Jutta Heckhausen
Heinz Heckhausen *Editors*

Motivation and Action

Third Edition

Springer

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For Christa Heckhausen

Preface

This is the third English edition of *Motivation and Action*, an extensively revised version of the second English edition and fifth German edition, with four entirely new chapters. All chapters have been updated to incorporate current research trends and findings, while new chapters on the motivation of developmental regulatory behavior as well as the applied fields of school and college, workplace, and sports were added. The chapters on the affiliation motive, the power motive, and goals were completely rewritten by new authors. Each chapter comes with an individual list of references, allowing instructors to use them separately for their courses. In addition, the Springer website for the book will provide useful materials for students and instructors alike, including a glossary with key terms.

The first English edition of *Motivation and Action*, based on the second German edition, was written by Heinz Heckhausen, who passed away on October 30, 1988. Springer and I agreed that a revised edition of this influential textbook on motivational psychology was needed. There have been many exciting and important conceptual and empirical innovations since the second English edition published in 2008, for example, in the research fields of volition and sequential phases of behavioral regulation, two perspectives that Heinz Heckhausen already discussed in the second edition (especially in Chaps. 6 "Volition" and 15 "Extended Perspectives"). Additionally, there have been important contributions to the study of the differences between and interaction of implicit versus explicit motives, as well as motivational and behavioral influences on development over the lifespan. It would be a Herculean task to provide a comprehensive overview of all these developments and to survey the field of motivation psychology in its full range and complexity. No single scientist could hope to follow in Heinz Heckhausen's footsteps and accomplish this task alone. A collaborative approach was clearly called for, and a look at the ranks of Heinz Heckhausen's students—and their students—shows that almost every subdomain of motivation psychology is represented by one or several renowned researchers. This new edition of *Motivation and Action* was only possible with the support of these scholars as authors. This book thus represents the intellectual legacy of Heinz Heckhausen in two respects. First, it shows how Heckhausen's approach to motivation psychology has been further developed and refined and that, while much has been retained, there have also been some important changes. Second, the book's chapters have been written by Heinz Heckhausen's intellectual heirs: by members of

his research groups in Bochum and Munich and their students and by myself, his daughter.

This new edition pursues the same goals as the earlier edition. It seeks to disentangle convoluted perspectives within the psychology of motivation. It seeks to integrate separate research strands by pointing to common issues and offering a unifying conceptual framework. It introduces and critically discusses new research findings that have proven particularly fruitful. As in the previous editions, the motivational categories examined are limited to classes of behavior that are characteristic of humans. The individual chapters build on one another, but each can also be read and understood independently.

There are four main parts to the book. The first five chapters provide a broad introduction to the field of motivation psychology, mapping out different perspectives and research traditions. The first chapter gives a brief overview of the main issues addressed and previews the book's contents. The second chapter on the historical development of motivation research remains unchanged from the original version written by Heinz Heckhausen for the first and updated for the second edition. Chapters 3 and 4 present two contrasting and one-sided perspectives, focusing exclusively on person factors versus situation factors. In Chap. 5, these perspectives are integrated through the introduction of models that take into account the expectancies and values of different persons in different situations.

The second group of chapters includes Chaps. 6, 7, and 8 on achievement, affiliation, and power motivation, which examine the major themes of human motivation. Further fundamental processes of motivation psychology are discussed in Chap. 9 on implicit and explicit motives, Chap. 10 on biopsychological foundations, and Chap. 11 on goals.

Following the chapters on the fundamentals of motivation psychology which lay the groundwork for discoveries regarding motivated and goal-oriented behavior, the third group of chapters, Chapters 12, 13, 14, 15, 16, and 17, considers the major components of action as well as its regulation and development. Chapters 12 and 13 discuss approaches to behavioral regulation and individual differences in these processes. Chapter 14 addresses intrinsic, activity-inherent incentives of behavior. Chapter 15 takes a close look at causal attributions in the context of behavior and its outcomes. Chapters 16 and 17 unite different approaches and strands of research by exploring the relationship of motivation and development from two perspectives: the development of motivation (Chap. 16) and the motivation of development (Chap. 17). The topics and research programs covered in this group of chapters (i.e., Chaps. 12, 13, 14, 15, 16, and 17) reflect the recent surge in research activity in international motivation psychology. Issues from current research provide fruitful topics of discussion for seminars and promising ideas for researchers and doctoral students.

The final group of chapters is the latest addition to this volume and elaborates the roles of motivation and volition in the three practical fields of school and college, workplace, and sports. In terms of authorship, Heinz Heckhausen is cited as coauthor of all chapters that contain parts of his original chapters, but they have been revised and expanded. This seemed the best way of reflecting Heinz Heckhausen's authorship without suggesting that he authorized the changes and additions himself.

The chapter authors and I have done our best to ensure the reader-friendliness that is now expected of academic texts and textbooks in particular. I think we have succeeded in making the highly complex domain of motivation psychology accessible to students and novices while ensuring that the text remains informative and stimulating for experts and researchers in the field. These efforts have been facilitated by special formatting elements: text boxes, summaries, definitions, and review questions give the reader practical tools for navigating the texts.

I am most thankful to the chapter authors for their readiness to participate in this project and for the outstanding chapters they have written and revised. I am greatly indebted to Angela Wirsig-Wolf, who edited the German edition and compiled the reference lists for the individual chapters as well as the complete reference list for this book. For the English edition, I would also like to thank Markus Russin, who masterfully translated the new chapters and revisions into English.

Irvine, CA, USA Jutta Heckhausen

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Jutta Heckhausen, PhD is a professor in the Department of Psychology and Social Behavior at the University of California, Irvine. Her areas of interest are lifespan developmental psychology, motivational psychology, control behavior, psychological influences on health, and developmental regulation across the lifespan. Her ongoing research addresses the role of the individual as an active agent in major life-course transitions and when confronted with challenging life events. Dr. Heckhausen has published articles in many behavioral and social science journals, including *Psychological Review*, *Developmental Psychology*, the *Journal of Personality and Social Psychology*, *Motivation Science*, *Health Psychology*, *Psychology and Aging*, *Journal of Research on Adolescence*, *The Journals of Gerontology: Psychological Sciences*, and the Journal of Vocational Behavior. She is author of the monograph *Developmental Regulation in Adulthood* and editor of several books including *Motivation and Self-Regulation Across the Life Span*, *Motivational Psychology of Human Development*, and *Motivation and Action.*

Motivation and Action: Introduction and Overview

1

Jutta Heckhausen and Heinz Heckhausen

Human life is composed of a continuous flow of activity. Besides the infinite variety of overt actions and expressions that impact the social and physical environment, it also has a more covert side in the mental activities of experiencing, perceiving, thinking, feeling, and imagining. These mental activities are part of the flow, although they cannot be observed directly by others and have no direct impact on the environment. The scope of human activity thus ranges from dreaming (Klinger, 1971) to preplanned, intentional acts. The psychology of motivation is specifically concerned with activities that reflect the pursuit of a particular goal and in this function form a meaningful unit of behavior. Motivational research seeks to explain these units of behavior in terms of their *whys* and *hows*.

Questions pertaining to the whys of human activity address its purposes from a variety of perspectives; for example:

- Can different units of behavior be assigned to one and the same class of goals and differentiated from other classes of goals?
- How do these classes of goals evolve in the course of an individual's development, and which individual differences exist in this regard?
- Why is it that specific situational conditions prompt people to choose certain goal-oriented activities over others and to pursue them with a certain amount of time and energy?

It is only recently that the focus of attention in academic psychology has returned to the hows of human activity; e.g., to how people, having decided on a course of action, actually come to execute (or abandon) it. Questions of this kind have always occupied laypeople – after all, we are all familiar with the difficulties of following through on our intentions in everyday life, for example:

- Why do we find it easy to implement some intentions, but keep losing track of others?
- Why is it that some people find it easier than others to act on their decisions and realize their goals?
- Do people become better at pursuing their adopted goals over the course of life?
- Which situational conditions facilitate or inhibit the resolute pursuit of goals?

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1.1 Universal Characteristics of Human Action

Two universal characteristics determine the basic structure and general directionality of motivated human action:

1. The striving for control
2. The organization of goal engagement and goal disengagement

These two characteristics of human action are so universal within and indeed far beyond our species that it is hard to imagine human behavior being any different (see the overview in J. Heckhausen, 2000; the first author is solely responsible for the arguments presented in this section). It would seem to be a given that human behavior is geared to effecting change in the environment, and how else might it be directed than either pursuing a goal or withdrawing from a goal? On closer consideration, however, it is clear that these characteristics are in fact an outcome of *behavioral evolution* and anything but a given. Moreover, the function they fulfill in guiding and organizing the organism's activities is highly adaptive. This is one of the reasons why biopsychological approaches to motivation that predominantly use animal models are so useful for investigating specific functions of the brain to explain motivational phenomena (see Chap. 10).

1.1.1 Control Striving

Control striving – i.e., the striving for direct or *primary control* of the physical and social environment – is part of the motivational makeup of our species (White, 1959). In fact, control striving is not unique to humans but is an outcome of behavioral evolution in all mammals and possibly all species that are mobile and thus in need of general mechanisms of behavioral regulation. Under changing environmental conditions, the organism can thus stay focused on the aimed for outcome as a guideline to modify its behavior (see the overview in J. Heckhausen, 2000; Schneider & Dittrich, 1990). Fixed stimulus-response patterns and instinctive behavior are not flexible enough to allow adaptive responses to environmental variation. Open behavioral programs (Mayr, 1974) or behavioral modules (Cosmides & Tooby, 1994; Fodor, 1983; Rozin, 1976), operating in conjunction with domain-general processes of behavioral regulation associated with emotional states and motivational orientations (Hamburg, 1963; Plutchik, 1980; Scherer, 1984), offer a more promising approach. In recent decades there has been a veritable explosion of research on cognitive modules such as risk perception and decision making (e.g., Gigerenzer, Todd, & ABC Research Group, 1999), social exchange (e.g., Cosmides & Tooby, 1992), and foraging (e.g., Krebs, 1980). However, comparative and evolutionary psychology has virtually ignored the motivational and volitional control of behavior. Yet there are both theoretical and empirical reasons for assuming that a set of basic motivational modules regulates control striving and control-related behavior (see also Chap. 15, Sect. 15.2):

1. In mammals and probably many other species, there seems to be a widespread *preference for behavior-event contingencies* over event-event contingencies: organisms are motivated to engage in behaviors that produce contingent effects (e.g., baby smiles, mother vocalizes).
2. *Exploration* is also a universal motivational system in mammals and engages the organism with the goal of extending its range of control over the external environment.
3. There is much evidence for an *asymmetric pattern of affective responses to positive and negative events* (Frijda, 1988): Organisms soon get used to the positive affect experienced after positive events, whereas the negative emotions elicited by negative events are much longer lasting. This motivates individuals to aspire to new goals rather than resting on their laurels after successes and prevents them from giving up too soon in the face of setbacks.

The first manifestations of control striving in human ontogenesis can be observed in neonates (Janos & Papoušek, 1977; Papoušek, 1967). Experiences of control are fostered in early

parent-child interactions, soon followed by a generalized expectancy of control (Watson, 1966) and – with the development of the self-concept in the second year of life (Geppert & Heckhausen, 1990) – by achievement striving, the goal of which is to demonstrate personal competence (for details, see Chap. 15):

- Human control striving is motivated by both an innate preference for behavior-event contingencies and specifically human anticipatory self-reinforcement, with its attractive and threatening aspects (Chap. 15, Sect. 15.4).

1.1.2 Goal Engagement and Goal Disengagement

Human action consists of organized behavior and experience. Perceptions, thoughts, emotions, skills, and activities are coordinated to facilitate either the attainment of goals or disengagement from unattainable or futile goals. During periods of *goal engagement*, individuals focus on what is important and ignore irrelevant stimuli. They put key procedures in place, attune their attention and perception to stimuli that trigger or cue behavior, and shield themselves from potential distractions. Expectations of control are optimistic. Research based on the Rubicon model of action phases has provided a wealth of empirical evidence for mental and behavioral resources being orchestrated in this way to facilitate goal pursuit (Chap. 11).

During periods of *goal disengagement*, by contrast, goals are deactivated. This does not imply a gradual decrease in goal engagement; on the contrary, goal disengagement is an active process whereby the processes typical of goal engagement are counteracted (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). It involves degrading the original goal and enhancing the value and attainability of alternative goals, defending self-esteem against experiences of failure, and, more generally, seeking to ensure that disengagement from a particular goal does not undermine motivational resources in the long term (J. Heckhausen, 1999; Heckhausen, Wrosch, & Schulz, 2010).

Goal engagement and goal disengagement can be seen as two motivational modes: *go* and *stop*. In adaptive behavior, at least, the two modes do not overlap, but discretely focus an organism's cognitive, behavioral, and motivational activities on the efficient investment of resources. After all, it is much more efficient to decide on a goal and pursue it resolutely than to dither between options, squandering resources without attaining the aspired goal. Should a goal prove to be unattainable or its costs too high, it makes sense to abandon that goal once and for all, without getting caught up in *postdecisional conflicts* or clinging halfheartedly to old habits, thus wasting mental, behavioral, and temporal resources that could be put to better use in the pursuit of new, attainable goals.

To date, the evolutionary precursors of this form of action regulation remain largely uncharted, but it seems reasonable to assume that animals also redirect their energies into more efficient pursuits wherever appropriate, as can be illustrated by the example of a predator pursuing its prey. Although it begins the chase at top speed, a predator that finds itself outrun will not slow down gradually, but will stop and turn away from its prey abruptly as soon as it becomes clear that its efforts are futile. In other words, it will save its energy for more worthwhile hunts (see also Chap. 17, Sect. 17.3.2 "Action Phases in the Pursuit of Developmental Goals"). Very little previous research on the evolution of behavior (e.g., French, Kamil, & Leger, 2001; Nesse, 2000, 2001) has addressed questions of motivational and volitional psychology. Cross-species studies remain scarce (cf. Bitterman, 1975), although this field of research would doubtless be highly productive, given that the regulation of goal-directed behavior by means of discrete go and stop modes can be assumed to be widespread in the animal kingdom as well (see also the overview in J. Heckhausen, 2000, and in Chap. 16). In contrast, much progress and innovation has been achieved in research on human motivational and volitional self-regulation in the past 20 years. Section 1.3 will provide a more in-depth discussion of these issues and provide guidance where to find them discussed in this book.

Summary
The two main, universal characteristics of motivated behavior are control striving and the organization of action into phases of goal engagement and goal disengagement.

1.2 Motivation as a Product of Person and Situation

Motivation psychology seeks to explain the direction, persistence, and intensity of goal-directed behavior. The many factors involved can first be classified as pertaining either to the person or to the situation. Throughout this volume, we will draw on the general model of motivation presented in Fig. 1.1 to show how the topics examined are accommodated within a general model and to illustrate how they relate to one another. The model integrates Heinz Heckhausen's (1977a, 1977b) extended cognitive model of motivation and Rheinberg's representation of the basic model of "classical" motivation psychology (Heckhausen & Rheinberg, 1980).

An individual's motivation to aspire to a certain goal is influenced by person factors and by situation factors, including the anticipated outcomes of actions and their consequences. In the following three sections, we will outline these influences and show where the relevant chapters of this book fit into the overall model of motivation.

1.2.1 Person Factors: Needs, Implicit and Explicit Motives

Motivational influences that reside within the person (Fig. 1.1, component 1) are crucial to both lay explanations and scientific theories of motivation. In a manner of speaking, they catch the eye at first glance. Three main kinds of person factors can be distinguished:

- Universal behavioral tendencies and needs
- Motive dispositions (implicit motives) that distinguish between individuals
- The goals (explicit motives) that individuals adopt and pursue

Definition
By universal behavioral tendencies and needs, we mean basic physical needs and the striving for control that underlies the various motives.

As part of the legacy of early research on motivation and learning, basic needs are covered primarily in the opening chapters of this volume. The focus here is on basic *physiological needs*, such as hunger and thirst, that are shared by all humans (Chap. 3, Sect. 3.3 and Chap. 5, Sects. 5.4.1–5.4.3, Chap. 10, Sect. 10.4) and that vary according to the situational degree of deprivation (Chap. 4, Sect. 4.2). The general and universal *striving for control* underlies more specific moti-

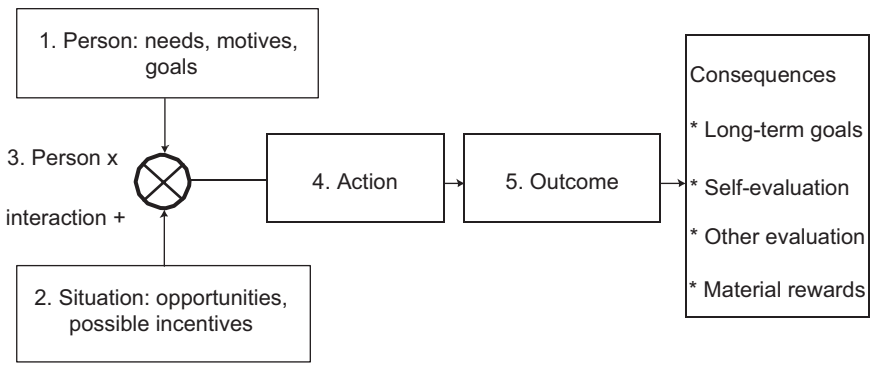

Fig. 1.1 The determinants and course of motivated action: general model

vational orientations (Sect. 1.1.1) and determines motivated action across the entire lifespan (Chap. 16 "Motivation and Development", Chap. 17 "The Motivation of Developmental Regulation").

Individual *motive dispositions* play a major role in both lay explanations of behavior and the scientific study of motivation (Chap. 3). They seem best able to explain why individual differences in behavior persist across time and situations (see also the excursus on "Kelley's Cube Model of Causal Inferences" below). Nothing would seem more natural than to attribute differences in behavior to individual dispositions: to the person's traits, "factors," habits, and motives, in short, to his or her "personality."

The evident heredity of certain characteristics reinforces the tendency to attribute interindividual differences in behavior to underlying dispositions. Besides physical characteristics, these include skills and abilities, behavioral styles, personality, and its development (Plomin, 2004; Plomin, DeFries, Craig, & McGuffin, 2003):

> Enduring individual motive dispositions, which have recently been labeled implicit motives as distinguished from explicit motives or goals (Chapter 9), are affectively charged preferences for certain kinds of incentives (habitual propensities) that are acquired in early childhood. (McClelland, Koestner, & Weinberger, 1989)

These incentives can be classified according to motivational themes: challenges to personal control in performance situations in the case of the achievement motive (Chap. 6), opportunities for social closeness and social bonding in the case of the affiliation motive (Chap. 7), and opportunities for social control in the case of the power motive (Chap. 8). In this volume, we focus on these "Big Three" motives of achievement, affiliation, and power. It is here that research is most advanced and where the main concepts of motivation psychology can best be demonstrated.

Definition
In contrast to implicit motives, explicit motives reflect the conscious, verbally represented (or representable) self-images, values, and goals that people attribute to themselves (Chap. 9).

In many cases, implicit and explicit motives do not match: people's conscious impressions of themselves and their motives are not necessarily congruent with their unconscious preferences and habits. In the best case scenario, implicit and explicit motives work together, and the specific goals that people set themselves in given situations (their explicit motives) coincide with their implicit motives. But this is by no means the rule. Implicit and explicit motives are frequently at odds, with detrimental consequences for efficiency, subjective well-being, and even mental health (Chap. 9).

Explicit action goals are the core of action control (Chap. 11 "Motivation and Development"). They provide directionality of behavior and a criterion for success and give the individual reason to muster the necessary motivational resources and to shield those resources against distractions. Goals can be more abstract or more concrete in nature and play a major role in the organization of motivated behavior both in individuals and in groups across many domains of life such as workplace (Chap. 19 "Motivation and Volition in the Workplace") and sports (Chap. 20 "Motivation and Volition in Sports").

1.2.2 Situation Factors: Intrinsic and Extrinsic Incentives

It soon becomes clear that purely person-centered, dispositional approaches to the explanation of motivated behavior overlook some important aspects. Above all, explanatory models based on enduring personality differences fail to account for the opportunities and constraints of the situation itself. Is the world really divided into thieves and nonthieves, or is it not opportunity that makes a thief?

There are various reasons for focusing on the situation, rather than the person, when seeking to explain behavior:

1. It is only when account is taken of the situation that within-person variations (i.e., intraindividual differences) in behavior can be properly identified.
2. A situation-based approach to behavioral motivation makes it possible to examine

common and otherwise unremarkable behaviors that have wide generalizability as caused by a specific situational context.
3. Situations can be controlled and varied systematically in experimental approaches.

Early situation-based approaches to the psychology of motivation focused on the organism's need states or drive strengths and on learning experiences; e.g., in experiments with hungry rats that had learned to tolerate an aversive stimulus to obtain food (Chap. 4). As research progressed, attention shifted to the cognitive implications of situational influences; e.g., in Lewin's conflict theory and Festinger's theory of cognitive dissonance. There has recently been a resurgence of interest in nonconscious situational influences; e.g., in how *priming stimuli* activate social stereotypes (Chap. 4).

An approach to situational influences on motivated behavior that is more closely related to Heinz Heckhausen's extended cognitive model of motivation focuses on anticipatory *incentives*.

Definition
Every positive or negative outcome that a situation can promise or signal to an individual is called an "incentive" and has "demand characteristics" for an appropriate action. Incentives may be associated with the action itself, its outcome, or various consequences of an action outcome.

As shown in Fig. 1.2 (see also Fig. 13.1 in Chap. 13), situations can differ in the levels and patterns of *situation-outcome expectancies* (7 in Fig. 1.2), *action-outcome expectancies* (8 in Fig. 1.2), and *outcome-consequence expectancies* (9 in Fig. 1.2). When situation-outcome expectancies are high (i.e., when it is assumed that the situation will automatically lead to the outcome, even without active intervention), there is little incentive to act. But when situation-outcome expectancies are low and action-outcome expectancies are high, the incentive to act is potentially high, particularly if outcome-consequence expectancies are also favorable.

Each component of a course of action has its specific incentives (Chap. 13). Some are *intrinsic*, meaning that they reside in the activity itself (4 in Fig. 1.2) or its outcome (5 in Fig. 1.2). Some are *extrinsic*, meaning that they derive from the consequences of actions and their outcomes – e.g., progress toward long-term goals, self-evaluation and evaluation by others, or material rewards (6 in Fig. 1.2). Research interest has long focused on the self-evaluative consequences of action outcomes, particularly in the field of achievement motivation, whereas incentives inherent in the activity itself have been neglected in the past. Recent years have seen a shift in focus, however, with research programs on the experience of flow, willingness to take risks, interests, shared experiences, and achievement-oriented activity incentives providing valuable insights (Chap. 14). Numerous related studies have been done in applied fields such as school (Chap. 18 "Motivation at School and University"), workplace (Chap. 19 "Motivation and Volition in the Workplace"), and sports (Chap. 20 "Motivation and Volition in Sports").

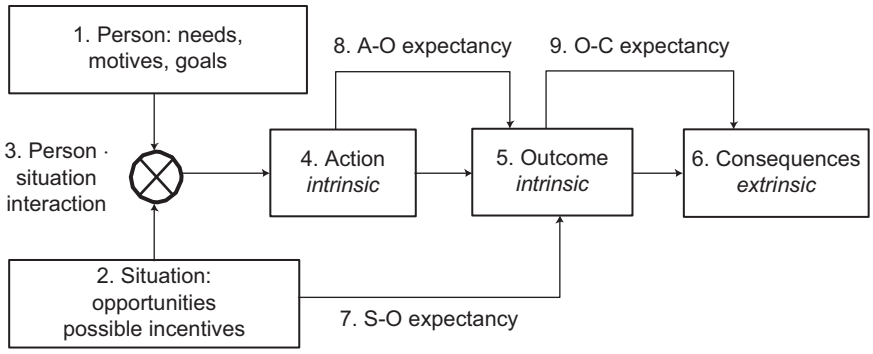

Fig. 1.2 Determinants of motivated action: general model with outcome- and consequence-related expectancies

Excursus

Kelley's Cube Model of Causal Inferences

The attribution cube model posited by social psychologist Harold Kelley (1967) describes how we as laypeople (and indeed as scientists) determine the extent to which a behavior is attributable to the person or to the environment. Kelley distinguishes three criterion dimensions for the explanation of behavior: consensus, distinctiveness, and consistency (Chap. 14).

1. *Consensus: comparison with the behavior of others (individual differences).* The less an individual's behavior corresponds with that of most other people in the same situation, the more it seems to be governed by individual factors. If, for example, a crowd of onlookers gathers around an accident victim and only one person kneels down to help, he or she is thought to be very "helpful." Conversely, the more an individual's behavior corresponds with that of most other people in the same situation, the less likely it is to be determined by person factors and the more likely it is to be driven by environmental factors. If, for example, a student regularly attends a compulsory class once a week, and his or her fellow students all do the same, we see no reason to attribute that behavior to a particular personality trait. Rather, it seems to be caused by the situation, specifically the obligatory nature of the class.
2. *Distinctiveness: comparison with behavior in other situations (intraindividual differences across situations).* The more consistent a person's behavior is across situations, the more likely it is to be attributed to individual person factors. If, for example, an employee is not only focused on his work at the office, but continues to talk about it during the company outing and turns every social get-together into a work meeting, he is thought to be highly "achievement motivated." Conversely, the less consistent a person's behavior is across situations, the more that behavior is deemed to be determined by situational factors. If, for example, a student cheats in an exam held in a large auditorium with insufficient invigilation, but not when playing cards with her friends, the assumption might be that she hopes not to be caught cheating in the exam, but considers the risk of being exposed as a cheat by her friends as too high.
3. *Consistency: comparison with earlier behavior (stability or intraindividual differences over time).* When someone's behavior remains consistent over time, it seems reasonable to attribute that behavior to individual person factors. If, for example, a boy who always did his very best to solve difficult problems at kindergarten is eager to learn to read at school, he is assumed to be highly and consistently "achievement motivated." Conversely, if an individual's behavior fluctuates over time, that behavior can reasonably be attributed to differences in situation factors. If, for example, a girl who always chose particularly difficult tasks at kindergarten and put a great deal of effort in solving them, turns out to be bored and distracted at school, it would seem that the tasks set by the teacher are "too easy."

1.2.3 The Interaction of Person and Situation: Subjective Patterns of Incentives

Which is the crucial factor, the person or the situation? Attempts to answer this question are futile for at least four reasons:

1. *It is impossible to isolate the two.* We can no more conceive of person factors abstract from a situation than we can of situation factors abstract

from a person. In other words, person always assumes "in a situation," and situation always assumes "for a particular person" (Bowers, 1973). In everyday life, individuals are characterized in terms of whether or not their behavioral repertoires are suited to certain situations (Cantor, Mischel, & Schwartz, 1982).

2. *Whether situation factors or person factors seem to have the strongest influence on behavior is determined largely by the sampling of variables from each of these domains.* Because it is not possible to define comparable units for each domain, it is difficult to determine whether samples of persons and situations are representative and therefore comparable. If, for example, a sampled group of individuals is very heterogeneous (e.g., in terms of age, mental health, etc.) and the variation in situations is less heterogeneous (e.g., achievement-related demand characteristics only), differences in behavior will obviously be more strongly associated with the person factors than with the situation factors. Conversely, if there is more situational variation than variation among persons, situation factors will necessarily dominate (Olweus, 1976).
3. *It is not the "situation" in an objective or intersubjective (i.e., consensual) sense that influences behavior, but the individual (subjective, "idiosyncratic") interpretation of it.* The situation is always something that is perceived, i.e., the product of an individual's thought, and is thus itself influenced by person factors. The incentives residing in activities, action outcomes, and their consequences are not set in stone; they take shape in the eye of the beholder. What one person sees as an exhilarating motorbike ride, another will see a reckless escapade on a speeding death trap. And what one person scorns as filthy lucre will prompt another to spare no effort at work. In other words, it is not the situation in the "objective" sense of intersubjective consensus among outside observers that prompts action, but the way the situation is perceived by the individual.
4. *The degree to which behavior is seen to be determined by the person or the situation depends on the observer's perspective.* We tend to view our own behavior as influenced primarily by the features of the perceived situation (Jones & Nisbett, 1971), but as observers of the behavior of others, we are more likely to attribute variations to their personal characteristics. The difference can be explained in terms of the salience of figure-ground articulations. When we observe the behavior of others, situational factors constitute the background against which their actions become salient. In self-observation, the reverse is true: situational features are perceived as figures against the background of our own course of action.

Expectancy-value theory permits the systematic integration of person and situation factors in models that yield predictions about behavior (Chap. 5). Although the expectancy of being able to attain a particular goal is largely dependent on situation factors, its value is very much "in the eye of the beholder" and thus conditional on the individual's implicit and explicit motivational state. People are most likely to perform an action when the product of expectancy and value is at its highest. In other words:

- The individual aspires to the goal with the highest possible incentive value, taking into account the probability of its attainment. Whether or not a situation acts as an incentive for a specific individual depends on whether or not it corresponds with that person's implicit and explicit motives.

Person and situation interact in these kinds of motivational processes. In addition to the incentive conditions of the situation (e.g., perceived opportunities to attain certain goals), the motives aroused play a decisive role, determining the incentive values of the anticipated outcomes. Depending on the individual motive orientation, situations that appear similar to outside observers may seem radically different to the individual involved. For example, tasks of intermediate difficulty are an irresistible incentive for individuals with a strong achievement motive (high hope for success, low fear of failure), whereas individuals high in fear of failure tend to avoid them (Chap. 6). In other words, whether or not achievement incentives are

equivalent in enticing behavior is entirely dependent on the individual's achievement motive. The same holds for the motives of affiliation and power (Chaps. 7 and 8).

Summary
A person's motivation to pursue a certain goal is determined by situational stimuli, personal preferences, and the interaction of the two. The resultant motivational tendency is a composite of the various incentives associated with the activity, its outcome, and its internal (self-evaluative) and external consequences, each weighted according to the personal motive profile.

1.3 Motivational and Volitional Regulation in the Course of Action

A resultant motivational tendency alone does not compel us to pursue the respective action goal. Before this can happen, the tendency resulting from the situational incentives and their personal evaluation must become an *intention*.

- Processes of intention formation determine which of the motivational tendencies that are present at any given time and that swell or subside depending on the specific situation and need state should gain access to action.

Without a superordinate instance to regulate the activation and deactivation of goal intentions, ordered sequences of behavior would be inconceivable. The strongest tendency to emerge at any given moment would be executed directly, causing the ongoing activity to be interrupted. It would be impossible to defer action until a suitable opportunity arises, to pursue a goal doggedly until it has been attained, to break intended actions down into consecutive steps, or indeed to delay gratification of the strongest resultant motivational tendency in favor of a weaker one for which the situation is relatively auspicious. Yet we know from experience that all this is possible and that individual behavior is not at the mercy of fluctuating motivational processes or constantly changing resultant tendencies.

Definition
Independent regulatory processes determine which motivational tendencies are implemented, at which opportunity, and in what manner. These processes are called "volition."

Motivation psychology long-neglected processes of volition (but see Lewin, Dembo, Festinger, & Sears, 1944), and focused almost exclusively on *motivation*, i.e., the setting or selection of goals. It was left to lay psychologists and the authors of self-help books to consider questions of goal realization or volition. In the early 1980s (Kuhl, 1983), however, the question of how goal implementation is regulated recaptured scientific interest (Halisch & Kuhl, 1986; Heckhausen, 1989; Heckhausen, Gollwitzer, & Weinert, 1987; Heckhausen & Kuhl, 1985), paving the way for modern *action-oriented volition research*, which constituted the framework for the development of the *Rubicon model of action phases* (Chap. 12; Heckhausen, 1989), research on the mechanisms underlying *action intentions* (Chap. 12; Gollwitzer, 1999), and a comprehensive *personality psychology model of action regulation and self-regulation* (Chap. 13; Kuhl, 2000a, 2000b).

The action-phase model, also known as the Rubicon model, serves as a useful framework model in research on volition, showing where the various functions of volitional processes come into effect within a sequence of behavior. Figure 1.3 shows the main action phases and their position in our overview model of motivation.

There are two important transitions as the individual moves from motivation to action:

- The first transition is *intention formation*, which marks the shift from the motivational phase of *deliberation* on motivational tendencies to the volitional phases of *planning* and *action*. It is at this point that the individual determines which motivational tendencies are allowed to pass the threshold, i.e., to acquire the status of an intention that governs behavior as and when appropriate.

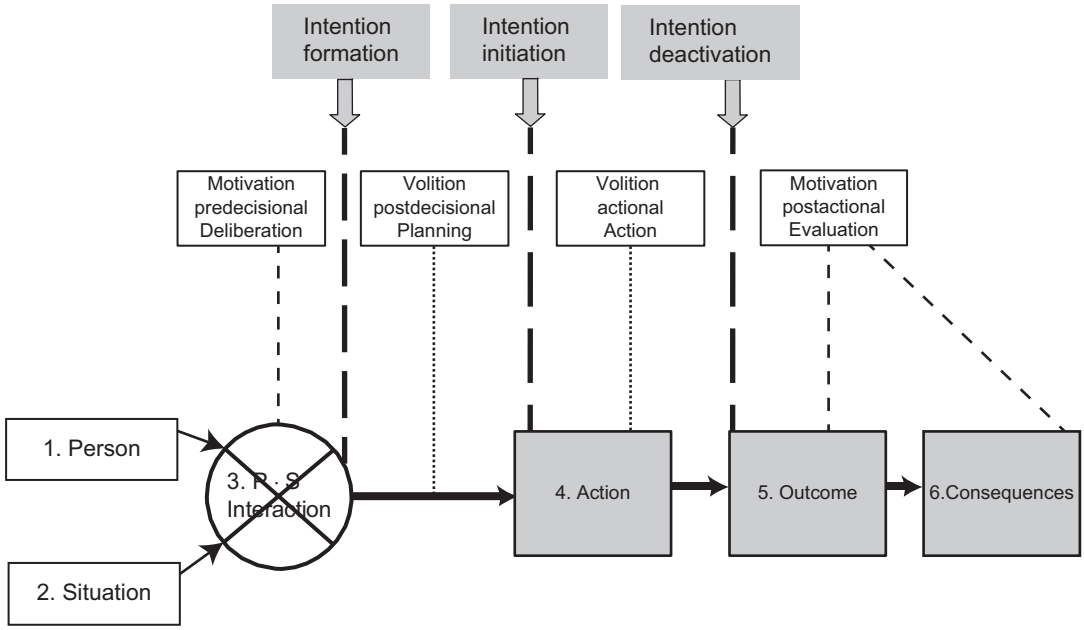

Fig. 1.3 Integration of the action-phase model and the general model

- The second transition is from intention formation to the *initiation of action*, i.e., from the volitional phase of planning and to that of acting. It is at this point that the individual determines which existing or newly formed intentions should gain access to action and be put into practice.
- Once an action has been completed or abandoned, the intention is deactivated. The *deactivation of an intention* marks a third shift: from a volitional to a motivational phase that involves *evaluation* of the action, reflection on its success, and if needed, on failure and *causal attributions* (Chap. 15 "Causal Attribution of Behavior and Achievement"):
  - What is decisive about all of these transitions between different phases of action is that they are ideally discrete shifts rather than gradual changes. Diverse facets of motivational orientation are coordinated and act in concert to facilitate the functioning of each action phase. These motivational facets include conscious and nonconscious processes of attention control and information processing; cognitive processes of interpretation, causal attribution, and prediction; and social cognitive processes of goal and self-evaluation. (Chap. 12 "Motivation and Volition in the Course of Action")

Three major modes of action regulation can be differentiated, each with a specific profile regarding the various facets of action regulation (see following summary box).

Phases of Action Regulation in the Rubicon Model

1. Goal selection in the predecisional phase before the Rubicon is crossed
2. Goal engagement (go mode) in the postdecisional phase and the action phase once the Rubicon has been crossed
3. Goal disengagement or intention deactivation (stop mode) in the postactional phase, subsequently leading into a new cycle of action

The predecisional and postactional phases are regarded as "motivational." Information processing during these phases should be open-minded and impartial, allowing the individual to draw balanced conclusions and make the best possible decisions. During the postdecisional and the actional phases, by contrast, a volitional orientation predominates, and information processing and evaluation are strongly biased in favor of the chosen alternative. These differences have not only been documented in laboratory studies but also have important implications in applied fields such as workplace (Chap. 19 "Motivation and Volition in the Workplace") and sports (Chap. 20 "Motivation and Volition in Sports").

Not everyone is equally skilled at deploying the many facets of volitional regulation of behavior to their best advantage. There are marked *interindividual differences* in the ability (or inability, sometimes pathological) to orchestrate volitional and motivational self-regulation (Chap. 13) and in how these person factors coincide with situational opportunities across the life course (Chap. 17; see also the construct of "motivational competence," Rheinberg, 2002; and Chap. 14, Sect. 14.7). These individual styles of self-regulation and action control may be the product of early experiences of affective self-regulation. However, much time and cost-intensive longitudinal studies are needed to identify the early origins of individual styles of self-regulation (Chap. 13, Sect. 13.6 and Chap. 16, Sect. 16.7).

Summary

Motivational and volitional regulation of action alternate across an action cycle, thus ensuring a form of information processing that is appropriate to the functioning of each phase of action. Ideally, the transitions between the action phases are discrete and efficient. There are considerable individual differences in the ability to regulate motivation and volition, but research on their developmental origins is still scarce.

1.4 Development of Motivation and Motivation of Development: The Dynamic Interaction of Person and Situation Across the Life Span

The relationship between motivation and development across the life span can be seen from two perspectives: on the one hand, as the *development of motivation* (Chap. 16), and, on the other hand, as the *motivation of development* (Chap. 17). In both cases, the regulation of human behavior is largely dependent on the individual capacity for *control* and its stability and change across the life course. The capacity to influence the environment (termed the potential for "primary control" in some conceptual contexts) undergoes radical change as an individual moves through the life course. Following the helplessness and dependence of infancy, the potential for control increases rapidly and universally in childhood and adolescence, plateaus out in adulthood, and declines gradually in old age. The motivational and volitional regulation of behavior must allow for these enormous changes in the potential for control across the life span.

The prerequisites for behavior directed at controlling external events are acquired in infancy and early childhood; e.g., generalized control expectancies, orientation toward an intended action goal, planning of steps to achieve that goal, and termination of behavior once it has been attained. The development of achievement-related emotions such as pride and shame imbues control-related behavior with a strong element of self-esteem and makes ambitious undertakings more attractive or (in the case of failure) more threatening. Evaluations of personal achievements and their anticipatory effects on achievement-motivated behavior are further elaborated when children become able to distinguish between task difficulty and their own competence and indeed between ability, effort, and the combination of the two in predicting and explaining success and failure.

Over the course of this universal developmental process, children see themselves as increasingly competent agents, yet they remain quite dependent on the guidance and support of adult caregivers. Although research in this area is still scarce, there is evidence to indicate that the behavior of these reference persons and their relations to the growing child lay the foundations for interindividual differences in implicit motivational and volitional orientations. Developmental trajectories reach a major crossroads when children start school, where social frames of reference predominate. These may either coincide or conflict with children's implicit motivational orientations and either promote or inhibit their motivation and development. To date, little is known about the development of interindividual differences. However, the past two decades of research have shown that the cognitive prerequisites of achievement-motivated self-evaluation only reveal a small section of the puzzle. Future research must consider the affective dynamics of parent-child dyads and early experiences of control in these contexts.

- Investigating the motivation of development broadens our outlook on the development of motivation, opening up a dynamic, interactive perspective on the interaction between motivation and development.

It is only recently that the part individuals play in actively shaping their own development has become a topic of investigation, particularly in life span developmental research (Chap. 17). The same questions might also have emerged from work on the development of motivation itself, which points to increasing levels of independence in the orchestration of action opportunities and developmental contexts. In adolescence and early adulthood, the individual might well have acquired sufficient potential for agency to play a decisive role in the selection of occupational and familial life paths. The question then arises, to what extent individuals remain "true" to these paths, and how much scope they have to shape them along the way. Recent research has shown that developmental goals can organize action cycles into phases of goal engagement and goal disengagement over the course of development, thus regulating the investment and withdrawal of resources (Heckhausen et al., 2010). Apart from their long-term nature, these cycles of action have much in common with more short-term actions and can also be examined within the framework of action-phase models. There is another important aspect, however. Individuals actively influence their environment over the course of development, thus creating their own developmental ecologies and opportunities for future action. Interindividual differences thus lead to increasingly divergent paths, for better or worse. A systems theoretical integration of person and situation across the life span can open up an integral perspective on this *dynamic interactionism*. The *dialectic interaction between person and environment* works not only in the here and now, but also across the spatial and temporal expanse and the effects of lifelong development.

Summary

Research on the development of motivation and research on the motivation of development complement and enrich each other. Many universal developmental achievements in the motivational and volitional regulation of control behavior occur in early childhood and are closely tied to the support and guidance provided by adult caregivers. The active influence that individuals have on their personal development represents a continuation of the striving for control in childhood and adolescence and gives the dialectic interaction between person and environment across the life span a truly dynamic quality.

Review Questions

1. *What kind of questions does motivation psychology address?*

   Motivation psychology addresses the "whys" and "hows" of activities that reflect the pursuit of a particular goal.

2. *What are the universal characteristics of human behavior and how are they defined?*

   Striving for control: seeking and establishing behavior-event contingencies or – to use the terminology of control theory – primary control of events in the material and social environment.

   Organizing action into phases of goal engagement and goal disengagement, perceptions, thoughts, emotions, skills, and activities are coordinated to facilitate either the attainment of goals (goal engagement) or disengagement from futile or unattainable goals.

3. *Which factors influence the resultant motivational tendency?*

   The resultant motivational tendency is influenced by personal preferences, situational incentives, and their mutual interaction. It is a composite of the various situational incentives residing in the activity, its outcome, and self- and other-evaluations, each weighted according to the personal motive profile.

4. *What is the difference between motivation and volition?*

   Motivation concerns processes of goal selection and goal setting. Volition concerns regulatory processes that determine which motivational tendencies are implemented, at which opportunity, and in what manner.

5. *How can the development of motivation be defined, in contrast to the motivation of development?*

   The development of motivation involves the development of a universal set of basic motivational modules and of individual differences in motivation. The motivation of development is the active influence that individuals have on their development across the life span.

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2 Historical Trends in Motivation Research

Heinz Heckhausen

2.1 Introduction

Attempts to explain human behavior date back to the dawn of time. Questions relating to motives, motivation, and volition have been addressed from various perspectives under different labels and have prompted a variety of explanatory models. What is common to all these attempts is that they seek to establish the reasons for actions; their individual differences; and for the activation, control, and persistence of goal-oriented behavior. It would go beyond the scope of this chapter to review the intricate and involved history of this endeavor (see Bolles, 1975, for such a review). What Hermann Ebbinghaus (1850–1909) supposedly said about psychology, namely, that it has a long past but a short history, applies equally to the study of motivation.

Once psychology became scientific, i.e., experimental, questions relating to motivation began to emerge in quite different contexts. Labels and definitions differed, reflecting the changing perspectives on the issues. The connotative content of concepts also changed with the biases and assumptions that dominated a particular era, however, increasing or decreasing their popularity. The nomenclature at the beginning of the last century is a case in point. At that time, the battle was between "motives" and "reasons" as directing the choice between alternative courses of behavior or as governing the emergence of a decision to do or not to do something. It was then that volition or "will" took effect to insure that an intention, once formed, would be followed up by the active pursuit of a goal. This applied particularly when resistance was to be overcome, be it in the form of countertendencies within the person or adverse environmental conditions. "Will" was often conceived as the guardian of moral norms and of duty, responsible for prevailing over "baser" tendencies such as "instinct," "drives," and "basic needs."

Just four or five decades later, completely new ideas and concepts had gained currency. Not only had the distinction between the morally good and reasonable on the one hand and the impassioned and impetuous on the other disappeared, but "will" had lost all credibility as a scientific concept. At the same time, "drives" and "needs" had lost their animalistic character and now applied to higher human striving as well.

Moreover, questions of motivation were now being addressed in many other psychological contexts going far beyond the explanation of actions and learning outcomes. "Motivation" was now seen to have explanatory value for apparently automated processes such as perception, imagination, and thought. This brought about the gradual development of the psychology of motivation as

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an independent field of research with its own concepts, methods, and theories.

At the beginning of the twentieth century, motivational questions were still essentially centered on volition (decision-making, choice behavior) and the volitional act (intentional behavior). "Motives" were merely seen as justifications for volitional decisions (Ach, 1910; James, 1890; Pfa¨nder, 1911). It was not until 1936, with the publication of P. T. Young's *Motivation and Behavior* that the word "motivation" was first used in a book title. Now it was no longer volition that controlled access to and execution of an action, but needs and tendencies that were assumed to determine behavior in accordance with their strength. Just 20 years later, the numbers of monographs, reviews, and handbooks on questions of motivation had swelled and continued to do so. With the annual *Nebraska Symposium on Motivation* (first published in 1953) at the forefront, handbooks include Koch (1959–1963) and Thomae (1965), and textbooks providing a more or less comprehensive coverage of the subject were published by Atkinson (1964), Atkinson and Birch (1978), Bolles (1967, 1975), Cofer and Appley (1964), Madsen (1959, 1974), Heckhausen (1980), Weiner (1972, 1980), McClelland (1985), and Winter (1996).

At present, the psychology of motivation is still far from being a coherent enterprise in terms of its issues, variables, methods, and theories. This makes it all the more important to trace the historical roots of contemporary research issues from their beginnings, more than a century ago. We start at the beginning of the last century, with a generation of pioneers who initiated many of the approaches that are still being pursued today. On this basis, we track individual strands of research, some with distinct but interconnecting branches, to the present state of the art.

2.2 The Generation of Pioneers

Traditionally, philosophy and theology have viewed humans as organisms endowed with reason and free will. This is what distinguishes us from animals, gives us dignity, and makes us responsible for our actions. This view of humankind leaves barely any scope for questions on the nature of human behavior. Humans are creatures of reason and therefore act rationally, in response to reasonable motives and legitimate values. Since humans are endowed with free will, it would be inappropriate and indeed pointless to explain their behavior in terms of external forces, be these within the environment or within the body. Admittedly, there may be some situations in which rational behavior and free-will decisions are encroached upon by "lower" motives or passions. Over the centuries, and with the development of scientific thought, this general idea of human behavior (of which our coverage here is very simplified) has been repeatedly called into question. Challenges have been raised by those who see human behavior as dependent on physical or physiological features of the organism, as well as by those who posit a hedonistic principle, i.e., behavior is driven by the organism's pursuit of pleasure and avoidance of displeasure. Yet the Cartesian distinction between humans and animals remained: animal behavior does not derive from reason or free will, but is driven by blind natural forces, i.e., instincts.

This dualistic view began to crumble with Darwin's book *The Origin of Species* (1859). According to Darwin (1809–1882), all differences in the physical characteristics and behaviors of organisms can be explained in terms of two principles:

- Random variation
- Natural selection of the fittest

Given that both of these principles were causally determined, it seemed reasonable to explain human behavior along deterministic lines as well, i.e., to attribute it purely to natural causes.

2.2.1 Roots in Evolutionary Theory

Aside from this breakthrough, which led to the long-held notion of ontological differences between humans and animals being replaced by a deterministic view of human motivation and behavior, the three assumptions outlined below played a major role in the development of research on motivation.

Instincts and Drives If there is no qualitative ontological difference between species of animals and humans, but rather a gradual progression, then explanations for animal behavior must have certain validity for human behavior as well.

This insight led to a search for the instincts and drives that motivate human behavior. For McDougall, instincts became the major explanatory concept. He published his first list of instincts in 1908, founding the *instinct theory approach* to the study of motivation, which is still reflected in ethology (Lorenz, Tinbergen) and contemporary sociobiology (Dawkins, 1976; Hamilton, 1964; Trivers, 1971). At the same time, Freud was attempting to elucidate apparently irrational phenomena such as the content of dreams (1900/1952a) and the behavior of neurotic patients (1915/1952c), which he attributed to hidden drives. In so doing, he became the founder of a major branch of the *personality theory* approach to motivation.

To the extent that humankind lost its special status in nature in the wake of evolutionary theory, it also lost its "free will." As a result, the concept of "will" fell out of favor in scientific circles, disappearing completely from the scientific parlance of most psychologists by the 1940s. Some, like Freud and McDougall, were quick to accept the deterministic view engendered by Darwinian theory. Others continued to adhere to philosophical traditions and phenomenological approaches and took another two or three decades to reach this point. This was the case in Germany, where there was a remarkable upswing in the psychology of the will after the turn of the last century.

Adaptation to Environmental Conditions Given that an organism's ability to adapt to a changing environment determines its fitness to survive and reproduce on the long term, human intelligence must be seen not as something unique but as something that has evolved over the millennia. Intelligence, i.e., the ability to learn from experience, must have a significant survival function, because it permits rapid adaptation to changed environmental conditions. This would mean that the species of animals still existing today must have rudimentary forms of intelligence.

This view was the basis for the development of comparative psychology in the 1880s, with its endeavors to identify and compare features of species-specific intelligence. Anecdotal observations and speculative comparisons gradually gave way to the systematic and experimental study of learning, pioneered by Thorndike (1874–1949). Thorndike conducted his first animal experiments in the basement of the home of his teacher, William James (Thorndike, 1898, 1911). James (1842–1910) was a remarkable mediator between the old and the new psychology. With his unequaled talent for introspection, he engaged in a phenomenological analysis of volitional acts, examining the role of consciousness. He retained the notion of free will, but held that humans were also endowed with a number of instincts. According to James, consciousness, which is uniquely human, evolved "for the sake of steering a nervous system grown too complex to regulate itself" (James, 1890, Vol. 1, p. 144).

James himself never experimented, but it was he who coined the term "habit," which was to become a central concept of associationist learning theories.

Definition
The term "habit" implies an automated behavioral sequence; James held that these behaviors had, at one time, been under conscious control.

Darwin had already seen instinct as a kind of intelligence-like adaptive mechanism and as a particular case of natural selection. In order to be able to apply his second principle, accidental variation, to instincts, he considered them to be collections of individual reflex units. Very gradual changes and advances in these collections of reflexes thus became plausible, true to the theory of evolution. This meant that instincts in animal and human behavior no longer had to be seen as global entities. Rather, they could be analyzed in terms of objectifiable stimulus-response associations. The reflex arc subsequently became the basic element of behavior and, around the turn of

the last century, the Russian physiologist Pavlov (English translation 1927) laid the foundations for another branch to the experimental study of learning beside Thorndike's. Both continue to influence the study of motivation.

Thorndike and Pavlov were founders of what has been called the *associationist approach* to motivation research. Both dealt with changes in stimulus-response associations. In Thorndike's work, earlier responses are replaced by more successful ones (instrumental or operant conditioning), whereas in Pavlov's approach, the stimuli that originally elicited a response are replaced by formerly neutral ones (classical conditioning).

- Thorndike founded the learning branch of the associationist approach to the study of motivation, while Pavlov founded its activation branch.

Natural Selection and Survival of the Fittest The physical and behavioral characteristics that Darwin hypothesized to represent an advantage for natural selection are not just generalized characteristics specific to the species existing today. Within a species, there must always be individuals that are somewhat better equipped than others for the "fight for survival" under the prevailing environmental conditions.

This conclusion sparked an interest in individual differences and their diagnostic assessment.

Galton (1822–1911), a cousin of Darwin, carried out a number of studies related to heredity and eugenics. Along with the French researcher Binet (1857–1911), who developed the first intelligence test in the early 1900s, Galton founded the psychology of testing, a movement that developed independent of mainstream psychology, particularly in the United States. It was not until the 1930s that the testing movement began to influence the personality theory approach to motivation through the works of Allport (1937), Murray (1938), and Cattell (1950).

Summary

Assumptions derived from and/or supported by the theory of evolution, transformed the old psychology of the human will into a psychology of motivation that accounts for individual differences and that, in a broad sense, also applies to animals. Yet they also facilitated that the psychology of will, which had enjoyed great popularity prior to World War I, was sidelined for several decades.

2.2.2 Roots in Psychological Thought

The pioneer generation also advanced a long-established tradition – that of philosophical and psychological speculations about human will. Not only was this tradition relatively immune to Darwinism; it reached its apex at the turn of the last century with the formulation of numerous theories. Along with sensations, ideas, and feelings, there were attempts to establish "volition" as a psychological experiential phenomenon and to determine the effects of "will."

Analysis of Volitional Processes in Consciousness The volitional act became a central theme for Wilhelm Wundt (1832–1920), the founder of experimental psychology. Wundt (1894) saw the volitional act as the organizing principle behind an individual's experience and actions, as a "psychological causality" to be distinguished from "physical causality," the laws of which were to be investigated by natural scientists.

The analysis of volitional processes through introspection and reaction-time studies led Wundt's contemporaries to espouse differing positions. Significant progress was made by members of the Würzburg school led by Oskar Külpe (1862–1915), a student of Wundt. Their analyses of thought processes failed to identify any conscious underlying processes. This led them to assume that there are unconscious attitudes and tendencies, generated by the task at hand, that control the cognitive processes without awareness, let alone voluntary control. Narziss Ach (1871–1946) interpreted this phenomenon in terms of a psychology of the will and, in 1905, coined the term "determining tendency" ("determinierende Tendenz").

- Narziss Ach and the Belgian researcher Albert Michotte (1881–1965), working independently, became the founders of an experimental psychology of the will. Regrettably, its popularity was short-lived, and it laid dormant for several decades before being revived more recently.

That completes the gallery of those who pioneered the study of motivation at the turn of the last century (for a similar overview, cf. Madsen, 1974). The five members of the pioneer generation are presented in Fig. 2.1:

- Ach, who initiated an experimental approach to the psychology of the will
- McDougall, who founded the instinct theory approach
- Freud, who created the conceptual foundation for personality theories
- Thorndike and Pavlov, the founders of the learning and the activation branch of the associationist approach.

These five approaches, only four of which have significantly influenced the study of motivation over the past 70 years, present a remarkably one-sided view of the subject. Comparison with the three major areas of motivational research – i.e., "motive," "motivation," and "volition" – shows that only "motivation" is covered in all five approaches. "Motives" are relevant only to the personality theory approach, and the "volition" aspect disappeared with the early demise of the experimental psychology of the will (though, to some extent, it resurfaced and survived elsewhere under different names and in different contexts, e.g., research on decision-making). Darwin's theory of evolution cast doubt on the notion of humankind having a special status in nature and heralded a new, deterministic view of human behavior, which could then be studied by scientific methods. This focused attention on characteristics humans share with other species that had previously been overlooked, namely, a dependence on the satisfaction of basic needs and the attendant necessity to learn, often under adverse conditions. These characteristics have since been the subject of much research, as will be shown below. Moreover, motivation research has again begun to consider human capacities for volitional action, i.e., the psychology of the will. It will, however, take some time to make up for past neglect.

In the following, we will trace the individual strands of research and approaches to the

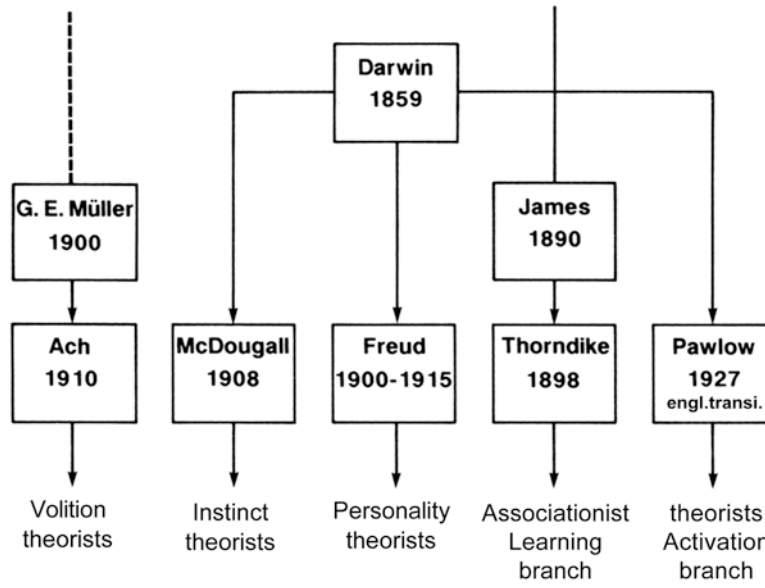

Fig. 2.1 Strands contributing to motivation research in the pioneer generation at the turn of the last century (Based on Madsen, 1974, p. 91)

study of motivation as they developed over the past century, highlighting the interconnections between them.

2.3 The Psychology of the Will

Since the works of Plato and Aristotle, it has been common practice to assume a triad of psychological functions, distinguishing between thinking, feeling, and willing or in terms of their respective capacities:

- Cognition
- Emotion
- Motivation

The functions are sometimes differentiated further – thinking, in particular, has been broken down into sensing, perceiving, and reasoning. Conversely, there have been repeated attempts to subsume willing – although it has always been acknowledged to be an undeniable and unique form of experience – to one of the other two members of the Platonic triad.

There have been few attempts to negate the existence of the will altogether. It was arguably the English empiricist David Hume (1711–1776) who went furthest along this path. Hume strived to avoid using metaphysical or a priori concepts to explain psychological functions, preferring instead to attribute all mental processes to impressions and ideas and to the associations that link them. The principles of causality and substance seemed to obviate self-awareness and volition as explanatory concepts – these were in fact products of our imagination deriving from experience and association.

2.3.1 Heterogenetic Perspectives

"Heterogenetic" theories of the will were less radical. They did not deny the phenomenal existence of will, but attributed it to manifestations and entities beyond volition itself. Depending on the assumed source of volitional experiences, affective, ideational, sensory, and intellectual theories of the will can be identified. However, those who conceptualized volition as an independent entity, not attributable to other manifestations, were proponents of an "autogenetic" theory of the will.

At the turn of the last century, most psychologists took a heterogenetic position. It is no longer easy to see things from their perspective, but the assumption was that the essential elements of psychological functioning could be studied by means of trained *introspection*. The descriptive identification of what were assumed to be essential classes of experience, capable of being observed introspectively and communicated to others, appeared to be at least as important as the experimental analysis of conditions that permitted inferences to be drawn about underlying but nonobservable processes.

- Heterogenetic theories of the will arose from the endeavor to determine the nature of volitional acts by means of introspection alone.

For many, this approach was attractive because it did not require laborious experimentation. Assumptions could be derived from mere armchair speculations. For example, Herrmann Ebbinghaus (1850–1909), the celebrated founder of the experimental psychology of memory, was also a proponent of a heterogenetic affective theory of the will (Ebbinghaus, 1902). Münsterberg (1863–1916) and Wundt's student Külpe (1862–1915) considered sensations to be the basis for volitional experiences. Münsterberg (1888) held that willing consisted of muscular sensations that preceded expected movements. Külpe (1893) conceptualized willing as a "keen organic sensation."

An intellectual theory – today it would be called a cognitive theory – was proposed by Ernst Meumann (1862–1915), another of Wundt's students, who posited that:

> Will is no more than a specific course of intellectual processes, converting our assent to a goal into action. They permit the purely internal psychological experiences to become externalized operators on the environment. (Meumann, 1st ed. 1908, 1913, p. 347)

Despite its antiquated terminology, Meumann's approach has much in common with modern notions. It has become increasingly popular to offer cognitive explanations for motivational phenomena and, since the "cognitive revolution" in psychology, efforts have been underway to derive dynamic processes of motivation and volition from the very associative network models that were originally postulated to explain the structure and application of knowledge (Anderson, 1983; Norman, 1980).

Meumann also identified two further points that were rediscovered by and are now emphasized by contemporary motivational psychology:

1. Different temporal aspects of the goal structures of actions: Awareness may focus on the immediate outcome of an action or on its subsequent consequences (the latter were long overlooked as motivational factors, cf. Heckhausen, 1977b; Vroom, 1964).
2. Actors' awareness of being the authors of their actions: The sense of responsibility became a cornerstone of attribution research (Weiner, Heckhausen, Meyer, & Cook, 1972).

To the grandmaster Wundt, however, volition was not a heterogenetic but an autogenetic phenomenon. For him, all of the processes involved in what is now known as information processing were driven by volitional acts. This applied to aspects of attention and apperception, in particular, but also to perceptions, thoughts, and memories (Wundt, 1874, 1896; cf. the more recent coverage in Mischel, 1970).

Summary

Wundt saw the volitional process as an independent synthesis of antecedent affects that were originally (i.e., in ontogenetic development) dissipated in pantomimic gestures. To this were added combinations of ideas and feelings that he called "motives." He labeled their ideational components "Beweggründe" (underlying reasons) and their affective components "Triebfeder" (driving forces). In other words, Wundt distinguished motivational from volitional processes; he attempted to infer the volitional process from its developmental origins.

2.3.2 Phenomenological Perspectives

While Wundt's volitional theory consists of highly abstract propositions, William James (1890) engaged in a phenomenological analysis of anecdotal material in an attempt to pinpoint the actual volitional act; i.e., the point at which a decision, a "fiat!", or an inner consensus terminates the "deliberative state" and from which point an action is determined by just one of the alternatives available. James was almost surprised to find that it is not always necessary for this point to be reached; sometimes the mental representation of an action is enough to trigger it.

The classic example of getting up on a cold winter's morning illustrates how this *ideomotor principle* seems to obviate the need for a volitional act.

William James gave an example of the ideomotor principle from everyday life:

Example

If I may generalize from my own experience, we more often than not get up without any struggle or decision at all. We suddenly find that we have got up. A fortunate lapse of consciousness occurs; we forget both the warmth and the cold; we fall into some revery concerned with the day's life, in the course of which the idea flashed across us, 'Hello! I must lie here no longer' – an idea which at that lucky instant awakens no contradictory or paralyzing suggestions, and consequently produces immediately its appropriate motor effects. (James, 1890, pp. 1132–1133)

As convincing as this example of the efficacy of the ideomotor principle may seem, it does not in fact concern a volitional act, but merely the point in time at which an unquestioned act (getting out of bed on a winter's day) is carried out. Nevertheless, the example points to the existence of something that may govern volitional processes, to a "metavolition," namely, triggering the execution of an intended action by activating a mental representation. James even presupposes

the existence of metamotivations when he postulates that the deliberative motivational process, i.e., the weighing up of two alternative courses of action, is controlled by two opposing tendencies:

1. The "impatience of the deliberative state"
2. The "dread of the irrevocable"

Beyond this, James identified five types of decisions that mark the point at which the motivational state ends and volition begins. He saw one type associated with the feeling of effort, when all avenues had been explored and considered and the balance was perceived as equal, but a decision had to be made. Because James, unlike his contemporaries in Germany, was not interested in determining the essence of volition, but rather in finding typical situations in which "will" could play a useful explanatory role, he explored all relevant areas of motivational research:

- Motivation
- Intention formation
- Volition

The study of volitional phenomena evidently remained purely descriptive for such a long time because it was difficult to imagine that manifestations of "higher" mental processes could be studied experimentally, in the same way as perception and memory.

2.3.3 Approaches to an Experimental Psychology of Volition

The late nineteenth and early twentieth century saw three separate approaches to the experimental study of volition. The first two concerned the conceptualization of two different courses of action within a theory of volition. One involved simple reaction-time experiments (Külpe, 1893; Lange, 1888); the second addressed processes of association when a specific task was imposed (Ach, 1905, 1910; Müller & Pilzecker, 1900). The third approach involved the experimental induction of a volitional act, with participants having to choose between two possible implementations of an intention (Michotte & Prüm, 1910).

Reaction-Time Experiments Although not intended to address volition as such, many early endeavors in experimental psychology in the areas of perception, imagination, learning, and thought had a volitional character in terms of the task-centered activities of the respondent. Boring, in his *History of Experimental Psychology* (1929), lists 12 explanatory concepts developed by the psychologists of the era to account for the volitional nature of experimental tasks. These include:

- Attention
- Expectation
- Preparation
- Predisposition
- "Einstellung" (set)
- "Aufgabe" (instruction)
- Predetermined, determining tendency (along with G. E. Müller's associative and perseverative tendencies)

In the last three decades of the nineteenth century, reaction-time experiments were very much en vogue. They were prompted by the discovery of the "personal equation," i.e., individual differences in the timing of stellar transit across the reticle of a telescope. These differences between observers had raised concerns among astronomers, generated much research, and led to the development of new observational methods. It emerged that the original eye-and-ear method (ear to hear the ticking of a clock) involved a "complication," i.e., a mental confounding of the two sensory systems. With this in mind, Donders (1862), a physiologist from the Netherlands, returned to the study of simple reactions and complicated these by the successive addition of other mental processes, e.g., by giving two stimuli, each of which required a different response. The lengthened reaction time observed in the two-stimulus condition relative to the single-stimulus condition was attributed to the additional mental process involved – in this case,

choice. This "subtractive" procedure led to large-scale studies of "mental chronometry" in Wundt's laboratory. Notably, these procedures have regained currency in contemporary cognitive psychology, where they are used for the analysis of information processing.

In 1888, Ludwig Lange, one of Wundt's students, ran the first experiment in volitional psychology, though without being aware of the fact. His respondents were instructed to attend either to a stimulus or to its motor response. It emerged that reaction times are shorter when attention is focused on the motor response than when it is directed to the stimulus. Wundt speculated that this difference between "muscular" and "sensory" response time arose because in the latter case the stimulus is not just perceived, but also apperceived (interpreted). The temporal difference in favor of the muscular reaction was thought to reflect the duration of the apperception process, namely, about 0.1 s. *Mental chronometry* based on Donders' "subtractive procedures" sparked some controversy, however. Külpe (1893) joined in the fray shortly before moving to Würzburg. He aimed to demonstrate that each task imposed results in a corresponding predisposition that determines the focus of the respondent's attention in Lange's experiment, thereby initiating a different process. According to Külpe, the resultant process is an integrated one that is not analyzable in terms of isolated components that can simply be added or subtracted.

- Külpe's explanation was thus in line with volitional theory, suggesting that a goal, once accepted by the respondent, governs task-related activities even in those areas that are not, or not directly, under volitional control.

The Würzburg School A similar conceptualization was apparent in the primary research endeavor of the Würzburg school, namely, the introspective analysis of thought processes. Here it was not only discovered that much of the thought process is beyond our conscious experience but also that the process must run an orderly course as the solution to the task set manifests itself directly (see the excursus below).

Excursus

Experimental Approaches to Thought Processes

Watt (1905), a member of the Würzburg school, made a remarkable discovery. His respondents were asked to form associations between nouns (e.g., "bird") and superordinates (e.g., "animal") or subordinates (e.g., "sparrow"). The subsequent introspection was then divided or "fractionated" into four time periods. Oddly enough, it was the third period, the search for the reaction word, that yielded least content, i.e., the least awareness. Watt concluded that the actual intent of an activity remains in awareness only so long as the respondent is taking the experimental instructions on board. After that, the impact of an intention on the cognitive process is unconscious and automatic. In his interpretation of the ideational process in association experiments, Georg Elias Müller (1850–1934) had already postulated a "perseverating tendency" in addition to purely associative tendencies. The adoption of a task results in a corresponding "Einstellung" (set).

Narziss Ach (1905, 1910), who began his research career in 1900 with G. E. Müller in G¨ottingen and moved to Würzburg in 1904, coined the term "determining tendency," which was also adopted by Watt and other investigators of thought processes, e.g., Otto Selz (1913). It incorporated the concept of "perseverating tendency" introduced by Ach's teacher G. E. Müller. Using reaction-time measures and "systematic experimental introspection" (subtly directed retrospection), Ach (1905) showed that determining tendencies below the level of conscious awareness must be at work in the implementation of an intended goal and that this holds for both mental and motor tasks.

Ach's (1910) attempt to measure volitional strength also proved to be of great significance. In his ingenious experiment,

(continued)

the associative strength of pairs of syllables, which was varied by manipulating the frequency of presentation, was rivaled by a new instruction for a contrasting task (a different combination of syllables). This meant that a volitional tendency (to carry out the new instruction) competed with an established habit. A triumph of the determining tendency to execute the new task would mean that "associative equivalence" had been reached. In other words, the volitional strength would outweigh the previously established associative strength. The reaction times in this rivalry condition were longer, and there were occasional response errors. In some cases, these errors induced respondents to renew their intention to carry out the task imposed. Ach analyzed this post hoc renewal of the intention and proposed that the "primary volitional act" comprises four elements including a self-reference; e.g., "I really want to do it!"

Selz (1910) was quick to note that Ach had not investigated the original volitional act, but a post hoc renewal of the intention in the face of unsuccessful attempts at its implementation. Nevertheless, the characteristics identified by Ach do seem to provide insight into the components of an intention or determining tendency that direct action. Ach also discovered some volitional metaprocesses (to use modern terminology) using this method of introspection.

Narziss Ach was concerned only with volitional processes and paid no heed to motivational issues. There is no doubt that he pioneered the experimental study of volition. Unfortunately, however, this research program withered even within his lifetime. A major contributor to its demise was Kurt Lewin (1890–1947), a young member of the Gestalt school at Berlin, which was founded by Wolfgang Köhler (1887–1967) and Max Wertheimer (1880–1943). In his dissertation, Lewin replicated Ach's attempt at measuring volitional strength, but changed the procedure slightly to show that the mere associative coupling of pairs of syllables as a function of repeated presentation does not give rise to a reproduction tendency unless there is an independent determining tendency to reproduce.

The dispute between Ach and Lewin, which was continued in the works of some of Ach's students, is extremely complex, soon lost its relevance to research, and remains unresolved to this day. A decisive factor in all of this was Lewin's (1926) influential paper on "Intent, Volition, and Need," in which he expanded productively on several aspects of Ach's volitional act, such as the mental representation of an opportunity for action and the steps in its implementation. For Lewin, however, the psychological character of an intention consists in a "quasi need" that derives from "genuine needs." With this, the defined goals of individual intentions became variably objectifiable and generalizable motivational goals (Heckhausen, 1987), and questions of volition became questions of motivation. Of course, these were already dominating the other approaches in motivational research.

That did not keep Lewin and his students from developing a number of experimental paradigms for a psychology of action and emotion. These paradigms were more suited to the study of volitional questions than to motivational issues, and their utility in this respect has by no means been exhausted. They include:

- The retention and resumption of interrupted tasks (Ovsiankina, 1928; Zeigarnik, 1927)
- The discharge value of completing a substitute activity (Lissner, 1933; Mahler, 1933)
- The forgetting of intentions (Birenbaum, 1930)

The Leuven School This final approach to the experimental investigation of volition was founded by a Belgian, Albert Michotte. In 1905, and again in 1906, Michotte spent a semester with Wundt in Leipzig. In the 2 years following the 1906 meeting of the German Psychological Society in Würzburg, he spent several months at Külpe's institute, where he was introduced to

Ach's work and indeed to the whole of contemporary German thought, which came as a "revelation" to him (Michotte, 1954). In 1908, Michotte and E. Prüm had concluded a lengthy experimental study on volitional choices ("choix volontaire"), the results of which were not published until 1910 because they first had to be translated from German (Prüm's mother tongue) into French. This meant that the Michotte and Prüm monograph appeared – coincidentally and entirely independently – in the same year (1910) as Ach's analysis of the volitional act. In contrast to Ach's post hoc analysis, the Belgian studies succeeded in analyzing the volitional act while it was happening. Admittedly, the actual intention – to follow the experimenter's instructions – had again been formed much earlier. However, there was still a choice to be made between two possible means of implementing each task, as quickly as possible and based on "serious motives."

Once the decision was made, and without waiting for its implementation, there was detailed introspection on the 4–5 s in which the choice had been made. The authors found a certain regularity in the sequence of processes:

- A motivation to weigh up the alternatives
- An inhibition or pause prior to the decision
- A resolution of the expectancy and muscle tensions once the decision had replaced doubt by certainty and, above all, by a conscious awareness of the action planned

The authors viewed the latter as the defining characteristic of a volitional act.

Unfortunately, Michotte did not continue his studies on volition (see his overview of 1912); his later research focused on the study of *phenomenal causality*. The tradition of Michotte's and Ach's volitional psychology was continued in England by F. Aveling (1875–1941), who began his research career at Michotte's laboratory. Evidently the only scholar to work in the field of volition outside continental Europe, Aveling (1926) continued the introspective analysis of volitional acts. For him, a crucial feature was in the identification of the self with the motives for the preferred action alternative. For the most part, his work substantiated the findings of Ach and Michotte.

In the USA, volitional issues surfaced only periodically after their phenomenological heyday in the writings of William James. Even then, they emerged in behavioristic contexts in works such as Irwin's (1971) *Intentional Behavior and Motivation – A Cognitive Theory*. Here, Irwin gives a stringent explanation of how an observer, with knowledge about a situation, an act, and its outcome, is able to predict the choice of an act and hence to infer the intention of the actor. In an essay entitled "From Acts to Dispositions," Jones and Davis (1965) proceeded in an analogous manner, analyzing the mental logic used by an observer of specific acts to infer not intentions, but personality dispositions, i.e., to attribute motives to the actor (Chap. 14).

In Germany, Johannes Lindworsky (1875–1939) collated the findings of volitional research (1923, 3rd ed.). Based on his own observations and on a reanalysis of Ach's findings, he, like Selz (1910), doubted that the intensity of a volitional act could enhance the implementation of an intention. Instead, he suggested that what is crucial is keeping the imposed task in mind while it is being executed and not "squeezing out" a forced intention (Lindworsky, 1923, p. 94).

Three other students of Ach deserved to be mentioned here: Hillgruber, Düker, and Mierke. Hillgruber (1912) discovered what he called the "difficulty principle of motivation," which relates to the implementation of volition during the execution of a task. He found that increasing the difficulty level of a task (in terms of the speed of presentation of syllables to be reversed) increased the number of correct responses. Hillgruber attributed these findings to greater volitional tension. Düker (1931, 1975) reported similar findings, which he held to reflect a "reactive increase in tension."

Locke's more recent goal-seeking theory (1968; Locke & Latham, 1990) also relates to these volitional issues. According to this theory, it is only an apparent paradox that higher goal setting leads to improved performance. Finally,

in 1955, Mierke published a book with the term "will" in the title *Wille und Leistung* or *Will and Performance*.

That was to be the last usage of the term for some time to come. Times have changed once more, however (Chaps. 11 and 12), and the terms "will" and "volition" are now acceptable again. Kuhl (1983) found individual differences in the ability to protect an intention that is being implemented against competing intentions or against a subsequent preoccupation with an unsuccessful outcome. He subsumed the processes involved under the term "action control." This signaled a return of the "determining tendency," if not of the volitional act itself, to psychological research. The Würzburg school's work on volition has also made a comeback. It covers aspects such as:

- The "volitional act"
- The formation of an intention
- The transition from the motivational to the volitional phase
- The initiation of the intended action

2.4 The Instinct Theory Approach

William James adopted the term instinct as an explanatory concept, but limited it to a particular class of behaviors, which he differentiated from behaviors such as emotion, habit formation, and volitional acts. He defined instinct as follows:

Definition
the faculty of acting in such a way as to produce certain ends, without foresight of the ends, and without previous education in the performance. (James, 1890, Vol. II. p. 383)

He emphasized the stimulus conditions, which, owing to built-in neural structures within the organism, trigger an automated behavioral sequence that is not learned or based on a goal expectation. This compulsive, automatic response to particular situational conditions is vividly described in James's famous description of a broody hen:

> To the broody hen the notion would probably seem monstrous that there should be a creature in the world to whom a nestful of eggs was not the utterly fascinating and precious and never-to-be-too-much-sat-upon object which it is to her. (James, 1890, Vol. II, p. 387)

In contrast to James, Wundt's view of instinct remained largely unaffected by Darwin. Wundt (1896) closely linked instinct with drive and drive with goal-directed behavior. For him, instinctive behaviors derived from previously volitional behaviors that had, at some point, become mechanized.

2.4.1 The Pioneer of Instinct Theory

It was, however, the Anglo-American William McDougall (1871–1938) who pioneered the instinct theory approach within the study of motivation. At the start of his career, he was influenced by European psychology, with its introspective analyses of volitional phenomena, as well as by the Darwinian revolution, with its focus on the heredity of behavioral characteristics. His assessment of the relative merits of each approach laid the foundations for Anglo-American motivation research in the twentieth century. In his influential work, *Introduction to Social Psychology* (1908), which, despite its title, addressed the psychology of motivation, and of which there were more than 30 editions, he argued against the European volitional perspective and in favor of an approach based on instinct theory. This cleared the path for the study of motivation and blocked off the volitional route. In the introduction to his 1908 book he wrote:

> I will merely sum up on the issue of the work of the nineteenth century as follows: – During the last century most of the workers in the social sciences were in two parties – those on the one hand who with the utilitarians reduced all motives to the search for pleasure and the avoidance of pain, and those on the other hand who, recoiling from the hedonistic doctrine, sought the mainspring of conduct in some vaguely conceived intuitive faculty, instinct, or sense. Before the close of the century

> the doctrines of both of these parties were generally seen to be fallacious; but no satisfactory substitute for them was generally accepted, and by the majority of psychologists nothing better was offered to fill the gap than a mere word, "the will," or some such phrase as "the tendency of ideas of self realization." On the other hand, Darwin, in the *Descent of Man* (1871) first enunciated the true doctrine of human motives, and showed how we must proceed, relying chiefly upon the comparative and natural history method, if we would arrive at a fuller understanding of them. (McDougall, 1908, p. 14)

McDougall did not completely ignore volition, however. In fact, he devoted an entire chapter to it. He maintained that humans are not mere victims of hedonism, as Darwinian theory dictates, but that they experience conflicts of motives. In his debates with Wundt and James, McDougall rejected the notion of the inhibition of one of two competing motives as the principle underlying volitional decision-making. Instead, he proposed that one of the motives is strengthened or reinforced by an impulse deriving from the motive system or the "system of self-regarding sentiment." Applied to the problem of decision-making, he defined volition as follows.

Definition

as the supporting or re-enforcing of a desire or connotation by the cooperation of an impulse excited within the system of the self-regarding sentiment. (McDougall, 1908, p. 249)

In attributing decision-making to a self-regarding motive, McDougall's perspective was consistent with one of the central notions of the volitional psychology of Ach and Michotte, namely, the ego- or self-involvement of the process. This was and remained the only point of contact between the two approaches, however. The manifold psychologies of the "self" that have since developed and come to play an important role tend to be seen in terms of motivational and not volitional processes.

McDougall remained fundamentally dissatisfied with the era's introspective studies of consciousness. He wanted to investigate what people actually do, based on sound phylogenetic principles that for him were the instincts, which he defined as follows.

Definition

An inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner or, at least, to experience an impulse to such action. (McDougall, 1908, p. 25)

To break down this rather complex explanatory construct:

- Instincts are innate.
- They have an energizing and piloting function.
- They consist of an ordered sequence of predispositional processes of perceptual processing (cognitive).
- Emotional arousal (affective).
- A readiness to act (conative).

McDougall began by compiling a list of 12 instincts, which he later expanded (see also Chap. 3). He no longer called them "instincts," but "propensities," the defining components of which were less fixed. He thus avoided giving the impression that they are simply highly stereotypical sequences of behavior. What remained was essentially a goal-directed behavioral tendency.

Definition

A propensity is a disposition, a functional unit of the mind's total organization, and it is one which, when it is excited, generates an active tendency, a striving, an impulse or drive towards some goal. (McDougall, 1932, p. 118)

The Instinct Controversy This work had been preceded by the so-called instinct controversy of the 1920s, one of the few great public

controversies in psychology. McDougall's main opponent was J. B. Watson who, as early as 1913, proposed that psychological research should be restricted to phenomena that are objectively observable and can be intersubjectively validated. McDougall's instinct theory had led many psychologists to explain all kinds of behavior in terms of particular instincts. In 1924, Bernard searched the literature for hypothesized "instincts" and found no less than 14,046! It goes without saying that this expansion of the concept turned it into a circuitous construct with very little explanatory value. McDougall had resisted such expansions – his final list encompassed no more than 18 "propensities" (1932). After a few years, the public lost interest in the instinct controversy, without any clear verdict having been reached (cf. Krantz & Allan, 1967).

Summary
McDougall strongly influenced two other important approaches to the study of motivation:

- First, the strand of research based on personality theories. His lists of instincts or propensities played a key role in endowing personality with motive-like dispositional variables. This was especially apparent in the trait theories of Allport (1937), Philipp Lersch (1938) in Germany, and in H. A. Murray's (1938) formulations, which significantly influenced the development of an approach in motivational research based on personality theory.
- Second, McDougall's work was the direct precursor of a strand of research that focused on the analysis of instinctive behavior and eventually evolved into the study of comparative behavior or ethology.

2.4.2 Forerunners of Ethology

The credit for instigating the study of comparative behavior goes to Konrad Lorenz (1937, 1943), who criticized McDougall's instinct theory for its vague definitions, and instead defined instinctive behavior as limited to a hereditary response sequence, i.e., to the invariant links in a chain of goal-directed behaviors that culminate in a terminal response. This final link, which manifests the actual instinctive behavior, is driven solely by the central nervous system. Triggered by an *innate releaser mechanism*, it is not flexible or modifiable in any way. The antecedent links are still oriented toward the situational context. The earlier they occur in the chain, the more likely they are to be modifiable through learning. This applies particularly to the preliminary phase of "general activation."

Example
Certain instinctive behaviors (such as the following response in ducklings and goslings) can become imprinted to arbitrary objects if the organism is exposed to these during a short critical period early in its ontogenetic development.

Intensive research efforts were focused on identifying the key stimuli that elicit a certain instinctive behaviorin a given species. If these key stimuli are absent over a long period of time, the instinctive behavior may begin without external releasers, in what is known as "idling behavior."

The example of a duckling's following response illustrates two aspects of instinctive behavior:

- First, that it is highly stereotyped and not dependent on experience
- Second, that the releaser mechanisms involve internal processes that are subject to critical periods of readiness

The latter observation led Lorenz (1950) to postulate a kind of "psychohydraulic" model of motivation that resembled Freud's (1895) early conceptualizations. Lorenz assumed that each instinct is powered by an action-specific energy, which is regenerated on an ongoing basis and stored in a reservoir. If the instinctive behavior has not occurred for some time, the reservoir overflows, i.e., the behavior is produced in the absence of the external stimuli (idling behavior).

Nikolaas Tinbergen (like Lorenz, winner of the 1973 Nobel Prize for Medicine), who system-

Definition

I will tentatively define an instinct as an hierarchically organized nervous mechanism which is susceptible to certain priming, releasing and directing impulses of internal as well as of external origin, and which responds to these impulses by coordinated movements that contribute to the maintenance of the individual and the species. (Tinbergen, 1951, p. 112)

atically extended Lorenz's approach, defined instinct in the following terms.

In this definition, a "nervous mechanism" is contrasted with an "impulse" that functions to activate the instinct, i.e., to motivate the behavior.

Although contemporary ethology is beyond the scope of the psychology of motivation, it has again gained increasing attention among motivation researchers, owing to two factors in particular:

1. Its criticism of learning theorists' laboratory experiments, in which animals are placed in artificial environments, rather than in natural ecological ones
2. Its attempts to apply various ethological findings to human behavior (Eibl-Eibesfeldt, 1973, 1984)

Lorenz's (1966) attempt to apply an instinct-theoretical conceptualization of aggression to humans encountered most criticism from motivation psychologists. Based on his psychohydraulic model of instinct energy, Lorenz postulated that a kind of aggressive energy is constantly being produced within an organism. This energy can build up to dangerous levels unless given occasional opportunities to dissipate in the form of harmless substitute activities.

A more detailed description of instinct theories in ethology can be found in Cofer and Appley (1964), Eibl-Eibesfeldt (1975), Hess (1962), and Hinde (1974). Boyce (1976) presents a critical assessment of Darwin's influence on ethological research under natural conditions and of laboratory research on animals.

Contemporary ethology attempts to explain the relationships between observed situational and behavioral variables by means of neurophysiological constructs or models – in part, with theoretically neutral characteristics in terms of systems theory.

2.5 Personality Oriented Approach

This tradition of motivation research addresses the issues solely from the perspective of human psychology. Motivation tends to be seen either as a key domain within which to describe and gain a deeper understanding of personality as such or as a source for explaining differences between individuals. Yet it can also be seen as a process that can explain actual behavior in terms of individual differences. This is the approach characteristic of motivational psychology as well as cognitive psychology.

The Father of Psychoanalysis Freud (1856–1939) has already been identified as the pioneer of this approach. He was concerned with explaining apparently unfathomable behaviors by means of clinical observation and procedures designed to elicit and interpret unusual thought processes. Freud was convinced that hidden, unconscious processes guide behavior and influence conscious thought. He considered psychodynamic conflicts to be reflected in unconscious drives and assumed the fragmentary and indirect manifestation of these drives in behavior and conscious experience to be the key to understanding behavior (see the excursus on p. 21).

Freud was committed to Darwin's biological-empirical determinism which he saw confirmed by the success of medical science at the time. He rejected the popular notion that mental processes could be investigated by the introspective analysis of mental content. For him the task was to identify in humans the vital biological drive dynamics that underlie manifest behaviors in all organisms. These he saw as the actual psychological processes operating in a continuous cause-and-effect relationship that, to him, was the unconscious. Examination of the stream of

consciousness reveals that unconscious processes are not the exception to the rule, but that the reverse is true. Conscious mental contents are fragmentary derivatives of the continuous activity of the unconscious. For Freud, all this was the result not of passive reactions to external impressions, but of an active orienting within the organism, its forces and conflicts. If he was influenced by any contemporary school of psychology, it was that of Brentano, whose lectures he had attended in Vienna and who, in contrast to Wundt, saw mental "acts" as characterized by directed intentionality. Incidentally, this was also a position increasingly espoused by the Würzburg school, resulting in controversy between that group and Wundt.

Excursus

Freud applied his analysis of hysteria and other neuroses in many ways, not only to identify the effects of unconscious processes but also to tap into them directly, to "bring them into consciousness." At first he used hypnosis, later the interpretation of dreams (1900/1952) and free association. Most of all, however, he engaged in ingenious means-end speculations. Like the behavioral psychologists, Freund attempted to identify relationships between antecedent conditions and subsequent manifestations by postulating various hypothetical mediating processes as explanatory concepts (a task that Freud approached with great flexibility and remarkable openness to continuous self-correction). It was not until 1915 that Freud formulated a comprehensive theory of motivation in his monograph *Instincts and their Vicissitudes*, although the roots of this work can be found in *Project for a Scientific Psychology*, published in 1895. According to Freud, what the "psychic apparatus" has to contend with are not external, but internal stimuli. Unlike external stimuli, the latter cannot be avoided, because they arise within the organism itself. The organism has manifold needs that result in continuous production and accumulation of drive stimuli, and this accumulated potential has to be discharged on an ongoing basis.

> The nervous system is an apparatus which has the function of getting rid of the stimuli that reach it, or of reducing them to the lowest possible level; or which, if it were feasible, would maintain itself in an altogether unstimulated condition. (Freud, 1952c, p. 213)

The Drive Reduction Model Freud's theory of motivation represents a drive reduction model. It has much in common with the conceptual model of ethology outlined above and, as we will see below, forms the basis for the learning branch of the associationist approach to the study of motivation. The drive reduction model incorporates homeostatic and hedonistic ideas. The lower the accumulated drive stimulus level, the closer the organism comes to equilibrium. Reductions are accompanied by pleasurable sensations, while increases bring about displeasure. Thus, the activity of the psychic apparatus becomes subject to the pleasure-displeasure principle.

Drive, for Freud, is an instance of mind-body dualism, combining the organismic (i.e., energy) with the psychological (i.e., affect) in the form of a mental representation. Furthermore, he differentiates four aspects in every manifestation of a drive.

If we now apply ourselves to considering mental life from a biological point of view, an "instinct" appears to us as a concept on the frontier between the mental and the somatic, as the psychical representative of the stimuli originating from within the organism and reaching the mind, as a measure of the demand made upon the mind for work in consequence of its connection with the body.

> We are now in a position to discuss certain terms which are used in reference to the concept of an instinct – for example, its "pressure," its "aim," its "object" and its "source."
> By the "pressure" (Drang) of an instinct we understand its motor factor, the amount of force or the

> measure of the demand for work which it represents . . . .
> The "aim" (Ziel) of an instinct is in every instance satisfaction, which can only be obtained by removing the state of stimulation at the source of the instinct . . . .
> The "object" (Objekt) of an instinct is the thing in regard to which or through which the instinct is able to achieve its aim. It is the most variable part of an instinct and is not originally connected to it, but becomes assigned to it only in consequence of being peculiarly fitted to make satisfaction possible . . . .
> By the "source" (Quelle) of an instinct is meant the somatic process which occurs in an organ or part of the body and whose stimulus is represented in mental life by an instinct. (Freud, 1952c, pp. 214–215)

Freud viewed mental life as a process of dynamic conflict. In this regard, he was influenced by dualistic principles – an influence that is also reflected in his attempts to solve the problem of classifying motives. He did not attempt to evolve an exhaustive catalog of motives, but kept a decision pending. In 1915, he contrasted ego- or self-preservation drives (e.g., the need for nourishment) with the sexual drives (libido). Later, influenced by World War I, he replaced the former by aggression drives. Nevertheless, his main research interest remained the sexual drives, which he conceptualized in a very broad sense. In his final works he postulated an antagonism between life instincts ("Eros") and death instincts ("Thanatos").

Other major aspects of Freud's drive theory that have influenced more recent work on motivation include the following:

1. Drive impulses become manifest in different ways. If there is high drive intensity without an appropriate object for its satisfaction, the unfulfilled desires continue to take effect by manifesting themselves in consciousness in the form of mental images of earlier drive satisfactions. This notion later had a determining influence on the development of procedures for the assessment of motives (Murray, 1938; McClelland, Atkinson, Clark, & Lowell, 1953). Drive impulses can also be diverted to other objects; they can be sublimated (i.e., directed to nonsexual goals) or suppressed. In the later case, they can influence experience (e.g., in dreams) or behavior (e.g., slips of the tongue or neurotic behavior) in ways that are difficult to decipher.
2. Freud views mental life as a constant conflict between contradictory tendencies within the individual. He proposes a three-level structure of the psyche, in which the pleasure-seeking "id" is subject to the moral control of the "superego," and the reality-oriented "ego" seeks to mediate between the two.
3. The adult personality is an outcome of drives and their vicissitudes in childhood. Interference in drive development, particularly in early childhood, can have very negative effects on an individual's "capacity to work and love." Psychoanalytic therapies make it possible to access the causes of these developmental disturbances and to "rework" them.
4. Drives develop through a number of psychosexual stages, sequentially focused on specific erogenous zones (areas around various body cavities that are sensitive to pleasure) that dominate the pleasure seeking of that stage and provide for its satisfaction. The order is as follows:
   - The mouth (oral phase: sucking, swallowing, biting)
   - The anus (anal phase: excretion)
   - The genitals (phallic and genital phase: masturbation, homosexual, and heterosexual relations)

   Drive development can become fixated at any stage. Confronted with traumatic events, it may also revert to an earlier stage (regression).
5. Drive development evolves from a three-person drama involving a married couple and an outsider. The child is cast in the latter role, wanting to become sexually involved with the opposite-sex parent and feeling threatened by the same-sex parent (Oedipus complex). Normally, this conflict is resolved through identification with the parent of the same sex. Thus, even in early childhood there is internalization of moral norms (represented in the parent of the same sex) leading to the formation of

conscience (superego) as a controlling authority within the personality structure.

The three last points – the significance of early childhood experiences, the vicissitudes of drive development, and the socializing effects of interactions between family members – continue to influence both theory and research on personality development and the genesis of motives. Since Freud, the descriptive analysis of static components has been supplemented by a dynamic-emotive approach covering processes of development. This approach has affected the study of motivation in many ways. Rapaport (1959, 1960) provides a detailed assessment of its contributions. Toman (1960) expanded the psychoanalytic theory of motivation, focusing on the periodicity and the developmental and biographical aspects of motivational phenomena.

Of course, psychoanalysis was not the only theory of personality at the beginning of the last century. Within "academic psychology," as psychoanalysts called it, there was, for example, Ach's (1910) rather premature identification of personality types, based on the individual differences he observed in his experiments on volition.

Kurt Lewin's Field Theory A far more productive and influential personality theorist was Kurt Lewin (1890–1947), who focused not on individual differences but on broader psychological principles. Lewin began his critical evaluation of Ach's analysis of volition in his dissertation. In 1926, he replaced Ach's term "determining tendencies" with the term "quasi needs" (see the excursus below) – ostensibly without altering the concept being designated. In retrospect, however, it is clear that the change of terminology was associated with a change in conceptualization. The volitional process, as defined by "determining tendencies," became an issue in motivation. More specifically, the distinction between motivational and volitional concepts disappeared from view once more and remained obscured until research on volitional issues resurfaced in the 1980s.

Excursus

The Principles of Lewin's Field Theory

Lewin attempted to explain behavior solely in terms of the (momentarily) existing field of psychological forces. In his "field theory," these psychological forces are cast as vectors (Chap. 5) that emanate from objects and regions of the environment having demand character (valence). These forces affect the individual and determine his or her actions. Lewin attempted to describe the field-theory aspects of his model by means of a topological (later "hodological") analog. Independent of his field theory model of the environment, he had earlier developed a person-oriented model of motivation in terms of an accumulation of single, central, or more peripheral regions (at surface or lower levels). Each region represents a need or quasi need. Depending on the need condition, each region is a system under more or less tension, striving for release via the executive functions (e.g., motor activities), and using such means as resuming an unfinished task. Dynamic conceptions of this kind are not very far removed from Freud's ideas.

For both Freud and Lewin, the reestablishment of equilibrium is the major principle of motivation. Lewin explains behavior as a function of the person and his or her (perceived) environment, as reflected in his general equation for behavior: $B = f(P, E)$.

Lewin and his students carried out numerous studies on the psychology of action and emotion. Some of his experimental paradigms have become standard procedures for motivational research. This applies particularly to methods of determining and analyzing levels of aspiration (Hoppe, 1930; Jucknat, 1938). Some of the phenomena Lewin investigated by experimental means, such as the substitute value of alternative

action for an unfinished task, show an affinity to Freud's theories. Freud's influence on Lewin was probably greater than reflected in the latter's writings, which are critical of Freud's explanations of present behavior in terms of past events in the individual biography. Lewin (1931) was perhaps the first to propose an interaction between the person and the situation. Nevertheless, his research was focused far more on the effects of situational differences than on individual differences.

Lewin endeavored to conceptualize an existing psychological "total situation" (called the "life space") that incorporated both the person and the subjectively perceived environment in a unified (field theoretical) model. This model represents a momentary interplay of forces, portrayed in terms of a general dynamic. The interplay of forces results in behavior analogous to the sum of the vectors. However, these sophisticated theoretical concepts stood in stark contrast to the lack of techniques available for measuring constructs, such as tension, forces, directions, valences, regions, and distances, or for linking them to observable data.

This is undoubtedly why Lewin's (1936, 1963) field-theory model did not have a great deal of influence on later research. Nevertheless, his thoughtful construction of concepts (e.g., demand character) and functional relationships, his analysis of situational forces (that formed the basis for conflict typologies), and above all his experimental paradigms for inducing motivational phenomena (e.g., level of aspiration) had a significant influence on later motivational research.

Lewin's contribution to research entails a branching of the lines of influence. Lewin indirectly influenced the psychology of learning via Tolman and the personality psychology approach to motivational research via Allport, as we will see later. He directly influenced the motivation psychology branch within personality theories of motivation through Henry A. Murray in the 1930s, J. W. Atkinson in the 1950s, and V. H. Vroom in the 1960s.

2.5.1 The Motivation Psychology Approach

2.5.1.1 Instrumentality Theory

Vroom's contribution – although relatively recent – was directly influenced by both Lewin and Tolman. At the beginning of the 1960s, industrial psychology had accumulated a wealth of findings on matters such as job satisfaction and job performance. Vroom (1964) developed what became known as instrumentality theory to shed more light on these findings. It is based on the idea that actions and their outcomes tend to have a series of consequences with differing levels of positive or negative valences for the individual. The individual anticipates these consequences, and this anticipation serves to motivate action. In other words, an action is guided by the instrumentality it has for the occurrence of desirable consequences and the nonoccurrence of undesirable ones.

Significantly, however, this simple idea has had little impact on laboratory research on motivation to date. The actions of participants in laboratory experiments are, after all, of little consequence to them (aside from helping the experimenter or contributing to "science," meeting a course requirement, or making a small amount of money). In real-life settings, such as the workplace, much depends on one's actions and their outcomes.

According to instrumentality theory, the individual valences (Lewin's demand characters) of the subjectively perceived consequences of one's actions must first be identified and then multiplied by the action's "instrumentality."

Definition
Instrumentality is the level of expectancy that an action will either produce or preclude certain consequences.

In the latter case, the instrumentality is negative. The sum of the products of valences and instrumentalities for each consequence gives the

instrumentality-weighted total valence of a possible action outcome, which – provided that the subjective probability of successfully attaining the goal is high enough – will then motivate behavior. Vroom's instrumentality theory is therefore a more precise formulation of the expectancy-value model originally conceptualized by Lewin and Tolman (Lewin, Dembo, Festinger, & Sears, 1944; Tolman, 1932; see also Chap. 5).

2.5.1.2 Murray's Research Approach

Murray was a key figure in the motivation psychology branch within personality theories of motivation, having been influenced by Darwin, McDougall, and primarily by Freud. In his book *Explorations in Personality* (1938), Murray gave a precise definition of the term "need" that had much in common with psychoanalytic thinking. He distinguished and delineated some 35 different needs (see Chap. 5), determined the situational incentives associated with each ("press"), drew up a detailed taxonomy of behaviors relevant to motivation, compiled questionnaires (or rating scales) to assess individual differences in motives, and – together with 27 collaborators – administered these questionnaires, interviews, clinical tests, experimental procedures (level of aspiration), etc., to various samples. In so doing, Murray laid the foundations for a breakthrough by McClelland and Atkinson in the early 1950s that consisted in:

- The more precise definition of one specific motive, the achievement motive
- The development and validation of a method to assess individual differences on the basis of Murray's thematic apperception test (TAT)

The opportunity to assess individual differences in motives before the event sparked intensive research efforts addressing fundamental issues in motivation research and prompted the development of techniques to measure other motives, such as social affiliation and power (Chaps. 7 and 8).

2.5.1.3 McClelland's Theoretical Assumptions

McClelland was a student of the learning theorist Hull. This academic lineage played a decisive role in the further articulation of what was still a rather global definition of "need" within the personality theory approach to motivation research. Lewin had conceptualized need as a momentary force (or a system under tension within the individual), without paying much attention to its evolution or dispositional character. For Murray needs were more enduring and idiosyncratic entities (analogous to the concept of motive). Although McClelland's theory did not distinguish clearly between motive and motivation – that was accomplished later by Atkinson (1957, 1964) – it came very close to doing so. McClelland combined elements of associationism with aspects of anticipatory behavior and hedonistic theory. His proximity to Hull is reflected in his 1951 definition:

> A motive becomes a strong affective association, characterized by an anticipatory goal reaction and based on past association of certain cues with pleasure and pain. (McClelland, 1951, p. 466)

Two years later (McClelland et al., 1953), he added a fourth component, namely, the discrepancy model of adaptation-level theory (Helson, 1948), which he borrowed from the psychology of perception and which he saw as the psychophysical foundation for the acquisition of all motives in the course of a lifetime. The basic idea is that there are (psychophysically prestabilized, unlearned) adaptation levels for different classes of stimuli or situational conditions, i.e., levels at which the stimuli are perceived as "normal" and neutral. Discrepancies from the adaptation level are experienced as positive, provided that they do not exceed a certain level. Beyond that level, they become increasingly unpleasant. Situational cues and antecedent conditions that are associated with these affective states and affective changes during ontogenetic development become capable of eliciting certain aspects of the original affective situation.

Definition

For McClelland, motivation is the "redintegration" by certain stimulus cues of an experienced change in an affective situation.

This definition is rather complex, as it attempts to explain with a single concept three issues pertaining to motives and motivation:

- The genesis of a motive
- Motive as an acquired individual disposition
- The eliciting stimuli as the actual motivation

McClelland et al. (1953) summarized all these as follows:

> Our definition of a motive is this: A motive is the redintegration by a cue of a change in an affective situation. The word "redintegration" in this definition is meant to imply previous learning. In our system all motives are learned. The basic idea is simply this: Certain stimuli or situations involving discrepancies between expectations (adaptation level) and perception are sources of primary, unlearned affect, either positive or negative in nature. Cues which are paired with these affective states, changes in these affective states, and the conditions producing them become capable of redintegrating a state (A^t) derived from the original affective situation (A), but not identical with it. (McClelland et al., 1953, p. 28)

With its multipurpose character and fusing of several postulates, this definition was evidently too cumbersome to have a significant influence on the later motivational research spearheaded by McClelland's former collaborator J. W. Atkinson. The discrepancy postulate, in particular, proved unsuccessful, although there were some initial attempts to develop this approach further (cf. Heckhausen, 1963; Peak, 1955). It is only recently that this postulate has begun to gain increasing significance, particularly in relation to the concept of "self-reinforcement," which is a function of the discrepancy between an action outcome and a performance standard accepted as binding by the individual.

In contrast to Atkinson, McClelland was more interested in individual differences in motives, their genesis, and their consequences than in the motivational phenomena of actual situations. This blending of motivational concepts with personality psychology is reflected in McClelland's well-known analyses of historical change in the motivational climate of nations and his findings of a pattern of relations between motivational change and economic and political developments (1961, 1971, 1975).

McClelland determined national and historical indices of motivation based on the content analyses of literary documents, analyzed motivational aspects the entrepreneur personality, and worked on programs for the modification of motives (cf. McClelland, 1965, 1978; McClelland & Winter, 1969).

2.5.1.4 Atkinson's Approach

Atkinson (1957, 1964) developed a formal model of motivation – the "risk-taking model" – which, more than any other, stimulated and influenced work on motivation in the 1960s and 1970s (see the excursus below and Chaps. 5 and 8). On the one hand, it elucidated the expectancy component of McClelland's postulates by defining it in terms of the subjective probability of success, i.e., goal attainment (*Ps*). On the other hand, it related this component to the incentive for success (*Is*) by means of multiplication. This product $Ps \times Is$ builds on an approach previously developed by Lewin's students Sybille Escalona (1940) and Leon Festinger (1942) to explain levels of aspiration, namely, the theory of resulting value. It represents a concretization of "expectancy-value theories," which had emerged concurrently but independently as "decision theories," formulated to predict consumer's purchasing decisions in an economic context (von Neumann & Morgenstern, 1944) and bets placed in games of chance in a psychological context (cf. Edwards, 1954).

In decision theory, the product of expectancy and value is the subjectively expected maximum utility of success, which is assumed to govern the decisions of rational individuals. But do all individuals make rational decisions?

Excursus

The Risk-Taking Model

Atkinson (1957) made a considerable step forward by taking account of individ-

(continued)

ual differences in motivation. He added a third, dispositional variable to the product of the probability of success and the incentive for success, namely, the motive to achieve success (M_s). This produced the "Atkinson formula" of the risk-taking model (see also Atkinson & Feather, 1966), according to which the current tendency to approach success (T_s) can be predicted if the actor's motive to achieve success, the probability of achieving success under the pre-vailing conditions, and the incentive value of success are known:

$$[T_s = M_s \times P_s \times I_s]$$

This equation incorporates one of Lewin's ideas, namely, that the demand character (or valence) is a product of motive and goal incentive.

An analogous equation was formulated for the tendency to avoid failure:

Motive to avoid failure × probability of failure × incentive of failure. This avoidance tendency is subtracted from the approach tendency to give the resultant tendency to perform.

Owing to its emphasis on individual differences in motives, the risk-taking model stimulated a wealth of research, producing many and diverse findings over a long period of time (see Heckhausen, Schmalt, & Schneider, 1985). This research will be examined in more detail in Chaps. 5 and 6.

Atkinson later turned to the study of changes in and resumption of an action. One of the questions he addressed harked back to Freud, namely, the aftereffects of unfulfilled motivations when an action is resumed. Atkinson incorporated these motivational remainders in his risk-taking formula as "inertial tendency" (Atkinson & Cartwright, 1964).

A book coauthored with D. Birch (1970, see also Atkinson & Birch, 1978) reflected a shift in Atkinson's research interest, away from the motivational analysis of individual, "episodic" segments of action to the question of why a particular action tendency ceases to influence behavior while another commences to do so. His research focus shifted to what might be called the links in the continuous stream of activity. Atkinson's dynamic theory of action is highly abstract; in fact, it postulates so many forces and dependency functions that computer programs are needed to determine the correct predictions for given starting conditions.

Together with J. Raynor – who had previously (1969) expanded the risk-taking model to account for future-oriented actions – Atkinson (1974a, b) attempted to explain the relationships between strength of motive, incentive level of the situation, and (cumulative) short-term and long-term achievement outcomes. This he did on the basis of an explanatory model formulated within the psychology of activation, the Yerkes-Dodson rule.

The Yerkes-Dodson rule states that an intermediate level of activity is most conducive to performance on a task of a given difficulty level.

2.5.1.5 Heckhausen's Research on Achievement Motivation

At the Ruhr-University in Bochum, Germany, Heinz Heckhausen soon picked up on and expanded the work of McClelland and Atkinson. He developed and validated two independent TAT measures to assess the motive to achieve success and the motive to avoid failure. Together with his colleagues at the University of Bochum, Heckhausen explored various issues relating to the achievement motive:

- Development of motives (Heckhausen, 1972, 1982; Trudewind, 1975)
- Risk-taking (Schneider, 1973)
- Occupational choices (Kleinbeck, 1975)
- Level of aspiration as a personality parameter (Kuhl, 1978a, 1978b)
- Measurement of motives (Schmalt, 1976)
- Regulation of effort (Halisch & Heckhausen, 1977)
- Modification of motives (Krug, 1976)
- Applications in educational research (Rheinberg, 1980)

The Bochum group had also shown an early interest in attribution theory within cognitive

psychology (see below) – particularly in Weiner's approach (1972) – and its members had contributed to the integration of the two research traditions. Their findings relate to aspects such as the perception of one's own ability as a determinant of the subjective probability of success (Meyer, 1973, 1976), the motive dependency of causal explanations of success and failure, and the dependency of the affective consequences of an action's outcome and change in expectancy on causal explanations (Meyer; Schmalt, 1979). Motive-related biases of causal explanations of success or failure proved to be important determinants of self-evaluation, suggesting that the achievement motive could be conceptualized as a self-reinforcement system (Heckhausen, 1972, 1978).

These multifaceted approaches led to the construction of more complex models of motivational processes. One such model was designed to predict expended effort on the basis of the perceived relationship between one's own ability and the difficulty of the task (Meyer, 1973). This approach resembles Ach's (1910) "law of difficulty of motivation." Another such model is the "expanded motivation model" (Heckhausen, 1977a), incorporating elements of attribution theory and, above all, the various consequences arising from the outcome of an action and its incentive values. These effects had been previously neglected in achievement motivation research, but had gained currency in the psychology of work, based on Vroom's (1964) instrumentality theory. Later, Kuhl (1977) showed that different models of motivation can have validity for different groups of individuals; in other words, achievement behavior may be governed more by calculations of required effort or by a priori self-evaluations.

Kuhl (1982, 1983) was also the first to point out that volitional issues had been neglected for decades. Motivation and volition are now conceptualized as adjacent phases within a course of action (Heckhausen & Gollwitzer, 1987; Heckhausen & Kuhl, 1985). We will come back to this in Chap. 11.

Later chapters will examine the contemporary research generated by the motivation psychology approach. Here, we need only say that Atkinson's work focused research attention on the interaction between person and situation factors. Finally, researchers approaching the subject from this perspective tackled issues relating to motives and motivation systematically, but disregarded volitional issues until the early 1980s.

2.5.2 The Cognitive Psychology Approach

Here, again, we begin with Lewin, whose field-theoretical, topological perspective is clearly apparent in the choice and treatment of the phenomena studied within the cognitive approach. What is more important, however, is the cognitivists' concern with *motive activation*. This concern was alien to both Freud and Lewin, who assumed accumulated drive strengths or existing needs to motivate action. Freud, more than Lewin, would acknowledge that behavior might also consist in cognitions. The cognitive psychology approach reverses the emphasis, postulating that cognitions about an individual's present state can, under certain conditions, activate motivation or influence existing motivations. What motivates us are the imbalances, the contradictions, and the incompatibilities of our cognitive representations. Various models have been developed to explain these ideas. They can all be subsumed under the heading *consistency theories* (cf. Zajonc, 1968) and have been characterized as follows:

> All variants of consistency theories have in common the notion that the person tends to behave in ways that minimize the internal inconsistency among his interpersonal relations, among his intrapersonal cognitions, and among his beliefs, feelings and action. (McGuire, 1966, p. 1)

This marked the return to motivation research of a notion that had been out of favor since Darwin, namely, that reasoning can instigate motivation. It is also worth noting that cognitivists based their experimental paradigms on approaches from social psychology, as pursued by Lewin in his later years (he died in 1947), and covering:

- Interpersonal relationships
- Group dynamics
- Attitude change
- Person perception

2.5.2.1 Consistency Theories

One consistency theory is Fritz Heider's (1946, 1960) theory of cognitive balance.

Theory of Cognitive Balance According to this theory, the relations between objects or persons can represent balanced or unbalanced cognitive configurations. Heider illustrated his point by reference to triadic personal relationships. If A likes B as well as C, but learns that B does not get on with C, then there is a break in the unity of the triad for A. This motivates A to establish a more balanced relationship within the triad. For example, A might try to find ways to improve the relationship between B and C. This achieved, the configuration of interpersonal relations would attain a "good Gestalt." This postulate, that cognitive processes strive for consistency, balance, and "good Gestalt," is reminiscent of the Gestalt school founded by Wertheimer, Köhler, and Koffka, under whom Heider had studied in the 1920s (as had Lewin earlier).

Cognitive Dissonance Theory This consistency theory was developed by Leon Festinger (1957, 1964), a student of Lewin. It states that cognitive dissonance arises when at least two cognitions that are relevant to self-esteem are mutually incompatible, i.e., contradictory. The individual is motivated to reduce the dissonance by effecting changes in behavior, changes in one of the dissonant cognitions, or by searching for new information or convictions. These postulates about the motivating effects of cognitive dissonance have prompted a wealth of ingenious experiments (Chap. 4).

Most studies pertaining to consistency theory remained rather peripheral to the study of motivation in the stricter sense, primarily because they did not cover enduring motives.

- The more general significance of consistency theories is that they drew attention to the role that cognition plays in motivational processes.

Attribution Theory A further contribution by Heider (1958) not only emphasized the significance of cognition in the psychology of motivation but also strongly influenced the mainstream of recent motivational research (Chap. 14). As social psychologists began to study person perception, efforts were made to determine why an observer attributes certain characteristics to the person observed. This prompted several attempts to construct an "attribution theory" (cf. Kelley, 1967; Weiner, 1972). Heider was interested in the genesis of an observer's commonsense explanations for the outcome of another person's behavior. Like Lewin, he distinguished between person forces and environment forces. In contrast to Lewin, however, he analyzed responses to the question of why certain outcomes occur in the context of an observer's experience and behavior. Under which conditions is someone more likely to locate the causes of a behavior or an event within the person or within the situation? Are these causes enduring characteristics (dispositions) of the person, the situation, or the object, or are they temporary states? All observations of behaviors and events seem to involve causal attributions of this kind. Especially if the observed event is, on the face of it, puzzling, there will be a search for causes. Causal attribution is not just a cognitive phenomenon like pure curiosity that has no further implications, however. Its outcomes – e.g., the intentions attributed to an associate – determine any further actions taken.

Example

Examples include situations in which actions can lead to success or failure. The major causal factors include the person factors of capability (or knowledge, power, and influence) and the situation factors of difficulty and resistance to the person forces during task performance. The relationship between these two kinds of forces predicts whether a person "can" accomplish the task – this is an enduring causal factor. This "can" must be supplemented by some variable factors if the task is to be accomplished successfully, however, namely, intention and effort (exertion, "try").

This simple model of causal factors provides easy explanations for the success or failure of an action. If, for example, somebody did not try hard, but succeeded nonetheless, then his or her ability must be far superior to the difficulty level of the task.

But what does this kind of naive causal attribution, based on perceptions of the behavior of others, have to do with motivation? Quite simply, what holds for the perception of others also holds for the perception of the self. We plan and evaluate our actions according to the causal factors we see as being important – factors like intention, ability, difficulties encountered, amount of effort required, good or back luck, etc. It makes a big difference whether we attribute a failure to a lack of ability or a lack of effort, for example. In the latter case we are less likely to give up.

Weiner (1972, 1974), a student of Atkinson, applied the theory of causal attribution to the study of achievement motivation. This approach triggered a great deal of research activity, which demonstrated that intervening cognitions relating to the causal attribution of success and failure are important mediating processes in the motivational system. At the same time, individual differences associated with differences in motives were revealed. We will examine the motivational research inspired by attribution theory in Chap. 14.

Thus, reason – albeit a "naive" notion of the concept – was again seen as something to be taken into account in psychological interpretations of motivated behavior.

Summary

Various situation factors as well as person factors such as attitudes were at the forefront of attempts to explain motivated behavior from the perspective of cognitive psychology. To date, attitude variables have had little bearing on the study of motivation, partly because their construct character is uncertain with respect to motivation – they are assumed to encompass cognitive, emotional, evaluative, and behavioral components – and partly because there is some doubt about their impact on behavior. Although social psychologists had not intended to engage in studies of motivation along cognitive psychology lines, they made valuable contributions to research on topics such as the following:

- Basic issues of motive arousal
- Resumption of motivation
- Motivational conflicts
- Effects of motivation
- Mediating cognitive processes in the self-regulation of behavior

In recent years, there has been a fruitful exchange about issues of causal attribution between cognitive psychology and motivational psychology.

In this context, cognitive psychology is not restricted to cognitive science or to methodological approaches based on models of information processing. Nevertheless, these theories and methods are likely to play an important role in future research on volition.

2.5.3 The Personality Psychology Approach

The 1930s saw the emergence of a "personality movement." Its supporters did not consider either psychoanalytic theory or behaviorist learning theories to be capable of providing an adequate interpretation of individual behavior. The movement was spearheaded by the German psychologist William Stern (1871–1938), whose book *General Psychology from a Personality Perspective* was originally published in 1935. Coming from the Wundtian tradition, Stern was not significantly influenced by McDougall. He was a pioneer in differential psychology, using psychometric techniques to examine differences in the capacities and personality characteristics of individuals. What is crucial for this new direction in psychology is that Stern, deviating

from Wundt's general psychological approach, was guided increasingly by personalism, the attempt to describe and interpret the individuality of a person in terms of a unit as multiplex.

- William Stern's main explanatory mechanisms were traits, which he subdivided into "driving traits" (directional dispositions) and "instrumental traits" (preparedness dispositions), the former having motivational character.

2.5.3.1 Proponents of Personality Psychology

Stern's most influential student was G. W. Allport (1897–1967). In his book entitled *Personality: A Psychological Interpretation* (1937), Allport extended Stern's basic ideas, adding to them an eclectic variety of contemporary theoretical perspectives.

Allport's Principle of Functional Autonomy Allport's approach reflects a mixture of German faculty psychology, McDougall's dynamism, and US empiricism. It sees the individual as a unique system that is constantly developing and is oriented toward the future. Accordingly, Allport argued that this system cannot be assessed using "nomothetic" techniques (general abstractions), but requires "idiographic" (concrete, individual) approaches. Allport's definition of a trait is similar to that of Stern.

> **Definition**
> A trait is a generalized and focalized neuropsychic system (peculiar to the individual), with the capacity to render many stimuli functionally equivalent, and to initiate and guide consistent (equivalent) forms of adaptive and expressive behavior. (Allport, 1937, p. 295)

Traits ensure that there is relative equivalence in an individual's behavior across situations. In the 1930s, a lively interactionism debate (cf. Lehmann & Witty, 1934) had been sparked by the findings of Hartshorne and May (1928), which showed that children's honesty/dishonesty behavior differs across situations. Allport's (1937) definition of the trait contained the key to this inconsistency problem, as became amply clear in the more recent interactionism debate. Consistency can only be expected in subjectively equivalent classes of behavior and situations. Thus, an idiographic approach is vital if we are to avoid the "nomothetic fallacy" (Bem & Allen, 1974; see Chap. 3).

Allport did not see traits as hypothetical constructs, but as realities within a person that are manifested directly in behavior. Furthermore, Allport, like Stern, distinguished between traits with a more "motivational" character and those with a more "instrumental" character, but without drawing a clear line between them.

Allport's principle of "functional autonomy of motives" became well known. It rejected theories that attribute adult motives to such sources as the vicissitudes of drives in early childhood or to particular classes of instincts or needs, as had been suggested by Freud, McDougall, and Murray. The principle of functional autonomy was designed to account for the uniqueness of individual behavior. Allport writes:

> The dynamic psychology proposed here regards adult motives as infinitely varied and as self-sustaining contemporary systems, growing out of antecedent systems, but functionally independent of them. (Allport, 1937, p. 194)

Maslow's Hierarchy of Needs Allport's approach is the classic among the diverse perspectives on personality research to emerge on the basis of trait theory. This approach was continued in the USA, primarily through humanistic psychology, which was known as the "third force." After World War II, this movement also took European existentialism on board. Its main proponent was Abraham Maslow (1908–1970), along with Carl Rogers, Rollo May, and Charlotte Bühler.

Maslow's book *Motivation and Personality* (1954) was very widely read. It had a far greater influence on attitudes toward applied psychological problems and their solution than it did on empirical research. Maslow postulated a hierarchy of needs, within which lower needs have to be satisfied before higher needs can be addressed. His hierarchical ranking is as follows:

- Physiological needs
- Safety needs
- Needs for belongingness
- Esteem needs
- Needs for self-actualization

Maslow defined the latter group as "growth needs," in contrast to the "deficiency needs" preceding it (Chap. 3).

Cattell's Trait Theory The final approach to trait theory worth mentioning in this context is based on complex multivariate testing and statistical analyses. Its main proponent was the Anglo-American psychologist Cattell (1957, 1965, 1974), whose work followed a typically British tradition, unmistakably influenced by Galton's differential psychology and McDougall's dynamic instinct theory. Cattell was taught by Spearman, one of the developers of factor analysis. Using factor analytic methods, Cattell constructed what is probably the most complex model of personality traits in existence, based almost exclusively on correlations between data from questionnaires and tests on a broad variety of areas. Of the factors he extracted, three are considered to have motivational character:

- Attitudes
- Sentiments
- Ergs (drives)

Definition
Attitudes consist of dispositions toward particular objects, activities, or situations. They refer to concrete entities; this places them on almost the same level as the data observed. Sentiments comprise groups of attitudes. "Ergs" (from the Greek *ergon*, meaning "work") are viewed as dynamic "source" variables that deliver energy to specific domains of behavior.

This understanding has much in common with McDougall's original construct of instinct.

Cattell assigned these three factor groups to different levels, distinguishing between surface traits and source traits. He postulated a "dynamic lattice" between individual factors at the different levels and assumed this lattice to be subject to interindividual variation. For Cattell the factors are not descriptive dimensions that differ according to the method applied, but "the causes" of behavior.

Summary
To conclude, the personality theory approach to the study of motivation is dominated by trait theory and thus addresses just a few fundamental issues in motivation research, primarily:

- The taxonomy of motives
- Motivated goal orientation
- The effects of motivations

This approach presents us with a wealth of dispositional variables, but with few functional variables (e.g., motivation as a process or volition). The orientations and perspectives discussed thus far are outlined in Fig. 2.2.

2.6 Associationist Theories

The associationist approach to the study of motivation can be split into two branches inspired by the work of Thorndike and Pavlov, respectively:

- The learning psychology approach
- The activation psychology approach

Both had their origins in Darwinian theory and, more specifically, in a new conception of the old hedonistic principle, modified from the perspective of evolutionary theory.

It was Herbert Spencer (1820–1903) who suggested that those behaviors that facilitate successful interaction with the environment, i.e., that have survival value, must have become associated with pleasurable sensations over the course of evolutionary development. The physiological models of the day held that pleasurable sensations resulted in greater permeability of the nerve tracts, accompanied by an arousal state that

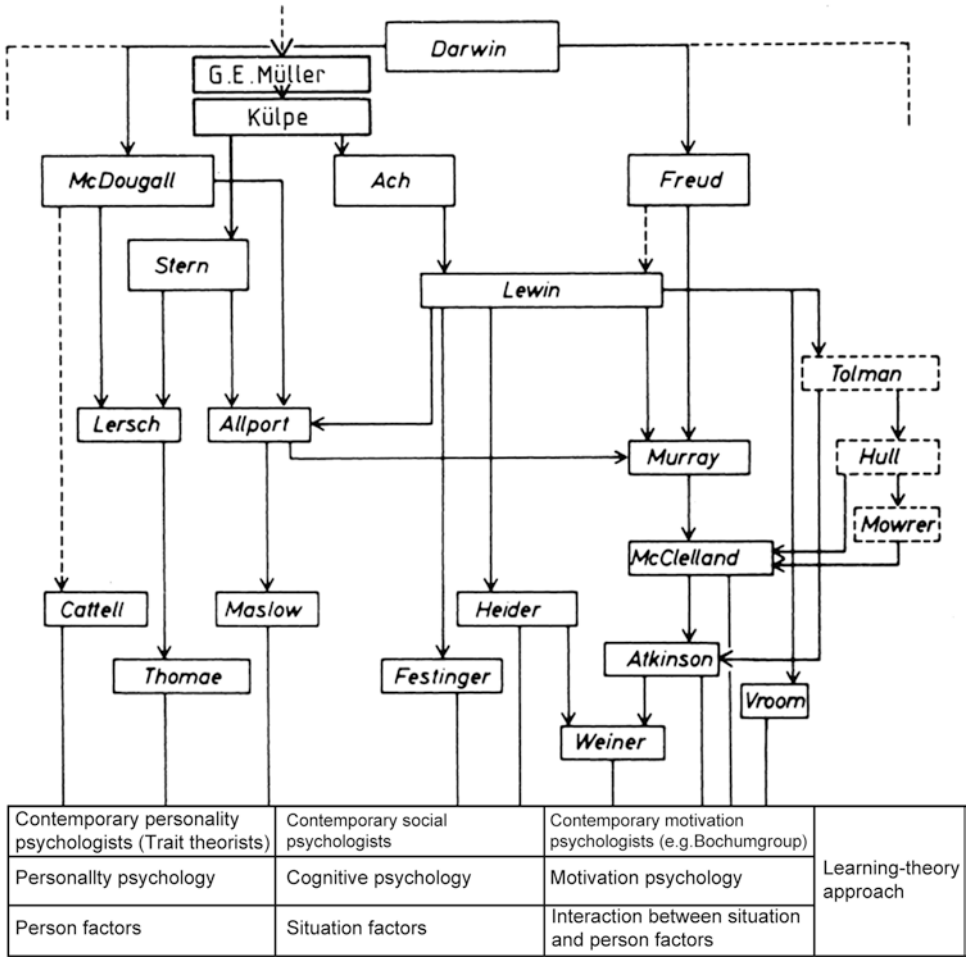

Fig. 2.2 Personality theories in the development of motivation research

allowed better "stamping in" of successful actions, making it easier to reproduce them later. For Spencer, pleasure and displeasure were not goal states to be desired or avoided for their own sake, as had been the postulate of classical hedonism for more than 2,500 years (i.e., since Aristipp). Rather, he viewed them as attendant circumstances that influence the acquisition of new behaviors and increase the probability of previously successful behaviors reoccurring. With these ideas, Spencer anticipated Thorndike's "law of effect," Hull's "drive-reduction theory," and Pavlovian activation theory.

2.6.1 The Learning Psychology Approach

2.6.1.1 Main Proponents

Thorndike, Founder of Experimental Psychology of Learning The experimental psychology of learning had its beginnings in the 1890s. Its founder, Edward Lee Thorndike (1874–1949), was guided by the Darwinian notion that there must be a continuum of intelligence and learning ability in animals and humans. Working with cats, Thorndike sought ways of teaching the animals to solve problems. A cat was

deprived of food and placed in a "puzzle box." Food was placed outside the box. The cat, which was restless because it was hungry, would accidentally move certain levers that opened a gate, giving access to the food. As early as the next trial, the animal would show instrumental, goal-directed behavior, i.e., a learning effect.

The analogy to Darwin's notion of evolution is clear. In a given environmental situation, the animal produces a variety of available responses. Under changed environmental conditions, only a few of these responses will lead to success, i.e., have survival value. Responses are selected on the basis of "trial and error," by trying out various possibilities one after the other. To draw an analogy between the available responses and organisms engaged in the "fight for survival," only a few adaptive responses will "survive," while the rest "become extinct." Thorndike (1898) proposed the "law of effect" to explain this pattern:

Definition
Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater the satisfaction or discomfort, the greater the strengthening or weakening of the bond. (Thorndike, 1898, 1911, p. 2441)

Satisfaction – in this case, of the hunger drive – was seen as creating a new stimulus-response bond for learning, a process that was later called "reinforcement." Thorndike (1898) viewed the observed learning phenomena as analogous to physiological processes, i.e., the bonding of neuronally represented elements of stimulus and response. At first, he was not aware of the motivational factors inherent in the observed behavior. Nevertheless, his learning experiments were also motivation experiments. The animal had to be deprived of food prior to the experiment. How else can they (unlike humans) be motivated to learn? To this extent, experimental learning research with animals, which has now evolved to a major field of research activity, has always incorporated aspects relating to motivation research and produced many very relevant findings. In human research on learning, in contrast, motivational aspects were, at first, largely overlooked.

- Stimulus-response bonds (*S–R bonds) were soon accepted to be the basic units of behavior.*

Thorndike did not disregard motivational issues totally. Certain events can only be satisfying if the organism is in a state of "readiness." Thus, food can only lead to a state of satisfaction – and facilitate the formation of new *S–R* bonds – if the organism is hungry. Thorndike (1911) originally referred to this readiness as susceptibility for the formation of a certain stimulus-response element. Later (1913) he introduced the law of "readiness." In order to avoid any mentalistic connotations, "readiness" was conceptualized as a momentary increase in the conductivity of neurons. Although he was unable to provide a satisfactory solution to the problem of motivation, his influence on the development of learning theories can hardly be overestimated. Learning theories were not only associationist but also specified what is being associated with what, namely, stimuli with responses. Thorndike labeled the association of a stimulus with a response "habit" (Sect. 2.2.2).

Definition
A "habit" is a pattern of responses that does not involve conscious processes, either because it became automated after having been under conscious control at some earlier point or because it was acquired without conscious control from the outset.

It was common practice at the time to skirt motivational issues by attributing goal-directed behavior to "instincts." Following the instinct controversy, the term "drive" – first proposed by Woodworth (1918) – gained currency. Woodworth (1869–1962) also made a fundamental distinction between the "drives" that initiate behaviors and the "mechanisms" that are then activated and that determine the course of the behavior, e.g., stimulus-response bonds. At the same time, he was the first to take the step of inserting a hypothetical construct between S and R, namely, "O" for organism in a particular drive state.

Tolman's Influence on the Psychology of Learning and Motivation Edward C. Tolman (1886–1959) was the first to provide a rigorously defined conception of hypothetical constructs, which he called "intervening variables." These must have close conceptual ties to the antecedent manipulations and subsequent observations. In order to hypothesize a hunger drive of a given strength, for example, the antecedent manipulated period of food deprivation must covary with the subsequently observable behavior of the animal, e.g., general restlessness, running speed, response latency, etc. Tolman (1932) carefully analyzed the criteria of goal-directed behavior.

Tolman was the first to clearly distinguish between motivation and learning. Before that, and indeed thereafter, the two were regularly confounded. For Tolman, learning was essentially the acquisition of knowledge, taking the form of intervening variables such as the cognitive map, means-end readiness, and above all expectancy. In order for learning to manifest itself in behavior, however, there must be motivation, the efficacy of which is determined by two intervening variables:

- "Drive"
- "Demand for the goal object" (analogous to Lewin's demand character; later the term "incentive" was commonly used)

Experiments on "latent learning" provided the crucial demonstration for the need to distinguish between learning and motivation (Chap. 5). Tolman was a "psychological behaviorist," and his notions closely resemble those of Lewin, who later influenced him directly. His is not a purely associationist theory, because he neither postulated fixed stimulus-response bonds on the cognitive side nor did he invoke drive reduction as the basis for learning on the motivational side. Instead, he drew attention to cognitive intervening variables that direct behavior toward a goal as soon as motivational intervening variables become activated.

- Tolman's work forged an important link between the psychology of learning and the psychology of motivation. His influence on the latter was via Atkinson.

Hull's Drive Theory Tolman's influence is also apparent in the works of Clark L. Hull (1884–1952), the major theorist of the learning psychology approach. Hull adopted Tolman's theoretical conception of intervening variables (calling them theoretical constructs). Later, the concept of "incentive" also became an important construct in Hull's model. It was used to explain residual behavioral differences in cases of equal drive strength and equal learning outcomes (habit strength). Hull proposed a complex theoretical network consisting of 17 postulates and 133 derived theorems. From the perspective of motivational psychology, he founded drive theory. Essentially, he adopted Thorndike's approach, but elucidated it further and stripped it of mentalistic connotations. "Satisfaction" of a need, which facilitates the formation of *S–R* bonds, became "drive reduction." A distinction was now also made between need and drive.

Definition
A need is a specific deficiency or disturbance within the organism (e.g., hunger, thirst, or pain) that elicits a nonspecific drive of a certain strength, capable of initiating behavior. For Hull, needs are essentially observable or at least manipulable variables, whereas drives are theoretical (hypothetical) constructs.

Hull's approach is made clear in the following definition – which also reflects a Darwinian perspective:

> When a condition arises for which action on the part of the organism is a prerequisite to optimum probability of survival of either the individual or the species, a state of need is said to exist. Since a need, either actual or potential, usually precedes and accompanies the action of an organism, the need is often said to motivate or drive the associated activity. Because of *this* motivational characteristic of needs they are regarded as producing primary animal drives.
> It is important to note in this connection that the general concept of drive (D) tends strongly to have the systematic status of an intervening variable or X, never directly observable. (Hull, 1943, p. 57) (Author's emphasis)

In the last revision of his system, Hull (1952) essentially attributed behavior partly to a motivational component and partly to an associative component. The motivational component, which is the product of drive (D) and incentive (K), has a purely energizing function. The associative component determines which of the available S–R bonds ("habits," $S\,HR$) will be implemented in response to the internal and external stimuli of a given situation. The two components are multiplied with each other to determine the behavior tendency, a vectorial concept combining force and direction. This is the *reaction-evocation potential* ($S\,ER$).

$$_{S}E_{R} = f\left(_{S}H_{R} \times D \times K\right)$$

Habit strength ($S\,HR$) is dependent on the number of and delays in preceding reinforcements, i.e., on how often and how quickly a stimulus-response bond has previously been followed by drive reduction.

Kenneth W. Spence (1907–1967) was a student of Hull and later worked with him to advance Hull's theory of motivation and learning in some important respects. Spence was particularly interested in the experimental and conceptual analysis of "incentive" in the light of Tolman's findings. (Incidentally, Hull's use of the symbol "*K*" for "incentive" in his formula reportedly reflects his appreciation of Kenneth Spence's work.)

Spence (1956, 1960) considered incentives, like habits, to be acquired through learning. His theoretical explanation for the acquisition and manifestation of incentives is associationistic, based on the mechanisms of "fractional anticipatory goal responses" ($r_G - s_G$) that had been postulated by Hull (1930). The basic idea is that fragments of an earlier goal response (r_G) are elicited by familiar stimuli on the way to reaching (or even perceiving) a goal and that these are in turn associated with fragments of an earlier goal object (s_G). With this mechanism, Hullian theory can account for Tolman's hypothetical construct "expectancy" and for what cognitive ("mentalistic") theories call anticipation or expectation. This explanation, in terms of associationist theory, endows the fractional anticipatory goal response ($r_G - s_G$) with motivational characteristics. The response is postulated to produce its own stimulation that – along with the drive stimuli – increases the internal stimulation on the organism. Thus, for Spence, the relationship between drive and incentive is additive, and not multiplicative, as had been suggested by Hull:

$$E = f\left(D + K\right) \times H$$

Now there can be an effective response potential (E), i.e., learning, in the presence of incentive stimuli alone, without drive stimuli, in other words, when the organism is not "driven" but "attracted" to a goal. This would be a case of pure incentive motivation.

Spence rejected the learning component of Hull's theory, i.e., habit formation, and the notion that it is drive reduction that enforces the S–R bond. For Spence, drive reduction determines incentive strength (K) that, along with drive (D), governs the intensity with which a learned response is performed. To this extent, drive reduction is a purely motivational issue and cannot explain learning. Spence saw Thorndike's "law of effect" as an indisputable fact ("empirical law of effort"), but not as an explanation for learning. Instead, he reverted to the old associationistic principle of *contiguity*.

Definition

The strength of a habit is solely dependent on the frequency with which a response has been made to a stimulus in temporal or spatial contiguity.

This is also the basic associationistic model for classical conditioning (see Pavlov, below), from which the fractional anticipatory goal responses ($r_G - s_G$) are derived. Spence was the first of the learning psychologists to measure individual differences in motivation and their effects on learning outcomes. This work also inspired researchers taking a motivation psychology approach (e.g., Atkinson and Weiner). The motive examined was "anxiety" (Taylor, 1953), which was assumed to produce a high general drive state or arousal state in the presence of particular tasks. According to "inference theory," this then activates competing responses that interfere with performance, particularly on difficult tasks (Taylor & Spence, 1952).

2.6.1.2 Applications of the Learning Psychology Approach to Motivation Research

Three of Hull's students and collaborators advanced the learning psychology approach to motivation research by applying it to specific issues:

- Neal E. Miller
- Judson S. Brown
- O. Hobart Mowrer

Miller and the psychoanalyst Dollard had soon become interested in Freud's psychology of motivation and applied learning theory to social and psychotherapeutic issues. They developed a "liberalized *S–R* theory" (Miller, 1959; Miller & Dollard, 1941) and an influential model of conflict behavior (see box on "Classical Learning Experiments" below), which they substantiated by experimental means (1944). Using fear as an example, Miller demonstrated the existence of "acquired drives" (1948, 1951), expanding on Hull's drive theory. He later focused on physiological brain mechanisms, postulating the existence of what he called "go-mechanisms" with an incentive function (1963).

Aside from drives, strong external stimuli can also have a motivating function. In their book *Personality and Psychotherapy* (1950), Dollard and Miller state:

> All that needs to be assumed here is (1) that intense enough stimuli serve as drives (but not all drives are strong stimuli), (2) that the reduction in painfully strong stimuli (or of other states of drive) acts as a reinforcement, and (3) that the presence of a drive increases the tendency for a habit to be performed. (Dollard & Miller, 1950, p. 31)

Drive is no longer a uniform, direction-nonspecific, purely energizing factor, as had been suggested by Hull. The drive *cues* associated with it determine which response will be emitted.

The drive impels a person to respond. Cues determine when he will respond, where he will respond, and which response he will make (p. 32).

To summarize, stimuli may vary quantitatively and qualitatively; any stimulus may be thought of having a certain drive value, depending on its strength, and a certain cue value, depending on its distinctiveness (Dollard & Miller, 1950, p. 34).

Like responses, drives can become associated with previously neutral stimuli.

Study

Classical Learning Experiments

In one of their famous experiments (Miller, 1948, 1951), rats were given painful electric shocks through a grid in the floor of a white-walled compartment until they had learned to open the entrance to an adjacent black compartment. After a few trials, the animals showed signs of fear as soon as they were placed in the white compartment, even when the grid was not charged. Previously neutral stimuli now aroused fear, a case of classical conditioning. Fear was learned and, at the same time, became a drive state, because the animals

now learned new responses to escape to the black compartment even without the presence of electric shocks. These experiments became the prime rationale for the assumption that "higher motives," learned or secondary drives, arise from originally organismic drives, particularly from the fear associated with painful states.

Another classical experiment with rats formed the basis for Miller's (1944) well-known model of conflict resolution. Given the stimulation of a particular drive state, the tendency to approach a positive goal object or to avoid a negative one increases with proximity to the goal. The approach gradient is less steep than the avoidance gradient, however. If the goal region is both positive and negative – e.g., because the hungry animal found food there, but also received a shock – there will be a point, at a particular distance from the goal region, where the approach gradient and the avoidance gradient intersect. This produces conflict. Any further approach results in fear becoming dominant; any further avoidance response results in hunger becoming dominant. The animal oscillates in its behavior.

This model of conflict has also proved valuable for research on humans, e.g., in the context of psychotherapy. Unlike Miller, Brown (1961) remained committed to Hullian drive theory. For him, drive was a general, activating, and direction-nonspecific intervening variable. Hence, there is only one drive and no acquired, secondary drives. There are, however, many sources that contribute to this general and uniform drive; these may be innate and organismic or acquired. There are also secondary motivational systems. All of these are based on the conditioning of certain stimuli with fear states that were originally associated with physical pain. Up to this point, Brown's conceptualization is highly reminiscent of Miller's notion of fear as an acquired drive. Brown goes further, however, postulating that fear can become linked to a whole range of different stimulus constellations, forming unique motivational systems that become energized. Brown's (1953) example of this is the money motive.

Mowrer's Theory of Avoidance Learning O. H. Mowrer, the third major learning theorist beside Hull and Spence, also studied the function of fear in motivating avoidance learning. His most significant contribution, in terms of a theory of motivation, was to introduce the emotions of expectancy, hope, and fear, as intervening variables mediating between features of the situation and the response. This represents a decisive step within classical *S–R* theory, leading to a conceptualization of motivation that assigns a central role to such cognitive mediating processes as expectancy. McClelland's theory of motivation (McClelland et al., 1953) clearly shows the influence of Mowrer's position in this respect. In turn, Mowrer was influenced by the work of Young, a representative of the psychology of activation (see below).

Mowrer (1939) began by examining the role of fear or anxiety. He saw the relevance of Freud's (1952b) notion that fear is a signal of impending danger, itself an unpleasant state that instigates behavior to avoid the danger. According to Mowrer, fear (or anxiety) is the anticipation of fear. It is a conditioned form of the pain response originally elicited by a strong adverse stimulus. Accordingly, fear has a motivating function, reinforcing all behaviors that serve to reduce it. As Mowrer (1960) himself put it later, this represents a reversal of ideas about "fear learning"; here, learning is reinforced by an expectation of being relieved of fear.

Example

Brown's money motive example was based on the observation that, when children are injured and suffer pain in the early years of life, their parents display concern and fear. An associative bond is formed between pain and parental con-

(continued)

cern. If the child now perceives the same concerned expressions when his or her parents talk about money problems (e.g., "We're broke"), the association with pain is reactivated, i.e., fear of pain and anxiety; this results in an association between fear and the word "money." Whenever there is talk of money (e.g., "We've no more money to buy food"), a state of anxiety is induced. This state can be diminished through appropriate instrumental activities (in the same way as the rats in Miller's experiment learned new escape responses to get from the white compartment to the black one even without the presence of shock). A reduction in anxiety can be attained by securing a regular income, for example. This leads to the formation of a "work motive," which, upon closer inspection, serves to reduce the fear of being broke. Although this example seems somewhat contrived, it is consistent with Brown's drive theory.

Finally, Mowrer (1960) postulated two basic types of reinforcement mechanisms that underlie all explanations of behavior:

1. Drive induction ("incremental reinforcement"):
   Whenever behavior is punished, a conditioned association with the expectancy of fear is produced ("fear learning").
2. Drive reduction ("decremental reinforcement"):
   Whenever behavior is rewarded, a conditioned association with the expectancy of hope is produced ("hope learning").
   Correspondingly, there are complementary expectancies of "relief" and "disappointment":
   Relief occurs when an induced fear state is diminished by the consequences of a response (decremental reinforcement).
   Disappointment occurs when an induced hope state is diminished by the consequences of a response (incremental reinforcement).

According to Mowrer, these four classes of expectancy emotion (hope and disappointment, fear and relief) and any increases or decreases in their intensity determine, for any given situation, which type of behavior will be chosen and pursued and thereby learned and reinforced.

Here, Mowrer deviates from the classical *S–R* notion that learning and behavior result from an unmediated association between stimulus and response. Instead, he suggests that expectancy emotions become associated with the stimuli. Stimuli can be either independent of the organism's behavior (and originate externally or internally within the organism), or they can be dependent, i.e., feedback from one's own behavior. Once emotions of expectancy have become associated with such stimuli, they can guide behavior in a flexible and appropriate manner by facilitating responses that increase hope and relief or decrease fear and disappointment.

Mowrer also sees the basic mechanisms of associative learning in classical conditioning. For him, instrumental conditioning – since Thorndike the primary explanatory principle of learning – is a subclass of classical conditioning.

- What characterizes explanations of behavior within the learning psychology approach is the focus on situational rather than dispositional, person factors. Behavior is guided by stimuli that can be either external or response dependent, i.e., internal. Motivational variables such as drive are frequently also conceptualized as "inner" stimuli.

Two types of intervening (construct) variables mediate between a situation ("stimulus") and behavior ("response"):

- Structural components:
- These give behavior direction, goal orientation, and utility. They reflect the effect of learning in terms of Tolman's expectation (what leads to what) or the Hullian concept of habit (*S HR*) or conditioned inhibition (*S IR*).
- Motivational components:
- These initiate and energize behavior. In Tolman's terms, they are need-dependent demands for the goal object; in Hull's (1943) terms, need-dependent drives (*D*); in the terms of Hull's successors, other activating mecha-

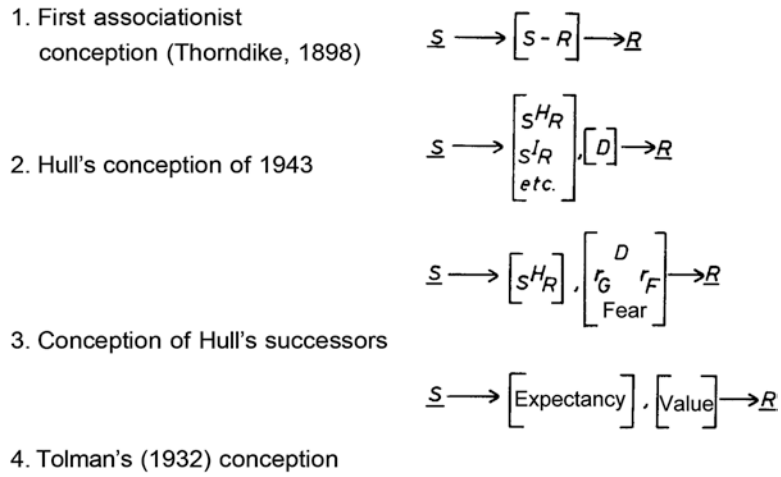

Fig. 2.3 Stages in the development of learning theory in terms of the motivational component of behavior (Based on Bolles, 1974)

nisms such as stimulus-evoked fractional goal responses or fear responses (r_G or r_F, respectively).

Figure 2.3 shows the stages of development of learning theory in simplified form. *S* and *R* ("stimulus" and "response") designate the observable situational or behavioral variables. The connecting links shown in square brackets represent the structural and motivational components (in that order). The first stage represents Thorndike's (1898) position at the turn of the last century. It is a purely associationistic and "mechanistic" model with no motivational component. Although Tolman's conceptual model predates that of Hull and his successors, it is in fact a more advanced variant in terms of a theory of motivation, because it contains the foundation for the expectancy-value models that dominate contemporary motivational research.

2.6.2 The Activation Psychology Approach

2.6.2.1 Main Representatives

Pawlow, Inventor of Classical Conditioning

Ivan P. Pavlov (1849–1936) was, along with Vladimir Bekhterev (1857–1927), the founder of reflexology, the study of conditioned reflexes. The process by which such reflexes are established was later called *classical conditioning*. It was Ivan Sechenov (1829–1905), the doyen of Russian physiology, who provided the decisive input for Pavlov's work. In 1863 (edited in 1968), Sechenov published his major work *Cerebral Reflexes*, which included a discussion of the inhibiting influences of the cortex on the subcortical centers. Working on the "digestive reflex" at the turn of the century, Pavlov demonstrated that unlearned reflex-inducing stimuli (unconditioned, innate stimuli) can be replaced by learned (conditioned) stimuli. This requires the presentation of the stimulus to be conditioned slightly (about half a second) before the unconditioned stimulus. After repeated pairings of the two stimuli, the new conditioned stimulus is sufficient to elicit the response. A typical example of classical conditioning is given below.

Example

The classic example is the triggering of the salivary response in dogs, where salivation is measured by means of a fistula implanted in the esophagus. If food (an unconditioned stimulus for salivation) is preceded repeatedly by a formerly neutral stimulus (e.g., a sound, a light signal, or pressure on the skin), then this formerly neutral stimulus will eventually produce salivation without food being presented. Thus, an unconditioned stimulus "reinforces" the association between a formerly neutral stimulus and the response in question.

The concept of reinforcement was first introduced by Pavlov and alluded to the physiology of the central nervous system in several ways. Reinforcement is the conceptual analog to what Thorndike termed "satisfaction" to explain the law of effect (in *instrumental conditioning*). Pavlov and other Russian physiologists were also able to show that a conditioned stimulus itself has acquired reinforcement characteristics, i.e., can serve to condition a formerly neutral stimulus, producing higher-order conditioning. For Pavlov this was the basis of all higher nervous activity (cf. Angermeier & Peters, 1973).

On the face of it, it would seem unlikely that the study of reflexive behavior of largely immobilized animals in experimental settings would have much to contribute to the study of motivation. Nevertheless, two critical conditions led to Pavlov becoming the founder and instigator of a multifaceted approach to motivation research based on the principle of activation:

- First, he was a physiologist (he won the Nobel Prize in 1904 for his studies on the physiology of digestion) and attempted to explain the learning phenomena he observed in terms of the underlying neurophysiological mechanisms in the brain.
- Second, he postulated an interaction between two underlying processes: excitation and inhibition.

For Pavlov, excitation serves to activate behavior; in terms of the traditional idea of motivation, it has an energizing function. Furthermore, *orienting reactions* accompany excitation states and play a part in the genesis of conditioned reflexes. Orienting reactions became the major focus of Russian research on activation.

Pavlov's writings soon became known to US learning psychologists, partly through a lecture that he gave in the US in 1906 and partly through an overview of his work by Yerkes and Morgulis (1909). Pavlov, like the US learning theorists, was opposed to the search for the basic elements of psychological functioning by means of introspection. Instead, he too was interested in finding answers to the question of what leads to what, as reflected by "observables," i.e., changes in external behavior. John B. Watson (1878–1958), who later became the evangelistic spokesman for this antimentalist movement called behaviorism, was strongly influenced by Pavlov's reflexology. Watson's demonstration of experimentally induced avoidance responses in a 9-month-old child by means of classical conditioning became a classic in the field (Watson & Rayner, 1920; for a critical analysis of the impact of the Little Albert study on the psychology textbooks of the next 50 years, see Harris, 1979).

Operant Conditioning After Skinner At first it was difficult to relate conditioned reflexes to Thorndike's "law of effect," the supposed basis of all learning. Skinner (1935) was the first to propose a fundamental division of all behavior into two categories, response substitution a' la Thorndike and stimulus substitution a' la Pavlov. Skinner later dubbed the first category "operant behaviors" or "operants" because they act upon the situation, "operate" upon it, and change it. Factors that increase the likelihood of a particular response occurring in the future were labeled "reinforcers." Skinner adopted the term "reinforcement" from Pavlov, finally establishing it in the US psychology of learning. For Skinner, the term reinforcer has no physiological connotations; it simply equates with an increase in the probability that a particular behavior will occur. The process is called *operant conditioning* (analogous to Thorndike's instrumental conditioning). Skinner called the second category of response "respondent behavior" or "respondents" because an available response is simply elicited by a stimulus. The acquisition of new eliciting stimuli is dependent on classical conditioning, as demonstrated by Pavlov.

This was an extremely important distinction for the later development of learning theory; with it Skinner influenced both the Thorndikian and the Pavlovian tradition. However, Skinner (1938, 1953) was more interested in empirical than in theoretical issues. He devoted himself to a detailed empirical analysis of all aspects of operant conditioning and used the knowledge gained to develop a number of applied techniques, including programmed instruction (Skinner, 1968). The influential behavior-therapy movement is also derived

directly from his specification of the contingencies of operant conditioning.

It is not easy to categorize Skinner with respect to the evolution of thinking in motivational research; after all, he rejected all hypothetical constructs and every theoretical construction that goes beyond the formulation of if-then relationships (see the excursus below). He even avoided labels alluding to motivation, such as hunger, referring instead to "deprivation," which was operationally defined in terms of the period of time the animal has been deprived of food or in terms of the resulting weight loss. Of course, both deprivation and the corresponding "reinforcement" (response consequences that increase the likelihood of the particular response) incorporate motivational aspects identified by learning and motivation theorists as intervening variables, including need, drive or satisfaction, and reward or expectation.

Excursus

Miller's Criticism of Skinner

Miller (1959) pointed out that Skinner's antitheoretical position becomes untenable when behavior is to be explained in terms of any more than two independent and dependent variables. There are, for example, three different manipulations that can serve as independent variables in the manipulation of drinking behavior in rats: hours of deprivation, dry feeding, and injection of a saline solution. Likewise, three different indicators of drinking behavior, the dependent variable, have been used: rate of bar pressing, amount of water consumed, and amount of quinine in the water needed to terminate drinking.

If we were to abandon the hypothetical construct "thirst" as mediating between the three independent variables and the three dependent variables (Fig. 2.4), we would have to postulate nine different if-then relationships. Not only would this be unparsimonious, it would be redundant, since the effect of each of the independent variables can be demonstrated with each of the dependent variables.

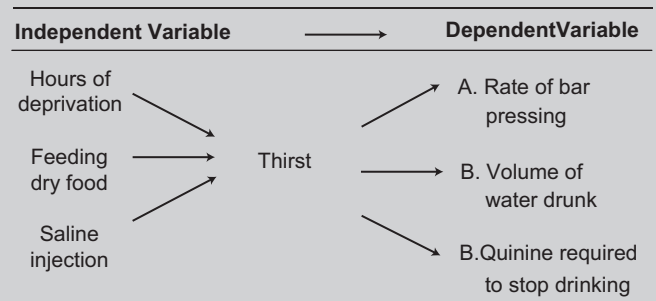

Fig. 2.4 Independent and dependent variables related to drinking behavior as an example for the value of taking a hypothetical construct ("thirst") as a mediating (intervening) variable (Based on Miller, 1959, p. 278)

Skinner cannot be categorized as belonging to the activation psychology strand of the study of motivation; rather, he forges the link between the research traditions of Thorndike and Pavlov.

The true representatives of the psychology of activation share four major approaches to theory construction:

1. They draw heavily on neurophysiological findings and theories about the functioning of the brain. To this extent, the explanatory constructs hypothesized are not neutral, but have considerable physiological implications. Activating systems in the brain stem are accorded a key role.
2. They make very general statements about the activation and direction of behavior. The emphasis is on finding regular relationships that have general applicability, at the cost of detailed, content-specific determinants of behavior.

3. Affect and emotion are of more relevance than in other theories of motivation.
4. They endeavor to identify the unique structural patterns on the stimulus side that produce generalized, activated behavior and imbue it with an approach or avoidance orientation.

2.6.2.2 Discoveries and Developments Within the Psychology of Activation

Two discoveries relating to the physiology of the brain proved particularly inspiring for researchers interested in the psychology of activation. One was the discovery of the *ascending reticular activation system* (ARAS).

ARAS and the Reinforcement Center Moruzzi and Magoun (1949) found that electrical stimulation of the reticular formation in the brain stem results in a change in the electroencephalogram, in what are known as "activation patterns." The various conditions of activation range from sleep and sleepiness to high levels of excitation. They have been found to be accompanied by changes in performance proficiency on a variety of tasks. This relationship describes an inverted-U function, with intermediate levels of activation being most conducive to performance. Emotions and affects have also been shown to be related to different levels of activation.

Under natural conditions, there are two sources of nonspecific stimulation of the ARAS:

- The afferent sensory nerves that send collaterals to the reticular formation
- Efferent cortical impulses arriving at the ARAS. Lindsley (1957) was the major force in calling attention to the significance of these findings on the physiology of the brain for the study of behavior.

The other discovery was the identification of a "reinforcement" or "pleasure center" in the hypothalamus of the rat brain. If this area is stimulated by means of implanted electrodes, rats will learn to produce the responses that preceded this stimulation without previous deprivation or actual drive reduction (Olds, 1955, 1969; Olds & Milner, 1954). The founder of this strand of research was James Olds, a former student of Hebb.

Hebb's Ideas of Cell Assemblies and Phase Sequences It was the Canadian psychologist Donald O. Hebb who became the most influential mediator between Pavlov's physiological approach and the new psychology of activation. In his book *Organization of Behavior* (1949), he restricted the study of motivation to explanations for the direction and persistence of behavior. From Hebb's perspective, there is no need to explain the energizing of behavior, because the organism is constantly active and metabolizing energy. The only question is why energy is released at particular loci of the organism and characterized by a particular spatial and temporal pattern of firing. Hebb attributes these effects to "cell assemblies" that are gradually built up through repeated stimulation, forming a closed system that facilitates motor response sequences. A cell assembly is capable of producing other cell assemblies, frequently in concert with other sensory input. This leads to the formation of what Hebb calls "organized phase sequences," for him the physiological equivalent to the cognitive processes that guide behavior.

With a play on words, Hebb later (1953) turned the CNS (central nervous system) into a conceptual nervous system. Drawing on the findings of the ARAS studies, Hebb differentiated between the arousal function and the cue function of all stimulus inputs. Before a sensory input can exercise a cue function (i.e., guide behavior), there must be a certain level of nonspecific activation (Hebb's analog to "drive"), otherwise no integrated phase sequence will occur (e.g., boredom brought on by sensory deprivation is associated with a rapid deterioration in performance on relatively simple tasks).

Conversely, the arousal level can be too high if the information input deviates too sharply from the familiar (or the stimulus is simply too intense), leading to a breakdown in the previously formed phase sequence. This may elicit emotions of displeasure, irritation, and even fear. Minor deviations from previously established

phase sequences are pleasurable, however, and motivate the continued pursuit of current behavior. Moreover, they stimulate further formation of phase sequences.

This final postulate corresponds to the processes of *accommodation* that are central to Jean Piaget's (1936) psychology of cognitive development. Here again, we encounter the idea of discrepancy, which – as we saw earlier – plays an affect-producing and therefore motivating role in McClelland's theory of motivation. Small departures from the familiar and the expected have positive emotional valences and motivate approach and persistence; larger discrepancies have negative valences and motivate avoidance, causing a break in the behavioral sequence. In this respect, McClelland's theory (1953) shows the influence of Hebb's conceptualization concerning the effects of discrepant phase sequences.

Arousal Potential After Berlyne Daniel E. Berlyne (1924–1976) developed the most extensive theory of motivation based on the principle of arousal. He expanded Hebb's ideas and combined them with the principles underlying the work of Piaget (cognitive accommodation) and Hull (integrative neo-associationism). Based on neurophysiological findings concerning the ARAS and reinforcement centers, Berlyne (1960, 1963, 1967) investigated the stimulus aspect of activation (arousal), on the one hand, and arousal-dependent motivational effects, on the other. On the stimulus side, it is the nature of the information and the resulting conflict that determine the arousal function. Berlyne used the term "collative variables" to designate these stimulus and conflict characteristics.

Definition
"Collative" means that incoming information is subjected to processes of comparison that can lead to greater or lesser incongruities and conflicts with the familiar and the expected.

Berlyne distinguished four types of collative variables:

- Novelty
- Uncertainty
- Complexity
- Surprise value

Aside from these collative variables, there are three further types of stimuli that have arousal functions:

- Affective stimuli
- Intense external stimuli
- Internal stimuli arising from need states

The combination of these stimuli produces what Berlyne called *arousal potential*. In contrast to Hebb, Berlyne was able to present a variety of findings demonstrating the need for a distinction to be made between the arousal potential and the resulting level of activation. The relationship between the two is not linear, but describes a U function. Both low and high arousal potentials result in high levels of activation, are experienced as unpleasant, and trigger activities serving to reduce the level of activation, i.e., leading to an intermediate level of arousal potential, which is the optimal state.

In Berlyne's (1960) words:

> Our hypotheses imply, therefore, that for an individual organism at a particular time, there will be an optimal influx of arousal potential. Arousal potential that deviates in either an upward or a downward direction from this optimum will be drive inducing or aversive. The organism will thus strive to keep arousal potential near its optimum. (Berlyne, 1960, p. 194)

Among the arousal-dependent motivational effects, Berlyne distinguished between exploratory and epistemic behavior (the latter refers to the acquisition of knowledge and insight through cogitation). If the arousal potential is too high, it will motivate focused exploratory behavior, i.e., the closer inspection of the incoming information in order to reduce the arousal potential. If the arousal potential is too low (boredom), it will result in diverse exploration, initiating a search for greater stimulus variety and entertainment, or curiosity.

Excursus

Young's Attempt to Integrate Psychology and Physiology

Paul Thomas Young founded a unique and independent branch within the motivational psychology of activation. As mentioned earlier, his *Motivation of Behavior* (1936) was the first English-language book to feature the term motivation in its title. Young proposed that physiological and psychological explanations of motivational events represent two different perspectives on the same phenomena. Beginning in the 1940s, Young (1941, 1961) devoted his research activities to food preferences in rats. He showed that even the behavior of satiated animals can be motivated by food and that the level of motivation depends on the type of food offered. Some substances appear to have intrinsic affective activation value, an incentive (e.g., tastiness) that is independent of the drive strength arising from the organism's need states. Moreover, in postulating "evaluative dispositions" (1959) that are linked to affective activation and therefore capable of reinforcing behavior, Young did not neglect the motivational effects of need states and drive strength.

Psychophysiological Approaches Elizabeth Duffy (1932) initiated psychophysiological research in the 1930s, even before the discovery of the ARAS. She was able to correlate indicators of neurovegetative functioning (e.g., muscle tone and galvanic skin responses) with performance measures and explained the relationships observed by assuming a kind of central activation function (analogous to the present-day concept of arousal), the physiological basis of which she attributed to the autonomic nervous system. Duffy (1934, 1941) also attempted to clarify the concept of emotion in terms of activation phenomena; Young's influence on her work is apparent here. Her book *Activation and Behavior* (1962) reviews the findings of activation research and presents her theoretical models of motivation. She summarizes her main findings on the relationship between activation and performance as follows:

> The degree of activation of the individual appears to affect the speed, intensity, and co-ordination of responses, and thus to affect the quality of performance. In general, the optimal degree of activation appears to be a moderate degree, with the curve expressing the relationship between activation and performance taking the form of an inverted U. (Duffy, 1962, p. 194)

A more complete and systematic theory of motivation, covering the findings on activation reported by Duffy and others, was presented by Dalbir Bindra (1959). He began by linking up the conceptualizations of Hebb, Skinner, and Hull. According to Bindra, no distinction can be made between emotional and motivated behavior. Motivated behavior is characterized by its goal directedness:

> Goal direction is thus a multidimensional concept. Appropriateness, persistence and searching . . . can be looked upon as some of the dimensions that are involved in judging behavior as more or less goal-directed. (Bindra, 1959, p. 59)

Like Skinner, Bindra attributed goal directedness primarily to reinforcing events. As he saw it, the manifestations of a given motivated behavior result from a variety of interacting factors, including sensory cues, habit strength, arousal level, blood chemistry, and a special "hypothetical mechanism," the "positive reinforcement mechanism" (PRM), which carries out the functions of the reinforcement centers discovered by Olds. In a later version of his theory, Bindra rejected the learning theorists' postulate of associations being formed through reinforcement (1969, 1974). Like Young, he now emphasized the importance of the incentive object, which – along with other stimulus aspects and certain organismic states, the "central motivational states" – induces motivation and initiates and guides behavior.

- Along with Bolles (1972), Bindra is the leading proponent of a theory of incentive motivation among the animal learning theorists (Chap. 5). His new conceptualizations of

incentive motivation run essentially parallel to the notions developed 40 years earlier by Lewin and Tolman.

Sokolov's Orienting Reactions The most prominent representative of the Russian branch of the activation psychology approach to the study of motivation is Sokolov (1958, English translation, 1963). His work represents an extension to Pavlov's reflexology, incorporating the advances that had been made in neurophysiological measurement techniques and recent findings on brain functioning (e.g., the ARAS). He was primarily interested in the study of orienting and avoidance reactions, identifying their triggering conditions and analyzing their scope and effects. Berlyne incorporated the findings of Sokolov and his colleagues in his theory of motivation, thus establishing their influence on Western activation-oriented research.

Definition
Orienting reactions are complex short-term processes which, in response to a decisive change in the stimulus field, trigger a series of physiological and psychological processes, all of which increase susceptibility to information input and heighten the readiness for action.

They include orienting of the sensory organs to the source of stimulation, exploratory responses, physical and chemical changes in the sense organs that facilitate greater discrimination, increases in the activation of the peripheral (e.g., muscle tone and blood pressure) and central (electroencephalogram) spheres of functioning, etc. After an orienting reaction has been triggered repeatedly, it increasingly changes from a generalized to a more specific functional activation. The avoidance reaction encompasses some similar and some distinctly different components. In contrast to the orienting reaction, it decreases susceptibility to information and protects against overstimulation. These detailed analyses of processes lasting only a few seconds are of interest not only to psychophysiologists; they are also relevant to theories of motivation – the processes in question represent prototypes of "advancing" and "retreating" tendencies, which may in turn lead to approach and avoidance behavior.

Eysenck's Trait Theory Approach The English psychologist Hans Jürgen Eysenck is known primarily for his trait-oriented research in personality. His use of questionnaire methods and factor analysis was similar to R. B. Cattell's technique. Eysenck's bipolar personality continua of extraversion vs. introversion and neuroticism vs. emotional stability have become standards. According to Eysenck, individual differences along these two mutually independent dimensions are hereditary.

Eysenck (1967) combined this trait-theoretical approach with Pavlov's brain physiological model of excitation and inhibition and particularly with the approaches of Sokolov and Hebb. He was also inspired by the more recent discoveries of activating centers in the brain and the attendant explanatory models of the physiology of activation. He attributed individual differences on the extraversion-introversion dimension to differences in the activation function of the ARAS, postulating higher levels of activation for introverted individuals. Extraverts take longer to develop conditioned reflexes. He characterized the other dimension (neuroticism vs. emotional stability) as an "emotional drive" and attributed it to centers of the limbic system (where Olds had discovered what he called "reinforcement centers"). This led to a unique merger of personality theory and activation-based motivation theory, in support of which Eysenck cited data from numerous tests and experimental studies of the physiology of the brain from both the East and the West.

- Many psychophysiologists are now involved in various areas of psychophysiological research on arousal. To the extent that this research is motivation-oriented, it focuses on the influence of situational factors and the effectiveness of organismic factors, particularly specific brain mechanisms.

Figure 2.5 gives an overview of the two branches of associationist theories within the study of motivation: the learning psychology

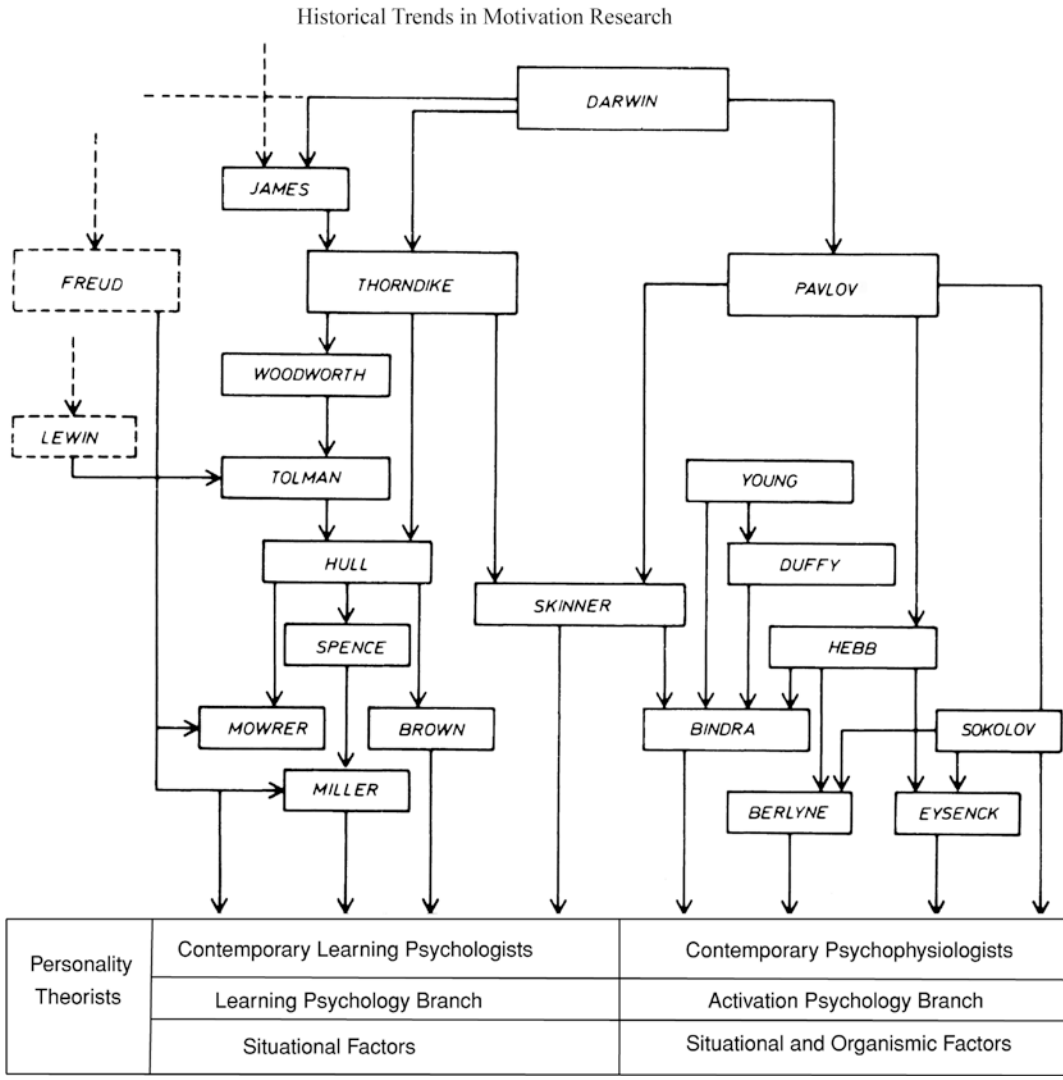

Fig. 2.5 Associationist theories in the development of motivation research

approach and the activation psychology approach. Both focus on the functional analysis of factors hypothesized to energize and guide observable behavior. Differences in behavior are explained almost exclusively in terms of situational factors, external as well as internal stimuli. Enduring (i.e., dispositional) factors are attributed to biological mechanisms, e.g., organismic homeostatic states that, if disturbed, elicit need states and thus stimulate drives, to mechanisms of the central nervous system such as the ARAS or the reinforcement centers, or to need-independent incentive characteristics of substances such as various types of food. Eysenck was the only proponent of the associationist approach to pay much attention to person factors, i.e., individual differences in motivational dispositions (traits).

There are historical reasons for this. Issues relating to motivation were initially embedded in other theoretical questions and only gradually evolved as questions in their own right. The learning theorists' research was and is primarily focused on learning processes, i.e., on the organism's adaptation to changes in the environment. Arousal-oriented research focuses on the functional analysis of neurological and psychophysiological mechanisms of the responding organism. Both branches made extensive use of animal research. For this reason, and

because their actual strength is more easily manipulated, motivation research within the associationist strand is generally restricted to organismic needs or, more accurately, the resulting drives or "primary motives." "Secondary," "higher," or "social" motives that encompass different categories of person-environment interactions were not considered at all, much less as an explanation for individual differences in motivation. Nevertheless, both branches contain some notions that point in that direction:

- Fear as a learned, secondary drive (N. E. Miller)
- Individual differences in dispositional anxiety (Spence and Taylor)
- Exploratory and epistemic behavior (Berlyne)
- Personality differences in the perception of the environment and emotional stability (Eysenck)

Summary

The historical overview provided in this chapter was intended to give readers an impression of the variety and scope of the research activities and theoretical models that relate to explanatory concepts like motive (or equivalent concepts) and motivation in one way or another. At the same time, the overview maps out the rather convoluted path that characterizes the study of motivation. The scientific study of motivation is still too young for there to have been a thorough historical analysis of the issues involved.

The subsequent chapters of this book focus more on motivational and cognitive approaches related to the psychology of motivation than on the other strands of motivation research. There are a number of reasons for this:

- These approaches reflect the interplay of influences from the other research traditions, particularly those relating to personality, cognition, and learning.
- They have produced a number of fruitful syntheses of theoretical models and methodological developments.
- They attest to the rapid development of experimental research.
- The study of "higher" human motives not only relates to all the fundamental issues of motivation research but also demonstrates a variety of approaches to these issues.
- At present, the theory and methods of these approaches are best able to respond to the demand that behavior be regarded as a process of interaction between changing situation factors and dispositional person factors.

Moreover, particular attention will be paid to volitional phenomena, an area of research that is undergoing rapid development. Undoubtedly, the study of volitional processes will play an increasingly significant role in future motivational research.

Review Questions

1. *Which research traditions can be distinguished in the history of motivation research, and who were their founders?*
   - The psychology of the will: founded by Narziss Ach
   - The instinct theory approach: founded by William McDougall
   - Personality theories: founded by Sigmund Freud
   - Associationist theories, the learning psychology approach: founded by Edward Lee Thorndike
   - Associationist theories, the activation psychology approach: founded by Ivan P. Pavlov
2. *What are heterogenetic and autogenetic theories of the will?*

   Heterogenetic theories of the will (e.g., Ebbinghaus, Külpe) attribute volitional phenomena to manifestations and entities beyond volition itself (e.g., muscular sensations, intellectual conclusions). These heterogenetic mechanisms were investigated using introspective methods. Autogenetic theories of the will (e.g., Wundt, James), in contrast, conceptualize volition as an independent

(continued)

entity, attributable to volitional processes and not to other manifestations.

3. *What role did Wilhelm Wundt and the members of the Würzburg school consider conscious and/or unconscious processes to play in the development and implementation of volition?*

   Both conscious and unconscious processes are involved in the development and implementation of volition, with unconscious processes playing a particularly important role. For Wundt, all processes of attention, apperception, perception, thought, and memory – i.e., what we now know as information processing – were driven by volitional acts.

4. *Who founded experimental psychology, and which were the first experiments conducted?*

   The founder of experimental psychology was Wilhelm Wundt; his experiments were studies of "mental chronometry." This involved the comparison of reaction times under different experimental conditions. The difference observed ("subtractive procedure") was used as an indicator of the complexity of certain subprocesses of the reaction.

5. *What is meant by Narziss Ach's construct of the "determining tendency," and what was the decisive experiment conducted in this respect?*

   In both mental and motor tasks, determining tendencies below the level of conscious awareness must be at work in order for an intended goal to be implemented. In Ach's decisive experiment to measure volitional strength (determining tendency), respondents had to overcome a strong association (between two syllables) to carry out a new instruction (a different combination of syllables). The more frequent the presentation of the original association, which now had to be overcome in order to execute the new instruction successfully, the stronger the determining tendency was considered to be.

6. *What contribution did William McDougall's instinct theory make to the study of motivation?*

   McDougall saw instincts as inherited psychophysical dispositions that determine people to perceive, and pay attention to, objects of a certain class, and to respond to this experience with a particular quality of emotional excitement and by acting in a particular manner. In the USA, this definition paved the way for the selective study of motivational processes (the reasons for action) at the expense of research on volitional processes. McDougall's specification of 18 motivational "propensities" inspired personality psychology (e.g., Allport, Lersch). Finally, McDougall's concepts of instinct and propensities can be seen as direct precursors to the study of comparative behavior or ethology.

7. *What was Sigmund Freud's contribution to contemporary motivational psychology?*

   Freud focused attention on the following aspects, introducing them to the study of psychology: the decisive role of the unconscious, individual drive dynamics as determinants of behavior, and drive reduction as the mechanism underlying motivated behavior. The following assumptions proved particularly influential:

   - Drive impulses become manifest in different ways.
   - The id, the superego, and the ego are involved in permanent conflict.
   - The adult personality is an outcome of drives and their vicissitudes in childhood.
   - The psychosexual stages of drive development evolve from a three-way drama between mother, father, and child.

8. *What influence did Kurt Lewin have on the psychology of motivation?*

   Lewin's theory did not focus on individual differences, but involved broader psychological principles. His construct of the "quasi need" shifted research interest away from processes of volition (Narziss Ach's "determining tendency"). Lewin explains behavior in terms of the field of psychological forces emanating from the environment and the individual at any point in time: $B = f(P, E)$. Although his model was focused on the environment, Lewin's work influenced the personality theory approach to motivation. His environmental model with its analysis of situational forces (i.e., incentives) informed incentive theories of motivation. Lewin's approach also influenced conflict theory, the theory of level of aspiration, and research on substitute activities. Many of his experimental paradigms are still in use.

9. *What are the basic premises of Vroom's instrumentality theory?*

   Actions and their outcomes have consequences that are associated with positive and negative incentive values. The individual anticipates these action-outcome consequences, and this anticipation serves to motivate action. The valences associated with the positive and negative incentives can vary individually. They are multiplied by the action's instrumentality for attaining the consequences (action-outcome-consequence expectancies; see outcome-consequence expectancies in Chap. 1, Fig. 1.2) to obtain the incentive value.

10. *How does McClelland define motivation?*

    Motivation is the "redintegration" by a stimulus cue of an experienced change in a certain class of affective situations (e.g., achievement situation).

11. *How does Atkinson's risk-taking model of achievement motivation represent the interaction between person and situation factors?*

    $T_s = M_s \times P_s \times I_s$; the motive tendency to approach success is the product of the personal motive to achieve success, the probability of success, and the incentive value of success. This product reflects the interaction between person and situation factors: If any of the factors in the equation is equal to zero, the others will have no effect either. When all factors come together, however, the product, i.e., the motive tendency, increases substantially.

12. *What was the major impact of the cognitive psychology approach (to personality theories of motivation) on the study of motivation? Which research traditions were founded on the basis of this approach?*

    The cognitive psychology approach reintroduced the concept of reason to the study of motivation, following a long period during which the field had been dominated by the concepts of drive and instinct. Cognitive processes such as beliefs, perceptions, and expectancies about the courses of action available in a given situation can motivate behavior, as can incentives. The cognitive psychology approach produced consistency theories, which state that motivated behavior is intended to avoid or resolve inconsistencies. These consistency theories include the theories of cognitive balance (Heider) and cognitive dissonance (Festinger). The theory of causal attribution (Heider, Weiner) is also an outcome of the cognitive psychology approach.

13. *What is the basic premise of associationist theories in motivation research?*

    The basic idea is that behaviors that facilitate successful interaction with the environment, i.e., that have survival value,

(continued)

became associated with pleasurable feelings over the course of human evolution. Thus, behavior becomes associated with positive affect and thus becomes attractive.

14. *According to Hull, which two components determine behavior? How are these components linked?*

    Hull postulates a motivational component ("drive") and an associative ("habit") component. The two components are multiplied to determine a behavior tendency known as the "reaction-evocation potential."

15. *How does B. F. Skinner distinguish between operant responses and respondent behavior?*

    In operant responses, behavior is reinforced by being closely followed by a desired stimulus. Behavior causes the outcome and is reinforced by it. In respondent behavior (classical conditioning), in contrast, the stimulus eliciting a particular behavior or affect becomes associated with a new stimulus, such that the new stimulus is now also able to trigger the behavior or affect in question.

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Trait Theories of Motivation

3

David Scheffer and Heinz Heckhausen

3.1 From the Nomothetic to the Idiographic

Motivation emerges from the interaction of situational stimuli and dispositional characteristics. This chapter deals with the latter.

Dispositional factors of motivation are assumed to explain why some people show certain patterns of motivated behavior across situations, whereas others do not. Apart from specific situational stimuli, motivation is thus attributed to stable traits that are rooted in the individual personality and that distinguish between people across situations and, to a certain extent, over time.

Individual dispositions to show certain patterns of motivation across situations have been given various labels in psychological research, reflecting very different notions of which and how many such dispositions there are, how they develop, and how they influence motivation. Accordingly, theories of motivation differ in terms of the relative importance they attribute to dispositional and environmental influences. Whereas the five-factor model focuses on endogenous dispositions and assumes the environment to play only a minor role, systems theory approaches emphasize the complex interactions between external stimuli and internal dispositions.

In this chapter, we start with a simple model and gradually work our way toward a much more complex perspective on the role of dispositional factors in motivation. This does not mean to imply that one model is inherently preferable to another: all scientific theories of motivation aim to explain and predict in the most parsimonious and yet generally valid way possible why different people experience very different levels of tension and energy in similar situations and why their behavior is directed toward such different goals. The five-factor model pursues these objectives by reference to just five independent dispositions, and meta-analyses have confirmed the validity of this approach. Nevertheless, critics object that this and other models are overly reductionist and cannot be applied productively to specific situations. They argue that explanations of individual differences should draw on many more variables and are interested in how the various internal and external factors of motivation are related and interact. Since both approaches unquestionably have their merits, this chapter covers a broad range of perspectives – from the strictly nomothetic to the idiographic.

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3.1.1 Key Issues in Trait Theories of Motivation

Person-centered explanations of behavior based on first-glance observations provide a natural starting point for the study of motivation. Individual differences in behavior under seemingly equivalent (or unheeded) situational conditions catch the eye immediately. Nothing would seem more reasonable than to attribute these differences to dispositions of varying strengths. That in itself constitutes a trait theory, albeit an incomplete one. When observed behaviors are described in terms of traits, such as helpfulness or pugnacity, they are endowed with motivational characteristics, implying that the individual strives to exhibit that behavior whenever possible.

Closer examination of the motive-like dispositions that underlie certain behaviors inevitably touches on some of the key issues of the motivation concept discussed in Chap. 1. One question to be asked is how individual differences can be objectified. Researchers only began to address this issue, which is essentially one of motive scaling, relatively recently. Their logical first step was to draw up a taxonomy of motives. How can one disposition be distinguished from other potential dispositions, and how many dispositions are there in total? Given that individual differences are not limited to a single behavioral domain such as helpfulness but are also apparent in many other domains, there must necessarily be numerous dispositions.

These motive dispositions do not all determine processes of motivation at once, however. Instead, one or a few motive dispositions become activated, while the others remain latent. But what are the mechanisms behind this activation process? This question brings us to the key issue of motive arousal: much as it is important to consider person factors in the form of motivational dispositions, it is also vital to be aware of the situational factors that contribute to the arousal of a motive. A taxonomy of motives must therefore take account of the various motives activated across different situations. In other words, how many categories of person-environment relationships can be distinguished on the basis of the motivation processes characteristically activated?

Once these questions have been addressed, a taxonomy of motives can be examined experimentally. The intensity and thematic content of the situational incentives can be varied systematically while observing the extent to which the motivation process remains equivalent, i.e., subject to the same motivational disposition. It is only when the situational incentives of individual motive dispositions have been determined that it is possible to tackle motive scaling by measuring individual differences in behavior, while the intensity and thematic content of situational incentives are held constant.

3.1.2 Definition of a Trait

Allport (1937) defined a trait as:

> **Definition**
> A generalized and focalized neuropsychic system (peculiar to the individual), with the capacity to render many stimuli functionally equivalent and to initiate and guide consistent (equivalent) forms of adaptive and expressive behavior. (p. 195).

The *achievement motive* (Chap. 6), e.g., might be defined as an internalized, highly generalized standard of excellence that is applied to stimuli as varied as playing chess, driving a car, chatting at a party, or doing one's job, in such a way that these stimuli are rendered functionally equivalent and lead to corresponding forms of behavior. Consistent (equivalent) forms of adaptive behavior that are congruent with the standard of excellence applied would be a strategic, ambitious approach to the game of chess, foresight and focus when driving, acquisition of useful information at the party, and professionalism at the workplace. Consistent (equivalent) forms of expressive behavior might be dogged determination in the game of chess, calm contemplation when driving, insistent interest at the party, and enjoyment of one's work. This definition of a trait is illustrated in Fig. 3.1.

The more stimuli (or, more generally speaking, situations) a trait can render functionally equivalent, the stronger it is. Extremely strong

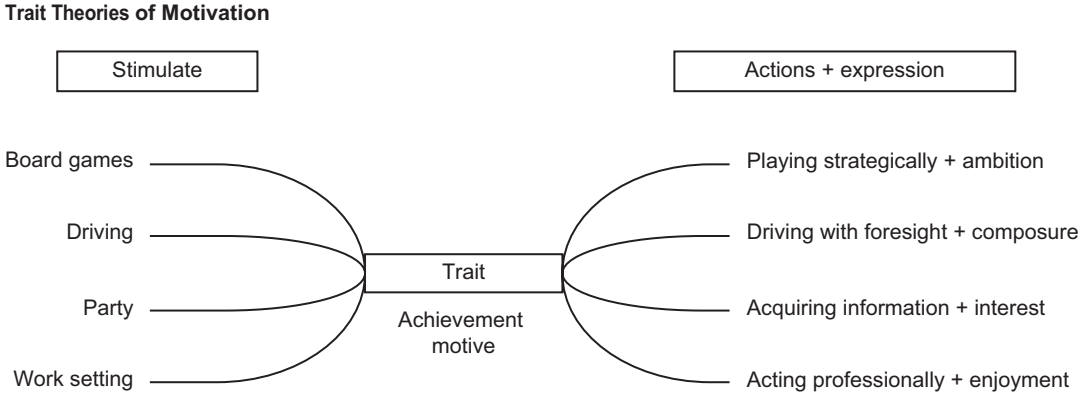

Fig. 3.1 The relationship between stimuli (situations), traits, and actions

traits may have detrimental effects. For example, a very strong achievement motive might lead someone to gauge his romantic life with a partner on a standard of excellence and to engage in corresponding forms of adaptive and expressive behavior. It goes without saying that this is unlikely to strengthen the relationship.

Allport's trait definition implies that extremely strong traits lead to uncompromising, inflexible reactions that can only be appropriate or adaptive in the presence of very specific environmental demands. In the course of human evolution, many traits have thus come to approximate a normal distribution; in other words, most people have traits of intermediate strength. Aristotle already described this principle in his *Nicomachean Ethics*. Later, the communication theory by Schulz von Thun (2002) expanded on this thought, while Scheffer, Schmitz, and Sarges (2007) and Scheffer and Sarges (2017) used it to develop models of competence. Erpenbeck, von Rosenstiel, Grote, and Sauter (2017) provide an overview of the various approaches that interpret traits such as implicit motives (see below) as competences to make them measurable in the practical fields of employee selection and human resources.

In the last two decades, empirical research has demonstrated that personality traits and their effects on behavior are implicit and not accessible to conscious self-report. For example, Stanton and Schultheiss (2009) report that men's explicit self-report about being dominant was unrelated to their objectively measured level of testosterone. In contrast, their implicitly assessed power motive correlated significantly with their testosterone level. Apparently, implicit motives such as the power and the achievement motive modulate complex configurations of cognitive and affective systems so as to optimize them for the satisfaction of needs (Kuhl & Kazén, 2008). Only a fraction of these processes in the central nervous system are accessible to consciousness. In a way, consciousness functions like a pilot in a modern airplane, who leaves 95% of the flight regulation to the automatic pilot and focuses on monitoring critical indicators and intervening in unusual or emergency situations. The practical implications of the functioning of such unconscious mental processes are being acknowledged and used in disciplines outside personality psychology, such as economics (Camerer, Loewenstein, & Prelec, 2005), market research (Zaltman, 2003), and diagnostics used in personnel decisions (Sarges & Scheffer, 2008).

Trait theories aim to identify and enumerate the major traits, to what degree they are conscious, to determine how they can be measured or inferred, and to establish the forms of adaptive and expressive behavior they can explain and predict. Moreover, they seek to predict how different traits interact with one another and with environmental stimuli.

The first question to be addressed is how many traits there are or, more specifically, which traits are important enough or seem to be of sufficient practical interest to warrant in-depth investigation. This brings us to the so-called classification problem, with its two potential errors:

1. All too often, people give observed behavior labels such as helpfulness or pugnacity, thus endowing them with the character of a trait and implying that the individual strives to exhibit that behavior at every opportunity. Although wanting to identify the dispositions underlying behavior seems reasonable, this approach can result in circular reasoning, with every observable behavior being attributed to a corresponding trait. Furthermore, it leads to the inflation of traits in behavioral explanations and thus violates the principle of parsimony.
2. Alternatively, too few traits may be assumed. Although in line with the principle of parsimony, the descriptions and predictions of motivation yielded by this kind of approach are just as invalid as those produced when the first error is committed.

Therefore, a good trait theory of motivation, like any other theory, must be "as simple as possible, and as complex as necessary."

In this chapter, we will first present theories that aim to explain motivational phenomena on the basis of relatively few variables. The models described will become gradually more complex, encompassing more variables and assuming these to interact with one another. This approach does not mean to imply that any one theory is inherently preferable to another. Simple models are not automatically better than complex ones because they are more parsimonious; complex models are not automatically superior to simple ones because they seem to be more valid and better applicable to specific situations.

3.2 The Lexical Approach or the Wisdom of Language

In this section, we present the five-factor model and Cattell's trait theory, both of which focus primarily on the classification problem. The two theories take a similar approach, relying on human intuition in the appraisal of others to generate hypotheses and using factor analysis to reduce redundancies in empirical data and identify the underlying factors.

Both theories draw heavily on the work of Allport and Odbert (1936), who investigated what is known as the sedimentation hypothesis, according to which all important interindividual differences that help to predict people's behavior in everyday life have been encoded in language over the course of linguistic evolution. Our ancestors' accumulated knowledge of human personality attributes is thus reflected in a corresponding vocabulary. Allport and Odbert found no less than 17,953(!) English words describing behavioral attributes.

In 1946, Cattell reduced this list to 171 variables, which he classified into bipolar pairs, such as:

- Forward-looking vs. preoccupied with the past
- Expressive vs. reserved

Thus, Cattell did much of the groundwork for the five-factor model. However, because the present chapter proceeds gradually from the nomothetic to the idiographic, we will nevertheless start with the five-factor model. Cattell's theory is broader in scope than the five-factor model and paved the way for the notion that motivation can be seen as a function of independent, but interrelating endogenous and exogenous systems. Here again, it is important for us to reiterate that our approach should not be interpreted as implying a rank ordering of models: a theory is not automatically any better than another, simply because it seeks to consider the complex interplay between environmental and personality factors. Science as an undertaking aims to increase efficiency. As we will see, the five-factor model offers a simple theory that allows individual differences in human motivation to be explained and predicted with great efficiency and methodological stringency.

3.2.1 The Five-Factor Model (The Big Five)

The five-factor model is today seen as the foremost trait theory, especially by practitioners in the field of personnel psychology. It is, in fact, a (relatively simple) model rather than a theory,

but psychological research does not always differentiate carefully between the two. Widely used personality tests based on the five-factor model include the NEO-FFI (Costa & McCrae, 1985; see also Chap. 9) and the Hogan Personality Inventory (Hogan & Hogan, 1995). The popularity of the five-factor model owes a great deal to its simplicity. It reduces the wealth of personality attributes in human language to just five underlying factors and thus provides for a clear classification. The statistical procedure of factor analysis is crucial to the model, being used to identify clusters of correlating personality characteristics.

The five-factor model originated from a systematic observation of how people appraise others. The personnel selection psychologists Tupes and Christal (1992), who were responsible for screening applicants for the US Air Force, used the adjective list compiled by Allport and Odbert in their assessment centers. They noticed that five factors always seemed to emerge from factor analyses of appraisal data, even with very different samples of applicants and raters. They concluded that these five factors constitute the underlying structure of the language that observers use to characterize others.

Goldberg (1982) recognized the implications of this work, which was not made available to a general readership until 1992, and disseminated the findings in scientific circles. He developed the general hypothesis that the factors identified by Tupes and Christal reflect the structure of the language that humans use to describe, predict, and control their own and others' behavior in everyday social interactions – processes that social life in groups had rendered indispensable to survival over the course of human evolution (see also Hogan, 1996; Saucier & Goldberg, 1996).

Based on this empirically determined factor structure, Goldberg inferred the existence of certain universal neuropsychological structures or traits and suggested that humans intuitively screen others (and indeed themselves) for behavioral evidence of these traits. When we meet people for the first time and know that our interactions with them are likely to be important, we ask ourselves the following questions:

Intuitive Self and Other Evaluations on the Basis of the Five-Factor Model

- Is the other person lively, convincing, optimistic, and sociable (extraverted)?
- Is the other person friendly, and does he or she adhere to social norms (agreeable)?
- Is the other person reliable, goal striving, and hardworking (conscientious)?
- Is the other person well balanced, robust, and stress resistant (emotionally stable)?
- Is the other person flexible, imaginative, and intellectual (open to experience)?

3.2.1.1 Validity of the Big Five

Goldberg argued that humans are unable to process any more information when appraising others owing to the limited working capacity of the cognitive apparatus. Nevertheless, people seek to assess the strength of the traits of those around them as accurately as possible. There is one simple reason for this: if we know what makes other people tick, we can predict how they will behave, and this knowledge can help us to succeed in life. We are constantly making predictions about other people's behavior in everyday life: "Will this man be an emotionally stable father?," "Is this disagreeable insurance agent trying to take me for a ride?," "Will this employee be conscientious enough to get his/her assignments finished on time?," and so on. A high score on one of the Big Five factors is not always adaptive, however. For example, some CEOs deliberately promote junior managers who do not seem to be very agreeable, in the belief that they will otherwise not be sufficiently tough in a competitive environment (e.g., in their interactions with subordinates).

- The underlying assumption of the five-factor model is that linguistic structures that facilitate valid predictions will be more likely to survive than structures that reliably lead to flawed predictions.

In terms of evolutionary theory, the Big Five can thus be interpreted as a complex form of *memes* – cultural entities that evolve through a process of selection and variation, in the same way as genes.

The behavioral observation methods and questionnaires developed on the basis of the five-factor model have enjoyed widespread application, and meta-analyses have been conducted to examine the validity of the Big Five traits. These meta-analyses unambiguously support the construct and criterion validity of the questionnaires and adjective checklists developed on the basis of the five-factor model (Barrick & Mount, 1991; Meyer et al., 2001). For example, when self-report questionnaires are used to assess the Big Five, extraversion is found to correlate with a good sales record, conscientiousness with positive performance appraisals, agreeableness with a strong customer focus, etc.

Notably, however, the mean, uncorrected correlations of self-reported Big Five with relevant criteria are below $r = 0.20$. This apparently low validity might be attributable to the limitations of self-evaluation questionnaires. Indeed, assessment center data show that direct evaluation of behavior made by the observers exhibit higher mean criterion validity, at $r = 0.38$ (for a summary, see Meyer et al., 2001).

Yet, even when the uncorrected correlations seem low, relationships between predictors and criteria are often worth taking very seriously. These relationships are often underestimated due to the low reliability of both the predictor and the criterion (!) variables and their frequently limited variance. The examples from the meta-analysis by Meyer et al. (2001) cited below illustrate this point.

It would hardly be advisable to continue smoking on the basis of the seemingly low correlation between smoking and lung cancer. As this example illustrates, even low validity scores can be of great significance in the real world. Findings showing that significant validities determined for the Big Five can be replicated across numerous different samples testify to the soundness of the approach.

- Because the Big Five are empirically independent of one another (i.e., barely intercorrelate), meaningful predictions can be made on the basis of individual trait profiles.

Example

Important effects may be concealed behind seemingly low correlations:

Correlation between gender and height	***r* = 0.67**
Correlation between observers' ratings of the attractiveness of cohabiting pairs	$r = 0.39$
Correlation between the reliability of a test and its construct validity	$r = 0.33$
Correlation between smoking and the onset of lung cancer within 25 years	$r = 0.08$
Correlation between chemotherapy and the survival rate in breast cancer patients	$r = 0.03$

The Big Five and the Structure of Human Temperament The Big Five traits derived from the five-factor model seem to be relevant to both research and practice for the simple reason that they represent a taxonomy of dimensions of human temperament (Angleitner & Ostendorf, 1994) that evidently also applies to other mammals (McCrae et al., 2000). Extensive international studies suggest that the five factors are basic, biologically rooted, endogenous traits, i.e., they are not affected by the environment in any way (McCrae et al., 2000, p. 175). The high heritability of the Big Five, which twin studies generally put at 50% (Loehlin, 1989), is one indication of this endogeneity. However, these estimates include measurement errors caused by the less-than-perfect reliability of the measures, as well as systematic method factors associated with the use of self-reports. When the method variance is reduced by combining self and other evaluations, estimations of heredity are much higher than 50%, at between 66% and 79% (Riemann, Angleitner, & Strelau, 1997).

The remaining 21–34% of the variance is explained almost exclusively by influences that siblings do not share, i.e., cannot be traced back to the social background, parenting styles, or similar factors. Harris (1995) argued that, after genetic factors, peers have the most

important impact on the development of children's characters. However, it is also possible that the small proportion of variance in the Big Five that cannot be explained by genetic factors is attributable to biological factors; e.g., the prenatal hormonal environment may be influenced by stress during pregnancy (Resnik, Gottesman, & McGue, 1993).

Two further patterns of results support the notion that the Big Five are endogenous personality dimensions:

1. They are remarkably stable. Very accurate predictions of a 70-year-old's personality can be made on the basis of measurements taken 30 years earlier (Costa & McCrae, 1992).
2. There seems to be a universal, cross-cultural process of maturation of the Big Five: extraversion and openness to experience decrease with age, while levels of agreeableness and conscientiousness increase (McCrae et al., 2000). This observation does not contradict the assumption – based on test-retest correlations – that the Big Five are extremely stable. In fact, an individual's rank placement in a sample can remain virtually unchanged over time, with all participants experiencing similar changes in trait strength. The magnitude of this change as a function of chronological age is low, however ($r < 0.20$; see McCrae et al.). This process of maturation makes perfect sense from the perspective of evolutionary psychology: whereas high levels of extraversion and openness to experience motivate young adults to approach others (an approach that is conducive to the "mating effort"), higher levels of agreeableness and conscientiousness lead to increasing *staidness* with age, thus providing any offspring with the security and routine they need to develop and thrive (an approach that is conducive to the *parenting effort*).

The biological rooting of the Big Five brings us back to the sedimentation hypothesis, according to which only genetically anchored traits that remain stable from generation to generation are coded in human language. This process results in a universal grammar for the description of important personality characteristics. Today, this grammar provides a practical heuristic that can be used to consolidate observations of oneself and others into valid characterizations of oneself and others. Heuristics are "rules of thumb" that are primarily used when time is short and information is incomplete. Although they have the advantage of being fast and frugal (Fiedler & Bless, 2002), it is important to bear in mind that heuristics like the five-factor model can also lead to errors in the appraisal of others.

Block (1995) identified two potential errors in personality descriptions based on the five-factor model:

1. Neglect of the context: The five-factor model does not define specific situations that activate or deactivate the five essential traits. Thus, personality descriptions based on the five-factor model are at risk of being blind to the context and remain an overly simple form of assessment based on indiscriminate classifications of others.
2. Neglect of less salient, but important characteristics: Based on methodological considerations, Block (1995) argues that factor analysis is not a suitable procedure for examining the decision-making processes underlying personality appraisals. Klein, Cosmides, Tooby, and Chance (2002) have since shown that semantic and episodic memory cooperates in the perception of others and that the functioning of episodic memory, in particular, does not correspond with the logical structure and sequential approach of factor analysis. Yet episodic memory is thought to be decisive for detailed, finely nuanced personality descriptions. An exclusive focus on factors that explain a large proportion of variance in factor analysis can thus lead to important details being overlooked. And as Block points out, factors that explain a large proportion of variance may have only trivial implications for behavior, if any, whereas residuals with low eigenvalues (i.e., the 6th, 7th, or even 21st factor) may have significant effects.

Excursus

Human Evolution Has Produced a Wealth of Traits: The Swiss Pocket Knife Analogy

Evolutionary psychologists Cosmides (1989) and Cosmides and Tooby (1992) identified a specific psychological mechanism, the function of which is to detect people who are trying to cheat us. This mechanism enables us to solve formal, logical problems that often defeat us in other contexts. Their findings have two implications for the five-factor model:

1. *Psychological mechanisms that develop into differential traits through a process of natural selection seem to be domain specific***.** In other words, they only render some potential stimuli functionally equivalent, e.g., all social situations in which cheating may occur. The mechanism is only activated in these situations.
2. *Numerous mechanisms of this kind seem to be needed for survival and reproduction, prompting Cosmides to compare the human psyche to a Swiss pocket knife.* Both have a number of different tools that can be applied to certain problems but that cannot solve others. Although these tools may appear to be similar on the surface, they evolved independently and represent distinct neuropsychological units, each with a specific evolutionary advantage.

Bearing in mind that the number of traits identifiable on the basis of Allport's definition is very high indeed, the five-factor model can nevertheless be put to worthwhile use as a heuristic. Labeling others as disagreeable may be interpreted as a product of the mechanism for detecting cheats, for example. After all, we have a vested interest in finding out whether or not the people with whom we interact are likely to abide by social norms.

All things considered, the five-factor model does not seem suited to solve the classification problem. Some personnel psychologists have long maintained that the five factors are much too broad for practical applications and that valid predictions of behavior require considerably larger numbers of better defined traits. Gough (1990) adopted a more differentiated strategy with the California Personality Inventory (CPI). He demonstrated that there are more than a dozen interculturally distinguishable *folk concepts* of traits that are regarded as independent in very different societies, even though their empirical intercorrelations are relatively high. Although dominance and sociability both load on the extraversion factor in the five-factor model, e.g., it is the dissociation of the two that provides the most valuable diagnostic information. The positive correlation between dominance and sociability means that they are relatively few in number but there are indeed individuals who are both highly assertive and very withdrawn and who thus seek to avoid public speaking and large crowds. According to Gough (1990), it is precisely this noncorrespondence of correlating traits that is often particularly meaningful for motivation (see also the dissociation-oriented approach presented in Chap. 12, according to which two variables that correlate strongly may be completely independent of each other, meaning that they should be assessed separately).

As the excursus above illustrates, Gough's notion that there is nothing to be gained from reducing a large number of traits to a few underlying factors has received support from researchers with a background in evolutionary psychology. Proponents of the five-factor approach do not claim the Big Five to be the only important human traits, however. They are well aware that there may be other independent personality dimensions, such as the willingness to take risks (Andresen, 1995). Indeed, nobody would be genuinely surprised if a Big Six or Big Seven model of endogenous personality dimensions proved to be necessary in the course of time. However, there would have to be very good arguments for the introduction of any new factors to ensure that the principle of parsimony is not violated.

Furthermore, McCrae et al. (2000) distinguish between the biologically anchored dispositions described by the Big Five and culturally conditioned characteristics, including acquired abilities, habits, values, and motives (McCrae et al., 2000). There can be no doubt that these environmentally determined systems exist, that they influence human motivation, and that they have dynamic characteristics that distinguish them from personality dimensions. Cattell provided factor analytic evidence for the orthogonality of temperament-related and culture-specific traits. He was also the first to point out that dynamic traits should be investigated using methods other than questionnaires (see the distinction between implicit motives, measured by operant tests, and explicit traits, measured by questionnaire methods, in Chap. 9).

In summary, the Big Five cannot solve the classification problem. This is because its relatively superficial and socially desired behavioral tendencies are derived from a *Wisdom of Language* and do not relate to specific contexts. Their correlation with the observable behavior of real individuals in real-life situations tends to be low (see Block, 2010). Recent studies have also shown that a psychometrically convincing assessment of the Big Five might be limited to educated Western populations, whereas people with sociodemographic disadvantages and indigenous populations seem to produce different factors and a low retest reliability (cf. Gurven, von Rueden, Massenkoff, Kaplan, & Vie, 2013; Gnambs, 2015).

3.2.2 R. B. Cattell's Trait Theory

Cattell's theory had a considerable influence on the development of the five-factor model but is itself much more complex. Cattell first distinguished three types of dispositions as the causes of observable classes of behavior:

- Cognitive dispositions (abilities), which are manifest in problem-solving situations of differing complexity
- Temperament dispositions, which are pervasive, i.e., are manifest regardless of the situation
- Dynamic or motivational dispositions, which increase or diminish in accordance with the incentive strength of the situation

These three types of dispositions are not distinguished conceptually in the five-factor model and are thus confounded in the tests based on that model.

The distinction between temperament dispositions (traits) and dynamic, motivational characteristics is one of Cattell's most significant contributions to research. In a longitudinal study, Winter, Stewart, John, Klohnen, and Duncan (1998) showed just how important this distinction is for predicting behavior. Whereas dynamic, motivational characteristics (like the motives covered in Chaps. 6, 7, and 8) describe and predict what a person strives to achieve, temperament dispositions reflect how he or she translates that motive into action.

Study

Motives and Traits May Have Interactive Effects on Behavior

Winter et al. (1998) already put the universal claim of the Big Five into perspective: in a longitudinal study with two different samples, they showed that implicit motives and traits may have interactive effects on social behavior. Extraverted and introverted individuals (extraversion-introversion was measured using the first vector scale of the CPI by Gough, 1990)) only differed on important behavioral criteria if they had scored high on the affiliation and power motives 20 years earlier. For example, women who were high in the affiliation motive 20 years earlier showed high levels of marital instability (more separations and remarriages) if they were later classed as introverted, but not if they were extraverted. This finding makes perfect sense if the trait of extraversion is interpreted as a motive implementation style: given their temperament, introverted indi-

viduals find it difficult to open up to others and to experience intimacy. Moreover, they may tend to overreact in marital conflicts. For someone with a high dispositional affiliation motive, responses of this kind must be seen as deficits that can put strain on the relationship (particularly if the partner is also introverted, although this aspect was not tested in the study by Winter and colleagues). For someone without a strong affiliation motive, on the other hand, this temperament-based interpersonal distance need not be seen as a deficit but can be perceived in positive terms, as a measure of independence. This might explain why introverted women who were low in the affiliation motivation 20 years earlier reported the highest levels of marital stability (although the differences were not significant) in the two samples examined.

Brunstein's distinction between implicit and explicit motives offers an equally plausible explanation for this pattern of results (see Brunstein, Schultheiss, & Grässmann, 1998; Schultheiss & Brunstein, 1999; see also Chap. 9). A questionnaire measure of extraversion can be interpreted as reflecting an explicit affiliation motive. If a person scores low on this measure, but high on a TAT measure of the implicit affiliation motive, the discrepancy is likely to have detrimental effects on well-being.

Asendorpf (2004) has drawn attention to a methodological shortcoming of the Winter et al. study. Whereas implicit motives were measured in young adulthood, the questionnaire measures of extraversion and social behavior were not implemented until 20 years later. Hence, discrepancies between implicit and explicit motives might also derive from experiences that influenced both motive types but could only logically be picked up by the questionnaires implemented at the second point of measurement. In this case, it would not be a matter of interactions between implicit and explicit motives but of changes in motive strength in response to social experiences.

This point can be illustrated by reference to two kinds of traits: the temperament disposition of extraversion, as contained in the five-factor model, and the motivational disposition of affiliation. The goal of the affiliation motive is to experience emotional warmth in social interactions with individuals and groups. It thus describes what a person strives to achieve. High extraversion, in contrast, describes the personal behavioral style, or how an individual expresses all manner of aspirations (even for power and influence) across very different situations. The following case study illustrates why it makes sense to distinguish between these dispositions, even though they seem so similar on the surface.

Example

Ben always sits by himself in the lecture theater. He rarely goes to parties. If his fellow students speak to him, his answers tend to be monosyllabic. His peers conclude that he is introverted and simply not interested in other people and soon begin to ignore him. They are very much mistaken, however, much to Ben's chagrin. Affiliation is in fact his strongest motive. But because he is so introverted, he does not dare talk to people he does not know very well, and he is at a complete loss for words whenever women speak to him. Consequently, he satisfies his need for social contact on the Internet, where nobody notices how shy and awkward he is. It is only in this context that he can reconcile his need for affiliation with his introverted temperament.

The what and the how of motivation do not correspond in this example. It is very much easier for people who seek to establish a wealth of social contacts to satisfy this need if they are extraverted – particularly in relatively new and unfamiliar situations (Winter et al., 1998). A high achievement motive might be more congruent with Ben's shyness; indeed, satisfying this motive is rather more compatible with an introverted temperament. What we are interested in at the

moment, however, is the independence of motives and temperament. The contrasting case study that follows provides further illustration of this point.

Example

Lisa is always surrounded by a throng of students in the lecture theater. She goes to lots of parties and is always the center of attention. She loves to engage in lively discussions and has many friends and acquaintances. After a while, however, those who get to know her more closely and who observe her carefully, realize that she is not really interested in forming meaningful relationships. Other people simply serve her aims of getting ahead and getting her own way. Should they step out of line, she will – in her own charming way – drop them like hot potatoes.

Ben and Lisa are complete opposites in terms of their needs and temperaments. Although Lisa finds it very easy to establish relationships with others, her sociable behavior does not reflect her true motivation. Despite her many contacts with others, she feels no real need for affiliation and social bonding. This makes her very independent and helps her to gain power and influence over others. Ben, on the other hand, is unable to satisfy his most fervent wish of establishing meaningful relationships with others.

Cattell (1957, 1958, 1965) was the first to provide comprehensive empirical evidence for the independence of motivational, cognitive, and temperamental dispositions. In his search for unique, independent dispositions and their mutual boundaries, he did not rely on phenomenological descriptions, the accumulated labels of everyday language, or intuitive insights. Rather, he measured individual differences, often over broad domains of possible classes of reactions, to determine which reactions covary with each other. Unlike the proponents of the five-factor model, he was not content to submit the data obtained from questionnaires measuring motive-related characteristics such as helpfulness or sociability to factor analytic categorization and to regard the factors extracted as dispositions, with individuals being characterized in terms of their factor scores.

He considered this kind of approach injudicious for two main reasons. First, the factors emerging (the covariation patterns of responses) are largely dependent on the range of variability of responses that can possibly be elicited from the participant by the assessment procedure applied. For example, the factor analyses performed by the proponents of the five-factor model were essentially based on various forms of the almost 200 adjectives that Cattell conceived of as the range of response. It is hardly surprising that factor analyses of a given set of adjectives or behavioral descriptions derived from those adjectives always yield five factors. Measures that encompass representative samples of what occurs outside the test situation (on both the stimulus side and the response side) are needed to overcome the methodological biases inherent in the factors extracted. Second, the questionnaire instruments commonly used to scale the strength of motive dispositions have proved to have limited validity. Responses are based on introspective self-reports that can easily be falsified or influenced by response tendencies, especially since the purposes of the tests are normally quite transparent. Moreover, the extent to which individuals are capable of providing accurate self-reports varies (see Nisbett & Wilson, 1977 and the following excursus). For example, Lisa from the case study above might subjectively interpret her many social activities as indicative of a high affiliation motive, although her behavior is in fact driven by an implicit desire for power and influence. In a self-evaluation, she would not be willing or able to distinguish the what from the how of her motivation.

Cattell (1957) took a two-step approach to sidestep the inherent difficulties of self-report measures:

Step 1. He identified behavioral indices that reflect motive strength in the most direct and objective manner, i.e., are not subject to the individual's awareness and do not provide an opportunity for responses to be modified. This involved identifying unitary domains of

motive-related interests and attitudes and constructing objective tests as indices of the corresponding behavior. The motive strength data obtained (for the domains specified a priori) were then subjected to factor analysis and classified according to their motivational components. These components do not represent different motives in themselves, but rather definable manifestations of each motive. The behavioral indices that form the basis of the components can thus be seen as devices by which individual differences in the strength of specific motives might be measured.

Step 2. These scaling devices were employed to determine the covariation patterns of a broad spectrum of different attitudes and interests. For Cattell, the differentiated motivational dispositions that emerged from this process had general psychological validity. Finally, specific criteria were used to categorize these traits in terms of whether they are biological or acquired through sociocultural learning.

To determine the strength of motivational components, Cattell first collated practically all of the behavioral indices that psychologists had ever posited to elicit motive tendencies. At one point, Cattell (1957) listed no fewer than 55 such measures of *motive manifestations*, originating from areas of psychological research including general knowledge (e.g., information about means-ends relationships), perception, memory, learning, reaction time, fantasy, autonomic responses, prejudice, and resumption of interrupted tasks.

Excursus

Telling More Than We Can Know? The Limits of Questionnaire Measures

In 1977, a classic article by Nisbett and Wilson showed that people are often not capable of providing accurate information about the reasons for their behavior. These findings cast doubt on the validity of the questionnaire measures commonly used by psychologists. In the 1980s and 1990s, cognitive psychology thus placed increased emphasis on the experimental investigation of implicit aspects of memory and learning, i.e., aspects that are not accessible to verbal description (Goschke, 1997; Schacter, 1987). Today, social psychology examines nonconscious attitudes by means of implicit association tests (Bosson, Swann, & Pennebaker, 2000; Greenwald & Banaji, 1995). In particular, the Implicit Association Test (IAT), which measures negative attitudes (e.g., toward members of another race) in terms of longer reaction times to specific word cues (e.g., names typical of members of another race, such as Jamel), has stimulated a great deal of theory building and testing in the field (Greenwald et al., 2002). Stable traits can also be investigated by means of implicit measures. Bosson et al. (2000) showed that narcissism is associated with high explicit (conscious) and low implicit self-esteem. In motivation psychology, the distinction between implicit and explicit methods of measurement has a long tradition. For example, it is known that findings from the TAT have much in common with many experimental operationalizations of implicit processes, but do not correlate with questionnaire measures of the same theme. This point is covered in-depth in Chap. 9.

These behavioral indices loaded on six motivational factors that related to motivation in general rather than to a specific motive. Three of these Cattell labeled with the psychoanalytic terms *id*, *ego*, and *superego*. These six factorial components of motive strength were then subjected to second-order factor analysis. From this emerged two second-order factors, an integrated and an unintegrated motivational component. The integrated component encompasses focused, conscious aspects of a motive disposition

(ego, superego). The unintegrated component encompasses *complexes*, unconscious predispositions, and physiological reactions. Examples for this are bias and galvanic skin response. In subsequent studies, just these two motivational components were employed to measure strength in terms of their combined value, using a set of six principle indices that had proved particularly sensitive.

Cattell had thus created a generally applicable technique for scaling motive strength and could move on to the second step of delineating traits by means of factor analysis. He called this step dynamic calculus: the search for the factors of dynamic structures. Responses to devices covering a wide range of attitudes related to goal-directed behavior were factor analyzed. A number of clear factors emerged and were termed "unitary dynamic source traits"(Cattell, 1957). Some of these were labeled *ergs* (from the Greek *ergon*, meaning energy or work), which represented to Cattell a sort of biological drive, not unlike McDougall's (1908) original conceptualization of instinct.

Ergic traits can vary in their manifestations depending on situational incentives. Cattell also subjected intraindividual changes in the *level of ergic tension* to factor analysis. He identified two constant components – inherent or constitutional differences and the individual's past history – as well as three variable components: situational incentive, physiological state, and presence or absence of goal satisfaction. He thus demonstrated the dynamic nature of ergs, which wax and wane according to the incentive strength of the situation at hand. The ergs he identified are listed in Table 3.1.

Table 3.1 Action goals, emotions, and example attitude statements for six motive dispositions of the "erg" type (Based on Cattell, 1957, p. 541)

Action goal	Emotion	Attitude statement
1. Mating	Sex	I want to fall in love with an attractive man/woman
2. Gregariousness	Loneliness	I want to belong to a social club or team of people with congenial interests
3. Parenthood	Pity	I want to help the needy, wherever they are
4. Exploration	Curiosity	I like to read books, newspapers, and magazines
5. Escape to security	Fear	I want my country to be better protected against terrorism
6. Self-assertion	Pride	I want to be smartly dressed, with a personal appearance that commands admiration

Summary

Cattell used factor analysis to show that the ergs he identified are independent of traits. From today's perspective, however, it is regrettable that he did not continue to investigate ergs systematically and to test their antecedent conditions or consequences in theory-driven experimental analyses. Although the factor analytic approach is a great improvement on a priori definitions, it can only describe mean patterns of relations for the entire population of study participants and does not allow subgroups to be preselected on the basis of idiographic equivalence classes. This is because of the descriptive rather than explanatory nature of correlational analyses (including factor analysis), which can show which variables are associated and which are not but are unable to specify causal connections. Few insights into the key issues of motive arousal and motive development can thus be expected from this approach.

However, Cattell's creative approach to factor analytic trait theory made a substantial contribution to work on the fundamental issue of motive classification by helping to distinguish the motivational dispositions (ergs) listed in Table 3.1, to which we will return in later sections of this chapter.

3.3 Motives as an Expression of Needs

The three major proponents of need theories are McDougall, Murray, and Maslow. A need can be defined as a discrepancy between an actual state

and a desired state (McClelland, Atkinson, Clark, & Lowell, 1953). Actual states are characterized by the presence or absence of certain motive-related incentives, the congruence or fit of which is essential to the trait disposition. For instance, the need for affiliation is activated only when people experience rejection, i.e., when the situation is at variance with the aspired outcome; and it is not deactivated until they have been accepted again. Other positive stimuli do not have the same effect (Shipley & Veroff, 1952).

The various motives activated across different situations must therefore be taken into account in any classification of motives by needs. Need theories investigate how many categories of person-environment relations can be distinguished on the basis of the motivation processes characteristically activated.

3.3.1 Instinct-Based Classification of Motives

To some extent, Cattell's descriptive system of motives was a revival of McDougall's explanatory model of behavior, which dates back to the early twentieth century. It was McDougall (1908) who first attempted to attribute all human behavior to motivational dispositions. At that time, these dispositions were commonly labeled *instincts* rather than *motives*, which explains why Freud's concept of *Trieb* was rendered as instinct (and not drive) in the original English translation. The nineteenth-century faculty psychologists had already proposed the concept of instinct as a counterpart to intelligence. With the increased acceptance of Darwin's theory of evolution, scholars had also begun to draw on instincts to explain human behavior.

James (1892) viewed instinct as the capacity to act intuitively. What for him was just one of several explanatory concepts, McDougall saw as the basic principle for all dynamic explanations of behavior. By elevating instincts to such a dominant position, McDougall triggered the great instinct controversy of the 1920s (Chap. 2). The main critics of instinct theory responded with a radical behaviorist position, attributing all behavior to simple reflexes and learning (Watson, 1919). At the same time, Woodworth (1918), who had long envisaged a "*motivology*," was prompted to reject the term instinct once and for all, replacing it by the term drive. It was Tolman who finally made McDougall's motivational psychology acceptable even to the behaviorists, by rendering it subject to experimental investigation. The concept of instinctive behavior was later investigated and clarified by ethologists such as Lorenz and Tinbergen.

What was McDougall's objective? He was opposed to a psychology limited to the description of mental contents and to approaches employing *mechanistic* explanations, such as association theory and reflexology. For McDougall (1908), all behavior was "teleological" – directed to the attainment of certain future goal states. He cited seven behavioral characteristics in support of this position:

1. A certain spontaneity of movement.
2. The persistence of activity, independent of the continuance of the impression that triggered it.
3. Directional change of goal-directed activity.
4. Termination of the activity as soon as the desired change in the situation has been brought about.
5. Preparation for the new situation brought about by the present action.
6. Improvement in the behavior's effectiveness when it is repeated under similar circumstances.
7. A reflex action is always a partial reaction, but a purposive action is a total reaction of the organism.

McDougall attributed these characteristics of behavior directed toward specific goal states to instincts. His original definition of instinct was fairly complex, encompassing three consecutive processes:

- A disposition to perceive selectively as a function of specific organic states (e.g., hunger increases sensitivity to edible objects)
- A corresponding emotional impulse (the core of instinct)
- Instrumental activities appropriate to attaining the goal (e.g., flight in response to fear)

McDougall's definition of instinct thus integrates very different phenomena. He viewed just one of the three determinants – emotion – as innate and unmodifiable, defining this component to be the core of instinct, but assumed the cognitive and motor components to be subject to change in response to biographical experience, adding to the complexity of the concept.

It was on the basis of this conceptualization that McDougall (1908) drew up a first list of ten instincts, although he was not able to assign clearly defined emotions to the last three (the corresponding emotions are shown in parentheses):

1. Flight (fear)
2. Repulsion (disgust)
3. Curiosity (wonder)
4. Pugnacity (anger)
5. Self-abasement (subjection)
6. Self-assertion (pride)
7. Parental instinct (tender emotion)
8. Reproduction instinct (–)
9. Acquisition instinct (–)
10. Construction instinct (–)

Because the term instinct came under heavy attack and led to the mistaken idea that behavior is determined largely by innate predispositions, McDougall later adopted the term *propensity*. There were no major changes to the concept itself, except for the distinction now made between propensity and tendency, as illustrated by the following quote from McDougall's last book (1932):

> A propensity is a disposition, a functional unit of the mind's total organization, and it is one which, when it is excited, generates an active tendency, a striving, and impulse or drive towards some goal; such a tendency working consciously towards a foreseen goal is a desire. (McDougall, 1932, p. 118)

Several propensities can combine to form *sentiments*. These are cognitive systems that result from learning and experience relating to the evaluation of objects and concepts, as we saw earlier in Cattell's approach. For example, the perception and evaluation of the concept "my country" involves several propensities. The self-sentiment – i.e., the perception of one's self – plays a central, organizational role in these cognitive schemata, which go to shape the character, i.e., the individual differences existing amid the innate, instinct-like emotional impulses of propensities.

One question that has remained unanswered is which empirical criteria might be used to infer the number of possible motive dispositions, beyond mere plausibility considerations. This question became perceived as increasingly urgent when – inspired by McDougall's lists of instincts – it became common practice, particularly in neighboring disciplines such as sociology and political science, to attribute all behavioral phenomena to specific instincts. War, for example, was attributed to an aggressive instinct. At the same time, the fact that people fight wars was cited as evidence for the presence of an aggressive instinct. The circularity of this approach (that McDougall himself would never have espoused) was the trigger for the great instinct controversy. The objections could have been countered with clearer criteria for instinctive behavior and systematic studies, but this possibility was overlooked in the heat of the exchange. A second, related reason for the controversy was the suspicion that the instinct concept might be used to revive faculty psychology and that all that was really being done was to describe and classify behavior. And how might behavior be categorized? As instinct-dependent behavior versus behavior resulting from acquired habits? To this end, it would be necessary to distinguish between interchangeable, instrumental activities and the goal states that are the focal point of behavior.

In the final analysis, opposing metatheoretical positions kept the controversy alive and prevented an objective, empirical resolution of the issues. Its opponents equated the instinct concept with McDougall's assertion that behavior is goal-directed, i.e., structured in terms of a goal. Associationists viewed this approach as unscientific, implying that McDougall had endowed instincts with a kind of mystical force, not unlike the vitalists who preceded him. As far as

McDougall was concerned, nothing could have been further from the truth. But these metatheoretical insinuations intensified the controversy and prevented an empirical clarification of the dispute. Because opponents of the instinct concept were unable to offer a better theory, there could be no objective resolution of the issue. The dispute finally petered out as interest in further speculation faded. All of those involved came to realize that more concrete and detailed experimentation was required, and the early 1930s saw a rapid increase in this kind of research (cf. Krantz & Allen, 1967).

Like Freud, McDougall introduced a thoroughly motivational approach to the explanation of behavior. His questions as to the nature and classification of motives raised central issues, and his descriptive and definitional responses to these issues triggered the controversies that were to determine much of the empirical motivational research of the subsequent decade. Is behavior predominantly the result of previous learning or of innate impulses? Is motivated behavior a function of its energizing or of its direction and selection? And, above all, is behavior to be explained in a mechanistic sense, i.e., in terms of stimulus-response bonds, or in a mentalistic way, in terms of anticipatory cognitions?

It now became taboo to use the term instinct to describe a motive disposition. Instead, the terms drive and need gained currency. The neglected problems of motivational incentives and effects were tackled. Another notable approach to the classification of motives came between McDougall's list of instincts and Cattell's factor-analytically derived catalogs, however, one that was closely linked to attempts at motive scaling.

3.3.2 Person-Environment Relationships

Murray's work *Explorations in Personality* (Murray, 1938) represents a point of intersection for several important strands of motivational research, particularly those originating from McDougall, Freud, and Lewin. Murray, whose main interest was in clinical and personality psychology, put needs at the center of a differentiated conceptual system that was not intended simply to describe behavior or to explain individual differences in responses to standardized situations. Rather, its function was to identify the idiosyncratic aspects of larger (molar) behavioral segments and to uncover the underlying themes in the cyclical recurrence of idiosyncrasies observed in individuals across situations and time. The individual is seen as an active organism who not only responds to the pressure of situations but actively seeks out situations and structures them.

Murray attempted to explain the goal directedness of behavior in terms of a continuous chaining of episodical interactions between individuals and their environments, i.e., a constant interaction of person and situation factors. This explanation went beyond a trait theory of motivation that attributes all behavior unilaterally to dispositional person factors, as the following quotation shows:

> What an organism knows or believes is, in some measure, a product of formerly encountered situations. Thus, much of what is now inside the organism was once outside. For these reasons, the organism and its milieu must be considered together, a single creature-environment interaction being a convenient short unit for psychology. A long unit – an individual life – can be most clearly formulated as a succession of related short units, or episodes. (Murray, 1938, p. 39–40)

Murray thus became the forerunner of the *modern* interactionist position (Bowers, 1973; Magnusson & Endler, 1977):

Definition
The organism (person) and the perceived situation form an interactional unit, mutually influencing each other. The two central and corresponding concepts are *need* on the person side and *press* on the situation side. Both cannot be observed directly but have to be inferred; they are not descriptive terms but hypothetical constructs.

But on what basis are they to be inferred? They cannot be read off momentary segments of presently occurring behavior or situations; they have

to be inferred indirectly, from their effects. Thus, the motivational concept of need (which, incidentally, is not distinguished from drive) is determined by the goal state to be achieved by means of a person-environment interaction. There is a thematic correspondence between need and press: a press elicits the corresponding need, and a need seeks out a corresponding press. The interaction between need and press is called thema (hence the Thematic Apperception Test, see below). The thema is the actual unit of analysis in the stream of activity. Each episode in the stream has a thema, a goal-oriented sequence of behavior.

Murray uses the term need to refer to both dispositional and functional variables and classifies needs in terms of a number of attributes. A first distinction is made between primary (viscerogenic) needs (e.g., n(eed)Water, nFood, nSex, nUrination, nColdavoidance) and secondary (psychogenic) needs (Table 3.2). Primary needs arise from organic processes and may be cyclical (like nFood) or regulatory (like nColdavoidance). Further distinctions are made between positive (approach) and negative (avoidance) needs and between manifest and latent needs. Manifest needs are freely expressed in overt behavior (objectified); latent needs relate to make-believe or fantasy behavior (semiobjectified or subjectified). In certain situations, needs can combine to motivate behavior. There can also be conflicts between needs, or one need can become subservient to another.

Table 3.2 Murray's catalog of psychogenic needs (n = need; in alphabetical order)

1.	nAbasement (nAba)
2.	nAchievement (nAch)
3.	nAffiliation (nAff)
4.	nAggression (nAgg)
5.	nAutonomy (nAuto)
6.	nCounteraction (nCnt)
7.	nDefense (nDef)
8.	nDefendance (nDfd)
9.	nDominance (nDom)
10.	nExhibition (nExh)
11.	nHarmavoidance (nHarm)
12.	nInfavoidance (nInf)
13.	nNurturance (nNur)
14.	nOrder (nOrd)
15.	nPlay (nPlay)
16.	nRejection (nRej)
17.	nSentience (nSen)
18.	nSex (nSex)
19.	nSuccorance (nSuc)
20.	nUnderstanding (nUnd)

The following needs were provisionally listed but not investigated systematically:

nAcquisition (nAcq)
nBlamavoidance (nBlam)
nCognizance (nCog)
nConstruction (nCons)
nExposition (nExp)
nRecognition (nRec)
nRetention (nRet)

These conceptual categories are not simply a result of plausibility considerations, speculation, and invention. In fact, the conceptual framework was developed, refined, and tested using data obtained from 50 participants in a variety of research settings at the Harvard Psychological Clinic. The thematic demarcation of the secondary needs is a case in point (Table 3.2). A total of 27 staff, psychologists, and psychiatrists exposed participants to a variety of situations and observed the recurring manifestations of each participant's more dominant motives. Participants were also confronted with situations in which their less dominant motives were aroused. The research settings included interviews, written biographies, childhood memories, various testing procedures, and experiments relating to memory and levels of aspiration.

Murray's (1938) Thematic Apperception Test (TAT), which can be considered one of the most important research instruments in the field of motivational psychology (Chaps. 6, 7, 8, and 9), deserves special mention.

Murray's list of needs leaves much to be desired against the background of the classification problem, however. Does it really make sense to assume the existence of 27 independent needs? Empirical motivation research has offered a more pragmatic solution, providing evidence for the existence of a smaller set of much broader motives, which are presented in detail in Chaps. 6, 7, and 8. Motives can be

distinguished from needs in terms of their broader scope. For example, the affiliation motive is not solely directed to satisfying the need for affiliation; seen from the perspective of developmental psychology (Chap. 15), it is clear that the affiliation motive is closely related to the satisfaction of needs for protection, nurturance, and warmth (Ainsworth, 1979; Bowlby, 1982; MacDonald, 1992). Empirical findings show that the affiliation motive is also associated with sexual activity (Scheffer, 2005). However, it is doubtful that the need for sexuality can be subsumed entirely under the affiliation motive, because it is evidently also related to the power motive (McClelland, 1975). Other models even consider sexuality to be an independent motive system in its own right (Bischof, 1985).

Summary

Besides developing the TAT, Murray collated and classified a wealth of ideas from a variety of theoretical approaches, all of which seemed relevant to the explanation of behavior. Drawing on this theoretical background, he developed an inventory of concepts that helped to focus research efforts on the measurement of motives and drew attention to aspects such as the dynamic shift between the interruption and resumption of motivation, the goal directedness of behavior, and motivational conflict. The TAT provided the basis for later breakthroughs in motive measurement (McClelland et al., 1953) and the dynamic conceptualization of motivation (Atkinson, 1957; Atkinson & Birch, 1970; Kuhl & Blankenship, 1979).

Although the classification problem remains unresolved in many respects, evidence for the existence of some broad-based motives could be provided by developing ways to measure motive differences (e.g., the TAT), validating these findings by reference to individual differences in behavior in seemingly equivalent situations, and demonstrating their universality. In the following, the achievement motive is used to illustrate this approach (McClelland et al., 1953).

3.3.2.1 The Achievement Motive as a Distinct Motive Class

Five determining criteria have been proposed for behavior in achievement-related situations. All five must be present for an action to be experienced or perceived as achievement-oriented by the actor or observer (Heckhausen, 1974). Specifically, the criteria are as follows:

1. The action must result in a concrete outcome.
2. The outcome must be measurable in terms of standards of quality or quantity.
3. The task must neither be too easy nor be too difficult. In other words, the action must have the potential to result in success or failure and (or at least) require a certain amount of time and effort.
4. The action outcomes must be assessed in terms of a certain standard, which must incorporate a certain binding norm value.
5. The action must have been intended by the actor and the outcome accomplished by him or her.

In short, achievement-motivated behavior is focused on the accomplishment of a task.

If the nature of the task does not reflect an objectifiable outcome or if its demands are too high or too low, the behavior cannot be characterized as achievement behavior, or only to a limited extent. The same holds if there are no binding standards or norms, if the actor has been forced to do the task, or if it has been accomplished without his or her active contribution. Admittedly, an observer does not determine whether all five of these conditions have been met before identifying another person's activities as being achievement-oriented. If one or more of these conditions appear to be present and there is no evidence of the absence of others, then the behavior will be perceived as achievement-oriented.

Situations that can elicit such achievement-oriented behavior, i.e., which are congruent with it, have already been alluded to as tasks. Specifically, they are situations that have the character of a task from the perspective of the

actor or an observer. In addition, these situations must offer opportunities for the five criteria of achievement behavior (as defined in the previous section) to be realized.

The third criterion (that the task be neither too easy nor too difficult) plays an important role in individual development. Given that people can perceive only those tasks that appear to be neither impossible nor too easy as achievement-related, the set of achievement-eliciting situations will change over the individual lifespan, especially in childhood and adolescence. Task situations that were once impenetrable but are now within the individual's reach will be included in the set, whereas tasks situations that can now be solved with no effort at all will be excluded.

Some settings (in Barker, 1968, sense) are dominated by situations that require achievement-oriented actions, e.g., school and the world of work in modern industrial societies. There is no question that the societal framework of achievement-arousing situations, their value in relation to other types of settings, and their objective content are, to a large extent, culture and time specific. It is difficult to imagine a culture within human history that did (does) not manifest achievement orientation. But does this make achievement-oriented behavior universal, i.e., does it manifest itself in all individuals everywhere and at all times?

Authors like Kornadt, Eckensberger, and Emminghaus (1980) and Maehr (1974) have examined the available cross-cultural evidence and given a tentative positive reply to this question. Considering the abstract and fundamental nature of the five criteria of achievement behavior (and the corresponding achievement-related situations), there can be little doubt as to the universality of achievement-oriented situations and hence the achievement motive.

Kornadt et al. (1980) and Maehr (1974) pointed out that these abstract-determining components of achievement-motivated behavior manifest themselves in a tremendous, culture-dependent diversity, becoming concretized only in the context of a "subjective culture" (Triandis, 1972). First, there is the thematic diversity of culture-specific task domains, such as hunting, fishing, commerce, practice of religious rites, artisan and industrial production, buying and selling, scientific research, artistic creation, and much more. Then there are different forms of individual, collective, or cooperative organizations, including the division of labor for the purposes of task accomplishment. Within the thematic sphere of each task, furthermore, there are culture-specific criteria for objectifying achievement-oriented behavior. These include standards of comparison and norm values for assessing achievement, causal explanations of success and failure (e.g., the causal role attributed to higher powers, to fate or fortuna), and the consequences of action outcomes, their incentive values, and future orientation.

It would thus appear that – irrespective of the specific historical and cultural framework – the core meanings, i.e., abstractions, of achievement-oriented, person-environment relationships are universal. The historico-cultural context dictates the concrete contents of achievement-related behavior and its potential variation in a specific instance. Having examined the achievement-oriented equivalence class from an external, general perspective, we must now ask whether all individuals in a given cultural epoch perceive this equivalence class in the same manner. This is certainly not the case. Individuals differ in terms of the breadth of situations they perceive to have achievement implications, in the importance they attribute to these situations relative to other types of situations, as well as in other idiosyncrasies.

Returning to Allport's trait definition (1937), we can conclude that the individual's achievement motive depends on the number of stimuli, i.e., situations, that he or she perceives to be "functionally equivalent" and that thus "initiate and guide consistent and equivalent forms of achievement-oriented actions".

The question is thus whether there are, or ever were, individuals who, throughout their lifetime, failed to perceive any of the universal situations defined in terms of the previous criteria as eliciting achievement-oriented actions and who thus omitted to engage in achievement-related behavior. It is hard to imagine this ever being the case. Thus, it would seem that achieve-

ment-oriented situations are universal not only among the general population but also on the individual level. Despite its idiosyncratic variations, and although the concrete situations that elicit achievement-oriented behavior are always specific to the historico-cultural context, it would seem that the achievement motive applies to all individuals.

- The logical conclusion to be drawn from this analysis is that the achievement motive is indeed a trait in its own right and that it encompasses a number of the needs on Murray's list. For example, the need for order can be regarded as a facet of the achievement motive: achievement can often be characterized as a process of creating order from a state of entropy (whether the individual in question is creating an artwork or doing the housework).

Clearly, few motives are as broad and universal as the *Big Three*, each of which is covered in a separate chapter of this book (Chaps. 6, 7, and 8). Interestingly, Lawrence and Nohria (2002), who approach the subject from the perspective of economics and business administration, have proposed a classification similar to the one that has emerged from experimental motivational research. They identify four basic motives that cannot be reduced any further:

1. Bonding
2. Defending

   This motive has much in common with the aggression motive, which Kornadt et al. (1980) described as universal, and can also be interpreted as the power motive, which has been thoroughly researched in experimental motivational psychology.
3. Acquiring

   This motive can be likened to the achievement motive defined above.
4. Learning

Interestingly, this motive is not included in Murray's list. Accordingly, it has not been investigated in experimental motivational research.

Why was learning not identified as a need in its own right by Murray but included in the economists' much shorter list? In today's political climate, lifelong learning is frequently portrayed as a (required) basic motive that provides a particularly powerful index of individual differences.

Upon more careful inspection, however, a subtle difference can be discerned between learning and the other motives. Motivation research sees learning as a general outcome of motivation. From this perspective, learning is not a motive in its own right, but a function of motives: in the long run, organisms maintain and develop only those adaptive and expressive behaviors that serve to satisfy motives (McClelland, 1985). More generally speaking, certain outcomes of motives may assume the character of general values that take on global significance for individuals. Learning can be regarded as such a value – first, because it is an outcome of all motives; second, because it makes the future satisfaction of motives more likely.

In the past, research on the Big Three was slowed down by the time-consuming and arduous evaluation by coders who were trained to achieve a satisfactory objectivity. Therefore, it has been very difficult to study samples that are large enough to allow the investigation of important questions such as the relationship between the Big Three and learning. Recent developments in the fields of artificial intelligence and machine learning, however, suggest that the automatic and psychometrically convincing evaluation of texts with regard to their implicit motives might soon become possible (Scheffer, 2017).

3.3.3 Maslow's Hierarchical Model of Motive Classification

Abraham Maslow (1954) took an alternative approach in his book entitled *Motivation and Personality*, classifying motives in terms of needs. Maslow was a founder of humanistic psychology, a movement that evolved in the USA after World War II, influenced by the existentialist thought of Continental Europe. The movement saw itself as a *third force* in psychology, trying to free research

from the constraints of either a purely behavioristic or a purely psychoanalytic approach and to shift the focus of attention in personality theory research to questions relating to the values and purposes of life. In so doing, the movement picked up on Dilthey's (1894) notions of analytical psychology, with its partly anti-Darwinian stance. True, humans are biologically determined, with innate capacities that unfold during maturation, but we are fundamentally different from infrahuman organisms in our ability and indeed our need, to achieve self-actualization.

Maslow developed an accessible classification system that differed from earlier taxonomies in two respects. First, it does not identify single needs but describes whole groups of needs. Second, these groups of needs are arranged in hierarchical order according to their relevance in personality development. This does not imply that the higher and highest needs are any less instinctual or innate than the lower needs. A need activates and influences behavior only as long as it remains unsatisfied. In fact, behavior is less *pushed* from within the organism than it is *pulled* by the external consequences of its satisfaction.

- Maslow's model is based on the principle of relative priorities in motive activation. It dictates that the lower needs must always be satisfied before higher needs can become aroused and determine behavior.

As illustrated in Fig. 3.2, the hierarchy of needs ranges from existential, physiological needs via security needs, needs for belongingness and love, and esteem needs, to the value of self-actualization.

Self-actualization can become a determinant of behavior only when all other needs have been satisfied. It can thus be seen as an outcome of need satisfaction and, like learning, be defined as a value. Every need is teleologically directed to the attainment of this value, and the satisfaction of every need brings individuals slightly nearer to it. Self-actualization thus pulls behavior; the force it develops is qualitatively different from the pushing effects of needs.

From the perspective of developmental psychology, the ascending groups of needs portrayed in Fig. 3.2 correspond to the ontological development of the individual (see also Erikson, 1963 research on ego development). The satisfaction of existential, physiological needs takes priority for infants, and security needs are most urgent for young children, followed by the needs of belongingness and self-esteem. It is not until adolescence that aspects of self-actualization become significant, to be finally realized, if at all, in adulthood.

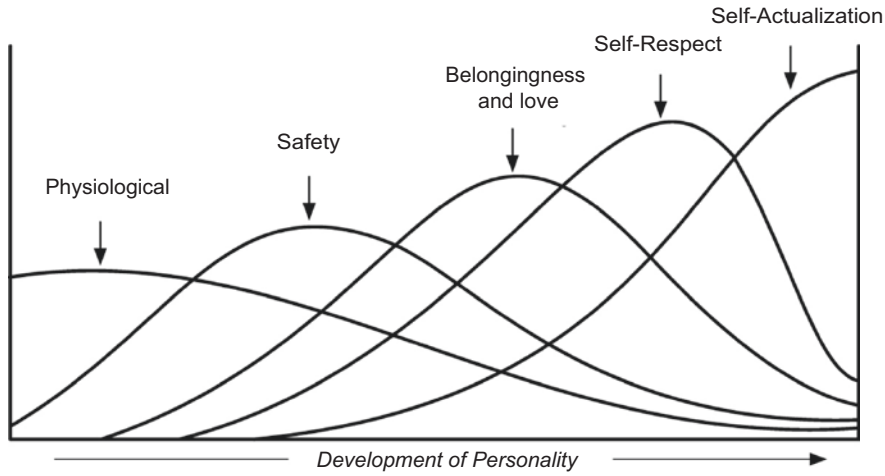

Fig. 3.2 Maslow's hierarchical model orders groups of motives according to the relative priority of need satisfaction (Based on Krech, Crutchfield, & Ballachey, 1962, p. 77)

A hierarchical structure of needs is also congruent with the principles of attachment theory (Ainsworth, 1979; Bowlby, 1982). The need to regulate physiological processes makes young children dependent on the support and protection of familiar others. Over time, this dependency can develop into a deep bond. If physiological needs are not satisfied, however, the development of a trusting relationship between mother and child is jeopardized, underlining the hierarchical relationship between existential needs and security needs. Without feelings of security and trust, it is unlikely that a secure bond will develop. Yet a secure bond is the prerequisite for exploration of the natural environment, which is in turn decisive for the development of self-esteem and autonomy. Children lacking in self-esteem and autonomy cannot really become adults capable of working and engaging in functional relationships; they cannot experience self-actualization. Thus, from the first months of life, human development is determined by sequential developmental tasks that imply a hierarchical directedness of needs, as reflected in the concept of focal times in developmental psychology (Keller, 1997a, 1997b; see the excursus in the next page).

Empirical support for Maslow's assumption that self-actualization is the highest value was provided by interviews with and biographies of prominent (contemporary and historical) figures, including Lincoln, Beethoven, Einstein, Eleanor Roosevelt, and Aldous Huxley. He saw this sample to be characterized by the following characteristics: superior perception of reality; acceptance of self, of others, and of nature; increased spontaneity; increased problem centering; increased detachment and desire for privacy; increased autonomy and resistance to enculturation; greater freshness of appreciation and richness of emotional reaction; higher frequency of mystic experiences; increased identification with the human species; deeper and more profound interpersonal relationships with a few close individuals; more democratic character structure; increased discrimination between means and ends; possessing a sense of humor; creativeness and nonconformity. Maslow further identified a number of major differences between higher and lower needs:

1. The higher need represents a later phyletic or evolutionary development.
2. The higher the need, the less critical it is for sheer survival, the longer its gratification can

Excursus

Directedness of Development: Contingency, Security, Bonding, and Exploration

Around the second month of life, infants are physiologically able to control their head and body in such a way that they can direct their line of vision. In mastering this physiological need for control, they become able to engage in rudimentary forms of situational control. By about the third month, interactions between babies and their mothers are characterized by a high frequency of eye contact; this age seems to constitute a focal time for this thema, because it soon becomes less important. Researchers interpret the significance of this focal time for development as follows: Because newborn babies have such a short attention span (shorter than 800 ms), they are essentially unable to gauge the effects of their behavior on the environment. When they develop the ability to control their field of vision, parents have the opportunity to mirror their baby's signals – e.g., smiling or the *eyebrow flash* – in face-to-face interactions. If they do so reliably within the baby's short attention span, the baby learns that both his or her own reactions and those of the caregiver are predictable. This experience of contingency gives babies a feeling of security, which helps them to cope with the next developmental thema of establishing a personal bond with primary caregivers, and engaging in exploration beyond their secure base. Thus, satisfying physiological demands is directly related to satisfying the needs for security, bonding, and exploration in the first year of life (cf. (Keller, 1997a, 1997b; Keller, Lohaus, Völker, Cappenberg, & Chasiotis, 1999).

be postponed, and the easier it is for the need to disappear permanently.
3. Living at a higher need level means greater biological efficiency, longer life, less disease, better sleep, more appetite, etc.
4. Higher needs are experienced as less urgent.
5. Gratification of higher needs produces more desirable and more personal results, i.e., more profound happiness, cheerfulness, and wealth of inner life (1954, pp. 98–99).

Maslow's approach is based on the notion that people are not only driven by needs but also attracted by their general outcomes. Outcomes with global significance for individuals can be defined as values. The precise definition of a value differs markedly across cultures. A cross-cultural perspective shows that overcoming the egoistic gratification of personal needs is the highest value in many non-Western cultures marked by material poverty (Greenfield, Keller, Fuligni, & Maynard, 2002; Keller, 1997c; Markus & Kitayama, 1991). Western industrialized nations, such as the USA, the UK, and Germany, are considered individualistic; i.e., people tend to take their personal, individual form of self-actualization very seriously and to give it priority over group needs. In most Asian, African, and South American cultures, in contrast, the prevailing orientation is more collectivist (more recently labeled interdependent). Group needs are given priority over individual needs, and fulfillment of these group needs is seen as true self-actualization (Triandis, 1997).

Summary
Unfortunately, Maslow's definitions of many of his concepts are rather vague, leaving much scope for subjective interpretation and making it difficult to subject the theory to empirical testing. In fact, no satisfactory empirical tests have been reported to date. Maslow's hierarchical model can be seen to reflect either an individualistic orientation directed at increasing personal need satisfaction or an interdependent orientation geared toward satisfying the needs of the community. It is quite possible that this elasticity of the theory is one of the main reasons for its continued popularity in training programs and seminars.

3.4 Basic Emotions as a Rudimentary Motivation System

Values involve the evaluation of actions, i.e., assessment of the extent to which actions are or are not expedient for motive satisfaction. These evaluations are not solely the product of rational consideration but are colored by emotions and feelings, the "prerational organs of perception" (Bischof, 1993). Emotions serve as navigational aids to motivation, without which the search for appropriate behavioral options in the vast network of stored, potentially relevant actions would be very protracted, if not hopeless (Damasio, 2000).

Emotions thus play a decisive role in the initiation of goal-directed behaviors designed to have certain effects on the environment and achieve certain outcomes. As psychological organs of perception, they indicate to the organism how close it has come to satisfying a motive and are responsible for the fine-tuning of motivational processes. In terms of Murray's theory, emotions can be seen as the point of interface between need and press. As such, they reflect the thema that is currently occupying and energizing an individual, and that a practiced observer can read fairly accurately from a person's face. Because emotions are involved in the evaluative phase of a motivational sequence (Chap. 11), they are – like values – endowed with the character of global rewards or punishments. The very anticipation of emotions such as joy or love can thus be motivating, even when they are not associated with the motive momentarily aroused.

- The emotions can be described as a rudimentary motive system that serves the internal and external communication of motivational sequences.

3.4.1 The Basic Emotions

There are a limited number of basic emotions that can be distinguished on the basis of facial expressions alone. As far back as 1872, Darwin identified the following basic emotions through careful observation of an infant:

1. Interest
2. Joy
3. Annoyance/grief
4. Surprise
5. Fear
6. Anger/rage
7. Disgust
8. Shame

Darwin realized that expressive behavior has a communicative function among social animals and observed phylogenetic continuity in the facial muscles, from the lower mammals via infrahuman primates to humans.

Aside from this phylogenetic continuity, there is another reason for characterizing basic emotions as innate dispositions, namely, the universality of their evocation (as manifested by facial expressions) and the degree of interobserver agreement in judgments of emotion-specific behavior. The claim that emotional expressions are part of the conventions of a culturally homogeneous population (e.g., Klineberg, 1938) prompted studies of tribes in Borneo and New Guinea who had previously had little contact with other cultures. Members of these tribes were read stories and then asked to select from several picture cues of the face that most accurately reflected the emotional state of the protagonist (Ekman, 1972; Ekman & Friesen, 1971). In other studies, they were asked to mimic the feelings of the characters in the stories. The facial expressions they produced were videotaped and later evaluated by American students. Interrater agreement was high in all conditions, dispelling any lingering doubts about universality in the production and recognition of emotion-specific facial expressions (only surprise and fear – two emotions frequently expressed in quick succession – were occasionally confused).

To gain a meaningful understanding of emotions, we need to abandon the layperson's view that they are restricted to mere feelings and stop seeing them as opposites to cognitions in the sense of thoughts or indeed to cognition in the sense of processing environmental information (Arnold, 1960; Tomkins, 1970, 1981; see also the debate between Zajonc (1980) and Lazarus (1984), which in essence seems to have been a battle over semantics).

3.4.1.1 Functions of Emotions

Some situations are vital to the organism, i.e., to its survival. Typical examples include the threat of a powerful enemy, exposure to an unfamiliar environment, or abandonment at a time when the help or company of others is needed. The perception of such vital situations is triggered partly by innate stimulus cues, which, in humans, are largely overlaid by subsequent experience. Watson (1924) was the first to draw attention to innate triggers, which he assumed to elicit emotions such as fear, rage, or affection in infants. These unconditioned triggers of emotions provide the necessary basis for the emotions to be conditioned to other, previously neutral stimuli (Watson & Rayner, 1920).

For the most part, experiences are overlaid on stimulus cues by means of classical conditioning, i.e., the association of a signal with specific organismic changes that facilitate the initiation of appropriate actions. This bonding process is accompanied by a certain emotional state that may enter into awareness. However, this bond does not constitute a fixed link between stimulus and response, such that a particular stimulus automatically elicits a particular response. Rather, a specific stimulus cue for a particular vital situation elicits changes in the organism's state that prepare it for subsequent expedient action. One component of this change in the organism's state is the experience of an emotion-specific sensation, which in its compressed and holistic form mediates a feeling for one's momentary situation. Accordingly, feelings are a kind of in-depth, split-second communiqué about the situation at hand, i.e., the vital situation being encountered. Arnold (1960) proposed a chain of effects comprising three links: perception-appraisal-action.

This chain of effects can be conceptualized as follows: information relating to an emotion-specific vital situation triggers biochemical changes in some areas of the central nervous system (e.g., the limbic system) that, in turn, lead to changes in four different spheres: first, in the

peripheral nervous system, including the receptor organs (e.g., increased blood supply or an orienting reflex); second, in experience; third, in expressive movements; and fourth, in action-initiating patterns of behavior. Emotion-specific expressive movements can involve facial expressions, gestures, posture, body orientations, or vocal patterns. As previously mentioned, expressive movements are observable and can provide others with precise information about the actor's momentary emotional state and disposition to act. Admittedly, such expressive movements can be intentionally exaggerated, diminished, controlled, suppressed, or faked in response to "display rules" (Ekman, 1972), i.e., cultural prescriptions for certain social situations. Some expressive movements, especially gestures, may merge with action-initiating behavior patterns.

Table 3.3 presents the three different languages that can be used to describe the eight basic emotions postulated by Plutchic (1980): subjective, behavioral, and functional.

3.4.2 The Adaptive Value of Emotions

Emotions are adaptive in the phylogenetic sense of having survival value, both in emergencies, where needs must be satisfied urgently, and in situations where they can only be satisfied on the longer term. We need only consider how important it can be to respond both appropriately and quickly in situations that are decisive for an organism's well-being. Although purely reflexive bonds between stimulus and responses would always be quick, they would often be inappropriate, because they would necessarily ignore gradations in meaning and contextual features of the eliciting stimuli.

If the organism's first reaction is not a motor activity, but an emotion, the stimulus-response bond is loosened, thus creating the conditions for an appropriate response (Scherer, 1981). At the same time, emotion-specific processing of information can help initiate a prompt response to the situation at hand or at least induce a state of heightened readiness for action. If people relied solely on the cognitive, argumentative processing of information, involving the analytical elaboration and subsequent integration of incentive and expectancy features, there would be long delays in responding to the situation. Their eventual responses, although fitting, would come too late and thus be inappropriate to the situational demands.

The phylogenetic development of the basic emotions has facilitated a more flexible response to the demands of a changing and complex environment than could be achieved by simple reflex responses. Furthermore, the communication of emotions via various expressive behaviors can

The Information-Processing Model of Emotions (Based on Scherer, 1981)

First step: The incoming information is checked for novelty or entropy (Sect. 3.5.1 Zürich Model).

Second step: Depending on whether the information is found to relate to something pleasant or unpleasant, affects such as pleasure or displeasure or interest or fear/terror are triggered (cf. Schneirla, 1959).

Third step: The information is screened in terms of its relevance for the goal, i.e., whether it contains cues as to the nature of the situation that might facilitate, interrupt, delay, or hinder the current course of action toward an aspired goal (emotions of joy and fear; in the case of hindrances: frustration, anger, rage).

Fourth step: Goal-relevant features are analyzed in terms of their requirements and the chances of attaining the goal (emotions: joy, fear, distress, anger).

Fifth step: Action outcomes are compared with social norms or self-imposed standards (emotions: joy in the sense of pride, shame, guilt, contempt). This last step is probably unique to humans.

Table 3.3 Three languages that may be used to describe emotional states

Subjective language	Behavioral language	Functional language
Fear, terror	Withdrawing, escaping	Protection
Anger, rage	Attacking, biting	Destruction
Joy, ecstasy	Mating, possessing	Reproduction
Sadness, grief	Crying for help	Reintegration
Acceptance, trust	Pair-bonding, grooming	Incorporation or affiliation
Disgust, loathing	Vomiting, defecating	Rejection
Expectancy, anticipation	Examining, mapping	Exploration
Surprise, astonishment	Stopping, freezing	Orientation

solve problems arising from social interaction within a species, e.g., the bloodless resolution of mating and rank rivalries; cf. Lorenz, 1966.

Scherer (1981) proposed an information-processing model of emotions comprising five consecutive steps (see the following overview) that appear to correspond with phylogenetic and ontogenetic development as well as with the microgenetic sequencing of specific situations.

A close inspection of these five processing steps reveals that all but the first (checking for novelty) feature aspects of value and expectancy can be regarded as dispositional, i.e., as traits. Steps 2 and 5 (pleasure/displeasure and comparisons with norms) relate to values; steps 3 and 4 (relevance of situational aspects to goal attainment and available means for attaining the goal) relate to expectancies.

Definition
Emotions are thus prerational forms of values and expectancies that influence the motivational process.

Table 3.4 lists the basic emotions postulated by Darwin, Tomkins, Ekman, Izard, and Plutchic, respectively, arranged in a sequence that approximates Scherer's (1981) processing steps. There is considerable agreement among the diverse theorists who, as the table shows, all postulated between six and nine basic emotions (Ekman, 1972; Izard, 1971; Plutchic, 1980; Tomkins, 1962, 1970) that can be distinguished largely on the basis of facial expressions (cf. Rinn, 1984).

That interest is not viewed as a basic emotion by all of the theorists is understandable, given that the corresponding emotional expressions can also be viewed as attention arousal. Some of the authors see shame, and single authors see contempt and acceptance, as products of other basic emotions. All authors assume that the basic emotions can blend together when elicited simultaneously. Tomkins (1981) used the term affect complexes to describe potential assemblies of basic emotions with various perceived and conceived causes and consequences.

3.4.3 Personality Traits as Congealed Emotions

Having established that all basic emotions are phylogenetically deeply rooted and universal and that they serve adaptive functions in vital situations in the relationship between the individual (organism) and the environment, we can now consider the implications of these insights for a taxonomy of motive dispositions. The first problem is that emotions tend to be transient states that vary across situations. How can these states usefully inform a taxonomy of motive dispositions?

Some research findings indicate that it is worth returning at this point to the five-factor model as previously discussed. In recent years, researchers have increasingly interpreted the Big Five not only as correlating patterns of behavior or as descriptive labels but as traits according to Allport's definition. In other words, the Big Five are increasingly seen as mechanisms with the capacity to render many stimuli func-

Table 3.4 The basic emotions, in order of the sequential phases of information processing postulated by Scherer (1981)

Darwin	(1877)	Interest	Surprise	Joy	Sadness	Disgust	Fear	Anger	Shame	–
Tomkins	(1981)	Interest	Surprise	Joy	Distress	Disgust	Fear	Anger	Shame	Contempt
Ekman	(1972)	–	Surprise	Joy	Sadness	Disgust	Fear	Anger	–	–
Izard	(1971)	Interest	Surprise	Joy	Distress	Disgust	Fear	Anger	Shame	–
Plutchic	(1980)	–	Surprise	Joy	Sadness	Disgust	Fear	Anger	–	Acceptance

tionally equivalent and to initiate equivalent forms of adaptive and expressive behavior. From this perspective, extraversion can be seen as a propensity to experience positive emotions across situations and to behave with according optimism, whereas neuroticism (the opposite of emotional stability) can be seen as a propensity to experience negative emotions across situations and to behave with the expected caution (Watson & Clark, 1997; Watson & Tellegen, 1985; Watson, Wiese, Vaidya, & Tellegen, 1999). The close connection between emotions and muscular innervation was mentioned in Sect. 3.4.1. Taking a similarly *proximal approach*, traits can be conceptualized as dispositions based primarily on emotions.

Definition
Traits are the stable, dispositional side of emotions that make certain emotional states more or less probable. Traits can thus be compared to consolidated or congealed emotions – previously transient states that have developed into stable and situation-transcending characteristics.

The other traits of the five-factor model can also be interpreted as a dispositionally heightened sensitivity to certain emotions. The openness to experience factor is associated with a heightened sensitivity to the emotions of interest and curiosity (McCrae & Costa, 1997). The agreeableness factor can be interpreted as a heightened sensitivity to group norms and to the shame that occurs when they are violated (Graziano & Eisenberg, 1997). Likewise the conscientiousness factor, the driving force behind integrity and a sense of responsibility, involves a heightened sensitivity to guilt (a strict superego); the behavior of conscientious individuals is directed to avoiding feelings of guilt (Hogan & Ones, 1997).

The traits of the five-factor model can thus be interpreted as congealed emotions. This would explain why extraverts are likely to experience joy in a broader range of situations than introverts and emotionally stable individuals are less likely to experience fear and anxiety than neurotic individuals. As such, it makes perfect sense to discuss emotions in a chapter on trait theories. However, it is again important to remember to distinguish between motivational constructs that explain the whats of behavior and those that apply to its hows. Needs and motives (or ergs) describe the kinds of incentives to which organisms respond; they relate to desired states or behavioral objectives. Traits and the associated emotions serve to direct behavior; they thus describe its hows.

Summary
Emotions play an important role in motivational processes: they indicate to the organism whether progress is smooth or faltering, whether behavior is being supported or stalled, whether unexpected difficulties have arisen or happy coincidences have occurred, whether behavior is being deliberately inhibited, and finally whether or not binding standards can be fulfilled. A taxonomy of motives cannot be established on the basis of emotions, however, because all of the basic emotions listed in Table 3.4 can clearly be combined with any motive. Nevertheless, there do seem to be prototypical combinations of certain motives and emotions. For example, McClelland (1985) associates the power motive with the emotion of anger, the affiliation motive with the emotion of love, and the achievement motive with the emotion of curiosity/interest.

Excursus

Operant Motive Measures

In contrast to questionnaires, operant measures such as the TAT or the Operant Motive Test (OMT; Chap. 12) are not based on stable self-evaluations but on sensitivity to a motive-related thema (Asendorpf, Weber, & Burkhardt, 1994; Scheffer, Kuhl, & Eichstaedt, 2003). Murray introduced the term thema to describe the interaction between a latent motive and a corresponding incentive and noted that this interaction must necessarily lead to inconsistencies at the manifest behavioral level, because it would hardly be adaptive to focus attention on a single thema. Another reason for the low consistency of manifest motivation is that latent motives influence perception directly and only affect behavior indirectly. To achieve direct behavioral control, motives have to act in combination with implementation styles, which may entail situational fluctuations (e.g., state-oriented individuals can only implement their motives effectively in relaxed situations, Chap. 12).

3.5 Systems Theory Models of Motivation

Systems theory conceptions of motivation had an early heyday in the 1970s (Atkinson & Birch, 1970; Bischof, 1975): (Kuhl & Blankenship, 1979), and a parallel strand of research was developed in the context of social-cognitive personality theory (Bandura, 1978; Cervone, 2004; Mischel & Shoda, 1998). Systems theory conceptions are characterized by three main principles:

1. Personality is a complex system involving the interaction of multiple, highly integrated processes.
2. These interacting processes are rooted in basic cognitive and affective systems that initiate and direct behavior.
3. The personality interacts with the environment, and the behavior initiated contributes to shaping the environment (reciprocal interactionism).

The question to be addressed by motivation research is thus how motives and personality traits interact, and by means of which processes (e.g., emotions, self-regulatory styles), they trigger and direct behavior in given situations.

Systems theory approaches to motivation have far-reaching implications; e.g., they call one of the central assumptions of classical test theory into question. Using computer simulations, Atkinson, Bongort, and Price (1977) showed that motive measures can show high construct validity, even when the internal consistency of the TAT scales is very low. In other words, whether a manifest motivation is identified (e.g., in the TAT) is the result of a complex process of interaction between different dispositions (e.g., the affiliation, achievement, and power motives competing to control behavior) and situational stimulus conditions (influenced in part by behavior). For example, a piece of cake may lose its incentive value to someone who has just eaten a large piece. Tuerlinckx, De Boeck, and Lens (2002) have demonstrated that a particular manifest motivation in the TAT is replaced by other forms of motivation in a stochastic drop-out process. This results in the "behavioral oscillations" described by Atkinson and Birch (1970).

The low consistency with which motives tend to become manifest is nevertheless compatible with Allport's definition of a trait. It is only when a motive is extremely strong that it emerges consistently across different situations; motives of moderate strength do not have such broad impact on the stream of behavior (Scheffer, Kuhl, & Eichstaedt, 2003). This is quite plausible from the perspective of evolutionary and developmental psychology, given that human motivation must be sensitive to the context and change and develop over the course of ontogenesis. In his model of social motivation, Bischof (1985) shows that this process of change involves an elemental conflict between the intimacy (bonding) and autonomy (achievement and power) motives (see Sect. 3.5.1).

3.5.1 The Zürich Model of Social Motivation

Bischof's (1975, 1985) Zürich model of social motivation is an ethological systems theory of motivation. Bischof was a student of Konrad Lorenz, and the concept of imprinting was central to his work.

- Imprinting takes places in sensitive periods during which the organism is especially receptive to environmental information (compare the concept of focal times) and has a sustained or even irreversible effect on character.

However, it is not motives that get imprinted but detectors for certain stimulus characteristics. From the ethological perspective, a distinction can be made between type detectors, which discriminate between conspecifics and other species, and individual detectors, which mark out the boundary of the nuclear family, and thus signal what is perceived as familiar. This boundary has a dual function: it suppresses altruistic behavior toward conspecifics beyond it, and it prevents sexual responses to those within it. Both kinds of detectors help to determine the familiarity of an object or situation.

Definition
The familiarity of a stimulus is directly and inversely related to its entropy, that is, its degree of novelty and complexity. Ambivalence, incongruence, and dynamics of a stimulus increase its entropy and decrease its familiarity. Another important input variable in this model is the relevance of an object. Together these input variables influence the felt security and arousal of an organism: a large, strange-looking creature making straight for an organism will trigger more arousal and less security than, say, its parents.

Compared to lower animals, like Lorenz's graylag geese, the processes by which type detectors and individual detectors are imprinted on humans are very complex. There is considerable variation across individuals and cultures in what is perceived as familiar or as alien. Phenomena such as customs, dialects, and traditional costumes amplify familiarity and may thus also trigger the individual detectors when we meet people for the first time. In view of these individual differences in the perception and evaluation of what is *familiar* and what is *alien*, Bischof's theory – although intended as a general psychological model – is also relevant as a trait theory.

Seen in this way, the first form of learning in ontogenesis is the discrimination between familiar and alien (Bischof, 1985, 1993). Young children experience familiarity as positive and as a source of security and protection. Unfamiliarity initially implies danger and is experienced as negative. This will change over the course of development when a second guiding principle takes effect: unfamiliarity can then also lead to a positively experienced state of arousal. For both of these guiding principles, the need for security and the need for arousal, individual set points define the ideal degree of unfamiliarity for an organism. There are certain similarities to Murray's list of motives, which are therefore provided here alongside Bischof's concepts:

- The set point for security (*dependency*), which has conceptual similarities with the affiliation motive
- The set point for arousal (*enterprise*), which comprises facets of the achievement motive

Four basic motivational tendencies emerge from the interplay of the level of familiarity (as determined by the detectors) and the two set points dependency and enterprise:

- Appetence for, or aversion to, security (bonding vs. surfeit)
- Appetence for, or aversion to, arousal (exploration vs. fear)

The detectors serve to evaluate the stream of incoming information. If the level of familiarity indicated by the individual detector is below the set point, the organism will experience insecurity and seek to resolve it. This endeavor is defined in

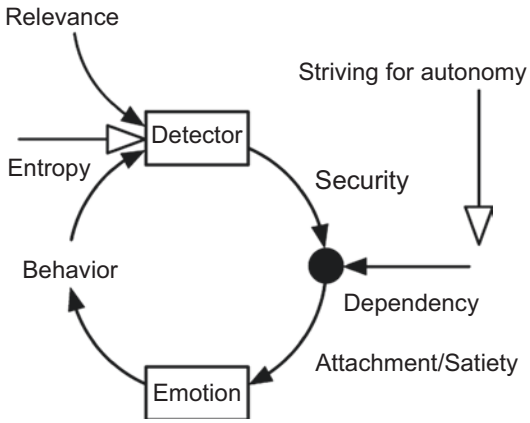

Fig. 3.3 The security system of the Zürich model (cf. Bischof, 1996, p. 501)

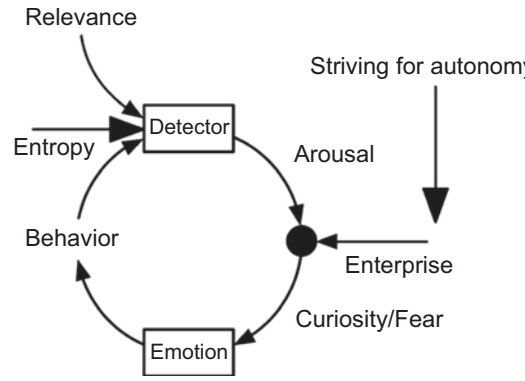

Fig. 3.4 The arousal system of the Zürich model (cf. Bischof, 1996, p. 500)

the Zürich model as attachment motivation. If, on the other hand, the level of security is above the set point, there is a surfeit response. This motivation, which runs counter to attachment motivation, takes effect most prominently in puberty, when the security parents provide is felt as a surplus to requirements and they become perceived as overly familiar, boring, and overprotective. From the sociobiological perspective, this is an adaptive development that serves to prevent incest. The relations between the variables of the security system are illustrated in Fig. 3.3.

When an object has low entropy, as shown by the unfilled arrow in Fig. 3.3, it triggers security in the organism's detector system (i.e., sensory structures), particularly if a familiar object is also highly relevant. The level of security experienced and desired depends on individual differences that change in the course of development. The older children get, the less security they need, i.e., their dependency decreases. This development seems to be influenced by the quality of early interactions with the primary caregiver (Ainsworth, 1979). The detectors also mature with time; what a small child considers complex and collative barely triggers any entropy anymore in puberty.

Figure 3.4 shows the part of the Zürich model that explicates the arousal system. It is connected to the autonomy motive, which describes facets of the achievement and power motives. Autonomous behavior is directed at implementing one's goals. It is positively related to the set point enterprise, because it necessitates direct confrontation with unfamiliar and relevant stimuli, i.e., it involves high entropy. Given a combination of high autonomy and high enterprise, arousal is perceived as pleasant and prompts diverse exploration and confrontation. The emotion of interest signals that the stimuli acting on the organism have not yet exceeded the set point for enterprise. As soon as this happens, it will be signaled by a feeling of fear, prompting the organism to take steps to remedy the excess of entropy, e.g., by flight, exploration, or aggression.

- Thus, emotions, motor activity, and the regulation of social distance differ markedly depending on whether the individual is high or low in the autonomy motive. Even when faced with essentially harmless threats, individuals high in dependency respond with concern, alarm, or even horror. It is only in environments that others find unbearably dull that they feel comfortable. The set points represent the true core of this complex system; they prompt the system to establish a dynamic balance within itself and in relation to the environment.

From the perspective of the Zürich model, the type of motivation that serves to promote development and self-actualization is the result of a balanced, developmentally graded equilibrium between security and arousal. A certain congruence can be seen here between the Zürich model

and Csikszentmihalyi's motivational theory of flow, which is defined as a state of concentrated absorption in activities (Csikszentmihalyi, 1990, 1997; see Chap. 13 for details).

The ideal balance between security and arousal can be reinforced by the influence of traits. In his risk-taking model of achievement motivation, Atkinson (1957) postulated that only individuals high on the approach component of the achievement motive tend to experience maximally arousing challenges (the demands of which are appropriate to individual ability level, meaning that the probability of success is moderate) as attractive and conducive to achievement. Individuals who are afraid of failure tend to choose tasks that are either too easy or too difficult and experience conditions that elicit arousal (if unsolicited) as less stimulating than alarming.

The achievement motive begins to influence individual choices early in life, thus shaping the social environment and the level of challenge potentially experienced in ways that seem difficult to compensate. Heckhausen and Tomasik (2002) found that males approaching the end of high school in Germany only aspired to a vocational training program that matched their scholastic achievement level if they had a high achievement motive score on the OMT. Given that an early person-job fit is vital for the favorable development of job satisfaction and performance (Holland, 1997), a weak achievement motive seems to set young people off on an unfavorable path that is very difficult to change later in life.

The principle of fit. The principle of fit also seems to play a key role in the development of the achievement motive. Heckhausen (1972) saw variables such as sensumotor exploration and "wanting to do it oneself," which can be observed in the striving for control or the pleasure in functioning (*funktionslust*) as early as the second and third years of life, as the precursors of achievement motivation. Heckhausen emphasized the interaction between the parent's expectations of independence and the age appropriateness of these demands (principle of fit), assuming that parental encouragement of independent behavior would have positive effects on the achievement motive if it matched the child's level of development, i.e., did not overstretch the child. Drawing on the principle of fit, Cube (2003) attributes many of the problems of modern industrialized societies (drug addiction, listlessness, and apathy) to the tempting, but ultimately destructive approach of providing children with too much security, the outcome of which is often quite the opposite: the ceaseless pursuit of ever stronger kicks to compensate for the overriding boredom of school or work. A study by Gubler, Paffrath, and Bischof (1994) shows that it is possible to predict human behavior on the basis of these system states, although the difficulties entailed in modeling such complex systems often make it extremely difficult to test them empirically. The difficulties of empirical investigation may account for the fact that the Zürich model to date has only scarcely been put to the test, empirically. As a consequence, the Zürich model plays only a marginal role in the basic research in this area. On the other hand, Bischof's model did exert significant influence in psychologically informed market research and has been adopted for practical applications by two leading marketing companies (Häusel, 2007; Scheier & Held, 2007).

3.5.2 Kuhl's Personality Systems Interactions Theory

Personality systems interactions (PSI) theory (Kuhl, 2001) is a theory describing motivational systems. It has been developed on the basis of both systematic conceptual inquiry and experimental research (Kuhl & Beckmann, 1985, 1994) and focuses on two major questions:

- How does self-facilitation and growth result from the integration of discrepancies, incongruities, and information that is not understood spontaneously (= entropy)?
- How is volitional facilitation and enactment of intentions realized when obstacles are encountered?

3.5.2.1 The Self-Facilitation System

Two subsystems make up the Self-Facilitation System: the low-level object recognition system (ORS) and the high-level extension memory (EM). The ORS recognizes objects as single entities, be they external things, internal states, emotions, etc. Because these objects are checked against templates that have been stored in the past, the ORS is oriented toward the past. It further entails a figure-ground sharpening mechanism that makes it inflexible, in the sense that it is ill-equipped to deal with degraded input, unlike intuitive information processing, which is oriented toward the present or the future. EM is an evaluation and decision-making system based on high-level intuition. It has extensive connections to a multitude of subsystems in the brain, drawing on a broad informational base and including a great number of needs, preferences, values, and other self-aspects.

Comparable to the Zürich model, PSI theory conceives of self-facilitation as a circular system (Fig. 3.5).

A self-facilitation cycle is activated when the ORS detects discrepancies or entropy. Highly entropic stimuli are initially associated with negative affect. They are transmitted to extension memory (EM) as incongruent or threatening. Because EM is a parallel memory system that integrates the totality of personal experiences, it is able to integrate information that the ORS cannot handle or interpret by drawing on related experiences. Once the new (discrepant) information has been successfully integrated, negative affect becomes downregulated (in the terminology of PSI theory: [A(−)]).

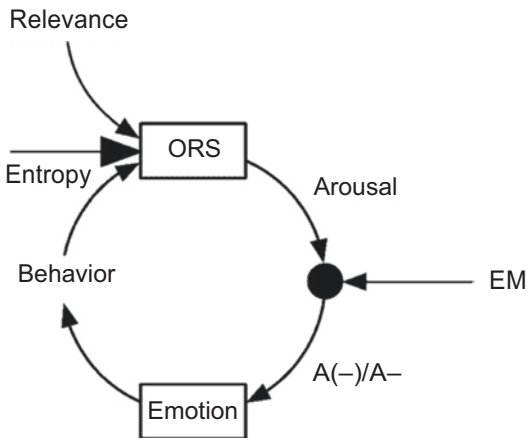

Fig. 3.5 The self-development system of PSI theory. *A* –, negative affect; *A*(−), downregulated negative affect; *EM*, extension memory; *ORS*, object recognition system

When negative affect (or arousal in the terms of the Zürich model) is not downregulated, however, which may result from individual differences in the activation of this system, negative affect (A–) persists and is translated into consciously accessible negative emotions that in turn trigger avoidance behavior.

Downregulated negative affect elicits a positively experienced emotion such as interest or acceptance, not unlike the concept of negative reinforcement in classical learning theory (Watson & Tellegen, 1985; Watson et al., 1999).

3.5.2.2 The Volitional Facilitation System

This system comprises two subsystems: the low-level intuitive behavior control (IBC) system and the high-level intention memory (IM). IBC has a double function. The first is the intuitive processing of information, involving the integration of contextual information within and across various modalities. The second is to initiate action and spontaneous reaction. Like all intuitive systems, the IBC has a rather rough but, at the same time, robust mode of operation and overlooks mistakes and incongruence. The intention memory is able to form explicit representations of intended actions. Its most important role is to inhibit immediate intuitive reactions in order to facilitate planning and analytical thinking, which would otherwise have to be terminated.

Like Piaget's sensorimotor schemata, intuitive behavior control entails a form of nonconscious perception that does not involve individual objects being extracted from their contexts but integrates numerous stimuli within parallel networks that simultaneously support intuitive motor programs. The IBC system does not interpret high-entropy stimuli as discrepant and threatening like the ORS would but finds or constructs some sort of meaning, or familiarity (reflected by the unfilled arrow representing

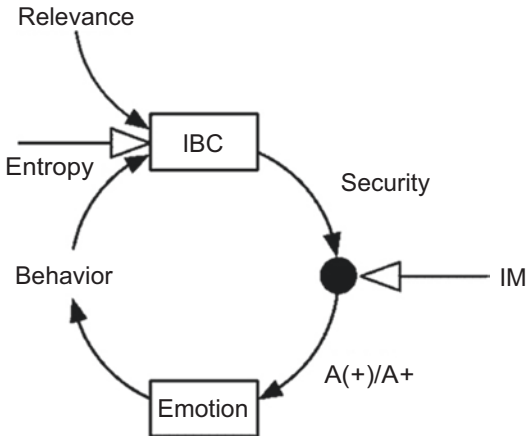

Fig. 3.6 The volitional facilitation system of PSI theory. *A+*, positive affect; *A(+)*, inhibited positive affect; *IM*, intention memory; *IBC*, intuitive behavioral control

entropy in Fig. 3.6). Familiarity triggers feelings of security that can be interpreted as primary positive affect (Bischof, 1993). An adaptive feature of IBC is its speed and fun component. As a result of its connectionistic architecture, it is relatively generous, overlooking mistakes and ignoring dangers. This can be disadvantageous, particularly in the face of potential threats. A further top-down system, intention memory, is therefore responsible for monitoring and regulating the IBC system.

- IM serves to inhibit premature or irrational intuitive processing and to delay automatic responding when difficulties arise. This process is called volitional inhibition. Intentions that cannot yet be implemented are maintained in IM, to the effect that they can be enacted later.

To facilitate volitional inhibition, primary positive affect (e.g., based on security) is down-regulated (in the terminology of PSI theory: A(+)) and transformed into a negative emotion that is not characterized by fear, but by the reduction of positive affect (e.g., frustration or dejection), and that may be expressed as rational, matter-of-fact behavior, listlessness, or even depressive mood. This negative emotion inhibits approach behavior (see Kuhl, 2000, for a more detailed description).

If, on the other hand, IM is unable to inhibit IBC (e.g., because of individual differences in the activation of this system, see Chap. 12), the motivational system remains in the intuitive mode.

Summary

According to PSI theory, motivation can be seen as a function of systems interactions (or configurations). This perspective provides better explanations of complex, recurrent patterns of behavior (e.g., self-facilitation, volitional facilitation) than do isolated traits. PSI theory places particular emphasis on the (down-)regulation of affect. Regulation of positive and negative affect can be seen as a volitional act that becomes necessary whenever emotions elicited directly by a situation would not suffice for motivation or would be dysfunctional. Baumann and Scheffer (2010) report empirical evidence about the phenomenon of achievement flow (see also "Flow" addressed in Chap. 13), showing that volitional effort is involved in shifts from reduced positive affect to self-regulated activation of positive affect. These self-regulatory processes also operate outside of consciousness and are guided by the autopilot of unconscious processing (Jostmann, Koole, Van der Wulp, & Fockenberg, 2005; Koole & Jostmann, 2004).

Intuitive behavior control is more appropriate when the information to be processed relates to issues that are very familiar to the individual, however complex they may be, e.g., social interaction. It is also the preferred – and often more efficient – approach when time is short and in the face of unexpected situations or spontaneous yielding to temptations.

Whenever a critical analysis of objects is required (e.g., because there is a problem to be solved), these intuitive behavioral routines have to be interrupted quickly and the analytical, systematic mode activated. This mode is appropriate when an important decision has to be made, when there is plenty of time, and when it is not yet clear how to proceed.

Scheffer and Kuhl (2006, 2010) have described the advantages and disadvantages of each approach for various occupational activities,

underlining the practical value that classifications based on systems configurations can have for studies of everyday behavior in occupations and organizations. For some time now, personnel psychologists have emphasized that compound variables – e.g., service orientation as a combination of the traits of extraversion, agreeableness, and dispositional achievement motivation – have much higher validity than individual traits when it comes to explaining and predicting patterns of behavior that are highly significant at the workplace, e.g., the capacity for teamwork, service orientation, and leadership potential (Schneider, Hough, & Dunnete, 1996). The availability of implicit methods to measure personality systems which exclusively use visual items and can be done quickly with large samples while still achieving good psychometric properties further (Scheffer & Manke, 2017) increases the practical relevance of the PSI theory.

Finally, it remains to note that systems theory may be criticized to the extent that assuming systems configurations to be the basis for motivation further complicates the classification problem previously discussed. It is then no longer a question of how many universally verifiable traits are involved in human motivation, but of which of these traits universally and verifiably interact with one another to create more complex, higher-order traits of predictive value that direct and guide a broad spectrum of functionally equivalent forms of adaptive and expressive behavior. The functional profiles of the systems and their interactions are nomothetic. Given the multitude of possible combinations, however, the precise configuration of a personality system will always be unique. Ultimately, then, investigation of system configurations must take a complementary, idiographic perspective that emphasizes the unique pattern of traits present in each individual and their interactions with environmental variables. This brings us back to an idiographic perspective on individual differences, though on a higher level of systems theory, integrating person and situation across the developmental trajectory of the lifespan.

3.6 Carver and Scheier's Model of Dynamic Self-Regulation

The intellectual roots of this influential approach go back to Cannon's (1932) descriptions of homeostatic processes and to Wiener's (1948) cybernetic formulas of communication and control processes, which go on in organic as well as artificial systems. The following section addresses the aspects of Scheier and Carver's model that are relevant for trait approaches to motivation.

What are the important contributions of the Carver and Scheier model for the development of a comprehensive trait theory of motivation? Carver and Scheier (2002) argue that the constructs of homeostasis and cybernetics are essential for understanding personality processes are still not yet directly applied in the field. The theories of Julius Kuhl and of Norbert Bischof as outlined previously (and with regard to Kuhl's theory in Chap. 12) are exceptions in this regard. Moreover, recent developments in personality psychology that have adopted constructs of goal pursuit (see review in Scheffer & Kuhl, 2010) have also called attention to the logic of cybernetic self-regulation. In particular, Carver and Scheier's model of processes involved in goal pursuit has used these constructs to bring important phenomena and constructs into sharper focus.

Processes of goal pursuit involve a feedback loop that reduces discrepancy in the case of positive or approach goals and that enhances discrepancy in the case of negative or avoidance goals (also referred to as anti-goals) (Carver & Scheier, 1998, 1999, 2000). Behavior can thus be viewed as the result of feedback processes involving a cybernetic system with four elements:

1. A comparator that compares actual and desired value
2. The neuronal capacity to represent a goal or standard of reference frame (desired value)
3. A channel for inputting information into the actual value
4. The means to influence the actual value (output channel)

These four elements appear straightforward, but we owe the insight into their specific structural and functional characteristics to Carver and Scheier's reasoning. The specific structural and functional characteristics of these four elements play a major role in the workings of personality systems, and this is what matters in the context of this chapter on trait approaches to motivation. The sometimes-conflicted, sometimes-cooperative psychodynamic of different subsystems varies across interindividual differences in personality systems (as also conceived by Allport). These differences are apparent because different personality systems:

1. Compare actual and desired values differently, depending on how the comparator works, which in turn is a function of which personality system is dispositionally activated.
2. Represent desired values, reference frames, and goals differently.
3. Process input information differently.
4. Facilitate or inhibit certain behaviors in different ways (specific personality systems have their own specific output channels).

For example, some people compare actual and desired values explicitly by listing and weighing them, whereas other people make such comparisons more implicitly by using intuitive-holistic heuristics. Depending on such personality difference, the comparator (see #1) is bound to work differently. The desired values (see #2) also vary according to the personality type. Some people form specific and measureable goals, whereas others generate vague goal paths without including a specific timing for goal pursuit and attainment. In addition, the input for determining the actual values (see #3) is subject to selective perception. Some people see their goal attainment under threat whenever even a small obstacle occurs, whereas others do not become aware of obstacles until it is almost too late. Finally, there are also individual differences in the output of behavioral regulation (see #4). A case in point is the personality dimension of impulsivity versus passivity.

Carver and Scheier's model conceptualizes personality as the product of a dynamic system that generates approach and avoidance behaviors (Carver, 2001, 2006). They view individual differences in the degree of approach and avoidance behaviors in the context of a dynamic system of personality. This approach integrates empirical insights from neuropsychology, psychopathology, and psychopharmacology about neurostructural bases of discrepancy-enhancing and discrepancy-reducing feedback loops.

In the case of an approach motive, the feedback loops serve to reduce the discrepancy between actual and desired (i.e., goal) values. In these negative (!) feedback loops, positive emotions (e.g., love, pride) play a major role. These positive emotions are attainable only via advances in goal attainment. Otherwise, they switch over to negative emotions (e.g., unrequited love).

Some negative emotions serve as approach goals and result from blocked approaches to a desired goal (Carver, 2006). A prime example is anger, an emotion that motivates an individual to make up for lost ground in goal pursuit. In contrast, sadness implies that further attempts at goal pursuit will be futile.

Avoidance goals involve an inverse relationship in that they aim at increasing the distance between the actual state and an undesired state (anti-goal). Initially, avoidance striving involves negative emotions such as fear, disgust, or contempt. These negative emotions switch over to positive emotions of relief and gratification as the individual is successful in avoiding the undesired state. Another characteristic of discrepancy-enhancing processes is that they – unlike discrepancy-reducing processes – have no particular direction, except away from the undesired state.

People differ with regard to their sensitivity to approach goals versus avoidance goals. Given that these two systems can be conceived as independent from each other, we arrive at four types of personality: high approach and high avoidance, high approach and low avoidance, low approach and high avoidance, and low approach and low avoidance. These personality types can be identified using the BIS or BAS scales (i.e., Behavior Inhibition or Approach Scales) and, for optimism, the LOT

scales (i.e., Life Orientation Test). The two extremes of high-high and low-low can be contrasted and identified clearly:

1. The high-low types can mostly (see the following exception) be classified as optimists. They are responsive to positive, not negative, incentives in terms of approaching positive states and ignoring negative threats. These people are unlikely to adjust their frame of reference downward if they experience a setback. They try to change the situation, not their standard for success.
2. The low-high types can be classified as pessimists. They are highly responsive to negative, not positive, incentives. When confronted with a setback, they are likely to adjust their frame of reference downward, giving up their standards for success more easily than striving to change the situation. The downscaling of goals may be adaptive if it reflects a realistic assessment of the situation and the controllability of goal attainment that facilitates the pursuit of feasible goals (Carver & Scheier, 2000).

Optimists and pessimists differ in their coping behavior, with optimistic coping not always being the adaptive choice. In a study with women patients who had early-stage breast cancer, Carver and colleagues (1993) identified the following coping strategies as adaptive:

- Acceptance
- Humor
- Positive reframing (reassessing values)

Notably, the Carver and colleagues study (1993) also found a negative effect of optimism in terms of enhancing the maladaptive coping strategy of denial. If the approach is overly positive and denies realities, coping with a serious illness is hampered. Overall, however, optimism was associated with adaptive strategies of acceptance, humor, and positive reframing, whereas pessimism was related to prematurely giving up, the most detrimental of all coping strategies. Carver and colleagues thus showed how coping strategies mediate the effect of personality differences of optimism versus pessimism on individuals' physical health and subjective well-being.

Hence, optimism can be characterized as the propensity to remain focused on important goals in life, even under adverse circumstances. In this regard, it resembles Kuhl's construct of action orientation. Both of these personality constructs emphasize the role of realistically perceiving threats and overcoming negative affective responses to threats. Being optimistic is not simply wishing one's problems away and in this sense cannot be equated with sensitivity to negative events but instead involves intermediate sensitivity to negative events coupled with high responsiveness to positive events. So when confronted with a chronic illness, for instance, the optimist will act following the guideline of actively addressing the new reality, whereas the pessimist would view the new reality as exceeding his or her coping capacity.

When observing a dynamic system for a longer period of time, certain behavioral strategies become more salient than others. In Carver and Scheier's model of dynamic self-regulation, these locations of greater probability are referred to as *attractors* (Carver, 2006). An example is the tendency of some people to select specific avoidance goals and vague approach goals, which leads them to respond to all challenges with avoidance and to all positive incentives with half-hearted approach attempts. The attractor for such a person is located on the periphery of both negative and positive incentives and will cause the individual to behave fairly consistently, avoiding negative incentives yet not striving for specific positive incentives (see Allport's definition and examples of traits).

A system can have more than one attractor, which typically means that neither attractor captures the behavior entirely. At first glance, the shifts of behavior from being regulated by one attractor to being regulated by the other can appear chaotic and random. However, these apparent inconsistencies can be understood when considering the structure and functionality of the system. The complement to attractors is *repellers*, states that are actively avoided by the system (e.g., feeling embarrassed in front of others).

Complex systems have the capacity for self-organization. The diverse forces interact in such a way that not one force can determine the system function. These dynamic and interactive systems spontaneously generate patterns of behavior, a notion that does not leave room for a central executive, such as the free will that could force the system in a certain direction. Such a model of self-organization is hard to apply to living and acting systems such as the human individual and thus is regarded by many merely as a descriptive metaphor (Carver & Scheier, 2002). However, at the level of organizing perception, the model of self-organization has significant benefits, because it accounts for preconscious perceptual and behavioral biases that reflect both situational stimuli and internal forces. The Carver and Scheier model of dynamic self-regulation conceptualizes the personality of the individual as a major determining force in the self-organization of perception and behavior. As such, their dynamic system model of self-regulation has significantly expanded our understanding of personality traits involved in motivation and action regulation.

3.7 Allport's Idiographic Approach

Observers of human behavior intuitively believe that they differ consistently from other people across a broad range of situations. Personality and differential psychologists were, and continue to be, of the same opinion. It thus seemed reasonable to assume that individual differences in behavior in all manner of future situations could be reliably predicted on the basis of individual trait strength. When scholars sought to confirm this assumption in empirical research, however, the consistency of behavior proved to be disappointingly low. Bem and Allen (1974) labeled this phenomenon, which has been the subject of considerable discussion, the consistency paradox.

Hartshorne and May (1928, 1929) placed children in situations where they had the opportunity to cheat, deceive, or steal. In a test situation, e.g., they could copy from their peers or surreptitiously continue to work after they had been told to stop. The correlation coefficients indicated that the consistency of behavior was rather low (between 0.20 and 0.40). Children who cheated in one situation were unlikely to do so in another. Those who cheated in one subject were honest in another. Upon closer consideration, this should not come as a surprise. After all, behavior is determined by the way the individual perceives the situation at hand, and not by the objective perspective of the observing psychologist. Yet it is the latter who assigns the various behaviors to a particular class – defining them, for example, as tempting situations that might induce someone to act dishonestly or deceptively.

To avoid the "nomothetic fallacy" (Bem & Allen, 1974) of this approach, it is first necessary to determine which classes of situations and related behaviors are equivalent from the perspective of each individual. Only then can the consistency of behavior be assessed. In other words, we can only expect consistency in an individual's behavior within subjectively equivalent classes of situations and actions (cf. Bem & Allen, 1974). In the final analysis, equivalence is defined by what the individual perceives as "equifinal" (Brunswik, 1952, 1956), i.e., as producing equivalent outcomes. Hence, two or more situations or actions may be seen as equivalent because they promise the same desirable outcomes or threaten to bring about the same undesirable outcomes. Therefore, a student may decide to cheat in only one of two subjects, because it is here that her grades are in need of improvement. Another student may take the opportunity to carry on working in secret but decide not to copy from her neighbor, because it would simply be too embarrassing to get caught.

Furthermore, Hartshorne and May found that consistency also depends on the broader context in which opportunities to deceive are embedded. Students who cheat in class will not necessarily do so in competitive sports or at Sunday school. Just these few examples show three things: first, that equivalence classes of situations and actions must be individually determined; second, that they are connected and interrelated; and third,

that they are shaped and held together by expectations of achieving desirable goals (values) or avoiding undesirable outcomes. Ultimately, then, the outcomes that people are able to bring about in a given situation determine classes of equivalence and hence consistency. G. W. Allport was already aware of this in 1937, when he defended the trait concept against the situational explanations of Hartshorne and May. He suggested that low consistency correlations proved only that "children are not consistent in the same way, not that they are inconsistent within themselves" (Allport, 1937, p. 250).

The inconsistencies observed are also caused by researchers assuming their respondents consider the same behaviors and situations as they do to be equivalent, and thus pooling them in questionnaire items and manipulated situations. This assumption is highly questionable, however. In his theory of the architecture of personality, Cervone (2004) suggested that both the contents of knowledge (about oneself and others) and the way this knowledge is linked to certain situations vary idiosyncratically; people who describe themselves using the same construct (e.g., "I am extraverted") may relate this construct to very different circumstances. As such, findings of inconsistency do not reflect transsituational inconsistencies in individual behavior as much as a lack of agreement between researchers and study participants on what constitute equivalent situations and equivalent behaviors. Before trait consistency can be studied, respondents would first have to be pretested to determine idiosyncratic equivalence classes of situations and actions and be divided into groups accordingly. This explains why people do not question the transsituational consistency of traits in everyday life. Unlike empirical psychologists, we do not seem to work on the assumption that there are generally valid (nomothetic) classes of situations and actions. Rather, we proceed idiographically, differentiating and categorizing situations and actions to fit the particularities of each individual case.

McClelland (1985) illustrated this point with an example that we would like to reproduce here in slightly modified form.

Example

What would you think of a dog that barks and bites, howls, scratches, jumps up, rolls on the ground, stretches out its neck, and finally urinates – all within a period of 10 min? You might see this behavior as thematically disconnected, inconsistent, or even disorganized. Looking at the situation from the dog's perspective, however, you would have to revise this interpretation immediately. Only then would you realize that the dog had not been fed for a week and that the owner was now approaching the kennel with a large piece of meat but showing no signs of handing it over. Driven by the need for food, the dog applies all of the strategies available in its behavioral repertoire to obtain the food. From the dog's perspective, then, the behavior is entirely consistent.

McClelland (1975) provides an impressive overview of the different strategies that people apply to gain power and status (e.g., accumulating status symbols, ensuring that they are the center of attention, associating with powerful individuals or organizations, helping others without being asked, criticizing others, etc.). In certain situations, people try out all of the strategies available to them in succession. This behavior may seem inconsistent to the outside observer, but is not at all inconsistent from the idiographic perspective – behaviors that seem qualitatively very different are in fact equivalent forms of adaptive and expressive behavior serving to satisfy (in this case) the power motive.

From the perspective of evolutionary psychology, it makes sense to consider motives and behavioral strategies separately. In complex social interactions, a strong autonomy or power motive can rarely be implemented by means of a single behavioral strategy. The more ambiguous situations become and the more often people encounter differently structured situations, the more important it is for them to be able to switch flexibly between different systems configurations

in order to satisfy their motives. MacDonald (1988) used the term compartmentalization to emphasize that people behave very differently in different situations – callously to their foes and warmly to their friends, for example. High consistency of behavior is not an evolutionary end in itself; like all other behavioral patterns, its adaptive value is tested over the course of natural selection. The fact that flexibility in the application of different behavioral strategies has the appearance of consistency from the subjective perspective is not a contradiction in terms but accentuates the need for an idiographic approach to complement nomothetic research.

We cannot assume consistency on the motive level, either, because the various motives have to compete with one another for access to the stream of behavior, which thus takes a dynamic course that is hard to predict (Atkinson & Birch, 1970; Kuhl & Blankenship, 1979). The resulting *behavioral oscillations* are not necessarily subjectively perceived as inconsistent, however; it can be part of the stable core of a personality to switch from one motive to another in certain situations. Equally, a motive conflict might characterize the consistency of a biography from the idiographic perspective, rendering many different situations equivalent across the life course.

Based on Allport's trait theory presented at the beginning of this chapter, a high consistency of behavior can only be expected when one motive is so strong that it dominates the others. Indeed, in operant tests such as the OMT (Chap. 12), high internal consistencies of thematic responses are found only in groups high or low in one of the three primary motives (Scheffer et al., 2003). Individuals with average motive strength, in contrast, show inconsistent response behavior across the different picture cues. From the idiographic perspective, these responses are by no means inconsistent, because each individual interprets the ambiguous picture cues on the basis of his or her own prior experience, thus giving them coherent meaning (see Cervone, 2004).

Summary

There are two reasons for complementing the nomothetic perspective by an idiographic approach that emphasizes the unique pattern of traits present within each individual. It is precisely in the normal ranges of motive strength that diagnosticians (professionals and laypeople alike) can only usefully describe and characterize individuals by taking an approach that acknowledges the context dependence and the underdetermined nature of behavioral and biographical trajectories and recognizes the role of personal goals (Baltes & Staudinger, 2000; Sternberg, 2003; Scheffer & Manke, 2013). In acknowledging the limits of the nomothetic perspective, however, we do not mean to imply that it is entirely without merit, as we aimed to show in this chapter by proceeding gradually from the nomothetic to the idiographic. Both approaches have their advantages and disadvantages and should therefore be considered complementary. They should ultimately be combined in such a way that the nomothetic approach is able to show how idiographic variety emerges from certain nomothetic regularities.

Longitudinal studies show that highly effective models and theories can be derived from the study of motivation; it is possible to predict behavior in disparate domains over very long time periods (up to 16 years!) on the basis of motives and traits. Domains examined to date include intimate relationships and psychosocial adjustment (McAdams & Vaillant, 1982), number of divorces and jobs (Winter et al., 1998), promotion to top positions in a large company (McClelland & Boyatzis, 1982), and business activities (McClelland, 1965).

Although trait theories only permit the prediction and change of human motivation in a statistical sense and although predictions are restricted to the probability of a certain behavior occurring later in life, these findings clearly confirm that – to draw on Kurt Lewin – there is nothing more practical than a good theory.

Review Questions

1. *Define the concept of trait and give an example.*

   A trait is a neuropsychic system with the capacity to render many stimuli functionally equivalent and to initiate and guide equivalent (consistent) forms of adaptive and expressive behavior, for example, the achievement motive (Fig. 3.1).

2. *How can the traits of the five-factor model be interpreted?*

   The Big Five traits can be interpreted as dispositionally heightened sensitivity to certain emotions. The dimensions distinguished are extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness. These five traits are assumed to be endogenous.

3. *What do the five-factor model and Cattell's trait theory have in common and where do they differ?*

   Both theories are based on the sedimentation hypothesis, the lexical approach, and the method of factor analysis. Cattell's theory is much broader than the five-factor model, however, in that it covers dynamic ergs as well as endogenous traits.

4. *Why did McDougall's instinct-based classification of motives fall into disrepute in scientific circles?*

   Attempts to infer instincts that underlie behavior can lead to circular reasoning, with every observable behavior being attributed to a corresponding instinct. Inspired by McDougall's list of instincts, it became common practice, particularly in neighboring disciplines such as sociology and political science, to attribute all behavioral phenomena to a specific instinct. For example, war was attributed to an aggressive instinct. At the same time, the fact that people fight wars was cited as evidence for the presence of an aggressive instinct.

5. *What did Murray mean by thema, and how did he seek to measure individual differences?*

   Murray used the term thema to describe person-environment relations, which he saw in terms of interactions between need (person) and press (environment). He developed the Thematic Apperception Test to measure individual differences in the relative strength of themas.

6. *Which are the needs identified in Maslow's hierarchical model?*

   Maslow's hierarchy ranges from existential, physiological needs via security needs, needs for belongingness and love, and esteem needs to the value of self-actualization at the very top of the hierarchy.

7. *Discuss the adaptive value of emotions.*

   Emotion-specific processing of information can help initiate a prompt response to the situation at hand. If people relied solely on the cognitive, argumentative processing of information, involving the analytical elaboration and subsequent integration of incentive and expectancy features, there would be long delays in responding to the situation. Their eventual responses, although fitting, would come too late and thus be inappropriate to the situational demands. The disadvantage of purely emotion-specific information processing is its context specificity, which may lead to a shortfall in abstract, situation-transcending action strategies.

8. *What are the three basic principles of systems theory models of motivation? What do these principles imply for our understanding of motive dispositions?*

   Personality is a complex system involving the interaction of multiple, highly integrated processes. These interacting

processes are rooted in basic cognitive and affective systems that initiate and direct behavior. The personality interacts with the environment, and the initiated behavior contributes to shaping the environment. From this perspective, motivational dispositions can be interpreted as systems configurations. In other words, several independent dispositions such as high levels of enterprise, autonomy, and intuitive behavioral control can be interconnected, jointly rendering numerous stimuli functionally equivalent and initiating consistent (equivalent) forms of adaptive and expressive behavior. As the systems configuration takes effect on the environment, the latter can change the system configuration (reciprocal interactionism), such that behavior becomes inconsistent, even though the dispositions involved remained stable.

9. *What is the consistency paradox?*

The inconsistencies frequently observed in behavior are caused by researchers assuming their respondents to consider the same behaviors and situations as they do to be equivalent, and thus pooling them in questionnaire items and manipulated situations. This kind of approach might lead a researcher to assume, for example, that someone who is dominant at work behaves the same way at home. For some respondents, however, assertive behavior in the private sphere will not mean a discernible gain in status. Thus, there is no incentive in this context for their idiographic power motive. From the respondents' own perspective, they are behaving entirely consistently, because dominance in the family circle cannot satisfy their power motive (the reverse case is also conceivable).

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Situational Determinants of Behavior

4

Jürgen Beckmann and Heinz Heckhausen

In Chap. 3, we considered explanations of behavior that draw solely on personality characteristics such as motives. Motives are relatively stable personality dispositions. Because the strength of the various motives differs interindividually, they can be invoked to explain differences in behavior. Indeed, motives can be seen as variables underlying predictable differences in individual behavior. In person-centered approaches, motive dispositions are also expected to explain the forces initiating and directing behavior. Seen from this perspective, situational factors serve only to arouse a particular motive. If, for example, someone with a strong achievement motive is invited to play a game of ludo (or Parcheesi), the achievement motive will take effect immediately and determine that player's behavior from that moment on. Any differences between the players in this situation would have to be explained by motive-dependent motivational differences. As shown in Chap. 3, however, the explanatory value of models that rely solely on personality variables is limited. An alternative approach is one that focuses on situational variables, on the situational stimuli that trigger and direct behavior. In this chapter, we look at the major theoretical developments that have emerged from situation-centered explanations of behavior.

The early twentieth century saw the emergence of a research tradition that took the equally radical approach of focusing on the situation as the sole determinant of behavior. Behaviorism turned its back on personality characteristics, and hence on motives, as explanatory variables. Indeed, behaviorists were less interested in individual differences than in the situational specificity of behavior. What initiates a behavioral sequence? What directs it toward a goal? What facilitates its adaptation to situational demands? What brings it to a close? These questions relate to the causes of concrete components of behavior, to functionalist aspects that cannot be attributed to the motive dispositions activated at a particular moment in time. The focus here is on specific processes of motivation.

- Behaviorists sought to describe the forces behind the initiation and direction of behavior in more precise terms. One basic assumption was that all instrumental acts are learned. This seemed to make concepts such as instinct and motive redundant. In time, however, the need for an initiating or energizing component was recognized. This energizing component was not specific to certain content domains

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(equivalent classes of goals), such as achievement, affiliation, or power. Instead, the concept of a general, activating "drive" was introduced (see Murray, 1951 p. 455).

Behaviorist approaches first shifted the focus of explanatory interest to learning. But how and when is what has been learned implemented in behavior? What is the nature of the link between learning and activation, the relationship between energizing behavior and giving it direction? Complex models were developed to address these questions from the behaviorist perspective. One of these was Hull's dynamic drive theory, which, like earlier approaches, attributed drive to physiological need states. The later postulates of acquired and derived drives, and of drive as a strong stimulus, prompted attempts to expand the explanatory value of drive theory to include behavior that cannot be attributed directly to physiological need states.

Influenced by psychoanalytic theory, the behaviorists went beyond animal experiments to examine the complexity of human behavioral phenomena. The study of conflict phenomena, in particular, led to a fruitful integration of approaches from learning psychology, psychoanalysis, and field theory.

Following an examination of conflict theory, we will consider the approaches taken to the situationally motivated determinants of behavior in the psychology of activation and in cognitive psychology. Activation theories are, for the most part, physiologically oriented and build on the concepts of drive theory, whereas cognitive theories focus on cognitive interpretations of situations and their effects on behavior, emphasizing the importance of intervening cognitive processes in motivation. Foremost among theoretical approaches incorporating a cognitive interpretation of situational factors is the theory of cognitive dissonance, which generated particularly intensive research activity. Originally a theory of motivation based on the assumptions of drive theory, it enjoyed increasing currency as a theory of attitudinal change in social psychology. Eventually, its function was reduced to one of mental hygiene, with processes of dissonance reduction serving solely to produce a conflict-free self. In essence, however, it is a motivational theory that describes processes of self-regulation occurring in response to internal conflicts. Thus, dissonance theory lies at the interface of motivation and volition (Beckmann, 1984).

4.1 The Explanatory Role of the Situation in Motivational Psychology

Information about the current situation is crucial to action control. In the simplest scenario, responses are triggered and controlled by "stimuli" present in the situation. Besides external stimuli, the sources of which are in the environment outside the organism, internal stimuli arise within the organism itself. These internal stimuli may be transient states of the organism such as hunger or states such as internal conflict.

Early behaviorist approaches did not study the situation within the organism, however, as it was not accessible to direct observation. Scholars were initially concerned only with what could be manipulated on the stimulus side and observed on the response side.

Learned, adaptive behaviors were seen to be based purely on the formation of associations. Neither Thorndike nor Pavlov considered it necessary to introduce a motivational concept to explain learned changes in behavior (with the exceptions of the processes of arousal and inhibition). Nevertheless, both ensured that their animals were hungry before using them in their food-related learning experiments. When Pavlov's dogs were satiated (i.e., not "aroused"), they no longer salivated in response to powdered meat being placed in their mouths; when Thorndike's cats were satiated, they did not engage in food-oriented escape behavior. Both researchers focused on the structural mechanisms of stimulus–response bonds (S–R bonds) and on identifying the temporal relations that would guarantee the best learning outcomes. They were evidently implicitly aware that learning requires a motivational basis, however, and thus manipulated the motivational state of hunger within the organism.

The state within the organism also plays a key role in Thorndike's (1911, 1913) "Law of Effect," according to which it is the achievement of a "satisfying state of affairs" that strengthens the bond between a successful instrumental response and the antecedent stimuli. It was not until 40 years later that underlying motivational states found their rightful recognition as internal situational determinants in the explanation of S–R bonds in Hull's drive reduction theory.

4.2 Need and Drive

Woodworth (1918) disagreed with McDougall's notion of instincts being the sole basis for the explanation of behavior. At the same time, he questioned the explanatory value of the simple *S–R* bonds postulated by the behaviorists. He expanded these simple *S–R* equations to include the additional determinants of organismic states (*O*), thus producing *S–O–R* equations. If the organism is in a need state, a distinction must be made between anticipatory and consummatory responses (terminal actions), as had already been proposed by Sherrington (1906). Whereas anticipatory responses are dominated by external stimuli, consummatory responses reflect the effects of internal stimuli. Drives, in particular, propel behavior toward its goal, satisfaction, or satiation. This "dynamic" view of behavior led Woodworth to suggest that the "mechanisms" of behavior (i.e., its structural components) eventually acquire the characteristics of a drive, becoming a motivational force in their own right.

- Woodworth (1918) was the first to distinguish between the concepts of "drives" and "mechanisms." In so doing, he differentiated between the dynamic or energetic component and the directive component of motivational phenomena. Tolman (1932) adopted this distinction, introducing it to the psychology of learning. His "intervening variables" were labeled "drive" and "cognition." These theoretical constructs were later used by Hull in his complex drive theory.

4.2.1 Approaches to the Measurement of Internal Stimuli

Whereas behaviorism initially focused exclusively on external effects on the organism, other approaches also considered the internal stimuli that arise from the internal environment of the organism and affect behavior from within. Freud had distinguished between external and internal stimuli as early as 1895, explaining that the latter are those from which the organism cannot escape. On the physiological side, this prompted a search for measurable internal stimuli that provide the incentive for certain behaviors. Cannon and others developed a localized theory of motivation for hunger and thirst (Cannon & Washburn, 1912). They measured stomach contractions with the aid of a rubber balloon that was inflated after it had been swallowed. The stomach contractions measured correlated with feelings of hunger. The internal stimuli for feelings of thirst were assumed to arise from a drying of the mucous membrane of the mouth and throat.

Later decades saw intensive research activity in this area (see Bolles, 1967, 1975, for an overview), the findings of which completely undermined the localized theory of motivation. For example, it was shown that dogs engaging in "shamdrinking" (where a fistula is inserted into the esophagus to drain away the water before it reaches the stomach) consumed large amounts of water, even though the oral cavity was kept moist. The regulation of food and liquid intake proved to be extremely complex. Even now, their physiological bases are not entirely understood. Beside peripheral regions of the organism like the gastrointestinal tract, stomach, colon, liver, body cells, arteries, and veins, brain centers have been shown to be involved, exercising a central integrating function (Balagura, 1973; Toates, 1981).

Another line of research, initiated primarily by Curt Richter, focused on the general activity level of experimental animals. Richter's (1927) findings suggest that activity level represents an index of periodic variation in drive that seems to accompany cyclic variation in need as a means of

maintaining the organism's metabolic equilibrium (homeostasis). Richter used running wheels and stabilimeter cages (see below) to record animals' activity levels automatically over a period of days. Based on the variations in activity observed, he assumed a threefold causal sequence: (1) need leads to drive [via (2) internal stimulation] and (3) drive leads to linearly increased activity. For a long time, it was thought that physiological indicators of need states were prima facie evidence for the drive in question, which, prior to its satiation, was expressed in increased general activity. At first, it was even thought that homeostatic principles could provide a watertight explanation for all behavior (Raup, 1925). Yet it soon became apparent that basing inferences about the presence of a drive on either antecedent indicators of need or subsequent increases in activity was a risky and overly simplistic strategy.

Here again, matters seem to be far more complicated than first assumed. For example, whether a food-deprived rat displays an above- or below-average level of general activity has far more to do with external stimulus conditions than was originally thought. Various attempts were made to operationalize the internal stimulus, the drive. Campbell and Sheffield (1953) kept rats in stabilimeter cages for 7 days. These cages registered the animal's every activity. The laboratory was dark and soundproof; a ventilating fan produced a constant masking noise. Food was provided in the first 4 days, followed by 3 days of deprivation. Once a day, the experimenter entered the room for 10 min, turning the light on and the fan off. Activity levels were measured in the 10 min prior to and during this change in stimulus. Figure 4.1 shows the mean activity levels in these two 10-min periods over the 7 days of the experiment. The level of activity prior to the stimulus change remains at the same low level, even with increasing hunger in the last 3 days. During the period of stimulus change, however, the level of activity increases steadily as a function of increasing hunger, supporting Morgan's assumption of an increased general motivational state. These findings, however, challenge Richter's theory that activity increases automatically with an increase in the need state. What increases is evidently the readiness to respond to external stimuli. In another experiment, Sheffield and Campbell (1954) showed that the increase in activity during the deprivation period was particularly pronounced if the change in stimulus was temporally linked to feeding on previous days. It would seem that the animals have learned stimulus cues that precede feeding, suggesting that the periodic variations in drive observed by Richter were the result of food-signaling stimuli that were not controlled in his experiment.

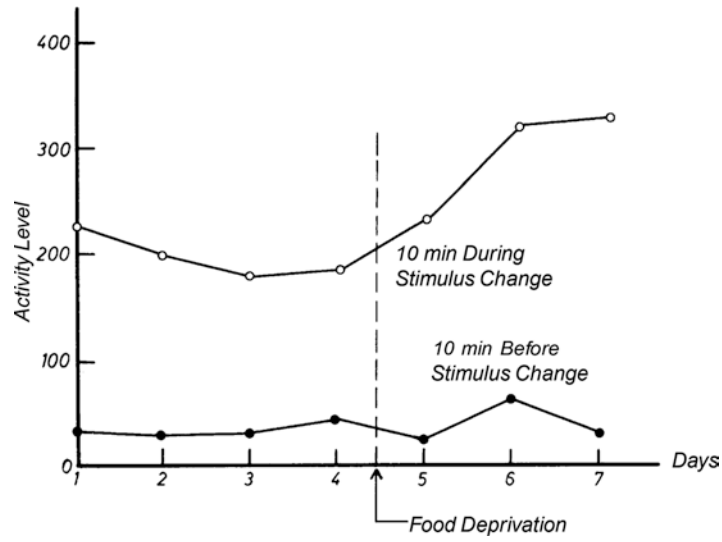

Fig. 4.1 Mean activity levels in 10-min periods prior to and during a stimulus change in satiated (day 1–4) and food-deprived (day 5–7) rats (Based on Campbell & Sheffield, 1953, p. 321)

Measurements of general activity are difficult to interpret because there is no way of knowing which specific drives they reflect. Similarly, general activity does not result in drive-specific, goal-directed behavior. Progress was made with the construction of a new experimental apparatus for measuring drive-specific, goal-oriented activity: the Columbia Obstruction Box.

Study

The Columbia Obstruction Box

Figure 4.2 shows the layout of the Columbia Obstruction Box. The animal is placed in the entrance compartment (*A*). To reach an incentive object to satisfy a drive, it has to cross an electrically charged grid (*B*) accessed by means of an experimenter-operated door (d_1). Having crossed the grid, the animal reaches the first section of the incentive compartment (*C*). Stepping on the release plate (*E*) opens the door (d_2) to the incentive compartment proper (*D*), which contains a drive-specific incentive object (food, water, or a sex partner).

The animals were first given a series of pretrials to acquaint them with the apparatus. The incentive object was present at all times. It was only in the last of the pretrials that the grid was charged. In the main experiment, deprivation of a specific need was varied, and the number of times an animal overcame its aversion to the charged grid to reach the incentive object in each 20-min observation period was recorded. The aim was to measure the strength or urgency of individual drives, not only as a function of length of deprivation but also in terms of differences between the various drives.

As shown in Fig. 4.3, thirst seems to have greater drive strength than hunger; and hunger,

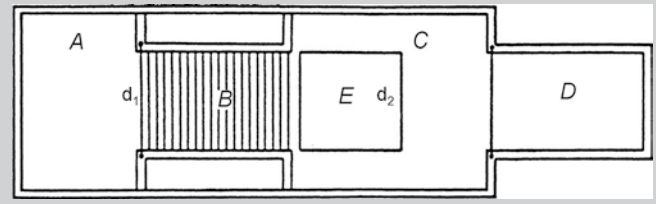

Fig. 4.2 The Columbia Obstruction Box designed to measure drive-specific levels of activity (Based on Jenkins, Warner, & Warden, 1926, p. 366)

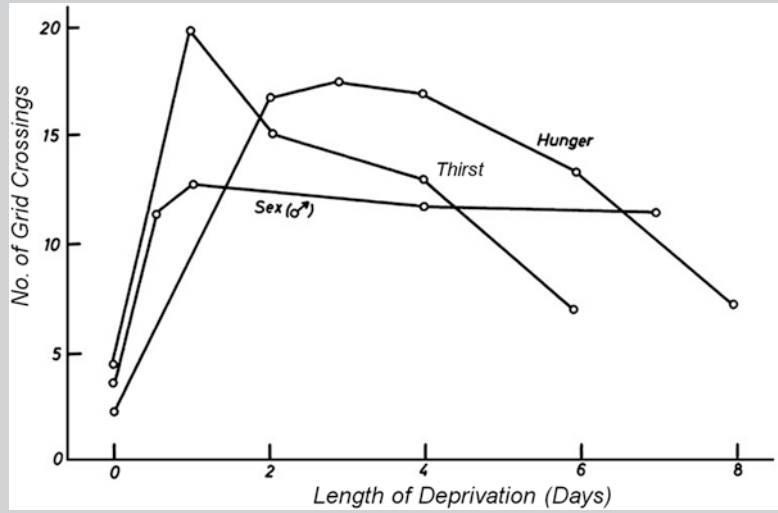

Fig. 4.3 Frequency with which rats crossed the electrically charged grid of the Columbia Obstruction Box to make contact with a need-specific incentive object by length of deprivation (Based on Warden, Jenkins, & Warner, 1936)

(continued)

in turn, seems to have greater drive strength than sexuality in males. The number of times the grid was crossed, however, is a questionable measure of drive strength. For one thing, uncontrolled factors in the pretrial phase may have led to different learning outcomes. Likewise, very different results might be obtained if the length of the observational period were changed. It would be difficult to determine which time period would produce the most valid measure of a specific drive strength. Most of all, the attractiveness of the incentive object was not varied systematically. We now know that this can be a motivating factor capable of activating behavior independent of need state. Furthermore, each contact with the incentive object – no matter how fleeting – results in consummatory activities that cannot always be controlled.

4.3 Drive Theory

In the 1920s and 1930s, extensive research relating to the concept of drive produced a broad range of findings and insights. Need states were manipulated; internal and external stimuli, physiological and behavioral indicators of need-dependent drive strengths, and instrumental and consummatory reactions were observed, operationalized, measured, and interrelated. This work represented a considerable advance on the speculative concept of instinct. However, there was still no clear and cohesive conception of drive beyond the general notion that the motivational state driving behavior increases as a function of need state.

Researchers reconsidered the questions that had already been addressed by instinct theorists. Are there as many drives as there are physiological needs? Or is there just one drive – a generalized incentive function for all behaviors that is not specific to a particular need? Assuming that there are various drives, does a need-specific drive have a selective function (in terms of stimulus and response) as well as an incentive function, i.e., a directive component as well as an energizing one?

These were the questions addressed by Hull's (1943) drive theory. In his complex theory, Hull made a clear distinction between drive and habits. Drive has a purely dynamic function and describes a general state of activation. Habits, in contrast, are learned, associative stimulus–response bonds that give behavior direction.

- Hull assumed a single, generalized incentive function, which had no selective function in determining behavior. Thus, the question of motivation was confined to a single drive or rather to a question of incentive. For Hull, motivation concerned only the energizing of behavior, whereas the selection and goal orientation of behavior were functions of associative learning.

The clear distinction between issues of learning and motivation in the explanation of behavior, however, does not mean that the two components were viewed as mutually exclusive. In fact, one basic tenet of Hull's drive theory is that the motivational component affects the learning component but that the learning component has no influence on the motivational component. The motivational component, drive (D), is – in a manner of speaking – an indigenous source of behavior.

How does drive influence learning? In the late 1930s, Hull began to ask whether stimulus–response contiguity suffices as the sole explanation for learning, i.e., for the formation of new S–R bonds. For him, it was not classical conditioning that had been invoked to explain Thorndike's trial-and-error learning, which was the primary learning principle; it was instrumental conditioning. Stimuli become linked to responses whenever these responses lead to need satisfac-

tion. The subsequent reduction in the existing need or drive serves to reinforce the new *S–R* bond. Thus, *S–R* learning follows the principle of reinforcement. This approach to the mechanisms of reinforcement is known as drive reduction theory (Chap. 2).

According to this approach, the strength of the emerging stimulus-response bond (*SHR*) is solely dependent on the frequency of reinforcement. The frequency or strength of learned responses is only dependent on the existing drive strength.

Study

Experimental Studies on the Drive Reduction Theory of Reinforcement

In the studies by Williams (1938) and Perin (1942), rats that had been deprived of food for 23 h learned an instrumental response (lever pressing) that produced food. The frequency of reinforcement of this instrumental response (by provision of the food reward) was varied across four experimental groups during the learning phase. In the subsequent test phase, the animals were again deprived of food (for 22 h in Williams's study and 3 h in Perin's study). Lever pressing was no longer reinforced, i.e., the learned response was extinguished. The dependent variable was resistance to extinction, i.e., the number of lever presses prior to a 5-min period of nonresponse. This is a measure of habit strength ($_sH_R$). The results are presented in Fig. 4.4.

The graph shows that the resistance to extinction of the acquired *S–R* bond increases as a function of the number of previous reinforcements. In other words, an animal whose goal responses have more frequently resulted in a reduction of need state in the past will show greater persistence in responding when reinforcement is withheld.

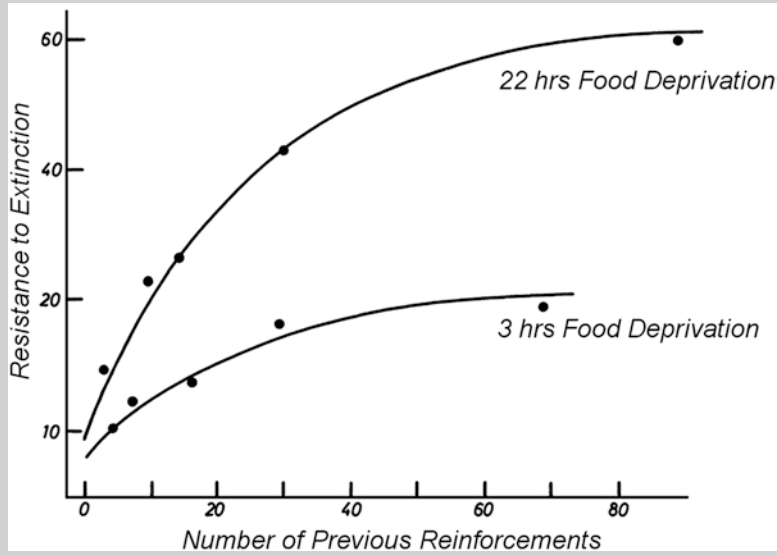

Fig. 4.4 Impact of the number of reinforcements and the length of deprivation on resistance to extinction (Based on Perin, 1942, p. 101)

Hull derived his drive reduction theory of reinforcement (and other concepts of his drive theory) from the two experiments presented in the study box: one by Williams (1938) and the other by Perin (1942).

The findings of the two studies appear to clearly support the notion of reinforcement being based on drive reduction. Furthermore, the two curves in Fig. 4.4 indicate that resistance to extinction increases as a function of hours of deprivation,

independent of the number of reinforcements. The higher the frequency of reinforcement, the greater the difference between the two different deprivation conditions, i.e., the two drive strengths, in terms of a resistance to extinction. In other words, where their influence on behavior is concerned, the relationship between frequency of reinforcement and drive strength is multiplicative. Neither habit strength (${}_{S}H_{R}$), based on the frequency of reinforcement, nor drive strength (D), based on hours of deprivation, is the only determinants of behavior (in this case, the extinction of a learned response). Rather, the two must combine to produce the behavior. Thus, behavior is shaped by the product of (${}_{S}H_{R}$) and (D), the so-called reaction potential, ${}_{S}E_{R}$ (Chap. 2, Sect. 2.6.1).

Performance is not solely a function of learning. A motivational component is also required. Hull makes an explicit distinction between learning and performance to the extent that, once a habit has been formed, performance of a response is determined only by the product of ${}_{S}H_{R}$ and D. Although not stated explicitly, however, the same also applies to the preceding acquisition process. For Hull, both learning and performance are behavioral principles. To build up habit strength, the organism has to repeatedly engage in behavior that results directly in the reduction of a specific drive. Regarding the acquisition phase, the distinction between learning components (${}_{S}H_{R}$) and motivational components (D) is problematic. If reinforcement is a necessary prerequisite for learning, then the learning component (habit formation) must necessarily also incorporate a motivational component.

Hull (1943) expanded his drive theory in a number of directions, essentially formulating six postulates. All of these helped to clarify the drive construct. They stimulated research and led to revisions and new conceptualizations. The six postulates relate to:

1. The antecedent conditions of drive
2. Drive stimuli
3. Independence of drive and habit
4. The energizing effect of drive
5. The reinforcing effect of drive reduction
6. The general nature of drive

4.3.1 Antecedent Conditions of Drive

Drive strength is a direct function of the organism's existing need state and is presumably mediated by need-specific receptors within the organism. Empirical studies have focused primarily on the need for food and the resulting drive states. Duration of food deprivation is varied as an antecedent condition of drive, thus serving as operational criterion for drive strength.

The value of deprivation as a criterion for drive strength, however, proved to be limited. In rats, for example, a relationship between length of deprivation and indicators of hunger – e.g., amount of food consumed – was observed only after a period of deprivation exceeding 4 h (Bolles, 1967, 1975). Because laboratory rats eat about four times during the day and eight times during the night, a given period of deprivation during the night will deprive the animal more than that same period during the day. The 4-h threshold was confirmed by Le Magnen and Tallon (1966) among others, who showed that food intake does not increase as a function of the period of abstinence between two regular feedings, but that it does increase as a function of the time interval following an omitted feeding.

Research (see Bolles, 1967) has shown that reduction in body weight is a better indicator of the strength of a hunger drive than is the period of deprivation. In line with Hull's drive theory, experiments with rats confirmed that the strength of both instrumental and consummatory behavior (in terms of latency, intensity, persistence, and resistance to extinction) increases proportionately to weight loss. It should be pointed out, however, that the quantitative relationship between the induced need states and drive strength (i.e., their behavioral parameters) does not represent an equal-interval scale, but only a rank-order scale. Needs other than food and liquid intake, such as sexuality or exploration, are not "needs" as defined by drive theory, because their deprivation has little effect on behavior. In these cases, the conditions determining behavior are very complex, and the external situation plays a decisive role in providing incentive

conditions. For example, certain hormonal states are necessary but not sufficient conditions for copulatory behavior.

4.3.2 Drive Stimuli

Drive states are assumed to be accompanied by specific drive stimuli (S_D). These are attributed to the structural (associative) and not to the motivational components of behavior. Drive stimuli form stimulus–response bonds of their own and can thus direct behavior. Unlike generalized, unspecific drive strength, however, they cannot motivate behavior of their own accord. Attempts were made to demonstrate the directive functions of drive stimuli in drive-discrimination studies. In one such study, rats learned certain instrumental responses under food-deprived conditions, and others under water-deprived conditions, but otherwise they were subjected to identical external conditions. How easy would it be for them to respond in a manner appropriate to the existent need state? To identify the appropriate response, they needed to "know" whether they were hungry or thirsty. In other words, specific drive stimuli needed to have formed associations with the instrumental responses.

The data obtained (Bolles, 1967, pp. 254–264) provide little evidence for the significance of drive stimuli. There are other, more convincing explanations for the finding that rats learn the instrumental response appropriate to the momentary need state more quickly – specifically, the incentive mechanism of fractional goal response (r_G), as illustrated by the following two studies. Hull (1933) had rats run through a maze. If they chose one path, they found water in the goal box; if they chose another path, leading to the same goal box, they found food. The animals were alternately food or water deprived when placed in the maze. It was a long time before they were able to discriminate between the two paths, and even then the distinction was weak and not very reliable. Leeper (1935), in contrast, observed rapid discrimination learning when water and food were placed in different goal boxes. If drive stimuli were the crucial factor, this difference in learning outcomes would not have been observed. Something other than drive stimuli evidently controlled the behavior of the rats in Leeper's research design. The consummatory responses of eating and drinking (R_G) are linked to stimuli present in the environment in which they take place. These environmental stimuli become associated with those previously encountered at the crucial fork in the maze. This triggers anticipatory fractional goal responses (r_G) of eating or drinking that steer the animal more strongly in one direction or the other, depending on the momentary need state.

- The hypothetical incentive mechanism of *anticipatory fractional goal response* (r_G) is the most serious challenge to drive theory, because it is also better able to explain other aspects of incentive motivation (Chap. 5). It is an especially marked improvement on explanations of behavior based solely on association, which relied heavily on the effectiveness of drive stimuli (e.g., Estes, 1958).

4.3.3 Independence of Drive and Habit

Neither the learning component (habit) nor the motivational component (drive) determines behavior independently; what takes effect is their multiplicative product. Two main approaches have been taken to this issue. The first compares learning curves obtained under different drive conditions but comparable frequencies of reinforcement. Given the multiplicative effect, variations in drive strength should result in the learning curves plateauing out at different levels (cf. the data presented by Williams and Perin in Fig. 4.4); in each case, however, these plateaus should be reached in equal steps. In the second approach, learning takes place under one drive state, and testing under another. The question is then whether behavior is commensurate with the change in the drive conditions or whether transfer effects from the previous drive condition can be observed?

A study by Deese and Carpenter (1951) is an example of the second approach.

Study

Asymmetrical Transfer With Reversed Drive

Deese and Carpenter (1951) ran food-deprived rats under either low or high drive conditions through a runway leading to a goal box that contained food. The authors measured latency of leaving the start box after the gate was opened. Both groups had reached their respective plateaus of response latency after 24 reinforcements. The drive conditions were then reversed, with the group that was previously run under a low drive condition being run under a high one and vice versa. The findings shown in Fig. 4.5 attest to a peculiarly asymmetrical transfer effect.

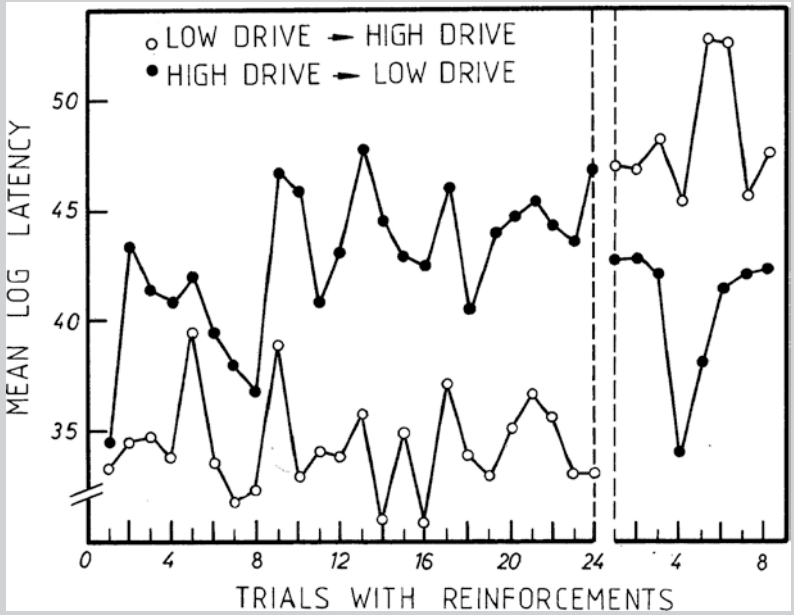

Fig. 4.5 Latencies (reciprocal) of a running response to food under low and high hunger drive conditions and (in the right-hand panel) under reversed drive conditions (Based on Deese & Carpenter, 1951, p. 237)

Bolles (1967, pp. 227–242) provides an overview of key findings. In general, it was possible to confirm the independence of habit and drive in the case of food-seeking behavior, as measured in terms of intensity differences. The latter restriction raises the question of whether slow and fast running speed are merely differences in the intensity of one and the same response, or two qualitatively different responses, learned under low or high drive strength.

Furthermore, whether drive and habit are independent of each other is really a question of definition. After all, there are secondary, acquired drives (motives), such as fear, that are activated in the presence of particular stimulus cues. Hull places these in a separate category because, for him, drive (D) encompasses only nonlearned drive states. By contrast, Hull's collaborators and students, such as Spence (1956), Miller (1956), and Brown (1961), categorize everything with motivating characteristics as D, thereby abandoning the postulate of independence of drive and stimulus–response bonds. These extensions of drive theory will be discussed next.

4.3.4 Energizing Effects of Drive

It is a basic hypothetical postulate of drive theory that the motivational component serves exclusively to initiate behavior, but does not give it direction. Here again, however, research find-

ings are inconsistent. The clearest support for the energizing characteristics of drive strength is provided by studies involving learning under drive conditions that are subject to rapid change through instrumental or consummatory responses (Fig. 4.4). On the whole, this applies only to "tissue needs" and not to the "sex drive" (whose drive character was questioned earlier). Parenthetically, if energizing is equated with response frequency, then there are also alternative explanations for these findings, e.g., in terms of purely associative principles or incentive effects. The study by Campbell and Sheffield (1953) presented above is an example of this (Fig. 4.1).

4.3.5 Reinforcement Effects of Drive Reduction

The acquisition of a new stimulus–response bond assumes the existence of a drive state that will be reduced by the response. None of the postulates of drive theory have prompted as much research and testing as this one.

The postulate raises questions about the precise nature of drive reduction. Does it consist in the consummatory activity itself, the effects of the stimulus (e.g., stomach activity after food intake), or the subsequent need reduction within the organism? Is drive reduction not simply a motivational process governing the execution of behavior that has also been acquired in other ways not involving drive reduction? In that case, drive reduction would be a behavioral principle – a matter of motivation – and not a learning principle (see Chap. 5 on latent learning).

To test whether consummatory responses are the critical event facilitating learning, experimenters sought to eliminate parts of the consummatory response sequence. Specifically, they bypassed the oral component by means of a fistula that introduced food directly to the stomach or the gastric component by means of an esophageal fistula that drained the food before it could enter the stomach (sham feeding). Because limited learning was observed under both conditions, drive reduction must, at least in part, be linked to consummatory activities. Given these findings, the hypothetical drive construct could only be maintained – e.g., by N. E. Miller (1961), who ran numerous experiments with normal and sham feeding – by abandoning Hull's notion that drive reduction is synonymous with a reduction of an organismic need state.

Sheffield went a step further. He showed that neither need reduction nor drive reduction are necessary prerequisites for learning. Sheffield and Roby (1950) demonstrated that thirsty rats will learn an instrumental response in order to obtain a saccharin solution rather than the same amount of water. Because saccharin has no nutritional value, it cannot have resulted in higher need satisfaction. Young (1949, 1961) identified numerous taste preferences that prompt learning without providing for the organism's metabolic requirements. Young attributed these findings to differences in the affect-inducing incentive values of the foodstuffs in question.

The findings of a study by Sheffield et al. (1951) present an even greater challenge to drive reduction theory. The study involved learning under stimulation of the sex drive. Male rats who had never copulated prior to the experiment learned an instrumental response to gain access to a female in heat, despite the fact that the copulatory process was interrupted prior to ejaculation. It seems reasonable to assume that not only was there no reduction in drive strength in this case, but that – in contrast – drive was increased. There must, then, be certain cases in which learning is the result of drive induction rather than drive reduction. Figure 4.6 shows the results for the rats in the experimental group in comparison to a control group that found a male animal in the goal box.

- Curiosity and exploratory behavior constitute an entire class of learning phenomena that cannot be explained in terms of a reduction in organismic need states.

A final group of studies was based on the remarkable discoveries of Olds and Milner (1954) who electrically stimulated certain lateral regions of the hypothalamus, the so-called pleasure centers. Rats learned to press a lever or to make another instrumental response when that response was followed by mild stimulation of

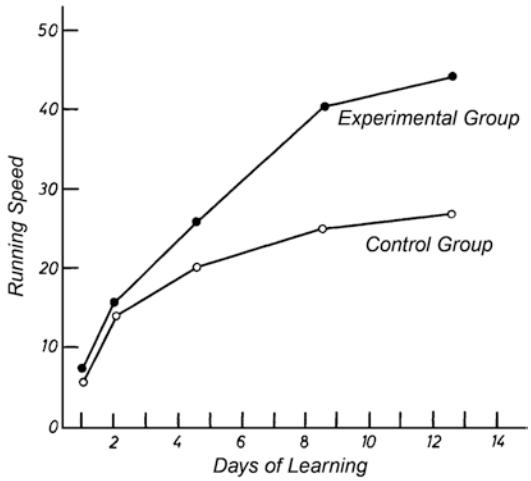

Fig. 4.6 Learning gains under the drive condition of copulation without ejaculation in rats. The control group found a male animal in the goal box (Based on Sheffield, Wulff, & Backer, 1951, p. 5)

these brain regions. Olds (1958) observed up to 7000 responses per hour under this condition, an activity level leading to physical exhaustion. When electrodes were implanted in another region, i.e., one involved in food regulation, the reinforcement effect of electrical stimulation ceased as soon as the animal became satiated. When sexual stimulation was achieved through injection of androgen, the reinforcement effect of stimulating the "hunger region" was reduced. Evidently, there are interactions between organismic need states and other drives.

Can these findings be reconciled with drive reduction theory? An inveterate drive theorist might argue that the electrical stimulation of the brain interferes with the complex regulatory mechanism governing need and drive states. Yet it might also be the case that need and drive states are not involved at all and that the emotional arousal or pleasurable states elicited by a certain behavior in fact reinforce that behavior. Especially the neurotransmitter dopamine seems to play an important role here (see Ikemoto & Panksepp, 1999). In either case, research using brain stimulation raises serious questions about Hull's postulate. In view of these accumulated findings, it would seem advisable – if Hull's theory is not to be abandoned – to divorce drive reduction from antecedent need states and to designate as drives everything that reinforces as a function of its reduction.

4.3.6 The General Nature of Drive

- If habit and drive are mutually independent, the habit-activating function of drive must also be independent of different drive sources. Drive is then the summation of all specific drive states, such as hunger and thirst. A response that was learned under hunger conditions must be emitted in an identical stimulus situation, even if the organism is only thirsty.
- Some empirical data confirm this assumption; others do not. Hunger and thirst seem to be inappropriate substitutes for each other because the organismic regulatory mechanisms of the two need states are not mutually independent.
- The empirical data discussed above indicate that the postulate of a general, nonspecific drive is the exception rather than the rule (cf. Bolles, 1965, p. 265 ff.). Meanwhile, findings from recent neuropsychological research, however, suggest that this old postulate might be worth some reconsideration (cf. Kuhl, 2001, p. 903).

The assumption of a generalized drive also formed the basis for a broad field of research relating to human motivation (Taylor & Spence, 1952). Taylor (1953) developed a questionnaire to measure enduring individual differences in generalized, nonspecific anxiety (MAS, "Manifest Anxiety Scale"). Anxiety is viewed not as a function of the situation, but as a motive disposition, an "acquired drive." People with high MAS scores are assumed to have a high generalized drive level, making them more likely to respond.

This has various implications for the acquisition of easy and difficult tasks. The reasoning here is as follows: Tasks are easy if their correct solution involves responses that already possess a measure of habit strength and if there is little competition with the habit strength of inappropriate responses. Given the multiplicative relationship between ${}_sH_R$

and *D*, high-anxiety individuals can be expected to learn easier tasks better and more quickly than low-anxiety individuals, because their higher drive strength raises the dominance of the reaction potential for the correct responses over the incorrect ones even further above the response threshold. The opposite can be expected for difficult tasks. Here, the correct responses have lower habit strength than the incorrect ones. The high drive strength of high-anxiety individuals serves to exacerbate the unfavorable relationship between competing responses, to the detriment of the correct ones. Moreover, other irrelevant habits are likely to be raised above their response thresholds. Paired-associate tasks were used to test this theory of the interaction between generalized drive strength and task difficulty. Low-difficulty tasks (high associative value between the pairs) were contrasted with high-difficulty tasks (low associative value; other responses are more salient, leading to interference with the prescribed response).

Spence, Farber, and McFann (1956) were able to confirm the hypotheses derived from this model. However, Weiner (1966) and Weiner and Schneider (1971) proposed an alternative explanation based on the frequently reported finding that, in high-anxiety individuals, success leads to improved performance and failure to deterioration, while the reverse holds for low-anxiety individuals. Because easier tasks are more likely to lead to success and difficult ones to failure, Weiner (1966) reasoned that the differential effects found by Spence et al. (1956) could be attributed to cognitive intervening processes of experiencing success or failure, rather than to response competition (as postulated by drive theory).

To adjudicate between the two explanatory models, Weiner experimentally separated easy tasks from success and difficult tasks from failure. Participants given the task of learning (objectively) easy paired associates were told that their performance was below average, while participants learning difficult syllable pairs were told that their performance was above average. Under these conditions it was indeed possible to show that differential performance was not dependent on the general anxiety level (i.e., "drive strength" as a personality-specific, situation-independent characteristic), but that it was a function of the momentary experience of success or failure. High-anxiety individuals learned a list of difficult trigram pairs (e.g., HOV-MIY) more quickly than low-anxiety subjects when given positive feedback. At the same time, low-anxiety participants learned a list of easy pairs more rapidly than their high-anxiety counterparts when given negative feedback.

A replication study by Weiner and Schneider (1971) produced similar findings for all combinations of participants' anxiety levels, task difficulty, and type of feedback (Fig. 4.7).

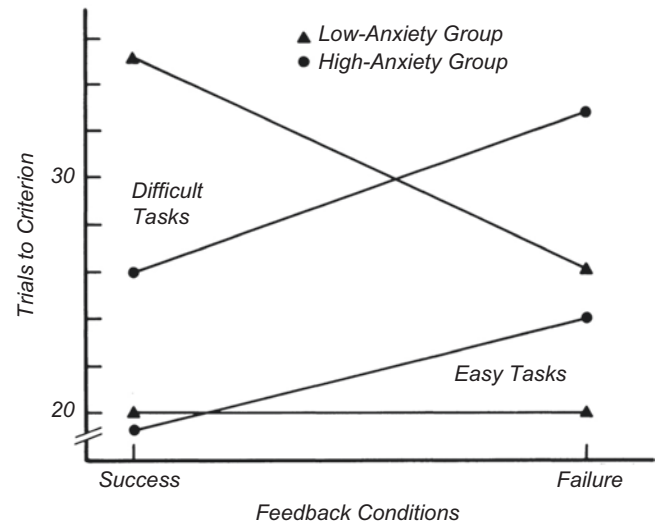

Fig. 4.7 Number of trials needed to learn an easy and a difficult list of 13 trigram pairs as a function of success and failure feedback for groups classified as confident of success or anxious about failure (Based on Weiner & Schneider, 1971, p. 260)

The interaction between anxiety and feedback of success or failure was more pronounced for difficult tasks than for easy ones (see Chap. 8 on success and failure motives).

Summary

Although empirical findings have undermined hypotheses derived from Hull's drive theory in specific respects, advances in neuropsychological research have produced findings that partly rehabilitate the generalized model. This applies, for example, to the assumption that a generalized drive state serves to energize behavior across situations (Smith, 1971).

Furthermore, Hull's differentiation between energizing (drive) and directive functions (habits) can be tied to specific anatomic structures. For example, LeDoux (1996) has demonstrated that – in the case of fear, in particular – the amygdala, the almond-shaped structure in the center of the brain, causes a generalized activation that first takes effect on brainstem activation systems and subsequently triggers cortical activation. The direction of an activity, in contrast, is mediated by another brain structure, the hippocampus. Models of the situation and of appropriate responses are stored in the hippocampus.

To conclude, this final postulate of drive theory also stimulated research and resulted in insights that advocated the revision, if not the complete abandonment of Hull's drive theory.

4.3.7 Extensions of Drive Theory

When Woodworth (1918) introduced the drive concept and contrasted it with the behavior mechanisms initiated by drive, he pointed out that these mechanisms can themselves acquire an incentive function, meaning that they can become divorced from the energizing function of primary drives. Tolman (1926, 1932) also addressed the question of how secondary drives could evolve and achieve independence from primary drives. Allport (1937) introduced the principle of functional autonomy. Although this principle does not deny the historical roots of motives in primary drives, it suggests that they soon become independent of these roots.

4.3.7.1 Acquired Drives

Co-workers of Hull, particularly Mowrer and N. E. Miller, attempted to expand and develop drive theory to cover more complex motivational phenomena, such as frustration, conflict, and nonprimary motivational conditions, particularly in humans. This led them to postulate "acquired drives."

Frustration. In this context, frustration implies the blocking of responses that lead to drive satisfaction or the blocking of consummatory responses once the goal has been attained. In both cases, animals are observed to respond more vigorously, more frequently, or with greater variation. This frustration effect seems to arise from an increase in the drive whose satisfaction has been thwarted. Dollard, Doob, Miller, Mowrer, and Sears (1939) assumed that frequent frustration leads to an acquired drive that contributes to general drive strength and, in its specific form, becomes tied to aggressive responses. They argued that aggressive behavior is always rooted in frustration and that every frustration leads to aggression. In other words, they saw frustration as a necessary and sufficient condition for aggression. Empirical findings, however, have since refuted these very broad assumptions (cf. Bandura, 1971; Feshbach & Singer, 1971; Zumkley, 1978).

The validity of inferring an increase in drive from an increase in frustration is doubtful for several reasons. An animal that does not find the expected food at a goal cannot complete the behavior sequence with consummatory responses. Instead, instrumental goal responses or other behaviors might be intensified, e.g., because past experience has shown that a more vigorous response can lead to success. In other words, an increase in the intensity or variability of behavior might be explained in terms of cognitive factors rather than drive factors. Such an explanation is supported by the results of Holder, Marx, Holder, and Collier (1957), who found

that rats can learn to respond more weakly rather than more vigorously following the thwarting of reinforcement.

Fear as an acquired drive. Although it was not possible to demonstrate acquired drives based on appetitive needs, it did seem possible to do so for aversive drives. Avoidance learning, where fear seems to be the crucial factor, is a case in point.

Definition
Fear can be seen as a conditioned response to pain, and pain as a primary (and aversive) drive state, the reduction of which reinforces instrumental escape and avoidance behavior.

Research has shown that fear and avoidance behavior can also be learned and maintained by means of conditioned fear states, without the pain originally experienced having to be reintroduced. This indicates that fear is an easily acquired drive that soon attains independence and can become attached to a variety of eliciting conditions.

Mowrer (1939) was the first to reason along these lines, referring to the second psychoanalytic theory of fear that Freud had formulated in 1926. This theory held that fear, if it is justifiable fear, represents an effective signal, a warning about real, impending dangers and motivating defense responses. Observations of animals in experimental situations had shown that responses that are learned in order to avoid an electric shock are extremely resistant to extinction. In other words, if an animal is placed in a previously aversive situation, it will continue to display escape behavior, even when the painful stimulus is not present. This would seem to be a typical case of classical conditioning. In actual fact, further reinforcement would have been needed for classical conditioning to occur. Hence, the high resistance to extinction cannot be explained in terms of classical conditioning. Mowrer assumed that fear is elicited by the stimulus cues arising from the originally aversive situation. Although fear was originally a conditioned form of the pain response, it now became an aversive tension state, an independent drive to be reduced by escape behavior.

- Thus, the escape response continues to be reinforced by the reduction of fear, even in the absence of pain.

The apparatus that N. E. Miller (1941, 1948) used in his fear experiments was later also adopted in research on the theory of learned helplessness (Seligman & Maier, 1967). Miller's experiment is described in Sect. 2.6.1 of Chap. 2 in the context of "classical learning experiments."

Based on the results of his experiments, Miller concluded that fear is an (unconditioned) response of the autonomic nervous system to painful stimuli and that it can therefore be conditioned to other stimuli. Fear is itself also a stimulus, however, because it can form associations with responses. As a stimulus it is also a drive, because every response that removes the organism from the fear-eliciting environment (e.g., flight) results in drive reduction and is thus reinforced.

In contrast to Hull, who hypothesized drives to evolve from primary needs only, Miller and Dollard (1941, p. 66) postulated that any stimulus can become a drive.

Mowrer (1947) introduced limitations to the general validity of the postulate of reinforcement through drive reduction. Initially, he advocated a two-factor theory, which held that all learning is based on either classical or instrumental conditioning. (He abandoned this position in 1960 in favor of an expectancy theory of motivation; see Chaps. 2 and 5.) According to Mowrer's two-factor theory, drive reduction is not a general prerequisite for every reinforcing event, but only for instrumentally conditioned responses that are mediated exclusively by the voluntary activity of the skeletal muscles. Classical conditioning (which is restricted to involuntary mechanisms) requires temporal contiguity alone.

- Both classical and instrumental conditioning play a role in avoidance learning. First, fear becomes classically conditioned to stimulus cues; then the reduction of fear reinforces the instrumental avoidance response.

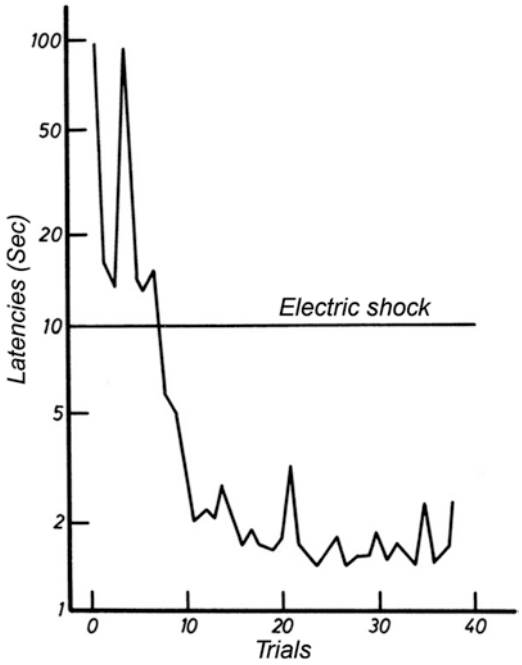

Fig. 4.8 An individual acquisition curve (latency time) for an avoidance response to an electric shock delivered after 10 s (Based on Solomon & Wynne, 1953. p. 6)

Further questions were raised by the experimental findings of Solomon and Wynne (1953), who found that, after several repetitions, an acquired avoidance response was shown more rapidly than a fear response could in fact occur. In their experiment, dogs administered strong electric shocks 10 s after a conditioned stimulus soon learned the avoidance response of jumping over a hurdle. Figure 4.8 shows typical response latencies. It took only seven trials for the dog to start jumping the hurdle before the onset of the shock. After three more trials, latencies were reduced to between 1 and 2 s, which is too short a time for the occurrence of an intervening fear response. As an autonomic nervous system response, fear generally requires 2–4 s to become manifest (cf. Spence & Runquist, 1958). On the occasions that longer latencies were observed, meaning that a fear response may have occurred, the succeeding latencies were often markedly shorter. It would seem that the animal tries to avoid not only pain, but also the fear of pain. Interestingly, under these experimental conditions, resistance to extinction was almost unlimited, with some animals requiring no less than 650 trials for the learned response to be extinguished. These findings seriously challenge the notion that fear reduction results in drive reduction and thus continues to reinforce the acquired avoidance response. The authors explain the high resistance to extinction in terms of a "conservation of fear." Once it abates, response latency increases; fear is then experienced once more and serves to reinforce the avoidance response. Yet even this explanation cannot account for the extreme resistance to extinction.

Schoenfeld (1950) proposed an interpretation of avoidance learning that makes no reference at all to acquired drives. His explanation is simply that there are positive or negative stimuli that have the capacity to reinforce. If these are associated with neutral stimuli, the latter will gradually acquire reinforcing characteristics. Hence, stimuli that were originally neutral acquire negative characteristics, and the organism learns to respond in a manner that will eliminate them.

Summary

Empirical findings have cast doubt on the explanatory value of drive theory, with respect to both its individual postulates and the hypothesis of fear as an acquired drive. Admittedly, drive theory generated a wealth of experimental research findings, but interpretations of these data increasingly drew on factors that related to external, situational determinants rather than to internal, organismic determinants like drive states. In other words, the focus shifted from the internal to the external environment. Stimulus cues, incentive values, and motivating expectations seemed able to provide more plausible theoretical explanations for the activation, direction, and persistence of goal-directed behavior.

Nevertheless, drive theory can be seen as a major step toward the development of the theoretical approaches being used today. For example,

social psychologists still draw on the basic assumptions of drive to explain the phenomena of social inhibition and facilitation. Since the 1980s, social psychology has also seen the emergence of neo-associationism, an approach that seeks to overcome the known shortcomings of classical associationism by incorporating cognitive variables.

4.4 Neo-associationism

Learning theorists increasingly disputed the basic associationist approach and expanded it to include cognitive variables. As shown in studies by Rescorla and co-workers (Rescorla, 1968; Rescorla & Wagner, 1972), even rats are not indiscriminately bound to the law of association; they establish "reasonable" rules. For example, rats do not respond to a contingent sound stimulus if they have already learned that a contingent light stimulus signals the onset of an unconditioned stimulus (e.g., an electric shock). Even if the light stimulus is paired with the sound stimulus in terms of space or time, the sound stimulus will have no effect in its own right – though the principles of associationism would predict otherwise. If light and sound stimuli are presented together from the outset, however, both stimuli will have independent effects (as concomitantly conditioned signals of impending pain, both stimuli are discriminative and thus "salient").

In social psychology, the tradition of the associationist approach is unbroken. Berkowitz (1974) assumed that any stimulus that is repeatedly linked (associated) with certain behaviors becomes capable of eliciting that behavior of its own accord, whether the stimulus is an object or a person. In contrast to the proponents of classical associationism, however, Berkowitz (1974) assumes that these associations are tied to certain mediating conditions and refers to "mediated associations." Berkowitz's weapon effect has become particularly well known. Because weapons are associated with aggression, they become aggressive stimulus cues that can trigger aggression by their very presence. In one experiment (Berkowitz & LePage, 1967), participants were first antagonized by a confederate of the experimenter. They were then given the chance to "get their own back" on the confederate by giving him electric shocks. A gun was visible in the room in one condition, but not in the other. In line with expectations, the participants delivered more shocks to the confederate when they had been antagonized in the presence of a gun than when no gun was present in the room.

Numerous recent experimental studies on nonconscious information processing have shown that different motivations are activated automatically by the perception of certain stimuli (see the following excursus). In these experiments, stimuli such as photographs of people's faces are presented on a computer screen for such a short time (a few milliseconds) that they cannot be consciously perceived or identified. Nevertheless, objective measures of physical responses and behaviors taken in the laboratory have demonstrated that people do in fact process these stimuli (Bargh, Chen, & Burrows, 1996).

Simple, learned stimulus–response bonds cannot provide an adequate explanation for the phenomena described in the excursus. In his cognitive neo-associationist model of impulsive (emotional) aggression, Berkowitz (1990) assumes a developmental mechanism that integrates Leventhal's (1984) theory of emotions and Bower's (1981) network theory of memory within an associationist framework. According to this model, frustration and aggressive stimulus cues do not necessarily trigger aggressive behavior. Rather, the intervening conditions determine whether or not aggressive behavior is exhibited. First, there must be a negative evaluation of an event. This negative appraisal triggers a general feeling of displeasure, which in turn activates corresponding thoughts, memories, expressive-motor and physiological responses, and feelings of anger that are linked together associatively in the network of memory. Activation of this

network-like system is most likely to spread from an "affect node."

- Neo-associationism assumes that – in humans, at least – cognitive and affective processes intervene in the primary association mechanism (Hull's habits) and thus serve to determine the overall response (Berkowitz, 1994). The affective responses elicited within the organism seem to play a key role here.

This aspect has also been considered in research on the activation of stereotypical patterns of behavior, where the role of organismic responses – particularly nonconscious processes of affective evaluation – has been examined. Findings from different paradigms indicate that the affective properties of the stimuli to which individuals are exposed are activated extremely quickly, without their conscious awareness. This activation of affective connotations can influence their subsequent judgments and behavior (Bargh 1994, 1997; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Greenwald & Banaji, 1995; Murphy & Zajonc, 1993).

Affective priming effects are not only apparent in people's evaluations, they have also been observed, e.g., in the pronunciation of target stimuli (Bargh, Chaiken, Raymond, & Hymes, 1996). Consequently, Bargh maintains that there is strong evidence for an unconditional, general process by which all environmental stimuli are evaluated automatically: "It appears that nearly everything is preconsciously classified as good or bad" (Bargh, 1994, p. 19).

- Neo-associationism assumes that the association between stimulus and response is mediated by basal organismic processes of evaluation. Thus, affect or emotions are again attributed a key role as intervening variables in the development of motivation and the activation of behavior. The introduction of these organismic processes of evaluation to the equation marked the end of strict associationism (cf. Bargh & Ferguson, 2000; Berkowitz, 1994; Eron, 1994).

4.5 Conflict Theory

Conflict theory represented a significant step along the path to modern conceptualizations of motivation.

4.5.1 Lewin's Conflict Theory

The experimental analysis of conflict behavior was an important facet of drive-related research. Lewin was the first to present fundamental ideas on conflict theory, back in the 1930s.

Definition
According to Lewin, "a conflict is to be characterized psychologically as a situation in which oppositely directed, simultaneously acting forces of approximately equal strength work upon the individual" (Lewin, 1935, p. 122).

Lewin identified three basic categories of conflict situations; Hovland and Sears (1938) later added a fourth. The defining characteristics of the four categories are the situational forces that impinge on the individual, resulting in approach or avoidance behavior as follows:

1. Approach–approach conflict: The individual has to choose between two incompatible situations or goals, both of which have positive valences of approximately equal strength. This is emblematized in Aristotle's allegory of Buridan's ass starving to death between two stacks of hay.[1]
2. Avoidance–avoidance conflict: Here, the choice is between "evils" of approximately equal strength; e.g., a student has to do his homework or face being set extra work as punishment.

[1] In an allegory, Jonathan Buridan is said to have envisioned the impossibility of a logical decision between two solutions of the same value through a donkey starving to death between two stacks of hay.

3. Approach–avoidance conflict: One and the same goal is both attractive and repulsive. For example, someone might want to commit to a loved one by marrying them but at the same time fear the loss of independence that this commitment incurs.
4. Double-approach–avoidance conflict (double-ambivalence conflict): An example would be a choice between two jobs, both of which have positive and negative aspects.

Figure 4.9 summarizes these four types of conflict situations using the symbols developed by Lewin for his field theory; e.g., the arrows represent directional vectors in the field, originating either from the situation or from within the person. Note that the schema for the avoidance–avoidance conflict is surrounded by a box, representing a psychological forced-choice situation. In other words, the individual considers himself or herself to be inextricably caught between two evils and unable to escape the field of conflict.

Excursus

Effect of Stereotypes: The Model of Nonconscious Behavioral Confirmation

Since the 1980s, social psychologists involved in social cognition research have paid particular attention to the more subtle effects of stereotypes (Kunda, 1999). One widespread stereotype in the United States is that African-Americans are especially aggressive. Priming studies have shown that this stereotype can be activated unconsciously and influence people's judgments of others without their conscious awareness (cf. Devine, 1989).

The model of nonconscious behavioral confirmation proposed by Chen and Bargh (1997) assumes three subprocesses:

1. Automatic activation of a stereotype
2. Direct and automatic link between perception and behavior
3. Automatic behavioral confirmation

It is assumed that the frequent activation of a stereotype suffices to increase the probability of its unconscious and unintentional activation, i.e., the development of automaticity. The activation of a stereotype (or behavioral schema) is thought to trigger the associated response behavior directly, in the manner of James' (1890) ideomotoric principle. The behavior exhibited is then confirmed by the social responses of those involved in the interaction, whose behavior is consistent with the stereotype. These assumptions were tested in an experiment by Chen and Bargh (1997). Two Caucasian participants worked independently on a computer task. One of them was subliminally (below the threshold of conscious perception) exposed to photos of Caucasian or African-American faces. In the second part of the experiment, the two participants interacted (they worked on a verbal task together). Finally, participants were asked to evaluate each other. The authors expected subliminal priming with photos of African-American faces to activate a negative stereotype, which was in turn expected to result in more negative evaluations of the experimental partner. Appraisals of the experimental partner were indeed more negative when participants were primed with photographs of African-American faces than when Caucasian faces were used. Correlations between 0.30 and 0.40 were found, indicating that around 10% of the variance in behavior was explained. These findings confirm the model proposed by Chen and Bargh but, at the same time, show that other variables must be involved in explaining the large residual variance in behavior.

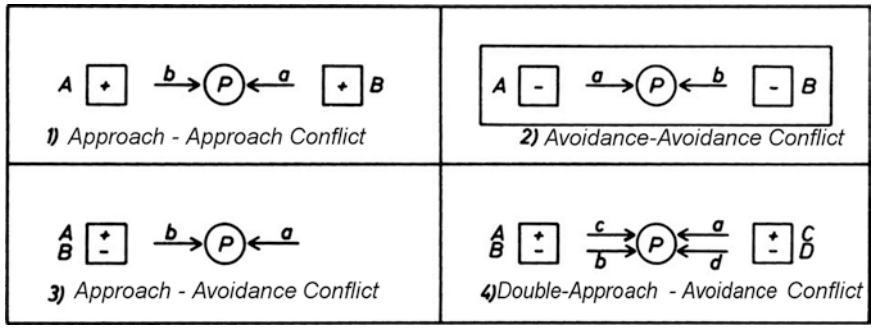

Fig. 4.9 The four types of conflict situations [*P*, Person; *A* to *D* positive (+) or negative (−), incentive characteristics of the available objects or goals of behavior; *a* to *d* positive or negative, incentive characteristics of the forces originating from these objects or goals that impinge on the person]

Example

Lewin's field-theoretical approach can best be illustrated by the example of a specific conflict situation, such as that represented by the force fields in Fig. 4.10. A 3-year-old boy at the beach is trying to retrieve a toy swan that has been swept away by the waves. On the one hand, he is pulled toward his beloved toy. Once he gets too close to the forbidding waves, however, he will be pushed back in the opposite direction. Evidently, there is a subjective barrier running parallel to the shoreline. Once that barrier is crossed, the force pushing the boy away from the waves soon becomes greater than the force pulling him toward the toy swan.

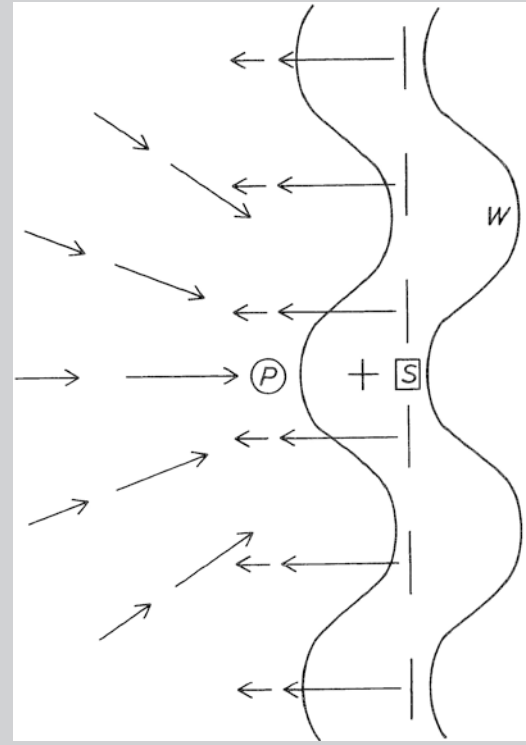

Fig. 4.10 The force field occurring in a conflict situation where a goal has both positive and negative valence (*P* person, *S* swan, *W* waves) (Based on Lewin, 1935, p. 92)

This example led Lewin (1946) to intuitively postulate that, in an approach–avoidance conflict, the strength of the repelling forces increases more rapidly with increasing proximity to the goal object than does that of the attracting forces. From this it can be deduced that there must be a point some distance from the goal at which equilibrium occurs. This point represents the intercept of the approach and avoidance gradients. Prior to this point, the attracting forces are stronger than the repelling ones, thus pulling the child toward the swan. But once the point of equilibrium is passed, the repelling forces become stronger, pushing the child back again. This results in oscillating behavior. Figure 4.11 illustrates the fluctuating relationships of the forces in this type of conflict situation as a function of a person's geographical distance to an attractive or feared situation.

According to Lewin, the strength of a behavioral tendency (force) is concomitantly dependent on two quantities: the strength of the valence of the goal (object) and the distance from the goal. Psychologically speaking, distance can be measured in terms other than geographical units, e.g., in time or in the number of necessary intervening activities, their difficulty, or the amount of effort they require.

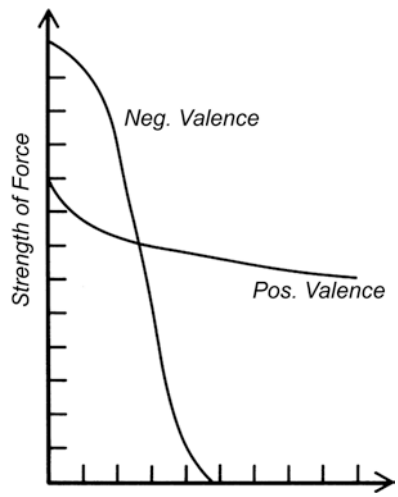

Fig. 4.11 Schematic representation of the change in the strength of a force with the distance to a positive and a negative valence (Based on Lewin, 1946, p. 812)

4.5.2 Miller's Model of Conflict

Miller (1944) combined Lewin's notion that fluctuations in valence are a function of the distance from the goal with Hull's (1932, 1934) hypothesis of goal gradients. Hull postulated this hypothesis to explain the observations that hungry animals run faster as they approach their goal and that the correction of errors in maze running begins near the goal and continues in reverse sequence back to the start box.

The goal gradient hypothesis states that stimulus–response bonds are first produced, i.e., habit strength built up, in the immediate proximity of the goal, because it is here that reinforcement is immediate, whereas it is delayed at points further away from the goal. In the acquisition of a new behavior sequence, the development of habit strength thus starts at the end of the response sequence and rolls slowly back to the beginning of that sequence.

Miller (1951, 1956) formulated six basic assumptions relating to conflict phenomena (see Fig. 4.12):

Basic Assumptions of the Conflict Model (After Miller 1951, 1956)

1. The tendency to approach a goal becomes stronger, the nearer a person is to it (gradient of approach).
2. The tendency to avoid a feared stimulus becomes stronger, the nearer a person is to it (gradient of avoidance).
3. The gradient of avoidance is steeper than the gradient of approach.
4. When two incompatible responses are in conflict, the stronger one will prevail.
5. The height of the approach and avoidance gradients is dependent on the strength of the underlying drive.
6. The strength of the response tendency being reinforced increases as a function of the number of reinforcements until learning plateaus out at a maximum level. (This assumption was added in 1959.)

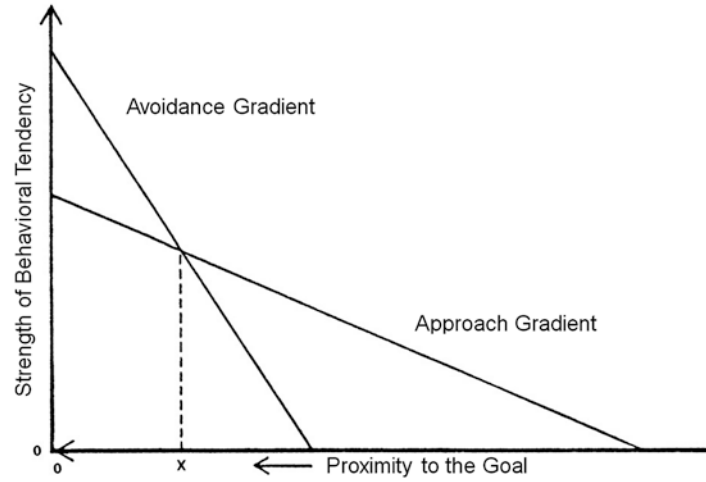

Fig. 4.12 Gradients of approach and avoidance when approaching a goal with both a positive and negative valence

Figure 4.12 illustrates the first four assumptions. As point "x" is crossed on the way to the goal, the avoidance tendency becomes stronger than the approach tendency. At this point, behavior will oscillate between approach and avoidance.

According to the fifth assumption, a change in the relative strengths of the drives underlying the approach and avoidance tendencies can result in a change of the relative strengths of these tendencies and produce a shift in the point of intersection. For example, increasing the period of food deprivation will increase the pull on an animal to approach a food goal. As a result, the entire approach gradient is raised, placing the intercept of the two gradients closer to the goal.

But what is the reasoning behind the assumption that the avoidance gradient is steeper than the approach gradient? For Miller, the difference lies in the sources of the two tendencies. In the case of hunger, the approach tendency is maintained by a drive stimulus arising from within the organism itself. The drive stimulus remains unchanged, regardless of the organism's distance from the goal where food is available. The avoidance tendency, in contrast, arises from fear, an acquired drive resulting from aversive stimulation (e.g., pain) experienced in the region of the goal. Because fear is not elicited by internal drive stimuli, but by external cues, it becomes closely linked with the original, pain-inducing situation.

Study

Experimental Evidence for Miller's Assumptions

Brown (1948) experimentally confirmed assumptions 1, 2, 3, and 5. Two of his four groups of rats repeatedly found food at the end of a runway; one of these groups had been deprived of food for 48 h, the other for just 1 h. The two remaining groups, which were not deprived of food, received electric shocks at the end of the weak shocks in one group and strong shocks in the other. Following a learning phase, Brown measured the strength with which individual animals pulled toward or away from the goal when placed in the runway. To this end, the animal was placed in a harness permitting the experimenter to stop it at various points on the runway and to measure the amount of pull exerted. Figure 4.13 shows the results.

In a later study, Miller (1959) combined his assumptions 4 (the stronger response prevails) and 5 (the height of the gradient is a function of drive strength) and confirmed them experimentally. The rats were now given both food and electric shocks at the goal, producing a

conflict situation. Hours of food deprivation and shock severity were now varied in combination for different groups of rats, thereby producing different levels of drive strengths and permitting the height of the approach and the avoidance gradients to be manipulated independently of each other. The gradients were now expected to intercept at various distances from the goal. Accordingly, the dependent measure was the minimum distance from the goal reached by the animal in the conflict situation. The data confirmed Miller's assumptions. When shock intensity was constant, distance from the goal decreased with hours of food deprivation. Conversely, when hours of food deprivation were kept constant, distance from the goal increased with the intensity of the shock.

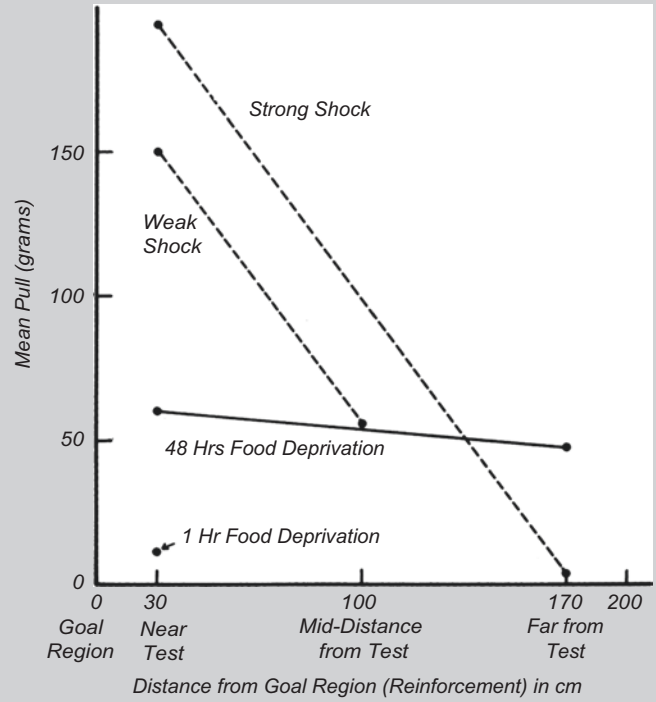

Fig. 4.13 Strength of approach and avoidance tendencies at various distances to the goal in four groups of rats: 1 h vs. 48 h food deprivation, strong vs. weak electric shock (Based on Brown, 1948, pp. 457, 459)

This idea also helps to explain the sixth and final assumption. The number of reinforced responses (i.e., habit strength) determines the steepness of the gradient of the respective tendency because habit strength, the associative component of the reaction potential, is dependent on the distance from the goal (at least until learning has reached a plateau on the way to the goal). The avoidance gradient is steeper precisely because, in this case, both components of the reaction potential – drive (i.e., fear) and habit strength – are linked to goal-related stimuli. In the case of the approach tendency, this applies only to the associative component, habit strength. If habit strength were considerably stronger for the approach than for the avoidance tendency, there might be an exceptional case of a steeper approach gradient.

4.5.3 Applications of the Conflict Model

A variety of intriguing applications were derived from Miller's model. The distance from the goal does not necessarily have to be spatial; it may be

measured in terms of temporal proximity or similarity to the original goal. A process of decreasing similarity to a conflict-inducing goal often plays a role in the development and treatment of neuroses. For example, an object of aggressive or sexual desire may also elicit fear of negative consequences. In Freud's terms, this can lead to displacement. The original object is replaced perceptually by a more or less similar object that elicits less fear or anxiety. Clark (1952) and Clark and Sensibar (1955) were able to experimentally demonstrate this process for sexuality. They induced displacements of imaged projections as a function of sexual motivation.

Displacement corresponds to a generalization of the response to the original object. The more the avoidance tendency outweighs the approach tendency, the less similar the displacement object will be to the original object.

Miller (1948) applied his conflict model to this situation. The gradients of approach and avoidance now signify response strength as a function of degree of similarity to the conflict-inducing stimulus, rather than as a function of spatial or temporal distance. Figure 4.14 shows the application of this model to the displacement mechanism. It indicates that displacement is most likely to occur at the degree of similarity associated with the highest net strength of the inhibited response. In Fig. 4.14, it would be a degree of similarity falling between C and D.

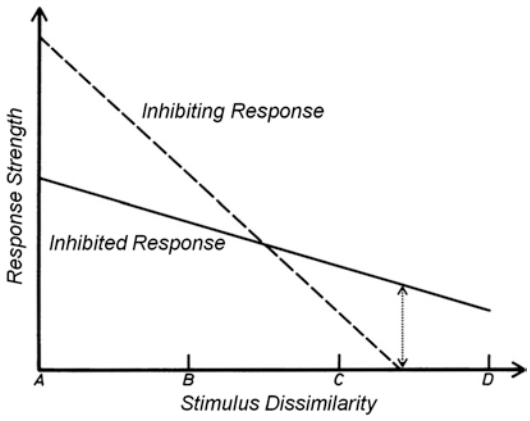

Fig. 4.14 Displacement of an inhibited response at the highest net strength of the inhibited response (*dotted arrow*) (Based on Miller, 1944, p. 434)

Murray and Berkun (1955) substantiated these ideas experimentally. After rats had learned to find food at the end of a black runway, they were given electric shocks while eating, resulting in avoidance of the goal box. Two additional runways were then set up parallel to the first. Openings connected the adjacent runways at varying distances from the goal box. The two new runways differed in color from the original one. The one immediately next to the original (black) runway was gray, the other white. This coloring represented a gradient of decreasing similarity from the original, conflict-inducing runway. When an animal was placed in the black runway, it would keep its distance from the goal; this avoidance decreased progressively as the animal escaped first to the gray and then to the white runway. Here, conflict is a function of two mutually exclusive dimensions: spatial distance from the conflict-inducing goal and degree of similarity of the runways.

Both dimensions can be utilized as orthogonal axes in a three-dimensional model of conflict in which the gradients no longer represent lines, but planes. Their intercepts become lines of intersection between the two-dimensional axes. In concrete terms, this means that an animal will reduce its distance to the goal if it is willing to accept greater dissimilarity from the original goal (and vice versa). Murray and Berkun were able to demonstrate this empirically. They also found that displacement can have a "therapeutic" effect – the avoidance gradient decreases over time and the animals increasingly approach both the more similar (gray) and the original (black) goal stimulus.

- The implication of these findings for psychotherapeutic applications is that the avoidance gradient must be lowered. This can be accomplished by measures altering the degree of similarity to the original cause of conflict. The patient then seems to be able to confront the conflict-inducing situation again. Simply telling a patient to confront the actual source of the conflict at the beginning of a course of therapy would shift the intercept of the two gradients closer to that source, but also raise it, which would increase the level of both conflicting tendencies, resulting in greater internal tension.

Conflicting tendencies in parachutists. Threatening but inevitable events that are set to occur at a fixed future date and thus loom ever nearer are prototypical for the conflict model. Examples of such situations are examinations, elective surgery, or childbirth. On the one hand, we dread these situations; on the other hand, we would like to have them over and done with. Fisch (1970) studied conflicting tendencies in the run-up to an exam as a function of temporal proximity and the degree of similarity between the situations portrayed in pictures and the upcoming event.

Epstein (1962) carried out a similar study with people about to do their first parachute jump. Participants were asked to rate their approach tendencies and then their avoidance tendencies at 14 points in the run-up to the jump.

Figure 4.15 presents the retrospective (mean) self-ratings of 28 novice jumpers at 14 sequential points in time: (1) last week, (2) last night, (3) this morning, (4) upon reaching the airfield, (5) during the training session before the jump, (6) getting strapped into the parachute, (7) boarding the plane, (8) during ascent, (9) at the ready signal, (10) stepping outside (onto the plane's undercarriage), (11) waiting to be tapped, (12) in free fall, (13) after the chute opened, and (14) immediately after landing.

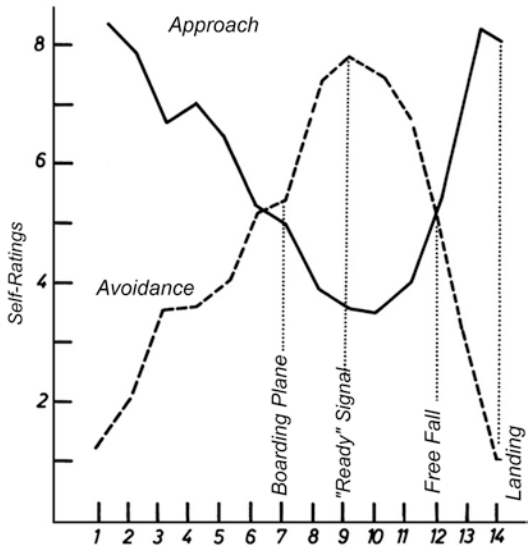

Fig. 4.15 Self-ratings of approach and avoidance tendencies as a function of the sequence of events in the run-up to and during the first parachute jump (Based on Epstein, 1962, p. 179)

Of course, self-reports (especially retrospective ones) are questionable measures of approach and avoidance tendencies. It is quite likely that the parachutists were not able to discriminate between the two tendencies, but in fact experienced mixed feelings of confidence and apprehension. This is also reflected in the fact that the curves represent mirror images of each other. Nevertheless, it is worth noting that the avoidance tendency (apprehension) increases steadily but then begins to decrease shortly before the critical event of jumping (as if the parachutists gained confidence through the realization that they could no longer turn back).

In subsequent studies, Fenz (1975) measured autonomic indexes of activation during an entire parachute jump. He found that heart rate, respiration, and galvanic skin response increased steadily until the chute opened. This only applied to beginners, however. Experienced parachutists reached maximum levels at earlier stages in the jump sequence: boarding the plane (heart rate), at the ready signal (respiration), and in free fall (galvanic skin response). In their case, however, the levels of all three indexes remained below the 50% mark of total variation observed among novices. These differences are not solely a function of experience, i.e., the number of previous jumps. Distinguishing between good and bad jumpers reveals that the latter show a sequence of activation similar to beginners, even after many jumps. It would seem that their performance does not equip them to cope as well with the stress of the threatening situation. The relationship between anxiety and performance may (at least in part) be a vicious circle: because they remain anxious, they perform less well, and their poor performance in turn prolongs their anxiety.

4.6 Activation Theories

Early in the twentieth century, attention had already been drawn (e.g., Duffy, 1934) to various autonomic activation phenomena and their measurement, particularly in connection with the description

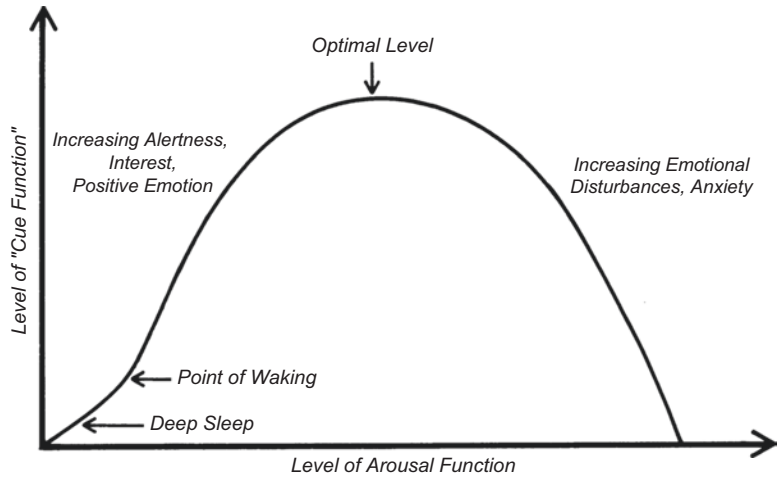

Fig. 4.16 Inverted U-function in the relationship between efficacy of behavior (cue function) and level of arousal (Based on Hebb, 1955, p. 250)

and interpretation of emotions. In the 1950s, it was postulated that the hypothetical construct of a general arousal level, based on the neurological *ARAS* function (Chap. 2), corresponded to the strength of a generalized drive and had the potential to replace Hull's D. The main proponents of this position were Hebb (1955) and Malmo (1959), as well as Bindra (1959) and Duffy (1957). Because arousal level can be measured in terms of numerous autonomic indexes, such as galvanic skin response, muscle tone, or electroencephalogram, it was thought to be a more direct indicator of drive strength than those previously used by drive theorists, who relied on deprivation procedures or measures of general activation. Lacey (1969) questioned the validity of general arousal, because the various measures are not highly correlated and produce profiles that reflect large individual differences (see Walschburger, 1994).

4.6.1 The Construct of Arousal

Yerkes and Dodson (1908) had already found that intermediate levels of arousal (produced by an electric shock) were most conducive to maze learning in animals. The optimal arousal level for easy tasks was higher than that for difficult tasks.

Hebb (1955) interpreted this inverted U-function as an interaction between the arousal function and the cue function. On the one hand, the flow of information picked up by the senses is processed in terms of specific cues; on the other hand, it makes a nonspecific contribution to the generalized arousal level. The cue function requires a certain level of activation of the brain regions involved to reach its optimal level. Figure 4.16 illustrates Hebb's conceptualization.

A number of questions remain open here. Can arousal level be equated with drive strength? Is there a difference between peripheral and central arousal (in the brain)? Might there even be a differential arousal in the brain? Modern research has provided numerous insights here (e.g., Haider, 1969). As we will see below, both differential arousal and generalized arousal seem to occur. First, however, we address the question of whether arousal can be equated with drive strength.

There are at least two points in which the equation of arousal level with drive strength (D) is difficult, if not impossible, to reconcile with the postulates of classical drive theory:

- First, the curvilinear relationship between arousal and performance does not tally with the postulate of a monotonic function between drive strength and measures of behavior (with the exception of Hull's exhaustion factor that results from prolonged food deprivation).
- Modern research, however, has called this curvilinear relationship between arousal and performance into question (Neiss, 1988; for a summary, see Beckmann & Rolstad, 1997). Dienstbier (1989) advocates a linear function, e.g., whereas Fazey and Hardy (1988) present a complex three-dimensional model in which

both a linear and a curvilinear relationship is possible as a function of the three dimensions.
- The second problem of equating arousal level with drive strength is that arousal level is known to be strongly affected by external stimulation, while the same is not assumed to apply to the classical drive concept (with the exception of aversive drives such as pain).

Investigators have identified relationships with a number of parameters of external stimulation. It is not just stimulus intensity that plays a role, but stimulus variation in time and space. Moreover, not only the physiological or physical aspects of the stimulus are involved but, more importantly, their psychological parameters – e.g., their information content, complexity, and deviation from the expected and familiar.

Effects of sensory deprivation and sensory flooding. At first, research attention focused on dramatic examples of phenomena at the extremes of a hypothesized continuum of stimulation, i.e., sensory deprivation, on the one hand, and situations that induced excitement, alarm, and fear, on the other hand. Best known among the sensory deprivation experiments is that of Bexton, Heron, and Scott (1954).

Study

Effects of Sensory Deprivation

Bexton et al. (1954) hired students at a high rate of pay and placed them in soundproof rooms. Participants wore translucent goggles eliminating all pattern vision and gloves and cardboard handcuffs to minimize tactile stimulation. Hallucinations and severe decrements in the participants' intellectual ability were soon observed. After just a few days, the participants terminated the experiment, despite the high pay, because they were no longer able to endure the deprivation condition. When given an opportunity to listen to stock market reports or excerpts from a telephone directory – information in which they would normally not be remotely interested – they now welcomed the prospect and kept asking for the material to be repeated.

The findings of Bexton et al. (1954) suggest that the organism requires a certain amount of external stimulation to maintain well-being and optimal functioning. As early as 1928, the results of experiments on "psychological satiation" carried out by Lewin's student Anitra Karsten had pointed to similar conclusions. Karsten instructed students to repeat monotonous short tasks for as long as possible, e.g., drawing lines, drawing moon-shaped faces, and writing the same sentence over and over. After a while, participants tried to make the tasks more interesting by changing the order of execution. Finally, performance deteriorated into nonsensical subcomponents, accompanied by an increase in errors. Satiation and aversion to the task became increasingly difficult to overcome. When the participants were asked to perform a new task, performance immediately returned to its previous level.

The opposite of sensory deprivation is not sensory flooding in the everyday sense of the word, but stimulus input that creates "incongruities," i.e., that can no longer be processed. Such conditions can produce severe emotional reactions, even panic and terror. Hebb (1946, 1949) demonstrated "paroxysms of terror" in chimpanzees who were shown a stuffed head or the lifeless body of an anesthetized fellow chimp or whose keeper suddenly wore his jacket inside out. Bühler, Hetzer, and Mabel (1928) observed similar severe fright reactions in infants when their mother or another familiar caretaker approached them speaking in a high falsetto voice. It is the sudden change in an otherwise similar and familiar object (Hebb calls it difference in sameness) that elicits severe panic arousal states.

Sensory deprivation and insurmountable incongruities in stimulus input represent the extremes of a broad continuum. Moderate incongruities seem to be experienced as pleasant and entertaining and to encourage exploratory behavior, curiosity, and manipulatory activities. It is these moderate incongruities within the familiar, the expected, and the already mastered that initiate and control behavior. The endless, apparently purposeless activities of the young child, especially at play, seem to be motivated by external stimulation of this kind (cf. Heckhausen, 1964; Klinger, 1971; see also Chap. 15). Approaches

based on activation theory now have greater currency than those derived from drive theory. Aside from Hebb (1955), the main proponents of the activation theory perspective are Fowler (1971), Walker (1973), and particularly Berlyne (1960, 1963a, b, 1971).

4.6.2 Arousal Potential and Its Effects

Berlyne sought to describe the determinants of arousal level in terms of various properties of the stimulus, particularly its "collative variables." This class of variables includes novelty and change, surprise, complexity, uncertainty, and conflict. The term "collative" refers to the fact that, in order to decide how novel, surprising, etc., a stimulus is, information from two or more sources has to be compared or collated. The collative variables are an important class of antecedent conditions for what Berlyne called arousal potential.

Definition
Arousal potential represents a hypothetical totality of all properties of a stimulus pattern. This totality is composed of collative variables, affective stimuli, intense external stimuli, and internal stimuli arising from need states.

Berlyne's concept of arousal potential is covered in more detail in Chap. 2.

It is important to distinguish arousal potential from its effects – the arousal level, on the one hand, and positive or negative hedonic values resulting in approach or avoidance tendencies, on the other. Berlyne (1971, 1974) used the old Wundt curve – originally introduced by Wundt (1874) to describe the relationship between stimulus intensity and sensations of pleasantness and unpleasantness – to describe the effect of arousal potential. As shown in Fig. 4.17, once an "absolute threshold" has been crossed, positive hedonic value builds to a peak as arousal potential increases. Any subsequent increases in arousal potential lead to a decline in hedonic value and eventually to increasingly negative values.

Berlyne's model was inspired by Olds' neurophysiological findings of positive and negative reinforcement centers in the brain (Olds & Olds, 1965). Berlyne suggested that the Wundt curve reflected the outcome of two opposing systems, a primary reward system and an aversion system. He interpreted it as a summation curve and split it into two partial curves corresponding to the two hypothesized systems (lower panel of Fig. 4.17). As shown in the figure, three successive regions of the arousal potential can then be identified, each having different effects on behavior. In region A, the arousal potential is low, producing only "positive effects," i.e., pleasant, reinforcing stimulation, eliciting approach behavior. In the middle region (B), there is a mixture of positive and negative effects, the former being dominant. Finally, in the upper region (C), the effects of the arousal potential are predominantly negative.

- In contrast to Hebb (1955) or Fiske and Maddi (1961), Berlyne did not see arousal level as a monotonic, linear function of the arousal potential (or stimulus input), but rather as a U-shaped function. This implies that a low arousal potential can serve to increase the activation level, as well as a high one.

Berlyne (1960) further assumed that boredom and stimulus monotony are accompanied by an irritatingly high activation level. That brings us to the postulated reinforcement function of the activation level. Everything that serves to reduce the level of the activation is seen as reinforcing. In this respect, Berlyne's approach is in line with Hull's postulate of reinforcement through drive reduction. At the same time, however, it takes into account the U-shaped relationship between arousal potential and activation and holds that a low arousal potential will be raised, and a high potential lowered, toward an intermediate level that is experienced as pleasant and positively reinforcing (Berlyne, 1967). Both events result in a reduction in the activation level and, according to Berlyne, both elicit particular types of behavior:

- If the arousal potential is too high, it will prompt "specific exploration" in order to obtain further information from a specific

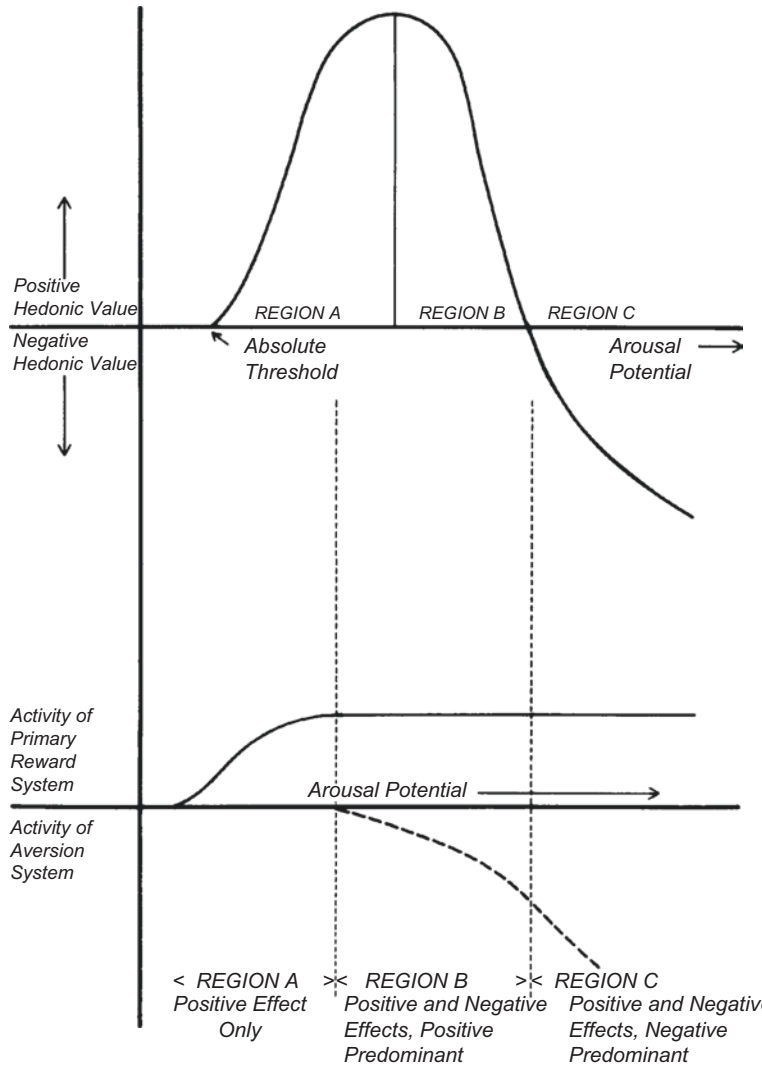

Fig. 4.17 The Wundt curve (*above*), broken down into two hypothetical partial curves (*below*) representing the activity of the primary reward system and the aversion system as functions of arousal potential (Based on Berlyne, 1973, p. 19)

Study

Complexity Preferences as a Function of Previous Stimulation

Berlyne and Crozier (1971) asked participants to express their preference for a series of either highly complex or markedly simpler patterns. For one group, presentation of the stimulus patterns was always preceded by a 3.5-s period of near darkness. For the other group, presentation was preceded by exposure to highly complex, that is highly stimulating, patterns. Participants in the latter group subsequently preferred patterns containing less information, while their counterparts in the former group, who had previously been exposed to near darkness, preferred the more complex, novel patterns. The stimulation of this group was evidently below the optimal activation level, resulting in a preference for stimulus input that enhanced activation (diverse exploration), while the optimal activation level of the other group had been exceeded, resulting in a preference for patterns that lowered activation (specific exploration).

source and thus relieve uncertainty. Berlyne calls this "perceptual curiosity."

- If the arousal potential is too low, it will prompt "diverse exploration" in order to seek out stimulation, regardless of content or source (frequently motivated by boredom).

Berlyne (1971, 1974) compiled these and many other findings to develop a psychology of aesthetics. It states that observers can be pleasantly stimulated by a work of art because it can raise their activation in the direction of an optimal level. A work of art can also be experienced as unattractive, even repellant, however, if the observer finds it too novel or too complex. This negative reaction can be reversed if the observer becomes gradually familiar with the work of art, e.g., by hearing a piece of music again and again. If the work finally becomes so familiar that it no longer has any novelty or surprise value, it will lose its activating function, leaving the observer cold and uninterested.

In contrast to Berlyne, Hebb (1955), as well as Fiske and Maddi (1961), proposed that an intermediate activation level (which for them is the same as an intermediate arousal level) results in an optimum state. All changes in the direction of this intermediate level will be sought out by the organism and will have a positively reinforcing effect. The difference between Hebb's and Berlyne's postulates is elucidated in Fig. 4.18, which shows the relationships that the two authors hypothesized to exist between arousal potential (stimulus input) and activation, on the one hand, and between activation and attractiveness (i.e., preferred activation level), on the other. Their approaches differ primarily with respect to the area of low arousal potential. In general, the empirical data seem to support Berlyne's position. Note that these theoretical notions about activation are closely related to discrepancy theories of motivation. McClelland based his theory of motivation on a discrepancy model (McClelland, Atkinson, Clark, & Lowell, 1953). Discrepancy theories state that relatively small deviations from a norm state are experienced as pleasurable and have motivating characteristics. This applies to deviations in either direction from the norm or adaptation level (Helson 1964, 1973; see the example below). Adaptation levels represent neutral points in the individual's value system or frame of reference that serve as a basis for all perceptual experiences and judgments. They are constantly shifting in the direction of past experience.

- A much cited example for the affective outcomes of deviation from the adaptation level is a study by Haber (1958). Participants first immersed both hands in water at near-body temperature. After they had adapted to this temperature, i.e., come to experience it as neither pleasant nor unpleasant, but neutral, they placed their hands in another bucket containing water that was colder or warmer by varying degrees. Figure 4.19 shows the results. Small deviations produced a positive affect, whereas larger deviations resulted in an increasingly negative affect, producing what is known as the "butterfly curve."

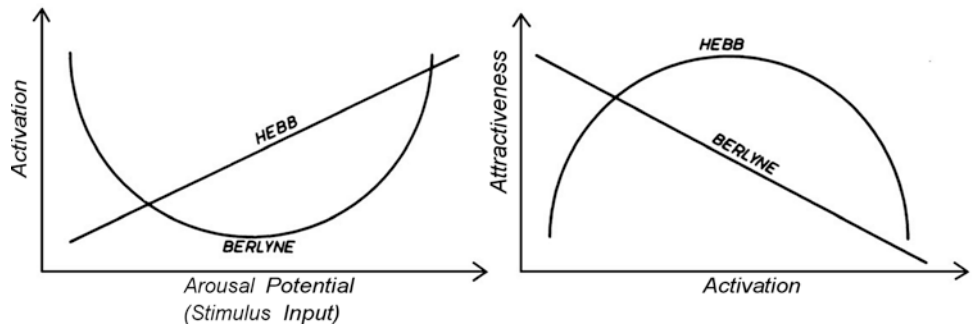

Fig. 4.18 Contrasting postulates by Hebb and Berlyne concerning the relationships between arousal potential and activation and between activation and attractiveness (preferred activation level)

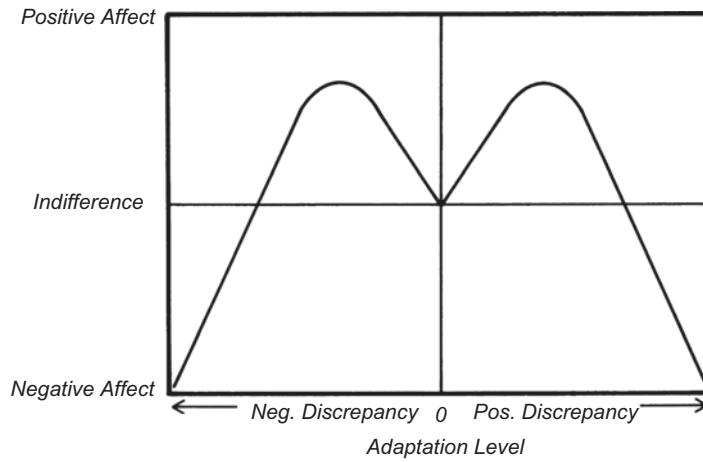

Fig. 4.19 Hypothetical relations between stimulus condition deviating from the adaptation level and hedonic value

4.7 Cognitive Appraisal Theories

Situational stimulus events represent pieces of information that must be processed in order to arrive at a cognitive representation of a situation. This endows the situation with meaning, which in turn motivates and influences behavior. Hence, the cognitive interpretation of a situation affects behavior.

The crucial point here is that stimulus events do not determine behavior directly or indiscriminately, but that they are interpreted by the individual and transformed into a coherent picture of the immediate situation. It would also be wrong to assume that people proceed from a complete representation of the situation, as suggested by Lewin's motivational analysis of conflict situations. There are numerous theoretical models postulating that an appraisal of the situation involves cognitive and motivational processes; the most important of these will be outlined below. First, we will consider emotions, which Schneider and Dittrich (1990) consider to be the organizational core of motivation, both energizing behavior and giving it general direction. Emotions are not simply "internal stimuli." Rather they are the outcome of information processing in which cognitive events play a significant role. Schachter's two-factor theory of emotion and its modifications by Valins, as well as Lazarus' theory of appraisal of threatening situations, are examples of this approach.

4.7.1 Emotion as an Outcome of a Cognitive Appraisal

The psychology of emotion has recently begun to attract a great deal of attention – largely as a result of developments in neuropsychological research (LeDoux, 1996). Subsequent to the cognitive revolution in psychology in the 1960s, research was long dominated by approaches that saw emotions primarily in terms of their information content or simply as epiphenomena with no functional significance of their own. The earlier research traditions reported in this chapter, however, had also neglected the subject of emotions. One reason for this neglect was that the theoretical position that emotions might have occupied as an organism-related input of vital importance to behavior was already occupied by the concept of drive.

Emotions can be regarded as the organizational core of motivation or indeed as a rudimentary motivation system (Schneider & Dittrich, 1990) within which different emotions can select, energize, and direct behavior appropriate to the situations in which they arise. The appraisal of a situation, in terms of its potential benefits or threats, is central to Arnold's (1960) sequential model of emotions. This model states that it is the "intuitive" appraisal of a situation that elicits emotion and its physiological responses. Appraisal consists of an affective judgment that is experienced as a behavioral

approach or avoidance tendency. The concomitant physiological responses determine the emotions expressed. The final step in the sequence is an approach or avoidance response.

From today's perspective, Arnold's positions – and especially her notions about the relationship of emotions to processes within the central nervous system – are rather speculative.

4.7.2 Emotion-Triggering Situations

John Watson (1913), the founder of behaviorism, observed emotional reactions in neonates that were evidently innate rather than learned. These included reactions to strong stimuli, such as sudden noises and loss of physical support, both of which elicited fear. Restrictions of bodily movement elicited anger. Body contact, e.g., stroking of the skin, elicited affection (Watson, 1924; Watson & Morgan, 1917). These unconditioned "stimuli" can be replaced by a variety of previously neutral stimuli by means of classical conditioning (cf. Harris, 1979; Watson & Rayner, 1920) and thus trigger the emotional response formerly evoked by the unconditioned stimuli.

Watson and many others after him, however, were wrong in assuming that any arbitrarily chosen stimulus can be classically conditioned. Research has shown that not every stimulus is equally suitable for eliciting a particular emotion. "Appropriate" stimuli evidently possess a certain unconditioned prepotency that may be conducive – or resistant – to a particular conditioning process (Valentine, 1930).

Definition
The prepotency of certain stimuli to be paired with particular emotions is called "preparedness" (Schwartz, 1974; Seligman, 1971).

For example, it is easy to condition fear of snakes or spiders (see the following study), despite the fact that there is little opportunity for negative experiences with the two species in many parts of the world. Jones and Jones (1928) observed fear of snakes in 4-year-olds who had no cause for such fear, leading them to assume a biogenetic predisposition.

Study
Preparedness for Conditioning Fear

Differences in the unconditioned preparedness of objects for conditioning fear were demonstrated by Öhman, Fredrikson, Hughdal, and Rimmö (1976). Participants in their study were administered a slight electric shock to the fingertip at the same time as they were shown a picture – either a phobic stimulus (snake or spider) or a neutral stimulus (flower or mushroom). A single presentation of the phobic stimuli proved sufficient to condition the fear response. Although it took longer to condition the fear response with the neutral stimuli, the response was also extinguished much sooner in this condition.

4.7.3 Appraisal of Threatening Situations

Magda Arnold's (1960) sequential model of emotions was the first to assign a central role to the appraisal of a given situation in terms of its potential benefits or threats. This general model of cognitive appraisal of situations was further elaborated and experimentally tested by Lazarus (1968).

4.7.3.1 Lazarus' Approach to Stress and Coping

According to Lazarus' model, cognitive components relating to situational appraisal and to physiological activation do not simply coexist, they complement each other. Cognitive processes involved in the assessment of a situation can directly influence the physiological activation component, i.e., conditional on the successive intermediate outcomes of such appraisals, there can be a feedback effect on emotions and behavior. Lazarus' experiments focused on coping in threatening and stressful situations. They were

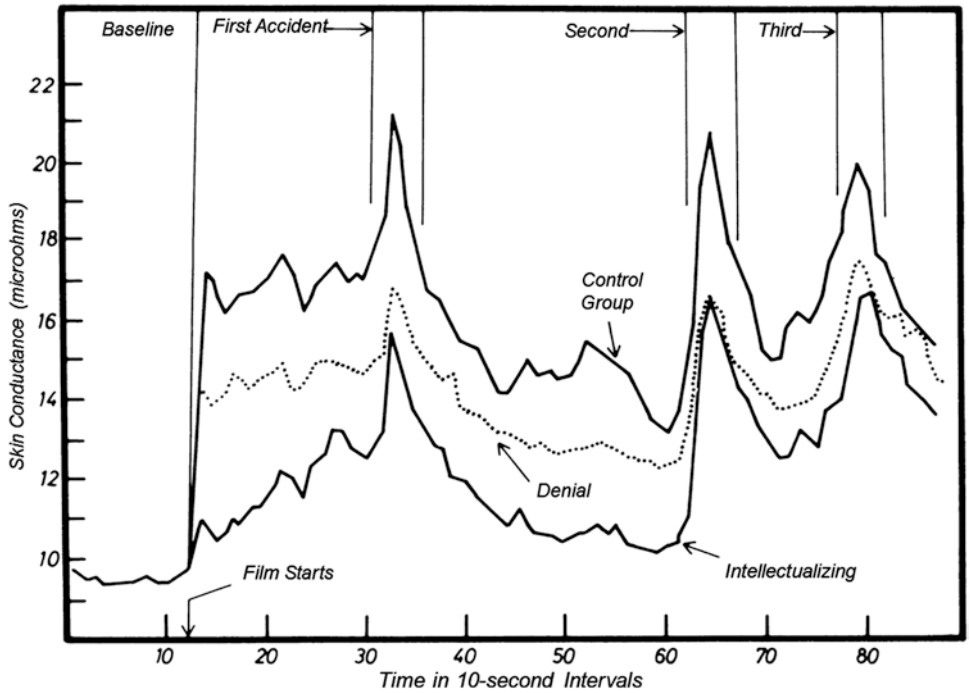

Fig. 4.20 Effects of experimental conditions on skin conductance (baselines equalized by covariance adjustment). (After Lazarus, Opton, Nomikos & Rankin, 1965, p. 628)

based on a model that assumes two sequential stages of cognitive activity:

1. Primary appraisal of whether and to what extent the situation is threatening
2. Secondary appraisal of possible means of dealing with the threatening situation

Essentially, either of two strategies can be applied here: direct action, accompanied by the corresponding emotions, e.g., attack (anger), withdrawal (fear), and inactivity (depression), or reappraisal, resulting in a more favorable, less threatening view of the situation and thus reducing the fear-related emotional arousal level.

Lazarus induced stress in his participants by showing them films with threatening contents: an anthropological film about circumcision rites among Australian aborigines and an accident-prevention film showing close-ups of several accidents in a sawmill (e.g., someone losing his thumb while working with a circular saw). In a study with the latter film, Lazarus, Opton, Nomikos, and Rankin (1965) presented participants with two types of cognitive reappraisal before showing them the film. Both reappraisal strategies were designed to make the film less threatening. One involved "denial" (it was only a make-believe film with actors); the other involved "intellectualizing" (viewing the film in a detached manner). Galvanic skin responses were recorded continuously during the viewing session to serve as a measure of emotional arousal level. Results are shown in Fig. 4.20. Compared with an uninstructed control group, those who were induced to reappraise the situation through denial and especially intellectualization showed a considerable decrease in the autonomic arousal state.

Such results are difficult to interpret within the framework of drive and learning theories. After all, the same fear arousing stimuli lead to different responses depending on the intervening cognitive appraisals of the situation (for theoretical implications, see Heckhausen, 1973).

Lazarus offered a behavioral explanation assuming a process of interaction between the

individual and the situation at hand. In fact, he developed a dynamic transactional model assuming a continuous process of reciprocal influences (Lazarus & Launier, 1979).

Lazarus distinguished three different outcomes of stress appraisal:

- Harm–loss (i.e., an already experienced impairment)
- Threat (i.e., potential and feared loss or injury)
- Challenge (i.e., anticipated opportunities for mastery or gain)

The amount of stress experienced depends on the extent to which an individual feels he or she has been harmed, threatened, or challenged, as well as on the person-environment relations within the particular life sphere. There are two facets to the appraisal of these relations – what is at stake (primary appraisal) and the coping resources and options available (secondary appraisal).

Coping – i.e., dealing with conflicts or coming to terms with difficulties – has two main purposes:

1. Gaining control over or modifying the person–situation variables producing the stress (problem-oriented coping)
2. Gaining control over stress-related emotions (emotion-oriented coping)

Study

Appraisal of Everyday Stressful Events

Folkman and Lazarus (1980) conducted a field study to examine everyday stressful events and the related coping patterns. The authors addressed two main questions. First, do coping responses to everyday stressful events reflect person-specific dispositions, meaning that they remain consistent across events, or are they situation-specific and inconsistent? Second, which of the following five factors influence individual coping responses: type of event (context), persons involved, appraisal of the event, age, and gender?

Over the course of a year, 100 men and women between the ages of 45 and 64 were surveyed on stressful events and how they had attempted to cope with them on repeated occasions. It emerged that stressful events almost always evoked both emotion-focused and problem-focused coping responses. There was a greater tendency toward variability than toward consistency in the coping responses of the individual participants. In fact, it emerged that whether emotion or problem-focused coping mechanisms were used hinged primarily on the context (family, health, job) and on the appraisal of the event. The work context was conducive to attempts to solve the problem; the health context to emotional control. Contrary to commonly held sex stereotypes, there were no gender differences in the choice of emotion-focused coping mechanisms. However, men did report more problem-focused coping than women in work situations that could not be changed and had to be accepted.

A key finding of this study is that everyday approaches to coping with stress do not reflect person-specific dispositions, but situationally appropriate patterns of behavior.

4.7.4 Cognitive Dissonance

Few approaches within motivation theory generated as much research in the 1960s as did Festinger's (1957, 1964) theory of cognitive dissonance, with more than 1000 empirical studies being conducted (see Joule & Beauvois, 1998). Recent work has focused primarily on attitudinal change and the establishment of a conflict-free self. Nevertheless, the roots of the theory can be found in the tradition of motivational psychology (Beckmann, 1984).

In formulating his theory of cognitive dissonance, Festinger (1957) was influenced by Lewin's field theory and Heider's cognitive balance theory.

- The basic assumption of the theory is that individuals strive for harmony, consistency, and congruence in their cognitive representation of themselves and their environment, insofar as this representation has immediate meaning, i.e., is relevant to the current situation. The theory deals with the relationships between various cognitive elements (knowledge, opinions, values, attitudes) and with the motivational effects mediated by striving for consistency in the face of two conflicting elements.

The first question to be asked is what is meant by "relationships" and "elements." Relationships exist between two elements, i.e., within a pair of elements. The relationship is either irrelevant or relevant – the two elements are either related or they are not. It can be consonant – whereby one element logically follows from the other – or dissonant, whereby the opposite of one element logically follows from the other. The latter state generates a negative affect.

This negative affect, which is triggered solely by the experience of dissonance, and not by factors such as its unpleasant consequences, will motivate the individual to engage in dissonance reduction (Harmon-Jones, 2000). Like Lewin's field theory and Heider's cognitive balance theory, Festinger's (1957) conceptualization of the motivational component represents a kind of homeostatic model. Whenever an imbalance is registered, the organism is motivated to restore equilibrium (homeostasis). This approach is also consistent with a theory of generalized drive, as proposed by Raup (1925) or Richter (1927). Of course, the criticisms directed at the latter approaches also apply to the present conception of a motivation to reduce dissonance. Beckmann (1984), in contrast, took a functional approach, assuming dissonance reduction to serve the purpose of ensuring that an action is performed effectively and without conflict. Seen from this perspective, processes of dissonance reduction facilitate action control. Harmon-Jones and Harmon-Jones (2002) have advocated a similar approach and provided empirical support for their arguments in a series of experiments.

There are three ways to reduce dissonance:

1. By changing one or more elements within dissonant relationships
2. By adding new elements that are consonant with the existing ones
3. By reducing the significance of the dissonant elements

Example

The various possibilities can be illustrated using the example of smokers who find themselves confronted with the information that smoking causes lung cancer. They can achieve reduction of the dissonance by (1) changing an element within the dissonant relationship – by quitting altogether; by reducing the number of cigarettes smoked per day and then seeing themselves as light smokers, to whom the link between smoking and lung cancer does not apply; or by reasoning that the information on lung cancer applies only to cigarettes and not to pipes, which is what they smoke. Alternatively, they can (2) add new elements to reduce the dissonance, by thinking about their many friends who smoke and who are in the best of health or by reasoning that there are many factors contributing to lung cancer that are beyond individual control. Finally, they can (3) increase the significance of smoking, e.g., by saying that it makes them feel better and increases their performance, or they can reduce the significance of lung cancer, e.g., by saying that it is or soon will be curable or by doubting the validity of the link between smoking and lung cancer. (Surveys have shown that this skepticism is more widespread among smokers than nonsmokers and particularly prevalent among heavy smokers.)

The strength of the motivation to reduce dissonance depends on the individual significance of the cognitions standing in dissonant

relation to one another and on the number of cognitions involved. People will be more motivated to restore consonance when faced with information that is contrary to their world view than when the cognitions are less relevant to their self-concept.

These postulates have been confirmed for a variety of spheres of action, partly through field studies in real-life settings but mostly through studies in artificial laboratory situations. Festinger (1957) assumed cognitive dissonance and its reduction to occur in five main spheres, each of which saw intense empirical investigation:

1. Postdecision conflicts
2. Forced compliance to do something one would not have undertaken on one's own initiative
3. Selection of information
4. Challenged convictions of social groups
5. Unexpected outcomes of actions and their consequences

4.7.4.1 Postdecision Conflicts

The resolution of a conflict by means of a decision can often give rise to cognitive dissonance (Festinger 1964). Whenever one of two alternatives has been chosen, the positive aspects of the rejected alternative and the negative aspects of the chosen alternative will contribute to the dissonance of the decision. Conversely, the negative aspects of the rejected alternative and the positive aspects of the chosen alternative will increase the consonance of the decision.

Example

Participants in this study were asked to rate household appliances in terms of their attractiveness. In return for their participation, they were allowed to select one of two of these appliances to keep. For one group, the choice was between two products rated to be equally attractive, e.g., a toaster and an electric coffee maker (high dissonance); for another, the choice was between an attractive product and a product rated to be much less attractive (low dissonance). The participants were then asked to rate each product again. In general, these postdecision ratings indicated a marked increase in the attractiveness of the chosen product relative to the rejected product. The net change from the first to the second rating was more pronounced for the high-dissonance group that had to choose between equally attractive alternatives than for the low-dissonance group.

The findings reported by Brehm (1956) illustrate this point. Since Brehm's first study in 1956, there have been numerous empirical confirmations of dissonance reduction in postdecision conflicts. The pattern observed here, in which the balance between the chosen and the rejected alternative is tipped in favor of the former, is known as the divergence effect. Generally speaking, the more choices there are, and the less they differ in qualitative terms, the stronger the observed divergence effect will be. Dissonance reduction can also be achieved by retroactive changes in the relative weights of the criteria on which the decision was based. Penner, Fitch, and Weick (1966) asked study participants to rate the importance of eight character traits in a corporate vice president. They were then asked to choose between two candidates on the basis of personality profiles, each of which attributed four of the eight traits to each candidate. After making their choice, participants were again asked to rate the importance of the eight traits. The traits of the chosen candidate were retroactively assigned a higher value.

The opposite of a divergence effect has also been observed: a convergence effect or effect of regret in which the chosen alternative is assigned a lower value, and the rejected alternative a higher value (e.g., Walster, 1964). Festinger (1964) sees this self-induced increase in dissonance immediately after a decision as a protective response in people with a low tolerance for

dissonance. It represents an attempt to nullify the decision that has just been made.

A dynamic view suggests that the effect of regret may be a short-lived one occurring immediately after a decision has been made, prior to the onset of the divergence effect. Convergence effects seem to be complications that require individual differences to be taken into consideration; this is highly unusual in dissonance research (see Beckmann & Kuhl, 1984).

4.7.4.2 Forced Compliance

The sphere of action that has seen the most investigation is that of forced compliance, a particular dissonance-inducing situation in which people are led to do things that do not seem entirely justifiable. Dissonance will occur only from actions entered into voluntarily and to which the individual has made a personal commitment (Brehm & Cohen, 1962).

To reduce the dissonance arising from such situations, the value of the action must be increased retroactively or its negative aspects trivialized. Compliance now appears to have been more reasonable and justifiable.

A number of research techniques have been developed to produce conditions of forced compliance and insufficient justification. In an early study, Festinger and Carlsmith (1959) presented participants with extremely boring tasks. These participants were then asked to tell other potential participants that the experiment was extremely interesting. In return, participants in one group received 20 dollars, while those in another group were given just 1 dollar. Subsequent ratings showed that participants who received less compensation rated the experiment as more interesting than those who had received high compensation. The greater dissonance of the latter group, which arose from consenting to deceive others for a paltry reward, was reduced in retrospect by falsifying the facts.

It soon emerged, however, that forced compliance does not always lead to dissonance reduction. Brehm and Cohen (1962) postulated two further conditions, in addition to the discrepancy and the importance of relevant cognitions, that are necessary for dissonance reduction.

- First, the individual must feel that he or she entered into the forced decision voluntarily.
- Second, a personal commitment to an action alternative is required.

The realization of having made a voluntary commitment to a course of action that is in contradiction with one's own attitudes triggers cognitive dissonance. This dissonance may, in turn, lead to attitudinal change.

Study

Attitude Change in the Context of Bribery

Frey and Irle (1972) studied the effects of freedom of choice (given vs. not given) and commitment (public vs. anonymous) by means of experimental variation. Participants were paid DM 1 or DM 8 to prepare a discussion paper arguing against lowering the voting age from 21 to 18. For some, the task was obligatory; for others, it was voluntary. Some participants had to present the paper publicly, identifying themselves as the author; others were allowed to present it anonymously. Prior to the experiment, all participants were in favor of lowering the voting age. Findings showed that a reduction in dissonance, i.e., a change of attitude in favor of not lowering the voting age, occurred only in the presence of freedom of choice and public commitment. The absence of both resulted in the "bribery" effect, with attitude change occurring only in the higher-pay condition. In the two other conditions, in which only one facet was present (freedom of choice or public commitment), neither dissonance reduction nor bribery effects were observed.

The motivational aspects of cognitive dissonance can even modify the effects of organismic needs. Mansson (1969) induced thirst in study participants by giving them crackers topped with a spread that made their mouths feel hot and dry. They were then invited to take part in a 24-h thirst experiment and offered either a high or a low reward for their participation. They were given a printed form on which they indicated their consent or refusal to participate in the experiment. Those who did not wish to participate constituted the "refuser" group. There were also two control groups: a high-thirst and a low-thirst control group. Members of these groups were not asked to participate in a thirst experiment. The low-thirst control group was given plain crackers, while the high-thirst control group was given crackers with the thirst-inducing spread. Prior to the expected thirst experiment, which did not in fact take place, data were collected from all groups on a variety of variables relating to the thirst experience. The predictions of dissonance theory were confirmed. Participants who had been prepared to subject themselves to a long period of fluid deprivation without sufficient justification (low reward) behaved as if they were experiencing little thirst, similarly to the low-thirst control group. Relative to the group given a strong justification (high reward) for participating in the experiment and to the high-thirst control group, these participants rated themselves to be less thirsty. They drank less water, perceived fewer thirst-related words in a recognition task, required more trials to learn thirst-related paired associates, and gave fewer thirst-related responses in the TAT stories they generated. Figure 4.21 shows the average amount of water consumed by members of the various groups prior to the expected onset of the 24-h period of deprivation. The amount of water drunk in the high-dissonance group differs significantly from that consumed in all other groups.

Dissonance reduction is thus capable of modifying the effects of organismic drive states, such as thirst and fear, on learning and behavior. These findings emphasize the considerable influence of intervening cognitive processes in otherwise identical conditions.

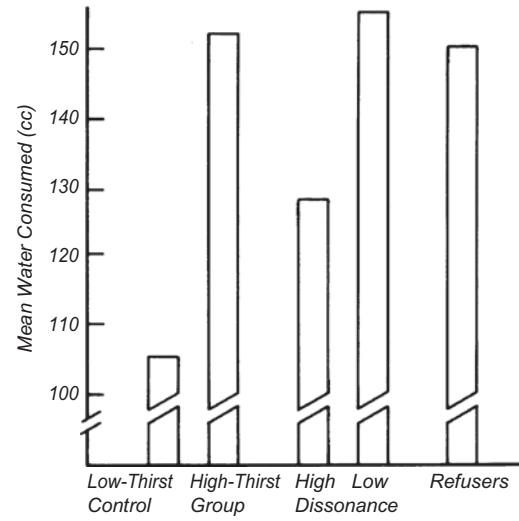

Fig. 4.21 Mean amount of water consumed in the low-thirst and high-thirst control groups, the high- and low-dissonance groups, and the refuser group (Based on Mansson, 1969, p. 90)

4.7.4.3 Selection of Information

Selection of information is a particularly effective way to reduce postdecision dissonance. The individual seeks out and gives preference to information that supports the chosen alternative and devalues the rejected one, while avoiding information that does the reverse. Ehrlich, Guttmann, Schönbach, and Mills (1957) found that new car owners were more likely to read advertisements for the car they had just bought than for makes they had considered but did not buy.

Subsequent investigations showed that people were more likely to seek support for the chosen alternative than to avoid information casting doubt on their decision (cf. Wicklund & Brehm, 1976). A crucial factor here is the ease with which consonant and dissonant information can be refuted. People tend to prefer consonant information that is hard to refute and dissonant information that is easy to refute – and to avoid easily refutable consonant information and less easily refutable dissonant information. These, in any case, were the findings of a field study conducted by Lowin (1967) during the presidential election of 1964. Supporters of Lyndon Johnson and of Barry Goldwater received promotional materials containing excerpts from the cam-

paign literature of the rival candidates. Some of the arguments were easily refuted, others were hard to refute. The participants were told that they could order additional materials free of charge. It emerged that there were more requests for hard-to-refute than for easy-to-refute consonant messages. The reverse held for dissonant messages.

An interesting case arises when dissonant information may prove beneficial after a decision has been made. If, for example, a student who has already signed up for a course run by a certain professor is given the opportunity to find out more about the examinations set by that professor, he or she will not avoid negative information. In this case, cognitive dissonance is not reduced, but accepted, because the negative information obtained may facilitate the goal of passing the exam (cf. Canon, 1964; Clarke & James, 1967; Freedman, 1965; Frey, 1981).

Example

Members of a small sect had gathered in a US town to await a cataclysmic flood that would occur on a certain day in December and would spell the end of the world. The faithful few would be whisked off to another planet in flying saucers. When this failed to occur, the dissonance between their expectations and reality could not be tolerated and had to be reduced. What could have been more logical than to abandon their beliefs about the end of the world and their personal salvation? However, only members of the sect who had been instructed to wait for the inevitable cataclysm on their own elsewhere responded in this way. Those members of the group who experienced the anticlimax together reduced the dissonance in the opposite way. They worked themselves up into a state of even greater fervor and missionary zeal, continuing to inform others that the end of the world was nigh, even though the prophesy had gone unfulfilled. In this case, dissonance reduction was closely linked to social interaction between the members of the group.

Hardyck and Braden (1962) report another field study involving a small religious sect ("True World"), the members of which expected an atom bomb attack on a certain day. They hid in below-ground shelters for 42 days after the assumed catastrophe. When they realized that a bomb had not in fact been dropped, they reduced the dissonance not through increased missionary fervor, but by adding consonant cognitive elements to the dissonant relationship. Specifically, they became convinced that they had passed God's test and prevented the catastrophe from occurring by virtue of their faith.

4.7.4.4 Challenged Convictions of Social Groups

Festinger, Riecken, and Schachter (1956) introduced this topic with a fascinating field study entitled *When Prophecy Fails* (see the example below).

4.7.4.5 Unexpected Outcomes of Actions and Their Consequences

There are situational conditions leading to dissonance reduction that were not specified by Festinger (1957) in his original formulation of dissonance theory, but derived from it later. One such category concerns the mismatch between high effort expenditure and disappointing outcomes. Another category concerns the consequences of an action in terms of the self-concept.

Mismatch between effort and outcome. Having tried hard, but in vain, seems to result in cognitive dissonance. To reduce that dissonance, attempts must be made to justify one's futile efforts retrospectively by increasing the value of the aspired goal (unless the expenditure of effort is trivialized or denied). Most impressive among the studies of this phenomenon are the animal experiments by

Lawrence and Festinger (1962) subtitled *The Psychology of Insufficient Reward*. The authors were able to demonstrate that cognitive dissonance and its reduction are not found only in humans, but can also be observed in infrahuman organisms, suggesting that dissonance theory also applies to nonverbal and noncommunicative behavior.

Hungry rats were trained to run a straight runway to obtain food under conditions that had previously been shown to inhibit learning and that the animals would avoid if easier or more reliable paths to the goal were made available. Three kinds of difficulty conditions were implemented in the acquisition phase: partial reinforcement, delayed reinforcement, and the requirement of greater effort expenditure (in this case, the rats had to run up an incline of a certain steepness). The dependent measure and indicator of dissonance reduction was resistance to extinction, i.e., the number of nonreinforced trials before the learned behavior was extinguished (in some cases, also its strength).

Lawrence and Festinger designed these experiments to test two implications of dissonance theory:

1. Every dissonance that results from nonreinforcement, delayed reinforcement, or reinforcement only after high effort expenditure will be reduced by attributing "extra attractions" to the goal, deriving from other motives like exploration or sensory stimulation.
2. Because dissonance is cumulative, it must be constantly reduced by a corresponding increase in the strength of these "extra attractions."

Sixteen separate experiments supported both of these hypotheses. In the case of partial reinforcement, the absolute number and relative proportion of nonreinforced trials was varied independently. (Learning theory research generally specified only ratios of nonreinforced to reinforced trials.) Figure 4.22 shows that resistance to extinction after partial reward was not a function of the ratio of reinforced to nonreinforced trials, but increased sharply as a function of the number of nonreinforced trials. This finding supports the postulate that dissonance is cumulative and has to

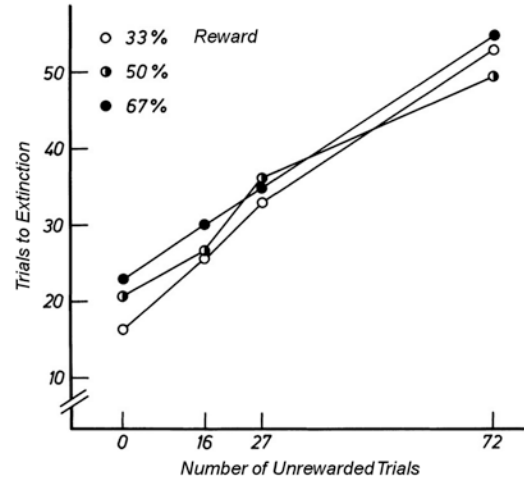

Fig. 4.22 Resistance to extinction as a function of the number of unrewarded trials in three conditions with different ratios of reinforced to nonreinforced trials (Based on Lawrence & Festinger, 1962, p. 91)

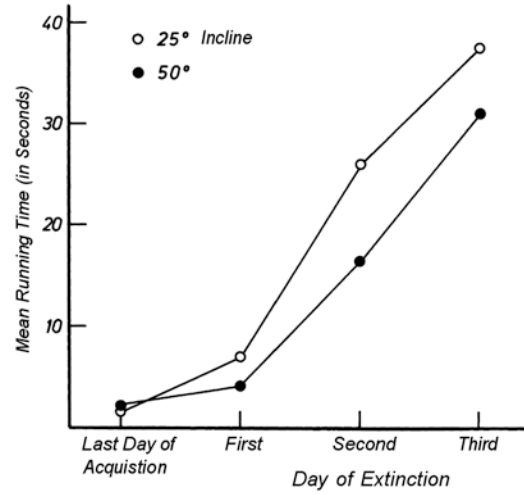

Fig. 4.23 Mean running time (in seconds) in the extinction phase by effort condition in the acquisition phase (incline of 25° or 50°) (Based on data from Lawrence & Festinger, 1962, p. 143)

be constantly reduced by elevating the attractions of the goal. If the dominant drive (hunger) is high in the acquisition phase, however, resistance to extinction increases as a function of the number of nonreinforced trials in the acquisition phase. These results suggest that greater dissonance resulting from the nonoccurrence of the expected reward under conditions of high drive level also

leads to increased dissonance reduction in the form of attributing extra attractions to the goal. Findings about the relative expenditure of effort were also in line with these hypotheses. Rats that had to run up an incline of 50° ran faster (Fig. 4.23) during the extinction phase than rats faced with an incline of just 25°. Likewise, resistance to extinction was greater in the former group. These findings on effort proved to be independent of the reinforcement schedule.

Varying both the amount of effort required and the number of nonreinforcements independently resulted in a summation of the effects of the two conditions. These and other findings led Lawrence and Festinger to the following conclusion:

> If an organism continues to engage in an activity while processing information that, considered alone, would lead it to discontinue the activity, it will develop some extra attraction for the activity or its consequences in order to give itself additional justification for continuing to engage in the behavior. (Lawrence & Festinger, 1962, p. 156)

Dissonance-inducing outcomes of an accomplished action. Behaving in a way that is inconsistent with one's expectations, i.e., in conflict with the self-concept, is likely to induce dissonance and to result in unambiguous effects of dissonance reduction.

The experimental paradigm for inducing dissonance with the self-concept was introduced by Aronson and Carlsmith (1962) and is also used in research on achievement motivation and cognitive attribution (Chaps. 6 and 14). In this paradigm, participants are set a task that has been designed to result in either success or failure, causing them to adopt either a high or a low self-estimation of their ability on that task. Later they receive feedback on their performance that contradicts their expectations either in a positive or negative direction. According to Aronson, both scenarios will result in cognitive dissonance and initiate attempts to reduce it. Dissonance reduction can be achieved in various ways, the relative effectiveness of which was investigated in a number of subsequent studies.

For example, Irle and Krolage (1973) found that self-esteem increased more in the case of positive discrepancy from the test results than it decreased in the case of negative discrepancy from the results. (These findings are consistent with many others relating to self-serving biases in the attribution of success and failure; cf. Bradley, 1978; Fitch, 1970; Miller, 1976; see also Chap. 14.)

Individuals' ratings of their effort and of the validity of the test were higher in the case of positive discrepancy than they were in that of negative discrepancy. The further the unexpected outcome deviated from the participant's expectations, the less accurately it was remembered. Individuals became convinced that their test score was representative of the mean score expected for the reference group. Interindividual differences in the level of self-esteem also had an effect. This variable interacted with the direction of feedback discrepancy from expectations. The dissonance effects were strongest among participants with high self-esteem and a negative discrepancy from expectations and participants with low self-esteem and a positive discrepancy from expectations.

Summary

Evidently, a remarkable number and variety of phenomena can serve to reduce cognitive dissonance. Most of these relate to changes in attitudes and beliefs when cognitive dissonance arises from postdecision conflicts, forced compliance in actions that one would not otherwise have undertaken, new information about previously chosen alternatives, challenged beliefs, or unexpected outcomes of actions and their consequences. Festinger (1964) postulated that information processing in the run-up to a decision is objective and impartial but that once a decision has been made, it is biased in favor of that choice. In so doing, he anticipated a volitional specification of dissonance theory and a postulate of the Rubicon model of action phases (Heckhausen, 1987).

The number and theoretical importance of cognitive dissonance studies focused more narrowly on motivational issues, however, has remained limited. Following the resurgence of volitional theory in recent years, dissonance research has again begun to attract increased interest (Beckmann, 1984; Harmon-Jones & Harmon-Jones, 2002).

Indeed, studies such as the animal experiments conducted by Lawrence and Festinger (1962) and Zimbardo's (1969) set of experiments on the cognitive control of drives (cf. Grinker, 1969; Mansson, 1969) have demonstrated the validity of dissonance theory beyond verbal and communicative behavior.

4.8 Cognitive Appraisal Theories and Motivational Psychology

All of the above models concerning the behavioral effects of cognitive appraisals of the situation have contributed to an understanding of motivational issues, even when they neglect individual differences. With respect to their possible role as motives, these theoretical models of cognitive appraisal have remained undeveloped and untested; they are motivational models without motives. This may be the reason why authors such as Festinger and Heider have remained ambivalent and doubtful about the contributions their theories can make to the study of motivation.

According to Festinger (1957):

> Cognitive dissonance can be seen as an antecedent condition which leads to activity towards dissonance reduction just as hunger leads to activity oriented towards hunger reduction. It is a very different motivation from what psychologists are used to dealing with, but, as we shall see, nonetheless powerful. (Festinger, 1957, p. 3)

From today's perspective, we concur with Festinger to the extent that we see the motivation to reduce dissonance as a motivation that indeed differs from other motivations. Specifically, it is a motivation that serves the realization of actions; a motivation that mobilizes processes to facilitate the implementation of intentions. In other words, it is a volitional process. As mentioned above, the theory of cognitive dissonance can also be seen as a theory of volition. Indeed, Kelly (1962, p. 81) responded to Brehm's approach by pointing out that the aim of dissonance reduction was not to restore balance, but rather "to reconcile force and action."

Beckmann (1984) endorsed this approach. Festinger (1964) had postulated that, in the predecisional phase, information processing was objective. Information distortion protecting a decision that has been made – that is, dissonance reduction – should occur only in the postdecisional phase. Beckmann (1984), in contrast, assumed that dissonance reduction – in its function as a volitional process that guarantees the achievement or maintenance of action control – may by all means occur before a decision is made if there is no other way of resolving a decisional conflict. This hypothesis was supported by an experimental study in which individuals who were actually house-hunting had to make their choice from a list of apartments that were equal in terms of attractiveness. Attractiveness ratings were taken twice: at the start of the decision process and shortly before participants were asked to announce their decision. During the decision process, a divergency effect occurred. Whereas the attractiveness rating of the apartment that was actually chosen later increased, the ratings of the later rejected alternatives decreased. This obviously helped the individuals to escape the paralyzing situation of the previously mentioned Buridan's ass, who starved between two equally attractive stacks of hay. The distorted information processing resolved the predecision conflict and helped the deciders to commit themselves to one alternative. However, individual differences occurred. Only individuals classified as action-oriented with Kuhl's (1994) action control scale showed the decision-promoting attractiveness distortion. Those individuals who were, according to their scale values, state-oriented – that is, individuals who tend to get lost in unproductive ruminations – remained objective and did not change their initial attractiveness ratings.

Heckhausen's (1987) Rubicon model of action phases (Chap. 11) links up with the volitional aspects of the theory of cognitive dissonance. In line with Festinger (1964), Heckhausen assumes that it is, on principle, functional for alternatives to be evaluated objectively and impartially before a decision is made. Once the Rubicon has been crossed, and a commitment to one alternative made, however, it becomes dysfunctional to dwell on the positive aspects of the alternatives that have been rejected. Such considerations might

demoralize the individual and undermine their resolve to pursue the chosen course of action. Consequently, after crossing the Rubicon, people tend to either forget about the alternatives they have rejected or to play them down. The Rubicon model, however, goes one step further than dissonance theory with respect to the functionality of information processing. The next logical step, once a decision has been made or an intention formed, is to put that intention into practice. Information relating to that action is of the essence here and needs to be taken into account, whether or not it is consonant with the decision that has been made. In fact, in some cases, it may be particularly useful or beneficial to consider information that challenges the choice made. Beckmann and Gollwitzer (1987) tested this assumption in the experiment presented below.

In other words, the strategy of reinforcing a decision that has already been made by focusing on its positive aspects and overlooking its negative ones can be reversed if negative information is more relevant to the realization of the action than is positive information. In the preactional phase, after a decision has been made, this approach is extremely functional.

Study

Dissonance Reduction or Action Control

In the experiment conducted by Beckmann and Gollwitzer (1987), participants were provided with various pieces of information about two potential partners in a subsequent discussion. Some of the information was positive, some of it was negative. After the information had been presented, a cued-recall memory test was administered. In two conditions, participants were provided with the information before making their decision. In one of these conditions, the memory test was administered before the decision was made; in the other, afterward. In the third condition, participants made their decision on the basis of photos of the potential partners, and the additional information was only provided, and its recall tested, after the decision had been made. It was only in this final condition that participants recalled significantly more information about the person they had chosen than about the person they had rejected. In both other conditions, including the typical dissonance condition (information provided before the decision, test administered afterward) participants recalled approximately the same amount of information about both potential partners. Interestingly, participants in the third condition recalled more negative than positive attributes of the partner they had chosen, whereas those in the condition where the test was administered before a decision was made recalled approximately equal numbers of positive and negative attributes. Do these findings disprove the assumptions of cognitive dissonance theory? Viewed from the perspective of volitional theory, the results are by all means in line with expectations. Specifically, participants' ratings of the relevance of the various pieces of information provided showed that information on negative personality attributes was considered much more important than information on positive attributes. When interacting with others, it can be important to know where sensitive points lie, and which topics to avoid to ensure that these do not have a detrimental effect on the conversation.

Summary

This chapter has dealt with the historical development of a number of quite heterogeneous perspectives on the situational determinants of behavior. The spectrum covers momentary need states and drive strengths, situationally induced conflicts and states of arousal, and emotions and cognitions as outcomes of situational appraisals. The only thing that all these determinants of internal or exter-

nal situations have in common is that they are intraindividually variable, meaning that they are not linked to interindividual differences in dispositions.

The situational approach is thus just as one-sided as the person-centered approach and does as little justice to the complexity of motivational processes. A whole series of experiments on the theoretical approaches covered in this chapter provide evidence for this point.

Nevertheless, most of the approaches presented in this chapter have undergone further development without any alteration in this basic perspective, i.e., without the inclusion of person variables. This applies particularly to neo-associationism in social psychology.

Overall, however, there has been a discernible convergence on the main problem in motivation, namely, how to explain the incentive value of goal states. In the process, it has become increasingly apparent that any clarification of the issue of motivation builds on two basic constructs – expectancy and incentive. We return to this issue in Chap. 5, paying particular attention to the development of Lewin's and Hull's approaches, as well as Tolman's approach, which was, from the outset, concerned with goal-oriented behavior involving the constructs of expectancy and incentive. Approaches from cognitive psychology and their further development have helped to clarify the conditions that determine the levels of anticipatory and incentive variables.

Review Questions

1. *What is the principle of homeostasis?*
   Organisms endeavor to maintain a state of equilibrium (homeostasis). Whenever an imbalance is registered, the organism is motivated to reestablish the initial state.

2. *How does Hull account for the strength of stimulus–response bonds ($_sH_R$, habits)?*
   According to Hull, the strength of a stimulus–response bond ($_sH_R$) is solely dependent on the frequency of reinforcement. The frequency or strength of learned responses is solely dependent on the existing drive strength.

3. *According to Hull's theory, what energizes behavior and what gives behavior its direction?*
   Hull's theory states that it is generalized drive that energizes behavior and learned stimulus–response bonds, or habits, that give it direction.

4. *What is affective priming?*
   In affective priming, the affective properties of the stimuli to which individuals are exposed are activated extremely quickly, without their conscious awareness. This activation of affective connotations can influence their subsequent judgments and behavior.

5. *Which are Lewin's three basic categories of conflict situations?*
   1. Approach–approach conflict
   2. Avoidance–avoidance conflict
   3. Approach–avoidance conflict

6. *Which six assumptions relating to conflict phenomena were formulated by* Miller (1951, 1956)*?*
   1. The tendency to approach a goal becomes stronger, the nearer a person is to it (gradient of approach).
   2. The tendency to approach a feared stimulus becomes stronger, the nearer a person is to it (gradient of avoidance).
   3. The gradient of avoidance is steeper than the gradient of approach.
   4. When two incompatible responses are in conflict, the stronger one will prevail.
   5. The height of the approach and avoidance gradients is dependent on the strength of the underlying drive.

6. The strength of the response tendency being reinforced increases as a function of the number of reinforcements until learning plateaus out at a maximum level.

7. *What happens in cases of displacement?*
   In cases of "displacement," the original object is replaced perceptually by a more or less similar object that elicits less fear or anxiety. Displacement corresponds to a generalization of the response to the original object. The more the avoidance tendency outweighs the approach tendency, the less similar the displacement object will be to the original object.

8. *What are the postulates of Arnold's sequential model of emotions?*
   The appraisal of a situation, in terms of its potential benefits or threats, is central to Arnold's (1960) sequential model of emotions. It is the "intuitive" appraisal of a situation that elicits emotion and its physiological responses. Appraisal consists of an affective judgment that is experienced as a behavioral approach or avoidance tendency. The concomitant physiological responses determine the emotions expressed. The final step in the sequence is an approach or avoidance response.

9. *According to Berlyne, what are the components constituting the arousal potential of a situation?*
   1. Collative variables (novelty, uncertainty, conflict, complexity, surprise value)
   2. Affective stimuli
   3. Intense external stimuli
   4. Internal stimuli arising from need states

10. *What do dissonance theory and the Rubicon model of action phases have in common; where do they differ?*
    Both dissonance theory and the Rubicon model of action phases work on the assumption that information processing in the run-up to a decision is, on principle, objective and impartial, but that once a decision has been made, it is biased in favor of that choice. However, the Rubicon model further distinguishes between information that is relevant to the decision, and information that is relevant to its realization. Only the processing of the first type of information should be biased after a decision, so as to reinforce and stabilize that decision. Because the latter type of information is relevant to proper execution of the action, the Rubicon model states that it should be processed objectively, even if it contradicts the decision that has been made.

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Motivation as a Function of Expectancy and Incentive

5

Jürgen Beckmann and Heinz Heckhausen

5.1 The Emergence of Incentives as Explanatory Concepts

Like Chap. 4, this chapter deals with the situational determinants of behavior. All of the theories to be discussed assume that the organism is able to anticipate events and that behavior is guided by anticipatory goal states. The underlying assumption is that goal states are involved in the "reinforcement" of behavior. When our actions meet with success, the respective goal states are associated with positive affect. When we fail, or in the case of negative reinforcement, they are associated with negative affect. The anticipation of the affect associated with goal states activates a behavioral tendency to either approach or avoid specific goal states. Situational stimuli that alert the organism to affectively charged goal states are known as incentives. Hence, the present chapter deals with incentive theories of motivation.

The striving for affectively charged goal states is a core component of motivation. There are evidently two preconditions for this striving. First, it must be possible to anticipate the occurrence of the goal state; there must be an expectation. Second, the goal state must have some subjective significance or value for the organism.

- Incentive theories of motivation assume that behavior is goal directed. Its regulation is forward looking, as though the organism were constantly asking itself what leads to what. Behavior is proactive and is attracted to future goal states by the incentive-like promises and threats of the present situation.

The explanatory models covered in Chap. 4, such as Hull's (1943) reinforcement theory, are rather reactive by comparison. Here, the general energizing of behavior is attributed to a nonspecific drive, and behavior is assumed to be guided by previously established stimulus-response bonds (habits).

Preliminary conceptualizations of incentive theories are found, in one form or another, in the work of the pioneers of motivation research, such as William James, Freud, and McDougall. The first theory of motivation in which the idea of incentives not only plays a central role but is also developed systematically is Lewin's field theory. Within his model of the psychological environment, Lewin tried to define the effects of incentives – or, to use his terminology, valences – on behavior.

For Tolman, "expectancy" and "demand for the goal" became the hypothetical constructs of a

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"psychological behaviorism." These intervening cognitions mediate between the situation and the subsequent behavior. Tolman felt the assumption of rigid, learned stimulus-response bonds ("habits") in Hull's reinforcement theory to be inappropriate for explaining the flexible goal orientation of behavior. Based largely on his experimental findings on latent learning, Tolman was able to draw a distinction between learning and motivation (performance). Reinforcement of behavior has less effect on learning as such than on whether what has been learned is actually put into practice. According to Tolman, reinforcement generates the expectation of an event with incentive character.

The proponents of reinforcement theory, Hull and his students, incorporated Tolman's findings in their work, leading to a gradual transformation of reinforcement theory into an incentive theory of motivation. This applied particularly to Spence (1956) and, even more so, to Mowrer (1960), who used incentives to explain everything that had previously been attributed to drives.

This move toward an incentive-oriented approach further raised the question of whether response reinforcement might not be a superfluous or even inadequate explanation for operant learning. Might it not be better to explain the reinforcer's impact on behavior as a motivational incentive effect rather than as an effect related to the linkage between stimulus and response? This is a position long held by many well-known theorists in learning and motivation, e.g., Walker (1969), Bolles (1972), and Bindra (1974). Theoretical models that expand on Tolman's approaches suggest that it is not stimulus-response bonds that are learned but expectations of contingencies. According to Bolles there are two basic types of expectations:

- Situation-consequence contingencies (*S*–*S**)
- Response-consequence contingencies (*R*–*S**)

This results in a simple cognitive model of motivation. The probability of a response increases as a function of the strength of *S*–*S** and of *R*–*S** and with the value of *S**. In other words, motivation is a function of expectancy and value.

The 1940s and 1950s saw the development of theoretical models incorporating expectancy and incentive beyond the confines of learning theory. These "expectancy-value theories" were invoked to explain decision-making behavior in situations ranging from placing bets in a game of chance to purchasing decisions (Edwards, 1954; von Neumann & Morgenstern, 1944) or setting levels of aspiration for tasks of varying difficulty levels (Atkinson, 1957; Escalona, 1940; Festinger, 1942).

- Expectancy-value theory states that, when several action alternatives are available, the one with the highest product of attainable value (incentive) times probability of success (expectancy) will be chosen. In other words, the individual strives for a goal state with the highest possible incentive value, taking into account the probability of its attainment. Expectancy-value theories form an important basis for contemporary motivation research.

Before examining the expectancy-value theories that are paradigmatic of today's motivation research, we will consider the foundations of these theories, starting with the concepts of incentive and expectancy and then discussing Kurt Lewin's conceptualizations. The latter provided an extremely fertile ground for contemporary theorizing.

5.2 Situational Parameters of Motivation

Behaviorist learning theory assumes the situations in which individuals find themselves to play a crucial role in energizing and directing behavior. Situational stimuli alert people to goal states that have incentive value for themselves personally. They also provide information permitting individuals to gauge the probability of attaining these goal states. In other words, situations contain stimuli that lead to subjective representations of incentive and expectancy. These subjective representations are not independent of person factors.

5.2.1 The Incentive Concept

Definition
The incentive construct describes situational stimuli that are capable of eliciting a motivational state. Affective responses constituting a fundamental (basal) evaluation are at the core of this construct.

A stimulus can acquire incentive character over the course of an individual's learning history through its association with affect. A ski slope, for example, can trigger positive affective responses, such as pleasure and excitement, in one person, but negative responses, such as fear, in another. These responses depend on the individual's previous experience – in this case, associated with skiing. Learning, however, does not always seem to be a necessary precondition for an object to acquire incentive value. For example, a taste can activate specific receptors for sweet substances, which then trigger specific behaviors without the need for having had any prior experience of the foodstuff in question (Pfaffmann, 1982).

Affect, in its function as a primary evaluative mechanism, is an integral component of the incentive concept. For Schmalt (1996, p. 245), incentives are nothing more than anticipated affect. An object associated with positive affect has positive incentive value; an object associated with negative affect has negative incentive value. Modern research assumes that positive and negative affects are two mutually independent events (Watson & Tellegen, 1985), meaning that it is possible for strong positive and strong negative affect to occur at the same time.

- Crucially, incentives do not describe objective states but subjective phenomena as perceived and affectively evaluated by the individual.

Particular objects or events that represent or are associated with the goal state, or that threaten to frustrate it, have positive or negative salience. These objects or events (S^*) represent a corresponding positive or negative incentive. They attract or repel the organism. Everything that has "reinforcement qualities," i.e., that can be shown to affect the antecedent behavior, can be attributed incentives. Incentives, like expectancies, are hypothetical constructs, and motivation theorists employ them to differing extents. In particular, their theoretical explanations of the conditions that give rise to incentives differ. The incentive value of objects or events may be seen as learned or innate (independent of experience) and as more or less dependent on momentary need states. Other terms used to designate this value character are valence (Lewin) and demand for the goal (Tolman).

Perceived or expected objects and events that have incentive character elicit behavior as well as giving it direction. Incentives are assumed to both energize and guide behavior by eliciting and attracting it across space and time.

The association of objects with affects, which endows stimuli with incentive character, occurs at early stages of processing in the limbic system. The amygdala plays a key role in generating affect, the nucleus accumbens is central in mediating motivational effects including reinforcement, and the prefrontal cortex helps to facilitate action (Wise & Rompré, 1989).

Leaving behind Hull's reinforcement theory, Milner (1970) defined incentives as the mechanisms that trigger behavior in the absence of a biological "drive." More recent research findings indicate that this triggering effect is not independent of the organismic state.

Organismic states influence the effect or salience of incentives. Toates (1986) suggested that organismic states can function as mediators that increase or diminish the salience of incentives, depending on whether excitatory or inhibitory influences predominate. Neuropsychological research has confirmed this assumption, showing that the salience of incentives is a function of the motivational state communicated by the central nervous dopamine system (Berridge & Robinson, 1998). It would seem that dopamine triggers desires and aspirations that can prompt an active search for cue stimuli. It does not have an impact on affective quality, however, i.e., how much we like something. This explains why we are more likely to notice food when we are hungry and why – although the range

of foods we consider palatable increases as our hunger grows – we would not be any happier to be served a worm for breakfast.

Schneider and Schmalt (1994, p. 16, own translation) see motives and incentives as closely related: "Situational incentives reflect the specific motive goals that people can aspire to or seek to avoid. Motives, in contrast, reflect evaluative dispositions for classes of these goals, the strength of which differs interindividually." In the following, we will show that the first formulations of incentive theories (e.g., Lewin's field theory) were in fact motivation theories without motives, i.e., that they disregarded enduring individual dispositions.

5.2.2 The Expectancy Concept

Another situational determinant of motivation is expectancy, i.e., the perceived probability that a certain goal state will ensue from a situation. This may entail the need for action or occur without the individual's involvement. Like incentive, expectancy is a subjective quality that develops over the course of the individual's learning history (see the overview and Fig. 1.2 in Chap. 1).

Characteristics of the "Expectancy" Variable

1. *Expectations of the situation-consequence contingency type (S–S*), cf.* Bolles, 1972*):* This type of expectation consists simply in the anticipation of a specific goal state, independent of the organism's own behavior (as in classical conditioning, where a signal precedes the presentation of food).
2. *Expectations of the response-consequence contingency type (R–S*):* This type of expectation entails the need for action on the part of the organism.
3. Expectations can also be differentiated on the basis of the amount of time or the number of behavioral sequences they encompass.
4. Expectations are not directly observable. They must be inferred and therefore represent hypothetical constructs.

Theories of motivation differ in the extent to which they take the last point in the overview into account, i.e., in how well they are able to interpret the role of expectations as hypothetical constructs that can be used to predict outcomes on the basis of previous learning.

5.3 Linking Incentive and Expectancy

The French philosopher Blaise Pascal (1623–1662) was the first to link the constructs of value (incentive) and expectancy in the attempt to explain behavior. In so doing, he founded a long-standing tradition of expectancy-value theories in behavioral science. These theories form the basis for most contemporary models of motivation (Feather, 1982). The basic idea is that behavior is explained by the linkage between expectancy and value (= individually weighted incentive), which is usually multiplicative in nature. We do not necessarily have to be consciously aware of the two components in order for them to influence our behavior. In fact, they need not even have a conscious representation. It follows that expectancy-value theories can, in principle, also be used to explain animal behavior.

5.4 Lewin's Field Theory

Kurt Lewin's "field theory" was designed to explain behavioral events in comprehensive and concrete terms by tracing them back to the specific conditions of the "field" that existed at the time a behavior occurred.

- According to this conception, which is borrowed from physics, a person is located within a force field and subject to its situational forces. These forces emanate from both the "external" situation (the environment) and the "internal" situation (the person). Thus, the field describes all behavior-relevant conditions residing in the existing situation and in the person's internal states and establishes causal dynamic relationships between them.

Lewin's field theory differs from the explanatory approaches of learning and drive theory, as presented in Chap. 4, in three major respects:

1. It attempts to reconstruct the entire situation as it exists for the individual.
2. The explanatory approach must be psychological.

   The internal and external determinants of behavior must be seen from a psychological rather than a quasi-physical perspective. Thus, stimuli – which behaviorists attempt to define in terms of "physical" events – are not among the fundamental units of causal analysis but rather perceived environmental events that offer the individual a number of behavioral choices. A psychological analysis, however, is not restricted to aspects that are phenomenologically given by internal states or external environmental conditions. It also includes aspects that are not consciously experienced but that nevertheless influence behavior. These may be affective reactions that are not consciously represented (cf. Kuhl, 2001), for example.
3. Simple connections in the sense of stimulus-response bonds are viewed as insufficient.

   All behavior is driven by underlying forces. This dynamic approach to understanding behavior goes beyond the assumption of a general, nonspecific drive.

For Lewin (1942), behavior is a function of the field existing at the time the behavior occurs. It is only the present that can determine behavior. Neither past nor future events can be remembered or anticipated in the present, thereby becoming effective determinants of behavior. Past events, such as learning, may have contributed structure to the present field, in terms of the peculiarities of both the person and the environment. But one cannot simply attribute present behavior to earlier events, as is often done in psychoanalysis. Lewin was skeptical of dispositional variables such as intelligence or "instinct," because he saw them as inappropriate references to historical abstractions.

- Lewin's field theory is distinct from psychoanalysis to the extent that it sees behavior as determined by the present field – by the subjective representations existing at the time it occurs. Childhood experiences can only have an impact on behavior in terms of their present representation.

Furthermore, Lewin (1942) believed that psychological situations should, wherever possible, be presented in terms of mathematical models, "to permit scientific derivations" and "to use a language which is logically strict and at the same time in line with constructive methods" (1942). Mathematical representations do not have to be exclusively quantitative; they can also be qualitative, as is the case in geometry. Lewin's field theory makes extensive use of topology, a form of geometry that refers to adjacent regions, but not to distances and directions. It also involves vectors with three determinants:

- Strength
- Direction
- Point of application

Lewin (1931a, 1931b, 1935) argued against psychological explanations of behavior in which classifications were based on external appearances, and in favor of analyzing the conditions that gave rise to those appearances, so that explanatory constructs with general validity could be identified. These explanatory constructs emerged to be the basic concepts of general dynamics, as developed in post-Galilean physics, e.g., potential, force, and field (analogous to electromagnetic or gravitational fields).

No less programmatic, but probably more important for the study of motivation, was Lewin's emphasis on an analysis of the total situation, which resulted in the well-known Lewinian equation (1946a).

- Behavior (B) is a function of person factors (P) and environmental factors (E): $B = f(P, E)$.

In principle, field theory thus recognizes the interactional relationships between person and situation factors, reflecting their mutual influences. In practice, however, field theory was unable to fulfill this programmatic pretension,

because it neglected the dispositional variables among the person factors in favor of the momentarily functional variables. This neglect of individual differences in motivation resulted from the skepticism toward "historical" explanations mentioned above, although field theory is not in principle at odds with this kind of approach. After all, the notion of previously acquired associations does not contradict the rule that behavior must be a function of the present field. They can provide a prestructuring of personal factors against which the present situation is perceived.

Lewin developed two different explanatory models that are, to a certain extent, complementary: the person model and the environment model. The environment model relates to motivational issues, the person model to volitional issues. This is despite the fact that Lewin tried to reduce volitional problems to motivational ones.

The two models differ in terms of their dynamic components. The person model involves energies and potentials, i.e., scalar magnitudes. The environment model employs forces and goal-oriented behavior ("locomotion" through behavioral regions), i.e., vectorial magnitudes. In the final analysis, however, both models are based on a homeostatic dynamic system. The states described tend toward the development of a homeostasis of tension or force. It is not the reduction of tension but its equalization that is the governing principle of the all-encompassing system or field (cf. Lewin, 1926a, p. 323ff.).

The Person Model

Lewin's theory of motivation was prompted by his dispute with Ach. Lewin (1922) sought to demonstrate that Ach's (1910) "determining tendency" not only explains a particular type of behavior but that it is the dynamic prerequisite for all behavior. Simply establishing a connection between stimulus and response is not sufficient. For learning to manifest itself in behavior, a force should always be present. Most important for Lewin was the question of energizing. This does not mean the use of energy to carry out ongoing cognitive or motor behaviors.

- Here, energizing refers to the central question of behavioral determinants. Which of the behavioral tendencies available in a given situation will succeed and ultimately determine behavior?

Lewin attempted to answer this question by postulating changing tension states in various inner-personal regions (cf. 1936). Figure 5.1 presents the person as a system of separate regions. Each region represents a particular behavioral goal, either an enduring desire that might be labeled a need or a motive or a momentary intention. The individual regions differ in their proximity to one another, which represents their degree of similarity. It is greatest when two regions share a common boundary.

A further distinction relates to the position of the regions and whether they are more central or peripheral. Central regions share more boundaries with adjacent regions than do peripheral ones. This indicates "ego-proximity," the personal importance of behavioral goals and activities, as well as their level of influence on other behavioral goals and activities, measured in terms of their number.

Tension Systems in the Person Model

Thus far, the person model represents a purely structural entity with regions, adjacencies, and mediating functions between inside and outside. One more structural characteristic should be mentioned, namely, the nature of the boundaries.

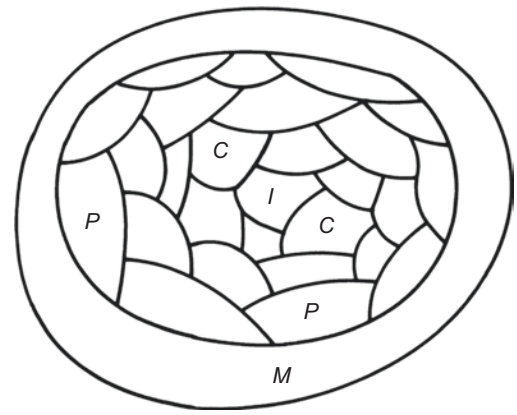

Fig. 5.1 Person model. The motor-perceptual region (*M*) mediates between the environment (*E*) and the inner-personal regions (*IP*), which may be either more central (*C*) or peripheral (*P*) (After Lewin, 1936, p. 177)

These can differ in their "permeability" and can allow "leakage" from one adjacent region to another. This structural characteristic of the boundaries is related to the dynamic component of the person model. It is here that Lewin introduces the concept of tension. Specifically, the tension states of the individual's inner-personal regions can vary. The regions can be thought of as vessels filled with liquid under varying degrees of pressure. If one region is marked by an increased tension state relative to another, it represents, according to Lewin, a tension system. Tension systems strive for the equalization of tension with adjacent regions. This can be accomplished in two ways:

- The tension system representing an intended action may become discharged if it can access the border region of sensory-motor execution, i.e., if it gains control over behavior and guides it toward the goal.
- If, however, it does not find such an access, the force will push against the boundary walls of the tension system. How soon there will be an equilibration of tension as a function of its diffusion is now a question of the permeability of the boundaries and the temporal duration.

Both types of tension equalization are quasi-physical conceptualizations rather than genuine explanations. They have heuristic value for analyzing the variables relating to a number of behavioral phenomena addressed by Lewin's students within the "psychology of action and affect." These experiments have become classics in the field. The first type of tension equalization, producing activities that can serve the execution of a purpose, can help clarify the behavior that follows a completed or an interrupted action. Prototypical here is the Zeigarnik effect. Lewin's student Bluma Zeigarnik (1927) found that interrupted tasks were more easily remembered than those that had been completed.

The second type of tension equalization, through diffusion to adjacent regions, can serve to explain phenomena such as need satisfaction through goal substitution (Henle, 1944; Lewin, 1932; Lissner, 1933; Mahler, 1933), the role of fatigue, emotionality, anger (Dembo, 1931), and unreality (Brown, 1933) resulting from the discharge of a tension system. Fatigue, emotionality, and unreality are viewed as conditions that change the permeability of the regional barriers, but both types of tension equalization always relate to the implementation of firm intentions.

The structure of the inner-personal sphere is not permanently fixed. It becomes more differentiated as a function of the individual's development and experience. It can be restructured, with each immediate goal forming a region of its own.

- As Lewin stated in his fundamental theoretical treatise on *intent*, *volition*, and *need* (1926b), action goals represent "quasi-needs," i.e., derived needs. Quasi-needs are transitory in nature. They often arise from the intention to do something that is goal-related, e.g., to mail a letter to a friend. They form a tension system that will disappear only when the goal has been attained.

Quasi-needs

Quasi-needs may also arise without an act of intention, e.g., in connection with the intermediate activities leading to a goal associated with "genuine" – i.e., superordinate and enduring – needs. For instance, the instructions given by an experimenter are, as a rule, accepted by a study participant without an actual intentional act. This induces a quasi-need to carry out the imposed task, which is basically the same as a self-initiated intention. In both cases the activity is resumed spontaneously after interruption (cf. Ovsiankina, 1928). According to Lewin, the strength of a quasi-need (or, more specifically, of the corresponding tension system) is not dependent on the presence or intensity of the intention but on the extent to which the quasi-need is related to or is fueled by real needs (which, for us, represent motives):

> The intention to mail a letter, to visit a friend, even the intention of a subject in an experiment to learn a series of nonsense-syllables, does not represent an isolated entity, even in the case where the action sequence represents a relatively well-defined whole. Instead, it arises from more far-reaching goals, such as the intent to take care of one's business, to make progress in one's studies, or to do a favor for a friend. It is not the strength of an intention, but

> (apart from other factors) the strength and the vital importance, or more correctly, the degree to which the genuine need – in which the quasi-need is embedded – has become firmly established ("Tiefe der Verankerung"), which determines the effectiveness of an intention. (Lewin, 1926b, pp. 369–370)

We will see shortly, when we examine the environment model, that a tension system, whether it represents a need or a quasi-need, is related to specific changes in the perceived environment. Objects that can facilitate a discharge, i.e., serve to satisfy a need, acquire "incentive character," a valence that sets them off from their environment and induces goal-oriented approach behavior. If, for example, you want to mail a letter in an unfamiliar part of town, you are much more likely than usual to notice a mailbox, even if you are not intentionally looking for one. The strength of the valence is dependent on the strength of the tension system. This postulated relationship is the only connection between the two models, which, as we will see later, are totally different.

Summary

Although field theory pays very little attention to individual differences, the person model does incorporate some attempts to describe individual differences in terms of enduring differences in the structural characteristics of the inner-personal space. For one, this applies to different stages of personality development, represented by both the degrees of differentiation (i.e., the number) of inner-personal regions and the permeability of the boundaries of individual regions. For another, Lewin (1935, Chap. 7) used the model to reconstruct and "explain" differences between "normal" and "feebleminded" individuals, concluding that "feebleminded" individuals have stronger (less permeable) boundaries between the inner-personal regions and fewer regions than "normal" individuals.

Lewin's concept of tension systems differs from Hull's drive theory in two main respects. First, the tension systems are always goal-specific and do not serve a general incentive function for every conceivable response; second, the tension systems do not simply activate previously established response habits (stimulus-response bonds) that have, in the past, led to the accomplishment of the particular goal. They are focused on achieving goal states by means of flexible actions that are adapted to the situational conditions.

The person model, however, does not specify how this objective is accomplished. In fact, it is not clear how particular tension systems gain access to sensorimotor border regions and how, within these regions, executive processes evolve and are carried out.

The model cannot describe transactions with the environment; they must simply be assumed. The person is totally encapsulated. In other words, the person model does not meet Lewin's requirement of an analysis of the total situation. Neither does it allow for motivating expectancies and incentives (demand characteristics, valences) within the particular person-environment relationship. For this, Lewin developed the environment model.

Despite these limitations, the person model has stimulated a series of important experiments. Because they relate to issues in volition rather than motivation, we will examine them below (aftereffects of incomplete tasks).

The Environment Model

From an early stage in his research, Lewin observed the psychological structure of the environment as an action sphere. He found remarkable differences between the psychological and the geographical structure of the environment.

Lewin frequently filmed the behavior of children in free play situations, typically on a playground, and analyzed their locomotion within the playground's structures as a psychological sphere of action. (One example of this is the conflict-dominated locomotion of the child in Fig. 4.10 in Chap. 4, who wants to retrieve a toy swan from the water but, at the same time, is afraid of the waves.)

To account for such phenomena, the environment model must be able to describe the directions of all possible goal behaviors within a psychological, rather than a geographical space.

The psychological space, the psychological field, consists of a variety of regions. The regions are not literally physical spaces but psychological potentialities for actions and events. Individual regions represent potentially positive

or negative events. They are goal regions with positive valences or repelling regions with negative valences. The remaining regions represent potential instrumental responses, leading toward a goal region or away from a repelling region. In other words, they represent means to an end. One of the regions within the environment model represents the person, usually indicated as a dot or an empty circle. To reach a goal region with a positive valence, the person must traverse, i.e., behaviorally attend to, all of the regions between it and the goal region. If, for example, you want to own and drive a car, you must first acquire a driver's license, save money, decide on a make of car, find a dealer, etc.

The environment model represents an attempt to map out the potential actions available in a given life situation that will lead to a desired goal or avert a negative event, rather than an explanation of these actions. It is a cognitive representation of the means-ends relationships that a person perceives with regard to potential behaviors and their outcomes, in other words, the expectations motivating behavior. This is the structural component of the environment model.

The dynamic component is expressed in terms of force fields that have their centers in regions with a positive or negative valence, as shown in Fig. 5.2. Forces with specific intensity act upon the person, and the resultant summation of vectors gives direction and strength to his or her psychological locomotion. Conflict results when opposing forces of approximately equal strength act upon the person. Direction, in this context, means the sequence of individual, purposeful actions. Frequently, different action paths lead to the same goal. In this case, the psychological direction remains unchanged; there is an equifinality of goal-oriented behavior. Thus, the environment model is essentially designed to clarify motivational issues, i.e., the "what" and "how" of approach and avoidance.

Because topological representations consist only of neighboring regions and lack direction, Lewin (1934) sought to expand this approach to a "hodological" conception (from the Greek "hodos" meaning path). Action paths represent connections between the region in which the person is presently located and the goal region. Figure 5.2a shows three different action paths leading to the same goal. Lewin assumes that there is a "superior" path that is preferred because it traverses the smallest number of regions and is therefore "shortest." Shortness or minimal psychological distance, however, is dependent not only on the number of intermediate regions. It can also be a function of the degree of difficulty, the amount of effort required, and the possible dangers inherent in traversing the various regions, quite independent of their number, e.g., on a battlefield. Topology disregards both directions and distances.

- Despite Lewin's efforts (1936, 1938, 1946a), the question of how psychological distance is to be measured and represented remains unanswered to this day. As we will see, however, an answer to this question must be found if we

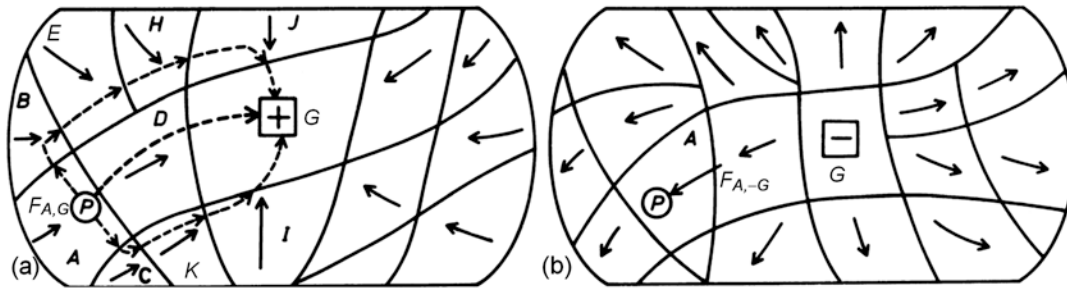

Fig. 5.2 The environment model illustrated by a positive and a negative force field. All forces within the positive field (**a**) are focused on the goal region *G*. $F_{A,G}$ is the force acting upon the person and corresponds with the positive demand characteristics (valences) of an individual located in region *A* and a goal located in region *G*. There are three possible action paths leading to the goal. They require the individual to pass through different numbers of adjacent regions (actions): *A-D-G*; *A-C-K-I-G*; and *A-B-E-H-J-G*. All forces in the negative force field (**b**) gravitate away from region *G*. The force $K_{A,-G}$ represents the negative demand characteristics of *Z*

are to determine the strength of forces arising from positive or negative valences and taking effect in various regions of the field.

The Postdictive Environment Model

The environment model cannot explain behavior but can only reconstruct it. It is postdictive not predictive, assuming the conditions that motivate behavior to be given and known. Specifically, these are:

- Motivating incentives, i.e., regions of the psychological field that are endowed with valences
- The cognitive structuring of expectations, i.e., the means-ends relationships of action sequences along the path to the goal

The latter are depicted as neighboring regions with traversing paths. The heuristic value of this model lies in its analysis of the conditions leading to behavior in a relatively free situation, rather than in an ability to explain it. The model can facilitate the detection and identification of determining factors within the complexity of the psychological total field, e.g., forces, barriers, action paths, and proximity to the goal. Examples of its application are the analysis of reward and punishment (1931a), the typology of conflict (1938; see also Chap. 4), and the simple taxonomy of the direction of behavior presented in Table 5.1. The direction of behavior is determined by whether the valence of the region results in approach or avoidance behavior and whether the person is already in that region or still in another one. The combination of these determinants yields four basic classes of directed behavior, as specified in Table 5.1.

Table 5.1 Taxonomy of the direction of behavior

Position of the person	Direction of behavior	
	Approach	Avoidance
Valence region (A)	(A, A) Consummatory behavior	(A, −A) Escape behavior
Outside the valence region (B) (or C, D, …)	(B, A) Instrumental behavior	(B, −A) Avoidance behavior

Further variations of the environment model can be found in its application to problems such as:

- Decision-promoting processes of motivation (cf. Cartwright & Festinger, 1943; Lewin, 1943, on food purchases)
- The social-psychological situation of adolescents (Lewin, 1939)
- Group formation under different leadership styles (Lippitt, 1940)
- Group dynamics (Lewin, 1946b)
- Group decisions (Lewin, 1947)
- Ecological aspects of large and small school settings and their influence on student activity (Barker & Gump, 1964)

Relative to the person model, however, the environment model generated barely any true experimentation, probably because it assumes relatively free situations rather than the highly controlled ones demanded for experimental design.

Relations Between the Two Models

It is very difficult to reconcile the person model and the environment model, for the simple reason that their dynamic components do not correspond. The person model is based on tension, the environment model on forces. Technically speaking, it is a question of pressure states within vessels as opposed to an all-encompassing force field. This also means that the apparent similarity in the structure of the regions in the two models is only superficial. Furthermore, the adjacency of regions does not have the same meaning in the two models. In the person model, it denotes similarity; in the environment model, means-ends relationships (see also Heider, 1960).

There is, however, one major point of correspondence between the two models – the covarying relationship between the need state of the person (tension system) and the valence of an object or action sphere in the environment. In Lewin's words:

> To a certain extent there is an equivalency between the statements "this or that need exists" and "this or that structural region possesses incentive characteristics for these or those actions". After all, a change in the need produces a corresponding change in the incentive characteristics. (Lewin, 1951, p. 353)

This statement raises the question of whether the need of the person and the valence in the environment are, in fact, two perspectives on the same thing. Does it mean that whenever there is a need, there is also a valence and, conversely, that a corresponding need can be inferred whenever there is a valence? Or would it not be more appropriate to assume a mutual interaction between cause and effect?

The Meaning of Valence

Lewin holds that whenever there is a valence, there must also be a need. What is questionable is whether the reverse is true. A need can emerge in the absence of opportunities within the environment to satisfy it (i.e., in the absence of objects that can take on valence characteristics). In this case, the environment would include wishful thinking at the level of unreality within the life space. One could then say that every need creates a corresponding valence. But Lewin does not accept the reverse, that a valence creates a need. What he does accept is that a portion of the valence is not dependent on the existing need state but inherent in the valence object itself. For example, we find some types of food more attractive than others, independent of our hunger state. Therefore, valence (Va) has two determinants:

- It is a function of the need tensions of the person (t).
- The perceived "nature" of the goal object (G): $\mathrm{Va}(G) = F(t, G)$; (cf. Lewin, 1938, pp. 106–107).
- Lewin's models do not deal with questions of incentive motivation. Rather, his theory of motivation is restricted to the following processes: A tension system (a need or quasi-need) is somehow created within the person. The tension results (under appropriate circumstances) in a corresponding environmental valence. The valence produces a force field in the environment that initiates and gives direction to the organism's behavior. The behavioral sequence is guided by a means-end structuring of the action paths leading to the goal region. Should the goal be attained, the need is satisfied, the tension system dissipates, the valence disappears along with the force field, and the behavior is terminated.

So what, precisely, is valence? According to Lewin, it is the determinant of the psychological force (f, "force") that pushes or pulls the person (P) toward the goal region (G). Lewin further assumes that this psychological force ($f_{P,G}$) is dependent on the relative positions of the person and the goal region, i.e., the psychological distance. For Lewin this dependence is not invariant. In many cases it would appear that the psychological force decreases with increased psychological distance from the goal region (d, distance; $d_{P,G}$). At least that is what Fajans (1933) observed in infants and toddlers. Lewin's (1938) formulation reads as follows:

$$f_{P,G} = \frac{\mathrm{Va}(G)}{d_{P,G}} = \frac{(t,G)}{d_{P,G}}$$

Psychological force according to this definition would today be labeled motivational strength or its resulting motivational tendency. It is essentially a function of Lewin's hypothetical construction of valence. Lewin went one step further, combining valence multiplicatively with an expectancy construct, labeled potency (P_o).

Potency is a conceptually somewhat ambiguous construct that plays a role in choice situations. It reflects the extent to which a positive or negative outcome of a choice is salient, which in turn is a function of the perceived likelihood of a positive or negative outcome. In this case, the "effective force" is defined as:

$$\text{effective force} = \frac{\mathrm{Va}(G) \times \mathrm{Po}(G)}{d_{P,G}}$$

This concept, which was developed in the context of setting levels of aspiration (Hoppe, 1930), was the direct predecessor of the theories of motivation that remain dominant to this day, namely, expectancy-value theories.

Summary

Lewin's major achievement was a penetrating conceptual analysis, leading to the identification of the constituent elements of a theory of motivation. To this day, the main weakness of field theory is that both the person and the environment model can generate only postdictive "explanations." There is little in the theory that would allow specific, cogent conditions to be identified in advance and thus permit reliable predictions of behavior. This weakness arises from the field theorists' neglect to tie their theoretical constructs to observable antecedents and outcomes. How can one specify in each individual case the magnitudes of *t* or *G*, valence, psychological distance, and force? What determines the means-ends structure of the action path leading to the goal region? Although the relationships among the hypothetical constructs have been carefully defined, their relationships to observable phenomena have been neglected. This deficiency is particularly apparent when this model is contrasted with those of learning and drive theories.

Another deficiency arises from the neglect of individual differences in dispositional variables. This particularly applies to the constructs *t* and *G*. The situational factors (*G*) capable of eliciting specific motives (*t*) remain largely unspecified, as does the need to at least delineate the essence of individual motives, if not to classify them. All questions relating to motive dispositions are essentially ignored, not only their classification but also their activation, measurement, and genesis. The main focus is on matters of motivation – goal orientation, choice, and conflict – as well as on their impact on behavior. Matters of volition, such as the aftereffects of interrupted tasks, in the form of resumption and substitute tasks, are also considered. Self-regulatory processes of intention forming or action control are not postulated, however, probably because the environment model simply assumes the existence of a cognitive representation of a particular situation, without explaining how it arises, e.g., in terms of the adjacent segments of the action path.

Despite its shortcomings, field theory has contributed significantly to the clarification of motivational issues. Unlike laboratory research, which necessarily tends to take a rather one-sided approach, it uncovered a variety of psychological phenomena in human motivation. Furthermore, it generated a series of experimental paradigms that continue to stimulate and enrich motivational research beyond field theory to this day.

Aftereffects of Incomplete Tasks

In the *Psychopathology of Everyday Life,* Freud (1901) collected many examples of the aftereffects of unfulfilled desires, i.e., unrealized actions. Even if these are actively suppressed because of their inappropriate or unacceptable nature, they do not just disappear but become manifest in a variety of covert forms, in free associations, in dreams, or in slips of the tongue, all of which result in an inadvertent interference with an action sequence. These phenomena are commonly known as Freudian slips.

Lewin based his model on similar observations, namely, the aftereffects of unfinished tasks. His student Bluma Zeigarnik (1927) provided experimental confirmation of his assumptions (see the following excursus). More recent research on rumination has returned to this topic area (see Martin & Tesser, 1989).

Aside from these two classical procedures, task retention and resumption, four further behavioral indicators have since been linked to the aftereffects of unfinished tasks:

1. Choice of tasks to be resumed, i.e., the choice between two tasks presented for a second time, one of which was solved at first presentation, while the other was not (Rosenzweig, 1933, 1945; Coopersmith, 1960).
2. Changes in autonomic responses resulting from a casual reference to unfinished materials, while the respondent is working on another task (Fuchs, 1954). It has been observed that task interruption is accompanied by increased muscle tonus (Forrest, 1959; Freeman, 1930; Smith, 1953).
3. Differences in the recognition threshold for words referring to completed or to interrupted tasks (Caron & Wallach, 1957; Postman & Solomon, 1949).
4. Increased attractiveness of a task following its interruption (Cartwright, 1942; Gebhard, 1948).

Lewin said that the idea of investigating unfinished tasks came to him when he realized that he needed to define the concept of tension in the person model in terms of concrete, experimental operations (cf. Heider, 1960, p. 154). There are a number of hypotheses that can be derived from the person model, each relating to one of the three defining characteristics of that model, namely:

Excursus

The Zeigarnik Effect

Participants were presented with 16–20 different tasks, half of which were interrupted before completion by the introduction of the next task. After the experiment, participants were casually asked which tasks they could remember. The aftereffects of the incomplete tasks were manifested as a better retention of these tasks. This finding became known as the "Zeigarnik effect."

A variation of this experiment was carried out by another of Lewin's students, Maria Ovsiankina (1928). Instead of testing task retention, Ovsiankina observed the spontaneous resumption of interrupted tasks. To this end, participants were left with the task material, while the experimenter left the room under a pretext and covertly observed whether or not the participant resumed the tasks. This approach has the advantage of showing more direct effects of unfinished quasi-needs. It avoids the confounding of the demand to recall, which applies equally to finished and unfinished tasks, with the effects arising from unfinished quasi-needs.

- The tension state of a region (tension system).
- The regional structuring (e.g., central vs. peripheral; degree of differentiation).
- The nature of the material (i.e., the permeability of the regional boundaries).

An account of the respective hypotheses and results can be found in Heckhausen (1980, p. 189).

Some findings do not relate to the person model but can be interpreted within the environment model. Instead of positing an inner-personal tension state, this model assumes a psychological force to pull the person in the direction of a particular action. As we have seen, this force depends on the valence of the action goal (G) and the psychological distance (d), while the valence depends on the need strength (t) and on characteristics of the goal (G) that are unrelated to the person:

$$F = \frac{\mathrm{Va}(G)}{d_{P,G}} = \frac{t,G}{d_{P,G}}$$

Zeigarnik found that incomplete tasks that have a definite ending are retained better than indefinite serial tasks (like crossing out particular letters in a text) that are highly repetitive. This could be from a factor G, a characteristic of the goal that is independent of the person and that codetermines the strength of the valence. Another finding can only be explained in terms of the other determinant of psychological force, namely, psychological distance, $d_{P,G}$.

- The closer someone is to their goal when the interruption occurs, the greater the Zeigarnik effect (Ovsiankina, 1928).

It was also shown that it is not the interruption of the action per se that is responsible for the Zeigarnik effect. The determining factor is the psychological situation as it is perceived by the individual; i.e., whether the goal (e.g., solving a task correctly) is perceived as having been accomplished or not. Marrow (1938) demonstrated this effect through a reversal of the experimental design. He informed his participants that he would interrupt them each time they were on the right path to a solution but that he would let them continue if they were not. Under these conditions, participants retained the "finished" failed tasks better than the interrupted (successful) ones (cf. also Junker, 1960).

These are the results that support the theory. There are, however, a large number of studies that did replicate Zeigarnik effects where they would have been predicted. These findings did not cast serious doubt on the validity of the postulated after-effects, however, or lead to the Zeigarnik effect being viewed as a "now you see it, now you don't" phenomenon. Rather, critical analyses of the experimental conditions in question generally raised and/or confirmed suspicions that the necessary psychological conditions had not been established or that the experimental design was flawed (cf. the analyses by Junker, 1960, and Butterfield, 1964). If, for example, the interrupted tasks are much more difficult than the completed ones, participants can easily gain the impression that they are too difficult or even impossible to solve. Because they do not expect to reach the goal, they reject the interrupted tasks and do not develop a quasi-need to solve them.

Most experimental flaws in this context relate to memory factors. Some settings permit overlearning; in others, participants approach the experiment with the intention to learn, as was observed for some of Zeigarnik's participants. Finished tasks frequently provide more opportunity for rehearsal, because the experimenter allows more time for these tasks (in Abel, 1938, it was six times as long as for the interrupted tasks). Alternatively, the order of presentation may facilitate the retention of finished tasks, e.g., if they occur at the beginning or end of a sequence (e.g., in Alper, 1946, or Sanford & Risser, 1948). Finally, the tasks may be overly homogeneous, resulting in the formation of a region that inhibits reproduction.

Complications of the Zeigarnik Effect

Zeigarnik's method entails serious complications for a psychology of memory. Any memory task involves, in three sequential processes:

1. Information uptake (learning)
2. Storage
3. Retrieval of stored information (reproduction)

The last two phases of storage and retrieval involve memory. The Zeigarnik effect is assumed to be a phenomenon of memory, rather than of learning. To demonstrate the effect, one would, strictly speaking, first have to show that the finished and unfinished tasks are learned equally well in the acquisition phase, before showing that interruption during the storage process results in differential "fates" for the respective memory traces, which, when recalled, produce the Zeigarnik effect. It is difficult to exclude the possibility that the interrupted tasks are simply learned better in the first place. This would require a test of memory to be implemented before the participant gains the impression of having finished the task (or not). It would, however, be possible to redefine the Zeigarnik effect as a phenomenon of learning, rather than of memory (storage and retrieval). Results indicating that completion of an interrupted task prior to the reproduction phase (retrieval) has no effect on the superior retention of the task but would then represent a serious challenge to the theory of tension systems.

Caron and Wallach (1959) tried to do just that (see the example).

Example

Caron and Wallach (1959) informed a group of study participants that they had been misled and that the unfinished tasks were in fact impossible to solve. According to Lewin's reasoning, these tasks would then be seen as completed, and the experimental group should no longer be able to reproduce them any better than the uninterrupted tasks – in contrast to a control group that was not offered this quasi-therapeutic explanation. However, the data showed that both groups retained approximately the same amount of interrupted material, indicating that there was selective learning during the acquisition phase.

It would appear that the determining factor for the memory trace is not the tension system and its subsequent release but selective learning during the acquisition phase. But can these results really be said to disprove Lewin's theory of the tension system? Were the interrupted tasks and their associated quasi-needs really as "finished" or discharged

as their completed counterparts? Might it not be the case that the explanation given by the experimenter prior to reproduction refreshed the unfinished material or that the effect of the tension release was offset by an additional learning effect? Because Caron and Wallach found no Zeigarnik effect for the control group, it seems likely that the explanation given to the experimental group provided an additional aid to retention.

Findings that appeared to contradict the hypothesis that the Zeigarnik effect increases in strength as a function of stronger quasi-needs soon began to accumulate as well. A number of studies showed that the more the tasks took on the significance of a test, the more likely the effect was to disappear or become reversed (e.g., Alper, 1946, 1957; Green, 1963; Rosenzweig, 1941, 1943; Smock, 1957). From the perspective of psychoanalytic repression theory, Rosenzweig explained this effect as being a self-defense tendency – despite his observation that increased pressure to perform results in an increased retention of finished tasks, rather than in a decreased retention of unfinished ones (cf. Glixman, 1948; Sears, 1950). All in all, findings are inconsistent and remain confusing. There are also a number of studies showing that test conditions increase the Zeigarnik effect (e.g., Junker, 1960; Marrow, 1938; Ro¨sler, 1955; Sanford & Risser, 1948). Within field theory, it would be quite possible to explain self-defense tendencies as being intervening effects of a central need that cause the Zeigarnik effect to disappear.

Study

Zeigarnik Effect or Shielding Self-Esteem? A Decision Experiment

Participants in studies by Beckmann and colleagues (Beckmann, 1996; Beckmann, Bobka, Fehrenbach, Hellebrandt, & Rost, 2004) were administered an ego-involving intelligence test. For one half of the tasks, they received the feedback "completed successfully" after each task; for the other half, the feedback was "not completed successfully." In one condition, the experimenter induced the motivation for positive self-presentation by explaining that participants were being asked to write down the tasks they had worked on as a basis for the subsequent discussion of their intelligence scores. Participants in the second condition were simply asked to recall the tasks they had worked on. The classic Zeigarnik effect was observed in the latter condition, with participants recalling more unsolved than solved tasks. In the self-presentation condition, the effect was reversed. As a second experiment showed, however, this self-presentation effect only seems to be observed when recall is measured in terms of criteria that can be consciously influenced, such as listing tasks in a test of recall. In other experiments, activation of the tasks was measured in terms of responses that were not subject to conscious control. After completing the test, participants in these experiments were shown tasks they had attempted as well as tasks that had not been administered. They were asked to specify which tasks had been featured in the test and which had not. The dependent variable was the time taken to make the correct choice. Participants in the non-self-presentation condition recognized unsolved tasks quicker than the tasks they had solved. The unsolved tasks were evidently still more strongly activated than the unsolved tasks. With decision latency as the dependent variable, however, the effect was not reversed in the self-presentation condition. Here, too, participants recognized unsolved tasks more quickly than solved tasks. These findings indicate, in fact, that the self-presentation effect is derived from conscious processes of evaluation and that – independent of this effect – incomplete tasks always remain more strongly activated than completed tasks, as indeed predicted by Lewin's assumption of tension systems.

Greenwald's (1982) work on the Zeigarnik effect is based on the same logic. He assumes, under ego-involving conditions, that a noncompletion of tasks is seen as failure, meaning that the memory of unfinished tasks threatens the maintenance of a positive self-concept. Accordingly, people are more likely to remember completed tasks (successes) than incomplete ones (failures). Beckmann et al. (2004; Beckmann, 1996) tested these assumptions experimentally (see the decision experiment in the study box on previous page).

Individual differences also have a role to play in the Zeigarnik effect. Zeigarnik had already observed stronger effects for "ambitious" than for "nonambitious" participants.

At first, individual differences were used merely as post hoc explanations based on behavioral differences observed during the experiments. Soon, however, researchers began to select groups of participants on the basis of characteristics such as "ego strength" (Alper, 1946, 1957), "need for recognition" (Mittag, 1955), "self-esteem" (Coopersmith, 1960; Freud; Worchel, 1957), and, above all, "achievement motive" (Atkinson, 1953; Heckhausen, 1963b; Moulton, 1958; Weiner, 1965).

- Individuals with a strong, success-oriented achievement motive generally show a stronger Zeigarnik effect than those with a weak, failure-oriented motive.

Substitute Actions

The aftereffects of unfinished tasks also include the possibility of satisfying unsatisfied needs through substitute actions that are similar to, or derived from, the unfinished task. Here again, Freud was the first who called attention to this form of aftereffect in 1915 (see Freud, 1952). And again it was Lewin (1932) who initiated its experimental analysis. Although inspired by Freud, he was dissatisfied with Freud's speculative inferences based on individual clinical observations.

Lewin analyzed the conditions under which unfinished tasks lose their aftereffects through completion of another task. The intervening activity can be said to have "substitute value" for the original task. Ovsiankina's experimental paradigm of spontaneous resumption was ideal for this investigation. The experimenter simply inserts a task that can be completed between the interruption and the resumption of the original task. If the original, interrupted task was resumed, the intervening activity did not have substitute value; if it was not resumed, substitute value can then be inferred.

Again, it was the person model from which the hypotheses were derived, specifically, from its two postulates. First, the relative permeability of the regional boundaries permits an equalization of tension between neighboring regions. Second, the adjacency of regions defines the level of similarity of the respective goals and activities. This would suggest that a release of a tension system is most likely to occur through completion of a similar activity. If region A is a tension system, some of the tension will then flow into neighboring region B. The differential tension is thus equalized.

Excursus

Substitute Actions: Substitute Value of Actions

Lissner interrupted children who were kneading clay figures and asked them to make another figure. The substitute value of the intervening task generally increased as a function of the similarity of the two tasks. One important dimension of similarity proved to be task difficulty level. If the substitute activity was easier than the interrupted task, it had little substitute value, but if it was more difficult, its substitute value was very high, i.e., there was little interest in resuming the original task. Situational factors relating to the individual's action goals also proved to have a strong influence on the substitute value of a task. If, for example, someone wants to construct something for a particular person but, before its completion, is told to construct

the same thing for another person, the second task has little substitute value (Adler & Kounin, 1939). The same applies when the experimenter introduces a similar activity but gives it a completely different label (Lissner, 1933).

Mahler varied substitute activities in terms of their level of reality, i.e., thinking about finishing the task, talking about how to finish it, and actually finishing it. She found that substitute value increased with the degree of reality of the intervening activity or, more specifically, with its level of appropriateness to the interrupted task. (For example, thinking has a higher reality level for problem solving than for motor action.)

Mahler's studies inspired a strand of research focused on the concept of symbolic self-completion (Wicklund & Gollwitzer, 1982). Instead of interrupting tasks and leaving them incomplete, the goals, attributes, and competencies inherent in the participant's self-definition were challenged. Individuals who had thus been "made incomplete" now grasped at every opportunity, even if it were only symbolic, to present themselves as "self-completed."

Henle carried out extensive studies attempting to explain substitute value in terms of the environment model rather than the person model, particularly in regard to the relative valences of the interrupted and the substitute activities. In her studies, participants first rated the attractiveness of various activities. Based on these data, Henle generated various combinations of attractive and nonattractive, interrupted, and substitute tasks. She found that if the valence of the substitute activity is lower than that of the interrupted activity, the substitute value is low, approaching zero. Conversely, the greater the valence of the intervening activity, the greater its substitute value.

The conditions under which another activity takes on substitute value were investigated primarily by three of Lewin's students (see the excursus below): Lissner (1933), Mahler (1933), and Henle (1944).

5.4.1 Tolman's Analysis of Goal-Directed Behavior

Lewin's explanatory model proceeds from the present conditions in the total situation: the valences within the environment and the structuring of the life space in terms of potential actions leading to the goal. He supposes the prior existence of valences and expectations (response-consequence contingencies) but pays little attention to the questions of how these might be objectified or how they are generated. The restructuring of an individual's life space at any moment in time may have some validity in the case of an empathic relationship between the experimenter and that individual, although even this would not be acceptable to the behaviorists because of its mentalistic nature. When dealing with children or animals, however, the lack of a firm foundation for explanatory concepts, such as valences, incentives, and expectations, is immediately apparent. Doubts may arise about the presence of a particular explanatory factor and its actual effect.

Expectancy and Goal Orientation

Tolman (1932), independent of Lewin, arrived at a rather similar explanatory model in the late 1920s, based on behavior observed in rats. Although Tolman was committed to behaviorism, he believed that nonobservable cognitive processes played an important role in directing an organism's behavior. Instead of simply presupposing such cognitive processes mentalistically, however, he attempted to translate them into observable events, i.e., to expose these internal, nonobservable events by tying them to the antecedent conditions and subsequent outcomes, both of which are observable. Thus, Tolman became the first theorist to define intervening variables in

terms of hypothetical constructs and to recognize the need to anchor them to operations and observations (Chap. 2). Does a rat in a maze know the shortest route to the food box, i.e., have expectations about response-consequence contingencies (*R*–*S**)? If one follows Tolman in drawing connections between the following observations and operations, the answer is yes:

> Consider a rat, which has completely learned a maze, so that when put in at the entrance, he dashes through like a shot, turning here, there, and yonder, entering no blind alleys and arriving at the food box in only some 4 or 5 seconds from the start. Suppose, now, one of the alleys be considerably shortened between trials. What happens? On the trial after, the animal runs kerplunk into the new end of the alley. In short, he acts as if the old length of the alley were still going to be present. His behavior postulates, expects, makes a claim for that old length. (Tolman, 1926, p. 356)

Tolman pursued a "psychological behaviorism." What distinguished him from other contemporary learning theorists, and brought him closer to Lewin's formulations, were three related approaches to the explanation of behavior.

Tolman's Psychological Behaviorist Perspective on Behavior

1. Molar behavioral units should be observed in preference to molecular ones. It is not single muscle twitches or glandular secretions that signal goal orientation and purpose but global sequences of behavior.
2. The premature reduction of behavior to physiological and neurological bases contributes little to behavioral explanations if psychological aspects remain unexamined and unspecified.
3. Because behavior is always oriented toward a goal object or goal state, it must be viewed and analyzed in terms of goal orientation.

Tolman insisted that the postulate of goal orientation does not have to remain a mentalistic and highly abstract concept but that it can be objectified in terms of various aspects of behavior. Indeed, he studied three aspects of goal orientation extensively: persistence, docility, and selectivity. Persistence implies "persistence until," i.e., perseverating until a particular object or state has been reached. Docility means increased learning over time in identical or similar situations. Selectivity implies spontaneous behavior that is not influenced by external pressures, the preference for a particular behavioral option in the face of several choices.

Tolman's approach provided new insights on Thorndike's "law of effect" (Chap. 2), which had, until then, been seen purely as a learning principle.

Because operant learning was viewed as dependent on the outcome, the success, and the satisfaction of a need, and because the learning process itself was seen as nothing more than an association between stimuli and responses (although this represents a purely hypothetical conceptualization or a quasi-neurological speculation), the motivational conditions of the observed changes in behavior (learning) continued to be ignored. Classical learning experiments were designed to demonstrate the learning process in terms of objectively observable behavior, as measurable performance. There seemed to be no need to distinguish between learning and behavior. Indeed, no clear distinction was made between motivation and learning until Tolman presented the findings of his research.

Incentive Effects

The narrowly conceived stimulus-response approach was incompatible with Tolman's program of behaviorism, which emphasized the molar and goal-oriented aspects of behavior. Is learning really nothing more than the "stamping in" of static stimulus-response bonds? Could it not also involve the formation of internally represented cognitive maps that mediate expectations about what leads to what? Must behavior necessarily be viewed as the final step in a learning program in which the organism is, so to speak, pushed from behind? Could it not be that the organism is more freely pulled toward the goal, guided more flexibly along the way by means-ends expectations, without diversions (i.e., trial and error)?

In the 1920s, some researchers – primarily from Tolman's group – began to vary the incentive characteristics of a goal. These variations

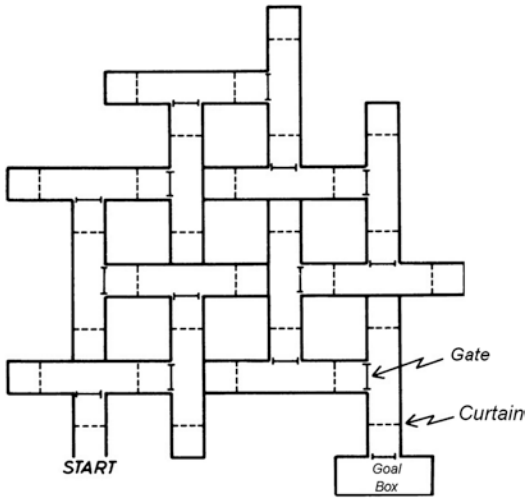

Fig. 5.3 Layout of a 14-part T-maze

resulted in abrupt changes in behavior, totally inconsistent with the notion of a gradual learning process. Behavior and learning now became separate entities, and it was possible to separate the experimental analysis of behavior from learning. In his book *Purposive Behavior in Animals and Men* (1932), Tolman integrated these results into a theory of incentives and expectations. Before considering the individual studies, let us look at the experimental apparatus used in these learning experiments, namely, the T-maze. As shown in Fig. 5.3, this maze consists of a number of interconnected T-shaped pathways, one branch leading to a new T-shaped section, the other forming a blind alley.

Experimental Evidence for Incentive Effects

An early series of investigations looked at the behavioral effects of different incentive strengths. The first of these investigations dates back to 1924. At that time there was great interest in determining the effect of need strength on activity using the Columbia Obstruction Box (Chap. 4, Fig. 4.2). One shortcoming of these studies was that the incentive value of the goal object was inadequately controlled. Simmons (1924) was the first to focus on incentive factors. She found that the speed of maze learning varies with the incentive value of the food in the goal box. The animals were all equally hungry at the time of the experiment, and did not receive their daily food ration until a few hours after the experiment, when returned to their cages. Before each trial, the rats were permitted a quick nibble on the food in the goal box. They were then placed in the start box. It emerged that the rats' running speed increased and error rate decreased more rapidly in trials with bread soaked in milk than in trials with sunflower seeds. This difference in incentive effect permits two interpretations: either stronger incentives facilitate more rapid learning or learning is identical under both incentive conditions, but a lower incentive value of the goal results in a reduced motivation to reach it. The first explanation would be consistent with Hull's (later) reinforcement theory; the second, with Tolman's postulate that – along with the present level of learning – the strength of the demand for the goal object, which derives from incentive strength, directly determines behavior.

The experimental findings of Elliott (1928) provided support for the latter interpretation. Elliot varied the incentive value in learning experiments with rats and found an increase in the error rate following the switchover to a lesser food incentive. This effect was not attributable to unlearning but could only be the result of a motivational effect that was unrelated to learning. This implies that learning is not synonymous with behavior and that a distinction must be made between learning and performance. It is clear that the incentive value of the goal object can have an independent effect on behavior.

Latent Learning: The Distinction Between Learning and Motivation

The extreme case of incentive variation is its total absence. In this case, there is no reinforcement, and goal-oriented behavior cannot be expected. Can learning still take place under these conditions? Blodgett (1929) was the first to show that it can. In his so-called latent learning experiment, three groups of hungry rats were placed in a maze once a day for nine consecutive days. The first group found food in the goal box from the first day on, the second from the third day on, and the third from the seventh day on. As soon as the animal had reached the goal box, it was allowed to

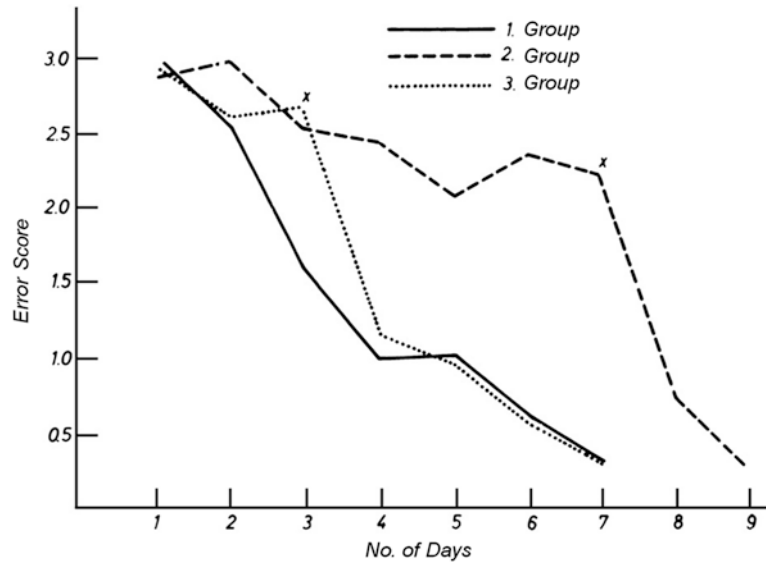

Fig. 5.4 The effects of latent learning and of delayed introduction of reinforcement on performance level. Group 1 was given a food reward on every trial; in Group 2, on day 3 (at the points marked *x*); and in Group 3, the food reward was not introduced until day 7 (After Blodgett, 1929, p. 120)

eat for 3 min (under "food" conditions) or left in the goal box for 2 min before being removed (under "no-food" conditions). Figure 5.4 shows the rapid decrease in the error rate following the introduction of food in the second and third groups. Both groups immediately reached the performance level obtained by the first group, which had been reinforced from the outset. Tolman and Honzik (1930) later confirmed these findings.

These findings represent a case of learning without reinforcement. Hence, reinforcement cannot be a necessary condition of learning. Learning can remain latent, i.e., not necessarily immediately manifested in behavior. In this particular case, learning must have involved the acquisition of knowledge about the pathways in the maze rather than the establishment of fixed stimulus-response bonds, because the goal-oriented behavior, an efficient approach to the goal, did not occur prior to the introduction of food.

Performance of a learned response becomes observable only if it serves to achieve a goal, i.e., in the presence of motivation. Thus, Thorndike's law of effect is not a principle of learning but of performance. Learning outcomes only manifest themselves in behavior in the presence of motivation and learning, both of which are separate conditional factors.

The goal-oriented motivational state can be enacted only through previously learned responses. That is shown by the difference in the performance of the second and third groups. Seven opportunities to explore the maze led to more efficient goal attainment than three such opportunities.

- Thus, behavior is explained by the interaction of two intervening variables, a learning factor and a motivation factor.

The learning factor, according to Tolman, involves knowledge about which path leads to the next maze segment. Under appropriate conditions, this knowledge leads to a goal expectation in the form of response-consequence contingencies. The motivation factor is the demand for the goal, which is dependent on the physiological need state or drive, and on the incentive value of the goal object (i.e., Tolman treated drive and incentive as more or less equal and did not consider their differential effects or interrelationships). Tolman's two intervening variables, goal expectation and demand for the goal, are not only cognitive in nature but can also mediate between observable, antecedent conditions and subsequent behavior in a way that permits an explanation of goal-oriented behavior. Figure 5.5 illustrates the logic of this theoretical formulation.

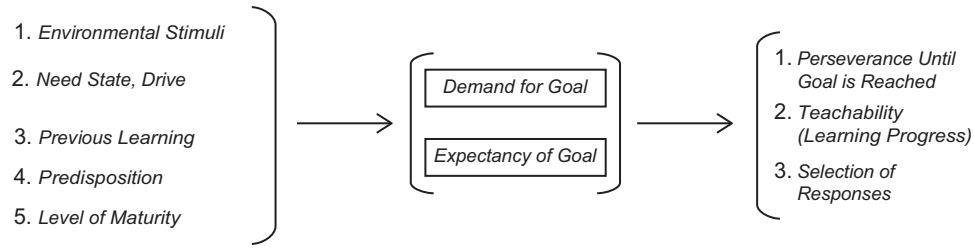

Fig. 5.5 Tolman's theoretical construction of two motivational intervening variables: demand for the goal and goal expectation. The variables are conceived to mediate between antecedent, observable conditions, and subsequently observable aspects of the goal directedness of molar behavior

Belief-Value Matrix

Tolman (1951, 1959) later expanded his theory of motivation to postulate that, apart from need states, there are two intervening cognitive variables that motivate a particular behavior, namely, belief and value. Value equals the incentive of the goal object, the other component of the demand for the goal alongside need (or drive). The two variables, belief and value, are usually not independent but are linked within a "belief-value matrix" in established systems of beliefs. As a rule, there are a number of possible response-consequence contingencies (*R*–*S**) leading to the satisfaction of a particular need state, i.e., expectations about choices of action, on the one hand, and accompanying goal states (*S**) of varying value, on the other.

Example

This applies particularly in situations involving choices, e.g., a hungry person choosing between two restaurants serving food of differing quality and price on the basis of preferences and pocketbook. The choice between the restaurants and their respective menus involves not only anticipatory choices of action but also decisions about value. Figure 5.6 shows the belief-value matrix for a person in such a situation. Tolman's matrix implies an action sequence between the present hunger state (left) and need satisfaction (right). The circuitous lines with arrows indicate the action sequences contemplated; the size of the plus sign denotes the value of each restaurant (means) and the food served there (goal object). All four restaurants offer the most preferred dishes *a* and *b*, but items *c*, *d*, and *e* (although not *f*) would also gratify the person's hunger.

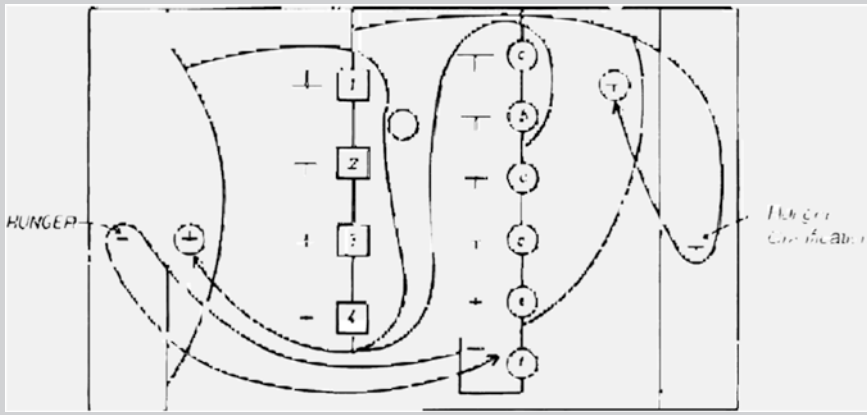

Fig. 5.6 Example of a belief-value matrix: cognitive anticipations in the choice between restaurants of different quality (and price) and different dishes in the presence of hunger (After Tolman, 1952, p. 392)

5.4.2 Hull's Learning Theory Conception of Motivation

Hull examined whether it was possible to explain motivation in terms of learned stimulus-response bonds, without reference to cognitive variables.

He was particularly interested in whether expectations can be conceptualized within *S–R* theory. Pavolv's data on classical conditioning, which had been translated into English at the end of the 1920s, offered some clues. Pavlov had shown that previously neutral stimuli could take on a signaling function for impending events. As can be seen in behaviors like salivation, these stimuli seem to create something that is analogous to "knowledge" about the future. There is anticipatory preparation for the actual goal response (eating), although the actual goal object (food) is not yet present. Therefore, there can be no goal response and certainly no goal state (satiation). If one now assumes that the response (R_1) that follows an external stimulus (S_1) brings about a proprioceptive feedback, i.e., results in an internal stimulus (s_1), then this inner stimulus can occur in temporal contiguity with the next external stimulus (S_2), which in turn elicits R_2. Thus, s_1 immediately precedes R_2 and may be associated with it. In the long run, S_1 might suffice to elicit the entire chain of responses, mediated via the internal stimuli produced by these responses. Note that the strengths of the S_n –R_n bonds increase with greater proximity to the goal; the chain is assembled from the end. Figure 5.7a–d shows the stages of these associations via internal stimuli.

Thus, a response sequence can literally short-circuit itself via these self-generated, response-dependent, internal stimuli, which can maintain behavior independent of further external stimulation. A conditioned chain of responses of this kind can run its course very quickly, usually faster than the chain of stimuli that represent the changes in the environment in the run-up to the goal. The response sequence is faster than the stimulus sequence; R_3 occurs prior to S_3. In other words:

- Events within the organism precede environmental events. This is how the organism can respond to something that has not yet occurred in reality. This is the theoretical basis for anticipation (cf. Hoffmann's concept of anticipatory behavioral control: Butz & Hoffmann, 2002; Hoffmann, 1993; Kunde, Koch, & Hoffmann, 2004).

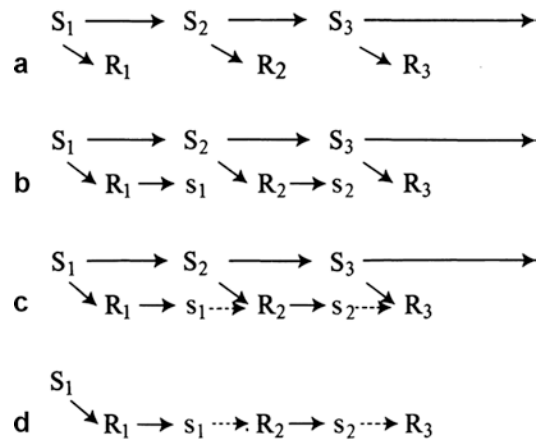

Fig. 5.7 (**a–d**) Basic pattern of how a response sequence (R_1 to R_3) can short-circuit itself via intervening, internal, i.e., response-dependent stimuli (s_1, s_2), thus no longer requiring the external triggering stimulus

Fractional Anticipatory Goal Responses

Along with internal stimuli (as proprioceptive feedback), Hull developed a further concept in his search for an *S–R* formulation of goal expectations that guide behavior. It was to become even more important to the development of his theory, particularly the part dealing with incentive effects. It concerns a salient group of pure stimulus acts: fractional anticipatory goal responses or r_G –s_G mechanisms. Like Freud before him, Hull assumed that a need state is accompanied by a drive stimulus (S_D) until it becomes satiated. Because the drive stimulus endures, it becomes associated with the whole sequence of responses leading to the goal response. Eventually, the drive stimulus is able to elicit the goal response immediately. It would be premature to trigger the full goal response at this point, however, because it would interfere with the necessary instrumental responses that lead to the goal and provide the basis for a successful goal response. According to the law of effect, such anticipatory goal responses would rapidly be extinguished. What remains is a fragment of the actual goal response, which does

not interfere with instrumental responses like biting, chewing, and swallowing (goal response), salivation, licking, and similar components of the eating process.

It is crucial that this fragmentary goal response (r_G) is elicited by the drive stimulus very early on and that it can, in one leap, bypass the entire chain of responses that has yet to lead to the goal response (R_G). Like all responses, it also results in proprioceptive feedback, S_G, an internal stimulus that Hull calls the goal stimulus. This internal goal stimulus represents the goal event, the satisfaction of the need. Like the drive stimulus, it is present during the entire behavior sequence, accompanying each intervening response. It can therefore serve as the basis for what Tolman called the goal expectation that anticipates behavioral outcomes and guides behavior toward its goal.

It was Crespi (1942, 1944) who provided experimental data showing that Hull's new *S–R* theoretical formulations could not solve the incentive problem. Rather, he saw incentive as an independent motivational phenomenon. Crespi varied the amount of food given to a hungry rat at the end of a straight runway. Rats provided with more food ran faster in the first 19 trials than those given less food. Figure 5.8 shows how the plateau of running performance differs in the two incentive conditions. Under both conditions, maximum speed is reached after an equal number of trials, meaning that both groups must have acquired the same habit strength.

Thus far, the findings are congruent with Hull's reinforcement theory. Now, however, Crespi changed the amount of food dispensed to some of the rats. Figure 5.8 shows the effect of the change from too much to too little food. The high-reward group shows an abrupt decrease in running speed to the level of the low-reward group and even lower. This sudden change in behavior cannot be explained in terms of association theory. Crespi's findings were confirmed by Zeaman (1949), who found that reversing the amount of food reward from 0.05 to 2.4 g resulted in a complete reversal of latencies to the level of the high-reward group.

Spence's Extension of Hull's Model

Spence returned to Hull's original concept of the r_G –s_G mechanism. According to Hull's conception, the fractional anticipatory goal response only becomes associated with the drive stimulus (S_D). Spence postulated that it also forms an association with external stimuli (*S*) and internal, proprioceptive stimuli (*s*). The anticipatory goal response can now be elicited by the corresponding stimuli and, in turn, serve as a motivator, i.e., increase the strength of the instrumental responses elicited by a particular situation. The anticipatory goal response has thus become an energizing incentive motivation.

Spence postulated that anticipatory goal responses could elicit tension states and conflicts that would have a general, nonspecific motivational effect. The true nature of the anticipatory

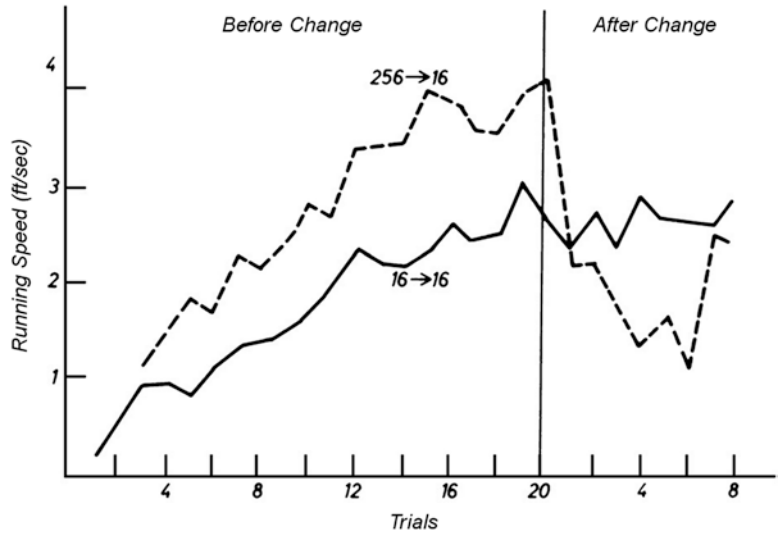

Fig. 5.8 Running speed as a function of the amount of food reward. For the first 19 trials, one group of rats was given 16 pellets, the other 256 pellets. From trial 20 on, all were given 16 pellets (After Crespi, 1942, Fig. 2, p. 488, Fig. 8, p. 508)

goal response remains clouded to this day. Attempts to observe and record it have been unsuccessful (cf. Bolles, 1967, p. 352ff.). Because Spence assigned to anticipatory goal responses the status of intervening variables, however, whether or not they are accessible to direct observation is arguably immaterial.

In contrast to Hull, Spence combined the two motivational factors D and K in an additive, not multiplicative manner, resulting in the excitatory potential (E; which is equivalent to Hull's response potential, ${}_S E_R$; see also Chap. 2):

$$E = (D + K) \times H$$

A number of findings confirm the validity of this modification to the theory (e.g., Reynolds & Anderson, 1961). Another of Spence's modifications to Hull's model, however, was more decisive. Spence (1956) totally abandoned the reinforcement theory of habit formation. For him, the strength of an *S–R* bond was simply a function of the frequency of association, i.e., contiguity. Reinforcing events – their frequency, strength, nature, and their immediacy or delay – now contribute directly to the level of incentive motivation, K, which is manifested in the fractional anticipatory goal response ($r_G - s_G$).

This formulation provides a better basis for explaining incentive effects and latent learning than does Hull's earlier revision. The effectiveness of reinforcing events is no longer related to the gradual build up or decrement of habits. After all, it was precisely this sluggishness of the learning process that could not be reconciled with the abruptness of incentive effects. Now the change in incentive value, as manifested by the reinforcing events, is immediately imparted to all responses elicited by the situation via the motivating function of the $r_G - s_G$ mechanism. The $r_G - s_G$ mechanism itself is elicited by the relevant stimuli (external, proprioceptive, and drive stimuli), as in classical conditioning, as a function of their similarity with the actual goal stimulus (S_G). An increase in the temporal or spatial distance from the goal results in a stimulus generalization gradient, i.e., the relevant stimuli lose their similarity to the goal stimulus as distance increases, thereby resulting in a corresponding decrease in the motivational effects of the anticipatory goal responses. Spence's extension of *S–R* theory into a theory of incentive motivation brings it very close to the conceptualizations of Lewin and Tolman. Viewed in terms of an *S–R* model, Spence's $r_G - s_G$ mechanism and Tolman's *SR–S* or *R–S** concepts are closely related.

5.4.3 More Recent Developments

There are many findings and other phenomena that have prompted researchers in motivation to give preference to incentive theories of one kind or another over drive and reinforcement theories (see the following excursus). An examination of the postulates of drive theory presented in Chap. 4 shows that several findings are equally or better explained by incentive theories. The findings of experiments attempting to differentiate among drives, where an animal is given choices corresponding to its relevant drive states, are one example. This choice behavior might be attributable to incentive effects, i.e., anticipatory goal responses, rather than to specific drive stimuli. The revisions of *S–R* theory by Hull and Spence raise the question of the extent to which energizing effects can be attributed to K.

Various sets of findings reported in Chap. 4 are consistent with Spence's idea that incentive effects result in increased activation. There must be a relationship between the strength of the consummatory response (R_G) and the strength of the instrumental response leading to it, because the latter is activated by the r_G, which anticipates the R_G. Sheffield, Roby, and Campbell (1954) confirmed this assumption. Their rats were rewarded with solutions of different sweetness and nutritional value (saccharin or dextrose). The results show an amazingly robust correlation between the amount of liquid consumed and running speed.

Walker's Analysis of the Explanatory Concepts of Learning Theory

Walker (1969) assigned the concepts of learning theory to four categories of hypothetical constructs:

1. Push: including explanatory concepts such as drive, motive, activation, tension, etc.
2. Pull: including valence, incentive, etc.

3. Structure: including cognitive organization, knowledge, habit, strength, etc.
4. Glue: including reinforcement in the sense of a hypothetical process that elicits and reinforces *S–R* bonds. Where reinforcement implies a goal state representing the satisfaction of a need, it belongs to the "pull" category, along with the concepts of incentive and valence.

Only three of the four categories of concepts are (or can be) manipulated by controlling the antecedent conditions: push through deprivation of need satisfaction, pull through the established incentive value (attractiveness) of a goal object, and structure through previous experience, i.e., the number of learning trials. By contrast, response reinforcement represents a hypothetical process, taking place between two hypothetical constructs. In a manner of speaking, the pull concept exudes a kind of glue within the structure that bonds a response increasingly strongly to a stimulus. Figure 5.9 illustrates these relationships.

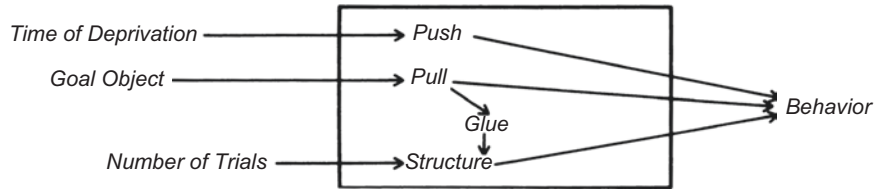

Fig. 5.9 Walker's four categories of explanatory concepts of learning theory, one of which ("glue," reinforcement) is superfluous (After Walker, 1969, p. 51)

Excursus

Sheffield's Theory of Incentive Motivation

In his theory of incentive motivation, Sheffield goes one step beyond Spence and toward Lewin and Tolman. For him, incentive motivation has a specific, albeit somewhat indirect orienting function. Sheffield assumes that a need state in a situation that is not yet a goal situation can elicit a number of response tendencies. Via proprioceptive stimuli, these arouse fractional goal responses (r_G) of differing strength. The more this occurs in connection with one of the response tendencies, the higher the associated arousal level of that response tendency will become, until it finally brings about a situation in which the goal response (R_G) can occur.

This and similar arguments all lead to the two fundamental questions about the postulates of *S–R* theory that are raised by every theory of incentive motivation:

1. Is it really necessary to assume two motivational factors, drive and incentive, or can incentive encompass drive?
2. Is the postulate about the habit-forming effects of reinforcement not, in fact, superfluous?

With respect to the first question, drive remains as a variable of need state, but it becomes a determining condition for the strength of the incentive motivation itself.

Seward (1942, 1951) was the first *S–R* theorist to move in this direction. He spoke of the "externalization of drive" via r_G mechanisms of incentive motivation. Incentive motivation suffices to select and activate appropriate responses, which are elicited by stimuli that have formed an associative bond with the reinforcing goal response.

Two former students of Hull, McClelland and Mowrer, based their theoretical models on the motivating properties of "excitement," which had previously been emphasized by Sheffield and Young. They endowed it with an emotional component, turning it into an emotion of expectancy. The positions of these authors are outlined in Chap. 2. In an abridged version of McClelland's definition, motivation

is defined as an expectation of a previously experienced change in an affectively meaningful situation. This motivating expectancy is elicited by a stimulus cue that partially reactivates the earlier meaningful situation (cf. McClelland, Atkinson, Clark & Lowell, 1953).

Mowrer (1960) lists four types of emotions of expectancy (hope, fear, disappointment, and relief) that guide as well as activate behavior. Drive is no longer required, either for the reinforcement of instrumental responses, or for their activation, but it still retains one important function. Its reduction and its induction serve to condition the emotions of expectancy. External as well as internal stimulus cues can elicit these emotions. They intensify the sequence of instrumental responses occurring in the run-up to the goal, increasing hope and decreasing fear. Thus, from the inception of a response, there are positive or negative expectancies, mediated by proprioceptive feedback and resulting in reinforcement or inhibition. However, in all this, Mowrer did not answer the question of how an instrumental response is activated before it is intensified or muted by an expectancy.

These and other concepts of incentive and expectancy, as well as their regulatory mechanisms, were incorporated in Heckhausen's (1963a) "systematic theory of motivation." This theory does not use the language of *S–R* theory; its central concept is the affectively charged "gradient of expectation," which is assumed to motivate approach or avoidance.

The question is now whether reinforcement as a "glue" concept is necessary for explaining changes in behavior. Does a behavior that is followed by reinforcement (in the sense of a need satisfaction) change more than a behavior that is not followed by such reinforcement? If so, can such change not be explained by the constructs of the other three categories of push, pull, and structure? Walker asserts that changes in structure (learning) can always be adequately explained by these three categories, making reinforcement as a glue a superfluous concept. For example, the disappearance of a learned response under conditions of extinction is most parsimoniously explained in terms of the absence of a previous incentive object. There is no longer any pull. Extinction is gradual because the incentive value of situational factors previously associated with the goal object has to be unlearned.

Walker cites a number of findings in support of the assertion that the glue construct is superfluous. Aside from the findings on latent learning and incentive change, he also points to findings showing that habit strength – contrary to the main postulate of reinforcement theory – does not remain at the same level under conditions of continuous reinforcement but decreases and eventually disappears. The response frequency approaches zero, despite the fact that each occurrence of the particular response has been reinforced.

- Walker not only sought to demonstrate that the glue effect of reinforcement remains unvalidated, he also pointed to the need to develop far more complex dependent variables to account for any glue effect between pull and structure.

Bolles' Cognitive Model of Incentive Motivation

Bolles, who was initially (1967) an adherent of the reinforcement view of motivation, later came to prefer a cognitive model based on incentive theory (1972). For him, reinforcement was neither a necessary nor a sufficient condition for instrumental learning. What is learned are not *S–R* bonds but two types of expectations:

- The first type of expectation relates to contingencies of external events and their consequences (*S–S**; i.e., stimulus-consequence contingencies).
- The second type relates to contingencies of one's own actions and their consequences (*R–S**; i.e., action-consequence contingencies).

The introduction of reinforcement simply provides an opportunity for the learning of both types of expectations. Bolles' model, which was derived

from *S*–*R*-oriented learning research, is more advanced than the other models and is largely congruent with cognitive approach theories of motivation. It is therefore worth examining this approach to the explanation of behavior, which Bouton and Fanselow (1997) label functional behaviorism, in more detail. In examining the reinforcement concept, we must first distinguish (as in Walker's critical analysis) between its two different meanings: reinforcement as an event (manipulated by the experimenter) and reinforcement as a process (habit formation), designated here as the "reinforcement mechanism."

Reinforcing events are often followed by behavior that looks like the kind of learning attributed to the reinforcement mechanism. There are numerous reports of observations, however, where this is not the case: either there is no learning following reinforcement or, conversely, learning occurs more rapidly or suddenly than can be accounted for by the reinforcement mechanism. Let us look at some of the evidence cited by Bolles. Breland and Breland (1961) reported reinforcement without learning effects in cases of what they called "misbehavior" in animals. Both Brelands were students of Skinner. They sought to apply the principles of operant conditioning to the training of circus animals (see example). These attempts met with remarkable difficulties and failures in various species.

Example

For example, a raccoon had learned to take a wooden coin to a piggy bank and deposit it there. This learned behavior broke down completely, however, when it was supposed to be carried out with two coins. Instead, a species-specific food-seeking behavior was initiated. The raccoon rubbed the two coins together, half inserted them into the piggy bank, and then pulled them out again. This behavior became so dominant that further training had to be abandoned.

One example of learning that occurs too rapidly to be attributed to the reinforcement mechanism is known as "autoshaping." As part of their training, many psychology students used to have to train a pigeon to peck a disc for a food reward. This can usually be accomplished within an hour by rewarding closer and closer approximations to the desired response. But more recent studies show that these students could have saved themselves a lot of effort. All one needs to do is to make the operation of the feeder contingent on the desired pecking response and to present the pigeon with food every now and then, regardless of what it is doing at that moment (Brown & Jenkins, 1968). Pecking, particularly pecking an optically distinct object, is a species-specific pattern of behavior and therefore has a high probability of occurrence. An explanation based on reinforcement theory could account for the gradually increasing frequency of the rewarded pecking response. But this explanatory model fails when the reinforcement conditions are reversed, as in the experiments by Williams and Williams (1969). Food rewards were given from time to time on a noncontingent schedule but never after the desired pecking response. Despite this, the frequency of unrewarded pecking responses increased and could not (or only to a limited extent) be brought under the control of reinforcement. The experimental animal responds in the same way as any other member of its species when it expects food, emitting need-specific responses that are part of its behavioral repertoire.

Bolles expanded these *S*–*R* conceptions into a different type of model, namely, a cognitive one. For him, the answer to the question of what is learned is not the pairing of *S* and *K* but of *S*–*S** and *R*–*S** in the form of expectancies. He formulated five corresponding laws of learning (see the following excursus).

All three determinants described in the "law of motivation" are multiplicatively combined in Bolles' model to predict the likelihood of a behavior occurring or its strength. This conception converges with the expectancy-value theories that emerged from other research orientations

(see below). What is new in Bolles' model is that it specifies two determinants of expectation: *S*–*S** and *R*–*S**. These are distinguished on the basis of whether the goal event, represented by the value (*S**), occurs spontaneously (*S*–*S**) or requires an action (*R*–*S**) and in terms of their respective probabilities. This differentiation also provides the basis for causal attribution of action outcomes, which has a determining effect on motivational processes.

Does this imply that *S*–*R* bonds play no role at all? Bolles sees these bonds as relevant in two contexts: first, in the innate response patterns of insects in the ethological sense and, second, in acquired behavior and skills that have become highly automated.

Bolles' model still needs to be refined in many respects. For example, Dickinson (1997) criticizes the theory's internal consistency. The interrelationship of the theoretical constructs requires further clarification, particularly the conditions under which *S*–*S** and *R*–*S** correspond. Moreover, the theoretical constructs have yet to be empirically anchored. Any experimental testing of their predictive value will first require their quantification.

Bindra's Quasi-physiological Model of Incentive Motivation

Bindra (1969, 1974) proposed a model that is quite similar to Bolles' approach. He also rejected the *S*–*R* postulate of response reinforcement, pointing out that learning can occur without opportunities for responding. When animals that have been administered curare, a poison that temporarily paralyzes the effector organs, are presented with an incentive object, they are unable to respond because of their paralysis. Once the paralysis has worn off, however, considerable learning gains become apparent (cf. Taub & Bergman, 1968). Imitation learning or modeling (Bandura, 1971) also seriously challenges the postulate of response reinforcement. The mere observation of a model's behavior evidently suffices to alter behavior significantly, without the observers themselves experiencing any form of reinforcement (cf. Bandura).

Excursus

Laws of Learning in the Form of Expectancies (Based on Bolles, 1972)

- Primary and secondary laws of learning:

The first two laws deal with learning. They define the two types of expectancies that constitute the essence of learning. The primary law of learning states that learning is a function of the formation of expectancies concerning new contingencies between environmental events. Newly emerging, orderly sequences of events are learned (in other words, stimulus-consequence contingencies). The stimulus signals an event that has significance to the organism, e.g., a potential need satisfaction or a threatening, painful goal object. The notation for this type of expectation is *S*–*S**. Organisms are evidently capable of comprehending not only predictable sequences of environmental events but also the relationship between their own action and its consequences for the environment. Expectancies belonging to the class of action-consequence contingencies are subsumed under the secondary law of learning and are labeled *R*–*S** expectancies. They can be observed in the manifold phenomena of instrumental conditioning. *S*–*S** and *R*–*S** correspond to Tolman's concept of expectancy (*SR*–*S*). It is useful to distinguish between the two, however, because it is possible for one type to already be in place in a new learning situation. It could either have been learned previously or have been innately present (see the law of preparatory experience below).

- Law of execution:

The third law – the law of execution – deals with how these two types of expectation interrelate and determine behavior. Syllogism provides an ideal model here: if *S*–*S** and *R*–*S** exist, then *S** can be achieved whenever *S* is present and *R* is initiated. A useful experimental investigation

would be to determine the extent to which various species (or individuals) are able to carry out such a syllogistic analysis of relationship, in terms of levels of complexity and complication. In any case, as shown by the findings on latent learning, initiation and guidance of behavior hinge on more complex processes than mere *S*–*R* pairing. A cognitive theory postulates more exacting processes. Tolman employed the metaphor of a "cognitive map" to "explain" the goal orientation of actions.

- Law of preparatory experience:

The fourth law – the law of preparatory experience – incorporates innate and acquired expectancies of both types, which an organism may bring to a new situation and which may become dominant. These expectancies explain those situations in which the experimenter's reinforcement procedures do not accomplish anything. This was, for example, the case in the study by Breland and Breland (1961) reported previously, in which once the to-be-learned behavior overlapped with a species-specific behavioral pattern, the learned behavior broke down and the raccoon reverted to the foraging behavior characteristic of the species. Experience has shown that there are limits to learning that have to be drawn separately for each species. For mammals like rats, the limits soon become apparent when the reinforcing event is delayed: species-specific responses begin to intrude.

- Law of motivation:

Fifth and finally, Bolles formulated the law of motivation, which states that the likelihood of a response occurring increases with (a) the strength of the *S*–*S** expectancy, (b) the strength of the *R*–*S** expectancy, and (c) the value of *S** (Bolles, 1972, p. 405). All three determinants have a motivational component in *S**, a desirable goal (or – if *S** represents a threat – an existing or impending state that is to be changed or avoided). *S**, the value of the goal event, is analogous to Lewin's valence or Tolman's "desire for the goal." It is independent of the need state, which corresponds to Hull's D. *S*–*S**, the expectation that a situation will lead to a goal object or event, is equivalent to Lewin's structure of the life space and to Hull's K. *R*–*S** gives direction to behavior in the presence of *S*–*S**. This corresponds to Lewin's action path, Tolman's expectations about means-ends relationships, and Hull's purely associative habits.

The model does not include *R*–*S** expectancies, because Bindra believes that these can be attributed to *S*–*S**. He argues that *R*–*S** expectancies are not required because "the specific response form that emerges is a fresh construction created by the momentary motivational state and the spatio-temporal distribution of various distal and contact discriminative incentive stimuli in the situation" (Bindra, 1974, p. 199). This conceptualization is reminiscent of Lewin's locomotion within the life space, which is free to follow the given forces and response choices within the field. Bolles (1972, p. 406) doubts the wisdom of excluding *R*–*S** expectancies, because this would tie the subsequent responses too strongly to the behavioral repertoire of a given motivational state. It would hardly do justice to the flexibility of lower mammalian, not to mention human, behavior. Aside from this point, however, the two authors are in general agreement on the basic issues. Bindra's model is quite specific in many respects and has many physiological corollaries.

According to Bindra, motivation is never solely determined by either an organism's need state or external, incentive stimuli but by a combination of both. The two aspects generate a "central motive state," as had already been conceptualized by Morgan (1943). From a temporal point of view, primacy is assumed by the incentive objects in the environment.

They elicit the central motive state, provided there is a state of readiness for it (i.e., the

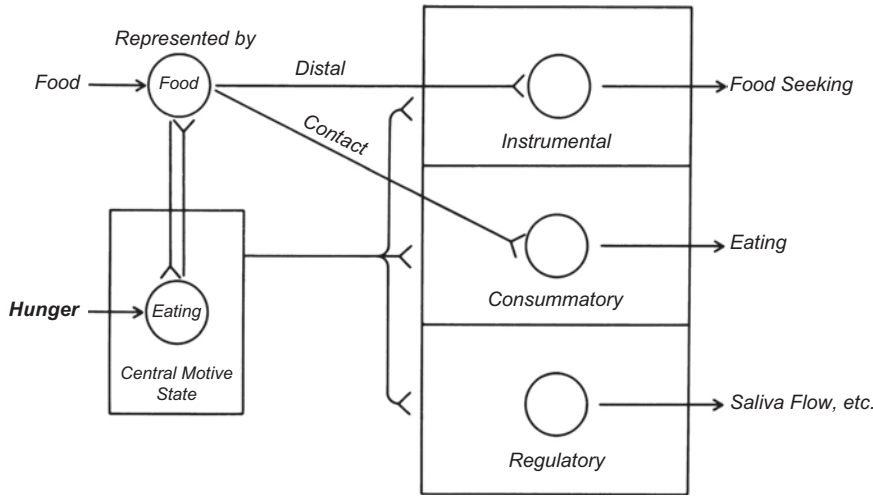

Fig. 5.10 Schema of Bindra's model of the motivation process and its influence on three different types of response, as exemplified by unconditioned food-seeking behavior

proprioceptive cues are compatible with it, and there is no other competing central motive state). One of the functions of the central motive state is to trigger and intensify sensorimotor functions that expedite approach (or avoidance) behavior. At the same time, it affects autonomic processes (like salivation during food-seeking) and increases the salience of an incentive object's central representation (in the brain). This leads to the mutual enhancement of the central representation of the incentive object and the central motive state.

Changes in behavior (learning) occur with the emergence of central representations of contingencies between situational stimuli and incentive stimuli. Some previously neutral situational stimuli are changed to conditioned incentive-related signals. Figure 5.10 shows the essence of the model. The arrows indicate the transition from observable events to nonobservable (hypothesized) processes. The forked lines represent the mutual effects of hypothetical variables. Bindra distinguishes between three types of responses:

- Instrumental (approach and avoidance)
- Consummatory (every response occurring at the point of contact with the goal object)
- Regulatory (internal, organismic responses, such as glandular secretions)

Bindra's model can also explain a number of phenomena and research findings that cannot meaningfully be explained by reinforcement theory.

5.5 Expectancy-Value Theories

There is probably no contemporary theory of motivation that does not incorporate some aspect of what is known as expectancy-value theory. Even theoretical approaches that emerged from completely different backgrounds converge in this respect, as Feather (1959a, 1959b) pointed out (see the overview in Feather, 1982; Wahba & House, 1974).

Before we present the most important theoretical models, let us briefly review the convergences that we have observed thus far in this chapter.

As early as Lewin's and Tolman's models, there were references to expectancy and value. Both authors made it quite clear from the outset that value was of pivotal importance to every theory of incentive motivation. For Lewin it was the valence, for Tolman the "demand for the goal." But Tolman was the first to postulate an expectancy variable. He introduced the concept to describe acquired knowledge about means-ends

relationships. Later, this evolved into a formalized value-expectancy theory in the form of the belief-value matrix. For Lewin, the expectancy variable remained at first embedded, even hidden, within the regional structure of the environment model, specifically in the perception of the appropriate action path leading to the goal region. Later, with the analysis of goal seeking and levels of aspiration (Lewin, Dembo, Festinger, & Sears, 1944), he introduced the independent concept of potency, the perceived probability of reaching the goal. This potency, along with the valence, determines the "effective force" or, in the case of setting levels of aspiration, the "resulting valence," i.e., the choice of task. The theory of resulting valence is one of the expectancy-value theories (see below).

Traditional behaviorism originally had no use for such "mentalistic" constructs as value and expectancy. Nevertheless, their functional equivalents can be detected under the cloak of *S–R* terminology. The value variable is inherent in the reinforcing experience, in the reduction of drive strength (*D*), and later in the incentive variable, *K*. The r_G –s_G mechanism, the fractional anticipatory goal response developed early on by Hull, was invoked to explain how goal objects come to have incentive (*K*) effects on behavior. The anticipation of the goal object (s_G) incorporates the value variable. At the same time, the r_G –s_G mechanism, through its associative bonding, embodies the expectancy variable, in that the feedback of a particular response (r_G) becomes associated with the representation (s_G) of the future goal event (S_G).

Drawing on Tolman or Lewin, the r_G –s_G mechanism might easily have been conceptualized as a hypothetical construct for the "mentalistic" process of expectancy. Hull, along with Spence and Sheffield, however, omitted to do so. Habit ($_S H_R$) had previously been the only directing structural component. But it no longer sufficed to explain the phenomena of latent learning and incentive change – both easily explained by Tolman's expectancy component. Now, the r_G –s_G mechanism denominating an incentive (*K*) was added to fill the explanatory gap. What applied to *D* also applied to K. Its activating effect is nonspecific. According to Spence, it imparts all of its strength to all activated habits. The habit that has been most closely conditioned to the goal response predominates.

Sheffield took this approach one step further in his theory of drive induction. After a few conditioning trials, premature goal responses will be triggered in the run-up to the goal. These result in nonspecific arousal, which in turn increases the response strength of the momentarily dominant habit. If, on the basis of previous learning, the dominant habits are those that lead to the goal, then hesitation and the testing of alternative responses at critical choice points must quickly lead to the identification of the right response, on the basis of increased arousal. As in Spence's model, the activating effect of the fragmentary goal response is nonspecific, an arousing jolt, but it is imparted only to the relevant responses. In this respect, *K* indirectly attains a behavior-directing function in Sheffield's conceptualization.

Mowrer finally overcame the behaviorists' resistance to the expectancy construct, introducing expectancy emotions that direct behavior. Finally, Bolles made the greatest advance toward a cognitive model by combining two types of expectancy with a goal-related value variable (*S**), namely:

- Expectancies about situation-consequence contingencies (*S–S**)
- Expectancies about action-consequence contingencies (*R–S**)
- This evolution of the expectancy-value formulation within S–R theory gave it a cognitive character comparable to the cognitive theories of Lewin (1938) and Tolman (1959). In fact, it went beyond them in terms of conceptual precision.

5.6 Decision Theory

This model can be traced back to French philosopher and mathematician Blaise Pascal (1623–1662). When Chevalier de Mérée asked him about the best strategy to adopt in a game of chance, Pascal's advice was to opt for the game that offers the maximum product of potential winnings and probability of winning. In subsequent centuries, the matter of economically expe-

dient decisions acquired great theoretical importance in political economics. Under which conditions it is advisable to buy something; when is it preferable to save one's money (see the review by Edwards, 1954)? This theory assumed the consumer to be an "economic man" who:

- Is fully informed
- Can differentiate among an infinite number of alternatives
- Proceeds rationally

It gradually became clear, however, that economic decisions are frequently made in conditions of (partial) uncertainty about their consequences. Faced with various combinations of possible gains and their probabilities, people are expected to choose the one that yields the highest product of value and probability of occurrence. This product is termed the expected value. In fact, however, decisions related to purchases and games of chance rarely follow this mathematical equation. In place of this expected objective value, David Bernoulli (1738) proposed a subjective one, namely, expected utility.

Bernoulli tried to explain the general reluctance of people to choose a large payoff with a low probability of occurrence over a small payoff with near certainty, even when the expected value is mathematically the same for both – and why this reluctance to take risks lessens with increasing wealth. Bernoulli argued that the subjective value is not a linear but a concave function of the amount of money, i.e., that the subjective difference between $10 and $20 is greater than that between $110 and $120.

Based on this concept of expected utility, Neumann and Morgenstern (1944) developed a descriptive model of behavior that can be used to determine the utility function for a given individual based on subjective preferences. The individual is asked to choose between alternative combinations of utility and likelihood, and those alternatives that are considered to be equal are identified. If, for example, someone perceives a sure bet of $12 to be equal to a 50% chance of winning $20, then, for him or her, $12 represents half the utility value of $20.

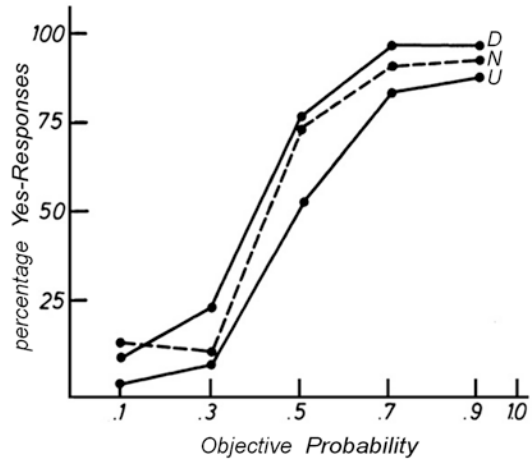

Fig. 5.11 Percentage of yes responses as a function of the objective probability of drawing a marked card under desirable (*D*), undesirable (*U*), and neutral (*N*) conditions (After Irwin, 1953, p. 331)

This model of behavior based on decision theory, in which the utility function is determined for each individual, has stimulated a great deal of research (cf. Edwards, 1962). Its application to psychology, i.e., to the prediction of actual behavior, however, has encountered many complications. Just as there are discrepancies between objective and subjective utility, there are also discrepancies between objective and subjective probability. For example, systematic distortions at both ends of the probability scale have been discovered.

- High probabilities are likely to be overestimated, while low probabilities are likely to be underestimated (Fig. 5.11). The term "subjectively expected utility" (SEU) is used to reflect subjectively expected probability and utility.

Complexities of Using Decision Theory to Predict Behavior

Even when working on the basis of subjective, rather than objective, probabilities, there are still clearly preferred regions of the probability curve when people are asked to choose between alternatives of equal subjective utility. Where the choice is between alternatives with increasingly higher payoffs and decreasing probability, combined in

such a way that the expected utility of all alternatives is the same, preference will still be given to a 50% probability. The case of negative utility, the chance of losing money, is a different one again. In this case, preference is for the lowest probability coupled with the highest potential loss.

In these cases, we are evidently dealing with psychophysical principles of risk-taking primarily investigated by Kahneman and Tversky in a series of experiments (cf. Kahneman & Tversky, 1984). The authors found that it is necessary to distinguish between gains and losses when determining value (in motivational terms, incentive), because the negative value of losing a sum of money is higher than the positive value of winning the same sum. In other words, the value function for losses is steeper than that for winnings. Hence, we can speak of loss aversion in cases where an individual is confronted with a loss and gain of the same value and with equal probabilities.

This irrational bias is consistent with two other inclinations, namely, a tendency toward risk avoidance in the winning sphere and risk seeking in the losing sphere. Both are predicted by the S-shaped value function, which is concave in the winning and convex in the losing sphere. In the first case, this means that if there is a choice to be made between a sure gain and a greater gain with a correspondingly reduced probability (mathematically equal objective value), there will be a reluctance to choose the latter alternative. In the second case, where the choice is between a sure loss and a higher loss with a correspondingly reduced probability (again with equal objective value), preference will be given to the latter. Since the risks of many decision problems can be classified as either positive or negative, i.e., slotted into a framework of possible gains or possible losses, the preferred alternative can often be determined simply by the way the issue is presented. The inclination to choose the more risky alternative decreases in the first case (gain) and increases in the second (loss).

The positive and negative values attached to an option can also change with differential perceptions of the circumstances, although there is no change in the probabilities associated with the risks. If, for example, the negative consequence of a choice is seen as a necessary cost, the negative value will be lower than if it is seen as a loss. Conversely, positive consequences can decrease in value if other individuals are able to attain even more favorable consequences.

There are many other complications. It is possible that:

- Probability and utility are not simply multiplicatively linked.
- The probabilities of winning and losing are not complementary but have to be weighted differentially.
- The subjective probability of an event can change as a function of temporal delay (Milburn, 1978).
- The perceived probability of an event depends on its desirability and, conversely, its desirability depends on its probability.

With respect to the first type of mutual interaction of probability and desirability of an event, Irwin (1953) showed that positive events are perceived as more probable than negative ones. Students were asked to draw a card from a deck containing ten cards, of which either 1, 3, 5, 7, or 9 were marked. Students were awarded a point for drawing a marked card in the first two trials and deducted a point for drawing a marked card in the next two trials. For a control group, drawing a marked card had no positive or negative effect. Prior to each draw, participants were told how many of the ten cards were marked and asked whether they thought it probable that they would draw a marked card. Figure 5.11 shows the distribution of yes responses in relation to the objective probability of drawing a marked card for each of the conditions: desirable (point awarded), undesirable (point deducted), and neutral outcomes. Throughout, desirable outcomes were estimated to be most probable, followed by neutral, and finally undesirable outcomes. (Moreover, the graph shows a systematic overestimation of high probabilities and underestimation of low probabilities.)

Conversely, the desirability of an event or object can be influenced by the likelihood of its occurrence. That applies to all "scarce goods," including performance-dependent events. The more unlikely the success, i.e., the more difficult

the task, the higher the value assigned to that success. All of these complexities of predicting behavior on the basis of decision theory also present problems for the other expectancy-value theories, which will be examined in the next section.

5.7 Level of Aspiration and the Theory of Resultant Valence

The concept of level of aspiration has occupied an important position in the study of motivation since Lewin's student Fritz Hoppe presented his work on success and failure (1930). On the one hand, it implies a specific experimental paradigm; on the other hand, it is a hypothetical construct used in the theory of achievement motivation to explain individual differences in performance (Chap. 6).

Definition

As a hypothetical construct, level of aspiration implies the level of performance that will be acceptable to an individual's self-image.

As an experimental paradigm, level of aspiration defines the self-imposed and internalized level of performance communicated by a respondent to the experimenter with respect to a familiar task, which is now to be performed with some degree of mastery (Heckhausen, 1955, p. 119).

The typical procedure presents respondents with a task that can be performed more or less well and more or less quickly or with several tasks of varying levels of difficulty. After acquiring some insight into their performance level, respondents are asked to set a level of aspiration for each subsequent trial. This results in the sequence of events illustrated in Fig. 5.12.

Hoppe was interested in identifying the factors that determine whether a given level of performance is perceived as a success or a failure. It had been shown that the same performance can be perceived as success by one person and as failure by another. In other words, success and failure are not only dependent on the objectively defined level of difficulty of the task but also on the previously established level of aspiration. If this level is achieved or exceeded, the individual perceives success. If not, there is a feeling of failure. As shown in Fig. 5.12, the criterion for this self-evaluation is what is known as the attainment discrepancy, i.e., the positive or negative difference between the self-imposed level of aspiration and the actual performance. Feelings of success or failure affect the level of aspiration set for the next performance. Success generally results in an increased level of aspiration, failure in a decreased level, and not the other way round (this is called the "displacement rule"). Displacement of the level of aspiration upward or downward is a function of the intensity of the perceived success or failure, as was shown by Margarete Jucknat's (1938) data presented in Table 5.2.

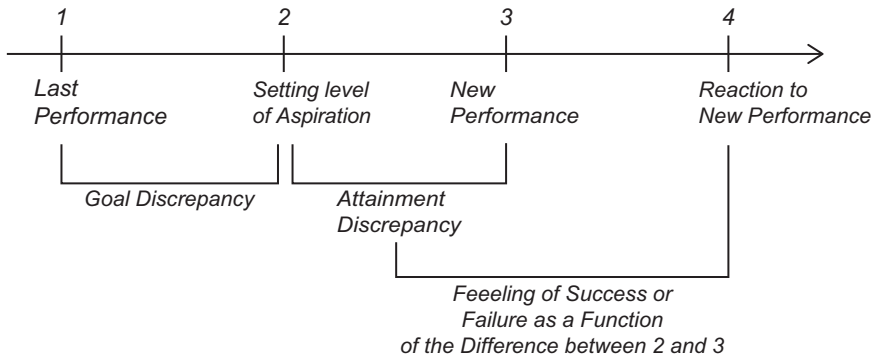

Fig. 5.12 Sequence of events in a level of aspiration experiment (After Lewin et al., 1944, p. 334)

Table 5.2 Percentage of upward and downward displacement of the level of aspiration as a function of the intensity of subjective success or failure

	After success			After failure		
Displacement of the level of aspiration	E!!	E!	E	M	M!	M!!
Upward	96	80	55	22	19	12
Downward	4	20	45	78	81	88

After Jucknat, 1938, p. 99
E!! very great success, *E!* great success, *E* no significant success, *M!!* very great failure, *M!* great failure, *M* no significant failure

Feelings of success or failure are concentrated at an intermediate level of subjective difficulty. Success on very easy tasks and failure on very difficult tasks have no effects on self-esteem. However, the more the mastery level exceeds previous performance, the more it will be perceived as a success. Conversely, the more it falls short of previous performance, the more it will be viewed as failure. This asymmetry of self-esteem is accompanied by an observable tendency to increase the level of aspiration following improvement in performance. The subjective perception of success does not increase with the level of aspiration, however, but remains more or less the same.

The crucial factor is the goal discrepancy, the difference between the last performance and the level of aspiration derived from it (Fig. 5.12). It shows a certain degree of individual constancy over time and may be positive or negative, i.e., the level of aspiration is always somewhat (or much) higher than the achieved level of performance or somewhat (or much) lower. One can usually observe a greater readiness to raise the level of aspiration after performance is significantly improved than to lower it after a decrement in performance. There is some – albeit weak – indication of this in Jucknat's data presented in Table 5.2, in the case of very great success and very great failure. As an explanation of this general upward tendency, Hoppe introduced the concept of "ego level," i.e., the tendency to maintain self-confidence at the highest possible level by adopting a high personal standard of performance. Later, this notion became incorporated in the definition of the achievement motive, which is defined as the tendency to enhance one's proficiency, or to maintain it at a high level, on all those tasks for which the individual has adopted a standard of excellence, and which can therefore lead to success or failure (Heckhausen, 1965, p. 604).

Aside from describing and explaining individual differences in the preferred goal discrepancy (which later become an important theme of achievement motivation research, Chap. 6), research on levels of aspiration also examined numerous intraindividual factors that result in pronounced upward or downward shifts in the goal discrepancy (see the example).

Example
If, for example, a task is endowed with greater personal importance, there will be a tendency to shift the level of aspiration upward, meaning that positive goal discrepancies become larger and negative ones smaller (cf. Frank, 1935; Ferguson, 1962). The same holds when goal setting is unrealistic and guided more by wishful thinking than by realistic expectations (Festinger, 1942). The introduction of a performance standard for a socially relevant reference group can bring about a conflict between individual and reference group norms (between one's own and external performance standards), thereby influencing the setting of levels of aspiration (cf. Heckhausen, 1969, p. 158 ff.). Even the presence, prestige, and behavior of the experimenter or an audience can have an effect and may result in a splitting of the level of aspiration into one that is publicly stated and one that is privately held.

Overviews of research on the levels of aspiration can be found in Lewin et al. (1944) and Heckhausen (1965a, pp. 647–658).

5.7.1 Success Expectancy and Valence

The theory of resultant valence (Lewin et al., 1944), developed in the early 1940s, built on the general findings reported above to explain in more stringent terms why a shift in the level of aspiration occurs in specific cases. Level of aspiration is conceived here as a choice between several alternatives – either between tasks of various difficulty levels (task choice) or between different levels of performance on the same task (goal setting). In either case, it involves varying difficulty levels. Each level of difficulty has a positive valence in the case of success and a negative valence in the case of failure. As we saw earlier, the positive valence of success increases as a function of increased difficulty level, up to an upper limit, beyond which success is seen to be totally out of the individual's reach (e.g., an Olympic sprinter wanting to reduce his time of 10 s by 2 s in the 100-m dash). Conversely, the negative valence of failure increases with decreasing levels of difficulty. The easier the task, the more embarrassing it is to fail. Again, this holds only up to a point, after which the task is seen as mere "child's play" and failure blamed on the circumstances. By this logic, plotting the difference between the positive and negative valences at each level of difficulty should result in monotonically increasing valences as a function of increasing task difficulty. Likewise, the individual should always choose only the most difficult task that is still humanly possible. This is not the case, however. The choices always fall within a middle range, sometimes above, sometimes below the previous level of performance.

Another factor is clearly in force beside the valence, namely, success expectancy, the subjective probability of success or failure. Specifically, the valence of success increases as a function of increasing task difficulty and decreasing likelihood of success. This intuitive relationship was empirically confirmed by Feather (1959a, 1959b). He found that the positive valence of success (Va_s) must be weighted by the subjective probability of success (P_s), because success on a difficult task may appear very attractive, but there is also an increased likelihood of failure. This is accounted for by computing the product of valence times probability, $Va_s \times P_s$, the weighted valence of success. The same applies to the negative valence of failure (Va_f) and the subjective probability of failure (P_f) on the same task, which give the weighted valence $Va_f \times P_f$. For any task, the probabilities of success and failure are complementary ($P_s + P_f = 1.00$). If the probability of success is 70%, the probability of failure is 30%. Hence, the formula for the resultant weighted valence (Va_r) is:

$$Va_r = \left(Va_s \times P_s\right) + \left(Va_f \times P_f\right)$$

There is a resultant weighted valence attached to each alternative task presented. Theoretically, individuals should choose the task with the highest sum of weighted success and failure valences.

If we know the success and failure valences and the probabilities for success and failure for each alternative in a series of tasks of varying difficulties, we can determine where level of aspiration ought to be set on the next trial. It may be set either above or below the previous performance level, depending on changes in the success and failure valences resulting from the subjective probability of success on the tasks in the series. Figure 5.13 shows a functional relationship, where the maximum resultant valence falls in the region of highest task difficulty, i.e., leads to a positive goal discrepancy in setting the level of aspiration.

Findings in neuroscience further qualify changes in valence due to experience on a neuromodulator level. Generally, a relationship between the release of the neuromodulator dopamine in the brain and motivation is postulated (Schultz, 2002). There is no dopamine release when the results of the behavior match the expectancies or fall short of them. If the results surpass the expectancies – that is, if the results are surprising – there is a strong release of dopamine (Abler, Walter, Erk, Kammerer, & Spitzer, 2006; Beck & Beckmann, 2010).

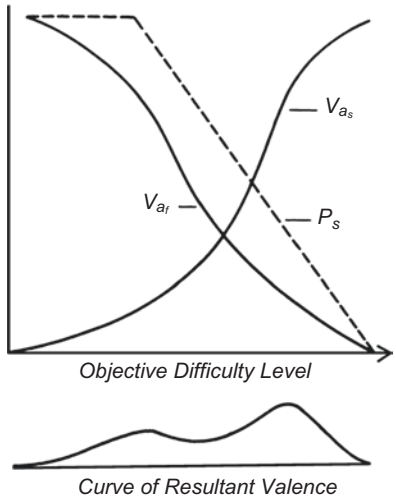

Fig. 5.13 Derivation of the curve of resultant valence from a set of functions for valence of success (Va_s), valence of failure (Va_f), and subjective probability of success (P_s) as a function of the objective difficulty level of a series of tasks (After Festinger, 1942 p. 241)

5.8 Atkinson's Risk-Taking Model

In 1957, Atkinson published an article entitled "Motivational Determinants of Risk-Taking Behavior," which was probably the most cited publication in the field of motivation over the next 15 years. The model, designed to predict individual preferences for task difficulty levels, represents a logical extension to the theory of resultant valence proposed by Lewin et al. (1944). Atkinson added a person component, namely, individual motive strength, to the situational component of value and expectancy (see excursus on the next page).

Aside from assuming an inverse linear relationship between task difficulty and incentive (point 4 of the excursus), Atkinson's crucial modification to the theory of resultant valence was to split Lewin's valence variable, $Va(G)=f(t,G)$ (Lewin, 1938), into a situational component, incentive (I; previously G), a function of task difficulty, and a person component, motive (M; previously t, a motivational variable). He then reconstituted these components to form new valence constructs of his own, success valence (V_s) and failure valence (V_f):

$$V_s = M_s \times I_s;\ V_f = M_f \times I_f$$

According to this definition of valence, success at a task judged by two individuals to be equally difficult should have a higher valence for a person with a high motive for success (M_e) than for a person with a low motive for success. A similar relationship holds for the failure valence, in the case of individuals with differing levels of the motive to avoid failure. In other words, with increasing task difficulty, the upward slope of the success-incentive gradient should become steeper as the strength of the motive to succeed increases (M_s) and the downward slope should become steeper as the strength of the motive to avoid failure (M_f) increases.

- This motive-weighed valence function of success and failure is the defining element of the risk-taking model. It is in this respect that the model goes beyond the theory of resultant valence and conventional expectancy-value theories.

One might reasonably expect this fundamental component of the theory to have been subjected to extensive empirical tests. Such testing has rarely been undertaken, however (Halisch & Heckhausen, 1988), one reason doubtless being the difficulty of operationalizing and measuring subjective probabilities.

Appending the subjective probability of success (P_s) and probability of failure (P_f) to the success and failure valence of a task – in a sense, a value calculation – gives the approach tendency of success (T_s) and the avoidance tendency of failure (T_f) for that task:

$$T_s = M_s \times I_s \times P_s;T_f = M_f \times I_f \times P_f$$

Success and failure tendency can be summed algebraically to obtain the resulting tendency (T_r) for a given task:

$T_r = T_s + T_s$ or, in more detail,

$$T_r = \left(M_s \times I_s \times P_s\right) + \left(M_f \times I_f \times P_f\right)$$

Because the failure incentive is negative, the failure tendency is also negative (or zero in the extreme case, where $M_f = 0$). Hence, Atkinson

viewed the failure motive as an inhibitory force. If the failure motive is stronger than the success motive, the resulting tendencies are negative at all levels of difficulty. Failure-motivated individuals should show a greater tendency to avoid a task as its resultant tendency becomes more negative. If they are set such a task, however, they should demonstrate increased effort and persistence (and possibly better performance) – at least, that is what Atkinson (1957) first postulated. Later he rejected this plausible assumption, which corresponds to Hillgruber's (1912) difficulty law of motivation, postulating – on theoretical but not empirical grounds – that a negative resultant valence not only inhibits the choice of a task but also the effort and persistence applied to it (Atkinson & Feather, 1966).

Predictions of the Risk-Taking Model

Given that the risk-taking model, like any postulate linking value and expectancy, was designed to predict choices or decisions only, it seems unreasonable to assume that the subtractive role of the failure tendency also applies to the parameters of task execution once work on the task has commenced (Heckhausen, 1984). To date, there is no empirical proof for this. On the contrary, it is quite plausible, as Atkinson (1957) himself originally assumed, that a failure tendency can have a positive effect on task performance, perhaps increasing effort to avoid a feared failure or to master the highest possible level of difficulty. (This effect has been confirmed in a number of studies; e.g., Heckhausen, 1963b; Locke, 1968.)

Excursus

Extending the Theory of Resultant Valence in the Risk-Taking Model

Atkinson's risk-taking model extends and revises the theory of resultant valence as outlined below:

1. The two expectancy-weighted values of success and failure are further weighted by person parameters of motive strength. The value of success is weighted by the motive to achieve success (success motive); the value of failure is weighted by the motive to avoid failure (failure motive).
2. In place of Lewin's concept of valence (which was a function of the need tension within a person, *t*, and the perceived nature of the goal object, *G*), Atkinson introduced the concept of incentive to reflect the value of success and failure. The incentive of success or failure on a specific task depends only on the perceived difficulty of that task and is not a function of a motive or motivational strength (such as *t*). Of course, as in the theory of the resultant valence, the perceived difficulty of a task is also person dependent, i.e., dependent on the extent to which the person feels capable of carrying out the task (Atkinson, 1964, p. 254).
3. The subjective probabilities of success and failure are complementary. Probability of success (P_s) and probability of failure (P_f) add up to 1.00:

$$P_s + P_f = 1.00 \left(\text{i.e., } P_f = 1 - P_s\right)$$

4. Value and expectancy do not vary independently of each other. The relationship between subjective probability and incentive is an inverse linear function that reflects everyday experience and empirical data indicating that the feeling of success increases as the perceived probability of success decreases, while the feeling of failure increases as the perceived difficulty of a task decreases (cf. Feather, 1959b; Karabenick & Heller 1976; Schneider, 1973, p. 160). Therefore, the incentives of success (I_s) and of failure (I_f) increase as a function of the decrease in the subjective probability of success (P_s) or failure (P_f), respectively:

$$I_s = 1 - P_s;\ I_f = 1 - P_f = -P_s \left(\text{as } P_f = 1 - P_s\right)$$

Because success and failure incentives are dependent on the subjective probabilities of success and failure, respectively, and as these two probabilities are complementary, the risk-taking model can make predictions simply on the basis of the two motive parameters and the subjective probabilities. Accordingly, it is possible to express all probabilities and incentive variables of the resultant tendency (T_r) in terms of Ps:

$$T_r = M_s \times P_s \times (1 - P_s) - M_f \times P_s \times (1 - P_s)$$

or reduced:

$$T_r = (M_s - M_f) \times (P_s - P_{s^2})$$

Because of the inverse linear relationship between the success incentive of a task and its probability of success, their product $-(1-P_s)\times P_s-$ is a quadratic function whose zero points are at $P_s = 0$ and $P_s = 1$ and whose maximum always lies at the intermediate probability of success ($P_s = 0.50$). It is a positive (approach) resultant tendency if the success motive is stronger than the failure motive and a negative (avoidance) resultant tendency if the failure motive is stronger than the success motive. Figure 5.14a–c shows the success and failure tendencies as well as the resultant tendencies for a person whose success motive is twice as strong as the failure motive (Fig. 5.14a–c) and for a person whose failure motive is twice as strong as the success motive (Fig. 5.14a–c). Figure 5.14a–c shows that the resultant tendency becomes more pronounced with the dominance of one of the two motives (in this case, the success motive), i.e., that at each sequential step in the probability of success, the difference in the strength of the tendencies increases.

If, for a particular individual, the failure motive is dominant, then the resultant tendency between the success probabilities 0 and 1.00 is always negative. Such a person would theoretically try to get out of doing any task. Because such complete avoidance behavior is barely ever observed, however, Atkinson assumes that other motives, which are not achievement-oriented, may be at work, e.g., affiliation (to please the experimenter). These supplementary motivations persuade the individual to tackle the task despite the resultant avoidance tendency. The efficacy of additional motives is called "extrinsic tendency" (T_{ex}) and is added to the variables constituting the resultant tendencies:

$$T_r = T_s + T_f + T_{ex}$$

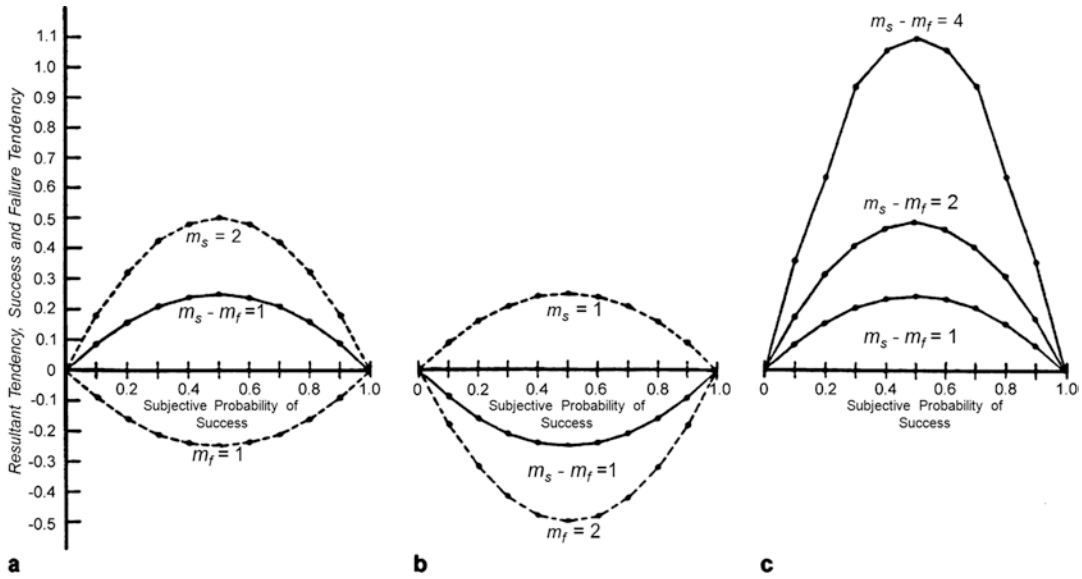

Fig. 5.14 Strength of the resultant tendency (and the success and failure tendencies – *broken lines*) as a function of subjective probability (**a**) when the success motive is stronger than the failure motive ($M_s - M_f = 1$), (**b**) when the failure motive is stronger than the success motive ($M_s - M_f = -1$), and (**c**) for different individuals where the success motive outweighs the failure motive to varying degrees

Summary

The risk-taking model can be summarized in eight points.

1. It is designed for the "pure case" of a single, purely achievement-related task, i.e., where no other motives are aroused, and the task choice has no further consequences for the actor apart from a direct self-evaluative response to success or failure. The addition of extrinsic tendencies deviates from this pure case in that it specifies a supplemental condition that is not achievement-related. It is only with this addition that failure-motivated individuals can become motivated to approach a task goal.
2. The incentive for achievement behavior – i.e., the motivating agent of a resultant success or failure motivation – consists exclusively in the anticipation of an affective self-evaluation following success or failure (Atkinson speaks of pride or shame, respectively). Aside from these direct consequences, all further achievement-related consequences are ignored, including a superordinate achievement goal for which the present task outcome has something of an instrumentality. Similarly ignored are the incentives of ancillary goals with achievement relevance (except for the occasionally invoked extrinsic tendencies).
3. The incentive values of success and failure on the chosen task – restricted as they are to achievement relevance – depend exclusively on the subjective probability of success on that task. This means that, of the situational variables (expectancy and value), only the subjective probability of success needs to be considered in order to arrive at the weighted incentive (expectancy times value).
4. The risk-taking model applies only to tasks within the same class, i.e., tasks that can be differentiated solely on the basis of their objective probability of success. No prediction can be made for choices between diverse tasks with the same or different subjective probabilities of success. That would require consideration of further incentives related to the types of tasks (e.g., differences in personal importance.
5. Among the family of expectancy-value models, the risk-taking model is the first to contain motive, in the sense of an enduring personality variable. The success motive and failure motive of a person lend weight to the incentive of success and failure in a given situation (or – which amounts to the same thing – to the incentives already incorporated in this probability of success).
6. The failure motive is conceptualized as an inhibiting force, implying that the failure tendency ($T_f = M_f \times I_f \times P_f$) should always lead to an avoidance of task choice (Atkinson & Feather, 1966, p. 19).
7. The model's three variables (motive, incentive, and probability) are mutually related in such a way that intermediate probabilities of success (tasks of intermediate difficulty) produce the strongest motivation to tackle the task, provided that the success motive is stronger than the failure motive. If, on the other hand, the failure motive outweighs the success motive, a task of intermediate difficulty is least likely to motivate, while a very difficult or very easy task should produce relatively high motivation – assuming that the task is not avoided altogether under this condition.
8. Although the risk-taking model was originally applied only to task choice, its application was later expanded to performance variables subsequent to such choices, including effort, persistence, and achievement outcomes. Neither theoretical nor empirical reasons were given for this. It was simply assumed that the maximum net difference between the success and failure tendency determines not only the choice of task difficulty but also task performance.

The risk-taking model has stimulated decisive research on achievement motivation, particularly research demonstrating that the preferred level of aspiration is motive dependent. Attempts have also been made to use the model to explain parameters of achievement behavior that are unrelated to task choice, e.g., persistence and achievement outcomes. Results were mixed, particularly when parameters of task performance and achievement were predicted. The model has been modified and

expanded repeatedly to account for results that are inconsistent with it or to explore new classes of phenomena. Revisions of the model are reviewed elsewhere (Heckhausen, 1980; Heckhausen, Schmalt, & Schneider, 1985). Some major problems (e.g., how to determine the probability of success) and related findings are presented in chapter on achievement motivation.

5.9 Rotter's Social Learning Theory

Julian Rotter (1954) assumed learned expectations about the relationship between one's actions and their reinforcing consequences to determine behavior, rather than unlearned and stimulus-response bonds resulting in nonspecific arousal. He chose the term social learning because "it stresses the fact that the major or basic modes of behavior are learned in social situations and are inextricably fused with needs requiring for their satisfaction the mediation of other persons" (1954, p. 84). According to Rotter (1954, 1955, 1960), a reinforcing event leads to an expectation that a particular behavior or circumstance will, in the future, result in the same reinforcement. Once reinforcement is no longer forthcoming, such acquired expectations about the contingencies of actions and their consequences will be unlearned, i.e., diminished or completely extinguished. Even a small child can increasingly differentiate behaviors in terms of their reinforcing outcomes. The more strongly one has experienced a causal connection between one's actions and a subsequent reinforcement, the greater will be the effect of a nonoccurrence of the expected contingency. Where the expectation is weak, however, nonconfirmation will have comparatively little effect.

This implies that each possible action alternative, in a given situation, has a specific behavior potential (BP). It is a function (1) of the strength of the expectancy (E) that the particular behavior in that situation (s_1) will lead to the specific reinforcement (R) and (2) of the reinforcement value (RV) of the reinforcement in that situation. Rotter's (1955) formula states:

$$\mathrm{BP} = f\left(E \,\&\, \mathrm{RV}\right)$$

In a given situation offering a number of action choices, the one with the greatest behavior potential (BP) will prevail. This construct corresponds to the Hullian reaction potential or Lewin's force. Expectancy and reinforcement value clearly correspond to the subjective probability and valence of success or failure, as defined by the theory of resultant valence. The only difference is that Rotter's conception makes fewer assumptions. For example, the relationship between expectancy and reinforcement value is not assumed to be multiplicative; it is left unspecified. Moreover, there are no a priori built-in relationships between the two variables, as is the case for probability of success and valence of success.

Rotter specified the constructs of expectancy and reinforcement values in more detail. The research initiated by his model has focused exclusively on the expectancy variable, however. It is a function of two independent determinants:

- The specific expectancy (E^{t}), on the basis of past experience, that this particular behavior, in this particular situation, will result in a particular reinforcing event
- A generalized expectancy (GE) that has become generalized over a broad range of similar situations and behaviors:

$$E = f\left(E^{t} \,\&\, \mathrm{GE}\right)$$

Rotter's (1954) social learning theory might long have been forgotten had he not added the mediational link of generalized expectancy (GE) to facilitate the prediction of expectancy changes. The concept relates to an acting individual's beliefs about the occurrence of the reinforcing consequence being under his or her control. Rotter calls this dimension internal control of reinforcement. Generalized expectancies come into play when whole segments of life situations appear to be influenced either by one's own actions (internal control) or by external sources (external control). This probably reflects transient cultural beliefs and ideologies about the role of causal agents like fate, luck, or control by powerful others. Rotter assumes that expectancies about one's own control over reinforcement are highly generalized,

extending over all life situations and constituting a personality dimension. He developed an assessment procedure to measure this dimension: the Internal-External (*I–E*) Scale (Rotter, 1966). The individual's score reflects the generalized expectancy (GE). The scale has continued to play an important role in the research based on Rotter's social learning theory (Lefcourt, 1976; Phares, 1976; Rotter, 1966, 1982; Rotter, Chance, & Phares, 1972).

Empirical Support

Situation-specific expectancies about reinforcing consequences were induced in experiments involving skill-determined vs. chance-determined situations. These studies showed that situations perceived to be chance-determined are less likely to heighten expectancies of further success than are situations perceived to be skill-determined. Likewise, there is less readiness to lower expectancies following failures. In the case of situations perceived to be chance-determined, there is also less readiness to generalize to other, similar situations. Findings related to resistance to extinction are particularly interesting, as they appear to contradict well-established findings from animal experiments, which show that intermittent reinforcement (in approx. 50% of acquisition trials) results in the strongest resistance to extinction. For humans, these results only emerge if the outcome of the task is perceived to be chance-dependent. If it is perceived to be skill-dependent, resistance to extinction after continuous (100%) reinforcement is higher than chance (50%) reinforcement, as shown by the findings of Rotter, Liverant, and Crowne (1961).

Study

Study on Resistance to Extinction as a Function of Specific Expectancies

In the experimental study by Rotter et al. (1961), participants were asked to lift a board on which a ball was balanced without dropping the ball. This skill-dependent task was followed by a chance-dependent one involving extra-sensory perception. During the learning phase, the success rate was varied for both groups, to the extent that they received 25%, 50%, 75%, or 100% reinforcement. In the subsequent extinction phase (i.e., constant nonsuccess series), participants were asked to state, prior to each trial, the subjective probability of success. The extinction criterion was reached when the perceived probability was below 10%. Figure 5.15 shows the number of trials to extinction required for each of the different conditions.

What is the best interpretation of the data plotted in Fig. 5.15? The authors' suggestion that less information is obtained from the reinforcing event in chance-dependent tasks, and that there is consequently less learning than in the skill-dependent tasks, is not very convincing. Looking at the various conditions from the point of view of the study participants, another conclusion appears plausible. Where reinforcement is dependent on skill, the increased success rate leading to a higher expectation of success is accompanied by a growing belief of having the skills necessary for the task at hand. The more firmly this belief becomes established, the more failures must be experienced to challenge and finally abandon it as individuals realize that they have either overestimated their skill level or underestimated the difficulty level of the task. This would explain the monotonic acceleration of the extinction curve as a function of the rate of success.

But what about the chance-dependent condition? A success rate of 50% will maximize the perception of a chance condition. Participants will never perceive an outcome to be chance-dependent if success is continuous. Instead, they will tend to suspect the experimenter of purposely manipulating the outcomes and will rapidly abandon all remaining beliefs in chance dependency during the extinction phase. With a 50% success rate, however, the belief in chance dependency becomes firmly established, and a greater amount of conflicting experience with 0% success is required before it is abandoned. Success rates of 25% and 75% are intermediate cases falling between the two extremes.

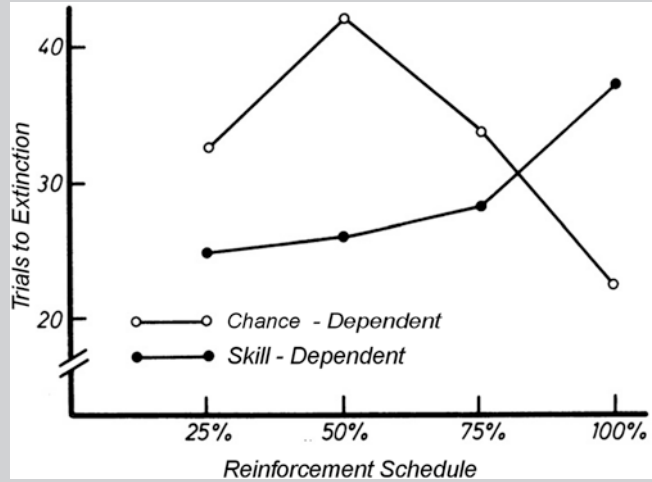

Fig. 5.15 Mean number of trials to extinction for a skill-dependent task and a chance-dependent task under four reinforcement schedules (After Rotter et al., 1961, p. 172.)

Rotter (1955) also specified the other determinant of the behavior potential, reinforcement value (RV), but this specification was not incorporated in the subsequent research generated by his model.

Reinforcement value *a* in situation 1 is a function of all expectancies that this reinforcement will lead to the subsequent reinforcements *b* to *n* in situation 1 and the values of these subsequent reinforcements *b* to *n* in situation 1. In other words, reinforcements do not occur entirely independently of one another, and the occurrence of one reinforcement may have expected consequences for future reinforcement (Rotter, 1955, pp. 255–256).

Reinforcement value, defined in this manner, can be represented by the following formula:

$$\mathrm{RV}_{a,s1} = f\left[E_{R\to R(b-n)s1} + \mathrm{RV}_{(b-n),s1}\right]$$

The idea that expectancies result from consecutive reinforcements (or valences) is the subject of instrumentality theory.

5.10 Instrumentality Theory

Helen Peak (1955) introduced the concept of instrumentality to the study of motivation to describe the expectation that an action outcome will bring about rewards (reinforcements).

Instrumentality plays a major role in explaining the relationship between attitude and motivation.

- The affective component of an attitude about a particular object or situation is a function:

1. Of the instrumentality of that object or situation in attaining a desired goal
2. The satisfaction to be gained from reaching that goal, which is, after all, dependent on motivation

In other words, an attitude can determine behavior. On the one hand, it incorporates a subjective probability that the value object can bring about the desired reinforcements (instrumentality); on the other hand, a certain level of satisfaction is expected from these reinforcements.

An index of the affective loading of a specific value object can be calculated by first multiplying the satisfaction value and instrumentality of each expected consequence of the value object. These products, called "derived affect loads," are then added algebraically to obtain the affective loading of the value object in question. Figure 5.16 illustrates this procedure for the value object of removing racial segregation.

Numerous studies were conducted in the 1970s to test whether individuals who participate in sociopolitical activities are more likely to be categorized as "internals" on the *I–E* scale (see Sect. 0). Rotter, Seeman, and Liverant (1962)

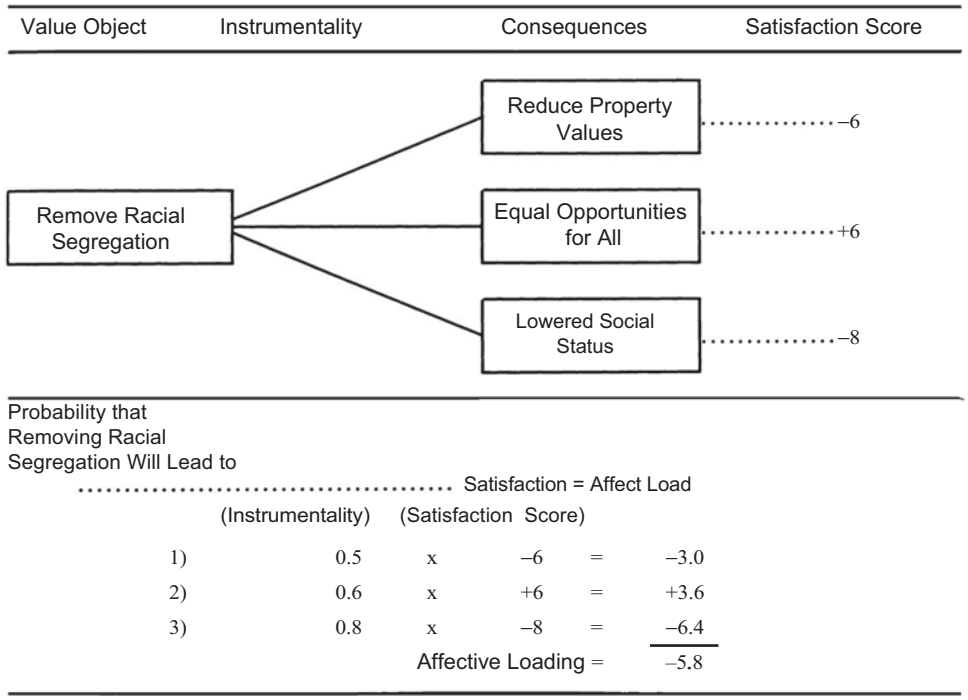

Fig. 5.16 Somewhat similar methods of combining indicdes of satisfaction and probability appear to have been employed more or less independently by a considerable number of people (After Peak, 1955, p.155)

had made this suggestion on the basis that "externals" are less likely to believe they can change the world. Klandermans (1983), in his literature review, contrasted this efficacy hypothesis with the power-formation hypothesis, which postulates on the contrary that "externals" experience a reduction in their characteristic feelings of powerlessness through sociopolitical activity. Of the 31 studies reported in the literature, only five confirmed the efficacy hypothesis and only four, the power-formation hypothesis. The criterion behavior of sociopolitical activists is evidently too complex to be a direct function of either an internal or an external control belief.

Peak's expectancy-value model for determining the affective loadings of an attitude has been confirmed empirically. Rosenberg (1956), for example, was able to predict individual differences in attitudes toward the right of free speech for members of the Communist party, and toward the removal of racial segregation in residential areas, by asking participants to rank a set of value items in terms of their importance as sources of satisfaction and their perceptions of "the extent to which the value tends to be attained or blocked through the instrumental agency of the attitude object" (p. 372). In a related study, Carlson (1956) was able to change an attitude by modifying the level of satisfaction to be derived from the removal of segregation. These approaches to attitude research were continued by Ajzen and Fishbein (1969), who examined behavior in response to actual and anticipated actions of a social partner.

Peak's approaches were first adopted by the industrial psychologists Georgopolous, Mahoney, and Jones (1957) (see study below). Later, Vroom (1964) expanded and formalized them into an instrumentality theory. It is not coincidental that industrial psychology, with its applied approach, focused on the instrumentality of action outcomes. The expectancy of the various consequences potentially arising from an action outcome must necessarily play a decisive role in motivating behavior. Only the artificiality of the laboratory experiments that characterized basic research in motivation could have obfuscated the fact that there is an a priori assessment of the instrumentality of future actions and the desirable as well as undesirable consequences of their outcomes.

Study

Applied Research on Instrumentality Theory

Georgopolous et al. (1957) postulated that labor productivity is dependent on the extent to which workers view their productivity as a means (a Lewinian "path goal") of attaining important personal goals. The subjective instrumentality of high or low labor productivity for each of ten personal goals was determined for 621 workers in a factory producing household articles. On the basis of the reported importance of three of these goals – namely, "earning money in the long run," "getting along with coworkers," and "finding a better paying job" – workers were then assigned to one of two groups, one with high and the other with low valence ("need"). Labor productivity was measured in terms of exceeding or falling short of the production quotas set by management and communicated to the workers. The results confirmed the path goal or instrumentality approach. High productivity was associated with the belief that high productivity is decisive for achieving the three goals. Workers for whom these goals had greater personal importance (i.e., valence) were more likely to perceive such instrumentality.

Hence, labor productivity depends, on the one hand, on its instrumentality value for achieving overall goals and, on the other, on the importance (valence) of these goals for the individual worker.

5.10.1 Vroom's Instrumentality Model

Vroom (1964), in the tradition of expectancy-value theories, combined instrumentality and valence multiplicatively. Valence here means no more than the perceived value of the outcome of an action. The higher the product of valence and instrumentality, the stronger the emerging motivation or action tendency. If there is a choice of alternative actions with equivalent instrumentality, the one with the optimal valence will be chosen. This is accomplished by multiplying the expected valences of the potential outcomes of each action by the expected probability of their occurrence. These products are then summed algebraically, and the action alternative with the greatest sum is chosen.

To clarify Vroom's instrumentality model, it is useful to make some distinctions that remain rather implicit in Vroom's own work. Specifically, a distinction needs to be drawn between action, action outcome, and ensuing consequences (to be precise, the "consequences of action outcomes"; Vroom labels both "action outcomes").

Whether a chosen action will lead to the desired outcome is more or less probable. In other words, the subjective probability of success can vary between zero and one. (Vroom uses the term "expectancy" (E) rather than subjective probability.) Once a particular action outcome has been achieved, it can have more or less appropriate, desirable, or undesirable consequences. On the positive side, it may imply support from coworkers, praise from supervisors, a promotion, or pay rise. Vroom does not use the term "probability" to designate the various coefficients between action outcomes and their consequences, as one might have expected. Instead, he uses the term "instrumentality," based on the idea that a given outcome may precede not only the desired consequence but also its opposite. As such, the respective coefficients can range from −1 to +1, rather than just from zero to one. Vroom defines a positive, a neutral, and a negative instrumentality of an "effective performance" for outcomes with positive and negative valence as follows:

Definition

If effective performance leads to attainment of positively valent outcomes or prevents the attainment of negatively valent outcomes, then it should be positively valent; if it is irrelevant to the attainment of either positively or negatively valent outcomes, it should have a valence of zero; and if it leads to the attainment of negatively valent outcomes and prevents the attainment of positively valent outcomes, it should be negatively valent (Vroom, 1964, p. 263).

For example, if an action outcome results in a negative consequence, it will have a positive instrumentality for a negative consequence. Because the product of instrumentality and valence is negative, the action will not be initiated. However, if the outcome serves to avoid a negative consequence, both the instrumentality and the consequence will be negative. Their product will thus be positive, resulting in a positive action tendency (see the example).

Example
An example here would be a student's fear of failing the year (negative consequence). He is aware that redoubling his efforts in the final weeks of the school year might prevent the feared event from occurring (negative instrumentality of not being promoted to the next grade). Hence, he will put more effort into his school work. In this case, a fear-related arousal leads to an increase in motivation. If instrumentality, like expectancy, varied only between +1 and 0, instead of between +1 and −1, the student's fear of failing the year would result in inactivity, because the product of instrumentality (expectancy) and negative consequences would always be negative.

Generally speaking, the latter approach would imply that fear motivation always leads to a reduction in the action tendency. As we have seen, this is the premise of Atkinson's risk-taking model, in which negative incentives are multiplied by the probability of success (0 to 1). Thus, the fear-related component within the risk-taking model is always negative and always has an inhibitory effect on the resulting action tendency.

Instrumentality, therefore, always concerns the relationship between an action outcome and the ensuing consequences. More generally speaking, it concerns the relationship between the direct outcome of an action and the associated indirect, subsequent effects.

This aspect of action-consequence contingencies has characteristically been overlooked by experimental laboratory research. After all, once the intended action outcome has been achieved, the respondent has completed the imposed task. Activities in the laboratory represent a restricted episode, without further consequences for the manifold life goals of the respondent (save perhaps the desire to make a good impression on the experimenter). It is assumed that there is a valence inherent in the outcome. In Vroom's model, this would mean that a successful outcome always has a full instrumentality of +1, with "rewards" that possesses valence characteristics for the individual respondent (e.g., a feeling of satisfaction with their achievement or other action consequences). The same applies to Atkinson's risk-taking model. Like other expectancy-value models, its expectancy component does not encompass instrumentalities. It is limited to the likelihood that one's actions will lead to the intended outcome. This is identical to Vroom's expectancy (*E*). It is the type of expectancy that Bolles called action-outcome contingencies (*R*–*S**), which represent the probability coefficient between one's own efforts and the outcome dependent on those efforts.

5.10.2 The Three-Component Model of Valence, Action, and Performance

Valence Model
As became clear from the discussion above, the valences of potential consequences of actions play a significant role. Collectively they determine – along with their specific instrumentality – the valence of the action outcome.

- The valence of the expected action outcome, therefore, is a function of the valences of all further consequences of the action and of the instrumentalities attributed to the action outcome for their occurrence.

The product of valence and instrumentality is computed for each action consequence, and these products are then summed algebraically. The action outcome itself has no valence, rather it

acquires valence in anticipation of its potential consequences. This relationship can be represented as follows:

$$V_j = f \times \left[\sum_{j=1}^{n} \left(V_k \times I_{jk} \right) \right]$$

where V_j = the valence of the action outcome j, V_k = valence of the action consequence k; I_{jk} = the expected instrumentality (−1 to +1) of the action outcome j for the occurrence of the action consequence k.

This valence modelv can serve to explain an individual's assessment of a situation, provided that there has already been action of a specifiable strength in a particular direction or that action outcomes are already in place. That explains why the model has been used almost exclusively to study job satisfaction (Mitchell & Biglan, 1971).

Action Model

The valence model cannot explain which of several action alternatives will be chosen in a particular situation and with what intensity that alternative will be carried out. Like all other expectancy-value theories, such predictions would require consideration of the likelihood that the action will lead to the desired outcome. This is why the instrumentality model of motivation multiplicatively links the expectation that an action will lead to a particular outcome with the valence of that outcome (derived in the manner described above). From this, the resultant action tendency in a choice situation can be derived. Drawing on Lewin's field theory, Vroom labels it the psychological force (F). Expressed as a formula:

$$F_i = f \times \left[\sum_{j=1}^{n} \left(E_{ij} \times V_j \right) \right]$$

where F_i = the psychological force to perform act i; E_{ij} = the strength of the expectancy (0 to 1) that act i will lead to outcome j; V_j = the valence of outcome j.

In contrast to the valence formula, this formula represents an action model rather than an assessment model for measuring aspects such as job satisfaction. It can explain behavioral differences in performance situations and has been used by industrial psychologists to study productivity or job performance. Vroom (1964) used the model to systematize and analyze a multitude of empirical findings relating to occupational choices, worker turnover, effort, and productivity, thus confirming the explanatory validity of the model. A summary of basic concepts is presented in Fig. 5.17.

Strictly speaking, the action model of psychological force (F) does not predict the action outcome. Vroom himself emphasizes that it predicts the amount of effort invested in the pursuit of a goal. Action outcomes (e.g., job performance) can be interpreted by this action model only

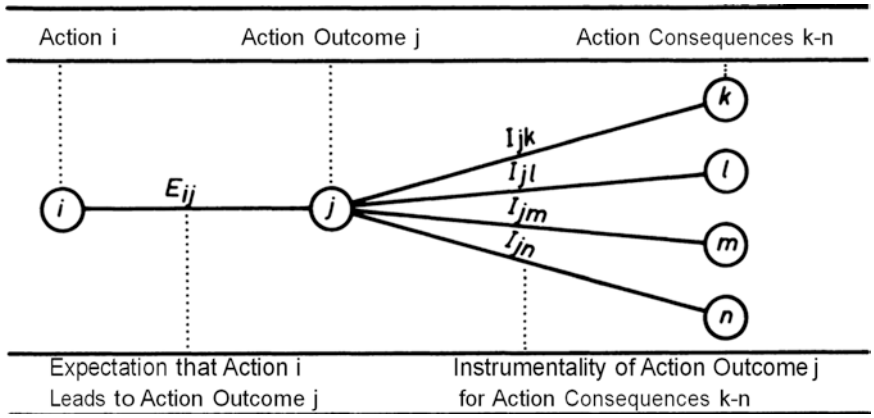

Fig. 5.17 Schema of the variables in Vroom's instrumentality model

insofar as they are dependent on the amount of effort (motivation) but not on other factors, e.g., task-relevant skills. Here, Vroom anticipated an important idea that was later elaborated in causal attribution theory: the motivational process consists, to a large extent, of a calculation of effort (Kukla, 1972; Meyer, 1973; see also Chap. 14). Different levels of required effort can lead to different levels of action outcomes, and these in turn can lead to consequences with varying valences. According to Vroom, the amount of effort is a function of the algebraic sum of the products of the valences for each level of the action outcome and of the expectancy that each outcome level can be achieved by a particular amount of effort.

Performance Model

To predict the action outcomes actually attained, Vroom (as well as Lawler & Porter, 1967) proposed a third model, the performance model. It states that the attained outcome is a function of a multiplicative relationship between competence and motivation, i.e., psychological force. In other words, action outcome = *f*(competence × motivation). If we now replace motivation (*M*) with the action model's formula for psychological force (*F*), we obtain:

$$\text{Action outcome} = f\left(\text{competence}\right) \times \left[\sum_{j=1}^{n}\left(E_{ij} \times V_j\right)\right]$$

Individual differences in competence have thus far been largely overlooked (cf. Gavin, 1970). They have not played a significant role in the interpretation of the variance of action outcomes, either by themselves or in conjunction with psychological force (Heneman & Schwab, 1972). This is probably because job performance was assessed by objective psychometric tests rather than self-reports (after all, expectancy, instrumentality, and valence are all subjective in nature).

Action Outcomes and Their Consequences

The fact that Vroom (1964) omitted to distinguish between action outcomes and their consequences led to some confusion between the various levels of outcomes. In fact, these different outcome levels are temporally staggered and are distinguished by their instrumentality for subsequent "outcomes." Galbraith and Cummings (1967) differentiated between level and level outcomes:

- Level Outcomes:
- According to these authors, a level outcome is one for which an investigator wishes to determine the valence.
- Level Outcomes:
- These include all events that have instrumental meaning for the level outcome and whose valence therefore determines the valence of the level outcome.

Less ambiguous, and arguably psychologically more appropriate, would be our distinction between action outcomes (level outcomes) and action consequences (level outcomes). This distinction raises the question of whether an action outcome receives its valence only through its consequences or whether it has its own valence. The latter is often referred to as intrinsic valence. In this case, the action outcome is more or less directly tied to significant experiences within the acting individual, without the mediation of any external factors. These experiences are based on self-evaluative processes occurring both during an action and after its outcome. Mitchell and Albright (1972) differentiated five types of intrinsic valences.

Intrinsic and extrinsic valences (Based on Mitchell & Albright, 1972)

- Intrinsic valences:

  1. Feelings of self-worth
  2. Opportunity for independent thought and action
  3. Opportunities for self-development
  4. Feelings of self-actualization
  5. Feelings of appropriate accomplishment

- Extrinsic valences:

  These involve external factors, i.e., action consequences mediated by external forces:

  1. Authority
  2. Prestige

3. Security
4. Opportunity to make friends
5. Salary
6. Promotion
7. Recognition

In contrast to the approach taken by Galbraith and Cummings, it might appear reasonable to conceptualize all externally mediated events having extrinsic valences as level outcomes (action consequences) and all events characterized by intrinsic valences as level outcomes (action outcomes). This distinction is also questionable, however, because events with intrinsic valences do not coincide with the accomplishment of a particular action outcome but are themselves the result of self-assessment processes as a reaction to the desired outcome. Thus, the same action outcomes can have different intrinsic values to the same individual, depending on the extent to which they are attributed to one's own proficiency, to luck, or to the help and support of others.

Furthermore, it is possible that events with external valence (action consequences) serve to initiate self-assessment involving intrinsic valences. A further distinction between level and level outcomes is made by Campbell, Dunnette, Lawler, and Weick (1970) in their hybrid expectancy model. They refer to the outcome of an action as the task goal, which has an expectancy I. Attainment of the task goal leads, with an expectancy, to outcomes of the first level with reward characteristics. Their valence is a function of their instrumentality for the satisfaction of needs, and this satisfaction of needs represents level outcomes. This would mean that all action consequences possessing valence would be level outcomes. They can be categorized in terms of the needs assumed to underlie them. What remains is the difficulty of defining level outcomes, i.e., of distinguishing between various needs and measuring their satisfaction.

Empirical Investigations

Vroom's instrumentality theory has proved fruitful for research. It generated a whole series of field studies, most of which confirmed the valence and action models. These models have also been expanded by the addition of variables such as work role, which describes the perceived and assumed demands of the workplace, e.g., expenditure of effort, and which, along with psychological force and competence, is assumed to determine the action outcome attained (Graen, 1969; Porter & Lawler, 1968). Critical reviews have been published by Mitchell (1974, 1982), Mitchell and Biglan (1971), and Henemann and Schwab (1972). Wahba and House (1974) discussed the theoretical and methodological problems (see also Semmer, 1995).

Excursus

Vroom's Instrumentality Theory: Three Models in One

Vroom formulated three models: the valence, action, and performance. These three models can be combined to form a process model (Fig. 5.18). This process model contains the individual components determining the valence of the desired action outcome (valence model), the psychological force behind the action (action model), and finally the action outcome achieved (performance model). The process model begins with the interaction between the valence of the action consequences and the instrumentality of the action level for this valence, which results in the valence of the corresponding action outcome level. This valence interacts with the expectancy that a particular action outcome can be achieved by the action, which results in the psychological force behind the particular action, i.e., the readiness to apply the necessary level of effort. It can also be called the strength of the action tendency or motivation. Finally, the product of psychological force (effort) and level of competence will determine the action outcome achieved:

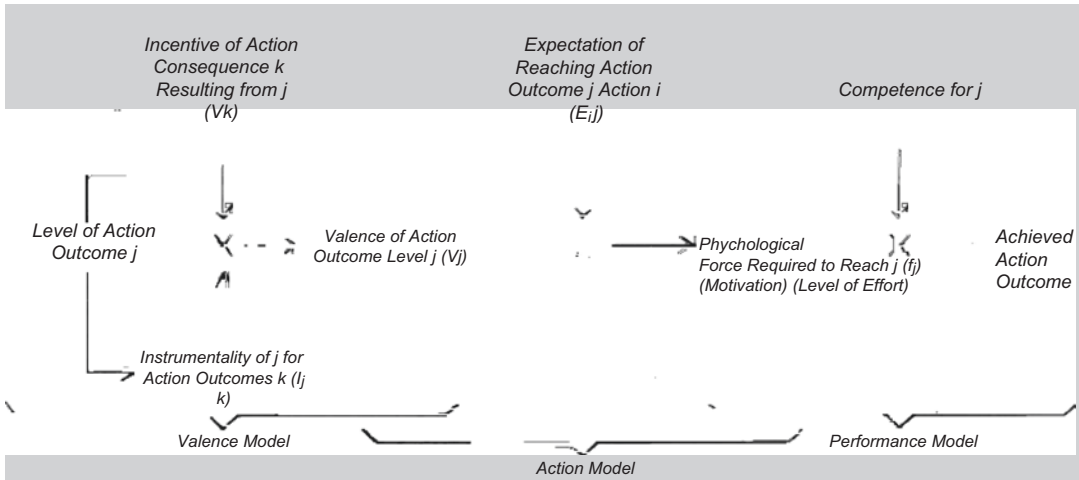

Fig. 5.18 Process model of Vroom's instrumentality theory, which links the valence model, the action model, and the performance model

- In general, it has been shown that the multiplicative relationships postulated in Vroom's model are more valid than the additive relationships.

For example, Mitchell and Albright (1972), using the valence model (i.e., the multiplicative combination of valence and instrumentality), were able to account for half of the variance ($r = 0.72$) in the job satisfaction scores of a sample of navy officers. This general rule does not always apply, however, either to the interaction between the valence of the consequence of an action and the instrumentality of its outcome or to the interaction between expectancy and the valence of its outcome (cf. Pritchard & Sanders, 1973). In earlier investigations, instrumentality and expectancy were generally not analyzed separately, as required by the model. The two could therefore be confounded, e.g., in studies attempting to determine the degree of relationship between effort and consequences (e.g., Hackman & Porter, 1968); in studies confounding that relationship with the one between action outcomes and action consequences, i.e., instrumentality (e.g., Gavin, 1970; Lawler & Porter, 1967); or in studies where perceived instrumentality is based on indirect estimates (e.g., Galbraith & Cummings, 1967; Georgopolous et al., 1957; Goodman, Rose, & Furcon, 1970).

All of these studies can be criticized for their operationalizations of the constructs, particularly where instrumentality is concerned. A pertinent example is the study by Pritchard and Sanders (1973), who studied postal workers taking a letter-sorting course that required them to memorize long and complex routes. The valences of 15 different consequences were to be evaluated (e.g., "keeping the job and not getting fired" and "getting a raise," along with more negative valences like "being assigned more work" or "having to work overtime"). The instrumentality scores (I), however, were not operationalized in accordance with the model. They consisted of ratings ranging from +1 to +10 that learning the course material would lead to the 15 consequences. The dependent variables were estimates of the amount of effort invested in the course. (Self-assessment of expended effort appears to be the best measure of the dependent variable, as most of the course program was completed at home.) The best predictions were obtained for the following components of the valence and action models involving multiplicative or additive interrelationships:

$r = 0.54\ V$	(Valence)
$0.52\ V \times E$	(Valence times expectancy)
$0.50\ V \times 1$	(Valence model, multiplicative)
$0.49\ E + (V \times 1)$	(Action model, additive)
$0.47\ E \times (V \times 1)$	(Action model, multiplicative)
$0.41\ V + I$	(Valence model, additive)
$0.36\ E + (V + 1)$	(Valence and action model, additive)
$0.22\ I$	(Instrumentality)

The multiplicative valence model seems to be somewhat superior to the additive one (0.50 vs. 0.41), but the same does not hold for the multiplicative and additive action models (0.47 vs. 0.49). The instrumentality measures, whose operationalization is not consistent with the theory, account for little of the variance but reduce it somewhat when I is added to the other variables. Admittedly, the scale levels of the variables are not suitable for determining whether an additive or multiplicative relationship is more appropriate (Schmidt, 1973).

A further problem consists in the number and types of action consequences to be taken into account by the investigator. Individuals differ in the number and types of action consequences that have relevance for them. Because measures of valence and instrumentality are based on the action consequences chosen by the investigator, there may be an undue restriction of the individual variance in valence and instrumentality, because important consequences are ignored. But if the number and types of consequences are determined for each individual case, then interindividual comparability might be jeopardized by the algebraic summing of all products of valence and instrumentality, as required by the model.

To date, investigations within the framework of instrumentality theory have largely involved field studies in the workplace. Admittedly, this provides them with a high external validity compared with artificial laboratory experiments. There is one disadvantage, however. It is impossible to carry out a causal analysis of simultaneously observed variables without systematic variation of those variables that are presumed to be the determinants. Lawler (1968) thus extended his investigation of 55 industrial managers over a whole year. The valence data consisted of an estimate of the importance of six stated consequences of actions. As mentioned above, his instrumentality data were confounded with expectancy. Participants were asked to estimate the extent to which their own efforts and action outcomes might lead to six action consequences. The actually attained outcomes (dependent variable) were assessed 1 year later, by means of evaluations by colleagues and superiors and self-evaluation. Multiple correlations between the product of "instrumentality" × valence and the attained action outcome after 1 year ranged between 0.45 (colleagues' evaluation), 0.55 (supervisor's evaluation), and.65 (self-evaluation). As the correlation of the independent variables and the dependent variables assessed 1 year later was higher than the correlation between the variables obtained at the beginning of the study, the findings suggest a causal dependence of the performance scores attained, as predicted by Vroom's valence and action models.

The concept of instrumentality introduced an expanded version of the expectancy-value model that has seen widespread use in theoretical and applied research on work motivation (cf. Kleinbeck, 1996; Mitchell, 1982). The expectancy-value theories take a variety of forms in the literature on work motivation (Kanfer, 1990). In this context, additional components are considered. Isaac, Zerbe, and Pitt (2001) proved that individuals feel motivated when they perceive that effort will lead to an acceptable level of performance, that the performance will lead to some outcome(s), and that the outcome(s) are personally valued. In an academic setting, Chen and Hoshower (2003) used expectancy theory to assess the validity of students' evaluation of their teachers (see also Friedman, Cox, & Maher, 2008). As Kleinbeck (1996, p. 50, own translation) points out, Vroom's approach, along with Atkinson's risk-taking model, "go a long way to clarifying the emergence of motivation, but always run into problems when it comes to explaining the relationship between motives, motivating potential, and motivation, on the one hand, and performance, on the other." How motivation is translated into action, and maintained effectively until the goal has been achieved, is the subject of volition research.

Summary

Today it is no longer possible to think about research in motivation without taking into account expectancy-value theories (cf. Feather, 1982). If for no other reason, this is because value and expectancy are the two fundamental variables producing motivation tendencies, which in turn provide us with the option to do or not do something. The family of theories has many diverse members, each of which has adjusted itself to a particular problem area. An overview of the whole clan was first provided in a volume by Feather (1982).

Some critical remarks are warranted, however. Heckhausen (1983) summarized them in five points.

> However, fertile motivation models of the family of expectancy and value have been so far, they still exhibit deficiencies in a fivefold respect. The models are (1) too objectivistic in supposing that the actor would use all information on which expectancy and value variables can be based, exhaustively and without errors. Here, cognition-psychological analyses may be helpful. The models are (2) too far generalized supposing a negative correlation between expectancy and value. This appears to be the case only when the value variables belong to the type of scarce goods, which does not hold for large areas of social activities. The models are (3) too rationalistic when they suppose that expectancy and value would always fully be elaborated and integrated. At most, this holds for researchers or consulting groups devoted to a scientific decision analysis, for instance, when a site for a nuclear plant has been chosen (cf. Keeney & Raiffa, 1976). Instead of supposing an unproved rationalistic algorithm, one should uncover conditions under which, for instance, only one of the two variables is of influence. An example is task choice in preschool age children where expectancy has a developmental primacy over incentive (Heckhausen, 1984). The models are (4) inappropriately formalized when they suppose algebraic relationships at a level at which they cannot be statistically tested, because the assessed variables do not have interval scale quality. Instead, algorithms with fewer suppositions are to be employed. Finally, they are (5) too universalistic when they suppose that individual differences within conditions should only be treated as error variance, instead of using them as information as to whether various individuals obey different motivation models and why this may be so (Heckhausen, 1983, pp. 14–15).

Kuhl and Beckmann (1983) provided experimental evidence for personality differences in the use of expectancy-value algorithms. Studying behavior in a game of chance, they found that action-oriented individuals base their decisions solely on expectancy, and disregard value information, whereas state-oriented individuals make their decisions in accordance with the expectancy-value model. More recently, Stiensmeier-Pelster (1994) has shown that the situational context determines action-oriented individuals' choice of algorithm. When there is a great deal at stake, they too apply the more complex expectancy-value rule.

Review Questions

1. *What are incentives?*
   Incentives are situational stimuli that alert the organism to affectively charged goal states.

2. *What are the two preconditions for people striving for goal states?*
   It must be possible to anticipate the occurrence of the goal state, i.e., there must be an expectation.
   The goal state must have some subjective meaning, i.e., value.

3. *What are quasi-needs?*
   Quasi-needs are action goals that are derived from "real needs." They form a tension system that disappears only when the goal has been attained.

4. *What is the Zeigarnik effect?*
   The Zeigarnik effect is the finding that incomplete tasks are more easily remembered than completed ones. Lewin's student Bluma Zeigarnik (1927) was the first to demonstrate the effect in an experiment designed to confirm Lewin's theory of tension systems.

5. *How did Kenneth Spence modify Hull's reinforcement theory?*
   Spence extended the theory to cover incentive motivation and, in so doing, totally abandoned the Hullian reinforcement theory of habit formation.

6. *What are emotions of expectancy and what effects do they have?*
   Mowrer (1960) listed four emotions of expectancy: hope, fear, disappointment, and relief. They serve to intensify the sequence of instrumental responses occurring in the run-up to the goal.

7. *What is the major difference between Atkinson's risk-taking model and the theory of resultant valence?*

   In Atkinson's model, the valence function for success and failure is weighted (multiplied) by a person variable, namely, motive.

8. *Why does the risk-taking model predict maximum levels of motivation at intermediate probabilities of success?*

   The values for the incentive of success and the subjective probability of success range from 0 to 1, and there is an inverse linear relationship between the two. Mathematics therefore dictates that, given a probability of success of 0.5, the incentive of success will be 0.5. Of all possible combinations of incentive and subjective probability, this one yields the highest product.

9. *How does Vroom's instrumentality theory expand on its predecessors?*

   Vroom's instrumentality theory expands on previous expectancy-value theories of motivation by incorporating the consequences of action outcomes. Motivation is assumed to be influenced by the expectancy of the various consequences potentially arising from an action outcome. Specifically, the probability of the action consequences occurring, the instrumentality, is combined multiplicatively with the perceived value of these consequences.

10. *Which types of intrinsic valence do Mitchell and Albright (1972) distinguish?*

    Mitchell and Albright (1972) distinguish five types of intrinsic valence:

    Feelings of self-worth
    Opportunity for independent thought and action
    Opportunity for self-development
    Feelings of self-actualization
    Feelings of appropriate accomplishment

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Achievement Motivation

6

Joachim C. Brunstein and Heinz Heckhausen

Achievement is undoubtedly the most thoroughly studied motive. It was first identified in Henry A. Murray's list of "psychogenic" needs as "n(eed) Achievement" and described in the following terms:

> To accomplish something difficult. To master, manipulate or organize physical objects, human beings, or ideas. To do this as rapidly and as independently as possible. To overcome obstacles and attain a high standard. To excel one's self. To rival and surpass others. To increase self-regard by the successful exercise of talent. (Murray, 1938, p. 164)

Murray can also be considered a pioneer of achievement motivation research in another respect, namely, as the author of the Thematic Apperception Test (TAT). McClelland, Atkinson, Clark, and Lowell (1953) later developed this instrument into one of the best-known and most frequently used procedures for measuring people's underlying motives. In their groundbreaking monograph *The Achievement Motive*, McClelland and his colleagues (1953) defined achievement motivation as follows:

Definition

A behavior can be considered achievement motivated when it involves "competition with a standard of excellence."

This definition allows a myriad of activities to be considered achievement motivated, the crucial point being a concern with doing those activities well, better than others do, or best of all. The striving for excellence implies quality standards against which performance can be evaluated: people may compare their current performance with their own previous performance ("to excel oneself"), for instance, or with that of others ("to rival or surpass others"), as Murray had already stated (see above). However, an action is only considered to be achievement motivated when the drive to perform emanates from within individuals themselves, i.e., when individuals feel committed to a standard of excellence and pursue achievement goals on their own initiative.

The precise definition of achievement may vary according to the cultural and social context (Hofer, Busch, Bender, Ming, & Hagemeyer, 2015). Fyans, Salili, Maehr, and Desai (1983) administered a semantic differential instrument to 15- to 18-year-olds from 30 different language communities to assess their understanding of the achievement concept. Despite the many cultural differences identified, a common semantic core

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did emerge, reflecting what Max Weber (1904) had termed the "Protestant work ethic." This semantic core covers the life spheres of work, learning, and knowledge. It is associated with an open societal system characterized by personal freedom and in which individual initiative is considered a precondition for personal success in life. Family values, tradition, and interpersonal relations are all subordinate to this value orientation. The social recognition of an individual hinges primarily on his or her willingness to perform.

Research on achievement motivation has generated an extensive body of findings that can only be outlined in broad brushstrokes in this chapter. More comprehensive and detailed accounts of the development of this research area are available elsewhere (Heckhausen, 1980; Heckhausen, Schmalt, & Schneider, 1985; Schultheiss & Brunstein, 2005; Weiner, 1985).

6.1 Ontogenetic and Evolutionary Perspectives

Achievement-oriented behavior implies commitment to standards of excellence and the evaluation of performance outcomes. This requires cognitive abilities individuals have to acquire during their development before they can behave in ways that are motivated by achievement.

But how can we determine whether standards of excellence are applied to behavior and whether behavioral outcomes are subject to any form of self-evaluation? Studies investigating observable reactions to unambiguous successes and failures provide crucial information here. From the ontogenetic perspective, such reactions can be observed from relatively early in life (see Chap. 16 for a detailed discussion of the development of motivation); this has been shown in studies about the emotional expressive reactions of children (Geppert & Heckhausen, 1990; Heckhausen, 1984, 1987; Heckhausen & Roelofsen, 1962).

Self-evaluative Emotions

Children begin to display self-evaluative reactions to success and failure on activities such as constructing a tower of building blocks between the ages of 2.5 and 3.5 (for illustrations of pride and shame reactions, see the photographs in Chap. 15, Figs. 15.2 and 15.3). Their first responses are facial expressions: smiling when an activity is successful and turning down the corners of the mouth when it is not. Assuming these two forms of expression to reflect the experience of success and the experience of failure, it seems that success is experienced earlier (from the 30th month) than failure (from around the 36th month). This developmental sequence may protect younger children from being discouraged by failure before they develop the ability needed for success. The emotions of joy vs. sadness signal that the child is concerned with attaining a certain action outcome and has started to measure his or her actions against a first, simple standard of excellence. However, it is uncertain whether children at this early stage establish a link between the outcomes of their action and their own abilities. There is clear evidence of such a connection being made just a few months later, at the (mental) age of about 3–3.5 years, when facial expressions of joy and sadness are supplemented by postural elements that express pride and shame. In pride, the upper torso is stretched and the head thrown back in triumph. Shame reactions are characterized by a lowered head and "crestfallen" torso. These expressions clearly demonstrate that pride and shame are self-evaluative emotions. A causal relationship has been established between the self and the success or failure of one's actions. Children now see themselves as responsible for the outcomes of their actions. Thus, all of the requirements stipulated in the previous definition of achievement-motivated behavior are now met (Heckhausen, 1974):

Definition
In achievement-motivated behavior, a standard of excellence is applied to evaluate one's actions, and the outcomes of those actions are associated with one's own competence.

In evolutionary terms, joy and sadness are related to expressive behavior observable in primates in the context of affiliation and bonding behavior. Joy and sadness are expressed in response to the acquisition or loss of a desired object or upon reunification with or separation from a close conspecific (Darwin, 1872; Eibl-Eibesfeldt, 1984; Frijda, 1986; Kaufmann & Rosenblum, 1969; Plutchic, 1980). Pride and shame, on the other hand, are much more closely related to the behavior systems of dominance and submission observable in social primate groups, but also among humans (Eibl-Eibesfeldt, 1984; Lawick-Goodall, 1968; Riskind, 1984, Weisfeld & Beresford, 1982).

In microgenetic terms, it is noteworthy that 3- through 4-year-old children who win or lose a competitive game first show joy or grief and that these expressions are then expanded to pride or shame, respectively, as the child establishes eye contact with the (adult) opponent (Geppert & Heckhausen, 1990). Expressions of pride include spellbound fixation on the opponent. Shame prompts an embarrassing smile, as though it were important to appease the superior opponent and to reestablish harmony within the troubled social relationship.

Drawing on these observations on the development of children's expressive behavior, it is possible to speculate on the evolutionary origins of achievement motivation and to reason that evolution did not need to create a unique affective base for this motivation system. Instead, two existing pairs of behavioral and expressive systems were combined:

- Acquisition vs. loss of a treasured object, linked to emotions of joy vs. grief
- Dominance vs. submission, linked to pride vs. shame and associated gestures of superiority and appeasement

This combination seems to suffice in providing an independent affective base for achievement behavior. The achievement motive is not biologically anchored, but primarily socioculturally mediated. It can be subjected to various evaluations and take many forms, provided that it is concerned with a binding standard of excellence. Nevertheless, the affective bases for these phenomena are deeply anchored in biological evolution and observable in early phases of ontogenesis.

Summary

In achievement-motivated behavior, people evaluate their actions and competence against a standard of excellence. The first signs of achievement-motivated behavior in human ontogenesis can be observed in the expressive behavior of children (mental age approx. 3.5 years) playing competitive games. The expression of self-evaluative emotions, such as pride and shame, indicates that these children evaluate not only the outcomes of their actions but also their own competence against a standard of excellence.

6.2 Motive Measurement

One way of finding out more about people's motives is simply to ask. There is no shortage of questionnaire measures that present respondents with statements describing characteristic features of achievement-motivated behavior (e.g., "I often set myself challenging goals" or "I like situations that tell me how good I am at something"). Positive responses are taken to indicate that the respondent has a strong need to achieve. Responses are structured, with participants indicating their agreement or disagreement with each statement on rating scales.

Direct Measurement

McClelland (1980) called this direct measurement of motives "respondent," by which he meant that highly standardized stimulus material and structured response formats leave very little scope for participants to provide spontaneous descriptions of their motives. Although this approach has clear advantages, such as its high psychometric quality and ease of analysis, it also has its disadvantages. Responses may be biased by the tendency to present oneself in a socially desirable light. Moreover, statements such as those cited above may assess respondents' evaluations of their own abilities rather than the motives actually driving their actions. Indeed, respondents may not always be in a position to

reliably identify the motives governing their behavior. Given his distrust of the validity of self-report measures in general, McClelland (1980) proposed that "operant" methods be used to measure motives.

Indirect Measurement

Operant methods offer a great deal more scope for differential responses. The test material is much more open and ambiguous than that used in questionnaire measures. Participants do not react to structured statements, but generate their own responses. As a rule, they are not informed that the assessment aims to investigate their motives. The advantages of this kind of indirect method of motive assessment are clear: the test situation is more lifelike, specific, and vivid and offers more opportunity to tap an individual's characteristic ideas and experiences. However, the test situation has to be endowed with stimuli that activate the motive under investigation – only then can this motive be expressed. Furthermore, researchers are faced with the task of filtering out, from the myriad of different responses, those components that provide insights into the nature and strength of the motive aroused. The responses of different individuals can only be compared and contrasted with reference to an objective evaluation system.

- The best-known method that has been developed on this basis for the indirect measurement of motives is the TAT.

6.2.1 The Thematic Apperception Test (TAT)

Inspired by the work of Freud (1952), Morgan and Murray (1935; see also Murray, 1938, 1943) developed the TAT to identify a person's needs, concerns, and worldviews from the stream of fantasy-like thoughts this person produces in response to ambiguous pictures, usually showing one or more persons. The respondent is instructed to write a short, spontaneous story about each picture, giving free rein to her or his imagination. The TAT is one of the families of picture-story tests (PSE) that are traditionally also known as projective methods, in which the respondent describes the actions, thoughts, and feelings of other people – those portrayed in the pictures. The concept of "projection" has a checkered history in psychology (Heckhausen, 1960). Freud used the term to describe a defense mechanism that enables paranoid individuals to attribute the feelings and impulses they cannot accept as their own to other people, thus alleviating the threat posed by these feelings and impulses (e.g., aggressive and sexual needs) by "projecting" them to the outside. Although empirical evidence for such processes has not been found (Murstein & Pryer, 1959), the TAT soon produced very interesting findings with respect to motive measurement. At a birthday party, Murray (1933) presented children with pictures of unfamiliar persons both before and after a scary game of murder in the dark. The children were asked to evaluate the maliciousness of the persons portrayed. They judged the strangers to be far more malicious after the scary game than before it. Subsequently, Sanford (1937) found that the frequency of food-related interpretations of TAT pictures increased when respondents were food deprived. These findings suggested that the TAT could be used to measure the need states activated at the time of the assessment, such as fear of strangers or need for food.

The next logical step was to use the TAT to measure enduring motives. Rather than using self-report measures to tap people's "latent" psychological needs, these needs were to be inferred from stories generated in response to picture cues. The pictorial material induces a particular motive theme, which then elicits thoughts and fantasies that may differ markedly from person to person. Respondents are instructed to consider a picture cue and to write a story explaining how the situation has arisen, what the people in the pictures are thinking and feeling, and how the story will end. The content of the stories obtained is then evaluated to identify the specific motive activated, e.g., the achievement motive.

Murray's (1943) concept of motive ("need") and his taxonomy of motives were presented in Chap. 3. Both played a crucial role in the con-

struction of the TAT (see also the excursus below). However, McClelland and colleagues took the decisive step of applying the method to the measurement of motives.

6.2.2 TAT Measures of the Achievement Motive

In the late 1940s, McClelland and his associates began investigating whether the TAT could be used to measure current need states as well as individual differences in the strength of more enduring motives. They based their work on an experimental paradigm known in the literature as motive-arousal study (see Schultheiss, 2001a). First, the motive state under investigation is induced through experimental manipulation. For example, the physiologically regulated need of hunger can be activated by temporary food deprivation. Atkinson and McClelland (1948) capitalized on this mechanism in a study with sailors stationed at a submarine base. Depending on their duty schedules, the sailors, who were not informed that they were participating in a psychological experiment, had not eaten for 1, 4, or 16 h prior to the test. Sailors were first shown TAT pictures containing food-related cues for 20 s and then given 4 min to write a story about each. As expected, an analysis of story content revealed that longer deprivation times were associated with a higher frequency of food-related imagery. Relative to participants who had eaten more recently, sailors who had not eaten for 16 h made more frequent references to such themes as food shortages and efforts to obtain food and were more likely to have the figures in their stories express hunger.

The questions remained of whether similar findings would be obtained for "higher" motives, such as the need to achieve, and whether the TAT could be used to measure enduring personality motives as well as current motivation states. In their influential work on the achievement motive, McClelland et al. (1953) addressed each of these two issues (see also the study presented below). Participants were shown pictures that suggested achievement-related themes. Figure 6.1 gives an example (other TAT pictures often used to measure motives are reproduced in Smith, 1992).

The "relaxed" and "failure" conditions were originally assumed to be the two poles of a motive-arousal continuum. By analogy with food deprivation and the need for sustenance, McClelland, Clark, Roby, and Atkinson (1949) interpreted failure to be a form of thwarted satisfaction (or deprivation) of the need for achievement. This somewhat questionable analogy ("hunger for achievement") was later abandoned. Instead, McClelland et al. (1953) contrasted the relaxed with the achievement-oriented condition and sought to find ways of distinguishing between the two, i.e., imagery that occurred more frequently in the achievement-oriented than in the relaxed condition. On this basis, they developed a coding system to measure the strength of achievement-related motivational states in TAT stories.

Excursus

The Route to the TAT: Controversy Between Murray and Allport

As a historical aside, it is interesting to note that the development of the TAT technique sparked a controversy between two Harvard professors: Gordon W. Allport and Henry A. Murray. Whereas Allport (1953) held that non-neurotic individuals experienced no difficulty in reporting their motives, Murray maintained that motives are not readily accessible to introspection and thus cannot be properly measured by self-report methods. He did not attribute this phenomenon so much to repression, as to the very early development of motives in human ontogeny. Whether people are or are not conscious of the motives underlying their actions remains a subject of sometimes lively debate (Wilson, 2002). Indeed, the distinction between "implicit" and "explicit" motives, addressed in more detail in Chap. 9, has recently revived this discussion.

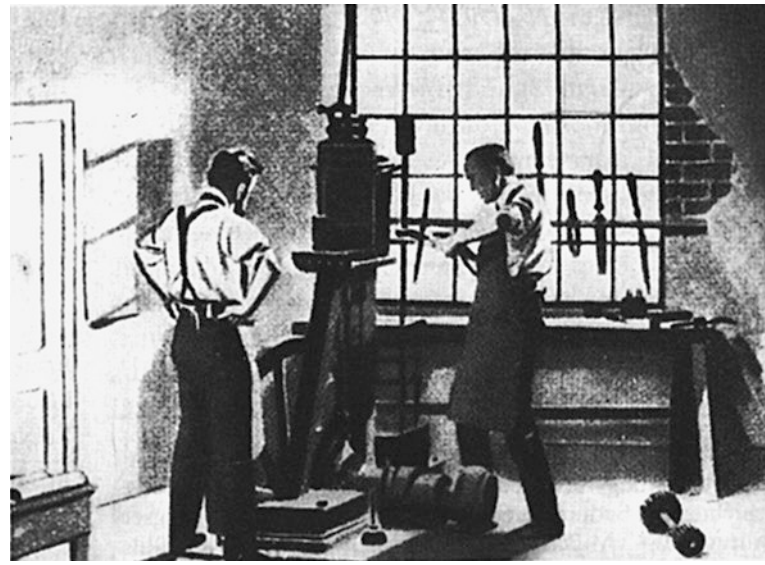

Fig. 6.1 A picture frequently used to measure the achievement motive: "two inventors in a workshop" (From McClelland et al., 1953, p. 101)

Study

Arousal of the Achievement Motive (Based on McClelland et al., 1953)

Before participants wrote their stories, achievement-related motivational states of different intensities were induced by administering various tasks under different arousal conditions:

- Relaxed:
  The experimenter introduced himself as a graduate student, made an informal impression, and reported that the test items were still in the developmental stage. He explained that the point of the exercise was to test the items, rather than the participants, and said that there was no need for participants to put their names on their forms.

- Neutral:
  The experimenter neither played down nor emphasized the test character of the items.

- Achievement-oriented:
  The experimenter was introduced as an established researcher administering an important test of intellectual abilities. Participants were urged to do their best.

- Success:
  The achievement-oriented instruction was used to introduce the items. Following the test, participants were given the chance to compare their performance with normative scores presented by the experimenter. These norms were fixed at such a level that all participants experienced success.

- Failure:
  In this case, the normative scores presented were fixed at such a level that all participants were likely to experience failure.

- Success-failure:
  Success was induced after the first task and failure at the end of the test battery.

TAT Coding of Achievement-Related Motive Scores McClelland et al. (1953) based their coding system on the definition of achievement-motivated behavior as involving competition with a standard of excellence. Thus, a story was coded as "achievement-related" (score: +1) only if one of the following criteria was met:

- Explicit reference to a standard of excellence (e.g., getting a good grade on an exam).
- Reference to a truly exceptional performance outcome (e.g., an invention).
- Reference to long-term achievement goals (e.g., career success).
- If none of these criteria were satisfied, and any work mentioned was thus of a routine nature, the story was coded as "achievement-neutral" (score: 0).

If, on the other hand, the story contained only imagery relating to other motives, it was coded as "unrelated" (score: –1).

Stories coded as containing achievement-relevant imagery were then inspected for further content indicative of a strong desire for achievement. To this end, McClelland et al. (1953) identified a number of content categories that occurred more frequently in the achievement-oriented than in the relaxed condition. They systematized their search for these categories by applying the schematic representation of an action sequence presented in Fig. 6.2. An action can be said to commence "within" the person with a need (*N*) to attain a particular goal. This goal is accompanied by anticipation of success (*Ga*+) or failure (*Ga*–). The instrumental activities undertaken to attain the goal may succeed (*I*+) or fail (*I*–). These activities may be facilitated by support from the social environment (nurturant press, Nup) or impeded and thwarted by obstacles and blocks in the world at large (*Bw*) or within the person him- or herself (*Bp*). Positive feelings (*G*+) are experienced after successes and negative feelings (*G*–) after failures.

McClelland et al. (1953) found that imageries belonging to each of these categories occurred more frequently in the achievement-oriented condition than in the relaxed condition. Finally, each content category was carefully defined and illustrated by examples to ensure that different raters came to the same conclusions. One point was given for every category identified in a story. The total number of points scored across all categories and all stories in a picture series represents a participant's (currently activated) achievement motive. This measure is termed nAchievement ("need for achievement") in the literature. Table 6.1 documents the scores that McClelland et al. (1953) measured for nAchievement in each of the arousal conditions described above. As arousal increased, so did the motive scores – a finding that has since been replicated in a number of further studies (Haber & Alpert, 1958; Lowell, 1950; Martire, 1956; Schroth, 1988).

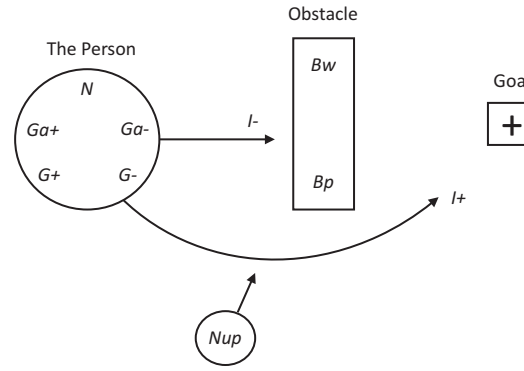

Fig. 6.2 Schematic representation of a goal-directed action sequence used to differentiate content categories in TAT stories. *N*, need to attain a goal; *Ga*+, anticipation of success; *Ga*–, anticipation of failure; *G*+, positive affective state; *G*–, negative affective state; *I*–, instrumental activity, unsuccessful; *I*+, instrumental activity, successful; *Nup*, nurturant press; *Bw*, block residing in the situation or the world at large; *Bp*, block residing in the person him- or herself (Based on McClelland et al., 1953, p. 109)

Strictly speaking, at this stage of its development, the instrument did not provide an index of motive strength, but reflected the current level of achievement motivation aroused within the given experimental context. However, it was just one small step to developing a measure assessing the strength of the enduring achievement motive. This step involved standardizing the test situation in the following respects:

Table 6.1 Impact of arousal conditions of various strengths on the frequency of achievement-related imageries in TAT stories

Condition	*N*	Mean	Standard deviation
Relaxed	39	1.95	4.30
Neutral	39	7.33	5.49
Achievement-oriented	39	8.77	5.31
Success	21	7.92	6.76
Failure	39	10.10	6.17
Success-failure	39	10.36	5.67

Based on McClelland et al. (1953, p. 184)

- The context in which the test was embedded (e.g., the demeanor of the experimenter)
- The instructions given
- The administration of the test (group vs. one-to-one setting; written vs. oral responses; time limitations)
- The achievement-related content of the pictures
- The coding system used to analyze story content

Three of these features – instructions, administration, and coding key – are fixed (for a summary of the respective procedures, see Smith, 1992), leaving the level of arousal induced by the cover story and the achievement-related content of the pictures to be determined.

Extensive studies were conducted to gauge the sensitivity of the nAchievement measure to these two aspects (Haber & Alpert, 1958; Jacobs, 1958; Klinger, 1967). Findings showed that the higher the achievement-related motivational content of the picture cues, the higher the nAchievement score. Nevertheless, pictures differing in motivational content were found to discriminate almost equally well between respondents high versus low in achievement motivation (McClelland et al., 1953, p. 198). Comparable findings were reported for the situational context: the TAT proved to be sensitive to even subtle differences in experimenter behavior (e.g., gestures and facial expressions; cf. Klinger, 1967). Shantz and Latham (2009) took advantage of this observation in order to demonstrate that the saturation of TAT stories with achievement-oriented words increases substantially if the test instructions are accompanied by a stimulus or cue pertaining to achievement (here, the photograph of a female Olympic champion). Both arousal factors, pictures and situational context, increase nAchievement scores to approximately the same extent. The question of which combination of the two factors permits the most accurate measurement of individual differences in the strength of the achievement motive was finally resolved in favor of weak situational influences (neutral instructions making no reference to achievement-related issues) and pictures fairly high in motive-arousing content (Heckhausen, 1964).

6.2.3 Success and Failure Motives

McClelland and Atkinson were aware that their thematic coding system for nAchievement confounded two very different achievement-related tendencies: approaching success and avoiding failure (see the study on the above). In the coding system described above, both types of imageries are reflected in a single score. Early attempts to separate success- and failure-related content categories were less than promising (Scott, 1956). Researchers noticed that the behavior of some respondents with moderate to low nAchievement scores was characterized by fear of failure rather than lack of motivation. It was practically impossible to predict how these respondents would behave in performance situations (Sorrentino & Short, 1977).

Study

The Zeigarnik Effect

A study conducted by Atkinson (1953) on the Zeigarnik effect (the tendency to remember interrupted actions more easily than actions that have been completed) illustrates early attempts to assess failure motives. Participants were given a test booklet containing 20 tasks to be completed under relaxed, neutral, or achievement-oriented conditions (in the latter condition, they were told that the items tested important abilities). The test booklets

were constructed such that only half of the items could be completed in the time available. The participants then wrote TAT stories. At the end of the experiment, they were interviewed informally about the tasks, and the number of references to completed vs. uncompleted tasks was noted. For the analyses, the sample was split at the median of the nAchievement distribution, and participants assigned to high vs. low achievement motivation groups. No differences were found between the two groups in terms of their ability to recall completed tasks. The results for uncompleted tasks were quite different, however, as shown in Fig. 6.3. Participants high in achievement motivation recalled more uncompleted tasks, as

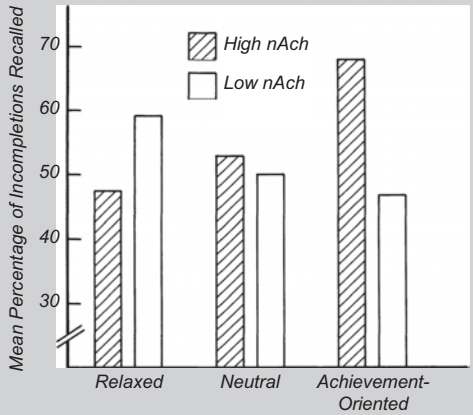

Fig. 6.3 Mean percentage recall of uncompleted tasks by respondents high and low in achievement motivation (nAchievement) under three arousal conditions (Based on McClelland et al., 1953, p. 266)

predicted by Zeigarnik (1927), when they had been exposed to achievement-oriented conditions. Participants with low achievement scores recalled far fewer uncompleted tasks under these conditions. In fact, the percentage of uncompleted tasks recalled by participants low in achievement motivation decreased steadily from the relaxed, to the neutral, to the achievement-oriented condition. Atkinson interpreted these findings as indicating that individuals low in nAchievement behaved as might be expected of individuals high in fear of failure, suppressing uncompleted tasks from memory, much like an experience of failure. On the same lines, McClelland and Liberman (1949) found that people low in nAchievement take longer to recognize words flashed on a screen when these words are associated with failure. They interpreted this phenomenon as indicative of "perceptual defense" against inimical stimuli.

Assessment of Failure Motives

Moulton (1958) also endeavored to identify fear of failure as a motive in its own right in TAT stories, but his efforts made little impact on research. Instead, researchers in the USA employed anxiety questionnaires such as the "Test Anxiety Questionnaire" (TAQ; Mandler & Sarason, 1952) to assess fear of failure. Atkinson (1964, 1987; Atkinson & Litwin, 1960) assumed fear of failure to be accessible to introspection and thus measurable by questionnaire techniques. In the risk-taking model, he defined fear of failure as a motive that counteracts the success motive. Achievement anxiety questionnaires do not assess motives, however. Instead, they tap behavioral symptoms that may be experienced in overly demanding achievement situations (e.g., a difficult exam). Responses to achievement anxiety questionnaire items thus correlate with self-perceptions of insufficient ability (Nicholls, 1984a, 1984b). Findings soon showed that, apart from feeling more nervous when faced with performance demands, individuals high in achievement anxiety often doubt their abilities to cope with these demands (Liebert & Morris, 1967; Wine, 1971). In the same vein, they rate the subjective difficulty of tasks to be higher than do less anxious individuals (Nicholls, 1984a, 1984b).

The TAT measure of the achievement motive does not correlate with self-perceptions of ability in this way. Even individuals who have little confidence in their own abilities may express a strong need for achievement in their imagination (e.g., by having one of the characters in their stories make a pioneering discovery).

- In US studies based on the risk-taking model, nAchievement was used as an indicator of the success motive and TAQ scores as indicators of the failure motive.

In most cases, the two variables have been split at the median, a procedure that is rather questionable from the statistical viewpoint, because it reduces variance and may introduce statistical artifacts. Participants with nAchievement scores above the median and TAQ scores below the median are characterized as being high in the "resultant" achievement motive (resultant in the sense that two opposing motives are offset against each other). As mentioned above, the failure motive is conceptualized as an inhibitory force that counteracts the success motive (nAchievement) (Atkinson, 1957, 1964). In numerical terms, the failure motive is subtracted from the success motive, after both have been standardized within the given sample. The resultant motive is thus calculated by combining a projective measure (nAchievement) with a questionnaire measure (TAQ). It is always difficult to say which of the two variables in difference scores of this kind is responsible for the predicted and observed effects. The hypothesis that the failure motive inhibits achievement in general also remained controversial (Blankenship, 1984; Heckhausen, 1963, 1968, 1977a; Schneider, 1973; Schultheiss & Brunstein, 2005).

Content Categories Used in Heckhausen's TAT Coding System (Based on Heckhausen, 1963)

- Hope for Success
  - Need for achievement and success (*N*: "He wants to construct a new piece of machinery").
  - Instrumental activity directed at achieving a goal (*I*: "The student tries hard to find a solution to the problem").
  - Anticipation of success (*AS*: "He is sure his work will be successful").
  - Praise (*P*: "The foreman praises the workmanship on the component").
  - Positive affect (*A+*: "He really enjoys doing the homework").
  - Success theme (Th) if the content of the story is predominantly success oriented.

- Fear of Failure
  - Need to avoid failure (*Nf*: "He hopes the foreman will not notice his mistake").
  - Instrumental activity directed at avoiding failure (*If*: "The student hides so the teacher cannot call on him").
  - Anticipation of failure (*AF*: "He doubts he will be able to manage the problem").
  - Rebuke (*R*: "You'll have to make more of an effort if you want to pass the exam!").
  - Negative affect (A–: "He could kick himself for making this mistake").
  - Failure (*F*: "The apprentice has ruined the mold").
  - Failure theme (*Thf*) if content of the story is predominantly failure oriented.

6.2.4 TAT Measures of Hope for Success and Fear of Failure

German researchers took a different approach. Heckhausen (1963; see also Meyer et al., 1965) developed a TAT technique to measure both "hope for success" (HS) and "fear of failure" (FF) using the same set of picture stories. The coding system was developed on the basis of TAT stories generated under conditions of neutral instructions (no reference being made to achievement) and picture cues high in motive-arousing content. Three pictures unmistakably depicted hope for success (e.g., a student sitting at a desk and smiling happily), three others for fear of failure (e.g., a student being watched by a

teacher as he writes something on the board). Behavior in a level of aspiration experiment was used as the criterion for identifying success-related or failure-related statements, allowing the coding system to be fine-tuned relative to a validity criterion. Specifically, the TAT stories produced by respondents who set goals that were slightly higher than their previous performance level (indicative of success motivation) were compared with the stories generated by respondents who set excessively high or low goals (both indicative of failure motivation). Content categories that were found to distinguish between these two groups were then used to construct a coding key for HS and FF (Heckhausen, 1963). The following overview documents the individual content categories (examples are given in parentheses):

Only one point is allocated for each content category present in a story. Total HS and FF scores are computed by aggregating the points scored across the entire set of six stories. The difference between the two scores is termed "net hope" ($NH = HS - FF$); their sum is termed "aggregate motivation" ($AM = HS + FF$). As mentioned above, the coding system was validated using an external criterion, namely, level of aspiration:

- Success-motivated participants (*HS*) favored goals that slightly exceeded their previous level of performance.
- Failure-motivated participants (*FF*), in contrast, fell into two subgroups:
  - Some opted for excessively low goals and others set themselves unrealistically high targets.

Correlational analyses show that the two motive tendencies, *HS* and *FF*, are mutually independent, indicating that there must be people who both strive for success and seek to avoid failure. Neither of the two TAT variables correlate significantly with questionnaire measures of achievement motivation (Halisch & Heckhausen, 1988). There is only a slight overlap between *FF* and *TAQ* scores, indicating that fear as measured by the *TAT* is conceptually different from test anxiety (Fisch & Schmalt, 1970). Table 6.2 reports the correlations between nAchievement, as defined by McClelland et al. (1953), and the two variables of Heckhausen's *TAT* instrument in two samples of college students. Whereas nAchievement shows strong correlations with *HS*, it does not correlate with *FF*, confirming that fear of failure is indeed a motive in its own right.

Table 6.2 Correlations between nAchievement (McClelland et al., 1953) and the motive variables of Heckhausen's TAT procedure

	Hope for success	Fear of failure	Net hope	Aggregate motivation
Teacher education students ($N = 71$)	0.73^{**}	0.15	0.32^{*}	0.63^{**}
University students ($N = 77$)	0.60^{**}	0.21	0.27^{*}	0.62^{**}

Based on Heckhausen (1963, p. 74)
$^{*}p < 0.01$, $^{**}p < 0.001$

6.2.5 Psychometric Properties of the TAT

Classical test theory (Cronbach, 1990) holds that the quality of a test is a function of the objectivity of test administration and coding procedures and the reliability of the scores determined. Both objectivity and reliability are considered prerequisites for the validity of test scores.

Objectivity. Because TAT instruments are sensitive to situational influences (Lundy, 1988), the objectivity of test administration is critical. Strict adherence to standardized administration procedures is thus imperative (Smith, 1992).

- The objectivity of the TAT coding procedure, measured in terms of the agreement between independent raters, has proved to be satisfactory to high.

Interrater agreement on content categories is at least 85% because only the data of raters who satisfy this criterion are included in empirical analyses. Interrater reliability coefficients range

between 0.80 and 0.95. Coefficients of this magnitude can only be achieved when raters are properly trained; training material and expert ratings are available for this purpose (for nAchievement, Smith & Feld, 1958; for HS and FF, Heckhausen, 1963). From early on, computer programs to analyze the content of TAT stories have also been developed (for nAchievement, Stone, Dumphy, Smith, & Ogilvie, 1966; for HS and FF, Seidenstücker & Seidenstücker, 1974). Despite their parsimony and objectivity, computer-based measurements of motives have initially gained little currency in research practice. There are now many indications that this situation might change in the foreseeable future. It is becoming increasingly common that TAT stories are typed with a keyboard instead of being written by hand (Blankenship & Zoota, 1998; Schultheiss et al., 2008). At the same time, key words that clearly represent a particular motive (e.g., "successful" or "win" for HE) are being collected in motive dictionaries (Hogenraad, 2005; Schultheiss, 2013). Using suitable text analysis software, such as Pennebaker and Francis's (1999) "Linguistic Inquiry and Word Count Program" (LWC), allows for the identification of how often "marker words" relevant to a motive (Schultheiss, 2013) or phrases associated with such words (Blankenship, 2010) appear in computer-based texts. Moreover, such software can uncover if formal or stylistic text features (e.g., word lengths, tense) are in a regular relationship with motive-relevant thoughts (Pennebaker & King, 1999). Studies on the convergence of motive scores based on marker words and comparable scores determined with traditional coding methods have yielded encouraging results. At the very least, they suggest that the time-consuming process of coding the content of TAT stories can fairly soon be done by automatic and easily reproducible evaluation systems (for an example from the field of applied psychology, see Shantz & Latham, 2009).

Reliability. Reliability is primarily concerned with the stability of test scores over repeated administrations. When compared with questionnaire measures, the test-retest correlations of TAT techniques are modest (Haber & Alpert, 1958; Heckhausen, 1963; Sader & Specht, 1967), ranging between 0.40 and 0.60 over a retest interval of 3–5 weeks. Correlations in the same range are found after a 1-year interval (Lundy, 1985). It should be noted, however, that it is impossible to reproduce the original conditions in a TAT retest. Respondents are often able to remember the pictures shown and the stories they wrote at the first administration and make a conscious decision to draft very different stories at retest. This phenomenon was illustrated for the power motive in a study conducted by Winter and Stewart (1977). At retest, which was taken 1 week after the first TAT administration, participants were given one of the following instructions:

- To think back to the previous week and write stories as similar as possible to their original ones
- Not to worry about whether or not their stories were similar to their original ones
- To write stories as different as possible from their original ones

The test-retest correlations for each instruction were 0.61, 0.58, and 0.27, respectively.

Excursus

Fear of Success

The material used by McClelland et al. (1953) and the picture cues employed in Heckhausen's TAT instrument (1963) were tailored exclusively to men. Women were not featured in the pictures. In fact, the results of early studies, particularly in the USA, indicated that women's achievement motives were not in line with the traditional "feminine" role orientation, making behavioral effects difficult to predict. Many studies did not even include women as part of their sample which seems particularly strange from today's perspective. Martina Horner (1974a, 1974b), a Harvard professor who became at age 32 the youngest president in the history of Radcliffe

College, went so far as to postulate "fear of success" as a motive unique to women. This label suggests that women often associate success in the performance domain with a loss of recognition in the social domain (see also Stewart & Chester, 1982). This hypothesis has proved contentious and remained controversial (Hyland et al., 1985), whether it was applied to categories of biological sex (female/male) or psychological gender (femininity/masculinity). It is more likely that women with a traditional role orientation channel their achievement-related aspirations into different domains (family and child rearing) than career-minded women (career success), as French and Lesser (1964) and Peterson and Stewart (1993) suggested. This implies that gender differences in achievement motivation are located at the behavioral level rather than at the level of the motives that drive behavior. For instance, social constraints (e.g., blocking the access to ambitious careers) can easily impede the expression of the achievement motive in socially recognized activities. More recently, researchers have ensured that the picture cues used in TAT studies show as many women as men in achievement contexts (Brunstein & Maier, 2005; Fodor & Carver, 2000; Thrash & Elliot, 2002). Needless to say, conventional content-coding keys (e.g., the coding keys developed by Heckhausen, 1963, and Winter, 1991a, 1991b) for the scoring of nAchievement are equally applicable to gender-balanced picture sets.

It seems reasonable to assume that participants in a test measuring imaginative behavior seek to avoid repeating themselves at retest, resulting in the rather low reliability coefficients that are typically reported for the TAT. Further problems are the lack of norm samples making it difficult to interpret the results of individual test takers (however, see Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001) and the fact that attempts at parallel testing series have not been developed beyond an initial stadium (Haber & Alpert, 1958).

Homogeneity. Another way of gauging the reliability of a test is to inspect correlations between scores on the first and second half of the items. This reliability criterion reflects the homogeneity (or internal consistency) of the assessment instrument.

- According to the criteria specified in classical test theory, the homogeneity of the TAT for assessing human motives has turned out to be very low.

Entwisle (1972) thus criticized the TAT method by arguing that it did not produce reliable measurements of the achievement motive and that it was not suitable for use in research or applied contexts (see also Fineman, 1977). The low internal consistency of TAT measures is not in fact surprising, however. The authors of the instrument aspired to a certain degree of heterogeneity; the pictures represent different areas of activity, and some of them suggest success, whereas others suggest failure. Therefore, Gruber and Kreuzpointer (2013) argued that it might be less than optimal to assess the internal consistency of the instrument (here, the Heckhausen TAT) by using pictures as analysis units (i.e., the total score of the content categories coded for a given picture). Instead, these authors suggested that it would be more adequate to consider in a reliability analysis the content-coding categories as test items (i.e., the cumulated values per category across pictures). Gruber and Kreuzpointer computed in their study not only Cronbach's coefficient alpha – a reliability estimate that has been criticized in the psychometric literature because it often underestimates the reliability of tests (Sijtsma, 2009) – but conducted a more complete reliability analysis according to Guttman's criteria (λ1 through λ6). In fact, reliability estimates based on categories were significantly higher than reliability estimates based on pictures. However, the former estimates still failed to meet conventional criteria for good measurement.

Atkinson, Bongort, and Price (1977) argued that homogeneity is not a suitable criterion for assessing the construct validity of the TAT (i.e., whether the scores generated are a reliable measure of actual motive levels). Using computer-simulated data, they demonstrated that low internal consistency (measured in terms of the time needed to generate achievement-related imagery per picture) does not mean that TAT results lack construct validity, i.e., that they fail to correspond with theoretically predicted "true" motive scores. Reuman (1982) later replicated this finding with real-life TAT data. In order to strengthen his argument, Atkinson (1981) stated that the axioms of classical test theory do not apply to motive measurement in principle because they contradict the basic assumptions of motivation theory; Kuhl (1977) and Schmalt and Sokolowski (2000) came to similar conclusions. In contrast to questionnaires, which prompt respondents to present themselves in a consistent light across a number of usually very similar items, every response to the TAT seems to satisfy the motivational tendency expressed to a certain extent ("consummatory strength"). Moreover, according to Atkinson's theory, thoughts pertaining to a particular motive do not represent the absolute strength of the motive, but its current strength in comparison to other motivational tendencies. Atkinson et al. (1977) were able to show that the resulting fluctuation in how motivational tendencies are expressed is by no means random, but exhibits a regularity that can be predicted by "dynamic action theory" (which describes the temporal trajectories of motivational tendencies competing with one another for access to behavior). This begs the question to what extent TAT picture stories reflect true variance in motive strength and to what extent they are sensitive to random noise in respondents' thoughts and fantasies. Studies applying item-response theory to TAT data by relating manifest reactions to latent motivational dispositions using a probability function are particularly promising.

6.2.6 The Consistency Problem from the Perspective of Measurement Theory and Construct Validity

Allport (1937) had already reasoned that differences and apparent inconsistencies in a person's behavior do not automatically indicate a lack of consistency in the respective personality trait. A latent personality dimension (e.g., a motive) of a particular strength may be expressed in different ways in different situations (Alker, 1972). Likewise, Mischel and Shoda (1995) argued that personality traits often only become manifest in typical variations of behavior across different situations. A career-oriented person may be competitive in the presence of her or his colleagues, but obliging and helpful in the presence of her or his superiors. This person's different behaviors in the two situations derive from the same motive. Thus, the fact that behavior is specific to the situation at hand and adapted to the current context does not yet refute the assumption that it is linked to personality traits.

Rasch's (1960) stochastic test model makes it possible to disentangle the strength of manifest reactions (e.g., to the items of an instrument) from the strength of underlying personality traits. This approach links the two theoretical perspectives of measurement and construct validity (see the excursus on the next page). The model tests whether, and to what extent, participants' responses represent a unidimensional continuum of the personality trait under investigation. Responses are unidimensional if they are equivalent across different tasks and situations (e.g., the different TAT pictures) as well as across different groups of respondents (e.g., age and gender groups), i.e., if they yield a comparable index of the personality trait in question in terms of both content and psychometrics.

Kuhl's Rasch analysis presented in the excursus initially received little attention. Of particular interest is a study by Blankenship et al. (2006) in

which the authors demonstrated how a modified Rasch model can be used to find suitable, i.e., particularly stimulating, pictures and to combine those pictures to a meaningful set of stimuli. Clearly, the use of models of stochastic test theory is not only relevant for measuring motives. It is about much more than merely the psychometric analysis of the properties of the TAT. Such models do in fact also test theoretical assumptions about which processes of "apperception" express a particular motive in the instrument (TAT). Proceeding on this idea, Tuerlinckx, Boeck, and Lens (2002) tried to separate relevant and nonrelevant achievement fantasies in the diagnosis of the achievement motive (TAT). For this purpose, they specified a stochastic model that integrated aspects of dynamic action theory by Atkinson et al. (1977), but their results were underwhelming. Using the specified ("dropout") model, Atkinson's idea that expressing an achievement-oriented fantasy creates a consummatory effect that in turn weakens the related motivational tendency could not be confirmed. In light of this model, a large part of the fantasies had an erratic effect and did not allow for any conclusions about the strength of the ostensibly relevant achievement motive. Using a different stochastic model ("Thurstonian item-response theory"), Lang (2014) was the first to show that the TAT provides a reliable and construct-valid measurement of the motives for achievement, power, and affiliation, provided that the measurement instrument consists of at least six pictures. Both for real and for simulated data, Lang found the best fit for a model that included dynamic processes as they had been postulated by Atkinson et al. (1977; competition between various motives for being expressed in fantasies; consummatory effect of the expressed motive on the strength of the respective motivational tendency).

6.2.7 Other Techniques for Measuring Achievement-Related Motives

Various other techniques have now been developed to measure the achievement motive and its facets. These include adaptations of the TAT method as well as objective tests, most of them questionnaire measures. We do not seek to provide a comprehensive overview of these instruments in the present chapter (cf. Fineman, 1977; Heckhausen et al., 1985; Rheinberg, 2004; Stiensmeier-Pelster & Rheinberg, 2003), but outline a selection of the most established.

Adaptations of the TAT

The French Test of Insight (FTI) developed by and named for French (1955, 1958a) uses the beginning of stories, rather than pictures, to activate imagery relevant to the motive under investigation ("Don is always trying something new…"). The manual used to categorize the imagery generated is equivalent to the coding system for nAchievement.

- The FTI is employed when the investigator deems it appropriate for pictorial cues to be replaced by verbal ones, e.g., when comparing individuals from different cultures. Hofer and Chasiotis (2004; see also Hofer, 2010) were the first to systematically and successfully design the TAT in a culture-fair way.

Birney, Burdick, and Teevan (1969) developed another TAT-like technique specifically to assess fear of failure. In contrast to Atkinson, these researchers proceeded on the assumption that fear of failure is not openly admitted, but becomes manifest indirectly, in perceptions of a hostile and self-threatening environment. The variable assessed by this technique is labeled hostile press (HP) and overlaps to some extent with high FF and low nAchievement scores (Birney et al., 1969; Heckhausen, 1968). This projective measure of fear of failure is used as a counterpart to nAchievement, particularly in studies conducted with US samples (e.g., Thrash & Elliot, 2002).

Schultheiss (2001b) translated Heckhausen's scoring key into English and thus made it accessible to a wider segment of the scientific community. Pang (2006, 2010) specifically stimulated HS and FF with positive and negative performance feedback in order to optimize Heckhausen's coding system. In turn, this engen-

dered a review of the Heckhausen key that Pang validated with relevant external criteria (e.g., pertaining to risk-taking behavior). Numerous variations on the TAT picture cues and coding system have been proposed. Winter (1991a, 1991b) developed a manual that allows achievement, power, and affiliation motives to be inferred from speeches, school books, and other documents, as well as from TAT stories. It does not permit hope- and fear-related content categories to be assessed separately, however.

Kuhl and Scheffer (1999; see also Scheffer, 2003; Baumann, Kazen, & Kuhl, 2010) modified the TAT technique for the assessment of basic motives (including achievement) in the Operant Motive Test (OMT). First, they used highly ambiguous pictures. Second, participants do not have to write complete stories. Instead, they are asked to concisely write down their thoughts on four central questions. This reduces the time required for running and coding the test. The key for the content analysis is driven by theory and involves concepts (for the achievement motive: flow, internal standards of excellence, coping with failure, pressure, and failure) that are taken from theories of motivational self-regulation (Kuhl, 2000, 2001). More detailed information on this method can be found in Chap. 13.

The achievement motive grid. Schmalt (1973, 1976a, 1976b, 1999) took a new approach to measuring the achievement motive. His Achievement Motive Grid (AM Grid) is a semi-projective technique that combines the advantages of the TAT method (picture cues) with the merits of questionnaire measures (objective and parsimonious analysis). Respondents are presented with 18 pictures from different areas of activity (sports, school, etc.). The same 18 statements – borrowed from the content categories of Heckhausen's TAT method – are listed below each picture. Respondents are asked to check those statements that, in their opinion, apply to the person shown in the picture (e.g., a student doing his homework: "He feels proud; doesn't think he's capable; is afraid of doing something wrong"). Three different motive tendencies are distinguished:

- HS: The conceptual equivalent of the TAT success motive
- FF-1: Active failure avoidance; also includes items reflecting a low self-concept of ability
- FF-2: Fear of failure and its potential social consequences

The two aspects of fear of failure (active vs. passive avoidance) are thus also clearly apparent in the AM Grid. Schmalt, Sokolowski, and Langens (2000; see also Langens & Schmalt, 2008; Sokolowski, Schmalt, Langens, & Puca, 2000) have expanded the Grid technique to cover the power and affiliation motives as well. This Multi-Motive Grid (MMG; Chap. 8) measures hope and fear components separately for each of the three motives.

Excursus

Using the Rasch Model to Test the TAT Measures

Kuhl (1977, 1978a) tested whether the TAT measures HS and FF can be scaled according to the Rasch model. He analyzed 6,204 TAT protocols produced by 1,034 respondents of different ages, genders, and educational levels. The consistency of both measures – or, more precisely, their content categories – was tested with respect to the theoretical construct (i.e., the Rasch criterion of "specific objectivity" was applied). The first question to be addressed was whether the frequency of content categories relating to a specific motive (HS or FF) varied proportionally across each pair of picture stimuli. Given this to be true, it should be possible to map all individual content categories to a regression line with a slope of one when two pictures are compared. As Fig. 6.4a shows for FF, the content categories F and R deviate markedly from the regression line. Relative to the other categories, F and R were scored disproportionately more often in stories about picture D than in stories about picture B. Assuming that a motive can be expressed in terms of differ-

ent content categories depending on the picture, this kind of interaction between the pictures and the response parameters does not necessarily preclude the specific objectivity of a person or an item parameter. For this reason, Kuhl did not view test items as pictures isolated from responses, but conceived of the two as fixed picture-response combinations.

Kuhl subjected the parameters calculated to internal and external model tests. For HS, the parameters of picture-response combinations proved consistent across various subgroups of participants. This finding held whether the groups were divided on the basis of high vs. low HS scores (internal model test) or high vs. low FF scores (external model test). In other words, the HS content categories yield equivalent and – from the perspective of construct theory – consistent indexes for one and the same personality trait. A different pattern of results emerged for FF, however. The internal model test showed that the FF content categories were not unidimensional. Figure 6.4b illustrates these findings for picture D in the Heckhausen TAT. Participants low in FF scored disproportionately more often in the categories If, Nf, and Af, whereas participants high in FF scored disproportionately more often in the categories F and R. Thus, the results did not substantiate the assumption that FF is a consistent disposition across situations and reactions. Further analysis revealed that it was not the pictures, but the content categories that caused this inconsistency. Two classes of fear-related imagery could be distinguished:

- A tendency toward expectancy and action-related failure avoidance (Nf, If, Af)
- A tendency to become preoccupied with failure (F) and its affective consequences (R)

Fear of failure (FF), as defined by Heckhausen, thus seems to incorporate active (or "action-oriented") as well as passive (or "state-oriented") approaches to coping with failure (Kuhl, 1983; Schultheiss & Brunstein, 2005). Factor analytic studies yielded very similar results. Whereas HS proved to be unidimensional, two independent factors emerged for FF: the need to avoid failure, on the one hand, and negative affective states occurring in response to failure, on the other (Sader & Keil, 1968).

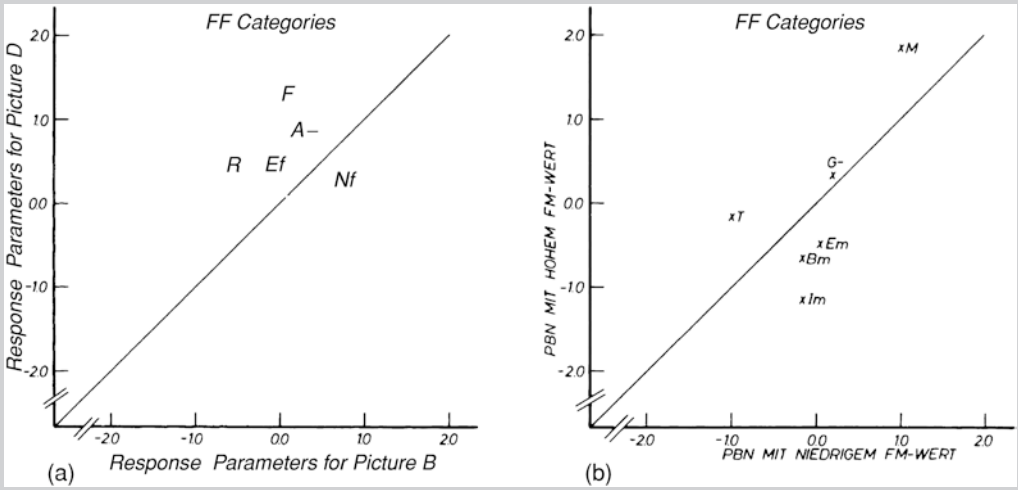

Fig. 6.4 Response parameters for the "fear of failure" (FF) content categories for (**a**) two TAT pictures (Pictures B and D from Heckhausen, 1963) and (**b**) two groups of respondents with high vs. low FF scores. The deviation of the response parameters from the regression line does not challenge the specific objectivity of FF in case (**a**), but it does in case (**b**) (Based on Kuhl, 1978a, pp. 40, 44)

- Different from the TAT method, the reliability of the Achievement Motive Grid is satisfactory based on the criteria of classical test theory.
- Besides its applications in basic research, the Grid technique has widely been used, and turned out to be quite fruitful, in studies on achievement motivation in the school setting (Schmalt, 2003).

Objective Tests

Like projective tests, objective tests do not rely on self-reports as a source of information on motives. Instead, motives are inferred from observable behavioral characteristics. Drawing both on Atkinson's (1957, 1964) model of risk-taking behavior and on Atkinson and Birch's (1970) dynamic action theory, Blankenship (1987) developed a computer-assisted method for the assessment of the achievement motive. For this purpose, the following behavior aspects are tested:

- Realistic vs. unrealistic change in levels of aspiration (typical vs. atypical shifts in levels of aspiration in response to success and failure)
- Preference for moderately difficult tasks over very easy or very difficult tasks
- Response latencies in choosing between achievement-related activities and neutral activities

Realistic targets, a preference for moderately difficult tasks, and shorter response latencies in choosing achievement-related activities proved to be intercorrelated behavioral characteristics indicative of a high "resultant" achievement motive. Although its proximity to behavior makes this method seem very convincing, it should be noted that the aspects it is actually supposed to predict (criteria of achievement-motivated behavior) are included in the measurement of the motive itself. In the German-speaking countries, Kubinger and Ebenhöh (1996; see also Kubinger & Litzenberger, 2003) have developed a similar computer-assisted method to assess achievement-oriented attitudes to work in a way that is both proximal to behavior and difficult to fake.

Questionnaire Methods

The multitude of questionnaire methods that have been designed to measure differences in achievement motivation cannot compete with the TAT method's contributions to achievement motivation research (Heckhausen et al., 1985; McClelland, 1980, 1985b; Spangler, 1992). Despite strong correlations between the various questionnaires, they are practically unrelated to TAT measures of nAchievement or of HS and FF. These findings substantiate McClelland's (1980; McClelland, Koestner, & Weinberger, 1989) suspicions that indirect (or operant) and direct (or respondent) procedures for the measurement of motives do not capture the same constructs (see Chap. 9). The three inventories presented below have been chosen to illustrate the many questionnaire measures available because they have been, and remain, closely connected with the development of achievement motivation research.

Questionnaire Methods Tapping Achievement Motivation

- Mehrabian Achievement Risk Preference Scale (MARPS; Mehrabian, 1969)
- Behaviors characteristic of achievement- or success-motivated individuals:
  - Realistic targets
  - Striving for independence
  - Preference for moderately difficult tasks
- Achievement Motivation Test (AMT, Hermans, 1970)
- Achievement Motives Scale (AMS; Gjesme & Nygard, 1970)

Two scales tap behavioral characteristics associated with anticipation of success (analogous to HS) vs. failure anxiety (analogous to FF). Items relate to the striving to obtain information about one's competence and address both cognitive and affective characteristics of achievement-oriented behavior. Sample success item: "I feel pleasure at working on tasks that are somewhat difficult for me." Sample failure item: "I become anxious when I meet a problem I don't understand at once."

It has long been acknowledged that motives measured by questionnaire techniques barely correlate with motives assessed using the TAT method (deCharms, Morrison, Reitman, & McClelland, 1955). This finding has been corroborated by numerous researchers (Halisch, 1986; Halisch & Heckhausen, 1988; Niitamo, 1999; Spangler, 1992; Schultheiss & Brunstein, 2001). Table 6.3 illustrates the typical pattern of results with a dataset that Brunstein and Schmitt (2003) collected from university students enrolled in various majors (psychology students were excluded). The correlations between hope for success as measured by projective (TAT), semi-projective (Grid), and questionnaire (AMS) methods, respectively, all approach zero. There are weak, but significant, correlations between fear of failure as measured by the TAT and by questionnaire measures. Only the correlations between the two questionnaire measures (AMS and MARPS) are really substantial in size. Notably, there is a marked negative correlation between HS and FF in the self-report measure (AMS), but not in the TAT. The correlations reported in Table 6.3 support the idea that there is a considerable overlap between respondents' subjective assessments of their cognitive capacities (measured with Meyer's, 1972, self-concept of ability questionnaire) and self-attributed achievement orientation. People who describe themselves as success-oriented achievers rate their intellectual abilities more favorably than people who describe themselves as being afraid of failure.

Covington and Omelich (1979), Kukla (1972b), Meyer (1984a, b, 1987), and Nicholls (1984a) had drawn attention to this point and concluded that perceived competence (or ability) is a major component of achievement motivation. However, inspection of the correlations for the TAT measures of HS and FF shows that neither is related to the self-concept of ability, challenging the assumption that achievement-related motives can be equated with ability-related self-views. These findings went unheeded for many years in empirical research. Instead, the same labels (hope for success, fear of failure) were used for measures of achievement motivation that have very little to do with one another on the empirical level. McClelland and his associates (1989; see also Weinberger & McClelland, 1990) finally spelled out the dangers of using the same terms to describe different concepts and proposed that a clear distinction be drawn between motives measured using indirect (TAT) methods and motives assessed with direct (questionnaire) methods. Their reasoning and findings are presented in Chap. 9.

It remains problematic, however, that even across indirect tests the convergent validity for the same motive tends to be fairly low. Table 6.3 shows this for measurements of the achievement motive with the TAT and the Motive Grid. The problem persists even if the degree of similarity between indirect instruments is increased. Schüler,

Table 6.3 Correlations between different methods of measuring individual differences in achievement motivation

	1.	2.	3.	4.	5.	6.	7.	8.
1. HS: TAT	–							
2. FF: TAT	0.07	–						
3. HS: MMG	0.10	−0.03	–					
4. FF: MMG	−0.07	0.02	−0.15*	–				
5. HS: AMS	−0.01	−0.19**	0.04	−0.07	–			
6. FF: AMS	−0.05	0.17**	−0.01	0.08	−0.57**	–		
7. MARPS	−0.09	−0.19**	0.00	−0.08	0.57**	−0.46**	–	
8. Subjective capacity	0.05	−0.03	0.05	−0.12	0.41**	−0.55**	0.35**	–

Data from Brunstein and Schmitt (2003)
*$p < 0.05$; **$p < 0.01$
$N = 220$ students with different majors, *HS* hope for success, *FF* fear of failure, *TAT* thematic apperception test, *MMG* Multi-Motive Grid, *AMS* Achievement Motives Scale, *MARPS* Mehrabian Achievement Risk Preference Scale, *subjective capacity* self-concept of ability

Brandstätter, Wegner, and Baumann (2015) used several instruments, including the TAT (coded with Winter's, 1991a, scoring key), OMT, and the Motive Grid, in a student sample and could not find a significant correlation of the three instrument-specific variables for "one" achievement motive. It seems doubtful that these instruments assess the same construct. At least, the methodological variance appears to be substantial.

6.2.8 Anatomy, Mechanisms, and Measurement of the Achievement Motive

According to Atkinson's (1957, 1964) formula (Chaps. 2 and 5), motivational tendencies result from the interplay of three variables: incentive (*I*), probability of success (*P*), and motive strength (*M*). For reasons of simplicity, we focus here on the tendency (*T*) to be successful (*s*), which Atkinson defined as follows:

$$Ts = Ms \times Ps \times Is$$

In this formula, the success motive functions as a weighting factor that is combined multiplicatively with incentive and expectancy. The question arises of which of the two situational factors, incentive or expectancy, is weighted by the success motive (or whether *Ms* applies to the product of both factors).

On the basis of the formula itself, it is impossible to give a formal or mathematical answer to this question. The fact that Atkinson combined the two situational variables in a subtractive relationship ($Is = 1 - Ps$) complicates the matter further. Approaching the problem on the conceptual level, different achievement motivation researchers have provided very different responses. McClelland, Atkinson, and Heckhausen advocated the view that a strong success motive increases the affective value of success. The product term $Ms \times Is$ can thus be interpreted as the valence of a success. The amount of pride felt by someone who has mastered a challenging task can be expected to increase as a function of the strength of her or his success motive (Sect. 6.4.1). Kukla (1972a, 1972b) and Nicholls (1984a), in contrast, assumed the achievement motive to have an impact on expectancies. Achievement-motivated individuals are more confident in their abilities, expect to be able to cope with difficult tasks, and are thus more motivated to tackle this kind of tasks.

Although the issue of affective (or incentive-based) vs. cognitive (or expectancy-based) interpretations of the success motive is at the very core of achievement motivation theory (Sect. 6.4.2), the debate is still limited to a few insiders. In view of the disparities between motive variables tapped by TAT vs. questionnaire methods, it might be speculated that HS as measured by the TAT has an impact on the incentive of success, whereas HS as measured by questionnaires has an impact on the anticipation of success. This interpretation would converge with the finding that the scores on achievement motive scales are related to the self-concept of ability, whereas TAT scores are not.

Ultimately, however, neither the TAT nor questionnaire methods distinguish carefully between incentive-related and expectancy-related information. HS as measured by the TAT – originally defined by Heckhausen (1963) as an "expectancy-related attitude" – covers both incentives (e.g., positive affect after success) and expectancies (e.g., certainty of success). Much the same can be said for the questionnaires mentioned above. In most cases, the statements to be rated relate to both incentives and expectancies. People who state that they "like working on difficult tasks" indicate not only that they find difficult tasks attractive but also that they are confident of being able to master them.

A more accurate examination of the mechanisms of achievement motives would require the disentangling of incentive-related and expectancy-related components. Global measures of achievement motivation are unsuitable for this purpose. Heckhausen (1977a, 1977b, 1986) thus proposed that the summary concept of "the" achievement motive should be abandoned altogether, and instead split into a number of constituent parts connected with situational vari-

ables (incentives, expectancies, instrumentalities, etc.). This approach would certainly help to provide more accurate descriptions of interactions between person and situation characteristics in motivation research. Besides, it seems implausible to represent a highly complex construct, such as the achievement motive, by only one single summary score (or by two scores if HS and FF are assessed separately) that is then used to predict a broad range of behavioral criteria.

Multidimensional questionnaire measures of achievement striving have already been successfully developed, as reported by Spence and Helmreich (1978). Schuler and Prochaska (2000) distinguished 17 scales of occupational achievement motivation, loading on three factors: ambition, independence, and task-related motivation. Comparable work on the development of multidimensional indirect (or operant) motive tests is still in its infancy. The Operant Motive Test (OMT) developed by Kuhl and Scheffer (1999) probably gets closest to achieving this goal (see Chap. 13).

After a long period of stagnation, it is high time to reinvigorate research on the measurement of the achievement motive (or, more specifically, its various components and facets). In the last 15 years, discussion on the measurement of "implicit" personality traits has been revived by the introduction of new chronometric methods, such as the "Implicit Association Test" (IAT) developed by Greenwald, McGhee, and Schwartz (1998), to measure (implicit) attitudes, self-concepts, and motives that people are not able to talk about (because they are not accessible to introspection) or do not want to talk about (because they are socially undesirable; cf. Greenwald, Banaji, Rudman, Farnham & Nosek, 2002; Wilson, Lindsey & Schooler, 2000). IAT-based assessment methods have also been developed and used to measure certain aspects of achievement motivation (Brunstein & Schmitt, 2004, 2010), power motivation (Slabbinck, De Houwer & Van Kenhove, 2013), and affiliation motivation (Slabbinck, De Houwer & Van Kenhove, 2012). They still need to be fully validated.

Summary

The achievement motive can be defined as a recurrent concern to compete with standards of excellence and to exceed previous levels of competence. The TAT procedure was designed to measure this motive, with the achievement-related imagery expressed being interpreted as an indication of motive strength. The method was developed mainly on the basis of empirical criteria: either the test's sensitivity to aroused motivational states (David C. McClelland) or the strength and change of the level of aspiration (Heckhausen TAT). The TAT method can be used to assess both hope for success and fear of failure. When the criteria of classical test theory are applied, its reliability must be considered low. Rasch model testing showed "hope for success" to be a unidimensional construct, but "fear of failure" to comprise both passive failure avoidance and active coping with failures. The use of different models of stochastic test theory that integrate assumptions of dynamic action theory has led to evidence that the TAT allows for a reliable measurement of personality motives. Moreover, numerous questionnaire measures have been constructed to assess the strength of the achievement motive (or its success-related and failure-related subcomponents) directly, by means of self-report. Which of the two methods (TAT or questionnaire) is more suitable for measuring the strength and direction (success vs. failure) of the achievement motive continues to be the subject of heated discussion. Indirect and direct methods for assessing individual differences in achievement motivation are barely correlated. Remarkably, this is also true for results derived from different indirect instruments (TAT, OMT, Motive Grid).

6.3 The Achievement Motive and Behavior

The achievement motive has been related to a range of behavioral characteristics, on the levels of both individual performance and societal productivity indicators. Selected findings are presented in the following two sections.

6.3.1 The Achievement Motive and Individual Performance

The first studies conducted to validate the nAchievement measure investigated the relations between the strength of the achievement motive and numerous behavioral criteria, without paying particular attention to situational incentives. Behavior was seen as a direct function of the strength of the motive and interindividual variations thereof. Meta-analyses have since shown that such correlations rarely exceed the level of .30 (Collins, Hanges, & Locke, 2004; Spangler, 1992). Because these findings have been documented elsewhere (Atkinson, 1964; Atkinson & Feather, 1966; Heckhausen et al., 1985), we limit our account to a few examples.

One of the fundamental characteristics attributed to every motive is that it energizes instrumental behavior; a second assumption is that behavior is more easily learned if it serves to satisfy a motive (cf. McClelland, 1980). It thus seemed reasonable to examine the predictive validity of the achievement motive with experimental tasks requiring high levels of effort and mental concentration. As Thurstone had noted early (see also Thomas, 1983), this is generally the case when in speeded tests respondents are required to execute large numbers of tasks as quickly as possible. Other studies tested whether the achievement motive is related to the acquisition of task-specific skills. Lowell (1952) was the first to take this approach. He presented participants with simple addition problems ("Düker tasks") and scrambled-word tasks (anagrams) and assessed performance at 2-min intervals. Right from the beginning and throughout the experiment, participants high in achievement motivation outperformed those low in achievement motivation on the addition problems (Fig. 6.5a). The same was true for the anagram tasks, but motive-dependent performance differences were not substantial until the middle and the last third of the test phase (Fig. 6.5b). In contrast to the (overlearned) addition problems, performance on the anagrams required the participants to identify a learning algorithm. Relative to less-motivated participants, highly motivated participants needed less practice to learn this algorithm and thereby optimize their test results. Lowell's findings for simple arithmetic problems were replicated in further studies (Biernat, 1989; Wendt, 1955), showing that individuals high in the achievement motive tend to perform better on tasks requiring high levels of mental concentration than do individuals with a relatively weak achievement motive. This difference is even stronger when respondents are provided with feedback informing them about how their achievement develops across task trials (Brunstein & Hoyer, 2002; Brunstein & Maier, 2005). Lowell's findings on the acquisition of

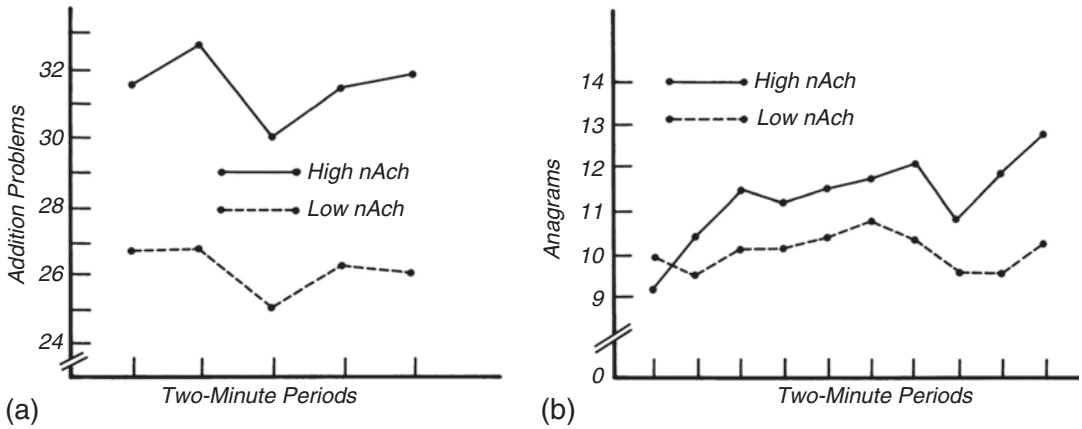

Fig. 6.5 Mean performance of individuals high and low in the achievement motive (nAchievement) on (**a**) simple addition problems and (**b**) scrambled-word tasks (anagrams) over 2-min periods (Based on Lowell, 1952, pp. 36, 38)

Study

Achievement Motive and Teamwork

French (1958b) investigated the influence of the achievement and affiliation motives on performance in a teamwork setting. Teams were given the task of constructing a coherent story from a number of phrases. Each of the four members of a team was responsible for putting one set of sentences into logical order. It was only when all four sections of the text were assembled that a coherent text emerged. The team's text coherence score served as the dependent variable (group performance). French varied three factors in the study design:

1. The composition of the groups (either the achievement motive or the affiliation motive was dominant in all members)
2. The task orientation imposed on the groups (in some groups, participants were required to reach consensus on the best solution; in others, they were allowed to insist on their individual solutions)
3. The type of feedback provided by the experimenter halfway through the experiment (praise for the group's competence or its cooperative spirit)

The study's findings are presented in Table 6.4.

As predicted, groups high in the achievement motive performed better when praised for their competence than for their cooperative spirit. The reverse was true of groups high in the affiliation motive. Task orientation had no effect in groups high in achievement motive, but groups high in the affiliation motive performed somewhat better when the task orientation corresponded with their dominant motive (group orientation). The most favorable constellation was affiliation motivation, group orientation, and feedback focusing on the group's cooperative spirit. In contrast, the combination of individual task orientation and competence feedback had unfavorable performance effects in affiliation-motivated groups. Likewise, groups high in the achievement motive performed particularly badly when neither the task orientation (group) nor the feedback condition (cooperation) corresponded with their dominant motive. None of the experimental factors alone had a significant main effect on performance, but the interactions between the dominant motive, on the one hand, and task orientation and feedback, on the other, were significant. These findings demonstrate that motives only have a predictable effect on behavior when the situational incentive conditions are taken into account.

Table 6.4 Mean performance of groups of four as a function of dominant motive (achievement vs. affiliation), task orientation (group vs. individual), and type of feedback (competence vs. cooperative spirit)

	Achievement motive		Affiliation motive	
	Group task	Individual task	Group task	Individual task
Feedback	Orientation	Orientation	Orientation	Orientation
Competence	40.50	39.38	29.12	25.12
Cooperation	29.25	30.87	38.38	31.50

Based on French (1958b, p. 404)

problem-solving algorithms prompted few follow-up studies, however.

- Achievement motivation research has focused on performance (i.e., the application of available competence in a current achievement situation) rather than on the acquisition of competence (i.e., the gradual mastery of skill).

The creativity of research inspired by David C. McClelland's efforts to investigate the effects of the achievement motive on performance outcomes in real-life settings remains unparalleled. Studies carried out in India (Singh, 1979) and Columbia (Rogers & Svenning, 1969), for example, showed that farmers high in the achievement motive implemented more innovative farming methods and produced better yields than their less achievement-motivated counterparts. In a longitudinal study, McClelland and Franz (1992) found that the strength of the achievement motive, measured at age 31, predicted income and occupational success at age 41. There is no doubt that findings of this kind are impressive and attest to the criterion validity of the nAchievement measure. However, it remained unclear which mediating processes (more learning, more time devoted to work, higher curiosity levels, higher levels of aspiration, etc.) accounted for the relationships observed.

As mentioned earlier, most early studies seeking to validate nAchievement paid very little attention to situational conditions. A study by French (1958b) in which the fit between behavioral motives and situational incentives was varied systematically is an exception to this rule (see excursus).

Findings similar to those reported by French have been documented by McKeachie (1961), in an analysis of college students' performance, and by Andrews (1967), in an analysis of career advancement in companies. Here again, correspondence between incentives and motives proved to be the decisive factor in educational and occupational success.

6.3.2 The Achievement Motive, Historical and Economic Change, and Regional Disparities Between Educational Achievements

Not only have differences in motive strength been related to individual differences in behavior, differences in the motives of various demographic groups have also been established. This strand of research took the bold, but plausible, approach of using sociological, historical, and economic categories as indicators of achievement-related valuations and behaviors. It was initiated by McClelland (1961), based on Max Weber's (1904) hypothesis of an intrinsic relationship between the Protestant work ethic and the spirit of capitalism. According to Weber, the industrial revolution was sparked by the activistic work ethic of post-reformation religious movements (e.g., Calvinist teachings of predestination).

6.3.2.1 The Achievement Motive and Economic Growth

McClelland (1961) reasoned that children brought up in the context of the Protestant ethic are raised to be independent and accountable. This kind of upbringing fosters the development of a high achievement motive, which in turn stimulates entrepreneurial activity, leading to accelerated economic growth, consistent reinvestment of capital gains, and an open-minded approach to technological progress. A comparison of Protestant and Catholic countries around 1950 revealed the former to be wielding greater economic power. McClelland used the per capita consumption of electricity as an index of economic power, taking into account national differences in natural resources.

How, though, is it possible to test the effects of national differences in collective motives on economic growth? And how can collective motives be measured at all? McClelland obtained a national motive index by analyzing the content of stories in third-grade readers using the nAchievement coding system. He felt that few sources would reflect the motivational "Zeitgeist" in countries with compulsory schooling as well as these early readers. In a preliminary analysis of a relatively small group of countries, the national nAchievement indexes for the year 1925 were correlated with the per capita consumption of electricity between 1925 and 1950. Yielding a coefficient of $r = 0.53$, this correlation turned out to be sensationally high. In a second analysis of a larger group of countries (Table 6.5), McClelland correlated the

national nAchievement index with the discrepancy between observed and expected increases in electricity consumption between 1952 and 1958. Differences in the countries' baseline levels of economic growth caused by disparities in the availability of natural resources and the level of industrialization were statistically controlled. The correlation between the motive index for the year 1950 and the increase or decrease in electricity consumption between 1952 and 1958 was $r = 0.43$. Thus, a high national achievement motive seems to be associated with disproportionately high economic growth, while low motive strength predicts below average growth. Follow-up studies generally corroborated this finding, but data have shown that the relationship between nAchievement and the level of electricity consumption is no longer as strong as it once was (Beit-Hallahmi, 1980; Frey, 1984; McClelland, 1976, 1984a, 1984b; Orpen, 1983). It seems that the validity of electricity

Table 6.5 National motive index (nAchievement) for the year 1950 and rate of increase in electricity consumption (deviation from the expected growth rate in standard deviations) between 1952 and 1958

	National motive index (1950)	Higher consumption than expected		National motive index (1950)		Lower consumption than expected
Countries high in nAchievement	Turkey	3.62	+1.38			
	India	2.71	+1.12			
	Australia	2.39	+0.42			
	Israel	2.33	+1.18			
	Spain	2.33	+0.01			
	Pakistan	2.29	+2.75			
	Greece	2.29	+1.18	Argentina	3.38	–0.56
	Canada	2.29	+0.06	Lebanon	2.71	–0.67
	Bulgaria	2.24	+1.37	France	2.38	–0.24
	USA	2.24	+0.47	South Africa	2.33	–0.06
	West Germany	2.14	+0.53	Ireland	2.29	–0.41
	USSR	2.10	+1.62	Tunisia	2.14	–1.87
	Portugal	2.10	+0.76	Syria	2.10	–0.25
Countries low in nAchievement	Iraq	1.95	+0.29	New Zealand	2.05	–0.29
	Austria	1.86	+0.38	Uruguay	1.86	–0.75
	England	1.67	+0.17	Hungary	1.81	–0.62
	Mexico	1.57	+0.12	Norway	1.71	–0.77
	Poland	0.86	+1.26	Sweden	1.62	–0.64
				Finland	1.52	–0.08
				Netherlands	1.48	–0.15
				Italy	1.33	–0.57
				Japan	1.29	–0.04
				Switzerland	1.20	–1.92
				Chile	1.19	–1.81
				Denmark	1.05	–0.89
				Algeria	0.57	–0.83
				Belgium	0.43	–1.65

Based on McClelland (1961, p. 100)

consumption as an indicator of economic development has decreased somewhat.

Content analysis of written documents makes it possible to establish motive indicators for earlier historical periods as well. Samples of datable literary texts were analyzed to examine the currency of achievement-related themes in earlier cultures. These texts included Ancient Greek epigrams, poetry, and funeral orations dating from 900 to 100 BC; Spanish novels, poems, and legends from 1,200 to 1,730; and English dramas, travelogues, and ballads from 1,400 to 1,830. The respective economic indicators were the extent of Greek olive oil exports, as shown on archeological maps; the tonnage of ships per year departing from Spain for the New World; and annual imports of coal to Greater London. In all cases, periods of economic prosperity were preceded by increases in the nAchievement index, and periods of economic decline by decreases. Figure 6.6 shows another example of this relationship: deCharms and Moeller (1962) compared the number of patents granted in the USA between 1810 and 1950 with the development of the national motive index (nAchievement as derived from reading books). Again, changes in nAchievement heralded corresponding changes in the patent index.

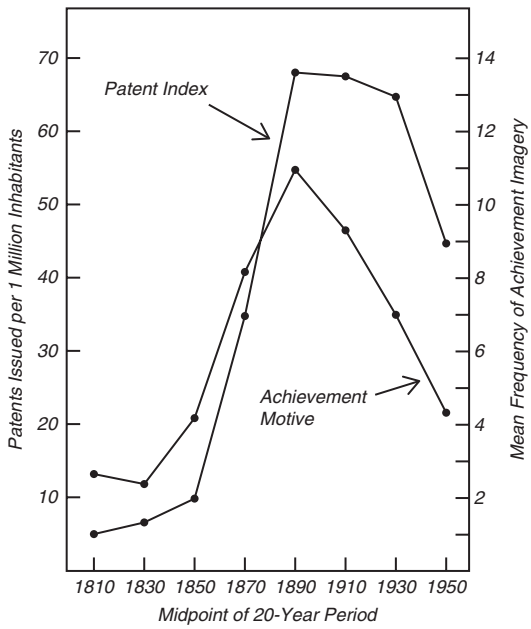

Fig. 6.6 National nAchievement index (frequency of achievement-related themes in readers) and number of patents issued per one million inhabitants of the USA between 1810 and 1950 (Based on deCharms & Moeller, 1962, p. 139)

6.3.2.2 Achievement Motive and Regional Disparities in Educational Achievements

In many cases, national motive indices were assessed using children's and youth literature. Therefore, educational achievements – both of individuals and of certain populations – should be a central criterion for the validation of such indices. In times of comparative studies on educational achievements, it has become possible to empirically test such assumptions.

Using Winter's (1991a) coding key, Engeser, Rheinberg, and Möller (2009) assessed the achievement-related content of textbooks for German language and mathematics classes in grades 2 and 9 in the German states of Baden-Wurttemberg and Bremen. These two states were chosen because they differ substantially with regard to indicators for economic (e.g., employment rate) and educational performance (results in comparative studies), usually favoring Baden-Wurttemberg. Nevertheless, several socioeconomic and cultural influences were seen as relatively comparable across both states. Engeser et al. (2009) found that textbooks used in Baden-Wurttemberg featured more achievement-related content than textbooks from Bremen, which was explained with McClelland's (1961) position: the motivational orientation of a society (or here of a particular region within a country) can be extracted from written documents that are widely used. A Zeitgeist characterized by achievement orientation (assessed by analyzing textbooks used in schools) is associated with higher educational performance.

More evidence for this position was reported by Engeser, Hollrich, and Baumann (2013) in a study that included seven federal states in Germany. They assessed the motivational Zeitgeist based on popular children's books in

the different regions, which were chosen using best-selling book lists and sales. Across states they found substantial positive correlations between the level of educational achievement (measured with comparative studies across states) and the frequency with which achievement-oriented content was featured in regionally preferred children's literature.

Whether or not we are willing to accept McClelland's (1961) idea that collective achievement motivation fuels economic and societal developments, his hypothesis does not provide any concrete explanation for the origin of this relationship. Engeser, Euen, and Bos (2015) tried to find such an explanation. In essence, they argued that achievement-related key words appearing in textbooks ("being successful," "master something") function as cues that activate the achievement motive via semantic behavioral priming and thus lead to more effort and eventually better performance. In a joint analysis of the achievement-oriented content in textbooks and the educational achievements of more than 3,000 students in Germany, Engeser et al. (2015) found preliminary evidence in support of this view. More experimental research will be needed to scrutinize the aforementioned explanation (semantic priming). A group of researchers around Engeser are currently working on such a study (Engeser, Baumann, & Baum, 2016).

6.3.3 Physiological and Neuroendocrine Correlates of the Achievement Motive

The very name of the construct seems to encourage researchers to validate measures of the achievement motive with criteria of task performance. Because performance is dependent on various factors, however, this validation process is difficult. One potentially interfering factor are cognitive abilities that may differ substantially across individuals and thus obfuscate motivational influences. Alternatively, it should be possible to use indicators of physiological activation in order to validate the achievement motive assessed with the TAT. In fact, many studies have chosen this approach since the beginning of research on achievement motivation (see Hall, Stanton, & Schultheiss, 2010). The achievement motive has been associated with measurements of muscle activity (Mücher & Heckhausen, 1962) and the concentration of uric acid (Mueller & Beimann, 1969). Pharmacological studies have shown that taking methylphenidate (Ritalin), a stimulant with an activating effect, increases the production of achievement-related thoughts in the TAT (Bäumler, 1975). McClelland's (1995) work was inspired by the observation that the strength of the need for achievement was negatively related to the urine volume in male adults. McClelland thus speculated that stimulating the achievement motive leads to the release of arginine vasopressin, an antidiuretic peptide which is thought to have beneficial effects on memory performance. All of these trials, however, were too sporadic in order to justify safe assumptions about the physiological and neuroendocrine basis of achievement-motivated behavior.

This line of research has not received much attention until recently (see the more detailed discussion of the biological foundation of motivated behavior, Chap. 10). Schultheiss, Wiemers, and Wolf (2014) as well as Yang, Ramsay, Schultheiss, and Pang (2015) tested the role of the achievement motive in stress regulation during demanding tasks. These studies were founded on the assumption that people with a strong achievement motive (TAT) process the difficulty of a task and the associated uncertainty whether they can succeed in a different way than their counterparts with a weak achievement motive. As reason for this expected difference, the authors suggested the recollection of positive experiences in the former group. People with a strong achievement motive perceive the difficulties that arise when working on a task as challenges that indicate successful mastering of the task at hand. By anticipating this rewarding experience, they see difficulties in a more positive light and feel much less stress when working on a task.

In order to test this hypothesis, Schultheiss et al. (2014) chose tasks (e.g., the Trier Social

Stress Test by Kirschbaum, Pirke, & Hellhammer, 1993) that had been shown to induce stress and activate the HPA axis that releases the stress hormone cortisol. Saliva cortisol, which was measured both before and after the tasks, indicated that stress reactions had a lower intensity in participants with a strong achievement motive (TAT) than in those with a weak achievement motive. Yang et al. (2015) replicated these findings with tasks that were followed by negative feedback. Moreover, they found that participants with a strong achievement motive not only had a weaker stress reaction (cortisol) but also subjectively reported a more positive mood.

These findings show that a characteristic that distinguishes people with a strong achievement motive more than anything else is their keenness to deal with challenges in which it is uncertain whether they can succeed. This trait is stabilized through affective and physiological adaptation processes. Later in this chapter (Sect. 6.5.1), we will see that cognitive evaluation also plays an important role in this kind of adaptive achievement.

Summary

Subsequent to the development of the TAT method of achievement motive measurement, relations between nAchievement scores and a range of behavioral characteristics were investigated. Individuals high in achievement motivation were found to outperform those low in achievement motivation on simple arithmetic problems and learning tasks. High nAchievement scores predicted innovative and creative outcomes in real-life contexts. On the societal level, nAchievement was found to correlate with indicators of economic development and productivity. Recent studies suggest that achievement-related content that appears in children's literature and textbooks at school have an activating effect on the achievement motive. Regional differences in educational performance are reflected in the achievement-related content of the preferred schoolbooks. In addition to performance criteria, physiological measures of activation are associated with the strength of the achievement motive. More recent studies have shown that a strong achievement motive measured with the TAT lessens the stress reaction to challenging tasks.

6.4 The Risk-Taking Model as the Dominant Research Paradigm

Atkinson's (1957) model of risk-taking behavior has informed achievement motivation research since the 1960s and dominated it until the late 1970s. Indeed, it is often referred to as the theory of achievement motivation. An introduction to the model can be found in Chap. 5. In this chapter, we examine the empirical data it has generated. The risk-taking model is characterized by the distinction it draws between a directional and an intensity component of motivation. The directional component (dominance of the success or failure motive) determines the preferred level of task difficulty; the intensity component influences the efficiency of task performance.

Before we present the empirical findings, let us briefly review the three basic assumptions of the model:

1. The success incentive increases with the subjective difficulty of a task, while the failure incentive decreases.
2. The relationship between incentive and probability of success is multiplicative. From these two assumptions, it follows that the resultant motivational tendency (the difference between success and failure tendencies) is symmetrical in form as a function of task difficulty:
   - Tasks of moderate difficulty maximize the tendency to achieve success or to avoid failure, depending on which of the two motives is dominant.
   - For very easy or very difficult tasks, differences in the resultant tendency are relatively small. Thus, the behavior of success-motivated individuals can be expected to differ from that of failure-motivated individuals on tasks of moderate difficulty, but not on extremely easy or difficult tasks.

Atkinson expected this model to apply not only to task choice but also to persistence and achievement outcomes. He thus explained both decision-making behavior (task choice) and execution of instrumental activities (task performance) by reference to the same model parameters. The problems involved in equating these two aspects are discussed in more detail in Chap. 5.

3. The valence (V) of a performance outcome is the product of motive strength (M) and incentive (I):

$$V = M \times I$$

This latter assumption applies to both the valence of success and the valence of failure. The stronger the achievement motive, the stronger the weighting of the respective incentive, producing marked differences in the tendency to approach success or to avoid failure. This assumption of the risk-taking model has attracted far less research attention, although it is critical to the logic of the model.

6.4.1 Motive-Dependent Valence Gradients

- One key assumption of the risk-taking model is that valence gradients are motive dependent.

This assumption can be illustrated for the valence of success. The success incentive increases with the difficulty of a task ($Is = 1 - Ps$). The more difficult a task, the more pride is to be expected upon a successful outcome. According to the logic of the risk-taking model, however, the success motive, which weighs the incentive associated with success as a multiplicator, must also be taken into account in this prediction:

$$Vs = Ms \times Is$$

Thus, success-motivated individuals experience an even higher degree of satisfaction upon solving a difficult task than do less success-motivated individuals. It is only in the context of very simple tasks that no differences are to be expected between the two groups. Here the incentive is so low that a success is trivial. The same pattern holds for the failure incentive, the only difference being that the failure motive now acts as the weighting factor:

$$Vf = Mf \times If$$

In other words, individuals high in failure motivation feel more shame at failing on a simple task ($If = -Ps$) than do less failure-motivated individuals. If the task is very difficult, however, the failure incentive will be low because it is no disgrace for anyone to be defeated by a very difficult task. In this situation, differences between individuals scoring high versus low on the failure motive should be minimal. To summarize, as task difficulty increases, the valence of success can be expected to increase more steeply among individuals high in success motivation than among their less success-motivated counterparts. Conversely, as task difficulty decreases, the valence of failure can be expected to increase more steeply among individuals high in failure motivation than among their less failure-motivated counterparts.

Taken together, it can be assumed that (distinct) successes are more attractive to success-motivated individuals than to failure-motivated individuals, whereas failure-motivated individuals feel more shame at (distinct) failures than do success-motivated individuals. These effects are not restricted to actual success or failure. Rather, even before individuals have begun to tackle the task at hand, the valences of success and failure can take effect in anticipation of these outcomes.

6.4.1.1 Early Findings

These assumptions have rarely been tested directly (cf. Halisch & Heckhausen, 1988), and the few available studies yielded mixed results. The first study was conducted by Litwin (1966), who measured the valence of hits in a ring toss game in terms of the prize money participants judged to be appropriate for throws from various distances. After ten practice trials, participants were asked to specify how much money (from 0 to 1 $) should be awarded for hits from each distance. As shown in Fig. 6.7, the valence of

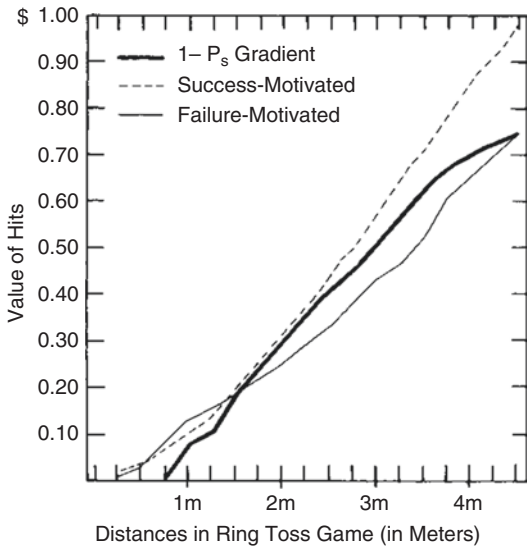

Fig. 6.7 Mean monetary value assigned by success- and failure-motivated individuals to hits from various distances in a ring toss game, as compared with the incentive function calculated on the basis of the estimated probabilities of success alone (Based on Litwin, 1966, p. 112)

success (prize money awarded) increased with the difficulty of the task. Moreover, the slope of the increase was significantly steeper for success-motivated individuals than for failure-motivated individuals (groups were formed by subtracting TAQ from nAchievement scores). The middle (bold) line represents the incentive function (1 – *Ps*), which was plotted on the basis of the probabilities of success estimated by a separate group of participants.

Litwin's (1966) findings seemed to corroborate the idea that valence gradients are motive dependent, although his study only considered the valence of success. However, these findings were substantiated in only one further study, in which Cooper (1983) asked respondents to estimate the valence of easy, moderate, and difficult tasks in terms of the (dis)satisfaction to be expected upon success or failure. However, Cooper's data did not confirm Atkinson's assumptions with respect to the failure valence. Neither Feather (1967) nor Karabenick (1972) could confirm success or failure valences to be the product of the interaction (×) of incentive and motive strength. Schneider (1973) did observe such an interaction, but only in one of several experiments.

Despite these largely disappointing findings, it would be premature to abandon the assumption that valences are motive dependent. After all, this assumption only applies to the "pure case," meaning that the variables under investigation must be operationalized with particular care in three respects:

1. The measurement of the two motives (HS and FF).
2. The determination of the subjective probability of success.
3. The assessment of success and failure incentives.

Shortcomings in all three domains of measurement can be identified in the studies cited. With the exception of Schneider's (1973) study, anxiety questionnaires were used to assess the failure motive, thus confounding the tendency to avoid failure with differences in the self-concept of ability. In many studies (including Cooper's), the subjective probabilities of success were gauged by respondents who had no experience of the task. In Feather's study, participants were told that task performance would not depend on intelligence, which may have reduced the failure incentive.

6.4.1.2 Further Analyses

Halisch and Heckhausen (1988) tried to avoid these methodological pitfalls by taking the following precautions:

1. They used the same instrument (Heckhausen's TAT) to measure both achievement motives (HS and FF). In addition, they administered questionnaire measures of achievement motivation and test anxiety.
2. They used a scaling method that provided a direct and unbiased measure of the valences of success and failure.
3. They varied task experience systematically to test the dependence of valence estimation on evidence-based expectancy of success.

The participants' task was to track a spot of light moving along a horizontal beam and to push

a button activating a video camera at the moment the spot filled a window in the beam. Task difficulty was manipulated by varying the speed of the spot of light.

A psychophysical scaling method was used to measure valence in terms of respondents' anticipated satisfaction or dissatisfaction with their performance. Respondents first identified standards for success and failure by specifying an upper and a lower boundary (or task difficulty level), beyond which they would experience success or failure, respectively. These estimates served as anchors for determining "minimal" success and failure levels. Based on these anchor points, participants were asked to specify the difficulty level at which they would experience "twice" as much satisfaction (success) or dissatisfaction (failure). The closer this estimate was to the respective anchor point, the steeper the valence gradient. In this method, slight deviations from the anchor point thus indicate a high level of emotional sensitivity to success or failure. The two achievement motives were assessed with TAT (Heckhausen, 1963) and questionnaire measures (e.g., MARPS, AMS, TAQ; Sect. 6.2.7).

The achievement motive scores that were derived from these two types of instruments were virtually unrelated. All questionnaires overlapped with scores on Meyer's (1972) questionnaire on the self-concept of ability (Halisch, 1986), while the TAT scores did not.

The results revealed a significant relationship between the TAT measures and the slope of the valence gradients for success and failure. The same pattern of results did not emerge for any of the questionnaires. Oddly, it was not the TAT net hope score (HS – FF), but the aggregate motive score (HS + FF), that interacted with task difficulty. Individuals high in aggregate motivation had a steeper valence gradient for success than for failure; the reverse held for individuals low in aggregate achievement motivation. In line with the predictions of the risk-taking model (Fig. 6.8a), a more detailed analysis of subcomponents of the success motive revealed that the content categories "positive affect," "praise," and

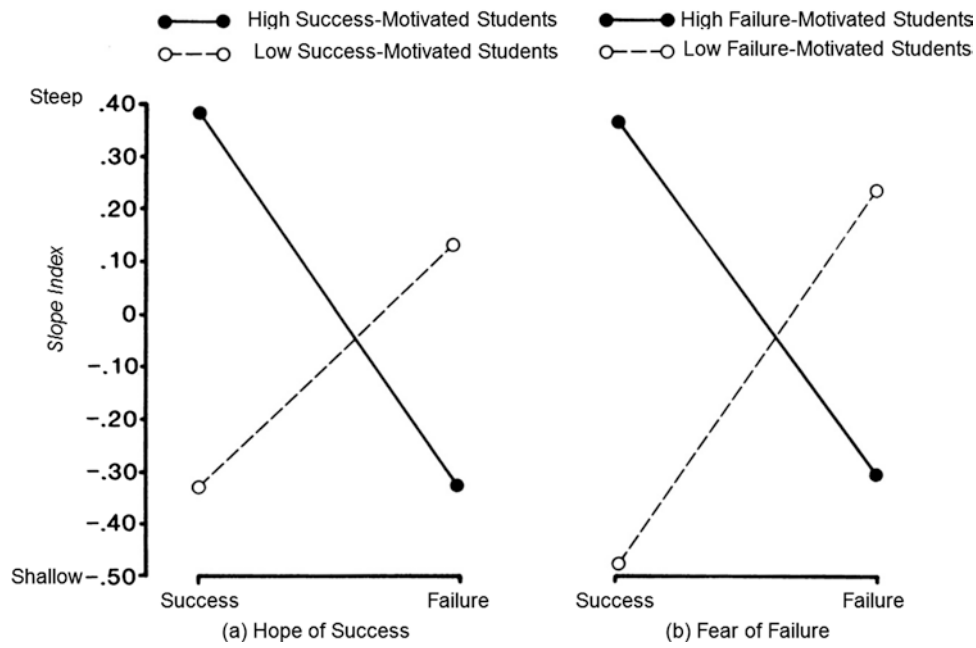

Fig. 6.8 Slope indexes of valence gradients for success and failure in (**a**) individuals high vs. low in success motivation (positive affect, praise, and expectancy of success) and (**b**) individuals high vs. low in failure motivation (total FF score) (Based on Halisch & Heckhausen, 1988, p. 60)

"expectancy of success" predicted steeper valence gradients for success than for failure. The findings for the failure motive were not congruent with the risk-taking model, however. Respondents high in the failure motive had steeper valence gradients for success than for failure; the reverse held for those low in failure motivation (Fig. 6.8b). Follow-up analyses showed that these findings were attributable to active failure avoidance (e.g., If). Once more, empirical research had identified a passive, avoidant facet of the failure motive, as well as an active, coping facet associated with higher attraction to success. It may be that success is the clearest indication of having averted failure (cf. Schultheiss & Brunstein, 2005). Additionally, valence judgments of another kind were best accounted for by scores obtained from the administration of questionnaire instruments. This alternative approach involved a reward schedule based on social comparison norms. Participants were asked to state how many points they would award someone for a success or deduct for a failure. Although there were no differences between success and failure, marked differences emerged in the general intensity with which success was rewarded and failure punished. Findings for a measure of test anxiety (TAQ) are illustrated in Fig. 6.9. Respondents low in test anxiety had steep gradients for both success (awarding points) and failure (deducting points) measured against a social reference norm. Respondents high in test anxiety had shallower gradients; i.e., they did not reward success or punish failure as strongly as their less anxious counterparts. Although this result seems plausible, it contradicts the risk-taking model, which predicts the slopes of the success and failure gradients to differ within the two anxiety groups (steeper success gradients in low anxiety respondents; steeper failure gradients in high anxiety respondents).

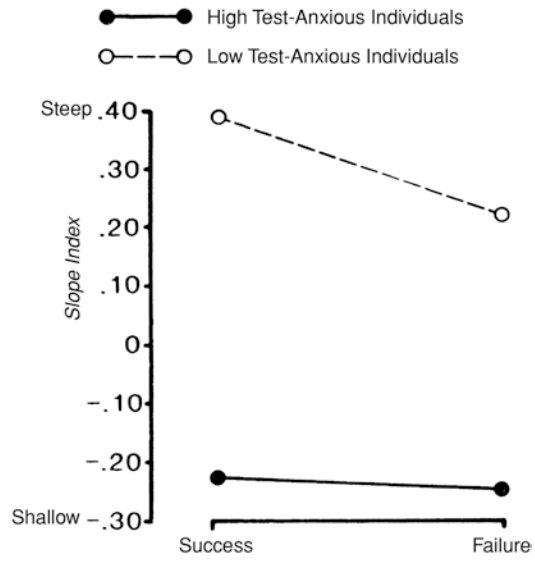

Fig. 6.9 Slope indexes of normative valence gradients for high vs. low test-anxious individuals (Based on Halisch & Heckhausen, 1988, p. 61)

6.4.1.3 Anticipated Satisfaction as a Function of Motive Strengths

In order to return to the core of measuring valence gradients ($V = M \times I$), Brunstein and Maier (2005) tested the following idea: the extent to which the successful completion of a difficult task will be experienced as emotionally rewarding depends on the strength of an individual's achievement motive. People with a strong achievement motive should react *even more* satisfied to success (e.g., solving a challenging task) and *even more* disappointed to failure (e.g., failing at a relatively easy task) than people with a weak achievement motive. Thus, the affective state of people with a strong achievement motive depends much more on success or failure even when the outcome of a task is still only anticipated. This dependence should have a motivating effect from the very beginning of an achievement episode and later engender more effort when the individual is working on the task.

Brunstein and Maier (2005, experiment 3) identified values for the achievement motive in a student sample using both a TAT based on Heckhausen (1963) and a questionnaire. Participants subsequently worked on a mental concentration task that was divided into several trials. As achievement incentive, participants could each time try to improve their best performance from earlier trials. Participants were asked twice – before the study and after half of the tasks – how satisfied (maximum = 10) or dissatisfied (minimum = 0) they would feel (nei-

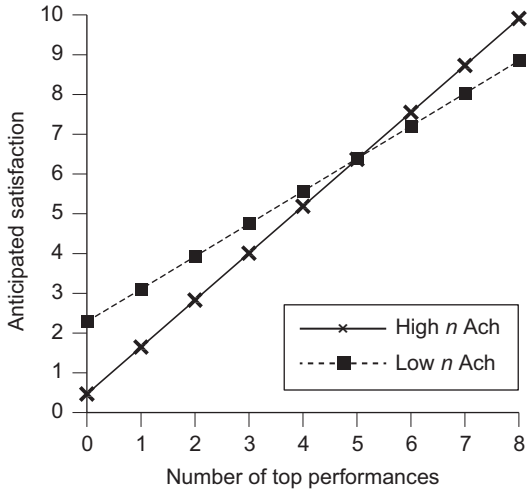

Fig. 6.10 Valence of performance as a function of the performance level (number of personal best performances) and the strength of the achievement motive (hope for success by Heckhausen). Shown are the gradients for hypothetical individuals who are one standard deviation above or below the average of the achievement motive assessed with the TAT (Taken from Brunstein & Maier, 2005, p. 218)

ther = 5) if they managed to score a certain number of personal bests (between 0 and 8 during each half of the test). In contrast to earlier studies, the motive-dependent steepness of the valence gradient was determined using a multilevel data-analytic method (growth curve analysis, cf. Bryk & Raudenbush, 1992). This approach was chosen because satisfaction ratings were assessed multiple times for the same individuals. Because the ratings before and during the experiment were highly correlated, the analysis used their average. This led to the following findings (Fig. 6.10):

1. For all participants, expected (dis)satisfaction depended on the expected number of personal bests (the higher this number, the more satisfied).
2. This relationship was much stronger in participants with a strong achievement motive compared to those with a weak motive.
3. These two findings were only confirmed for the TAT measurement, but not for the questionnaire.
4. Individual differences in the steepness of the valence gradient predicted the extent to which a participant's performance on the mental concentration test improved throughout the trials. If they had *not* received positive feedback in the previous trial, participants with a strong achievement motive immediately reacted with an increase in mental concentration in the subsequent trial.

Taken together, these findings shed some light on the mechanisms by which the achievement motive fuels task-related efforts in the presence of self-evaluative standards of comparison. Two discrepancies are of particular importance here (for a historical overview of the discrepancy-theoretical interpretation of achievement-related behavior, see McClelland et al., 1953). The first discrepancy is a central component of an individual's initial expectation. Potential success is associated with a high level of satisfaction, whereas potential failure is associated with dissatisfaction. Because an individual's mental state depends strongly on the outcome of her or his engagement, a strong need to perform well is present from the beginning. The second discrepancy emerges if an individual realizes during an activity that the actual outcome might differ from the desired outcome. If things do not go well, they indicate a future state of dissatisfaction, and in reaction to this concern, more effort is put into the activity. The behavioral change is combined with the expectation that potential future dissatisfaction can be averted by one's own behavior and thus transformed into satisfaction. Subjectively, the individual experiences this as mastering the activity. The first discrepancy creates a strong impulse to engage in achievement-related efforts, while the second discrepancy has a correcting function during the activity. This is only the case, however, if the achievement motive is strong. If this condition is met, achievement-related behav-

ior serves to ensure that the affective reactions (satisfaction and pride vs. disappointment and shame) to the outcomes of an individual's actions will be positive.

A shortcoming of Brunstein and Maier's (2005) study is that they completely ignored fear of failure in their analysis and conceptualized satisfaction vs. dissatisfaction as (only) two poles of the same affective dimension. In another experiment, however, they changed the operationalization of the concept of personal best performances. After each trial, participants received feedback on whether their performance had been part of the top 33% of all participants. If a social standard of excellence was thus applied to individual performances, the steepness of the valence gradient was predicted by both the TAT measure and the questionnaire measure of achievement motivation. The steepest gradients were found for participants with a strong achievement motive as reflected in the TAT and a strong self-concept of achievement as assessed with the self-report instrument. In accord with Halisch and Heckhausen's (1988) idea, the introduction of social comparisons resulted in an involvement of participant's self-image pertaining to achievement. The question of how directly (TAT) and indirectly (self-report) measured motives interact in the regulation of affect and behavior is discussed elsewhere in this volume (Chap. 9).

Summary

Determining motive-dependent valence gradients is relevant to test one of the key assumptions of the risk-taking model. There still has not been a complete confirmation that the strength of the success motive and the strength of the motive to avoid failure weight the incentives of success and failure. Nonetheless, individual studies have managed to show that the valence of success can be conceptualized as the product of difficulty incentive and success motive (Ve = Me × Ie). This has not yet been shown for failure motivation. In general, only TAT variables can uncover differences in the valences of success and failure. Questionnaire measures are unable to provide such information. If, however, social comparisons are used, self-reported achievement motives and the associated self-concept of ability become relevant to the prediction of valence gradients.

6.4.2 Choice: Product of Incentive and Expectancy

We now come to the expectancy aspect of the risk-taking model. Because incentive value hinges on the level of difficulty ($Is = 1 - Ps$; $If = -Ps$) and is in turn multiplied by the probability of success, the function for the resultant motivational tendency peaks at a moderate level of difficulty. This is the point of maximum approach for success-motivated individuals, but the point of maximum avoidance for failure-motivated individuals. The model thus has a symmetrical structure, as described in Chap. 5. The symmetry around the horizontal axis (level of difficulty) is determined by the scores for the two achievement motives. Depending on which of these two motives is dominant, an individual either prefers ($Ms > Mf$) or avoids ($Ms < Mf$) moderately difficult tasks. This symmetry rests on two assumptions:

1. The incentive is a function of the level of task difficulty. This assumption is not only intuitively reasonable, but has also been confirmed in numerous studies (Feather, 1959b, Karabenick, 1972; Meyer, Niepel, & Engler, 1987; Schneider, 1973, experiment 2).
2. Approach and avoidance motivation peak at a moderate level of task difficulty ($P = 0.50$), i.e., the point at which the product of incentive and expectancy reaches its maximum.

Studies seeking to test this assumption have been dogged by numerous difficulties, as summarized below.

6.4.2.1 Objective and Subjective Probability of Success

Various methods have been used to measure the probability of success. Atkinson (1957) initially

worked on the assumption that objective and subjective probabilities of success were congruent. Yet this notion was shattered by his very first study on this issue (Atkinson, 1958a, 1958b). As shown by their performance outcomes, and later substantiated by studies on level of aspiration, highly motivated individuals turned out to be most motivated when the objective probability of success was less than 50%. One might therefore speculate that these individuals' judgments of how likely they are to succeed on a task are more optimistic than realistic. Yet it is also possible that, contrary to the predictions of the risk-taking model, achievement-motivated (or, more specifically, success-motivated) individuals prefer tasks of above-average difficulty. Much indicates that task preference indeed deviates from the symmetrical structure assumed in the risk-taking model (Heckhausen, 1963; Kuhl, 1978b) and that the point of maximum motivation is at $Ps < 0.50$.

In any test of the risk-taking model, it is vital that the probability of success be assessed accurately by applying one of various standards:

- Absolute standards (e.g., distance from the target in a ring toss game)
- Social comparison standards (how many other people have been able to solve a task)
- One's own experience (how well one performed on previous attempts to solve a certain task)

When the same task is presented repeatedly, the subjective probability of success reflects the proportion of successes to failures on previous trials. The performance trend across trials is also taken into account (Jones, Rock, Shaver, Goethals, & Ward, 1968). People who experience success at the beginning of the trials, but failure toward the end, judge their probability of success to be lower than do those whose performance improves over time. Further factors come into play when social comparison standards are applied. In this case, the subjective probability of success is largely dependent on how an individual rates his or her own ability relative to the ability of others.

Study

Gauge the Objective and Subjective Probability of Success

Schneider (1971, 1973, 1974) investigated the relationship between objective and subjective probabilities of success. Participants were presented with a motor skills task that involved shooting a metal ball through goals of nine different widths. The objective probability of success was calculated on the basis of the relative frequency of successes and failures in previous trials; the subjective probability of being able to score a "goal" at a given difficulty level was obtained from participants. The simplest approach was to ask participants to predict whether or not they would score a goal ("yes"/"no"). Results showed that subjective probabilities of success were considerably higher than objective probabilities of success (Fig. 6.11). Participants' subjective judgments only approached objective task difficulty when tasks were extremely difficult.

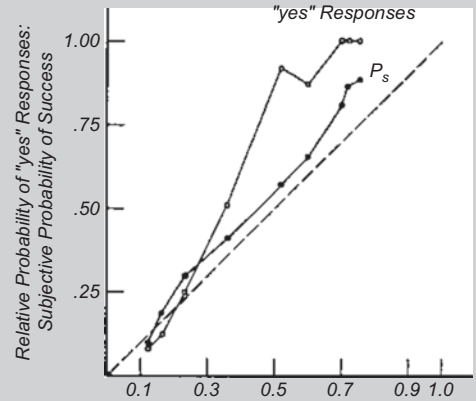

Fig. 6.11 Subjective probability of success (Ps) and relative proportion of predicted goals ("yes" responses) as a function of the objective probability of success on a motor skills task. The *dashed line* shows the results that would be expected if the subjective and objective probabilities of success converged (Based on Schneider, 1974, p. 162)

The tendency to overestimate one's performance (see the study above) seems to be characteristic of achievement-related behavior. It is almost as if the desire to improve one's performance outcomes was factored into the expectancy value. At least, this is the pattern observed when a task has already been attempted and performance outcomes are dependent on effort and practice. Expectancies formed without prior exposure to a task may have to be corrected after the first few attempts. The reliability of these expectancies is correspondingly low, and they are not suitable for testing the risk-taking model. Similar problems have emerged for social comparison norms (e.g., "This task was solved by 50% of the previous participants"). The divergence of the subjective anticipation of success from the stated norm may be more or less pronounced, depending on how an individual ranks his or her task-specific ability relative to that of the reference group. Furthermore, research has shown that respondents often have little confidence in probabilities of success or failure reported by an experimenter (Feather, 1963, 1966). A certain amount of exposure to a task thus seems to be indispensable if reliable data on probabilities of success are to be obtained.

6.4.2.2 Level of Aspiration: Task Choice and Goal Setting

The risk-taking model was originally developed to explain how levels of aspiration are set. Two experimental paradigms can be used to examine this mechanism:

1. In the task-selection paradigm, participants choose between tasks of the same type representing different levels of difficulty (e.g., throwing from different distances, shooting from the same distance at goals of different widths, or solving increasingly complex labyrinth problems).
2. In the goal-setting paradigm, participants execute repeated trials on a single task. The goal is defined in terms of the time required to execute the task, the number of correct solutions, or the number of mistakes. To determine goal discrepancy (difference between current goal level and previous attainment), the goal set by the participant is compared with his or her prior performance.

From the outset, a consistent pattern of results emerged. The level of aspiration does not increase steadily with the strength of success-oriented achievement motivation; rather, there is a preference for high but attainable goals and avoidance of unrealistically high ones. Many of the studies using the task-selection paradigm have involved ring toss games. In a study with kindergarten children as participants, McClelland (1958c) found that success-motivated children preferred "calculated risks" and chose tasks that were neither too easy nor too difficult. Figure 6.12 shows the distances chosen by success-motivated and failure-motivated students (as measured by nAchievement and TAQ) in a study by Atkinson and Litwin (1960). The preference for intermediate distances was much more pronounced among success-motivated students than among failure-motivated students. Heckhausen (1963) reported similar findings from an analysis of goal-setting behavior in a labyrinth task. The difficulty of the task was varied by presenting labyrinths of different sizes; the achievement motive was assessed in terms of a TAT measure of net hope (HS – FF). Success-motivated individuals chose goals that were comparable to, or moderately higher than, their previous performance, whereas failure-motivated participants were more likely to set themselves goals that were either extremely difficult or extremely easy relative to their earlier performance (Fig. 6.13).

Studies designed to test whether the most frequently chosen difficulty levels fall into a broadly defined "intermediate" range have produced data substantiating the risk-taking model. Upon closer inspection, however, three problems are apparent, two of them empirical and one theoretical in nature. When the preferred probabilities of success are examined in more detail, a marked deviation from the risk-taking model is observed. The maximum preference, whether defined in terms of objective or subjective probability of success, falls below the critical level of $Ps = 0.50$; as a rule, it is between 0.30 and 0.40. In other words, people do not prefer

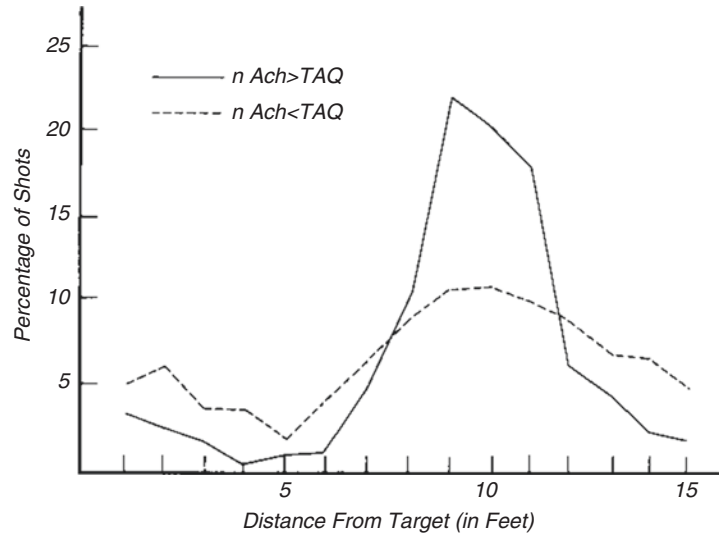

Fig. 6.12 Percentage of shots taken from each line by respondents high (nAchievement > TAQ) and low (nAchievement < TAQ) in resultant achievement motive (Based on Atkinson & Litwin, 1960, p. 55)

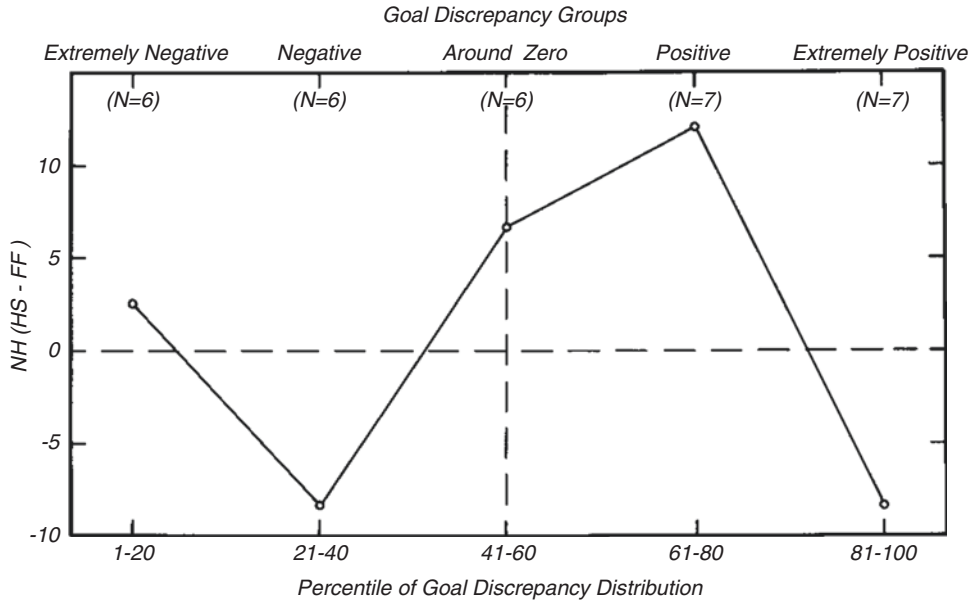

Fig. 6.13 Goal discrepancies for labyrinth tasks as a function of net hope (hope for success - fear of failure) in Heckhausen's TAT measure (Based on Heckhausen, 1963, p. 95)

tasks of moderate difficulty, but opt for somewhat more difficult tasks. Moreover, failure-motivated individuals do not choose extremely difficult tasks to anything like the extent predicted by the risk-taking model. Atkinson speculated that too few of his student participants were high in failure motivation (Atkinson & Litwin, 1960; Atkinson & Feather, 1966). Yet findings similar to those reported above have also been documented for unselected samples of school students (McClelland, 1958).

Besides these two empirical problems, there is a third problem that is inherent in the risk-taking model itself. The model does not predict whether a failure-motivated individual will be more likely to opt for extremely difficult or extremely easy tasks. Heckhausen (1963) proposed a possible

solution to this problem, suggesting that the task choice of failure-motivated individuals depends on the strength of their aggregate motivation ($AM = HS + FF$). If their aggregate motivation is high, so goes Heckhausen's reasoning, they will prefer extremely difficult tasks; if it is low, they will choose very easy tasks. In other words, failure-motivated individuals high in aggregate motivation will tend to expect too much of themselves, and those low in aggregate motivation will not stretch themselves enough. Jopt (1974), Schmalt (1976a), and Schneider (1971) reported evidence for the validity of these hypotheses.

It is worth asking whether these discrepancies from the risk-taking model are attributable to shortcomings in the measurement of probability of success (or task difficulty). In addition to self-reports, Schneider (1973, 1974; Schneider & Heckhausen, 1981) used an objective index to determine the probability of success, namely, the time it took respondents to decide whether or not they would succeed. Moreover, Schneider asked respondents to state how confident they were in this judgment (confidence rating). Figure 6.14 shows the three indexes for predictions of hits in a motor skills task (goal-shooting game). The findings for all three indexes were inconsistent with the symmetrical form predicted by the risk-taking model. Decision time peaked well below the objective probability of 0.50 (when respondents had chalked up as many successes as failures on previous trials). Likewise, confidence reached its lowest value well below this point. Subjective assessments of the probability of success were higher than would be expected on the basis of the objective data. Schneider attributes these findings to a "hope bonus" that people add to their performance level when thinking about the future. This bonus may explain why people tend to tackle tasks that slightly exceed their current level of performance.

There have been many attempts to adapt the risk-taking model to this body of findings (Hamilton, 1974; Heckhausen, 1968; Nygard, 1975; Wendt, 1967). In most cases, additional variables have been specified and incorporated into revisions of the model. Examples of such variables are:

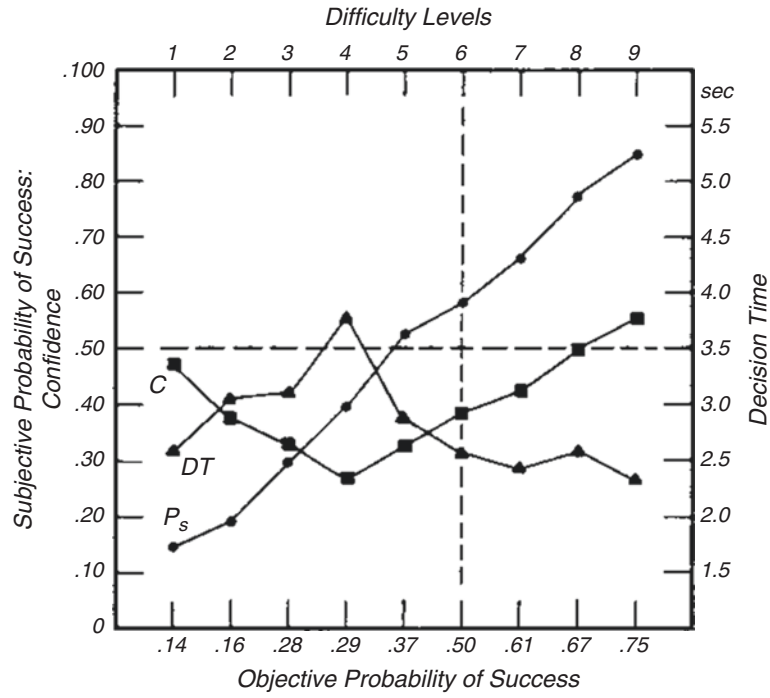

Fig. 6.14 Probability of success (*Ps*), decision time (*DT*), and confidence (*C*) in predicting success (hits) in a goal-shooting game as a function of the objective probability of success and absolute difficulty levels (Based on Schneider, 1974, p. 154)

- Personal standards defining the difficulty level at which a certain success incentive is reached (Kuhl, 1978b)
- Inertial tendencies resulting from previous attempts to complete a task, which afford a kind of additional motivation for future tasks (Atkinson & Cartwright, 1964; Weiner, 1965a, 1970)
- Future-oriented tendencies that take effect when task attainment entails a number of consecutive steps, e.g., in the context of long-term goals (Raynor, 1969, 1974; Raynor & Roeder, 1987)

These revisions are described in detail elsewhere (Heckhausen, 1980; Heckhausen et al., 1985). None of them proved a resounding success, however.

6.4.2.3 Typical and Atypical Shifts in the Level of Aspiration

Moulton (1965) took an apparently paradoxical finding from research on the level of aspiration and used it as a test case for the validation of the risk-taking model. He studied the atypical shifts in aspiration levels that are sometimes observed after task accomplishment, namely, increased aspiration levels after failure and decreased aspiration levels after success. The risk-taking model can explain this seemingly rather peculiar behavior in terms of an interaction between the probability of success and the failure motive. Atypical shifts can be expected when failure-motivated individuals experience an unexpected success on a difficult task or a surprising failure on an easy one. In both cases, the probability of success approaches the intermediate range, i.e., precisely the range of difficulty that failure-motivated individuals seek to avoid. As a result, the level of aspiration shows erratic shifts toward the other end of the task difficulty scale. The pattern of results predicted by the risk-taking model is illustrated in Fig. 6.15.

Moulton (1965) tested these inferences by inducing three task difficulty levels (symmetrically distributed probabilities of success of 75%, 50%, and 25%, respectively). Respondents were first instructed to select one of the three tasks, but they were then all administered the moderately difficult task. Moulton induced failure for participants who had chosen the easy task and success for participants who had chosen the difficult task. Participants were then free to choose the next task. As shown in Table 6.6, the results were in line with the assumptions of the risk-taking model. In the free-choice condition, the majority

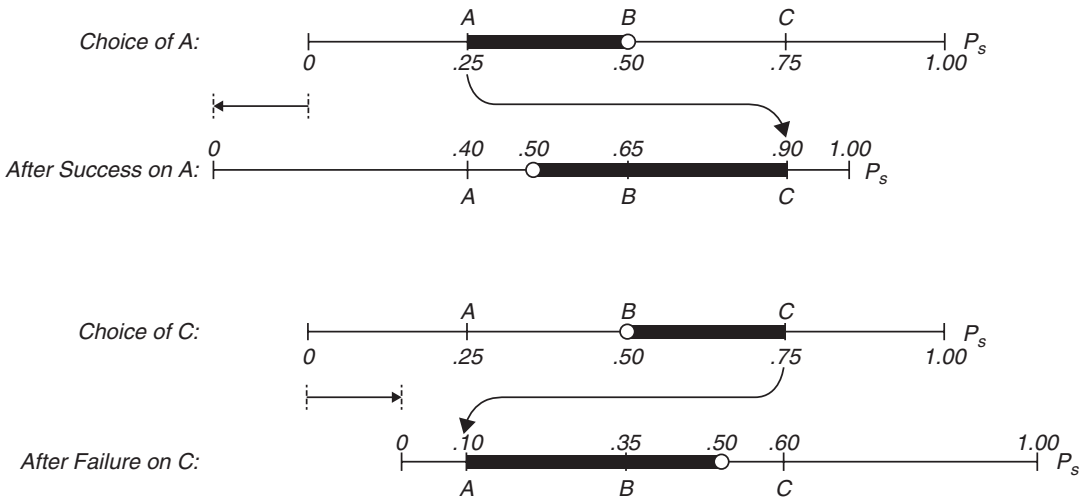

Fig. 6.15 Atypical shifts in the aspiration levels of failure-motivated individuals who have succeeded on a difficult task (shift from A to C) or failed on an easy one (shift from C to A), as derived from the risk-taking model

Table 6.6 Initial task preferences and subsequent typical versus atypical shifts in the level of aspiration of success- and failure-motivated individuals

	Difficulty level of task initially chosen				
	Easy	Intermediate	Difficult	Shift in level of aspiration	
	(*Ps* = 0.75)	(*Ps* = 0.50)	(*Ps* = 0.25)	Atypical	Typical
Success-motivated individuals (*N* = 31)	1	23	7	1	30
Failure-motivated individuals (*N* = 31)	9	14	8	11	20

Based on Moulton (1965, pp. 403–404)

of success-motivated individuals chose moderately difficult tasks, whereas a substantial proportion of the failure-motivated participants opted for easy or difficult tasks. The results also substantiated predictions on change in the level of aspiration. Relatively few participants made atypical choices, and all but one of those who did belonged to the failure-motivated group.

6.4.2.4 Striving to Maximize Affect or to Obtain Information?

According to the risk-taking model, the preference for moderate levels of difficulty maximizes the anticipated affect, be it pride at success or shame at failure. Success-motivated individuals thus prefer moderately difficult tasks because they promise the highest degree of satisfaction; failure-motivated individuals avoid these tasks because they risk the highest degree of shame. The behavior of the former group is geared at maximizing positive self-evaluative emotions that of the latter group at reducing negative self-evaluative emotions (Sect. 6.5). Other authors have pitted the principle of maximizing affect against the principle of obtaining information, based on Festinger's (1954) theory of social comparison processes. According to this second principle, people have a fundamental need to acquire insights into their own attitudes, opinions, and skills and to evaluate these attitudes, opinions, and skills in social comparison with others. Accordingly, they prefer moderately difficult tasks that split populations into high vs. low ability groups of approximately equal size and thus have the greatest information value with respect to one's own ability levels (Meyer, 1973; Schneider, 1973; Weiner et al., 1971). Both principles (maximizing affect and obtaining information) thus predict a preference for moderately difficult tasks.

Trope (1975, 1980, 1986b; Trope & Brickman, 1975; for overviews, see Trope, 1983, 1986a) compared and contrasted the two principles in an attempt to determine which is decisive for task selection. To this end, he assigned higher diagnosticity for self-evaluation of ability to either easy or difficult tasks. In other words, respondents were told that certain tasks either distinguished very clearly between people high and low in ability (high diagnosticity) or barely distinguished between the two groups (low diagnosticity). Trope found that respondents generally preferred high to low diagnosticity tasks. He interpreted these findings as indicating that people strive to reduce uncertainty about their ability levels. Notably, individuals high in achievement motivation are even more likely to choose highly diagnostic tasks than those low in achievement motivation (Trope, 1980).

From Trope's (1986b) interpretation, it follows that achievement-motivated individuals seek to obtain realistic and valid information about their abilities as a matter of principle, whether this information proves to be positive (success) or negative (failure; see also Meyer & Starke, 1982). This need for self-assessment can be compared with the need for "self-enhancement," another fundamental motive of self-evaluation (Sedikides & Strube, 1997). Some authors have postulated that achievement-motivated individuals are primarily interested in demonstrating their superior abilities (Kukla, 1972a, 1972b, 1978), implying that they prefer tasks that afford them the opportunity to emphasize positive aspects of the self and thus to enhance their self-esteem.

Consensus has not yet been reached on which of these two needs (self-assessment or self-enhancement) is dominant in determining which tasks will be selected by achievement-motivated individuals. Sorrentino (Sorrentino & Hewitt, 1984; Sorrentino, Roney, & Hewitt, 1988) reported that both needs influence task choice, but that they are associated with different personality characteristics. The achievement motive (nAchievement) is oriented to maximizing the affective value of a task and predicts how much value individuals attach to obtaining feedback on high abilities (success-motivated individuals) or avoiding feedback on low abilities (failure-motivated individuals). As such, nAchievement can be interpreted as a motive geared to affect maximization. However, Sorrentino identified another motive, labeled uncertainty orientation, that can also be assessed using the TAT (nUncertainty; cf. Sorrentino, Hanna, & Roney, 1992) or related techniques (cf. Szeto, Sorrentino, Yasunaga, Kouhara, & Lin, 2011). People high in uncertainty orientation generally strive to obtain information about themselves and their social environment. This cognitive need is expressed in the tendency to choose tasks that promise to provide as much new information as possible, whether it is indicative of high or of low ability levels (Sorrentino & Hewitt, 1984). As such, nUncertainty can be interpreted as a motive geared to the self-assessment of abilities.

- Integral to the theory of uncertainty orientation (Sorrentino, Smithson, Hodson, Roney, & Walker, 2003) is the idea that achievement motives (hope for success and fear of failure) are only activated if the current certainty vs. uncertainty of a behavioral situation (e.g., a pre-structured vs. an open lesson) fits the uncertainty orientation of the individual. If this condition is met, people with strong success motivation perform better than their counterparts with strong failure motivation. If the condition is not met, however, both motives are deactivated, resulting in a reversal of motive-dependent performance differences: in this situation, success-motivated people often perform worse than those with failure motivation (Szeto et al., 2011).

Attempts have also been made to relate differing needs for self-evaluation to features of the assessment situation (Taylor, Neter, & Wayment, 1995). Brunstein and Maier (2005) found that individuals who describe themselves as achievers act according to the principle of self-enhancement when the ability being tested is socially desirable and according to the principle of self-assessment in less ego-involving situations. As Sedikides and Strube (1997) pointed out, the relations between achievement motives – whether assessed by the TAT or by questionnaire measures – and different needs for self-evaluation warrant careful examination in future research.

6.4.3 Persistence

Persistence is the second major criterion against which the risk-taking model has been tested. Persistence can manifest itself in various forms:

- Duration of uninterrupted pursuit of a task
- Resumption of an interrupted or unsuccessful activity
- Long-term pursuit of a superordinate goal (e.g., career success)

Heckhausen and Kuhl (1985) have questioned whether the motivation to choose a task can be equated with the motivation that occurs when engaged in a task. Where long-term persistence is concerned, Raynor (1969, 1974) was quick to point out that the risk-taking model would have to be extended to yield valid predictions in this domain as well. More specifically, actions would have to be broken down into a series of more or less interconnected subactions, the outcome of each determining whether or not a person is permitted to continue along the path in question (e.g., passing academic exams is the prerequisite for entering a graduate career). This model is particularly suited to predicting persistence in the pursuit of long-term, superordinate goals

(Raynor & Entin, 1982) and has been discussed in detail elsewhere (Heckhausen et al., 1985). The notion that ongoing persistence (time spent working on a challenging task) can be equated with the decision to resume work on a previously abandoned task is now also questionable. In the former case, persistence may derive from the incentives residing in the activity without further reflection (e.g., "flow"; Chap. 14); in the latter case, it requires a conscious act of deliberation and decision making (e.g., when choosing between various activities). The present section focuses on Feather's persistence studies, which were of particular significance to the risk-taking model.

6.4.3.1 Feather's Analysis of Persistence Conditions

In the experimental design that Feather (1961, 1962, 1963) used to analyze motive-dependent differences in persistence (see the studies reported below), participants were first told that the probability of success on a task was either high or low. Failure was then induced on repeated trials of that task. After a certain number of trials, participants were free to decide whether they wanted to continue working on the task or wanted to switch to another kind of activity. This procedure allows two factors to be controlled:

- First, the initial probability of success (*Ps*) is steadily reduced by the repeated induction of failure.
- Thus, an initially high probability of success (on a task purported to be easy) will approach *Ps* = 0.50, and an initially low probability of success (on a task purported to be difficult) will recede from *Ps* = 0.50. In the former case, approach and avoidance tendencies can be expected to increase (depending on whether the achievement motive is dominated by success or failure tendencies); in the latter case, both tendencies can be expected to decrease, resulting in a reduction of avoidance in failure-motivated individuals and a reduction of approach in success-motivated individuals.

Study

Feather's Studies on Motive-Dependent Differences in Persistence

The student participants in Feather's (1961) first experiment were instructed to retrace a complex figure without lifting their pencils from the paper. What they were not told was that the task was impossible. Participants were presented with four tracing tasks and told that they could move from the first to the second task at any time. Half of the participants were told that the first task was easy and half of them that it was difficult. Specifically, they were told that 70% vs. 5% of students had solved the task in a previous trial. In this first experiment, no information was given on the probability of success on the second task. Based on the assumptions of the risk-taking model, Feather predicted that success-motivated individuals would show more persistence on an ostensibly easy task than on an ostensibly difficult task. In the former case, the probability of success approaches *Ps* = 0.50 after futile attempts to solve it; in the latter case, it recedes from *Ps* = 0.50. The reverse was expected to hold for failure-motivated individuals, who were expected to show more persistence on an allegedly difficult task than on an allegedly easy task. The avoidance tendencies of failure-motivated individuals were expected to increase as the probability of success on the initially "easy" task approached the critical value of *Ps* = 0.50. The data presented in Table 6.7

Table 6.7 Numbers of success- and failure-motivated participants who were high and low in persistence when failure were induced on an allegedly easy vs. difficult task

	Difficulty of the first task	Persistence	
		High	Low
Success-motivated participants	Easy	6	2
	Difficult	2	7
Failure-motivated participants	Easy	3	6
	Difficult	6	2

Based on Feather (1961, p. 558)

support these hypotheses. Two points warrant discussion, however:

- First, Feather found that failure-motivated individuals showed more persistence than their success-motivated counterparts on extremely difficult tasks. This finding is not in line with the risk-taking model, which does not predict the task motivation of failure-motivated individuals to exceed that of success-motivated individuals at any point.
- Second, Feather did not specify the difficulty of the second task. It seems reasonable to speculate that participants expected the second task to be moderately difficult, such that it had an off-putting effect on failure-motivated participants, but was appealing to success-motivated participants. Without knowing the difficulty level of the alternative task, however, this remains uncertain.

In a further experiment, Feather (1963) specified the probability of success on the second task to be $Ps = 0.50$. The probability of solving the first task was reported to be 5%. Failure-motivated individuals were expected to be more persistent than their success-motivated counterparts under these conditions. The first task was attractive to them (because it was practically impossible to solve); the second task was threatening, because failure on it would cause great shame. The reverse was expected to hold for success-motivated individuals. In principle, Feather's data confirmed these hypotheses. However, results indicated that the alleged probabilities of success were less influential than the respondents' subjective anticipations of success.

- Second, this experimental procedure allows the alternative activity to be varied systematically.
- The alternative activity may or may not be a performance-related procedure; the probability of success on this activity can also be varied. In this case, persistence is calculated in terms of the respective probabilities of success.

Overall, Feather's studies succeeded in testing the risk-taking model and in corroborating its predictions with unprecedented elegance. At the same time, they showed that the possibilities for testing the detailed predictions of the risk-taking model are soon exhausted. The problem remains of how subjective probabilities of success can be reliably induced, controlled, and measured. Nygard (1975, 1977, 1982) took great care in this regard. In one of his studies, participants were presented with very easy or very difficult tasks and told that they could move on to a moderately difficult task whenever they liked. Relative to failure-motivated participants, success-motivated participants spent longer working on the difficult tasks than on the easy tasks before switching to the moderately difficult task. Considering that both motives were measured with questionnaire measures, meaning that differences in motives reflect differences in self-perceptions of ability, these findings are easy to explain. Individuals who perceive themselves to be more competent (or success motivated) than others are confident in being able to solve tasks that others find very difficult. If self-concept of ability is not controlled, however, findings such as these are difficult to explain and of little relevance to the validity of the risk-taking model.

6.4.3.2 Inertial Tendencies of Uncompleted Actions

As Feather's analysis showed, persistence on a specific activity is always partly dependent on competing action tendencies. In the same vein, Lewin (1926a, 1926b) had assumed a "system under tension" within the individual, which is not released until a task has been completed.

An interrupted action leaves a residual tension that becomes manifest as soon as it is no longer suppressed by another, stronger action tendency. Atkinson and Cartwright (1964) integrated these ideas into the risk-taking model, adding to the success tendency (*Ts*) the "inertial tendency" (T_{Gi}) that results from not having completed an earlier achievement-related activity:

$$Ts = Ms \times Ps \times Is + T_{Gi},$$

where *T* denotes an action tendency, *G* ("goal") a particular class of action goals (here, achievement), and "*i*" ("inertial") the fact that the tendency in question derives from an unfinished or failed activity. As soon as the individual embarks on an activity relating to the same theme, this persistent inertial tendency is added to the motivation already activated. In other words, Atkinson and Cartwright (1964) assumed that inertial tendencies can be transferred to the entire spectrum of action tendencies in the same thematic category. Both the classic literature on the substitute value of actions (Henle, 1944; Lissner, 1933; Mahler, 1933) and more recent works on the topic (Wicklund & Gollwitzer; 1982; Brunstein, 1995) suggest that it is unrealistic to assume such a broad level of generalizability. Nevertheless, Atkinson and Cartwright can be commended for expanding the perspective on individual episodes of achievement-related behavior to cover multiple action tendencies. This perspective only came to full fruition in the theory of the dynamics of action, which was developed by Atkinson and Birch (1970, 1974; see also Revelle, 1986; Revelle & Michaels, 1976) to explain the interplay of different action tendencies competing for the access to behavior.

Atkinson and Cartwright (1964) only postulated an (positive) inertial tendency for the success tendency. Weiner (1965a, 1970) extended this conceptualization to the tendency to avoid failure. After a failure, the previous success tendency (T_{Gi}) and failure tendency (T_{-Gi}) both continue to exist (the minus sign indicates that the persistent failure tendency has an inhibiting effect on achievement behavior). Building on the original risk-taking model, the following equation can be derived for the resultant motivational tendency (*Tr*):

$$Tr = \left(Ms \times Ps \times Is + T_{Gi}\right) + \left(Mf \times Pf \times If + T_{-Gi}\right)$$

The resultant inertial tendency increases the motivation of success-oriented individuals to engage in achievement-related activities and inhibits the motivation of failure-oriented individuals to resume failed activities or related activities. In this point, Weiner's model departs from the Atkinson and Cartwright conception of inertia: after failure, success-motivated individuals are expected to experience a gain in motivation and failure-motivated individuals to experience a loss. In line with this hypothesis, Weiner (1965b, 1979) found that success-motivated individuals performed better after failure than after success, whereas failure-motivated individuals showed better performance after success than after failure.

6.4.4 Performance Outcomes

It is a daring undertaking to predict not only task choice but also performance outcomes on the basis of resultant motivational strength. Motivation is a variable better suited to explaining intraindividual variation in performance than interindividual differences in performance outcomes. These interindividual differences derive primarily from differences in task-related abilities, which often have little to do with motive variables (a highly motivated novice will not be able to match the performance of an expert in a given domain, even if the expert makes no great effort). But even when individual differences in ability are controlled, there is still no coherent theory to explain how achievement motivation influences the individual steps involved in task performance or the associated patterns of information processing.

Krau (1982) noted that the motivation to select a task should not be equated with the motivation that occurs when engaged in a task. Goal setting and goal pursuit refer to different action

phases that are determined by different variables. Specifically, Krau distinguished the following action-phase and associated variables:

Action-phases	Variables
Goal setting	Estimated task difficulty; strength of the individual achievement motive
Preparation	Planned effort expenditure
Execution	Actual effort expenditure and work-related attitudes

As expected, Krau found that the achievement motive does not have an impact on persistence and performance directly, but that it affects performance outcomes indirectly by increasing the amount of effort that people plan to expend (or are willing to invest). It seems rather rash, in view of these findings, to assume that achievement motivation (or indeed the achievement motive itself) has direct and unmediated effects on task performance. Nevertheless, achievement motivation research has generated various noteworthy models and findings concerning the relationship between motivation and performance. Krau's arguments were later integrated within the Rubicon model of action phases (Chap. 11).

6.4.4.1 School Performance

It would seem logical for researchers to examine the relationship between achievement motivation and school performance. Studies of this type must control for both motivational dispositions (e.g., hope for success and fear of failure) and task difficulty. Researchers can only expect to find substantial relations between motive measures and performance measures when characteristics of the instructional setting and the tasks assigned are taken into account (unless the achievement motivation data also reflect differences in school performance). One way of getting around this problem is to examine ability-based groups. It can be assumed that most students in these classes find the work assigned moderately difficult. O'Connor, Atkinson, and Horner (1966) found that success-motivated students in homogeneous classes showed greater performance gains than their failure-motivated classmates. Weiner (1967) reported comparable data for college students, with success-motivated students benefiting most from ability grouping.

Gjesme (1971) presented similar findings, having taken a somewhat different approach. He assigned students from mixed-ability classes to aptitude groups based on their intelligence scores and found, as expected, that it was only in the moderate-ability group that the success motive was positively, and the failure motive negatively, related to school performance. Assuming that instructional demands fell in the moderate difficulty range for students of moderate intelligence only, these findings are consistent with the risk-taking model.

These data should not be interpreted as supporting ability grouping in schools, however. First, instruction can be individualized to ensure that the tasks assigned are neither too easy nor too difficult ("principle of fit"; Heckhausen, 1969). Second, when cooperative learning methods are applied, heterogeneity of the student body is no impediment to creating realistic, competitive classroom settings that do not over- or understretch students (Slavin, 1995). Moreover, the opportunity to select and work on tasks independently can have positive effects on task motivation, at least when students are predominantly success motivated (and thus choose moderately difficult tasks). McClelland (1980) attributed the low (to nonexistent) correlations found between the achievement motive (nAchievement) and school performance to the fact that the incentives essential for activating the achievement motive (difficulty, novelty, variation, self-determination, informative feedback) are often not present in the classroom, in contrast to occupational settings, where they are either more easily accessible or can be actively sought out. These arguments are all based on the assumption that motives are dispositional variables. However, expectancy-value theories have also been successfully applied to predict school performance, as illustrated in the excursus on this page based on the research of Eccles and Wigfield.

Excursus

School Performance and the Expectancy-Value Theory of Achievement Motivation

The expectancy-value theory of achievement motivation developed by Eccles and Wigfield (Eccles, Wigfield, & Schiefele, 1998; Wigfield & Eccles, 2000) has inspired a wealth of research on school achievement behavior. Like Atkinson (1957, 1964), Eccles and Wigfield posit that characteristics of achievement-motivated behavior, such as task selection, persistence, and performance, are the product of expectancy variables (e.g., a student's hope for success), on the one hand, and value variables (e.g., the personal incentive of doing well at school), on the other. Their main interest is not in how the dispositional achievement motive is gradually translated into achievement behavior, however. Rather, Eccles and Wigfield assume expectancy and value to have direct and independent effects on achievement motivation. Other characteristics, such as experience, personality, upbringing, and cultural influences, are predicted to affect achievement behavior via these two core variables only. Another characteristic feature of the theory is that both the expectancy and value components are assumed to be task specific, which accounts for the fact that a student who is highly motivated in mathematics will not necessarily be equally enthusiastic and willing to learn in English.

For Eccles and Wigfield, "value" derives from task incentives that may relate to the aspired outcome and its consequences (e.g., doing well in a mathematics exam and, in consequence, being considered a talented mathematician) or reside in the activity itself (e.g., when a student really enjoys working on tricky mathematics problems). Perceptions of a task's utility (e.g., its relevance to an aspired career) and costs (e.g., having to do mathematics homework instead of meeting up with friends) are also factored into the value attached to it. Eccles and Wigfield assume the expectancy component to be closely related to ability beliefs. Judgments of personal ability in a particular domain are formed on the basis of previous experience with similar tasks. These judgments in turn have an impact on expectations of success in future tasks in the same domain. Because self-concepts of ability are task- or subject-matter specific (Marsh, Byrne, & Shavelson, 1988), a student's motivation may vary considerably depending on the task and context (e.g., in mathematics vs. English lessons).

The model's predictions have been supported for various aspects of school achievement behavior (cf. Wigfield & Eccles, 2000). Even when controlling for baseline performance, task-specific expectancies and values have been shown to predict learning outcomes (e.g., mathematics grades) as well as students' preferences for certain subjects (e.g., in course selection). One of the best-known – and, in certain respects, most alarming – findings to emerge from this research approach (Eccles, Wigfield, Harold, & Blumenfeld, 1993) is that the mean level of achievement motivation decreases over the elementary school years and that this negative trend continues across the school career. Eccles and Wigfield reason that the regular and realistic performance feedback provided by teachers, and the inevitable competition with other students attending the same class, shatters many students' belief in their own capabilities. The value attached to these tasks also decreases, though not as broadly and dramatically.

The Eccles and Wigfield model makes a significant contribution to research by accounting for the task specificity of expectancy and value variables. Reliable predictions about the achievement behavior of children and adolescents are only possible when task-specific aspects of motivation are taken into account. Moreover, their theory emphasizes the importance of including expectancy- and value-relevant variables other than task difficulty (the classic incentive variable in achievement motivation research) in any analysis of achievement motivation.

6.4.4.2 Motivational Strength and Performance Outcomes: Quantity vs. Quality

The nature of the relationship between motivational strength and performance outcomes has not yet been fully clarified, even when resultant motivational strength, rather than motive strength, is assumed to be the crucial factor. The idea that the intensity of task pursuit (as reflected in speed, i.e., the quantity of tasks completed in a certain interval) increases with resultant motivational strength seems unproblematic. What is problematic, however, is the idea that the quality of performance also increases automatically as a function of motivation. Complex tasks cannot be mastered by speed alone; indeed, speed may come at the expense of accuracy. The risk-taking model does not distinguish between quantitative and qualitative achievement criteria, and very few studies have tested the model's predictions in the context of complex tasks.

Karabenick and Yousseff (1968) used a task that required students to learn a list of paired associates that were objectively equally difficult. They found that success-motivated students (nAchievement > TAQ) performed better on word pairs purported to be moderately difficult. Failure-motivated individuals (nAchievement < TAQ) showed their poorest performance in this condition but much better performance on paired associates purported to be easy or difficult. These findings are illustrated in Fig. 6.16. The differences in the observed learning outcomes were probably the result of differences in effort expenditure, which the risk-taking model predicts to be greatest in the moderate difficulty range. However, it is also conceivable that failure-motivated individuals expended a great deal of effort on the moderately difficult tasks, but made more errors as a result of their fear of failure. Further research has confirmed that measures of achievement motivation predict performance on paired-associate tasks (Koestner, Weinberger, & McClelland, 1991). The finding that performance is highest on moderately (rather than extremely) difficult tasks remains controversial, however, and was challenged by

Excursus

Goal Theory and the Risk-Taking Model

The core assumption of Locke and Latham's (1990, 2012; Locke, 1968) goal theory is that achievement increases as a function of goal difficulty. At first glance, this idea seems entirely incompatible with the predictions of the risk-taking model. Yet Locke, Latham, and colleagues have repeatedly found precisely this pattern of results. The relationship between goal level and achievement level has proved to be much stronger for simple than for complex tasks, however (Wood, Mento, & Locke, 1987). Ambitious goals stimulate effort, mental concentration, and persistence on simple tasks and thus have direct effects on performance outcomes. In the context of complex tasks (e.g., business strategy games), however, ambitious goals only enhance performance when complemented by a thorough analysis of the problem and the planning of solution strategies.

Locke (1975; Locke & Shaw, 1984) pointed out that his findings contradicted the risk-taking model. His data indicated that effort and performance increase with decreasing probability of success (the higher the goal, the more difficult it is), whereas the risk-taking model predicts an inverse U-shaped relationship, with success-motivated individuals making less effort, and thus showing lower performance, as the probability of success recedes from the critical value of $Ps = 0.50$. In the same vein, Brehm and Wright (see Wright, 1996, for an overview) found that effort expenditure, assessed in terms of physiological measures of cardiovascular response, increases with the difficulty of a task until the point of maximum potential motivation is reached. Is this point exceeded, effort expenditure abruptly begins to decrease again.

Bearing in mind that the motivation to select a goal and the motivation to realize that goal are not identical (Chaps. 11 and 12), it

is possible to reconcile these seemingly contradictory findings. The risk-taking model primarily addresses goal setting and task choice, i.e., purely motivational issues. Goal theory, on the other hand, relates to the realization of existing goals, regardless of whether they are self-chosen or imposed by others. It is here that volitional processes come into play. These processes cannot be explained solely by the motivational tendencies that prompted the individual to select the goal in the first place (Heckhausen & Kuhl, 1985). Ach (1910) and Hillgruber (1912) had already drawn attention to this point. In the "difficulty law of motivation," they postulated that during task performance, effort expenditure is automatically adjusted to the prevailing difficulty level. This idea is congruent with the empirical evidence reported by Locke, Latham, and their colleagues.

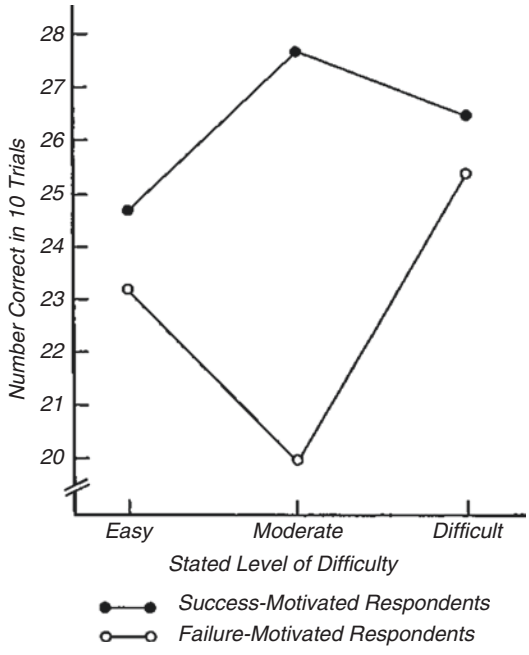

Fig. 6.16 Numbers of correct paired associates in ten trials for word pairs that were purported to be easy, moderately difficult, or difficult, but were in fact equally difficult. Results for success- and failure-motivated respondents (Based on Karabenick & Yousseff, 1968, p. 416)

Locke and Latham's (1968; Locke & Latham, 1990; Locke, 1968) research on goal setting (see the excursus on this page).

Other studies have shown that increased effort expenditure can also have the opposite effect, leading to a decrease in performance. Increasing speed can have detrimental effects on accuracy, a phenomenon known in the literature as the "speed/accuracy trade-off." Schneider and Kreuz (1979) reported one example of this trade-off. Student participants worked on number-symbol tasks once under normal conditions and a second time (1 week later) under "record" conditions. The record condition was induced by instructing students to do their very best (based on Mierke, 1955) or by setting high goals (based on Locke, 1968). Two different versions of the number-symbol test were administered, one was easy and the other one was difficult. Speed of performance on both easy and difficult tasks increased as a function of the (induced) effort level. The same pattern was not observed for quality of performance (number of errors). Maximum effort was associated with an increased number of errors, to a far greater extent on the difficult version of the test than on the easy version. An overly hasty, error-prone approach can thus have counterproductive effects on the quality of performance, particularly on difficult tasks. Accordingly, the quality and the quantity of performance may diverge as the strength of motivation increases. Change in motivational strength is only reflected directly in quantity of performance, as Thurstone (1937) had already pointed out. In fact, quality of performance may be impaired by excessively high levels of motivation. It seems that there is an optimal motivational level for any given task, at which performance efficiency is highest (see below).

Nevertheless, a strongly activated achievement motive can also be associated with better performance on complex problem-solving tasks. Fodor and Carver (2000) found that nAchievement (TAT) predicted the creativity and complexity of the suggestions put forward by student participants in a strategy game, the aim of which was to ensure that a pet dog had an adequate supply of water while its owners were away for a few days. However, this effect was only observed when the achievement motive had been activated

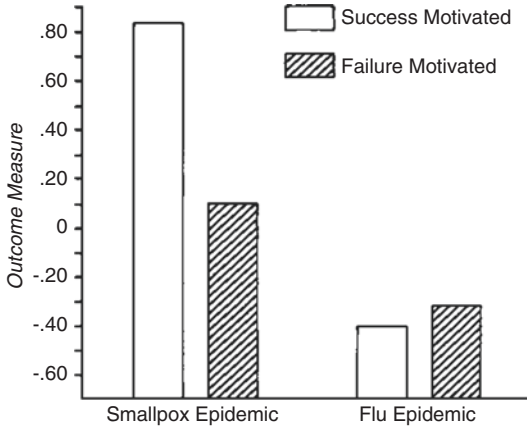

Fig. 6.17 Effect of the level of personal involvement on success- and failure-motivated individuals' performance on a complex problem (Based on Hesse, Spies, & Lüer, 1983, p. 416)

by feedback on another task. Hesse et al. (1983) asked their participants to fight a fictional epidemic that had broken out in a small town. The participants were able to choose between a broad range of measures, some with positive and other with negative consequences. The task was constructed such that the degree of personal involvement was high (serious outbreak of smallpox, high personal responsibility) or low (flu epidemic, low personal responsibility) (Fig. 6.17). When faced with a smallpox epidemic, success-motivated individuals (questionnaire) were much more effective in their approach than failure-motivated individuals. They worked more persistently, asked more questions, and showed a better grasp of the problem.

Summary

Despite these promising findings, the relationship between motivation and achievement warrants a theory of its own. This theory should specify the mediating influences – be they motivational, emotional, or cognitive in nature – that intervene between individual, situational, and task-related characteristics, on the one hand, and achievement outcome variables, on the other. To this end, motivational action control should be examined and carefully modeled through the in-depth analysis of an individual's ongoing feelings, thoughts, and actions during task performance. This approach to the analysis of task performance would require to combine perspectives from differential and general psychology. It does not suffice to define motivation as an input variable and to measure performance as an output variable, disregarding the intervening motivational influences on information processing during task performance. Approaches that satisfy these requirements do exist, but they are few and far between (cf. Boekarts, 2003; Revelle, 1986; Schiefele & Rheinberg, 1997; Schneider, Wegge, & Konradt, 1993; Rheinberg, Vollmeyer, & Burns, 2000), at least in the tradition of achievement motivation theory. Two notable exceptions, both of which draw on the work of Atkinson, are presented in the following sections.

6.4.4.3 Efficiency of Task Performance

In 1974, Raynor and Atkinson published "Motivation and Achievement," a more detailed analysis of the relationship between motivational strength and quality of performance that took account of the complexity of the respective task.

Reminiscent of the Yerkes-Dodson Rule (1908; see also Chap. 2), Atkinson (1974b) did not assume a monotonic relationship between motivational strength and efficiency of performance. The highest efficiency derives not from maximal motivation strength but from *optimal* motivation strength. This optimal motivation strength decreases as the task and its information processing demands become increasingly complex. People functioning below this optimal level are "undermotivated"; when motivational strength exceeds the optimal level, performance is adversely affected by "overmotivation." These assumptions are illustrated in Fig. 6.18. Performance on a simple task (A) increases continuously as a function of motivational strength; the slope is steep to begin with and flattens off somewhat later. Performance on a moderately difficult task (B) takes the inverse U-shaped form of the Yerkes-Dodson Rule. When

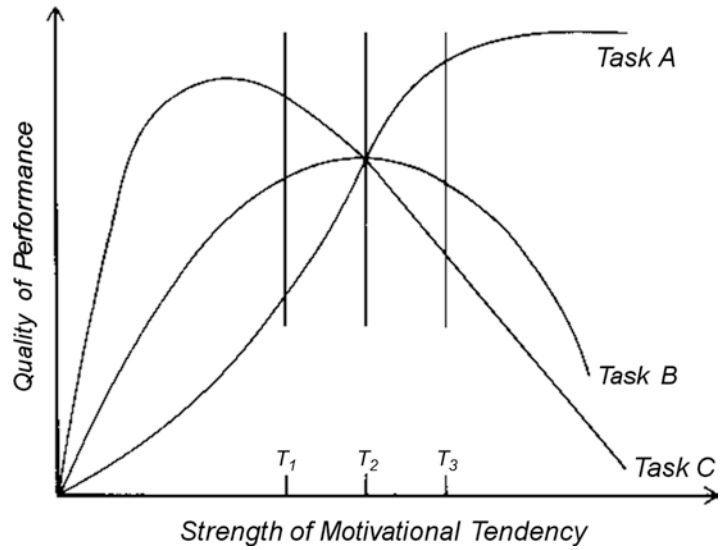

Fig. 6.18 Efficiency of task execution (quality of performance) as a function of motivational strength on three tasks (*A*, *B*, *C*) of increasing complexity. Depending on the complexity of the task, the strength of the motivational tendency (*T*1 , *T*2 , *T*3) may be conducive or inhibitive to quality of performance (Based on Atkinson, 1974b, p. 200)

a task is very complex (C), motivational strength reaches its optimal level even sooner. Hence, a given motivational strength can have very different effects on performance outcomes depending on the type of task at hand (in other words, more motivation does not automatically mean better performance).

The motivational strength to perform a task is determined by three variables:

1. The person's motives
2. The perceived difficulty of the task (probability of success)
3. The situational incentives (e.g., consequences of self and other evaluation after success and failure)

These assumptions are largely in line with those of the risk-taking model. Atkinson continued to suggest that the relationship between the tendency to avoid failure and the tendency to approach success is subtractive, leading to the logical, though seemingly paradoxical, hypothesis that high failure motivation can have favorable effects on performance on complex tasks, where (overly) high success motivation would have detrimental effects.

- What distinguishes this new approach is the assumption that the effects of motivational strength on performance are moderated by task complexity.

The model was tested with data from empirical studies addressing the effects of multiple motives and incentives on task performance. The idea behind this approach was very simple: the interaction of multiple motives and incentives can easily result in a state of overmotivation that impairs subsequent task performance. Most of these studies were summarized in the volume edited by Atkinson and Raynor (1974) and based on the reanalysis of published data.

Entin (1974) measured the achievement and affiliation motives of student respondents (person characteristics) presented with simple or complex calculations (task characteristics). The situational context was endowed with achievement-related (private feedback) or affiliation-related (public feedback) incentives (situational

characteristics). In the private feedback condition, success-motivated students performed better than failure-motivated students, regardless of the complexity of the task. In the public feedback condition, respondents with high scores in both motives (achievement and affiliation) showed marginal performance deficits as a result of overmotivation. Again, no differences were found between simple and complex tasks.

Atkinson's (1974b) reanalysis of studies reported by Atkinson and Reitman (1956) and Reitman (1960) was rather more convincing. Participants were given math tasks in a multithematic incentive situation (group competition, encouragement by the experimenter, and promise of reward). Success-motivated respondents performed less well under these conditions than in a situation with few extrinsic achievement incentives. The reverse held for participants with a low resultant achievement motive, who benefited from the introduction of additional incentives and performed better under these conditions. Findings from further studies confirm that multi-thematic incentives soon lead to performance decrements in success-motivated individuals, whereas less-motivated or failure-motivated participants tend to benefit from the provision of additional incentives.

Horner (1974b) asked male students to solve math problems and anagrams, either alone or in competitive situations with a male or a female opponent. Again, the resultant achievement motive and the affiliation motive were assessed. Table 6.8 documents the findings for the anagram tasks (the pattern of results obtained for the math problems was similar). When working independently, success-motivated students performed much better than failure-motivated students. When competitive incentives were added, a different picture emerged, particularly for respondents competing with a same-sex opponent (i.e., in this case with a male). Under these conditions, participants high in both the success and the affiliation motive performed just as poorly as participants low in both of these motives. In the former case, the performance decrement was attributed to the effects of overmotivation and, in the latter case, to the effects of undermotivation.

Table 6.8 Mean number of anagrams solved as a function of the resultant achievement motive (nAchievement – TAQ), affiliation motive (TAT), and three incentive conditions (N = 88 male students; scores were standardized to have a mean of 50 and a standard deviation of 10)

	Condition		
Motive constellation	No competitor (alone)	Female competitor	Male competitor
High affiliation motive			
High success motive	46.5	53.9	48.4
High failure motive	41.8	53.6	56.1
Low affiliation motive			
High success motive	48.4	53.4	53.7
High failure motive	40.8	47.7	46.7

Based on Horner (1974a, p. 249)

The most convincing evidence to date for overmotivation leading to performance decrements was reported by Short and Sorrentino (1986). Participants worked on a rule construction task, either alone or in small groups. When the incentive of group work was added, a combination of high success and high affiliation motives predicted a performance decrement, whereas a high failure motive was associated with enhanced performance. This is one of the few studies that has succeeded in demonstrating that the failure motive has a subtractive effect on the achievement tendency and can thus diminish the effects of overmotivation.

Nevertheless, three points warrant further consideration:

1. There has been surprisingly little empirical investigation of Atkinson's hypothesis that task complexity moderates the effects of motivational strength on performance. This endeavor would doubtless be facilitated by a taxonomy permitting more precise definitions of task complexity and the associated information processing demands (cf. Wood, 1986). Strictly speaking, the core premise of the achievement model described above remained untested.

2. The performance decrements observed in multi-thematic incentive situations are difficult to interpret.

Overmotivation is just one of many possible explanations. In meta-analytic studies, Spangler (1992) found that achievement motive-incongruent incentives, such as material rewards, social recognition, and pressure to perform well, reduce efficiency of task performance in individuals with a strong achievement motive (nAchievement). Spangler did not interpret this finding in terms of an overmotivation effect, but considered it to reflect the undermining effect of external rewards. Specifically, he suggested that the intrinsic motivation that achievement-motivated individuals automatically experience in the presence of challenging tasks is undermined by motive-incongruent incentives. It remains unclear which of these two explanations (overmotivation or loss of task-intrinsic motivation) is correct.

3. Atkinson's achievement model requires a careful distinction to be drawn between success- and failure-related achievement motives. It is not appropriate to calculate the difference between the two motive scores, because doing so neglects the independence of the two motives. Covington and Roberts (1994) have proposed a more appropriate two-dimensional model of achievement motivation (see the excursus on the following page).

6.4.4.4 Overmotivation as a Problem of Attention and Effort Control

Beyond the boundaries of achievement motivation research, Baumeister (1984; Baumeister & Showers, 1986) has described a phenomenon that he terms "choking under pressure." By this he means the decrements in performance are sometimes observed at the very moment when peak performance is required (e.g., in an important test). This phenomenon seems to be caused by attention being focused on the action at hand, thus interfering with its automatized and overlearned execution. Self-related cognitions can also interfere with performance, as postulated in the attention thesis of test anxiety (Wine, 1971), in which case attention has to be controlled by volitional means (e.g., by instructing oneself to concentrate on the task).

Typical variables that can easily cause a decline in efficiency are:

- The presence of critical observers
- Competition with others
- Outcome-dependent rewards or sanctions
- Ego-relevance of the task

Further variables that may qualify the effects of the aforementioned influences are:

- High task complexity
- Expectancies
- Individual differences

Individual differences include the ability to regulate or direct one's effort and attention to be consistent with the demands of a task. Kuhl (1983) described this self-regulatory ability as an essential component of action control, which is vital for ensuring the enactment of intentions, even in difficult or distracting situations with few incentives (Chap. 12). For example, people may visualize incentives that increase their motivation to perform an unpleasant activity; they may reward themselves for completing the activity by doing something more enjoyable afterward; they may endow the activity itself with playful incentives; they may eliminate environmental distractions that might divert them from the action at hand (for an overview of motivational control strategies, see Wolters, 2003).

Conversely, people faced with very complex and error-prone tasks may have to rein in their motivation in order to avoid rushing into a task with undue haste.

Heckhausen and Strang (1988) investigated the ability of semiprofessional basketball players to moderate their effort to an optimal level. In repeated trials, the players were required to perform a difficult dribbling maneuver before shooting a goal under either normal training conditions or "record" conditions. The record condition was induced by instructing players to score a personal best. Two types of measures served as dependent variables: physiological indicators of effort (blood lactate levels and pulse rate) and observational

measures of performance accuracy (number of dribbling errors and number of misses). As expected, a performance decrement (i.e., an increase in the numbers of dribbling errors and misses) was observed in the record condition, although there were marked differences between players. Those (action-oriented) athletes who were able to keep their effort at an optimal level (lactate levels) and who made few errors, even under the stressful record condition, were not identified by the level of their achievement motive, but by their scores on a questionnaire devised by Kuhl (1983) to measure action- vs. state-oriented modes of action control.

Excursus

The Quadripolar Model of Achievement Motivation

Covington and Roberts (1994; see also Covington & Omelich, 1991) suggested that striving for success and striving to avoid failure should be treated as two independent dimensions of achievement motivation. Unlike Atkinson (1957, 1964), who reduced these two motives to a single, bipolar dimension (hope for success vs. fear of failure) by computing a difference score, Covington and associates distinguished four types of achievement-motivated individuals (Fig. 6.19):

Type 1: Success-oriented optimists strive for success without the fear of experiencing failure.

Type 2: Failure-avoiding individuals fear failure, but derive little pleasure from success.

Type 3: Overstrivers have high scores on both motives; they strive for success, but also fear failure.

Type 4: Failure-accepting individuals do not feel attracted to success, nor are they concerned about possible failure.

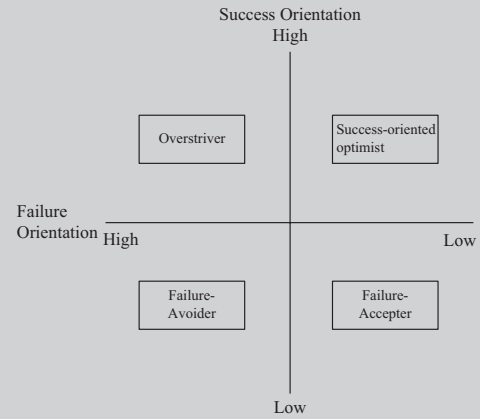

Fig. 6.19 Quadripolar model of achievement motivation (Based on Covington & Roberts, 1994, p. 160)

This quadripolar model of achievement motivation is based on the finding that correlations between success orientation and failure avoidance are either nonexistent (TAT) or of small to moderate magnitude (self-report). Any imaginable combination of the two motives can be observed within individuals. The approach traditionally taken in achievement motivation research of subtracting the failure motive from the success motive produces the same neutral score for both overstrivers and failure accepters – both types are characterized by approximately equal (strong or weak) levels of the two motives. Yet Covington and Roberts (1994) reported that failure-accepters differ from overstrivers in numerous respects with the most important field of application being the investigation of students' school-related engagement (By De Castella, Byrne & Covington, 2013; Martin, Marsh, & Debus, 2001).

Specifically, people who accept failure do not seek to acquire new skills or to improve their performance. They actively avoid effort and are rather indifferent to achievement in educational and work settings. In contrast to failure avoiders, their performance does not cause them much

anxiety or worry. Covington and Roberts explain these phenomena by reasoning that failure accepters have uncoupled their self-esteem from socially desirable performance outcomes. Overstrivers, on the other hand, work hard to succeed, but their efforts are driven by the fear of failure. They are the students who often work incessantly, but whose learning tends to be superficial. In exam situations, they have trouble retrieving the knowledge they spent so much time and energy committing to memory. Their thoughts revolve constantly around achievement-related activities, which they associate with high levels of stress and social pressure. When they do succeed, they experience relief, but rarely real pride and satisfaction. Overstrivers differ from failure avoiders to the extent that their fears have a mobilizing, rather than inhibiting, effect. Because of the value they attach to success, overstrivers see attack as the best means of defense and try to overcome their fear of failure by stepping up effort expenditure. Unlike success-oriented individuals, whose approach to challenging tasks is optimistic and self-confident, overstrivers often fling themselves into their work without pause for thought. They lack flexibility, sticking instead to established approaches, and tend to get lost in detail. Despite their enormous efforts, they are ineffective and are particularly likely to fail on complex tasks.

Although these findings are more illustrative than explanatory, they demonstrate that a model that conceives of success orientation and fear of failure as two independent person characteristics does more justice to the information value of the two achievement motives than an approach based on the computation of difference scores (Schultheiss & Brunstein, 2005). One further advantage of the quadripolar model is that individuals whose achievement behavior is characterized by a conflict of motives (overstrivers) can be distinguished from individuals for whom achievement-driven behavior has no incentive at all (failure accepters).

The study by Heckhausen and Strang (1988) shows that the strength of a motivational tendency alone cannot predict performance. As McClelland (1985a) noted, the risk-taking model has led to rather exaggerated, overly simplistic claims in this respect. What is in fact crucial is whether an individual has the self-regulatory competence to adjust motivation levels to the demands of the task. Schiefele and Urhahne (2000) reported similar findings for academic outcomes: action control (self-regulatory skills) was found to have a direct effect on examination results, whereas the effects of achievement motivation were indirect (via goal setting).

In the final analysis, all of these findings show that achievement motivation is just one of many variables having an impact on the quality of task performance. It can be the driving force behind efforts to consistently enhance one's performance and achieve ambitious goals, but it cannot compensate for a lack of cognitive or self-regulatory skills. In the following section, we describe a model (Fig. 6.20) developed by Atkinson to account for these phenomena.

6.4.4.5 Cumulative Achievement

The quality of performance depends not only on the strength of motivation but also, and indeed primarily, on individual ability. Accordingly, Atkinson (1974a; Atkinson et al., 1976) defined quality of performance as the product (×) of ability and efficiency, where efficiency was the joint function of motivational strength and task demands. Seen from this perspective, an intelligence test (or any other ability test) will only reveal "true" differences in ability if all respondents work on it at the optimal motivation level. Yet, because the multi-thematic incentives involved in test situations can both arouse

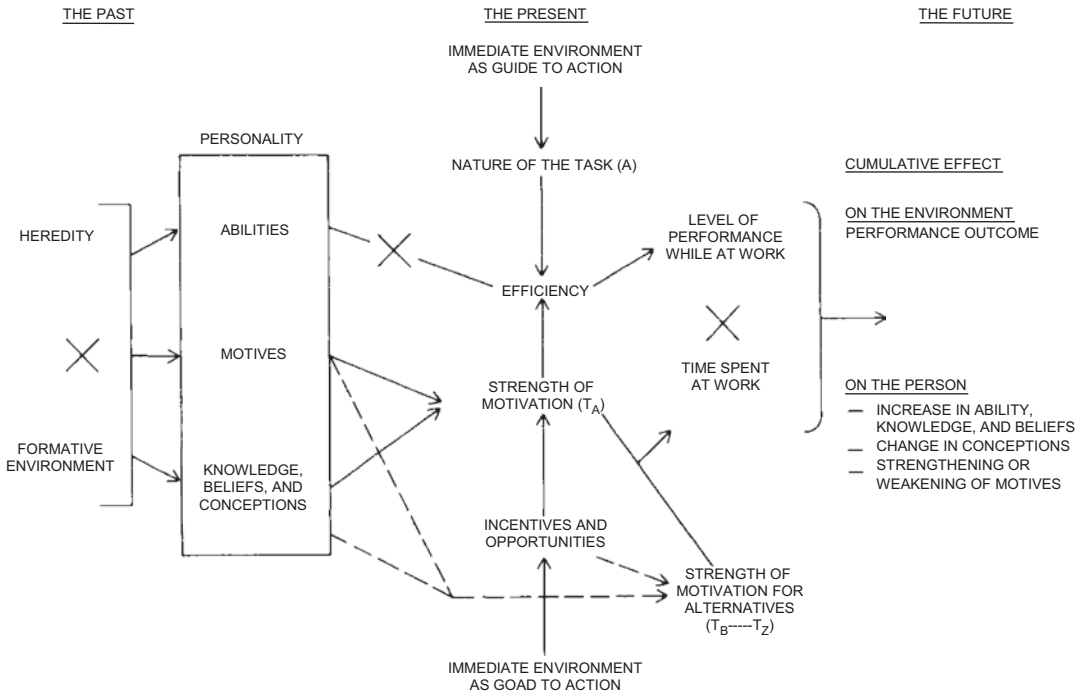

Fig. 6.20 The dual role of motivation as a determinant of cumulative achievement. Besides individual ability on a specific task (*A*), strength of motivation (*TA*) influences performance gains in two ways. First, together with the specific demands of the task, it determines the efficiency of task performance. Second, strength of motivation has a direct influence on the time devoted to a task, although strength of motivation for alternative activities (*TB* ... *TZ*) must also be taken into account here (Based on Atkinson, Lens, & O'Malley, 1976, p. 51)

motivation and inhibit performance (e.g., by activating fears), this condition is unlikely to be met in real-life contexts. Scores on ability tests thus represent a mixture of true ability and motivation-dependent efficiency that is difficult to disentangle. Simply instructing test takers to do their best does not suffice to neutralize these influences, as research showing that scores on mental concentration tests are influenced by the induction of success- and failure-related motivational states has demonstrated (cf. Brunstein & Gollwitzer, 1996; Brunstein & Hoyer, 2002).

In Atkinson's view, individuals high in motive strength are at particular risk for becoming overmotivated and suffering from performance decrements in high arousal situations such as exams. Yet under everyday working conditions, where achievement-relevant incentives are less prevalent, these individuals benefit from high motive strength. In these contexts, their high motivational strength is within the range of optimal efficiency and fosters the investment of time and effort in successive phases of an activity. Atkinson assumed an almost linear relationship between the strength of the (activated) achievement motive and the time devoted to an activity. In the long run, high efficiency coupled with high time investments results in a high level of cumulative achievement.

In other words, because quality of performance is dependent on both ability and efficiency, it follows that cumulative achievement is the product of performance quality and time invested in a task. The latter is determined by the strength of the success motive and by the presence of environmental incentives capable of arousing this motive. Of course, incentives and motives relating to alternative activities (e.g., meeting up with friends rather than doing one's homework) may also take effect. Which activity is performed, and how much time is invested, ultimately depends on the relative strengths of the competing motives. Motivation thus serves a dual function in cumulative achievements. First, it influences the effi-

ciency with which a task is performed. Second, it influences the time invested in that task.

This model has important implications, not only for predicting cumulative achievements but also for the long-term acquisition of knowledge and skills. Besides having an impact on current performance, the multiplicative interaction between performance quality and working (or learning) time affects the individual himself or herself in the sense that it furthers the development of important competences and skills. As the proverb says, "practice makes perfect." Hence, Atkinson anticipated an idea that was later developed in expertise research (Ericsson, 1996): excellence, in any given area of expertise, requires intensive and regular practice, with a focus on insightful learning ("deliberate practice") rather than routine drills.

Given its complexity, the model has mainly been used as a framework theory for explaining multiply determined performance trajectories (e.g., the development of scholastic achievements; cf. Helmke & Weinert, 1997). Yet detailed empirical analyses are scarce. Sawusch (1974) could validate the model's key assumptions in a computer simulation. Because this analysis drew on artificial data, its results should be interpreted with caution. Atkinson et al. (1976) assessed resultant achievement motivation (nAchievement – TAQ) and intelligence levels of sixth and ninth graders and used these data to predict academic performances at the end of their participants' school career (grade 12). Overall, differences in intelligence explained more variance in students' final grades than did motivational differences. There was also an interaction effect between strength of motivation and intelligence. High motivation predicted better school performance only among students in the upper range of the intelligence distribution. This finding is consistent with Atkinson's idea of cumulative achievement: it is only at high ability levels that motivational strength – mediated by efficiency – can have positive effects on performance quality. Furthermore, the relationship between motive strength and ability level was more pronounced in grade 9 than in grade 6. This finding might indicate that motive strength – mediated by the time spent on school work – promotes the acquisition of new knowledge. Entirely convincing evidence for this hypothesis has yet to be presented, however.

Summary

A good deal of research on achievement motivation has drawn on Atkinson's risk-taking model. Although studies of task choice and persistence provided evidence in support of this model, the insights it provided into achievement levels and learning trajectories were rather limited. Whereas quantity of performance is dependent on strength of motivation, the same only applies to quality of performance under very specific conditions. Therefore, Atkinson developed various models to predict the effects of motivational strength on the efficiency of performance at various levels of difficulty. In doing so, he established that both undermotivation and overmotivation can cause performance decrements. In the case of cumulative achievement, ability levels have to be taken into account as well; it is the interaction between ability and motivation that determines the quality of long-term performance. It has not been possible to confirm the predictions of the risk-taking model for the effects of failure motivation, probably because fear of failure is not purely an avoidance motive.

As yet, there have been relatively few efforts to test the core assumptions of the risk-taking model. Findings on the valences of success and failure and on subjective evaluations of the probability of success indicate either that achievement behavior in real-life contexts deviates from the model's assumptions of symmetry (with respondents preferring rather difficult tasks to tasks of moderate difficulty) or that researchers have not yet succeeded in measuring the critical variables (e.g., the probability of success) with a sufficient degree of accuracy.

6.5 Achievement Motivation and Self-evaluation

How can the findings on achievement motivation theory described above best be integrated and interpreted? As impressive and differentiated as these data may be, the question remains of how

characteristic patterns of success-motivated and failure-motivated behavior are maintained over time. Heckhausen attempted to answer both of these questions by proposing a self-evaluation model that explains characteristics of success-motivated and failure-motivated behavior in terms of both affective and cognitive aspects of achievement motivation.

6.5.1 Achievement Motivation as a Self-reinforcing System

According to Heckhausen (1972, 1975a, 1977a, 1977b), the key to understanding behavioral differences between success-motivated and failure-motivated individuals lies in the specific directives that govern their behavior, as well as in the contrasting frames of reference (or reference values) that they use to evaluate the outcomes of their efforts. These relationships can best be illustrated by reference to the situation of success-motivated individuals, as illustrated in Fig. 6.21.

6.5.1.1 The Directive Governing Success-Motivated Individuals

The actions of success-motivated individuals are governed by the directive to prove their competence, acquire new skills, and improve their abilities in specific domains of expertise. This striving is driven by positive anticipatory emotions (hope for success) that are activated right at the beginning of the given task, providing the actor with a foretaste of how it will feel if this task can be mastered. Anticipatory emotions thus stimulate, but do not satisfy, the need for achievement. As a personality trait, hope for success can only be explained against the background of the individual's learning history (e.g., repeated experiences of mastering challenging tasks); for simplicity's sake, this aspect is not considered in detail here (see Chap. 16). At the beginning of an achievement episode, success-motivated individuals act on their hope for success by choosing challenging tasks and setting ambitious goal standards. They prefer tasks that are slightly more difficult than those they have previously mastered. Because such tasks are susceptible to effort, they

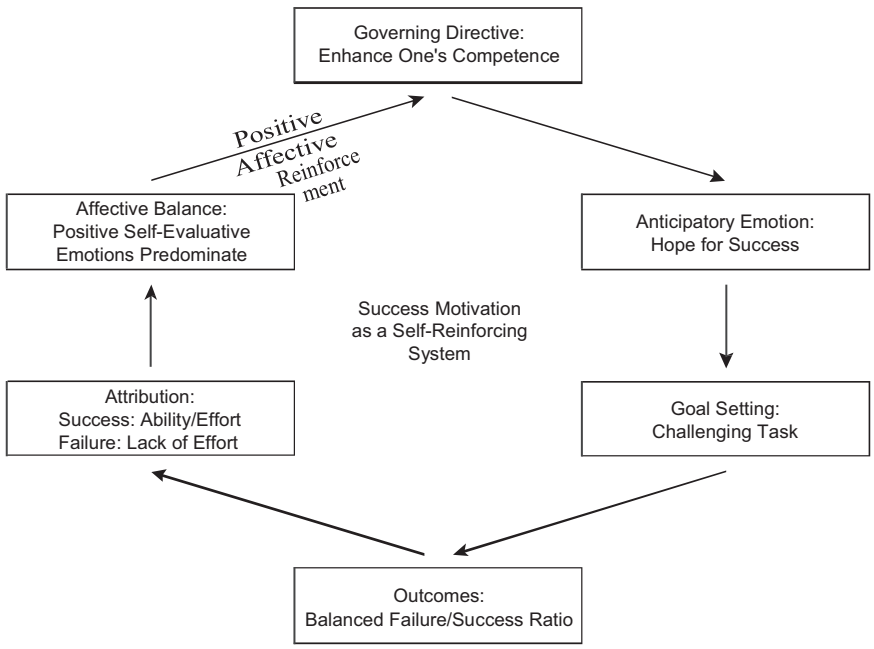

Fig. 6.21 Success motivation as a self-reinforcing system

provide success-motivated individuals with a perfect opportunity to demonstrate their proficiency. Because the level of aspiration is intermediate or slightly above-average difficulty, success-motivated individuals will logically experience failure just as often as success; their ratio of failures to successes is more or less balanced. How is it, then, that success-motivated individuals can "afford" to fail just as often as they succeed? According to Atkinson (1957, 1964), the pride that success-motivated individuals take in their successes far outweighs the shame they feel at failure. Despite a balanced failure/success ratio, the affective balance of self-evaluation after success or failure – i.e., the ratio of positive to negative self-evaluative emotions – remains positive. Although the risk-taking model postulated this phenomenon, no real explanation was given for it. Weiner (1974; Weiner et al., 1971) was the first to shed real light on this issue (Chap. 14). Success-motivated individuals tend to attribute success to effort and aptitude and failure to a lack of effort or external causes. Even if they do not succeed, they do not doubt their ability. For them, experiences of failure are associated with the expectation of being able to do better next time. Experiences of success are associated with feelings of joy and pride and provide confirmation of their ability and effort. Thus, although their failure/success ratio is balanced, the self-evaluations of success-motivated individuals are conducive to achievement-oriented behavior, and evaluations detrimental to self-esteem are rare. This is the critical point in Heckhausen's self-evaluation model: although the directive governing the actions of success-motivated individuals causes them to experience as many failures as successes, their feelings of pride (success) far outweigh their feelings of shame (failure). Heckhausen assumes that affect (here, self-evaluative emotions) serves to reinforce achievement-oriented behavior. Rather than each individual element of the model outlined in Fig. 6.21, it is the directive underlying the entire cycle that is reinforced. The behavior of success-motivated individuals is driven by the reference values of improving one's competence and increasing one's efficiency in the execution of goal-directed behavior.

Because this directive is positively reinforced by achievement-related affect, it can be maintained even in the face of failure.

- Like McClelland (1985b), Heckhausen thus ascribes to affect a key role in the activation (anticipatory emotions) and reward (self-evaluative emotions) of achievement-related behavior. Alongside the governing directive, these emotions play a major role in reinforcing success-oriented behavior.

Unlike McClelland, however, Heckhausen also specifies the cognitive factors (here, causal attributions of success and failure) that underlie self-evaluations and link them to the corresponding affective reactions.

6.5.1.2 The Directive Governing Failure-Motivated Individuals

Against the background of this model, the behavior of failure-motivated individuals can be explained from two different perspectives. First, failure-motivated behavior can be conceived of as inhibiting or disrupting the balance of the process depicted in Fig. 6.21. Let us imagine what would happen if failure-motivated individuals also preferred tasks of intermediate difficulty. The ratio of failures to successes would again be balanced. Failure-motivated individuals do not account for success and failure in the same way as their success-motivated counterparts, however. Instead, they often attribute failure to a lack of ability and have no clear preferences for the causal attribution of successes (Weiner et al., 1971). And it is precisely because failure-motivated individuals interpret failure as a sign of inadequacy that they experience it as shameful and disheartening. Success cannot compensate for these feelings of failure, because failure-motivated individuals rarely attribute success to ability and effort. Thus, although the failure/success ratio is balanced, feelings of threat to one's self-esteem make the affective balance negative. In effect, if failure-motivated individuals were to prefer tasks of

intermediate difficulty, like their success-motivated counterparts, they would be punished by recurrent negative self-evaluative emotions.

Simply describing what failure-motivated individuals do not do cannot provide a satisfactory understanding of how failure motivation affects the regulation of achievement behavior. The adaptive functions of failure-driven behavior must also be identified. Heckhausen (1975a) proposed that the directive governing the behavior of failure-motivated individuals is markedly different from the directive hypothesized for success-motivated individuals. Its ultimate aim is to reduce threats to self-esteem or, if possible, to avoid them altogether. The behavior of failure-motivated individuals is not driven by the goal of doing things better and better, but gives priority to the goal of protecting one's self-esteem. Because failure-motivated individuals associate achievement-related behavior with negative self-evaluative emotions (fear of failure prior to an achievement-related activity and shame when a failure actually occurs), the only possible self-reinforcing factor is a form of negative reinforcement, namely, avoiding experiences that will threaten self-esteem. Choosing extremely difficult or extremely easy tasks, low persistence, and abandoning achievement-related activities are just a few of the many measures that can help to diminish or avert threats to self-esteem (see Higgins, Snyder, & Berglas, 1990, and Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014, for further self-handicapping strategies, people use to shield their self-esteem in threatening achievement situations). All these approaches serve either to minimize the probability of failure (selecting very easy tasks) or to prevent negative self-evaluations after failure (the task was so difficult that failure has not to be attributed to personal inadequacies). Thus, although the behavior of failure-motivated individuals may seem strange and inappropriate from the perspective of the "improve one's capabilities" directive, it is in fact adaptive and entirely functional from that of the "reduce threats to self-esteem" directive. Nonetheless, the failure-related directive remains detrimental to the acquisition of knowledge and skills. It is associated with defensive and sporadic achievement behavior and is incompatible with the goal of increasing personal competence (see Covington, 1992, for a clear account of how the conflict between competence striving and threat to self-esteem can have detrimental consequences for student learning).

The self-evaluation model was welcomed as a heuristic framework that unifies and clarifies many of the findings produced in decades of research on achievement motivation. Heckhausen's idea of describing success- and failure-motivated behavior in terms of a self-regulating and self-reinforcing system has since generated much further research, the effects of which are most apparent in applied motivation psychology. One of the model's major implications is that any attempts to transform failure motivation into success motivation (e.g., in training programs) must target three subprocesses at once:

- Goal setting
- Causal attributions
- Achievement-related affect

A focus on just one of these three subprocesses would risk the intervention's success being compromised by the effects of the neglected elements.

On this basis, Rheinberg and Krug (2004; see also Rheinberg & Engeser, 2010) have developed student training programs that have been shown to bring about a sustained increase in hope for success and a corresponding decline in fear of failure. Furthermore, Fries (2002; Fries, Lund, & Rheinberg, 1999) showed that a training program targeting all three subprocesses can increase the efficacy of treatments to enhance cognitive skills. Indeed, it is vital that training programs aiming to increase actual performance, as well as motivation, do not overlook the strategies necessary for the task at hand. This principle is congruent with Atkinson's model of cumulative achievement outlined above; its effects have already been demonstrated in training programs designed to increase the economic activities of small business entrepreneurs (McClelland & Winter, 1969).

The research presented in the two following sections shows how a change in the reference norm used to evaluate achievement is associated with marked changes in each of the three subprocesses identified above.

6.5.2 The Role of Reference Norms in the Motivation Process

McClelland et al. (1953) and Heckhausen (1963) defined achievement motivation as the striving to meet standards of excellence. Yet they did not specify which standard is used to evaluate an action outcome. Three such standards are the following (see Heckhausen, 1974)

Each of these reference norms can also be applied to evaluate the performance of others. This is particularly relevant for occupations (e.g., the teaching profession) involving the routine evaluation of others' performance (see below).

The three reference norms are not mutually exclusive, but have been shown to take effect in different phases of skill acquisition. In a study conducted by Brackhane (1976), participants were asked to evaluate their own performance at a dart-throwing task. At first, they based their judgments on the characteristics of the task, i.e., on the scores displayed on the rings of the target (criterion norm). As they gained more experience, they developed a personal reference system for assessing change in their performance (individual norm). With increasing practice, the criterion for a good outcome was shifted gradually upward. Finally, some participants inquired about their cohorts' performance, indicating that they were interested in how their performance compared with that of others (social reference norm). The advantages of this sequence of reference-norm application are clear (see also Zimmerman & Kitsantas, 1997). At first, attention is focused on the task itself. People then begin to register improvements in their performance and only start to evaluate that performance in social comparison after gaining a good deal of practice. The reverse sequence of norm application could only lead to frustration and discourage people to persist in their task-related efforts until they have acquired a new skill.

Reference Norms (Based on Dickhäuser & Rheinberg, 2003)

1. Individual reference norms:
   Individuals compare their performance outcomes with previous outcomes to determine whether their performance has improved, worsened, or remained unchanged over time. The comparative perspective is temporal change in an individual's development (e.g., learning gains on a new type of task).
2. Social reference norms:
   Individuals compare their performance outcomes with those of others. The comparative perspective is the performance distribution within a social reference group (e.g., a student's position in a class). In a snapshot cross-sectional comparison, the individual's current ranking on a certain task is determined by relating it to the achievements of relevant others.
3. Objective or criterial reference norms:
   Performance outcomes are measured against absolute criteria inherent in the task itself. A solution may be correct or incorrect; an intended outcome may be achieved to a specifiable extent.

The distinction between different reference norms (or standards of excellence) was long neglected in achievement motivation research (for an exception cf. Veroff, 1969), but has attracted increasing attention since the 1980s. It is no coincidence that researchers investigating motivational issues in the context of developmental and educational psychology have played a pioneering role here: Rheinberg (1980; Heckhausen & Rheinberg, 1980) in the German-speaking countries and Nicholls (1984a, 1984b, 1989), Dweck (1986; Dweck & Elliot, 1983), and Ames and Ames (1984) in the English-speaking countries, to name just a few.

But how do the different reference norms have an impact on the motivation process?

The primate of individual reference norms. Individual reference norms occupy a preeminent position among aspects promoting motivation. People assessing their own performance levels on the basis of their previous achievements generally find that effort and persistence, on the one

hand, covary with gradual improvements in performance, on the other. Moreover, the performance level attained tends to be in the intermediate range of (subjective) difficulty, which – according to the risk-taking model – is maximally motivating. By contrast, comparison with social reference norms tells an individual only that he or she is better or worse than a certain percentage of others and does not reflect performance gains (assuming the reference group to be making comparable progress). Individual progress does not imply an improvement in relative ranking, as reflected in the high stability of school grades. Individual reference norms focus attention on improvements in personal performance and the effort made to achieve learning gains. Effort is a factor that is under the voluntary control of the individual and for which he or she can thus be held responsible. Social reference norms, on the other hand, focus attention on a relative ranking – e.g., relative to the rest of a class – that tends to be relatively stable and that barely correlates with effort and persistence. Social reference norms thus reflect differences in ability. Especially when assessed in social comparison, ability is generally seen as a determinant of achievement that is very difficult to influence in the short term.

- Instructional experiments conducted by Rheinberg and Krug (Rheinberg, 1980; Rheinberg & Krug, 2004; see also Rheinberg & Engeser, 2010) provided strong evidence for the idea that individual reference norms, in terms of both self-evaluations (student ratings) and other evaluations (teacher ratings), enhance motivation to learn. School classes characterized by individual reference norms show higher levels of hope for success, willingness to exert effort, and student responsibility.

Furthermore, individual reference norms are associated with more realistic levels of aspiration and performance expectations and with increased effort attributions. Achievement-related affect is dominated by joy and pride rather than by shame and fear of failure. Heckhausen (1975b) even found that people evaluate their own abilities in a more positive light, probably because this appraisal has less to do with social comparison (doing better than others) than with individual learning gains (improving one's own knowledge and skills). Learners who notice the progress they are making see the effects of their efforts at first hand and gain more enjoyment from the learning process (Jagacinski & Nicholls, 1987). This pattern of results has been observed in natural conditions (unaffected by outside influences), as well as in intervention studies in which teachers were trained to apply individual reference norms, and in training studies seeking to modify students' self-evaluations. Transforming a social frame of reference in the classroom to an individual one (or at least enriching it by aspects of intraindividual comparison) creates a motivational climate that has an impact on students' self-evaluations, with favorable effects on precisely those subprocesses (goal setting, causal explanations, and achievement-related emotions) identified above as being relevant to success-motivated achievement behavior (Rheinberg et al., 2000).

A study by Krampen (1987) showed that individual reference norms have particularly positive effects on the outcomes of weaker students. Mathematics teachers in 13 ninth and tenth grade classes were trained to provide students with written comments about their work, based on either individual, social, objective (curriculum-based), or no reference norms. The students were assigned at random to one of the four reference-norm conditions. After 6 months, findings showed significant interactions between the baseline performance level (school grade) and the reference norm on which the teachers' comments were based. As shown in Fig. 6.22, the expectancies of students with relatively poor achievements were highest when feedback was based on individual reference norms, whereas feedback based on social comparison was associated with a much more pessimistic view. The performance gains observed over a 6-month interval were even more remarkable. Here again, individual reference norms had the most favorable effect; social reference norms had none. The lower the student's baseline performance, the more conducive an individual reference norm was to learning gains (Fig. 6.23).

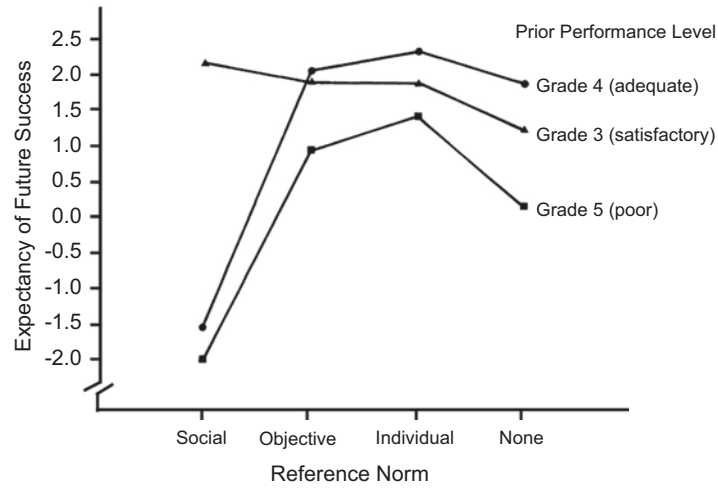

Fig. 6.22 Interaction of reference norm and prior achievement on the anticipation of success (Based on Krampen, 1987, p. 143)

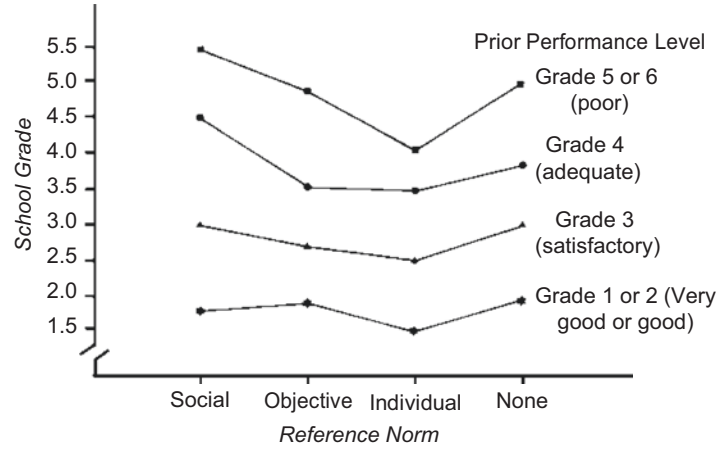

Fig. 6.23 Interaction of reference norm and prior achievement on school grades 6 months later (Based on Krampen, 1987, p. 144)

6.5.3 Reference-Norm Orientation and Achievement Motivation

Both directions of the relationship between reference norms and achievement motivation warrant careful analysis. From one perspective, hope for success can be expected to emerge in conditions characterized by individual reference norms, and fear of failure to develop when social reference norms dominate, particularly when people feel overwhelmed by task demands. From the other perspective, it is worth investigating which reference-norm success-motivated individuals instinctively use to govern their behavior and evaluate their performance.

6.5.3.1 Individual Reference Norms as a Developmental Condition for Success Motivation

From the domain of motivation to learn in schools, a wealth of data are available on the first issue. Rheinberg (1980) developed a parsimonious test to gauge the relative amount of social comparison information, on the one hand, and information about individual change in achievement, on the other, that teachers take into account when grading the performances of their students. Findings consistently show considerable variation in reference-norm orientation across teacher samples, even in equivalent situational contexts. Of course, teachers may adapt the reference norm that they use to the

type and purpose of the evaluation. Teachers with an individual reference-norm orientation have proved to be much more flexible in this respect, varying the reference norm applied according to the context of evaluation (e.g., using objective and social norms when writing report cards, but using individual norms in the context of student discussions and everyday feedback). Teachers with a social reference-norm orientation have proved to be less flexible, applying a social frame of reference regardless of the purpose of the evaluation (report cards, praise for good work, etc.).

The reference norm applied in the classroom also provides a certain amount of insight into teachers' causal attributions of student performance:

- Teachers with a social reference-norm orientation tend to ascribe success and failure at school to stable, internal factors (e.g., ability) and to form stable expectations of student performance. They only reward achievements that are above average. They set all students the same tasks, and their praise and criticism are dependent on class-average performance. "Very good" students will be praised even if they could have done better, as long as their performance is above the class average.
- Teachers with an individual reference-norm orientation attribute students' learning outcomes largely to effort. Their praise and criticism is dependent on learning gains, regardless of a student's absolute achievement level. Progress is consistently rewarded (by praise) and supported by informative feedback. Moreover, these teachers adapt the difficulty level of task assignments to their students' individual knowledge level.

In view of all these correlates, an individual reference-norm orientation in the classroom can be expected to have positive effects on students' learning motivation. Indeed, empirical evidence indicates this to be the case. For 16 third-grade classes, Brauckmann (1976) reported the correlation between the individual reference-norm orientation of teachers and the mean success motive of their students to be quite substantial ($r = 0.54$). Rheinberg, Schmalt, and Wasser (1978) found that the failure motive was relatively pronounced in classes whose teachers preferred social reference norms. Interestingly, a longitudinal study by Rheinberg (1980) showed that the introduction of individualized feedback led to a more pronounced reduction in the initial level of failure motivation in educationally disadvantaged students who could barely compete with their classmates. The sample consisted of fifth graders from the lowest track of the three-tier German secondary system (*Hauptschule*). Students had been allocated to new classes at the beginning of the school year. Half of the classes were assigned a teacher who applied social reference norms and the other half a teacher who applied individual reference norms. Within each class, students were categorized into three groups based on their scores on an intelligence test. Figure 6.24 shows how the failure motive (measured by Schmalt's, 1976a, Achievement Motive Grid) changed over the school year. Students exposed to individual reference norms experienced a reduction in the failure motive, and this effect was most pronounced among students whose intelligence scores were in the lowest tertile.

Corresponding patterns of results were found for test and manifest anxiety. Moreover, students exposed to an individual reference norm reported an increase in self-perceived ability, regardless of their intelligence. They were also much less likely than students exposed to a social reference norm to attribute failure to a lack of ability. This finding has since been replicated in numerous further studies (Rheinberg & Krug, 2004).

- Individual reference norms in the classroom are conducive to the development of students' hope for success and reduce fear of failure. These effects are not limited to the instructional situation, but extend to the level of personality dispositions as they develop and become increasingly stable.

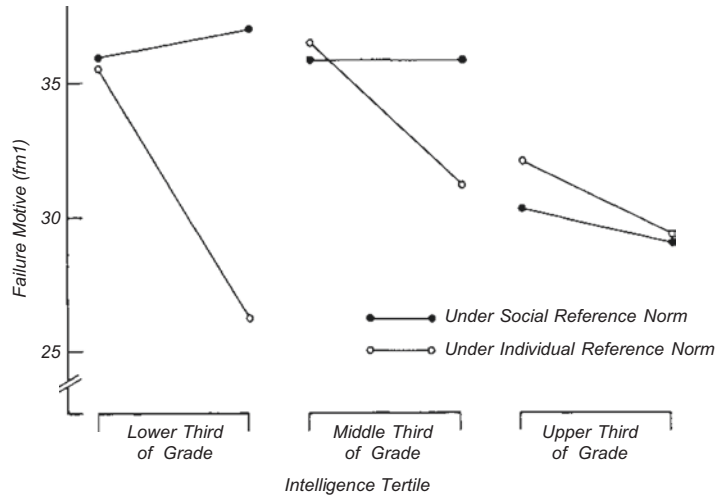

Fig. 6.24 Developmental change in the failure motive (FM-1, Grid test) during the fifth grade for classes whose teachers applied individual vs. social reference norms by performance on an intelligence test (in tertiles) (Based on Rheinberg, 1980, p. 148)

Family context and achievement motivation. Trudewind and Husarek (1979) presented some of the most compelling findings on the relationship between family background and the development of motive dispositions. The authors investigated how mothers' behavior in homework situations was associated with the development of hope for success and fear of failure from first to second grade. Mothers of children who feared failure were found to differ from mothers of children who were confident of success in the following respects:

- They were more likely to apply social norms than individual and objective norms and tended to expect too much of their children.
- They interfered in the homework process and showed little respect for their child's wishes or autonomy.
- They criticized failure, but responded neutrally to success.
- They attributed failure to a lack of ability, but success to the ease of the task.

These findings clearly show that fear of failure, as described in Heckhausen's (1975a) self-evaluation model, is transferred from the (negative) model of the mother to the child. Failure-centered interactions may be internalized in the form of inner dialogs and thus affect the child's behavior in other situations as well (e.g., at school). As a result, the child experiences fear of failure and helplessness when confronted with scholastic demands, particularly when outcomes are under par. This pattern of results is supported by the findings of Hodoka and Fincham (1995), who studied mother-child interactions in students classified as "helpless" (teacher rating), again in homework situations. Their findings confirm those of Trudewind and Husarek to the letter. A practical conclusion to be drawn from these insights is that interventions designed to combat fear of failure or to boost hope for success must take both the school and family contexts into consideration (for a parent training program of this kind, see Lund, Rheinberg, & Gladasch, 2001).

6.5.3.2 The Achievement Motive and Preferences for Reference Norms

Extrapolating from these findings, it seems reasonable to assume that people scoring high on success motivation instinctively use individual reference norms to evaluate their own performance. There have been few investigations of this assumption, but at least three studies have provided findings to support it. In a study with 124 students aged between 11 and 13, Rheinberg, Duscha, and Michels (1980) found a significant correlation of $r = 0.39$ between hope for success (AM Grid; Schmalt, 1976a) and preference for an

individual reference norm over a social reference norm in a motor skills game. Brunstein and Hoyer (2002; see also Brunstein & Maier, 2005; and Sect. 9.2.2 of this volume) took a different approach, but their pattern of results was similar. In an experimental study involving a mental concentration test, student participants were given feedback on both their individual performance gains (self-referenced feedback) and their ranking relative to the performances of other participants (norm-referenced feedback). The achievement motive was measured by means of the TAT (nAchievement). Change in performance subsequent to the provision of feedback served as the dependent variable. In this situation, the achievement motive did not interact with normative feedback but was highly responsive to self-referenced feedback. As soon as their performance decreased below the level expected on the basis of their previous performance, participants high in achievement motivation redoubled their efforts and showed an immediate improvement in performance. Thrash and Elliot (2002) investigated how success and failure motives, assessed by means of projective tests, are related to achievement-related goal orientations, assessed by questionnaire measures. Student participants were asked to state their goals for an upcoming exam:

- Outperforming other students (achievement-approach goals)
- Avoiding failure (achievement-avoidance goals)
- Mastering the tasks as well as possible (mastery goals)

Multiple regression analyses showed that success-motivated students tended to prefer mastery goals, whereas failure-motivated students pursued both achievement-approach goals and achievement-avoidance goals. The latter finding reemphasizes the two sides of the failure-avoidance motive (active vs. passive coping with failure). Findings were similar, though not identical, when questionnaires were used to assess the two achievement motives. Again, the success motive was associated with mastery goals and the failure motive with social comparison goals.

Findings on the hierarchical model of motivation (see the excursus) correspond with the ideas of Breckler and Greenwald (1986), who argued that achievement-motivated individuals, as defined by McClelland et al. (1953), have the capacity to regulate their behavior autonomously. Achievement-motivated individuals strive constantly to improve their knowledge and skills, applying their own standards of excellence, and with no need for social norms and feedback. Against this background, it makes perfect sense that de Charms et al. (1955) found striving for independence and low conformity to be close correlates of the achievement motive. Failure-motivated individuals, on the other hand, seem to be hounded by concerns about the social evaluation of their achievements and its implications. Failure-motivated individuals are thus dependent on the recognition of others. For them, the striving to achieve is a means to the end of gaining the acceptance and appreciation of the social environment.

To the casual observer, these findings seem to contradict a distinction that Nicholls (1984a, 1984b) made between two forms of achievement motivation. Nicholls proposed the first form of achievement motivation to be activated in situations where the aim is to master a task, make a personal effort, and improve one's performance. In these "task-involving" situations, ability is equated with the capacity to improve one's personal performance. In "ego-involving" situations, in contrast, the main aim is to compare one's ability with that of others and to do as well as possible or, at the very least, to conceal one's weaknesses. There are obvious parallels between Nicholls' distinction between task and ego involvement, on the one hand, and Rheinberg's distinction between individual and social reference norms, on the other. These norms, along with the respective incentives (self-improvement vs. demonstrating one's superior abilities), are indeed key components of both forms of motivational involvement (Butler, 1993). The potential contradiction is that Nicholls assumed classical

achievement motivation theory to apply only to ego-involving situations. However, the findings reported above suggest that achievement-motivated individuals – provided that their hope for success outweighs their fear of failure – are in fact attracted to task-related incentives and apply individual, rather than normative standards of excellence. This apparent contradiction is easy to explain, however.

Nicholls' assumptions were based on the awareness that measurements of the resultant achievement motive contain a measure of test anxiety. As described above, test anxiety is associated with low levels of confidence in one's ability.

Excursus

A Hierarchical Model of Achievement Motivation

Based on findings such as those presented earlier, Elliot (1997, 1999; Elliot & Church, 1997; Elliot & McGregor, 2001) concluded that approach and avoidance pervade the entire architecture of achievement motivation. In fact, his "hierarchical" model of motivation assumes approach and avoidance goals to be the factors determining performance and affect. The motive dispositions "hope for success" and "fear of failure," by contrast, are regarded as distal factors whose impact on behavior and experience is indirect, via the respective goals formulated.

Avoidance goals are associated with lower levels of effective behavior. First, their criteria ("what must not be allowed to happen") are not as clearly defined as those of approach goals ("what is to be achieved"), making the task of planning, executing, and evaluating actions rather more difficult (Schwarz, 1990). Second, people who pursue avoidance goals tend to focus on negative rather than positive events. They are more likely to register their failures than their successes. The opposite holds for people with approach goals. As a result, the former tend to underestimate their successes relative to the latter, even when objective outcomes are comparable (Coats, Janoff-Bulman, & Alpert, 1996). Avoidance goals serve the regulation of negative affect (stress and anxiety), whereas approach goals primarily influence the intensity of positive affect (energetic arousal and satisfaction) (Carver & Scheier, 1998). As a result, individuals pursuing avoidance goals cannot experience real joy; at most, they feel relief when they succeed in averting or avoiding a threatening state. Their inner participation in achievement-related activities is correspondingly low (Elliot & Harackiewicz, 1996); they are more likely to tackle such tasks under pressure than out of interest.

Although the distinction between approach and avoidance goals is, in many respects, reminiscent of that between success and failure motives, it has provided valuable new insights into how avoidance orientations produce adverse effects on action and emotional experience (Pekrun, Elliot, & Maier, 2006). Research on family context factors associated with the development of each type of goal orientation is still in its early stages. The results available thus far echo those produced by traditional research on parenting styles (e.g., Krohne, 1988): parenting that focuses on rewards and support, and that positively reinforces competence and independence, seems to foster the development of approach goals, whereas parenting that focuses on criticism, discipline, and punishment, and that engenders anxiety and apprehension, tends to promote the development of avoidance goals (see Elliot & McGregor, 2001).

This self-critical outlook has negative implications in social comparison situations, diminishing perceived prospects of success in competition with others. It is only worth people making an

effort in ego-involving situations if they have a minimum level of confidence in their abilities (Butler, 1999). Ideally, success materializes without any effort at all, simply as a result of ability. In situations where one's own ability is the only measure of comparison, however, estimations of relative ability are immaterial. Nicholls' argument thus makes perfect sense in the context of the risk-taking model and in terms of the way the achievement motive was measured (nAchievement – TAQ) and arousal conditions were implemented in the corresponding studies (test items were often purported to be intelligence measures), at least with respect to the anxiety measure. A different picture emerges when the classical TAT measure of the achievement motive is administered, however, because this measure does not correlate with how individuals assess their cognitive abilities (Sect. 6.2.7).

This discussion again illustrates the point that the theoretical assumptions of achievement motivation research can only be adequately tested when success- and failure-related motives are properly assessed. Calculating the difference between two (uncorrelated) motives and combining different methods of measurement (TAT and questionnaires) may prove empirically expedient (in the same way as calculating the difference between intelligence and anxiety in predicting performance would probably prove empirically expedient, even though it would mean combining entirely different kinds of constructs). Such an approach can only provide limited insights into the functional mechanisms of achievement-motivated behavior and the underlying motives, however. Nicholls' research has afforded valuable insights into the development of achievement motivation and provided the inspiration for many other models of achievement behavior (Chap. 15).

Summary

Success and failure motivation can be described as two self-reinforcing systems within which behavior is governed by a specific directive, and actions are confirmed or reinforced on an ongoing basis by affective processes (self-evaluative emotions). The directive governing the behavior of success-motivated individuals – to acquire competence and optimize knowledge and skills – is supported by the selection of challenging goals, by attributions conducive to self-esteem, and by positive achievement-related emotions. This kind of directive is most likely to develop when self- and other evaluations are based on individual reference norms, such that achievement is associated with effort and persistence. Failure motivation, on the other hand, involves negative reinforcement. Specifically, the threat to the self-esteem is reduced by defensive strategies and self-handicapping behaviors (e.g., unrealistic goals and low effort expenditure). The associated directive – to protect self-esteem – is most likely to develop in response to the application of social reference norms and experiences of helplessness. Attempts to reduce failure motivation must target three aspects: goal setting, causal attributions, and achievement-related affect. In real-life achievement settings, such as the classroom, social comparison norms can be supplemented by individualized feedback.

6.6 Final Thoughts

The theories and data presented in this chapter were derived from the pioneers of achievement motivation research. David C. McClelland, John W. Atkinson, and Heinz Heckhausen have had a lasting impact on our understanding of achievement motivation. Because they are discussed in more detail in other parts of this volume, we have touched only briefly on works of Bernhard Weiner and John Nicholls in this chapter. In 1986, Heinz Heckhausen still recommended that researchers should take time to reflect on this rich legacy before bringing any new ideas into play. Fortunately, many researchers ignored this advice, which is perhaps precisely the response that Heckhausen had intended to provoke with his remark. Notable developments in research on goal orientations, self-regulatory processes, and volition can be cited as examples. This chapter did not aim to provide a conclusive overview of research findings on achievement motivation theory; rather, it was our intention to identify

research questions that address the very core of the human striving for excellence and self-improvement. We conclude this chapter by highlighting four of those questions:

1. Since the beginning of research on achievement motivation, questions regarding how to measure motives have stayed highly relevant. The TAT was criticized fairly early due to its inadequate psychometric properties. However, there is no other instrument that has been developed with similar care (based on experimental studies of motive arousal) and delivered a comparable amount of insightful results (McClelland, 1985b). Recent findings suggesting that reactions in the TAT can be explained with the help of stochastic test theory are encouraging. Such findings have recently been further elaborated and advanced in order to include basic assumptions about the dynamics of motivation processes (Lang, 2014). If all of its facets are taken into account, a construct such as that of "the" achievement motive might be too complex to reduce it to only 1 or 2 numerical values. Although Heckhausen (1977a, 1977b) suggested that the "summary construct" of achievement motive should be divided into its single incentive- and expectancy-related components, this has not yet been realized in the field of motive measurement. The finding, however, that indirect (TAT) and direct (questionnaires) methods for measuring achievement motivation are barely correlated and thus might not assess the same construct has received much more attention. It might give some comfort that the measurement of other personality constructs that are difficult to access has suffered from similar problems (Bosson, Swann & Pennebaker, 2000). It would, however, be better if Heckhausen's recommendations were heeded and multidimensional tests for measuring basic motives developed.
2. The status of fear of failure in the context of achievement motivation research remains uncertain. The mere attempt to measure "the" failure motive has proven problematic, at least when using the TAT method, which does not distinguish satisfactorily between active and passive forms of coping with failure. Nevertheless, it is fortunate that this important distinction was detected and acknowledged early in achievement motivation research. Little is known, however, about the validity of FF measures (TAT) or more precisely about how this motive affects behavior depending on the situation. There is certainly no lack of ideas on how the existing findings are to be interpreted and integrated into theories a posteriori (Schultheiss & Brunstein, 2005). What is now needed is the development of more elaborated theories enabling researchers to make accurate predictions about the occurrence and the behavioral effects of each form of avoidance. To this end, the focus of theories and empirical research must be shifted to the connections between motivation and strategies for coping with failure.
3. The complexity of the risk-taking model should not be underestimated. From a purely algebraic perspective, achievement motivation is seen as a function of the product consisting of motive, incentive, and expectancy. The tendencies to strive for success and to avoid failure are distinguished from each other. A regression equation attempting to represent Atkinson's formula in its entirety would require 14 different predictors: 6 first-order predictors, 6 two-way interactions, and 2 three-way interactions. The specific effects of all of these terms would have to be tested. Testing such an equation would require a very large sample in order to ensure a reasonable test power. Studies on the risk-taking model dramatically simplified this situation by running preliminary calculations. A dependence between incentive and expectation is created by means of an additional assumption (Ae = 1 – We; this is not the case in other models of achievement motivation, e.g., Eccles & Wigfield, 2002). Thus these two variables are turned into a single one. In effect, the respective research has almost exclusively focused on task difficulty as the incentive for achievement behavior. In order to get a relatively easy measure for the "resulting" achievement

motive, fear of failure is subtracted from the success motive a priori. This subtraction is based on a fairly arbitrary convention for which alternatives have been suggested (see Covington & Roberts, 1994). Whether or not this convention is truly appropriate might require further investigation (Do the interaction terms for success and failure tendencies really have opposite signs if they are tested independently from each other?). If the validation of the risk-taking model is to be placed on an empirically supported foundation, the theoretically assumed interactions between the components of the model need to be tested more precisely.

4. Very little is yet known about how achievement motives influence the acquisition of knowledge. Achievement motivation research has, for decades, focused on performance criteria and neglected to clarify the relationship between motivation and learning. This neglect is surprising, because achievement motivation is often associated or even equated with competence motivation (see Koestner & McClelland, 1990; Schultheiss & Brunstein, 2005). For filling this gap the analysis of motivation needs to be linked more closely to cognitive and emotional processes that occur during an activity and interact with each other. In an analogous manner, studies investigating the long-term relationship between achievement motivation and the development of competency would provide crucial insights. One-shot studies that only look at the relationship between motivation and performance at a single point in time can only deliver a momentary snapshot of how this interaction is seen from the outside. Further analyses of how motivational influences affect learning and performance will be needed in the future. Once more, Atkinson (1974a, 1974b) was a pioneer in this regard. His work on the relationship of motivation and performance deserves new empirical attention.

Review Questions

1. *How is the achievement motive defined?*

   The achievement motive is defined as the recurrent concern for competing with standards of excellence and to increase one's competence. Achievement-oriented individuals strive to do well, improve their personal accomplishments, and outperform others on achievement-related tasks, activities, and skills.

2. *Which empirical criteria were used to develop thematic apperception tests for the assessment of individual differences in the strength of the achievement motive?*

   The sensitivity of the test to experimentally aroused motivational states (McClelland) and aspiration levels and changes thereof (Heckhausen).

3. *What are the advantages and disadvantages of the TAT method of assessing individual differences in achievement motivation relative to questionnaire methods?*

   Advantages: the TAT is relatively immune to response bias tendencies, taps the spontaneous expression of achievement-related motivational tendencies, and does not correlate substantially with self-concepts of ability. Disadvantages: despite an objective coding system, the method is sensitive to situational influences (e.g., the behavior of the test administrator) and has low internal consistency (reliability), and its implementation and analysis are time-consuming and cost-intensive (parsimony).

4. *Which criteria were used to validate the TAT method of measuring the achievement motive?*

   Scores on tasks requiring effort and mental concentration (e.g., adding one-figure numbers), simple learning tasks (e.g., word puzzles), and real-life outcomes (e.g., career success, innovations).

5. *How can the relationship between the amount of achievement-related content in textbooks and differences in educational achievements in different German states be explained?*

   Due to their semantic connotations, achievement-related statements (mastering something, improving on something) and key words (diligent, successful) can arouse the achievement motive. In turn, the aroused achievement motive mobilizes resources, such as persistence and effort, that are required to improve one's skills and master academic challenges.

6. *Which neuroendocrine features are found in achievement-motivated individuals when they work on tasks without being certain whether they can succeed?*

   In this situation, a strong achievement motive (assessed with the TAT) is associated with stress-response-dampening effects. Saliva cortisol is comparatively low in achievement-motivated individuals under stress compared to individuals with a weaker achievement motive. Achievement-motivated individuals subjectively perceive an activity characterized by high difficulty or uncertainty of success as a challenge that indicates an opportunity to master something.

7. *How does the risk-taking model define the valence of success and how is it measured?*

   The valence of success is defined as the product of the success incentive and the success motive: $Vs = Ms \times Is$. It is measured in terms of satisfaction judgments for achievements at different difficulty levels. The more anticipated satisfaction increases with the difficulty of the task, the higher the valence of success. The valence gradient for success (satisfaction across different difficulty levels) is steeper in people high in success motivation than in people low in success motivation. This means that individuals high in success motivation are more sensitive to achievement differences than less success-motivated individuals. Accordingly, their satisfaction is more dependent on the level of achievement attained.

8. *According to the predictions of the risk-taking model, which difficulty levels do success-motivated and failure-motivated individuals prefer when choosing tasks? Outline the actual empirical findings.*

   According to the risk-taking model, success-motivated individuals prefer moderately difficult tasks ($Ps = 0.50$), whereas failure-motivated individuals avoid this range of difficulty, opting instead for extremely difficult or extremely easy tasks. Empirical findings show that success-motivated individuals tend to prefer more difficult tasks falling below the critical value of $Ps = 0.50$ predicted by the risk-taking model. Failure-motivated individuals are more likely than success-motivated individuals to choose either extremely easy or extremely difficult tasks, but they do not purposely avoid the intermediate range of difficulty.

9. *How does the risk-taking model explain atypical shifts in the level of aspiration in failure-motivated individuals?*

   After failure on a simple task or success on a difficult task, the probability of success approaches the critical level of $Ps = 0.50$, i.e., precisely the range of difficulty that failure-motivated individuals seek to avoid. As a result, there are erratic shifts in the level of aspiration toward the other end of the task difficulty scale (i.e., from very easy to very difficult tasks or vice versa).

10. *Which experimental paradigm did Feather use to predict the level of persistence on the basis of the risk-taking model?*

    Two tasks are administered in Feather's experimental paradigm. Participants are told that the first is either difficult or easy, but it is in fact impossible. Over repeated trials, the probability of success thus approaches $Ps = 0.50$ ("simple" task) or recedes from $Ps = 0.50$ ("difficult" task). The probability of success on the second task is also stated. Success-motivated individuals are expected to show more persistence when the first task has a moderate probability of success and the second an extremely high or low probability of success. The reverse is expected to hold for failure-motivated individuals. For them, the more extreme the difficulty level of the second task, and the nearer the probability of success on the first task to $Ps = 0.50$, the more likely a switch to the second task becomes.

11. *How can the contradiction between the risk-taking model (Atkinson) and goal theory (Locke) in terms of the relationship between task difficulty and performance levels be explained?*

    The risk-taking model is primarily concerned with task choice. Tasks of moderate difficulty are generally preferred. Goal theory, in contrast, is concerned with the realization of selected goals. Effort expenditure is automatically adjusted to task difficulty level (difficulty law of motivation) until the point of maximum potential motivation is exceeded.

12. *Name at least two factors that moderate the strength of the relationship between achievement motivation and task performance.*

    First, the strength of the relationship depends on the demands of the task. A linear relationship between motivation and performance can only be assumed for very easy, speed-dependent tasks. Due to the speed/accuracy trade-off, high levels of motivation on complex, error-prone tasks can lead to decreased performance.

    Second, the individual's cognitive and self-regulatory skills are important. A lack of ability cannot be offset by high motivation. Self-regulatory skills are needed to ensure the optimal level of motivation for the task.

13. *How does Covington explain the phenomenon of overmotivation?*

    By a combination of high success motivation and high failure motivation. Covington calls individuals meeting this description "overstrivers." They invest a great deal of time and effort, but because their approach tends to be ill-considered and superficial, they remain ineffective.

14. *What is the function of motivational strength in Atkinson's model of cumulative achievement?*

    Motivation fulfills a dual function in this model. Together with ability, it influences the efficiency of task performance. Optimal, rather than maximum, motivation facilitates good performance.

    Motivation also influences the time invested in an activity. From a long-term perspective, high motivation thus has a positive effect on the acquisition of new knowledge and skills.

15. *Why might it not be advisable to calculate the "resultant motivation tendency" in terms of the difference between success and failure motivation?*

    Four arguments are relevant:

    Success and failure motives represent theoretically independent constructs. By

calculating difference scores, two dimensions are artificially combined in a single bipolar dimension of achievement motivation.

Difference scores do not reflect which variable is responsible for the predicted effects.

When difference scores are calculated, individuals high in both motives have the same resultant score as people low in both motives.

Failure motivation does not always undermine the success tendency; it can also facilitate proactive approaches to coping with failure.

16. *What is the role of achievement-related affect in Heckhausen's self-evaluation model of achievement motivation?*

It reinforces the behavioral directives that govern success-related vs. failure-related behavior: to increase competence in the case of success motivation and to protect self-esteem in the case of failure motivation. Causal attributions provide the link between performance outcomes and the affective reactions of success-motivated vs. failure-motivated individuals. Failure-motivated individuals avoid challenges in order to protect their self-esteem against detrimental effects associated with the attribution of failure experiences to internal and stable factors (e.g., lack of ability).

In contrast, success-motivated individuals prefer challenging tasks because their attributions are conducive to self-esteem and enhanced feelings of competence. Even when the ratio of successes to failures is balanced, the affective balance remains positive (with pride outweighing shame) for this group of individuals.

17. *Which reference norms can be used to evaluate a performance outcome?*

Individual reference norms, temporal comparison of one's performance with one's own previous performances; social reference norms, comparison of one's performance with the performance of others; and objective norms, task-immanent criteria of success, such as solving vs. not solving a task or attaining vs. failing to attain a given learning goal.

18. *Individual reference norms are known to be conducive to achievement-motivated behavior. What are the mediating processes involved in this relationship?*

Effort attributions of success and failure: individual reference norms emphasize that the level of achievement is contingent on the amount of effort invested.

Realistic goal setting: the goals set are based on individual ability or individual learning trajectories.

A sense of achievement and progress: weaker students, in particular, experience more success when exposed to individual than to social reference norms. The result is increased pride, which in turn reinforces feelings of competence and efficacy.

19. *Which characteristics of the mother-child interaction are associated with the development of a strong failure motive in elementary school children?*

In a homework situation, Trudewind and Husarek (1979) identified four such characteristics:

Using social reference norms

Expecting too much of the child and having unrealistically high goals and expectations

Attributing failure to a lack of ability

Criticizing failure and ignoring success

20. *How do avoidance goals inhibit achievement and enjoyment of learning?*

Avoidance goals tend not to have clear criteria; progress on such ill-defined goals

is inherently difficult to plan and evaluate.

Avoidance goals direct attention to failures; successes are not really registered.

Avoidance goals are associated with negative affect (anxiety, tension), less enjoyment of learning, and less interest in tasks, which are only attempted under pressure (e.g., to avoid experiences of failure, rather than to increase one's competence).

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7 Social Bonding: Affiliation Motivation and Intimacy Motivation

Jan Hofer and Birk Hagemeyer

7.1 Introduction

At birth, human beings are rather immature when compared to other primates and higher developed mammals (members of the so-called Placentalia). Without the continuous support and care of others, humans would not be able to survive, which is why Swiss zoologist and anthropologist Portmann (1951) described humans as "physiologically premature infants." As Portmann outlined, humans need to be brought up and cared for. Although the claim that humans are "ever evolving" is by no means uncontroversial, their cognitive and sociocultural immaturity is exactly what enables them to adapt to a wide array of highly different ecological and sociocultural contexts and to adequately develop into competent, respected, and happy members of their cultural communities.

In psychology, infants' psychosocial skills, which enable them to interact with their environment and to form social relationships, have been dramatically underestimated for a long time (Keller, 2011). The findings of modern research on development in infancy are in stark contrast to earlier descriptions of neonates as "reflexive beings" unable to even see or hear at birth (Stern, 1923). In fact, shortly after birth infants show a strong interest in stimuli that look similar to human faces (Fantz, 1961) and are, for instance, able to recognize the smell of their mother and distinguish her voice from the voices of other women (e.g., DeCasper & Fifer, 1980).

Nevertheless, human development universally requires social interactions even if culture-bound early childhood experiences result in divergent developmental pathways across the lifespan in different cultural contexts (Keller, 2007). Healthy development of any individual requires the supervision and attendance of others. Physical and emotional closeness does not only feel good; intimate social relationships are also essential to meet fundamental needs (Sullivan, 1953). Parents, siblings, peers, and partners all take on different roles of support across the lifespan; they adopt the roles of attachment figures, can boost self-worth, or offer possibilities for social integration (Asendorpf & Banse, 2000; Weiss, 1974).

While parents constitute an important source of care particularly during infancy and childhood to meet children's needs for security and safety and to offer them the chance for emotional refueling in threatening situations (Mahler, Pine, & Bergmann, 1980), relationships formed outside of one's family of origin, such as peers and friends of the same or different sex, take over these functions more and more at the beginning

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of adolescence. These new forms of relationships also play a key role for the satisfaction of needs that only arise later in life (e.g., sexuality). However, all forms of relationships have in common that they offer, albeit to various extents, opportunities for the satisfaction of the basic human need for closeness and contact.

People are generally reluctant to end social relationships, even abusive ones. This illustrates that the need for social bonding is deeply ingrained into the human mind. A brief glimpse at the clinical literature shows that many developmental disorders are closely related to social deprivation. It is therefore hardly surprising that the fundamental human need for social acceptance, belonging, and interpersonal exchange constitutes an important part of many theoretical approaches that examine personality development from various psychological angles. Prominent examples include the need for love and belonging in Maslow's model (1954); the need for relatedness that Deci and Ryan (2000) describe as one of three fundamental human needs alongside autonomy and competence in self-determination theory; and the need for belonging and social acceptance (need to belong) that integrates aspects of width and depth of social relationships into a common concept (Baumeister & Leary, 1995). Even though needs are defined differently across these approaches, they all have in common that the need to form social relationships represents the basis for a large part of human behavior, thinking, and (affective) experience.

7.2 The Need for Social Relationships

7.2.1 Views from Developmental Psychology

According to Sullivan (1953), personality development is based on the human ability to form and maintain relationships with others. This ability is closely associated with (early childhood) experiences of satisfaction or frustration of the innate need for closeness to and contact with others. Winnicott (1974) claims that infants require a developmental climate characterized by parental love and care to unfold their innate potential. In the first months of life, the loving and reliable care of others helps children to develop the confidence that others will continuously satisfy their fundamental needs. This is what Erikson (1950) calls the development of trust.

7.2.1.1 Attachment Theory

John Bowlby's attachment theory is still one of the most prominent approaches in research on the development of the first social relationships in life. Like Rene Spitz (1965) who studied the sometimes fatal effects of maternal and emotional deprivation on children in social care in the USA of the 1940s, Bowlby emphasizes that the quality of the mother-child relation in the first year of life determines the formation of social relationships later in life. Therefore, the postulate that close relationships between people are based on an innate basic human need for attachment is in stark contrast to fundamentals of behaviorism which views the attraction to an attachment figure and thus attachment itself as a result of reinforcement when basic physiological needs are satisfied (e.g., satisfying the child's need for food by feeding).

In addition, findings on the social behavior of rhesus monkeys reported by Harlow (1958) do not support a behaviorist explanation for the development of attachment between mother and child. In probably his most famous series of studies, Harlow separated young rhesus monkeys from their mothers shortly after birth. Mothers were replaced by either a food-giving wire mother-dummy or a warm cloth-covered mother-dummy. Harlow observed that the young monkeys spent most of their time with the cloth-covered dummy and only switched to the wire dummy to be fed. Moreover, the young monkeys were looking for closeness and protection by the cloth-covered dummies after the presentation of a fear-inducing stimulus and only resumed to explore their environment after emotionally refueling for a certain period in close proximity to the cloth-covered dummy. Even though Harlow's studies have always been subject to criticism due to their questionable ethical standards, he was able to clearly show the significance of (social)

body contact or – as he often named it – "the experience of love" for the healthy development of young rhesus monkeys.

According to Bowlby, infants' natural social orientation does not imply that they attach themselves to a particular person immediately after birth, as, for example, described by Konrad Lorenz (1935) in his seminal work on imprinting of young geese. The development of attachment bonds in humans is a rather extensive process that unfolds in the first year of life. While the attachment system itself has evolved phylogenetically, the quality of this first relationship to another person results from attachment-related experiences made by the infant with its primary caregiver from birth. Parents, who are usually the first attachment figures in an infant's life, are well-prepared for their task. A biologically rooted caregiving system allows them to respond sensitively and adequately to the needs of the infant (Papoušek & Papoušek, 1987). However, the extent to which caregivers continuously show their intuitive parenting behaviors when interacting with their infants and thus appropriately react to infants' needs substantially varies between individuals. It depends on various contextual factors (e.g., availability of resources), personal factors (e.g., attachment styles of caregivers), and characteristics of the infant (e.g., temperament). Thus, from birth infants make their individual experiences in social interactions with their primary caregiver. Typically, repeating interaction patterns with the primary attachment figure are increasingly internalized over time and integrated into the (emerging) personality of the infant. Infants form so-called internal working models which help them to predict (social) events and to plan future behavior accordingly (Bretherton, 2001). Bowlby (1969) postulates that mental representations of attachment include working models of the self and of the world (others). Working models of the self particularly involve beliefs about whether or not I am loveable, competent, and worthy of love in the eyes of attachment figures. In contrast, working models of the world cover, above all, perceptions concerning potential attachment figures and how they might behave. The quality of these first still rudimentary working models already affects infants' behavior toward the end of the first year of life. This has been shown impressively in studies on the behavior of infants and young children in the "strange situation test" (Ainsworth & Wittig, 1969), which is the standard instrument for the assessment of attachment quality in early childhood.

Excursus

Strange Situation: Assessing Attachment Quality in Early Childhood

The strange situation procedure is a kind of mini drama that allows researchers to observe different attachment strategies in children aged between 12 and 18 months during situations of free play and separation from the caregiver in a laboratory setting. The procedure rests on the assumption that new and unfamiliar situations entail the threat of being abandoned and thus activate the attachment system of the infant. Consequently, infants behave in accordance with their previous experiences with their primary attachment figures.

The infant and the attachment figure enter an unfamiliar room that is equipped with interesting toys. Eight short episodes are following in which the child is observed during two separations from the attachment figure, during the reunions with the caregiver after the stressful separations, and when having contact with a stranger. Based on the studies conducted by Ainsworth and colleagues in Uganda and Baltimore (e.g., Ainsworth, Blehar, Waters, & Wall, 1978), three main types of early childhood attachment strategies could be identified: secure (B), insecure-avoidant (A), and insecure-ambivalent (C). The attachment and exploration behavior of securely attached children is balanced. Even though they protest when separated from their caregiver, they show attachment behavior when reunited, calm down quickly, and resume exploring the room. In contrast, children with insecure attachment do not seem to perceive their attachment figure as a resource for providing emotional stability during

unfamiliar and potentially threatening situations. Insecure-avoidant (A) children appear to be relatively calm during separation episodes although physiological stress parameters such as increases in cortisol secretion and heart rate suggest that their attachment system is activated. These children explore a lot and tend to ignore or to avoid close proximity with their attachment figure during reunion. Insecure-ambivalent (C) children, on the other hand, are characterized by low levels of exploratory behavior. Throughout the entire strange situation procedure they show strong attachment behavior. In the reunion episodes they are difficult to console and often show a typical behavioral pattern that is characterized by an intense seeking of close proximity to the caregiver while simultaneously rejecting closeness to and expressing anger toward their caregiver.

These three main patterns reflect, above all, to what extent the caregiver is continuously available as a secure base for exploring the world or whether this criterion is met insufficiently (e.g., by avoiding physical contact) or in an ambivalent/inconsistent way. Additionally, there is a fourth behavioral pattern (D; Main & Solomon, 1990): Disorganized/disoriented children do not have a specific coordinated attachment strategy. In the strange situation, they attract attention by bizarre behavior, stereotypic movements, or suddenly becoming motionless (freezing behavior). Whereas the insecure-avoidant and insecure-ambivalent attachment patterns are considered to represent adaptive behavioral strategies enabling children to establish a certain degree of emotional closeness, the disorganized/disoriented pattern does not seem to have any adaptive value for the children. The disorganized pattern seems to be associated with children's experiences of abuse as well as their parents' unsolved traumatic experiences, which may finally cause children to become afraid of their caregivers (for a detailed discussion, see Grossmann & Grossmann, 2012).

Attachment patterns developed in early childhood may change if experiences with significant attachment figures substantially change over time. However, they tend to be relatively stable, as they mostly function outside conscious awareness. Hence, attachment styles represent a framework for the development of subsequent relationships and their associated internal models because attachment styles influence which information about new interaction partners is collected and how this information is processed, interpreted, and memorized. In brief, working models developed early in life represent prototypes of attachment for the establishment of relationships later in life (Bowlby, 1973, 1980). Thus, they actively influence individuals' psychological and behavioral strategies in, for example, romantic relationships (Hazan & Shaver, 1987) or their parenting behavior toward own children (Steele & Steele, 1995). The concept of internal working models which involves affective and behavioral components with varying degrees of conscious accessibility shows a strong overlap with the concept of motives, i.e., another psychological construct that is typically used to predict individuals' behavior and its associated affect. Although a close link between an individual's affiliative motivation and his or her early attachment-related experiences seems to be plausible, researchers have rarely tried to bring these two theoretical approaches together. Thus, it seems highly plausible that securely and insecurely attached children, respectively, significantly differ from each other in the strength and nature of their affiliative motivation as adolescents or adults (e.g., fear of rejection; hope of affiliation; Schultheiss, 2008).

7.2.2 Phylogenetic Roots

If the need for social relationships is innate, what is its biological purpose? Which selective advantages were gained with the motivation to build and maintain social relationships in the course of our phylogenetic history? Three functional domains can be distinguished. Firstly, attachment provides children with the necessary security for

the exploration of their environment, which allows them to gain experience and competence during early childhood (Bischof, 1985). Secondly, cooperation within groups is facilitated. Individual resources can be combined with the resources of others in order to optimize the outcomes, e.g., when foraging together (Voland, 2013). Thirdly, because human childhood is relatively long compared to that of other species, a special kind of cooperation is crucial for bringing up offspring. Eibl-Eibesfeldt (1997) assumes that the necessity to care for one's offspring is the phylogenetic origin of love. On the one hand, love between parents facilitates cooperation in bringing up children. On the other hand, without parental love parents might hardly invest the efforts and resources required for intensive childcare particularly during the first years of life. According to Eibl-Eibesfeldt (1997), this is also the motivational basis for developing personal relationships outside one's family of origin.

Distinguishing between different functional domains in which affiliative motivation has proven to be adaptive shows that conceptualizing a general need for social relationships (e.g., Baumeister & Leary, 1995; Deci & Ryan, 2000) might be too broad and unspecific. It is possible that distinguishable motivational facets have developed within the specific functional domains. For instance, the motivation to join groups seems at first glance to be fundamentally different from the love found between parents and children. Contemporary evolutionary psychology is in fact dominated by the notion of evolved psychological mechanisms (EPM; Buss, 2004; Cosmides & Tooby, 1995). An EPM is the result of a specific adaptation problem that had to be solved by a species over the course of its phylogenetic history. Attachment in early childhood can be understood as an evolved mechanism that solves one particular problem: providing a sense of security for the child. In solving this problem, the mechanism operates independently from other aspects of affiliative motivation, e.g., personal relationships in adulthood. Because EPMs are always specific to a particular problem, this evolutionary perspective assumes that the functional basis of affiliative motivation consists of a set of independent modules without shared functional principles. Yet, the explanatory power of this approach seems to be rather low. A more parsimonious theoretical account of a wide array of social phenomena is provided by the Zurich Model of Social Motivation (Bischof, 1985, 1993) which outlines a motivational system with a limited number of modules interacting with one another based on a few, clearly specified functional principles.

7.2.2.1 The Zurich Model of Social Motivation

The Zurich Model of Social Motivation (Bischof, 1985, 1993) provides a systems-theory approach to the motivational foundation of social distance regulation. The model was developed based on a large number of behavior observations in humans and other species and is supposed to depict the basic framework of the social motivation system in humans and other mammals. It does not cover higher cognitive functions such as expectations of success or failure which are relatively recent developments in our phylogenetic history that are only found in humans. Rather, the Zurich Model of Social Motivation aims at explaining basic social behavior by dynamic interactions between different feedback control systems. These systems explain the motivational dynamics of approaching and avoiding certain social cues and experiences by comparing an internal set point which defines the ideal level of experience with an actual value of experience. The larger the discrepancy between actual value and set point, the stronger the organism is activated. The term activation here refers to a state of tension that demands relief and can take on two different motivational forms: If the actual value falls beneath the set point, a state of appetence emerges. If, on the other hand, the actual value exceeds the set point, this leads to a state of aversion.

Each feedback system represents the need for a particular class of social experiences. According to the Zurich Model, the security system and the arousal system are of key importance for social distance regulation. The set points of these two systems quantify the ideal levels of closeness to

familiar and unfamiliar objects and are called dependency and enterprise, respectively. The security system and the arousal system do not work independently of each other. There is an inverse relationship between the two systems regarding both set points and actual values: higher levels of dependency are associated with lower levels of enterprise, and a more pronounced actual feeling of security is associated with lower levels of felt arousal.

The autonomy system represents the third feedback system that strongly influences dependency and enterprise. According to Bischof (1993), autonomy refers to feelings of strength, competence, freedom, and social acknowledgment. The set point of this system is called autonomy claim. A high autonomy claim increases enterprise and decreases dependency. Thus, the autonomy system indirectly affects affiliative behavior via the security and arousal systems.

The possible states of the security and arousal systems result in four basic affective-motivational patterns that play an important role in the regulation of social distance:

- Attachment (= security appetence), if security < dependency
- Curiosity (= arousal appetence), if arousal < enterprise
- Surfeit (= security aversion), if security > dependency
- Fear (= arousal aversion), if arousal > enterprise

Developing the Zurich Model, Bischof (1985) was especially interested in a particular phenomenon of social distance regulation: Why do adolescents detach from their familiar attachment figures (in most cases their parents)? This process of detachment sometimes happens very abruptly and can also be observed in other social species. To answer this question, it is important to note that familiarity with conspecifics is not a priori given among humans. Rather, familiarity results from repeated experiences in social interactions. Bischof (1985) distinguishes between three types of familiarity that occur in an ontogenetic sequence:

- Primary familiarity, i.e., the child's attachment to his or her primary caregiver, especially the mother
- Secondary familiarity, i.e., the ability to trust and bond with strangers outside the family of origin such as peers, friends, and, above all, romantic partners later in life
- Tertiary familiarity, i.e., parents' relationship with their children

Sexual motivation, which is referred to as libido in the Zurich Model, is the key to understanding the detachment process during adolescence. Besides being stimulated by external cues, libido is activated by physiological factors. Libido is linked to the autonomy claim in a positive feedback loop, which means that the two motivations mutually amplify each other. Biological maturation during adolescence leads to a surge in libido which in turn increases the autonomy claim. According to the Zurich Model, the temporal increase in rebellious and sometimes antisocial behavior among adolescents is caused by an increased appetence for autonomy. A more pronounced autonomy claim is associated with higher levels of enterprise and lower levels of dependency. Thus, adolescents often show behaviors of aversion and avoidance when they are close to their familiar caregivers who used to be significant sources of security and comfort. The constellation of the motivational system now promotes the exploration of new and exciting social environments which finally facilitates the search for a heterosexual partner and reproduction. Bischof (1985) describes this process as a biologically appropriate detachment from primary caregivers as it allows for the development of secondary familiarity with an intimate partner and averts the risk of incest due to the emerging sexuality within the family of origin.

In a similar way, many phenomena of social motivation including attachment styles and their development described by Bowlby and Ainsworth can be explained in terms of the functional principles derived from an integrated, phylogenetically evolved system of motivation. However, the Zurich Model of Social Motivation has hardly

been examined in empirical research (for an exception see Gubler, Paffrath, & Bischof, 1994). This lack of empirical research might be due to the complexity of the model, which can only be outlined along general lines in this chapter. Moreover, the theory is highly formalized. It allows testing very specific assumptions but requires an a priori estimation of many model parameters. Thus, the Zurich Model might be of high heuristic value; however, it is yet for the most part unclear whether the postulated functional principles are valid.

7.3 Theories from Personality and Motivational Psychology

Social motives are defined as relatively stable personality dispositions that energize, select, and direct behavior (and experience) within a given situational context with its possibilities and limitations for motive realization (McClelland, 1986).

Psychology has been for more than a century striving to find an answer to the question what drives people to act under particular situational circumstances and to maintain these actions at a certain intensity level for a certain amount of time (Atkinson, 1958). Many well-known psychological theories incorporate the idea that unconscious (implicit) and/or conscious (explicit) motives represent a crucial element of personality that causes goal-oriented behavior (e.g., Freud, 1959; Kuhl, 2001; Rogers, 1951). The origin of personality-related psychological research on affiliative motivation basically dates back to Henry Murray (1938) who developed an elaborated theory of human motivation. Murray's classification of needs distinguishes between primary (viscerogenic) needs that are based on organic processes (e.g., food, sex, avoidance of pain) and secondary (psychogenic) needs that can either be derived from biological needs or are shaped during early stages of ontogenesis even if deeply rooted in human nature such as affiliation, dominance, achievement, and play (see also Chap. 3 on trait theories).

7.3.1 The Affiliation Motive

According to Murray (1938), the aim of the need for affiliation is "a mutually enjoyable, enduring, harmoniously co-operating and reciprocal relation with another person" (p. 175). This need can be satisfied by different kinds of everyday behavior, such as meeting with friends or participating in cooperative group activities. Such behavior is associated with feelings of trust, sympathy, and affection. Murray's research was the basis of various methods for the assessment and description of personality including the thematic apperception test (TAT; Morgan & Murray, 1935; Murray, 1943) and its variants for the assessment of motives (McClelland, Koestner, & Weinberger, 1989). Following Murray's early contributions, psychological research concentrated primarily on psychogenic needs, above all on the so-called Big Three of implicit motive research, i.e., achievement, power, and affiliation.

The affiliation motive is defined as an individual's concern or desire to establish, maintain, or restore affectively positive relationships with other people or groups (Heyns, Veroff, & Atkinson, 1958).

Looking back at the history of motive research, very different psychological and behavioral correlates of the affiliation motive have emerged. Weinberger, Cotler, and Fishman (2010) concluded that the affiliation motive is a double-edged sword. On the one hand, it represents the desire to avoid feelings of loneliness and rejection by contacting other people and being close to them (fear of rejection; affiliation). On the other hand, it also refers to the need for a warm, emotionally fulfilling, intimate, and mutual exchange in social relationships (hope for affiliation/closeness; intimacy; see Sect. 7.3.3).

Retrospectively, studies conducted in the first phase of experimental research that began in the 1950s particularly produced findings on the avoidance component of affiliation, i.e., fear of rejection. Such early research was based on the assumption that individuals are not per se motivated to affiliate; rather this need is aroused by

feelings of fear and uncertainty (Schachter, 1959). This assumption also affected the way affiliation motivation was aroused in experiments. For example, in studies by Shipley and Veroff (1952; see also Atkinson, Heyns, & Veroff, 1954; Rosenfeld & Franklin, 1966) students were sociometrically evaluated by their roommates in public or rejected by a students' fraternity. Control groups were instead asked to indicate their favorite foods or were accepted by a fraternity, respectively. Subsequently, all participants completed a TAT. When comparing participants' fantasy stories across groups, it was found that participants in the arousal groups wrote more often about (imminent) separations. This was interpreted as an expression of the avoidance component of the affiliation motive. Due to their social worries, people with a strong affiliation motive often act insecurely in social relationships and repeatedly ask for reassurance from their interaction partners. Consequently, others perceive them as being more complicated and less likeable (Atkinson et al., 1954; Boyatzis, 1973).

In the following years, a large body of evidence on correlates of the affiliation motive was collected that helped to validate thematic apperception methods for the measurement of motives. According to McClelland and colleagues (McClelland, Atkinson, Clark, & Lowell, 1953), adequate motive values should indicate that motives function similarly to biological drives and thus energize, select, and direct behavior. In studies on correlates of the affiliation motive, clear evidence for the three basic functions of motives was found: Individuals with a well-pronounced affiliation motive strive to pursue affiliative goals, they pay more attention to affiliative cues (e.g., friendly faces), and they learn behavioral patterns required to achieve affiliative goals without much effort (Biernat, 1989).

Individuals with a strong affiliation motive initiate social interactions more frequently than people whose affiliation motive is weak; they spend more time with others or express the wish to do so when they are alone; they visit friends more often, make more phone calls, write more letters, and have a strong interest in long-term romantic relationships (Boyatzis, 1973; Constantian, 1981; Lansing & Heyns, 1959; McAdams & Constantian, 1983; McClelland, 1986). They wish to live in a peaceful world (Rokeach, 1973). They are caring and considerate toward others and try to gain the sympathy of other people and to avoid conflicts with them (Exline, 1962; McClelland, 1975; Walker & Heyns, 1962; see also Langner & Winter, 2001). Moreover, they are willing to change their own divergent opinions and attitudes to avoid conflicts with other people (Burdick & Burnes, 1958).

The affiliation motive also affects individuals' experience and behavior in contexts that are not primarily affiliative but are rather achievement related in nature. Thus, highly affiliation-motivated people avoid competing with others (Terhune, 1968). If they have to compete, however, they perform worse than people with a weak affiliation motive (Karabenick, 1977). When choosing a profession, they prefer careers that allow them to have a lot of social contact (Exline, 1960; Sundheim, 1962). Therefore, not surprisingly, they also spend more time with others in professional contexts (Noujaim, 1968). Rather than cooperating with experts, they prefer to work together with friends. Similarly, they prefer relationship-oriented feedback to competence-oriented feedback and perform better when pursuing affiliative goals (French, 1956, 1958a). Compared to students characterized by a weak affiliation motive, highly affiliation-motivated students achieved better grades in classes that were taught by warm-hearted and friendly instructors (McKeachie, 1961). Findings by Sorrentino (1974) and Sorrentino and Sheppard (1978) also indicate the significant role that the affiliation motive plays in achievement-related activities. In swimming competitions, affiliation-motivated swimmers achieved faster swimming speeds when they competed as part of a team and thus contributed to their

team's overall performance. In contrast, in individual competitions when the quality of their individual performance was evaluated against the swimming speed of all other participants, highly affiliation-motivated students performed worse. Particularly, students with low levels of fear of social rejection achieved good results in team contests. The authors assume that anticipating potential failure in group situations activates the negative consequences of affiliation motivation in individuals characterized by a strong fear of rejection, which in turn lowers or inhibits their behavioral motivation.

Even in social situations, a strong affiliation motive is not always associated with social success and good relations with others. Besides a "bright" side, there also seems to be a "dark" side of the affiliation motive (Weinberger et al., 2010). Behavioral correlates of the motive's dark side do not reflect an enjoyment of interpersonal communication and contact but rather illustrate individuals' fear of social rejection and marginalization (Boyatzis, 1973). For example, people with a strong affiliation motive are particularly sensitive to signs of social rejection (McClelland, 1986). Although they interact more often with others whom they perceive as friendly and like-minded, they reject (potential) interaction partners who express opinions that clearly differ from their own (Byrne, 1961; Exline, 1963). Since affiliation-motivated people seek for constant social attention, they are not very popular, and other people avoid having contact with them. Thus, the people to whom they wish to be close often keep their distance (Atkinson et al., 1954). Mason and Blankenship (1987) found that women with a strong affiliation motive but a low activity inhibition, i.e., an individual's disposition to control emotional and behavioral impulses, frequently become psychologically and physically abusive toward their partners if they experience stress in their relationship (e.g., imminent or anticipated breakup). This could be a desperate attempt to maintain the relationship (see also Zurbriggen, 2000). The dark side of the affiliation motive seems to particularly come forward when the motive is frustrated (see also Hofer & Busch, 2011a).

In sum, early research on the affiliation motive has yielded very heterogeneous, partly inconsistent results regarding correlates of the motive. Several empirical studies have shown that the affiliation motive seems to include a component that can be described as a strong fear of social rejection and isolation. This fear causes people to initiate social contact and seek for interpersonal closeness. Therefore, Boyatzis (1973) already suggested the existence of a second positively connoted motive component which should receive more empirical attention. This second component primarily reflects an individual's hope for closeness.

A number of studies conducted during the early decades of motive research already aimed to distinguish between the avoidance and the approach component of the affiliation motive and to look for their specific psychological and behavioral correlates. For example, the "Test of Insight" (French, 1958b), a method similar to the TAT developed by Murray and colleagues, allows to distinguish between hope and fear components when evaluating the content of individuals' statements. According to French and Chadwick (1956), the positive approach component of the affiliation motive is more pronounced in popular than in unpopular individuals. In contrast, children growing up in children's homes without close caregivers showed higher levels of the avoidance component of the affiliation motive than children growing up with their families, which might be caused by experiences of social deprivation in children's homes (Youngleson, 1973).

Excursus

Development of the Implicit Affiliation Motive in (Early) Childhood

According to Winter and Stewart (1978), implicit motives represent affect-laden and goal-oriented associative networks that are activated under specific circumstances. Their development is based on strong affective experiences made in interactions with caregivers during early preverbal childhood. Thus, implicit motives measured in adulthood are assumed to reflect their ontogenetic history: Implicit motives develop from innate connections (unconditioned S-R associations) between cues and emotional reactions in early childhood. Over time, however, the total number of motive-related cues increases (classic conditioning of S-S-R associations) and children learn by which behaviors positive emotional experiences can be achieved, and negative emotional experiences can be avoided (operant learning of R-S associations). Differences in the strength of implicit motives result from differences in motive-relevant experiences during socialization, i.e., to what extent the satisfaction of implicit motives was promoted or blocked in a given developmental context (e.g., by the parents' responsiveness toward their children's need-related expressions).

Even though the assumption that the strength of implicit motives results from significant experiences in early childhood is frequently repeated in the literature, there is (apart from the case of the achievement motive) not much empirical evidence to support this claim. In fact, there is only a single study that longitudinally examined the developmental correlates of motives including the affiliation motive (McClelland & Pilon, 1983). This study showed that neither basic parenting styles nor parental attitudes significantly predicted the strength of implicit motives in adult children. Instead, the strongest predictors of implicit motives in adulthood were specific parental behaviors that mothers reported when their children were 5 years old. In particular, adults whose mothers had indicated 25 years earlier that they had not been responsive to their children's crying tended to have a high affiliation motive. Considering that the affiliation motive includes a strong avoidance component that reflects an increased sensitivity to social rejection, these findings do not come as a surprise: Children who early in life experience uncertainty with regard to the satisfaction of their affiliative needs might grow up with a strong implicit fear of social rejection, even though this experience of insecurity might not affect their self-reported affiliation motive (see also Skolnick, 1966; for the relationship between motive strength and retrospectively assessed developmental correlates, see Scheffer, 2000).

Postulates and findings of motive and attachment theory have not yet been integrated theoretically or empirically. Nevertheless, the results of McClelland and Pilon's (1983) longitudinal study nicely parallel findings on developmental correlates of insecure-ambivalent attachment (Ainsworth et al., 1978). Interestingly, comparable differences in the strength of the implicit affiliation motive have also been found between individuals who were raised in different cultural contexts and thus were exposed to differences in the satisfaction of their basic needs in daily life. Hofer, Chasiotis, and Campos (2006) found in a cross-cultural study with adults from Germany, Costa Rica, and Cameroon that participants from Cameroon on average showed the weakest implicit affiliation motive. According to the authors, this finding might indicate that children in community-oriented (collectivistic) cultural contexts experience less uncertainty in the satisfaction of their needs as significant caregivers (mother, older siblings, and other members of the extended family) are constantly available to provide, for example, contingent reactions to a child's expressions of negative affect (see Keller, 2007). However, there is very little research on the development of the

affiliation motive. Further research on early developmental conditions and antecedents of the affiliation motive is indispensable to fill this empirical gap.

This also applies to gender-related differences in developmental pathways. A recent meta-analysis shows that the implicit affiliation motive is on average more pronounced in women than in men (Drescher & Schultheiss, 2016). Given the current state of research, however, one can only speculate about the reasons for this gender difference. Both biological differences and normative gender roles, which according to classic developmental theory influence the behavior of caregivers, and thus processes of reinforcement, are plausible explanations.

Mehrabian (1970) developed another theory-based instrument to distinguish between the avoidance and approach components of the affiliation motive. The questionnaire consists of two scales that measure affiliative (approach) tendencies and fear of rejection. Mehrabian and Ksionzky (1974) report several differences between people with strong affiliative approach tendencies and those with strong avoidance tendencies. The former group tends to be confident when interacting with others; they like others more, find more enjoyment in social interactions, and are positively evaluated by other people. In contrast, individuals with a strong fear of social rejection feel uncomfortable and anxious in social situations and find them more difficult to handle; they are less adept in social interactions, are less popular, and often feel lonely although they do not interact with other people less frequently than individuals with strong affiliative approach tendencies.

Even though Mehrabian and Ksionzky's (1974) results support the assumption that the affiliation motive combines two affect-laden motivational tendencies, i.e., approach- and avoidance-oriented motivational facets, their methodological approach highlights another problem of early research on the affiliation motive: Projective methods, self-reports, and combinations of both were implemented to measure the affiliative motive, and resulting motive scores were considered to reflect the same underlying psychological construct. This lack of distinction is problematic because research in motivational psychology has shown that the correlation between self-attributed motives and implicit motives that were assessed with projective methods is fairly low (Köllner & Schultheiss, 2014; Koestner & McClelland, 1992).

In the 1980s, two milestones regarding the theoretical foundation of research on the affiliation motive have helped to clear up the often confusing data on correlates of the affiliation motive. Firstly, McAdams (1980) developed a manual for coding the (implicit) intimacy motive in thematic apperception methods. Secondly, McClelland et al. (1989) provided conclusive evidence that individual experiences and behavior are best explained by two different motivational systems, namely, an implicit system and a consciously accessible (explicit) system (see also Chap. 9 on implicit and explicit motives).

7.3.2 The Intimacy Motive

The shortcomings of existing methods, particularly the original manual for the assessment of the affiliation motive by Heyns and colleagues (1958) which primarily measured the avoidance component of the motive (McAdams, 1992) prompted the development of the coding manual for the intimacy motive (need for intimacy). The aim was to develop a new coding system that stresses the positive aspects of affiliative motivation. In the course of the experimental development and validation of indicators of the intimacy motive in fantasy stories, arousal studies were conducted. Participants in the experimental group wrote their TAT stories under conditions that highlighted positive and harmonious interactions with other people (e.g., after being accepted into a student fraternity). Comparisons with stories

written under neutral conditions resulted in ten categories for coding the intimacy motive (see McAdams, 1980).

The intimacy motive refers to the recurrent willingness to experience warm, close, and communicative exchange with other people. Profound experiences of intimate exchanges of thoughts, feelings, and one's inner life with others form the core of the motive (McAdams, 1980, 1992).

Empirical findings on the intimacy motive impressively indicate the significance of a positively connoted affiliative motive for everyday social life. Compared to individuals with a low level of the intimacy motive, people high in intimacy motivation were evaluated by friends and acquaintances but also by primary school teachers as being friendlier, more honest, more cooperative, and less dominant (McAdams & Losoff, 1984; McAdams & Powers, 1981). They try to integrate everyone in group activities and use pronouns such as "we" and "us" more often but issue commands less frequently (McAdams & Powers, 1981). In dyadic interactions, they hold more eye contact with their conversation partners; they are friendlier, smile more, and reveal more private information about themselves when interacting with friends (McAdams, Healy & Krause, 1984; McAdams, Jackson, & Kirshnit, 1984).

Although all humans seek intimacy in social relationships to a certain extent, people with a strong intimacy motive more often perceive opportunities for intimate exchange in their everyday lives and are found more frequently in spontaneous positive interactions with others (McAdams & Constantin, 1983). Even their thoughts (e.g., when asked to remember significant events in their past or when asked for future prospects) focus more often on interpersonal themes and close, positive, and intimate relationships with other people than the thoughts of people with a weak intimacy motive (McAdams, 1982, 1985; see also Woike & Polo, 2001).

Finally, the strength of the intimacy motive even seems to allow predictions about well-being and mental health. Zeldow, Daugherty, and McAdams (1988) found a positive correlation between the strength of the intimacy motive (in association with a low power motive) and individual well-being in a study with medical students. McAdams and Bryant (1987) also reported a positive relationship between the intimacy motive and various indicators of well-being and mental health. This pattern was also confirmed in a longitudinal study by McAdams and Vaillant (1982): The strength of the intimacy motive measured in fantasy stories written by Harvard graduates around age 30 predicted their psychosocial adjustment, particularly job and marriage satisfaction, 17 years later.

The aforementioned study by McAdams and Bryant (1987) found, for instance, that a stronger intimacy motive in men was associated with lower psychophysiological stress, which is a cluster of symptoms consisting of factors such as symptoms of physical illness, anxiety, and substance and alcohol abuse. McClelland and Jemmott (1980) reported findings that partly support the notion of a protective function of strong affiliative motives although they used the classic coding system for the affiliation motive. For instance, McClelland (1979) found a significant negative correlation between the affiliation motive of approximately 30-year-old students and their diastolic blood pressure 20 years later. A strong affiliation motive seems to reduce the long-term risk of high blood pressure, which is a risk factor for the development of arteriosclerosis and thus of heart attack and stroke (see also McClelland, Alexander, & Marks, 1982). Results by Jemmott (1982; see also Jemmott et al., 1990) suggest that a high affiliation motive is associated with a higher efficiency of the immune system, which increases resistance against diseases: Over the course of their study, Jemmott found permanently increased concentrations of immunoglobulin A (IgA), an antibody against pathogens, in the saliva of students with a strong affiliation motive. Even after temporarily dropping during stressful exam periods, their IgA-concentration quickly recovered to the original levels (see also Jemmott, 1987; McClelland, Ross, & Patel, 1985). McClelland and Kirshnit (1988) provided experimental support for the relationship between the affiliation motive and saliva IgA: while arousing the affiliation motive with an affiliation-related film resulted in an

increased release of IgA, arousing the power motive did not have that effect.

Studies on health-related outcomes of the affiliation motive pointed, however, also to the dark side of the motive. McClelland (1989) found that a particular motive pattern that was characterized by a strong affiliation motive and low levels of self-control occurred twice as often among adults with type 1 diabetes mellitus than it did in a control group. After the arousal of the affiliation motive with a romantic film, people with the disease tended to eat more than the control group, particularly if they had reported stressful changes in their lives. Obviously, the arousal of the affiliation motive was associated with ignoring their dietary prescriptions. Anomalies were also found at the physiological level: Arousing the affiliation motive resulted in a higher dopamine secretion (measured in serum or saliva; see also McClelland, Patel, Stier, & Brown, 1987), which in turn mobilized more blood sugar in the liver. Additional markers (e.g., glycohemoglobin) that provide information about blood sugar levels during the past 2–3 months indicated that the observed negative reaction pattern had occurred several times during the weeks prior to the study. Under certain circumstances a strong affiliation motive can thus become a risk factor for the adequate adaptation to a disease (e.g., controlling blood sugar).

To sum up, due to their close relationship with emotional and endocrine processes, both the affiliation and the intimacy motive can influence the physical and mental health but also the behavior of individuals (e.g., Schultheiss, Dargel, & Rohde, 2003; for an overview of new findings on motives and hormonal and physiological processes, see Chap. 10). Empirical findings also suggest that acknowledging both positive and negative facets of social affiliation motivation might help to explain previously contradicting findings about the relationship between the strength of the affiliation motive and various indicators of physical and mental health.

7.3.3 Affiliation and Intimacy: Two Facets of Affiliative Motivation

The question remains whether the affiliation and the intimacy motive are two distinct types of motives or rather two facets of one superordinate motive of social affiliation that only differ in positive versus negative affective tone. The literature provides arguments for both perspectives. Arguments from human ethology assuming differences in the phylogenetic roots of affiliative motives are in favor of two independent motive types. Following this line of reasoning, the affiliation motive is responsible for increasing an individual's safety and chances of survival by establishing and maintaining contact to social groups. The roots of the intimacy motive, on the other hand, are found in brood care and the associated establishment of intimate relationships (Eibl-Eibesfeldt, 1997). Human ethologists therefore postulate distinct components of fear and hope for two distinct motives of affiliation and intimacy which differ in their valence and scope of social objects. Little empirical research, however, has been conducted to test this assumption, particularly with regard to the intimacy motive. Moreover, findings suggest, contrary to the ethological perspective, that the affiliation motive affects individuals' experience and behavior in romantic relationships (Mason & Blankenship, 1987) and that the intimacy motive (like the affiliation motive) is also associated with attitudes and behavior toward other people in general (Hofer & Busch, 2011a; McAdams, Jackson et al., 1984). In addition, empirical research points to a significant overlap between the measures of the affiliation and the intimacy motive. Hagemeyer, Dufner, and Denissen (2016) reviewed published research and found that the two motive measures show an average correlation of 0.58 (similar correlations between affiliation and intimacy are also reported for explicit life goals; see Pöhlmann, Brunstein, Koch, Brähler, & Joraschky, 2010). Thus, a tentative interpretation of these findings would suggest that the two constructs represent in fact facets of the same superordinate affiliative motive. In this

case, measures of the affiliation and the intimacy motive, respectively, would reproduce the fear and hope components of the superordinate motive to different extents.

An evaluation of the few available developmental correlates of the affiliation and the intimacy motive (McClelland & Pilon, 1983), respectively, supports the conclusion that parental reactions to expressions of their children's needs shape the development of the social affiliation motive (for a similar, empirically well-established argument on the effect of parental behavior on the development of the mother-child-attachment in early childhood, see Ainsworth, Bell, & Stayton, 1974). While a lack of parental willingness to react contingently and reliably to their children's needs is associated with a more pronounced avoidance component (affiliation), parental warmth and engagement (praising children) seem to foster the development of positive expectations in children that their basic social needs will be consistently met (intimacy).

Among others, Baumeister and Leary (1995) argue against a perspective that favors separate motive systems for having contact with (a) strangers and (b) familiar people. Instead, the authors endorse an evolutionary perspective and emphasize that social relationships which are characterized by both affiliation-related (security) and intimacy-related (familiarity) aspects provide the highest chances of survival and reproductive success. Consequently, Baumeister and Leary (1995) postulate a "need to belong" that incorporates both motivational facets (see Murray, 1938: "positive tropism toward people"; see also Kuhl, 2001; Chap. 13).

7.3.4 Implicit and Explicit Affiliative Motives and How to Measure Them

For a long time, psychologists have argued about whether motives are consciously accessible or not. How to adequately measure them depends strongly on how this question is answered. For Schultheiss and Brunstein (2005), the debate between proponents of a traditional implicit take on human motivation and researchers who define motivation as a conscious process is based on the misunderstanding of using the same terminology for the description of two different types of motives. McClelland et al. (1989; Weinberger & McClelland, 1990) presented a model that helped to end this old argument and to overcome the fragmentation of motivational psychology as a discipline. Using their model which assumes two independent motivational systems, it becomes possible to integrate various seemingly heterogeneous findings into a common theoretical framework (see Chap. 9 for a detailed discussion).

In short, McClelland and colleagues (1989) postulate that goal-oriented behavior is energized, oriented, and selected by an implicit and an explicit motive system. The two motive systems develop at different times during ontogenesis, predict different classes of behavior, and need to be assessed with different methods. Implicit motives are assumed to emerge from affective experiences connected to need satisfaction in early, preverbal childhood (see excursus II). They primarily allow for the prediction of spontaneous behavior and long-term developmental trends. Because implicit motives do not have an explicit representation, they can hardly be verbalized, and they affect the regulation of behavior beyond conscious control. However, the strength of implicit motives becomes apparent in fictional stories (McClelland, 1980) and thus can be measured with projective/operant methods.

To this day research on implicit motives usually employs so-called Picture Story Exercises which are derived from the classic TAT. Using standardized instructions people are asked to write stories in response to picture cues that are relevant to particular motives and depict ambiguous (social) situations. Verbal stimuli are also sometimes used (Smith, Feld, & Franz, 1992). The evaluation of the stories is based on the assumption that people express aspects of their own personality (e.g., motives) in the stories they write. Stories are evaluated for particular motives using specific coding manuals that are reliable and have high validity. Studies have shown that the coding guidelines of various keys can be objectively applied. Reliability across different coders is consistently high or very high, while measurements also show satisfactory stability over time (Busch & Hofer, 2012; Schultheiss & Pang, 2007).

Several well-validated coding manuals are available for the social affiliation motive and its various facets (see Smith, 1992; Schultheiss & Pang, 2007). These include the coding systems for the affiliation motive by Heyns et al. (1958) and for the intimacy motive by McAdams (1980) as well as the less frequently used manuals for coding trust/distrust in social relationships (McKay, 1992) and the implicit need for being part of an entity that transcends one's own self ("oneness"; Siegel & Weinberger, 1998).

Currently, the dominant manual for coding implicit motives seems to be the system developed by Winter (1994) which has largely replaced older keys. This strong reliance on a single manual has been criticized by Weinberger et al. (2010) as differences in particular motive facets might be missed in research. Winter's manual is essentially adapted from older manuals for the evaluation of implicit motives. It has the advantage that the strength of the achievement, power, and affiliation-intimacy motives can all be coded simultaneously. Moreover, it is not only suitable for coding implicit motives in PSE stories but can be applied to any kind of written or spoken material (e.g., political speeches, interviews, literature). Winter's measure of the affiliation-intimacy motive combines the two classic keys for affiliation (Heyns et al., 1958) and intimacy (McAdams, 1980) based on theoretical and empirical overlaps.

Content Categories for the Affiliation-Intimacy Motive According to Winter (1994)

According to Winter (1994), every expression indicating the establishment, maintenance, or reestablishment of warm, amicable interactions and relationships between people is to be coded as an indicator of the affiliation-intimacy motive. Four basic content categories can be coded:

- Expressions of positive, friendly, or intimate feelings toward other persons, groups, or nations
- Expressions of sadness or other negative emotions in reaction to separation or disruption of a friendly relationship or the wish to restore it
- Affiliative, companionate activities
- Friendly behavior, nurturant acts

In addition to the classic PSE methods, several new approaches to the measurement of implicit motives (including affiliative motives) have been developed and presented in recent times. One of the factors leading to these new developments is probably the re-emerging interest in unconscious processes of human perception and behavior in psychology (Kihlstrom, 2002) caused by the frequently low ecological validity of self-reports (Greenwald & Banaji, 1995). The Operant Motive Test (OMT; Kuhl & Scheffer, 1999) is particularly noteworthy. It was developed based on the PSI theory by Julius Kuhl (2001) and measures the strength of the achievement, power, and attachment (affiliation/intimacy) motives. Moreover, the OMT provides information about styles of self-regulation that influence how motives are implemented (see Chap. 13, Individual Differences in Self-Control). Another, so-called semi-projective, method for measuring the affiliation motive was introduced by Sokolowski (1992; Sokolowski, Schmalt, Langens, & Puca, 2000). The method uses ambiguous pictures just like the PSE. Instead of writing stories, however, respondents choose from several pre-written statements the ones that they think match a given picture. Because this method distinguishes between approach and avoidance components, it provides indicators of individual differences in "hope for affiliation" and "fear of rejection." Finally, methods based on reaction times (implicit association test; IAT) that were originally developed for the assessment of individual differences in implicit attitudes (Greenwald, McGhee, & Schwartz, 1998) have been adapted for the measurement of implicit motives. One example is the Pictorial Attitude IAT (PA-IAT) for the implicit affiliation motive developed by Slabbinck, De Houwer, and Van Kenhove (2012). Even though these new methods provide some promising results on perceptual and behavioral correlates of social affiliation motivation, further methodological research on their convergent validity with older PSE measures seems to be advisable (Schultheiss, 2008). Slabbinck and colleagues, for example, only

report correlations between their PA-IAT and explicit measures of affiliation but not with implicit markers of the affiliation motive.

In addition to new instruments for the global assessment of implicit motives, research also concentrates on the development of new instruments for the assessment of implicit motives in particular life domains. An example of such a domain-specific approach to implicit motives in the context of romantic relationships is illustrated below.

The second motivational system, i.e., the explicit motivational system, emerges later in life when verbal competence and other cognitive functions are much further developed. Explicit or self-attributed motives seem to originate from conscious, intentional learning of sociocultural requirements, norms, and behavioral expectations, which in childhood are mainly transmitted by parental instructions. The explicit motive system is therefore reflected in individual values, goals,

The Partner-Related Agency and Communion Test (PACT)

The PACT is an instrument for the assessment of the implicit needs for communion and agency in the specific life domain of intimate couple relationships (Hagemeyer & Neyer, 2012). Its format resembles the Operant Motive Test (Kuhl & Scheffer, 1999), but its instructions and evaluation focus on motives that are specific to couple relationships. Respondents are presented with eight ambiguous pictures and asked to write a fantasy story about each of them that relates to everyday situations in a couple relationship. Subsequently, respondents answer questions about current goals, instrumental behavior, and accompanying emotions based on their stories (see Fig. 7.1.).

For the evaluation of the responses, a coding system was developed on the basis of experimentally induced motivational differences (Hagemeyer & Neyer, 2012). For this purpose the responses of participants whose communion or agency motive had been aroused with corresponding imagination tasks were compared to the responses of a control group. Expressions and themes that more frequently appeared in the stories written by experimentally motivated participants were defined as indicators of the respective motive. For example, participants in the communion-motivated group wrote more often about expe-

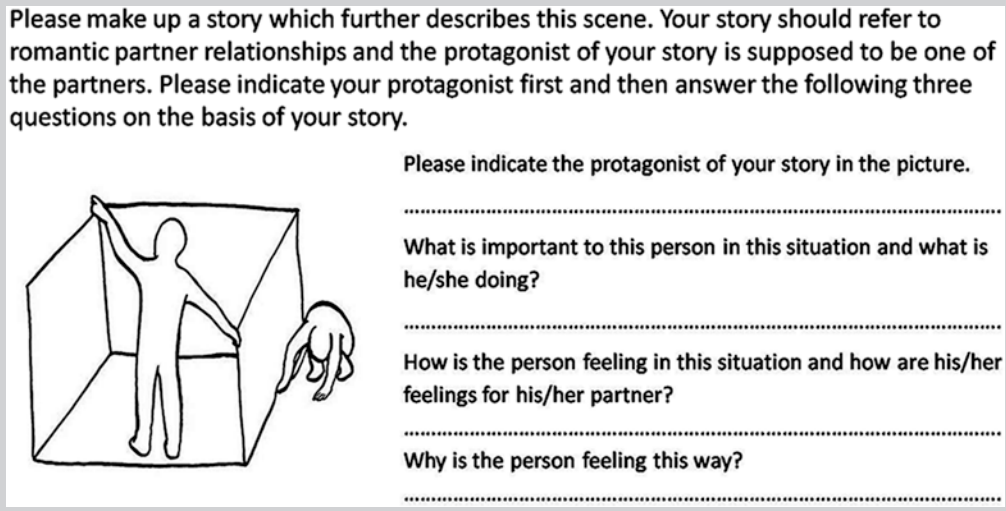

Fig. 7.1. Example of a PACT task

riences of emotional closeness or attachment processes in couple relationships than the control group. The responses of the agency-motivated group featured more expressions and themes associated with independence and dominance. Ensuing the development of the coding systems, these group differences were cross-validated in an independent sample.

This method of development and causal validation of coding systems is known as empirical differentiation. It is deemed the gold standard of motive measurement by many researchers, and most coding systems for Picture Story Exercises were developed with this method. This also applies to the classic measures of the affiliation motive (Atkinson et al., 1954) and the intimacy motive (McAdams, 1980). Next to demonstrating the causal validity of the PACT, Hagemeyer and Neyer (2012) were also able to show that the instrument possesses external/predictive validity. A study with 550 couples found, for example, that both the communion and the agency motive made independent contributions to the prediction of relationship satisfaction: The communion motive was positively associated with one's own relationship satisfaction (actor effect), while the agency motive was negatively associated with both, one's own and the partner's relationship satisfaction (actor and partner effects). Furthermore, the stability of relationships across 1 year was predicted by the intrapersonal (in) congruence between the implicit and the explicit communion motives (Hagemeyer, Neberich, Asendorpf, & Neyer, 2013). A couple's risk of breaking up was increased if the motive constellation of one or both partners was incongruent (i.e., a strong explicit motive was not supported by a similarly strong implicit motive or vice versa). Overall, the PACT has been shown to be a valid and promising instrument for motivational research on romantic relationships. Future studies should examine whether using the domain-specific measurement of implicit motives provided by the PACT actually outperforms classic global PSE measures and thus allows for a more accurate prediction of relationship-relevant variables as expected by Hagemeyer and Neyer (2012).

and attitudes (McClelland et al., 1989). These consciously represented motives influence individual behavior particularly in situations that activate the self-concept and in which individuals are required to consciously select a behavioral alternative that corresponds with their motivational self-image (Biernat, 1989; Brunstein, 2003).

Because people can reflect about and report their explicit motives, these are usually measured with standardized questionnaires or other forms of self-report. Several methods have been used to measure the strength of explicit affiliative motives, including the scale "Affiliation" from the Personality Research Form (Jackson, 1974), the value category "Benevolence" from the Schwartz Value Inventory (Schwartz, 1992), or the scales for affiliation- and intimacy-oriented life goals from the GOALS questionnaire by Pöhlmann and Brunstein (1997; see also Mehrabian, 1970). These constructs differ with regard to their levels of abstraction. Values, for example, indicate how a person should act consistently across different situations, while goals usually have a much more specific focus and refer to how a person intends to behave precisely in a given situation. This means that the two constructs differ with regard to their proximity to individuals' intentions and actual behavior (Schmuck & Sheldon, 2001). The definition of both constructs, however, includes a motivational component that can initiate behavior.

7.4 Recent Findings on Affiliative Motivation

Recent studies have contributed to the steady increase in knowledge about behavioral and perceptual correlates of affiliative motivation. The simultaneous consideration of implicit and explicit motives alongside other significant personality dispositions in motivational research has

been particularly productive. McClelland et al. (1989) already stated that both types of motives affect behavior and should thus be considered jointly in empirical research. On the one hand, implicit and explicit motives guide different types of behavior (operant vs. respondent behavior). On the other hand, explicit motives can channel the realization of implicit motives. It is therefore indispensable to examine both types of motives together in order to develop a comprehensive explanation of the motivational foundation of social behavior and its consequences for well-being and psychological adaptation.

In the following, we will present findings on the effects of motives on both social behavior and individual well-being to outline recent developments in the field. The final part of the chapter will then discuss cross-cultural research on motives, a field of research that has been neglected for a long time.

7.4.1 Social Behavior

According to McClelland and colleagues (1989), implicit and explicit motives are rooted in functionally independent motivational systems. The implicit system is activated by intrinsic action incentives and guides operant behavior. The explicit system, on the other hand, is supposed to respond to social-extrinsic incentives and guides respondent behavior. Schultheiss (2001, 2008) suggested differentiating the incentives for implicit and explicit motives based on whether they are verbal or nonverbal. Thus, the explicit motivational system reacts to verbal-symbolic incentives, e.g., an experimenter's instructions in a laboratory setting or the questions asked by an interlocutor. Related behavioral reactions can be assessed with declarative measures that rely on verbal representations (e.g., self-report). The implicit, and phylogenetically older, motivation system is based on nonverbal, experiential information processing. It is therefore more responsive to nonverbal incentives, e.g., gestures and facial expressions. Implicitly guided behavior can thus only be assessed with non-declarative methods, e.g., physiological markers or observations of nonverbal behavior.

Hagemeyer and colleagues (2016) investigated the behavior of university students in social interactions by designing a study in which experimenters had an ostensibly casual conversation with their participants following a long series of tests. The conversations only lasted for a few minutes and were structured by a set of predetermined questions asked by the experimenters (e.g., "How did you like the experiment?"; "Have you already graduated from college?"; "What are your plans for the future?"). Participants were unaware that these conversations were in fact another part of the investigation. The conversations were videotaped and subsequently evaluated by several independent coders who assessed the participants' verbal and nonverbal socializing behavior. The amount of personal information that participants shared in their responses (self-disclosure) was coded as verbal socializing, whereas the evaluation of nonverbal socializing relied on gestures and facial expressions (e.g., smiling, eye contact, nodding). In addition, participants' implicit and explicit affiliation motives were assessed using the PSE coding system by Winter (1994) and a self-report questionnaire (Unified Motive Scales; Schönbrodt & Gerstenberg, 2012), respectively.

The results indicated that a strong implicit motive predicted more nonverbal socializing behavior during the conversations, but it had no effect on verbal socializing. On the other hand, a strong explicit motive was associated with more verbal socializing but was unrelated to nonverbal socializing behavior (see Fig. 7.2).

This predictive pattern is known as double dissociation. It provides strong support for the theoretical assumption that implicit and explicit affiliation motives are grounded in two independent motivational systems. Wegner, Bohnacker, Mempel, Teubel, and Schüler (2014) found corresponding dissociations in the less affiliative context of professional sports. Athletes with a strong explicit affiliation motive asked their teammates more frequently for advice and support during competitions (verbal affiliative behavior). In contrast, a strong implicit motive was associated with socially agreeable nonverbal behavior toward opponents.

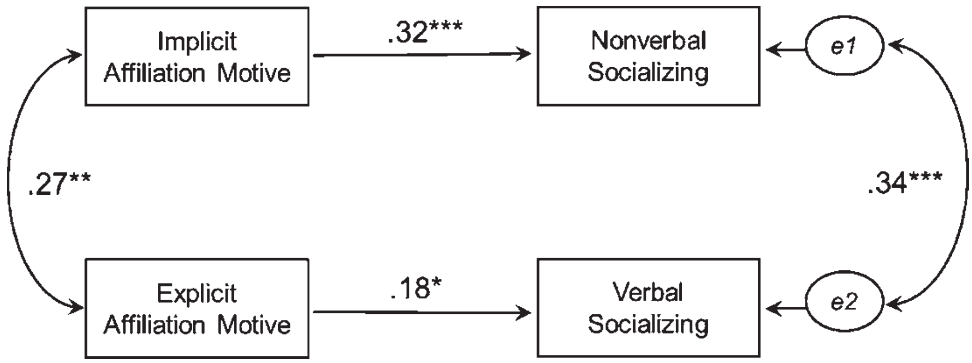

Fig. 7.2 Path model for the prediction of nonverbal and verbal socializing behavior during a short conversation with an unfamiliar person (Adapted from Hagemeyer et al., 2016. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$)

The distinction between implicit and explicit affiliation motives has not only been helpful for explaining social behavior in particular situations but also for predicting individual differences in behavior aggregated across time and situations. In a study of the implicit and explicit intimacy motive, participants recorded their everyday social interactions over a period of 7 days (Craig, Koestner, & Zuroff, 1994). Only the explicit intimacy motive was found to be positively associated with the total number of social interactions during this time. However, only a strong implicit motive was associated with a higher proportion of dyadic interactions. These findings match the observation made in previous studies that people with a strong implicit intimacy motive prefer personal exchanges in intimate relationships (McAdams & Constantian, 1983; McAdams, Healy et al., 1984). Both types of motives moreover contributed to the prediction of self-rated interaction quality.

The findings listed here provide evidence in support of the dual motive theory (McClelland et al., 1989; Schultheiss, 2001) and its claim of differential validity of implicit and explicit affiliative motives in predicting social behavior. The two types of motives seem to have complementary influences on social behavior by differentially regulating verbal and nonverbal aspects of behavior. In contrast to achievement-related behavior (see Spangler, 1992), however, there are to date only few studies that simultaneously assessed implicit and explicit affiliative motives. Little is known, for example, about the dissociations of the two motive types in different relationship types (e.g., friendship, romantic relationship, etc.). Thus, additional research is necessary to further substantiate the claims of the dual motive theory in the domain of affiliation.

Excursus

Affiliative Motivation and the Expression of Emotions

An important aspect of nonverbal social behavior is the facial expression of emotions (e.g., smiling, frowning; Mehrabian, 1972). With regard to the affiliation motive, different functions of facial expressions have been discussed. On the one hand, expressing emotions can be the immediate consequence of current affiliative motivation. This view is consistent with McClelland's (1986) definition of implicit motives as catalysts of affect and has been corroborated by empirical research (Hagemeyer et al., 2016; McAdams, Jackson et al., 1984). Therefore, the tendency to contingently react with facial expressions of positive emotions (i.e., smiling) to affiliative stimuli is also the basis for an innovative approach to the physiological

measurement of the affiliation motive. Dufner, Arslan, Hagemeyer, Schönbrodt, and Denissen (2015) presented undergraduate participants pictures of affiliative situations (e.g., friends hanging out together) while simultaneously assessing the activity of the facial muscles zygomaticus major and corrugator supercilii. Both muscles are involved in smiling. The authors found that individual differences in positive affective reactions to affiliative stimuli could be reliably measured by this method. Several criteria of affiliative behavior could be predicted using this contingency-based measure of the approach component of the affiliation motive (e.g., the amount of affiliative content that participants publish on social media; behavior in dyadic face-to-face interactions). Because of its high content and criterion validity, measuring facial expressions of emotion with such incentive-contingent methods is a promising new approach to motive research.

From an observer's perspective, facial expressions can also function as an important incentive in social situations. In addition to triggering affective reactions in observers (Kordik, Eska & Schultheiss, 2012), the emotional expression of others also seems to stimulate the orienting or directing function of implicit motives in observers, that is, the motive directs cognitive processes related to, for instance, attention and learning (Schultheiss & Hale, 2007; Schultheiss, Pang, Torges, Wirth, & Treynor, 2005; see also McClelland, 1986). For example, people with a strong implicit affiliation motive tend to direct their attention toward happy facial expressions while turning away from angry faces that seem to be aversive to them (Schultheiss & Hale, 2007). Since the role of facial expressions of emotions in social interactions is twofold (i.e., consequence and incentive of affiliative motives), they take on a double key function for the explanation of dynamic interactions between the affiliation motives of two interaction partners. In order to examine such dynamics under somewhat natural conditions, researchers need to look at dyadic designs: Both, motives and emotional expression, need to be measured in both interaction partners (e.g., in the context of observing conflict styles in romantic couples; Gottman, 1994). However, only a handful of studies on implicit motives have so far realized dyadic designs (e.g., Hagemeyer, Schönbrodt, Neyer, Neberich, & Asendorpf, 2015; Stewart & Rubin, 1976), and motive research has yet begun to fully exploit their potential.

7.4.2 Well-Being and Psychological Adaptation

Empirical evidence shows that the successful striving for goals of high personal importance gives individuals a sense of meaning and direction in their lives (Bühler & Massarik, 1968) and is also an important source of personal well-being and happiness (Brunstein, 1993). However, Brunstein, Schultheiss, and Grässmann (1998) showed that different goals affect individual well-being to different extents and that the accomplishment of certain goals can even lead to impaired well-being. The positive effect of goal accomplishment depends on whether or not the goal in question is congruent with an individual's implicit motives. Accordingly, Brunstein et al. (1998) reported that the well-being of undergraduates increased longitudinally if they were pursuing achievable goals that matched their personal implicit affiliation motive. In another study a positive association between reports of life satisfaction and satisfaction of the need for positive social relationships was only found if individuals were characterized by a high implicit affiliation motive (Hofer, Busch, & Kiessling, 2008). Meanwhile, there is ample evidence in favor of the assumption that motive congruence in various motivational domains has a positive effect on well-

being and life satisfaction (e.g., Thrash & Elliot, 2002; for determinants of motive congruence, see Chap. 9). Schultheiss, Jones, Davis, and Kley (2008) interpret this finding as a consequence of the pursuit of hot (motive-congruent) and cold (motive-incongruent) goals. Motive-congruent goals allow individuals the consummation of affective incentives while striving for goal accomplishment, thus contributing to motive satisfaction and in turn increasing individual well-being (see also Job & Brandstätter, 2009; Schüler, Job, Fröhlich, & Brandstätter, 2008). In contrast, motive-incongruent goals distract individuals from satisfying their motives and therefore have no or even negative effects on well-being. A corresponding relationship between the pursuit of motive-congruent goals and mental health has been found in clinical studies. Patients in psychotherapy with a strong implicit affiliation motive reported fewer depressive symptoms if they accomplished affiliative goals. In contrast, the attainment of self-efficacy-oriented goals did not positively affect the frequency of depressive symptoms (Püschel, Schulte, & Michalak, 2011).

Pursuing motive-congruent affiliative goals does not only affect personal well-being but is also associated with solving developmental tasks that arise over the life course. A study by Hofer, Busch, Chasiotis, and Kießling (2006) found that congruence between implicit and explicit affiliation motives was associated with more advanced levels of identity achievement in the interpersonal domain.

Besides personal goals, personality traits seem to foster or hinder the realization of implicit motives. Winter, John, Stewart, Klohnen, and Duncan (1998) showed that the personality trait extraversion can predict the successful or unsuccessful pursuit of the implicit affiliation motive. Extraverted people are able to easily initiate contact with others and experience interpersonal exchange as stimulating and rewarding. In the study by Winter et al. (1998), extraverted adults with a strong affiliation motive reported more positive relationships in their lives, whereas introverted people with a strong affiliation motive faced more conflicts in their social relationships, which made them feel unhappy. Lang, Zettler, Ewen, and Hülsheger (2012) found similar results in a work-related context: Extraverted individuals with a strong affiliation motive performed better on the job because they strive to please their superiors and colleagues (see also McClelland, 1986; for socially oriented achievement motivation across different cultural contexts, see also Hofer, Busch, Bender, Li, & Hagemeyer, 2010). Introverted employees, on the other hand, often did not even try to initiate relationships and were less motivated to perform well for others.

The influence of personality traits on the realization of motives was also subject of a cross-cultural study (Hofer, Busch, & Schneider, 2015). The effect of extraversion was not statistically significant in this study although it was in the assumed direction. However, moderating effects of agreeableness and neuroticism on motive realization were found in Cameroonian and German adults. These effects were evident in the self-reported number of intimate and satisfying relationships 18 months after motive assessment. While agreeableness supported the realization of the implicit affiliation-intimacy motive, high neuroticism hindered motive realization (see Fig. 7.3).

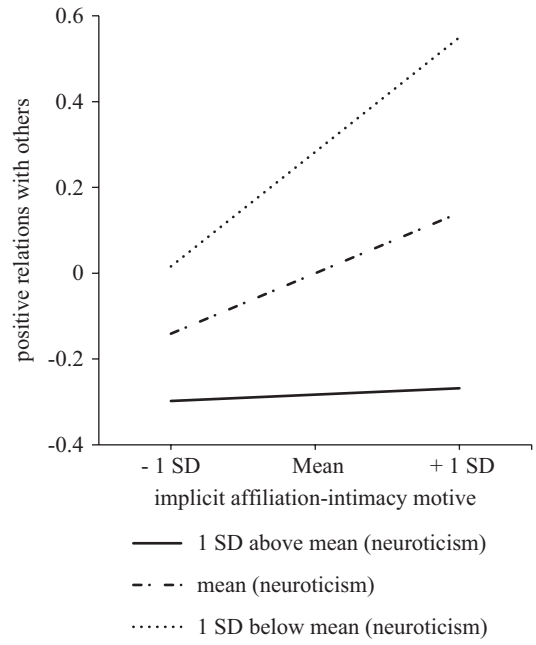

Fig. 7.3 Effects of the implicit affiliation-intimacy motive on satisfaction with social relationships depending on neuroticism (Adapted from Hofer, Busch, & Schneider, 2015)

7.4.3 Intercultural Universality

Numerous cross-cultural studies have examined constructs that represent the explicit motivation system. Studies on personal and cultural value orientations in so-called Western/individualistic and non-Western/collectivistic cultural contexts (see Schwartz, 2011) provide remarkable insights into cultural similarities and differences regarding values and their behavioral correlates. Unfortunately, cross-cultural research on implicit motives is much less common even though Picture Story Exercises (primarily for the assessment of the achievement motive) were used in many cross-cultural studies until the 1960s (e.g., McClelland, 1961). This research, however, did not focus on the affiliation motive, particularly not on the individual level. In general, it remains unclear how valid the results of early cross-cultural studies actually are because they did not address the difficulties of comparing measurements from different cultural contexts (Hofer, 2010).

Excursus

Measurement Problems in Cross-Cultural Research

Van de Vijver and Leung (1997) list three types of bias that might compromise the comparability of measurements originating from different cultural contexts:

- Construct bias can affect measurements if the construct in question differs conceptually across different cultures, i.e., if individuals understand the construct differently.
- Method bias is primarily caused by problems related to how a study is conducted. Method bias impairs the equivalence of different measurements even if the construct is adequately defined. There are three sources of method bias: sample bias (e.g., individuals in different cultures differ with regard to background variables that are relevant to the measure), instrument bias (e.g., occurrence of different response styles; differences in familiarity with the instruments), and procedural bias (e.g., differences in study conditions).
- Item bias occurs "locally" and refers to specific items that individuals from different cultures might answer differently even though they are related to the same construct (e.g., translation errors).

Hofer, Chasiotis, Friedlmeier, Busch, and Campos (2005; see also Hofer & Chasiotis, 2004) examined the comparability of PSE measurements across cultures and found that implicit motives can be measured in a reliable and valid way if certain precautions are taken. Particular attention should be given to the selection of picture stimuli because they can differ in their pull to arouse implicit motives in different cultural samples. Moreover, PSE methods need to be accompanied by very detailed instructions because people from non-Western cultures are frequently not familiar with this methodology.

Studies with unbiased measures of the affiliation motive found that, on the one hand, the average strength of the motive differs across cultural groups. Interpreting these findings, however, is difficult due to the unclear developmental history of the motive. On the other hand, several results from Western samples have been replicated in cross-cultural studies, highlighting the universality of implicit motives as claimed by classical motive theory. For example, the effect of goal-motive congruence on well-being was equally found in a teenage sample from Zambia (Hofer & Chasiotis, 2003): Adolescents with a strong implicit affiliation motive were more content with their lives if they strongly pursued affiliative life goals. A cross-cultural study with adults from Costa Rica, Cameroon, and Germany yielded similar results (Hofer, Chasiotis et al., 2006). Here, people with a strong implicit affiliation motive who indicated that they valued guiding principles in life emphasizing a concern for close interpersonal relationships reported higher life satisfaction regardless of their cultural background. In addition, a study on satisfac-

tion in romantic relationships with adults from Cameroon and Germany also found a moderating effect of the implicit affiliation motive across cultural contexts (Hofer & Busch, 2011b): A stronger self-reported satisfaction of the need for relatedness (Deci & Ryan, 2000) was only associated with higher relationship satisfaction in people with a strong implicit affiliation motive.

Cross-cultural studies also found proof for the dark side of the affiliation motive. In a study by Hofer and Busch (2011a) individuals' implicit affiliative motivation was separately coded for affiliation (Heyns et al., 1958) and intimacy (McAdams, 1980). The strength of both components was positively associated with feelings of envy and inferiority in participants who reported that their need for relatedness is not satisfied. Indirect aggressive behavior (e.g., spreading rumors and lies about others), on the other hand, was only related to the affiliation component. In another study with elderly people from Cameroon, the Czech Republic, and Germany frustration of the need for relatedness was only associated with social cynicism in individuals with a strong implicit affiliation motive (Hofer, Busch, Raihala, Poláčková Šolcová, & Tavel, 2017). Interestingly, the latter studies suggest that the effect of the need for relatedness on indicators of well-being and mental health are moderated by individual differences in the implicit affiliation motive. So far, this effect has been viewed as universal within the framework of self-determination theory (Deci & Ryan, 2000).

It is promising that (cross-cultural) research on implicit motives has gained renewed attention in Psychology, but many open questions still remain. Although there are a number of recent findings on individuals' affiliative motives, studies usually focus on the assessment of self-reported mental states. Unfortunately, cross-cultural studies on behavioral correlates of the implicit affiliation motive are missing.

7.5 Summary and Outlook

Across cultural contexts people have an innate need for initiating and maintaining relationships with others. Experiencing acceptance and relatedness is associated with happiness, whereas social rejection results in negative emotions. Even though the affiliation motive is not equally strong in each person, it is the origin of many human actions, thoughts, and emotions. The motive does not only affect social behavior among friends and romantic partners but is also relevant in professional settings for behavior toward colleagues. The strength of the affiliation motive is even reflected in the actions of government leaders (Winter, 1991).

The human affiliation motive seems to be composed of different facets. The components of fear and hope have so far received the most attention from researchers. The strength of these components is assumed to be based on affective experiences regarding the satisfaction or frustration of motives in early childhood and to affect behavior in response to situational/social incentives in later life.

Hopefully, future research will address certain questions that have so far not been answered sufficiently. In particular, more attention should be paid to developmental correlates of the affiliation motive and its approach and avoidance components in order to improve explanations and predictions of psychological and behavioral correlates of implicit motives over the lifespan (and across cultures). Future research should also focus on the implementation of dyadic designs, because they allow for the examination of implicitly motivated behavior in the context of current interactions and relationships. Considering intrapersonal motive constellations and dynamics is another aspect that could greatly broaden our understanding of psychological and behavioral outcomes of the affiliation motive. For instance, previous studies have already shown that the strength of the implicit affiliation motive can significantly influence the realization of the power motive (Langner & Winter, 2001; Winter, 1993). Finally, longitudinal studies are necessary to answer the question whether the implicit affiliation motive actually decreases with age (Denzinger, Backes, Job, & Brandstätter, 2016; Veroff, Reuman, & Feld, 1984) or whether motive changes merely relate to changes of the contexts in which a motive is primarily realized.

Review Questions

1. *What is the goal of the affiliation motive?*
   - The goal of the affiliation motive is the establishment of positive social interactions and relationships.

2. *What are the similarities and differences between the affiliation motive and the intimacy motive?*
   - Both motives are based on the need for social relatedness, positive social interactions, and relationships.
   - The affiliation motive more strongly reflects the avoidance component of affiliative motivation (fear of rejection).
   - The intimacy motive more strongly reflects the approach component of affiliative motivation (hope for affiliation/closeness).

3. *What are characteristics of people with a strong intimacy motive?*
   - They are more confident and have more positive emotions in social interactions which are also mirrored by their nonverbal behavior towards others.
   - They tend to contemplate social themes more often, think more frequently about their friends, and have more social exchanges with them.
   - They are perceived by others as friendlier, more honest, more cooperative, and less dominant.
   - Their well-being and psychosocial adaptation tends to be higher.

4. *What are characteristics of people with a strong fear of rejection?*
   - They are more easily overwhelmed by social situations and act in more insecure and awkward ways.
   - They tend to think of themselves as unpopular and lonely even though they do not actually have fewer social contacts.
   - They tend to reject interaction partners whose attitudes differ from their own.
   - They might react with more indirect aggression to rejection.

5. *Which methods are available for measuring the implicit and explicit affiliation motive?*
   - The implicit motive has traditionally been measured with variants of the Picture Story Exercise.
   - Newer methods include semi-projective methods, reaction time-based IAT measures, domain-specific measures, and physiological approaches.
   - The explicit motive is usually measured with self-reports. Motive constructs differ with regard to how abstract they are, ranging from very concrete goals to abstract values.

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Power Motivation

8

Holger Busch

8.1 Power as Social, Cultural and Individual Phenomenon

Power is a fundamental dimension of human communal life (Russell, 1938/2004; Winter, 2006). Regardless of whether we consider rules enforced by states or different institutions, asserting oneself in discussions at work or in romantic relationships or arguments between pre-schoolers about who gets to "decide" are all examples which constitute expressions of power and its pursuit. These situations have in common that one actor has some form of influence over another, which can be interpreted as the core characteristic of power (Lukes, 1974): "Power constitutes the possibility of an influencing instance (person, group or institution) to influence others as desired" (Bierhoff, 2006, p. 414). This can happen in many different ways.

Everyday usage frequently adds a negative connotation to the expression "power" as it is associated with the misuse of power, oppression and other related concerns. We can indeed find examples in academic literature that define power as the influence on others against their will or in the presence of resistance (s. Dahl, 1957; Partridge, 1963).

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The famous saying "Power tends to corrupt and absolute power corrupts absolutely" (Lord Acton, English historian and politician, 1834–1902) expresses the danger of misusing power very clearly. Several studies show that this is undoubtedly a real threat: Individuals with a high level of power differ from those with little power in various ways, including:

- Talking more than their conversation partners (Schmid Mast, 2002) and interrupting them more frequently (Hall, Coats, & LeBeau, 2005)
- Evaluating others more frequently based on how useful they appear for achieving personal goals (Gruenfeld, Inesi, Magee, & Galinsky, 2008)
- Attributing the accomplishment of others to themselves (Kipnis, 1972)

However, if power is more generally defined as the possibility to influence others, it is of course also possible to do so in a positive way. Scholl (2007) suggests using the term "social impact" when actors use their possibility to influence others. Even if this term has the advantage of being more neutral, we will nevertheless use the term power throughout this chapter as it is established in the literature. There are in fact several findings that suggest that power can be used in prosocial ways. Individuals with high degrees of power – when compared to those with little power – have, for example, been found to:

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- Be more willing to forgive others (Karremans & Smith, 2010)
- Be more accurate when assessing the emotions of others (Schmid Mast, Jonas, & Hall, 2009)
- See themselves as more willing to help (DeMarree, Briňol, & Petty, 2014) and act more helpfully (Chen, Lee-Chai, & Bargh, 2001)

Interestingly, these seemingly contradicting findings can be explained fairly well with a statement from another politician: "If you want to test a man's character, give him power" (Abraham Lincoln, US President, 1809–1865). Why does this statement fit the aforementioned findings so well? Power shapes behaviour (Hirsh, Galinsky, & Zhong, 2011) – and the behaviour shaped in this process corresponds to the traits and views that are most pronounced in the respective individual (Anderson & Berdahl, 2002; Bargh, 1990; DeMarree et al., 2014): Individuals with a strong need for social attachment, for example, show less misuse of power in order not to endanger their social contacts (Rios, Fast, & Gruenfeld, 2015). Thus, power causes people to act more in accordance with their personality or in other words more authentically (Keltner, Gruenfeld, & Anderson, 2003). Two caveats, however, need to be considered when trying to apply this rule. Extremely strong situational stimuli can advise an individual to act in another way (Guinote, Weick, & Cai, 2012); and the experience of exercising power can of course change an individual's traits and views in the long run (Kipnis, 1976).

Pointing to the positive aspects of power does therefore by no means suggest that power is never at risk of being abused. It is, however, important to stress that power can evidently have two distinct faces (McClelland, 1970): one that is manipulative and oppressive and another that is helpful and supportive.

Definition
These two facets are called personalised and socialised power, respectively (McClelland, 1970, 1975).

There are thus two different reasons for why people desire power: in part because they can feel strong and superior by dominating and manipulating others (personalised power) and in part because they can use their scope of influence to contribute to the well-being of the collective and support others. Russell (1938/2004) writes that power needs to be tamed in order to encourage productive rather than destructive behaviour. It is without a doubt a highly relevant question for society how the pursuit of power can be directed in such a way that it takes on its socialised rather than its personalised form. Winter (2006) names some personality traits that can contribute to "the taming of power", e.g. the affiliation motive and activation inhibition. We will return to this thought when we will discuss various behavioural correlates of the power motive in Sect. 8.4.

As the examples at the beginning of the chapter show, there are different instances that can exercise power. The executive, judiciary and legislative institutions of society are three such instances, and scientific disciplines such as political science and sociology try to develop a deeper understanding about them. The focus here is primarily on analysing the institutions and procedures that regulate society as well as the mechanisms and structures of political authority (cf. Berg-Schlosser & Stammen, 2013). There is a long history in the humanities of developing ideas about which forms state control can take; in the European cultural sphere, they go all the way back to Plato's *Republic*. The ideas that have been developed differ significantly with regard to how power should be authorised. Sociologist Max Weber developed a famous typology of the legitimation of authority: it can be based on structures passed down by tradition (traditional authority), on the belief that a certain leader is chosen or destined to lead (charismatic authority) or on a general legal basis applicable to everyone (rational-legal authority) (Müller, 2007). Depending on the relative relevance ascribed to these three sources of legitimation, different forms of states and societies emerge as we can easily confirm when taking a look at history or contemporary politics.

Psychologists have also discovered that the distribution and use of power vary across societies. In fact, cultures differ with regard to the extent to which their members accept or even expect dissimilarities in how power is distributed. This dimension is known as power distance (Hofstede, 2001). Cross-cultural psychology uses this construct for the description of and distinction between different cultures. Cultures with a high degree of power distance accept hierarchical structures and status differences, whereas cultures with a low degree of power distance perceive egalitarian structures and status equality as more desirable (Hofstede, 2001; cf. Schwartz, 1994). Power distance and form of government, however, are not necessarily equivalent. When comparing France and Germany, two Western European democracies, we find that both are individualistic cultures, but power distance is much larger in centralist France compared to federal Germany (Hofstede, 2001).

Studies have shown that the degree of power distance in a culture can influence the perception of those in positions of power. Such studies frequently examine leadership in professional contexts. For instance, students were asked to image themselves as an employee whose company is going through various changes due to a fusion. Students from cultures with low levels of power distance tended to express more trust in their employers and were less inclined to consider leaving their company and finding a new job when having a say in these changes and thus a possibility to influence them. They tended to act as if this option did not even exist. Having a say did not, however, influence this variable in students from cultures with high levels of power distance (Summereder, Streicher, & Batinic, 2014). Sure enough, authorities have a stronger influence on group decisions in cultures with high power distance compared to cultures with low power distance (Eagley, 1999). Another study found that power distance moderates the relationship between employers' emphatic and appreciative leadership and employees' well-being (Zwingmann Wegge, Wolf, Rudolf, Schmidt, & Richter, 2014). In more specific terms, this means that employees in cultures with high power distance benefit more from this form of positive leadership than their counterparts in cultures with low power distance. Such findings exemplify that less participation in decision-making is expected in cultures with high power distance; furthermore, the behaviour of employers and other authorities is seen as more significant, thus having a stronger influence on subordinates. The opposite is true for cultures with low power distance.

So far, this chapter primarily discussed the societal and cultural understanding of power. From here on, we will have a look at the motivational psychological perspective because individuals can of course also exercise power and influence others. Because there are large interpersonal differences in the inclination to influence others, power is an important phenomenon in motivational psychology. Therefore, we will next define the power motive, establish its evolutionary foundation and discuss its neurobiological basis and developmental conditions (Sect. 8.2). Subsequently, we will delineate different measures that can capture the power motive (Sect. 8.3). At the end of this chapter, we will have a look at different behavioural correlates of the power motive (Sect. 8.4).

8.2 The Motivational Psychological Perspective of Power

8.2.1 The Power Motive

"Love of power, though one of the strongest of human motives, is very unevenly distributed" – this quote by Bertrand Russell (1938/2004, p. 10) already provided a fairly accurate summary of the motivational psychological perspective of power. Even though everybody desires power, there are large interpersonal differences with regard to how strong this desire is across individuals.

The power motive is the desire to exert influence on others.

Influence can be directed towards the physical states, thoughts and/or emotions of other people. It can also become manifest in various ways. In an analogous manner to the achievement motive (see Chap. 6) and the affiliation motive (see Chap. 7), the power motive exists in an implicit, i.e. unconscious, and an explicit, i.e. conscious, form (McClelland, Koestner, & Weinberger, 1989). Section 8.3 will elaborate on this distinction. The following sections will primarily focus on the implicit power motive.

People with a strongly developed power motive therefore take pleasure in situations in which they exert influence on others because such situations ensure them of their superiority and control (McClelland, 1975; Winter, 1973). On the other hand, situations in which they cannot exert influence or even are under the influence of others are extremely unpleasant to them because they make them feel weak and ineffective. Thus, the pursuit of power can also be interpreted as a fear of weakness (Veroff & Veroff, 1972). In fact, one incentive of power is that it makes individuals independent and autonomous (Lammers, Stoker, Rink, & Galinsky, 2016; van Dijke & Poppe, 2006).

> The central incentive of the power motive is the experience of strength and social impact.

How then do people with a strong power motive react if they cannot exert influence on another person, e.g. if that person is resisting any potential influence or if that influence fails to show the desired effect? In order to answer this question, we have to analyse the context in which the situation takes place. On the one hand, the situation has to stimulate the power motive, i.e. it has to be evident that exerting influence is possible given the particular context. This is the case in situations in which individuals can show strong leadership or impress others. On the other hand, the stimulated power motive must then be frustrated, for instance, because other people disagree or give negative feedback. If these two conditions are met, people with a strong power motive experience power stress. This is an internal condition of the phenomenon: compared to individuals with a weak power motive, individuals with a strong power motive express this phenomenon by:

- Reporting stronger agitation, which can be physiologically confirmed by heightened muscle tension (Fodor, 1985)
- Reporting more anxiety (Fodor & Wick, 2009)
- Acting less cooperatively with others (Fodor & Riordan, 1995)
- Perceiving another person who is acting in a dominant way as disagreeable (Fodor, Wick, & Conroy, 2012)

The study presented in the box illustrates the context for and the effects of power stress. Although most research has been done in a work context by giving participants leadership roles, the phenomenon can also be found in other interpersonal contexts, such as evaluating a potential partner for a date (Fodor et al., 2012).

Study

Power Stress Caused by a Dominant Colleague

Fodor, Wick and Hartsen (2006) preliminarily identified participants with particularly strong and weak power motives for their study. These participants were asked in a laboratory setting to imagine themselves in the role of a manager. Subsequently, they were shown a video featuring a potential colleague called Greg who was applying for a subordinate position in the participant's team. The applicant's behaviour was varied experimentally. One version of the video showed him as dominant and ready to disagree with authority; in another version he was less dominant and tried to understand the opinion of authori-

ties even in cases in which he disagreed. After having watched the video, participants were asked to picture as vividly as possible what it might be like to work together with the applicant as his superior.

This scenario met the external conditions for causing power stress: the power motive was stimulated by taking the role of a superior, while at the same time, there was a threat of frustration in the experimental condition with the dominant applicant. Thus, the authors expected an interaction effect between the strength of the power motive and the experimental condition. The most negative attitude towards the applicant was expected for participants with a strong power motive who had seen the dominant behaviour in the video.

Fodor et al. measured two dependent variables. As one of them, the authors used an EMG to measure the activity of the corrugator supercilii muscle that causes frowning. High activity means strong frowning, causing clearly visible wrinkling of the forehead. Thus, high activity represents stronger negative affect. Just as predicted, the highest corrugator supercilii activity was found for participants with a strong power motive who had seen the dominant applicant (Fig. 8.1). The same pattern was found for the second dependent variable: a self-report about the emotional attitude towards the applicant. This study is an example of how particularly people with a strong power motive show physiological reactions and subjectively experience power stress in situations of anticipated frustration of the stimulated power motive.

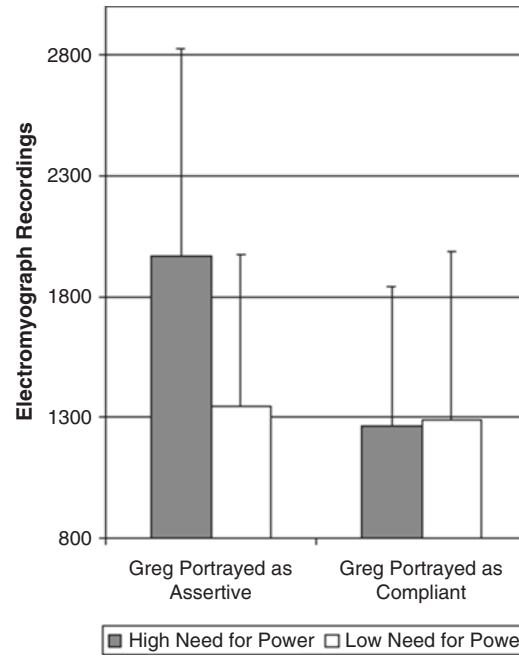

Fig. 8.1 Power stress: the relationship between the activity of the corrugator supercilii and the power motive disposition as well as dominant behaviour of an interaction partner (Fig. 1 in Fodor et al., 2006)

8.2.2 The Evolutionary Roots of Power

We have already seen that cultures differ with regard to the acceptance of inequality in the distribution of power (power distance: Hofstede, 2001; Sect. 8.1). The fact that an analogous characterisation is possible in all cultures shows that power and the power motive are universal phenomena (cf. Russell, 1938/2004). Therefore, it is hardly surprising that different languages across cultures have a dimension of dominance versus submission for describing personality (White, 1980). Why is power evidently such an important quality?

We can find one answer to this question if we do not focus exclusively on human beings. Particularly for non-human primates – species who are closely related to humans – there has been a long tradition of trying to measure personality differences, and dominance has played a central role from early on (see, e.g. Bernstein, 1981). In an influential study by King and Figueredo (1997), chimpanzees living in zoos were characterised with a list of adjectives that had been established for human participants. In addition to the well-known Big Five (see Chap. 3), they found a dominance factor consisting of adjectives such as dominant, independent and

anxious (poled negatively). Although not all factors have been replicated clearly in later studies, the personality trait dominance has been shown in other samples of chimpanzees (King, Weiss, & Farmer, 2005; Latzman, Freeman, Schapiro, & Hopkins, 2015). As expected for a personality trait, dominance shows a high test-retest correlation for non-human primates (Freeman & Gosling, 2010; Pusey, Williams, & Goodall, 1997).

Studies based on these insights have found that the personality trait dominance is associated with observable behaviour in primates. For orangutans living in zoos, the probability of successful goal realisation was rated higher for more dominant animals (Weiss, King, & Perkins, 2006). Amongst gorillas in the wild, dominance correlated positively with the frequency of successfully chasing away another animal from a particular location as well as with the number of interventions in fights within a group; and it correlated negatively with initiating eye contact with other members of the group, which is often done by individuals of low status amongst gorillas (Eckardt, Steklis, Steklis, Fletcher, Stoinski, & Weiss, 2015). Amongst chimpanzees in the wild, it has been observed over the course of several years that the offspring of dominant females has a higher chance of survival, gains weight faster and – in cases of female offspring – reaches sexual maturity earlier than the offspring of less dominant females (Pusey et al., 1997).

Such findings suggest that dominance is associated with clear advantages for survival and reproduction for non-human primates (see also Voland, 2000). An explanation for this relationship is that dominance constitutes a way to gain and secure material and social resources (Weiss, King, & Enns, 2002). From the perspective of evolutionary psychology, it seems reasonable to transfer this argument to humans because human evolutionary development – just like in the case of other animals – had to rely on access to resources; therefore, humans are thought to have developed motivational tendencies that are conducive to acquiring resource (Hawley, 1999; MacDonald, 1988).

It is easy to observe the relationship between dominance and access to resources in children. If a resource is given to a group of children, clear differences in access to it can be seen across individuals. These differences can be explained with the dominance of the respective child. For instance, Charlesworth and La Freniere (1983) gave groups of four 5-year-old children the opportunity to watch an attractive film. However, this was only possible for one child at a given time and furthermore only if two other children simultaneously activated a switch that turned on the film. As predicted, children that had been classified as dominant in preliminary behavioural observations watched the film significantly longer than other children. Hawley (2002) could confirm the central finding that dominance leads to access to resources in a much more elaborate research design. She formed dyads consisting of one child that had previously been judged dominant by educators and another one that had been judged non-dominant. These dyads were introduced to games and instructed to assign different roles to play them. While one of the two roles was attractive (e.g. placing beads on the arms of a moving toy character), the other one was far less attractive (e.g. providing the other child with beads). Once again it was the dominant child who took on the attractive role for a longer time. Interestingly, just as we saw earlier in the case of dominance amongst non-human primates, dominance ratings are stable over time for children as well (La Freniere & Charlesworth, 1983).

It has been shown for non-human primates and humans alike that dominance is associated with a higher probability of gaining access to limited resources. The pursuit of power has thus evolved phylogenetically because dominance helps with ensuring one's survival and boosting one's reproductive success. The finding that dominant individuals are able to successfully access resources raises the question of what kind of behaviour they use to reach this goal. Directive behaviour, such as threatening other children or chasing them away, is without a doubt effective

in the short run. In fact, such behaviour plays an important part in how dominant children act (Charlesworth & La Freniere, 1983; Hawley, 2002). On the other hand, dominant children also behave in ways that might be considered more socially acceptable (e.g. asking other children to step aside or offering a favour in return) but are nonetheless instrumental in gaining resources (Hawley, 1999, 2002). Thus, although the dominant children in Charlesworth and La Freniere's (1983) study watched the film for a longer time than less dominant children, they did not differ from others with regard to the time that they spent in the supportive role. The observation that both directive and more considerate strategies are correlated with successfully controlling resources has been found not only for children but also for different age groups (e.g. Hawley, Shorey, & Alderman, 2009).

Even though both facilitate successful access to resources in the short run, both directive and considerate behavioural strategies come with different advantages and disadvantages. Considerate behaviour might be useless when dealing with obstinate others, but it preserves social harmony. On the other hand, assertiveness is often successful when trying to secure resources, but it can lead to social conflict. Therefore, it appears to be a good strategy to combine both in order to compensate for their respective disadvantages. This pattern can in fact be found if individuals are classified based on the frequency of the different behavioural strategies they use. People who combine directive and socially agreeable strategies (Hawley, 2003; Hawley, Little, & Card, 2007):

- Control resources as often as people who rely on directive strategies and more often than those who primarily act in a socially agreeable way
- Are better liked amongst their peers compared to people who rely on directive strategies, but not those who primarily act in a socially agreeable way

In order to avoid the social costs of purely directive strategies, children already adapt their approach for controlling resources: it is a development from a strategy focusing on pure dominance to a form of dominance that is compatible with social agreeableness. Until the age of 6 years, dominance tends to be associated with popularity; later, however, it is perceived more negatively (Hawley, 1999). If dominant behaviour leads to social rejection, as several studies have shown (e.g. Hawley, Little, & Pasupathi, 2002; Newcomb, Bukowski, & Pattee, 1993; Ridgeway, 1987), relying exclusively on this strategy should impair the possibility to exert influence in the long run. For instance, people who could otherwise be influenced might begin to resist or avoid the dominant person, thus evading their influence.

Indeed, people with a strong power motive seem to consider these costs. Contrary to popular belief, they do not always act dominantly in order to exert influence, but are able to use smarter strategies (cf. McClelland, 1975). Although some studies have found that people with a strong power motive might lose influence due to maladaptive dominant behaviour (Kolb & Boyatzis, 1970; for further results see McClelland, 1987), there has also been evidence that such individuals are perceived as particularly convincing, which has been explained with subtle facial expressions and gestures (Schultheiss & Brunstein, 2002). Thus, people with a strong power motive seem to be able to satisfy their desire for exerting influence without using dominant behaviour.

In general, dominance is an important component of social interactions in humans and non-human primates. It enables individuals to secure high social status by gaining attention (La Freniere & Charlesworth, 1983, measured this through looks at a person; cf. the results of Eckardt et al., 2015, with gorillas) and access to resources. However, balancing the pursuit of resources and an appreciation of social relationships is crucial for maintaining popularity within a group. This balance can be achieved by combining directive and socially agreeable behavioural strategies to gain access to resources (Hawley et al., 2009). This was also confirmed by more recent findings according to

which people with a strongly developed need for social affiliation indicated to act in a particularly submissive way when being assigned a position of power (Rios et al., 2015). Thus, individuals who consider social harmony to be important do not often act in a directive way in such a position in order to maintain social cohesion (see Sect. 8.4.1).

8.2.3 The Neurobiology of the Power Motive

In the previous section we saw that power – represented by dominance and status – constitutes an important differential trait across individuals for predicting social behaviour. This was true for humans and non-human primates alike. When searching for neurobiological substrates of motivation (see Chap. 10), particularly the power motive, it therefore seems to be fairly reasonable to start with non-human species once again and subsequently expand our thoughts to humans.

The sex hormone testosterone has often been used when trying to explain differences in dominant and aggressive behaviour across males of various species (Mazur, 1985; Mazur & Booth, 1998). Although there is evidence for a general relationship between testosterone level and dominance (e.g. Anestis, 2006; Muehlenbein & Watts, 2010), many studies do not confirm such a connection (e.g. Barrett, Shimizu, Bardi, Asaba, & Mori, 2002; Lynch, Ziegler, & Strier, 2002; overviews can be found in Sapolsky, 1987; Wingfield, Hegner, Dufty, & Ball, 1990). However, a strong relationship between testosterone and aggressive behaviour in order to ensure dominance has indeed been found in males of various species in situations in which new dominance patterns emerge (e.g. due to an injury of the previous alpha male; Sapolsky, 1991) or if they are threatened (e.g. when a rival enters one's territory; Wingfield et al., 1990). Therefore, simultaneously regarding testosterone and environmental stimuli pertaining to dominance provides much more information than focusing on baseline testosterone alone.

Following this argument, we will first also focus our discussion of humans on men. Although there is evidence for a relationship between baseline testosterone and the power motive in men (Schultheiss, Dargel, & Rohde, 2003a; Winter, 1973), situational stimuli should still play an important role. The first question is what kind of external stimuli relevant to dominance need to be considered in order to examine the relationship between the power motive and testosterone. Competitions are a common interaction with the explicit purpose to determine the ranking of individuals, which Edwards (2006, p. 682) called "formalized contests for status".

Accordingly, Schultheiss, Campbell and McClelland (1999) examined changes in saliva testosterone in male participants who had lost or won against an opponent in an experimental competition in which they had to finish a number combination test faster than their counterpart. There was no systematic change in testosterone compared to the baseline in losers. Winners, however, showed a considerable rise in testosterone if they had had both a strong desire for dominance over others (personalised power) and at the same time a weak need for positive influence via help and support (socialised power) prior to the competition. If, however, both personalised and socialised power had been strong initially, their testosterone dropped below the baseline. In fact, changes in testosterone can even be found in situations that merely stimulate dominance, such as imagination exercises about successful motive realisation (Schultheiss et al., 1999), film scenes that depict dominance (Schultheiss, Wirth, & Stanton, 2004) or when participants take on posture signalising dominance (Carney, Cuddy, & Yap, 2010). Just like in animals, the dispositional power motive and contextual cues pertaining to dominance apparently interact in humans as well and influence their hormonal reactions.

This general conclusion was further confirmed for the stress hormone cortisol by another insightful study. Using the same competition context as Schultheiss et al. (1999), the authors found an interaction between the strength of the power motive and the result of the competition (Wirth,

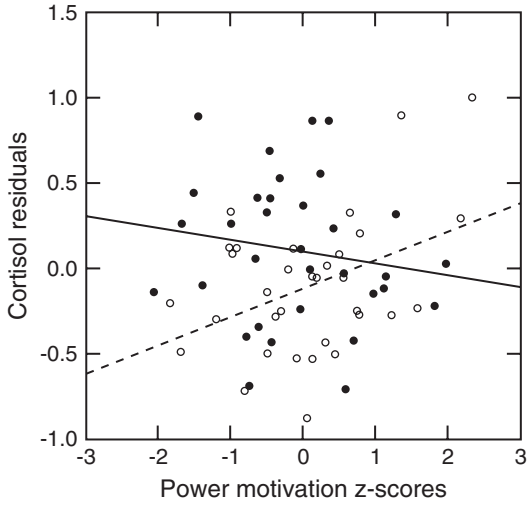

Fig. 8.2 The relationship between the implicit power motive and changes in cortisol compared to the baseline level in response to winning (*continuous line*) and losing (*dotted line*) a competition (Fig. 1 in Wirth et al., 2006)

Welsh, & Schultheiss, 2006). However, in contrast to testosterone, an effect on the power motive was found in losers rather than winners for cortisol. This interaction is shown in Fig. 8.2. Whereas no relationship between power motive and cortisol was found in winners, losers' cortisol rose substantially the stronger their power motive was.

How can we explain these effects of a competitive situation on testosterone and cortisol? For answering this question, Stanton and Schultheiss (2009) developed a biological model of the power motive for men according to which there are two opposing mechanisms through which competitive situations affect testosterone production (Fig. 8.3). The outcome of the competition determines which mechanism becomes relevant. Both mechanisms themselves, however, depend on the power motive.

First, let us have a look at a situation that stimulates the power motive, e.g. a competition that will potentially allow for dominating an opponent or an actually successful competition. Such a simple stressor activates the release of epinephrine/norepinephrine, also known as adrenaline/noradrenaline. Epinephrine/norepinephrine causes an increased testosterone production. The strength of the power motive influences the release of epinephrine/norepinephrine. This was shown in studies in which students were put in different situations stimulating power (e.g. competitive situation prior to an examination, argument with the university administration), and those with a strong power motive had a stronger increase in epinephrine/norepinephrine than participants with a weak power motive (McClelland, Floor, Davidson, & Saron, 1980; McClelland, Ross, & Patel, 1985). Evidently, people with a strong power motive react to challenges to their dominance with a stronger release of epinephrine/norepinephrine and thus a higher testosterone production.

Now let us have a look at a situation in which the power motive is frustrated. We have already introduced the concept of power stress: physiological activation in individuals with a strong power motive in reaction to external obstacles that hinder the realisation of their pursuit of power in a particular situation (Fodor, 1985; Fodor et al., 2006). We find the same constellation when although a competitive context theoretically allows for dominating an opponent, losing the competition makes such dominance impossible: much rather, the opponent is the one gaining dominance. In this case more cortisol is released, which inhibits testosterone production. As we saw earlier, this process is particularly strong in people with a strong power motive (Wirth et al., 2006). More recent studies have provided more information about this connection between cortisol and the power motive. Following a situation in which the power motive is stimulated but also frustrated (viz. a presentation with a reserved committee), participants had a stronger power motive than their baseline before the presentation. This increase of the power motive was negatively associated with increasing cortisol (Wiemers, Schultheiss, & Wolf, 2015). This means that a less pronounced release of cortisol as a stress reaction predicts a stronger increase of the power motive. Furthermore, there are first indications that giving cortisol to people lowers their power motive (Schultheiss, Wiemers, & Wolf, 2016).

These findings as a whole mean that the power motive modulates testosterone production in men

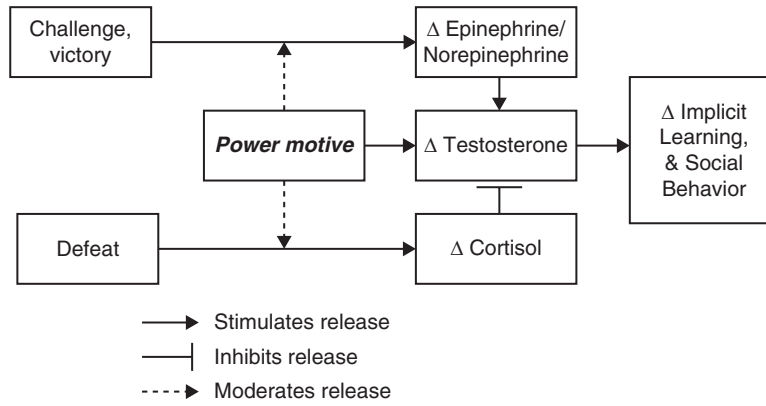

Fig. 8.3 Biological model of the power motive in men: the power motive influences the release of hormones in different contexts of dominance (Fig. 1 in Stanton & Schultheiss, 2009)

in reaction to external stimuli relevant to dominance. After winning a competitive situation, an increase in epinephrine/norepinephrine stimulates testosterone production, whereas an increase in cortisol inhibits it after defeat. Both processes are stronger in individuals with a strong power motive than those with a weak one.

Which functions do these hormonal changes serve depending on the strength of the power motive? Studies have shown that the increase in testosterone following successful competitions promotes motor learning, while the reduction following defeat hinders such learning (Schultheiss & Rohde, 2002; Schultheiss, Wirth, Torges, Pang, Villacorta, & Welsh, 2005). For instance, Schultheiss et al. (2005) created a competition in which participants had to react as fast as possible to symbols shown on a computer screen. While the position of these symbols on the screen was random in some trials, other trials showed the symbols in a repeated pattern and yielded an interested result. Participants' learning curves, i.e. faster reactions to the pattern, were associated with a change in testosterone. In accordance with our observations so far, this change depended on whether participants won or lost and on the strength of their power motive. An increase in testosterone thus boosts behaviour that has proven to be instrumental in dominating an opponent in a competitive situation (unsurprisingly, changes in testosterone predict the readiness to participate in further competitions; Mehta & Josephs, 2006). A reduction in testosterone, on the other hand, inhibits learning the same behaviour as it has proven to be ineffective.

So far we have only looked at the relationship between the power motive and hormones in men. Do the results presented so far apply to women as well? Vongas and Al-Hajj (2015) point to different mechanisms of testosterone production in women compared to men. While testosterone primarily has a gonadal foundation in men, the hypothalamic-pituitary-adrenal axis (HPA axis) is of particular importance in women. The release of cortisol also stimulates the testosterone production in this way. Accordingly, not only victory but also defeat increases cortisol and testosterone in women with a strong power motive (Schultheiss et al., 2005; Wirth et al., 2006). While the increase in cortisol thus causes a stronger avoidance of competitive situations in men (Stanton & Schultheiss, 2009), the same increase should boost the readiness to participate in competitions in women due to the associated increase in testosterone. Indeed, women tend to be more persistent after defeat than men (Bronson & Merryman, 2013).

In addition to testosterone, the female sex hormone oestradiol is also important for the power motive. A relationship between oestradiol and dominance has been found in females of several non-human mammals (e.g. Michael & Zumpe, 1993) and also in humans (Stanton & Edelstein, 2009; Stanton & Schultheiss, 2007). Comparable to testosterone in men, there is a

dynamic influence of oestradiol depending on external factors. In women with a strong power motive, victory leads to an increase in oestradiol, while defeat leads to a decrease (Stanton & Schultheiss, 2007). Moreover, the relationship between the power motive and baseline oestradiol is stronger in single women than in women who are in a stable relationship and women who do not use hormonal contraception, i.e. take the pill (Stanton & Edelstein, 2009; Stanton & Schultheiss, 2007; slightly different results by Schultheiss et al., 2003a). Because both dominance and oestradiol are linked to the frequency of sexual activity (Pusey et al., 1997; Schultheiss, Dargel, & Rohde, 2003b; Udry & Morris, 1968; Voland, 2000), this relationship might be a mechanism to increase the chances of reproductive success.

It has become evident that the power motive has a hormonal representation although it is not the baseline level, but the level found in certain external situations that matters. Schultheiss and colleagues (Schultheiss & Schiepe-Tiska, 2013; Schultheiss, Wirth, Waugh, Stanton, Meier, & Reuter-Lorenz, 2008) assume furthermore that there should be differences between individuals with strong and weak power motives in the activities of certain brain areas. In particular, this should be the case for those areas that have been shown to be involved in emotional and motivational processes, such as the dorso-anterior striatum that plays a role in learning processes like implicit motor learning (Schultheiss et al., 2005) and learning in social contexts (Schultheiss & Schiepe-Tiska, 2013). In fact, when looking at pictures of angry faces compared to emotionally neutral faces, people with a strong power motive show stronger activation of the caudate nucleus, a part of the striatum, on an fMRI than those with a weak power motive (Schultheiss et al., 2008). An interpretation for this finding is that people with a strong power motive react to facial expressions that signalise dominance of the bearer (Tiedens, 2001) with the activation of brain areas that control their own dominance behaviour. Additional findings suggesting that primarily structures in the left hemisphere are activated in reaction to emotional expressions (Schultheiss et al., 2008) match other results that indicate that pictures (Kuhl & Kazén, 2008) and film sequences about power (Quirin et al., 2011) are mostly processed in the left hemisphere. In summation, the power motive influences hormonal processes and brain physiology if it is stimulated by external cues such as competitions or emotional expressions that signalise dominance.

8.2.4 The Development of the Power Motive

We have already seen that, although power is a universal need, there are substantial differences in the strength of the power motive across individuals. Why do we find such differences? To answer this question, we need to take a look at how the power motive develops.

Many theories assumed that motive development takes place during childhood (e.g. McClelland, 1965; McClelland et al., 1989; Veroff, 1969). With regard to the power motive, most researchers initially proposed a deficiency hypothesis: individuals who only have few opportunities to act dominantly are those who develop a strong power motive (Adler, 1922/1997; Horney, 1937/1964; Veroff & Veroff, 1972; cf. Schwartz, 2012). Because they hardly experience power, such individuals were thought to develop a particularly strong desire for it. The most relevant empirical evidence for this assumption is that men with little formal education, which is interpreted as low social status, have a strong power motive (Veroff, Depner, Kulka, & Douvan, 1980). This argument is supported by findings that suggest that differences in social status can motivate attempts at improving one's social standing (Hays & Bendersky, 2015). However, this result only applies to a specific facet of the power motive, namely, fear of powerlessness. Furthermore, it focuses on social rather than psychological conditions. Lastly, Veroff et al.'s (1980) conclusions were based on a group comparison with adults, which is why the suggested mechanism can only be construed from correlations; however, it cannot be proven.

This deficiency hypothesis has become irrelevant to more recent explanations of the development of motives. Instead, researchers assume that the origins of the power motive can be found in an innate unspecific efficacy motive (Holodynski, 2009). The efficacy motive refers to an infant's joy in creating an effect (e.g. pushing and ringing a bell by moving one's own body). Later during childhood the efficacy motive is thought to split into an achievement motive whose desired effect is represented by meeting a certain criterion (e.g. successfully solving a problem) and a power motive whose effect is influencing other people (e.g. impressing another person).

The most influential study on the development of the power motive to date (McClelland & Pilon, 1983) used a longitudinal design. The authors were able to measure the power motive in participants whose mothers had been interviewed on their parenting behaviour in an earlier study (Sears, Maccoby, & Levin, 1957). Approximately 26 years had passed between the two studies, so the participants who had been about 5 years old when their mothers had been asked about their parenting behaviour had become young adults by the time their power motive was measured. McClelland and Pilon's (1983) study was based on the assumption that the relationship between parent and child determines the strength of motives because parents react to their children's motive-specific behaviour in different ways and thus create an affective preference in children for seeking out or avoiding certain situations. In other words, children receive reactions from their parents if they, for example, behave in a dominant way, and these reactions can later motivate them to repeat certain behaviour or to avoid it. Depending on how parents react, their children will develop either a strong or a weak power motive, raising the question which reactions to which behaviour lead to the development of a strong power motive?

Interestingly, McClelland and Pilon's (1983) findings diametrically contradicted the deficiency hypothesis of how the power motive develops. Mothers' tolerance of their children's sexually suggestive and aggressive behaviour at age 5 was positively correlated at a significant level with the strength of children's power motive two and a half decades later. Examples of behaviour included in the original interviews are children's playing with their own genitals and sexual play with other children as well as aggressive behaviour towards siblings and parents (see Appendix A in Sears et al., 1957, for the exact phrasing of these questions). Two other correlations contradicted the deficiency hypothesis, albeit less clearly: for boys at least, more physical punishment led to a weaker power motive in young adulthood, while for girls at least, parent's suggestion to fight back if a situation demands it led to a stronger power motive.

The most important and robust results of this longitudinal study suggest that children who spontaneously behave in a sexual or aggressive way develop a strong power motive if their behaviour is tolerated by their parents. It appears to be crucial that children's spontaneous aggressive or sexual behaviour is not sanctioned by parents; thus, they do not learn to associate their power-related behaviour with any form of negative affect. Although such a developmental trajectory seems plausible, it assumes that all or at least most children show sexual and aggressive behaviour. Even though it seems reasonable to assume that this might be the case, there are nevertheless substantial individual differences with regard to children's tendency to behave sexually and aggressively. How can we explain these differences?

Looking back at the neurobiology of the power motive will help us here. We saw in Sect. 8.2.3 that the power motive and the sex hormones testosterone and oestradiol influence one another. Interpersonal differences in testosterone and oestradiol that predict spontaneously occurring dominant behaviour can already be found in utero (Liu, Portnoy, & Raine, 2012). After birth this prenatal ratio between oestradiol and testosterone manifests itself in the length of the index finger relative to the ring finger, which is known as the 2D:4D ratio. Concretely, a long index finger compared to the ring finger, which means a high 2D:4D ratio, indicates a high level of prenatal testosterone (Lutchmaya, Baron-Cohen, Raggatt, Knickmeyer, & Manning, 2004). Schultheiss and

Zimni (2015) showed that there is a systematic association between the 2D:4D ratio and the power motive. Therefore, it seems likely that hormonal factors increase the probability of dominant behaviour during childhood.

The results presented thus far suggest that the strength of the power motive is the product of an interaction between biological and social factors. For a child's development, it seems therefore likely that biologically determined differences in the concentrations of the sex hormones testosterone and oestradiol result in different inclinations to dominant, aggressive and sexualised behaviour (see, e.g. Archer, 2006; Liu et al., 2012; Mazur & Booth, 1998; Schultheiss et al., 2003b). Parents tolerate such behaviour in their children to a different extent and thus shape the individual strength of the power motive (McClelland & Pilon, 1983). Conducive parental behaviour is thus required for children to develop a lasting power motive from spontaneous aggressive or sexual behaviour.

With regard to the development of the power motive during later stages of life, there are not many empirical findings either. At least for men, there appears to be a curvilinear relationship between age and the power motive: the latter tends to be higher in middle-aged men compared to early and late adulthood (Veroff et al., 1980). Moreover, some evidence suggests that there is a connection between the number of critical life events and the stability of the power motive over time (see Smith, 1992b). Unfortunately, however, there are not any insightful studies that longitudinally examine the development of the power motive.

McClelland presented an interesting theoretical approach about how the power motive might develop across the lifespan. He proposed four developmental stages depending on whether power sources and target objects of power are located inside or outside of an individual. These stages are shown in Table 8.1 and will be discussed below. The names of the stages are based on Krug and Kuhl's (2006) terminology.

Table 8.1 The four developmental stages of the power motive according to McClelland

	Source of power	
Target of power	Others	Self
Self	I: Power through others	II: Self-directed power
	Strength	Autonomy
	Oral phase/ childhood	Anal phase/adolescence
Others	IV: Power benefitting others	III: Selfish power
	Mentoring	Assertiveness/dominance
	Generativity/ mature adulthood	Phallic phase/adulthood

Table based on McClelland (1975)

In order to understand McClelland's (1975) approach, it is important to note that these four stages should be passed through in a fixed order. This does not mean that earlier stages are completely replaced by later ones. Instead, being able to access earlier developmental stages in appropriate situations is an indicator or personal maturity to McClelland. It is, however, possible that individuals fixate on a particular developmental stage, thus preventing them from reaching later stages and developing the associated behaviour of those stages. McClelland took this thought from the developmental theories developed by Freud (1938) and Erikson (1963).

During stage I the individual itself is not the source of power. However, an external source is nevertheless used to strengthen oneself. The purpose of this borrowed power is to use the strength of an authority figure in a way that is beneficial to oneself. This form of power is particularly common in children, but it can also be found when adults identify with organisations or parties that give them a feeling of strength or superiority. Because power is based on the strength of others during this stage, the individual is necessarily dependent on another person. Therefore, McClelland compares this stage to the oral phase

stage by Freud during which infants satisfy their needs primarily through their mothers.

Stage II is characterised by overcoming this dependence on the strength of others. This can usually be observed during adolescence when the individual becomes its own source of power. This power, however, continues to be used in a self-centred way. Essentially, this self-centred power means that individuals want to make decisions about their own lives and behaviour. If individuals manage to acquire many resources, realising this wish becomes more likely because they can more easily achieve independence from others. Therefore, this stage is reminiscent of the anal stage by Freud that is associated with exaggerated self-control and miserliness.

The new component during stage III is that one's own power is no longer directed exclusively at oneself. Instead, controlling others becomes important. Therefore, the wish to dominate others and be respected by them is central to this stage. This dominance over others is essentially the basis for a feeling of superiority and strength. Thus, it is selfish or (according to the terminology by McClelland, 1970, 1975 introduced in Sect. 8.1) personalised power. This is comparable to the phallic stage by Freud during which asserting one's interests is equally important.

Stage IV is the most mature form of power. Individuals themselves are no longer the source of power. Instead, power is derived from convictions and general principles. The use of power is furthermore no longer directed at oneself, but at trying to influence others in a positive way, e.g. supporting their developments as a mentor. Therefore, this form of power is beneficial to the community and constitutes socialised power (in contrast with the personalised power of stage III). It is analogous to Erikson's developmental stage of generativity which focuses on the attempt to support and dedicate oneself to others (see excursion on the relationship between the power motive and generativity).

It is important to note, however, that there is no empirical evidence for McClelland's developmental approach. It is therefore not clear if the suggested stages really represent qualitative changes of the power motive or if the behaviour expressing the motive simply changes. At the time of writing, there were no empirical findings about behavioural correlates of the power motive in children and only a few regarding adolescents (Skolnick, 1966). Those latter studies furthermore suffer from several methodological shortcomings and must therefore be taken with a grain of salt. Therefore, the suggested developmental sequence of behaviour pertaining to the power motive cannot be tested.

Excursus

Generativity and the Power Motive

Generativity describes the interest in establishing future generations, to support them and to facilitate their development (Erikson, 1963). This can be achieved in many different ways, e.g. passing on experiences, skills, knowledge and values. Such activities, however, only represent one of the possible contexts of generativity, namely, one with a communal focus. Additionally, there is also an agentic, thus self-focused, context for generativity. Creating ideas or artworks can also have a beneficial effect on future generations (see Evans, 1967). Both forms have in common that they allow the generative individual to leave a lasting impression on others (see Newton, Herr, Pollack, & McAdams, 2014).

Several scholars have noted that generativity shares conceptual similarities with the power motive to the extent that the former aims at positively influencing others, particularly younger people. For instance, Veroff et al. (1980) used generativity to explain their findings that middle-aged men have a higher power motive compared to their younger and older counterparts: according to Erikson, generativity plays a particularly important role during this part of life. McAdams (1985; McAdams, Ruetzel, & Foley, 1986)

was the first researcher to empirically establish a relationship between the power motive and generativity. As expected, the combination of the power and intimacy motives correlates positively with the strength of generative goals for the future. Although this result confirms the assumption that generativity is shaped by both communal and agentic motivational sources, the addition of these two motives raises new questions that have not been answered yet. It is, for example, not clear if and how one of them might compensate for the other if it is weak.

Therefore, it seems more promising to examine both motives separately. Peterson and Stewart (1993) showed a relationship between the power motive and particular generative attitudes, e.g. the desired number of children and the opinion that being a parent is an important source of feeling competent. It is problematic, however, that these results were not gender-neutral, but instead found primarily in women. The most extensive study so far focused on a prosocial facet of the power motive that indeed predicted a generative attitude which, in turn, predicted generative goals that the participants had generated themselves (Hofer, Busch, Chasiotis, Kärtner, & Campos, 2008). Furthermore, the study stressed that this pattern can be found in adults in Costa Rica, Germany and Cameroon. Overall, these results demonstrate that the power motive plays some role in the development of generativity. It remains to be seen how the motive might furthermore support successful handling of other developmental challenges.

In summary, more research about the development of the power motive will be needed in the future. This is true both for the developmental conditions of the power motive during childhood – particularly with a simultaneous consideration of biological and social factors – and over the course of the lifespan. Furthermore, in contrast with adults (see Sect. 8.4), it is unclear how the power motive is expressed in the behaviour of children and adolescents.

8.3 Measuring the Power Motive

As mentioned earlier, there are two motive systems that differ substantially with regard to various dimensions: implicit and explicit motives (McClelland et al., 1989). Table 8.2 provides an overview of the attributes that characterise these two motive systems.

The first question that needs to be addressed is whether the two motive systems postulated by McClelland (1987; McClelland et al., 1989) are independent of each other. Interestingly, the historical development of motive research developed exactly the other way around. Many authors complained about the problem that research on motivation yielded a large number of inconsistent findings that contradicted one another. McClelland's theory of two systems is able to solve this ostensible contradiction: inconsistent findings occurred when studies using different methodologies were compared – concretely, projective methods that measure the implicit system vs. self-report methods that

Table 8.2 Characteristics of the implicit and explicit motive systems

	Implicit motives	Explicit motives
Definition	Shaped by affect, goal-oriented networks	Motivational self-images
Representation	Non-verbal, not conscious	Verbal, conscious
Development	Conditioning in early childhood	Verbal transmission
Behavioural correlates	Spontaneous behaviour, long-term trends in behaviour	In concrete situations requiring decision-making
Measurement	Projective: PSE	Questionnaires

measure explicit motivation. Another central criticism directed towards motivational research was the observation that test scores of the same motive were frequently uncorrelated. In fact, there is strong evidence for the phenomenon that two measurements of the same motive tend to be uncorrelated if they do not hail from the same of the two aforementioned groups of tests (e.g. Köllner & Schultheiss, 2014). Even in cases in which questionnaires are constructed in a way that attempts to mirror projective methods as closely as possible, only little convergence can be found (Schultheiss, Yankova, Dirlikov, & Schad, 2009).

Which characteristics of the two motive systems are responsible for the observation that the usefulness of different methods tends to be limited to only one of them? A central difference between the systems is that implicit motives do not require consciousness, while the explicit motive system does. This means that people are not usually able to directly access their implicit motives and thus cannot provide information about them. However, McClelland et al. (1989) already assumed that it should be possible to improve access to the implicit motive system by means of introspection. Several studies have provided some evidence for this assumption: a stronger disposition to self-access (e.g. Thrash & Elliot, 2002) as well as the situational activation of motives through imagining successful goal realisation (Job & Brandstätter, 2009; Schultheiss & Brunstein, 1999) can lead to a higher awareness of implicit motives.

The unconscious implicit motive system is based on affect. Thus, it represents an emotional preference for particular situations, which means that people experience pleasure if a situation provides certain incentives. With regard to the power motive, this means that individuals with a strong power motive experience situations as pleasant in which they can feel superior. Such affective preferences are conditioned during early childhood (Sect. 8.2.4). People with a strong power motive, however, do not only enjoy such situations, but they also actively search for them, which means that implicit motives predict two types of behaviour: spontaneous behaviour and long-term tendencies that are supported by extended transaction processes between individuals and their direct environments. On the one hand, people with a strong power motive seize opportunities to experience strength as soon as such opportunities occur. Their attention is directed towards recognising and making the best of such chances (Schultheiss & Hale, 2007). On the other hand, they tend to behave in ways that increase the likelihood that situations providing incentives for their power motive will occur in the future (e.g. by choosing a particular job: Jenkins, 1994).

The explicit motive system, however, is a cognitive system that includes self-perceptions with regard to the strength of an individual's motives. Such self-perceptions of motivation are primarily values and goals that differ from each other regarding how they affect behaviour (Jolibert & Baumgartner, 1997). Children learn them through the language used by their parents, teachers and friends (Eccles & Wigfield, 2002; McClelland et al., 1989). Explicit motives predict behaviour particularly well in situations in which individuals can choose between different behavioural options.

8.3.1 The Picture Story Exercise (PSE): The Classic Method for Measuring the Implicit Power Motive

Today the picture story exercise (PSE) is the method most frequently used for assessing implicit motives. Because implicit motives cannot be accessed consciously as discussed earlier, they need to be measured indirectly for which a projective approach can be used. Participants are shown pictures of socially ambivalent situations (Fig. 8.4 shows a common example for measuring the implicit power motive). Participants see a certain picture and are subsequently given a limited amount of time to write a story in order to

Fig. 8.4 The ship captain: example of a PSE picture with a high degree of activation of the implicit power motive (Smith, 1992a)

describe the picture. These stories are then coded by trained interpreters with regard to their content pertaining to different motives. The underlying assumption is that the more a particular person refers to a particular motive in their story, the stronger that particular motive is. Suggestions and assistance for what needs to be considered when using the PSE can be found in Schultheiss and Pang (2007) as well as Smith, Feld, and Franz (1992).

Historically, the PSE has been developed from the thematic apperception test (TAT) that was developed by Morgan and Murray (1935) for clinical diagnostics. However, the PSE can be seen as a methodological improvement on its predecessor in many ways (an overview can be found in Winter, 1998). Therefore, PSE and TAT need to be clearly distinguished from each other. Here are two examples for differences between the two methods. On the one hand, pictures used in the PSE only feature situations that often occur in everyday life and are always of social relevance, which did not apply to the TAT. On the other hand, the coding system used to identify motives in the PSE is not exclusively driven by theory, but also implements results from motive-triggering studies. Concretely, PSE stories were coded in situations that strongly activate the power motive, e.g. while candidates for a student appointment were waiting for the disclosure of the election result (Veroff, 1957), after participants had watched a video of the inauguration speech by US President John F. Kennedy (Winter, 1973), after participants had watched how another person was supposedly hypnotised (Stewart & Winter, 1976) or after they had been asked to frustrate another person while acting as a mock experimenter in a psychological study (Uleman, 1972). Characteristics that were prominent in the stories of triggered participants, but missing or less prominent in the stories written by participants under neutral control conditions, became the basis for general rules of coding the power motive. Remarkably, after having received much criticism for its purported lack of validity (e.g. Entwisle, 1972), the PSE thus meets a central criterion of validity due to its empirically founded coding system (Borsboom, Mellenbergh, & van Heerden, 2004).

Looking at the historical development of the PSE helps with understanding how PSE stories are coded for the power motive. Before the established set of rules that is used today was developed (Winter, 1994), there were several forerunners that all contributed to the contemporary operational definition of the implicit power motive. The conception of the power motive by Veroff (1957) is essentially based on a form of avoidance motivation: the motivation to avoid the experience of powerlessness. A stronger focus on the search for positive experiences could be found in Uleman's (1972) conception that defined the power motive primarily through dominant behaviour. Winter (1973, 1994) integrated both motivational orientations in his manual. This led to moderate correlations (Winter, 1973) with the coding systems of both Veroff and Uleman. Overall, there are six criteria for coding the power motive in a story:

- Dominant behaviour with an inherent influence on others
- Control over others

Table 8.3 Examples for how to code the implicit power motive in PSE stories based on the manual by Winter (1994)

Category in the Winter manual	Example
Dominant behaviour with an inherent influence over others	"I will let you and all the other mutineers careen," yelled the captain at his chief mate
Controlling others	The captain watched that passenger for days to finally discover what he was up to
Attempts to convince, persuade or influence others	The captain talked at the shipowner to dissuade him from his plan of changing the route of the cruise
Helping others without being asked	When the captain discovered the stowaway, he showed him a hiding place where he would definitely not be discovered and promised to provide him with food throughout the voyage
Addressing status, prestige, etc.	The captain was sure that he would become even more famous should he succeed in crossing the Atlantic Ocean faster than anyone had ever done before him
Strong emotional reactions to the intentions of others	The crew cheered the captain enthusiastically when he finished his ardent speech

- Attempts to convince, persuade or influence others
- Helping others without being asked to do so
- Addressing topics such as status, prestige, fame, etc.
- Strong emotional reactions to the intended actions of others

Table 8.3 shows examples of story elements taken from Winter's manual for each of the six categories as they might appear in stories written about the picture of a captain (Fig. 8.4). Further information about how to proceed once motive scores are obtained can be found in Schultheiss and Pang (2007). It should be noted that is currently being suggested that status might be an independent motive and thus independent of power (Anderson, Hildreth, & Howland, 2015; Hays & Bendersky, 2015). For now, however, status remains one of the criteria for coding the power motive.

8.3.2 Other Methods for Measuring the Implicit Power Motive

The PSE comes with a considerable disadvantage in spite of its strengths: it is extremely time-consuming for participants and interpreters. The required time for the coding process does not only include the actual process of coding participants' stories but also the time required to train interpreters in how to reliably code texts in the first place. Unsurprisingly, several researchers have proposed alternative methods for measuring implicit motives including the power motive. Three of these instruments will be discussed briefly.

8.3.2.1 Operant Multi-motive Test

Just like the PSE, the operant multi-motive test (OMT; Kuhl & Scheffer, 1999; see also Kuhl, Scheffer, & Eichstaedt, 2003) uses ambiguous pictures as its stimuli that are shown to participants. The difference, however, is that participants are not asked to write full stories about the pictures, but instead answer several questions in written form ("What is important to the person in this situation and what is he/she doing?"; "How is the person feeling?"; "Why does the person feel that way?"; "How does the story end?"). Because of these suggestive questions, the OMT is considered to be a semi-projective method. How participants can answer is substantially reduced by how the questions are phrased. The test covers not only the power motive but also the achievement and affiliation motives. Additionally, the OMT allows for the differentiation between tendencies for five different realisation strategies of the respective motive (Kuhl & Scheffer, 1999) based on the theory of personality system interactions (Kuhl, 2001). With regard to the power motive, these strategies are prosocial power (cf. socialised power by McClelland, 1970), opportu-

nistic power (status), assertiveness, actionist power and submission/surrendering power. Empirical evidence is primarily available for the prosocial expression of the power motive, a tendency that is associated with generativity (Hofer et al., 2008) and helping behaviour (Aydinli, Bender, Chasiotis, Cemalcilar, & van de Vijver, 2014). As expected, measuring the power motive with the OMT leads to an index that is related to well-being (Kazén & Kuhl, 2011; see Sect. 8.4.2). However, the index does not interact with the personality trait extraversion (Lang, Zettler, Ewen, & Hülsheger, 2012) unlike its PSE counterpart (Winter, John, Stewart, Klohnen, & Duncan, 1998; see Sect. 8.4.1).

8.3.2.2 Multi-motive Grid

The multi-motive grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000) is another semi-projective method that is even more suggestive than the OMT. Participants are not required to write anything in reaction to ambiguous picture stimuli; instead, they are shown a number of several possible answers and choose those with which they agree the most. Thus, participants can decide which statements are relevant to the people shown in the pictures, e.g. "The person's reputation might be jeopardised" or "The person want to exert influence by herself/himself" (these are examples for the power motive; however, the MMG also includes statements for measuring the achievement and affiliation motives). These examples show that the MMG differentiates between an approach (hoping for power) and an avoidance component (fear of power). However, the power, achievement and affiliations' motive measurements of the MMG are correlated which violates its theoretical foundation (e.g. Job, Oertig, Brandstätter, & Allemand, 2010; Kehr, 2004; Sokolowski et al., 2000). Therefore, its discriminant validity is questionable. Otherwise, MMG studies on the power motive yield expected results; e.g. individuals with a strong power motive consider the physical appearance of a potential partner to be more important (Schmalt, 2006) and benefit more from leadership competence trainings (Sokolowski & Kehr, 1999) than individuals with a weaker power motive.

8.3.2.3 Pictorial Attitude Implicit-Association Test

More recently, some researchers have started to try measuring the implicit power motive with a computer-based procedure to measure reaction times. This approach is based on the implicit-association test (IAT; Greenwald, McGhee, & Schwartz, 1998) that connects examples for a specific construct (e.g. the power motive) with a particular evaluative dimension (e.g. affective valence, self-affiliation). The implicit attitude towards the construct is indicated by the comparison between the reaction time to such pairings with other pairings in which examples for a different, potentially contradicting construct are presented. Admittedly, "example for a construct" is a complicated idea that can be explained as follows: there seems to be a difference depending on how the construct of the power motive is presented to participants. Convergent validity with the PSE cannot be found if words pertaining to the power motive are used (Sheldon, King, Houser-Marko, Osbaldiston, & Gunz, 2007), but can if pictures are used instead (Slabbinck, de Houwer, & van Kenhove, 2011, 2013). Slabbinck et al. combined pictures pertaining to the power motive (e.g. a man leaning over a table with clenched fists) and pictures without any such connotation (e.g. playing children) with positive affective evaluations such as "great" or negative ones such as "unpleasant". This differential effect follows the logic of the activation of implicit motives by pictures as seen in the methods mentioned above. Moreover, the picture-based method is not correlated with measurements of the explicit power motive. Future research will show whether approaches based on reaction times will replace the classic PSE or rather complement its use.

8.3.3 Methods for Measuring the Explicit Power Motive

Because they can be accessed consciously and contemplated, explicit motive systems can be measured with self-report methods. Several such instruments contain scales that register the

explicit power motive. The explicit motive system is usually conceptualised as a goal rather than a value construct. Values pertaining to the power motive can be measured with the Schwartz Value Survey (Schwartz, 1992) and other methods that are based on it. Further developments of this questionnaire distinguish between specific components of power as a value: prestige, control of resources and dominance (Schwartz, Cieciuch, Vecchione, Davidov, Fischer, Beierlein et al., 2012).

The classic measure for the strength of the explicit power motive is the dominance scale found on the Personality Research Form (PRF) that is based on Murray's (1938) classification of motives. The name already suggests that assertiveness represents a specific facet of the pursuit of power. Participants are asked to indicate for 16 statements about motivation how much they apply or do not apply to them. Thus, the motive is operationalised as a form of self-description in this case. In this regard, the power scale of the GOALS questionnaire (Pöhlmann & Brunstein, 1997) differs because it asks concretely for the subjective importance of power-motivated goals. Although the power motive is covered more inclusively here as status and influence, the fact that the power motive is measured with only four goals is problematic. The Unified Motive Scales (UMS; Schönbrodt & Gerstenberg, 2012) combine the items of established motive measures (such as GOALS and the Personal Values Questionnaire) in order to create a new motive scale on their basis. In so doing, however, the UMS combines motivational self-descriptions, the importance of goals and value judgments. New items are added to the already existing measures. These items represent a fear component of motivation, which is the fear of losing control and prestige in the case of the power motive. Such conceptual differences as well as the concrete research question at hand need to be considered for the choice of an appropriate instrument for measuring the explicit power motive.

8.4 Behavioural Correlates of the Power Motive

The ultimate purpose of motivational psychology is the prediction of human behaviour. How does the power motive express itself in behaviour? In fact, there are many different ways in which this can happen.

An area that has received particular attention in studies on the power motive is assertiveness. Teachers tend to rate students with a strong power motive as particularly committed to persuade others of their point of view during class discussions (Veroff, 1957). On the negative side, individuals with a strong power motive can be perceived as controlling in group settings (Kolb & Boyatzis, 1970). They are more successful in situations requiring negotiations (e.g. McClelland, 1987; Schnackers & Kleinbeck, 1975), for instance, by asking for higher wages in fictional scenarios (Trapp & Kehr, 2016). Schnackers and Kleinbeck (1975) did not only investigate how successful individuals with a strong power motive are in negotiations but also which strategies they tend to use. In their study they asked three participants to play a particular game of dice in which they should try to score as many points as possible. Individual players could maximise their total score in two ways: by using so-called power cards that showed numbers with which the numbers on the die were multiplied and by making and breaking coalitions with their opponents. Players with a strong power motive scored indeed higher than their counterparts with a weak power motive. Interestingly, they did so by being much more willing to use strategies that offered selfish benefits, e.g. breaking a coalition with one opponent if a better offer was made by the other. Similar behaviour was found in prisoners' dilemma studies in which two players need to decide covertly whether they wish to cooperate with their opponent or not. Individuals with a strong power motive tend to begin the game with a non-cooperative or confrontational strategy (Terhune, 1968).

Moreover, individuals with a strong power motive have a tendency to more frequently seek out situations in which power plays an important role. This difference can in fact be seen at the brain physiological level: Compared to people with a weak power motive, they show stronger reactions to words with a mild connection to the power motive. This advantage in processing, however, disappears when the intensity of the power motive gets bigger (Davidson, Saron, & McClelland, 1980; see McClelland, 1987). With regard to social stimuli, individuals with a strong power motive turn away from faces expressing anger and thus signalising dominance; but they turn to faces that look surprised and thus suggest that they might be easily influenced (Schultheiss & Hale, 2007). Furthermore, they are more sensitive to low-intensity expressions of anger compared to their weak power motive counterparts. This means that individuals with a strong power motive are better at recognising subtle indications of anger in the faces of others. Similar to the results reported by Davidson et al. (1980), however, this advantage once again disappears when the emotional intensity gets too high (Wang, Liu, & Yan, 2014). Accordingly, individuals with a strong power motive excel at perceiving and processing stimuli pertaining to the power motive. Because such stimuli are often of a social nature, the power motive is apparently associated with a certain level of social intelligence. This is reflected in the ability to faster recognise changes in the emotional expressions of others (Donhauser, Rösch, & Schultheiss, 2015).

The sensitivity to power is not only evident with regard to present stimuli but also in the finding that the power motive is a prominent facet of how events are remembered: The stronger the power motive, the more commonly it appears as a central topic when recalling beautiful and fulfilling life events (McAdams, 1982; see also Woike & Polo, 2001). Furthermore, the power motive is associated with the degree of reported anger in unpleasant memories. The reason might be the facilitation of assertive behaviour in order to gain control over the aversive situation (McAdams, 1982). This relationship between the degree of the power motive and memory content reflecting the motive was also shown in a study in which students were asked to describe ten interactions with their friends: The stronger the power motive, the more frequently students reported situations in which they controlled or tried to control the interaction, for instance, by persuading their friends to do something or making plans (McAdams, Healy, & Krause, 1984). Overall, particular attention seems to be given to past situations in which the power motive was relevant.

Additionally, individuals with a strong power motive tend to attribute more importance to the social visibility of strength and feeling stronger than others. They impress others with prestigious possessions and status symbols (Winter, 1973) as well as their readiness to take risks, e.g. by placing high bets in luck-based games (McClelland & Watson, 1973). They tend to boast, surround themselves with others of lower status and those who are less assertive, and have a proclivity for gambling and competitions (Winter, 1973). Men with a strong power motive also drink a lot of alcohol (McClelland, Davis, Kalin, & Wanner, 1972). They read magazines such as "Playboy" and state to have become sexually active at a relatively young age (Winter, 1973). Moreover, the power motive was associated with sociosexuality (i.e. the frequency of sexual intercourse and fantasies as well as a liberal attitude towards sex without attachment) in men from Cameroon, China, Costa Rica and Germany (Hofer, Busch, Bond, Campos, Li, & Law, 2010). Unsurprisingly, the strength of the power motive is correlated with the frequency of sexual intercourse (McClelland, 1975; Schultheiss et al., 2003b). Female and male individuals with a strong power motive state the concern of feeling bored in a relationship (Stewart & Rubin, 1974), and in men there is even a connection with the tendency for aggressive behaviour towards a partner (e.g. Zurbriggen, 2000).

8.4.1 The Taming of the Power Motive

Overall, these findings do not paint a likeable picture of people with a strong power motive. They seem to be relentlessly searching for opportuni-

ties to extend their influence without much care for the interests of others. This negative impression is due to the fact that our discussion so far has only looked at behavioural correlates of the personalised power motive (see Sect. 8.1). The findings reported in the previous section in particular are prototypical for the personalised power motive that is primarily concerned with creating a feeling of strength and superiority. Thus, it only focuses on the emotional state of those exercising power.

However, as Schultheiss (2008) stated, the exclusive reliance on enforcing one's interests by means of pure dominance cannot be a successful strategy in the long run. As shown above, even children develop from a stage of purely directive behaviour to a combination of directive and socially acceptable strategies in order to acquire resources (Hawley, 1999). Moreover, we have already seen that individuals with a strong power motive can use their need for influence in ways that are beneficial to others (Hofer et al., 2008; McAdams, 1985; McClelland, 1975). This is what McClelland (1970) meant when he wrote about socialised power. The power-oriented professions chosen by people with a strong power motive frequently focus on helping and teaching others (Jenkins, 1994; Winter, 1973). Finally, US presidents whose inauguration speeches were characterised by a strong power motive are generally perceived as particularly successful (Winter, 2005).

Put together, the behavioural correlates of the power motive draw the same picture presented at the beginning of this chapter: Power has two faces – a personalised and a socialised one (McClelland, 1970) – and it needs to be tamed to become socially acceptable (Winter, 2006). This begs an important question about behaviour that is activated by the power motive: How can its motivational foundation be changed from the personalised form of power, which is impulsive and untamed, into the socialised form, which is more agreeable and socially acceptable? In general, studies (Hofer, Busch, & Schneider, 2015; Winter et al., 1998) suggest that the relationship between implicit motives and behaviour or experience is mediated by other personality traits such as the Big Five; for instance, in contrast to high introversion, the power motive is associated with the subjective importance of social relations in the professional context, which includes the possibility to influence others, in the case of high extraversion (Winter et al., 1998). Unsurprisingly, other personality variables have been hypothesised to have an influence on whether the power motive takes on its personalised or socialised form when translated into behaviour (an overview can be found in Winter, 2006). Most empirical evidence has been reported for activity inhibition and the affiliation motive (see Chap. 7), some of which will be introduced here. In summary, the results have shown that the power motive can be expressed in different forms of behaviour when combined with other personality and motivational variables.

8.4.1.1 Activity Inhibition

Activity inhibition is the tendency to act in a reserved or restrained manner and suppress spontaneous motivational impulses (McClelland, 1975; McClelland et al., 1972). Just like the strength of motives, an individual's strength of this trait is measured with the PSE. Concretely, it is coded as how frequently participants use the word "not" in their stories, thus negating actions, thoughts and feelings (McClelland et al., 1972). Depending on how strong activity inhibition is in an individual, the power motive can result in different behaviour. If activity inhibition is able to tame the power motive, many types of problematic behaviour mentioned above, such as drinking a lot of alcohol, tend to be absent (McClelland et al., 1972). For instance, men with a strong power motive and simultaneous high level of activity inhibition tend to assume more offices in clubs (McClelland et al., 1972). The same effect was found for men and women in a longitudinal study over 10 years but only if the participants already had children (Winter, McClelland, & Stewart, 1982). Furthermore, individuals showing this pattern tend to be perceived as more persuasive: In a study by Schultheiss and Brunstein (2002), participants were asked to present their position on the ethical justifiability of animal experiments in a talk held for a person with an (allegedly) different point of view. Neutral

observers who analysed videos of the talks rated those given by individuals with a strong power motive and activity inhibition as more persuasive than those given by participants with different combinations of the two traits. What participants said was less relevant to this evaluation than the fluency of their presentation, their gestures and their facial expressions (in particular raising one's eyebrows).

Moreover, simultaneously high levels of the power motive and inhibition seem to be important at work. Individuals with the aforementioned pattern of both traits showed particularly high involvement at their workplace 10 years after their motives were measured (McClelland & Franz, 1992). Studies investigating managers' success at work yielded similar results. This relationship was discovered with regard to the so-called leadership motive syndrome, which is characterised by a strong power motive and activity inhibition as well as simultaneous weak affiliation motive. This combination of traits was associated with managers' success at work 8 and 16 years after entering their company (McClelland & Boyatzis, 1982). Managers with the leadership motive syndrome are not only portrayed in a fairly positive light with regard to their success at work, but they have also been characterised by a strong team spirit, conscientiousness and sense of justice (McClelland, 1975). Moreover, employees working under such managers stated a strong "we" feeling at work (McClelland & Burnham, 1976) and conformed less (McClelland, 1975). These findings, however, only apply to managers without technical obligations whose job was primarily to interact with others rather than solve technical problems. More recent studies question furthermore whether a weaker affiliation motive is truly necessary for the leadership motive syndrome. This assumption might merely be a methodological artefact of earlier studies; in fact, a stronger affiliation motive might be beneficial (Steinmann, Dörr, Schultheiss, & Maier, 2015).

8.4.1.2 Affiliation Motivation

From early on researchers assumed that a strong need for social relations might have an attenuating effect on the power motive (McClelland, 1975). McClelland's approach was to code several written historical documents as well as children's books and schoolbooks from various countries for their inclusion of the affiliation and power motives. His rationale was that the different texts could be seen as motivational representations of the conditions present at their respective times in history. Remarkably, the analysis of US documents painted a very clear picture. Throughout American history violent conflicts are preceded by times characterised by a strong power motive alongside a weak affiliation motive (McClelland, 1975). An interpretation of these results is that growing up with texts that address the power motive more frequently than the affiliation motive increases the risk of children to become violent adults. Similarly, Winter's (1993) analysis of documents penned by heads of states during various international crises showed that the same motive combination was associated with outbreaks of war. By making it easier to make concessions to opponents, a strong affiliation motive works against the power motive in times of crisis. This is not only true in analyses of political documents. Langner and Winter (2001) found the same relationship in a laboratory setting in which students were asked to write responses to real documents from the time of the Cuban Missile Crisis.

However, under certain circumstances, the affiliation motive can also be directed in ways that might justify violent behaviour. According to McClelland's (1975) text analysis, a strong affiliation motive should attenuate the destructive force of a strong power motive. Documents from the time of the Crusades, however, were characterised by simultaneously strong expressions for both motives. In an analogous manner, written documents by terrorist groups are also characterised by strong power and affiliation motives even though the latter is limited to their own in-group (Smith, 2008).

Overall, however, a strong affiliation motive tends to move the power motive from its personalised to its socialised form. Accordingly, individuals with a strong need for social relations do not exploit their assigned power (Rios et al., 2015), are more willing to help others (Chen et al., 2001), treat partners in simulated negotia-

tions more fairly (Blader & Chen, 2012) and are less demanding in fictional wage negotiations (Trapp & Kehr, 2016).

8.4.2 Power and Well-Being

Well-being is a crucial criterion for ensuring that psychological properties and behaviours can function properly. But does power make people happy? Different authors have come to different conclusions. Proponents of self-determination theory identify the pursuit of power as related to extrinsic motivation and thus do not see power as beneficial to an individual's well-being (e.g. Ryan, Huta, & Deci, 2008). Here, well-being is defined in a fairly specific way, namely, by whether or not certain needs can be satisfied. If, however, well-being is defined as a high level of positive affect, a low level of negative affect and a high degree of life satisfaction in self-reports, we might end up at a different conclusion.

Without a doubt the power motive can reduce well-being, for instance, if the realisation of the motive is frustrated (see findings on power stress by Fodor et al., 2006; or Fodor & Wick, 2009) or if it results from a feeling of powerlessness (Veroff, 1982). If the motive is frustrated for an extended amount of time, the frustration can even have a harmful effect on an individual's health, which has been shown in various studies (see the overview by Jemmott, 1987), including a sample of convicts (McClelland, Alexander, & Marks, 1982). The negative relationship between a frustrated motive and well-being is, however, not limited to the power motive, but can in fact be found for other motives as well.

On the other hand, many findings suggest that wielding power is associated with optimism (Anderson & Galinsky, 2006), positive affect and life satisfaction (see overview in Keltner et al., 2003). For instance, participants who are put in a position of power by chance report more positive emotions than their subordinates (Berdahl & Martorana, 2006). Power facilitates behaviour that is in accordance with an individual's dispositions, which might be one possible explanation for the relationship between power and well-being (Keltner et al., 2003). Accordingly, people whose actions are based on power experience themselves in a more authentic way (Kifer, Heller, Perunovic, & Galinsky, 2013). The implicit power motive can also have an impact on well-being. People tend to experience the pursuit of power goals as particularly pleasant if their implicit power motive is strong (Hofer, Busch, Bond, Li, & Law, 2010; cf. Kazén & Kuhl, 2011), i.e. when their explicit and implicit power motives match. It is therefore up to the implicit motive to decide whether pursuing certain goals increases a person's well-being (see info box). This effect is known as power congruence and has been documented in several studies (see Chap. 9).

Study

Motive Congruence in the Case of the Power Motive

Hofer, Busch, Bond, Li and Law (2010) documented motive congruence in the case of the power motive using a fairly elaborate design that allowed them to answer several research questions. For determining motive congruence, i.e., whether the strengths of the implicit and explicit power motives matched, they did not only use the PSE, but also two methods for measuring explicit motives: power goals (GOALS questionnaire) and values (Schwartz Value Survey). As has been discussed earlier, values and goals differ from each other with regard to their degree of abstraction and thus in how they affect behaviour. Values form the backbone of behaviour that determines which concrete goals people choose; and these goals then become evident in observable behaviour (Jolibert & Baumgartner, 1997). The first research question thus concentrated on the differentiation between power values and power goals. Concretely, the authors hypothesised that motive congru-

ence effects can be found for goals, but not for values.

The second question addressed how broadly the expected effects can be generalised. In order to avoid a potential Western cultural bias (Henrich, Heine, & Norenzayan, 2010), the study used participants from Germany as well as Hong Kong and China. Even though Hong Kong is part of China today, two different cultures were assumed by the authors due to their historical separation, making it more acceptable for individuals from Hong Kong to pursue autonomy. Put simply, Germany thus represented an individualistic culture, China a collective culture and Hong Kong a mixed form (Hofstede, 2001). If the relationship between motive congruence and well-being was an exclusively Western cultural phenomenon, it should not be found in the other two samples.

The results confirmed the expectations: An effect of motive congruence between the implicit power motive and power goals was found for subjective life satisfaction and positive affect in participants' self-reports. This was not true for power values. The results were comparable across the three samples. The findings for positive affect in the whole sample of all three cultures are illustrated in Fig. 8.5.

These results highlight that values and goals are distinct representations of the explicit power motive that do not necessarily match. Moreover, they demonstrate that the pursuit of goals benefits well-being particularly if the respective goal matches the implicit motive system. Thus, if its pursuit supports the implicit power motive, achieving the goal substantially increases well-being. The fact that this effect can be shown across three different cultural groups suggests that the notion of motive congruence can be generalised quite broadly. Regardless of cultural context, implicit motives seem to function as a weighing influence of the emotional gains associated with goal achievement.

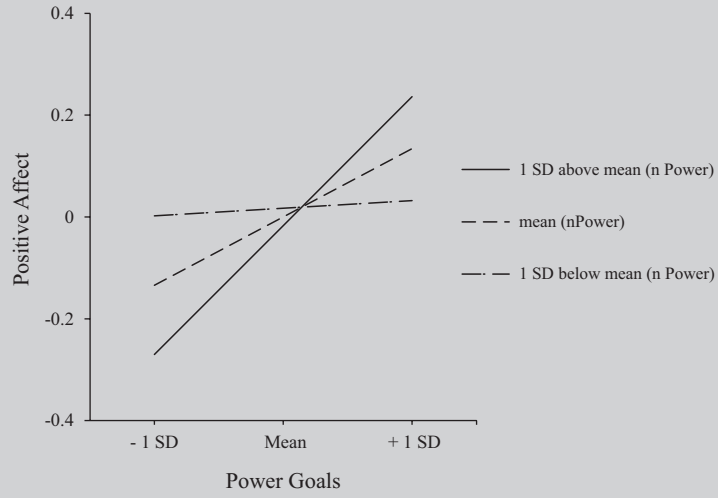

Fig. 8.5 Motive congruence in the case of the power motive: the relationship between positive affect and the strength of the implicit power motive as well as the importance of explicit power goals (Fig. 2 in Hofer, Busch, Bond, Li, & Law, 2010)

The power motive does not only affect general well-being but also satisfaction in specific areas. The power motive influences, for instance, job satisfaction (Jenkins, 1994) – including powerful jobs such as the US presidency (Winter, 2005) – and relationship satisfaction if relationships let people experience a feeling of strength (Job, Bernecker, & Dweck, 2012).

8.5 Conclusion

The power motive is defined as an individual's inclination towards experiencing positive affect in reaction to exerting influence over the thoughts, feelings and behaviours of others. In contrast, being influenced by others or facing resistance is experienced as aversive. The implicit power motive is measured with projective instruments because it cannot be accessed consciously.

From the perspective of social sciences, power is an important dimension because it supports the formation of social structures and the regulation of communities. For individuals, power has many evolutionary advantages because it enables them to gain and secure resources and enhances their reproductive success as has been shown in studies with non-human primates. This is further supported by the systematic relationship between the power motive and the sex hormones testosterone and oestradiol.

Interindividual differences in dominance can already be found in human children. However, children have to combine different behavioural strategies for acquiring resources in order to be socially successful in the long run. Essentially, the power motive has two distinct faces that lead to dramatically different behaviour: Personalised power supports the inconsiderate pursuit of personal interests, whereas socialised power has an explicitly social focus. The ambivalence of the power motive creates a fascinating, albeit complicated, field of inquiry.

Although there are assumptions and empirical evidence for the circumstances under which the power motive is expressed in its socialised form, past research has sadly neglected the developmental psychological perspective. Future research should address this question because adjustments during childhood might be able to set the course for a preference for socialised power later in life. Available evidence does in fact suggest that the power motive is developed in early childhood when individual differences in the strength of the motive are shaped. However, it is not yet clear how children express the motive in their behaviour and how adults can influence relevant behaviour. The understanding of how to tame the power motive has many real-life implications. How can conflicts be solved in amicable ways? How can leaders motivate their employees without succumbing to the temptation of abusing their efforts for their own interests?

Such questions illustrate the inherent conflict of the power motive: on the one hand, the personalised power motive as the destructive abuse of power for personal gains and, on the other hand, the socialised power motive as the productive use of power for benefitting the cumulated interest of a group. Over the course of the last few decades, research has made many contributions to a better understanding of both sides of the power motive as rooted in the common motivation to exert influence over others. The results collected in this chapter can hopefully provide a solid foundation for putting our knowledge about the beneficial and the destructive sides of the power motive to use.

Review Questions

1. *Under which conditions does power stress occur?*

   Overall, three conditions need to be met for power stress to occur. First, the power motive must be activated by a situation promising an opportunity to exert influence. Second, the power motive must be frustrated, e.g. because interaction partners resist influence or act in a dominant way themselves. Lastly, the power motive of the individual in question needs to be high in order to experience power stress in reaction to the situation. Individuals with a weak power motive do not feel power stress.

2. *What can we learn about dominance from observing non-human primates?*

   Dominance can be seen as a relatively stable personality trait in non-human primates as well. From an evolutionary perspective, this makes sense because dominance facilitates the access and protection of resources. Indeed, there is a relationship between dominance and evolutionary success in non-human primates, e.g. the high rate of survival of the offspring of dominant female gorillas. However, because resources are also essential to human survival, it seems likely that the pursuit of dominance has also developed as a motive in human evolution.

3. *What is the relationship between the power motive and the sex hormone testosterone in men?*

   Although there is some evidence suggesting a relationship between the power motive and baseline testosterone in men, considering situational contexts such as competitions provides much more information. Depending on the outcome of a competition, there are two potential mechanisms influencing the release of testosterone. Arousal prior to a competition (i.e. a situation promising a feeling of dominance) engenders the release of epinephrine/norepinephrine, which in turn stimulates the release of testosterone. If, however, an individual is defeated in a competition, cortisol is released and inhibits the release of testosterone. Both mechanisms are influenced by the strength of the implicit power motive, which means that the stimulation or inhibition of testosterone is stronger in men with a strong power motive than in their counterparts with a weak power motive.

4. *What can we say about the development of the implicit power motive based on empirical research so far?*

   The strength of the implicit power motive in adults at the age of 30 was associated with specific parenting behaviour that their mothers had reported in an interview 25 years earlier. In particular, a positive relationship was found for aggressive behaviour and behaviour with sexual connotations, i.e. the more tolerant mothers reacted to such behaviour in their children, the stronger was their power motive later in life. This finding contradicts the historically prominent deficit hypothesis of power motive development. Differences across children in the frequency of such behaviour pertaining to the power motive that might be influenced by how parents socialise their children are to a certain extent potentially caused by differences in testosterone concentration in utero.

5. *What are the "two faces of power"?*

   The power motive can lead to two distinct types of behaviour. On the one hand, personalised power leads to behaviour focusing on the inconsiderate experience of personal strength and superiority. On the other hand, socialised power focuses on benefitting the interests of a larger group. There are several personality traits that can direct behaviour motivated by power towards its personalised or its socially agreeable form. For instance, the relationship between the power motive and inconsiderate behaviour is particularly strong if the affiliation motive or activity inhibition is weak in a person.

6. *What is the relationship between power and well-being?*

   Power is associated with higher levels of positive affect and subjective life satisfaction. One explanation for this relationship is that power shapes behaviour and individuals experience their own behaviour as more authentic. Moreover, there is an effect of power congruence for the power motive, i.e. the pursuit of power goals is experienced as particularly satisfying if the

implicit power motive is also strong. A long-term frustration of the power motive is detrimental to well-being and can even negatively affect a person's health.

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Implicit and Explicit Motives

9

Joachim C. Brunstein

9.1 Theoretical Concepts and Background

From its beginnings, research into the motives behind people's efforts to be competent (the achievement motive), have an impact on others (the power motive), establish and maintain social contact with others (the affiliation motive), and become involved in affectionate relationships (intimacy motive) has been bound up with the question of which methods are best suited to assessing individual differences in underlying motives (cf. Schmalt & Sokolowski, 2000). As described in Chap. 6 of this volume, McClelland, Atkinson, Clark, and Lowell (1953) developed a version of the thematic apperception test (TAT) to measure the strength of the achievement motive. McClelland and colleagues considered the achievement motive to be an affectively charged need that is activated by challenging tasks and satisfied by the continual improvement of the skills involved and the outcomes achieved. The TAT was devised to allow the achievement motive to be assessed without the influence of:

- Response bias tendencies (e.g., social desirability bias)
- Cognitive abilities (e.g., the respondent's actual aptitude)
- Situational influences (e.g., external incentives)

McClelland (1958) doubted that methods of direct assessment, measures of achievement, or observations of behavior would permit conclusions to be drawn about the strength of the achievement motive. Instead, he worked on the assumption that the achievement motive can only be measured indirectly by tapping into the stream of thoughts and fantasies that people produce in response to motive-arousing picture cues. Soon afterward, Heckhausen (1963) presented a comparable but more differentiated TAT measure of the achievement motive that distinguished between "hope for success" and "fear of failure" (Chap. 6).

Definition

According to McClelland (1980, 1985b), a motive that has been activated by environmental stimuli fulfills three functions: it energizes, directs, and selects behavior instrumental for satisfying that motive.

In keeping with this definition, research has shown that the personality variable "need for

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achievement" as measured by the TAT method predicts criteria of effort expenditure, learning, and attention in achievement situations (Chap. 6). TAT-type procedures were soon developed to assess other motives, such as the needs for power, affiliation, and intimacy, based on the same principles (for an overview, see Smith, 1992).

Despite the initial success of the TAT approach in explaining both individual (McClelland et al., 1953) and collective achievement behavior (McClelland, 1961), other authors soon began using questionnaires to tap the achievement motive, among others.

In most cases they used Murray's (1938) classification and definition of "psychogenic" needs as their starting point. The best-known example of an instrument constructed in this manner is the *Personality Research Form* (PRF) by Jackson (1974). This questionnaire contains scales designed to tap people's strivings for achievement, dominance, and affiliation, among others. Researchers working on specific scales to capture the achievement motive soon returned to the findings of studies that had used the TAT. Mehrabian (1969) developed a particularly widely administered questionnaire ("Mehrabian Achievement Risk Taking Scale," MARPS) drawing on Atkinson's risk-taking model (1957). Other authors have based their questionnaires on Festinger's (1954) theory of social comparison processes:

- The theory of social comparison processes states that people have a need to assess their abilities by comparing them with the abilities of others.

The "Achievement Motives Scale" (AMS) constructed by Gjesme and Nygard (1970) includes a number of items relating to precisely this need.

From the outset, proponents of the TAT method took a skeptical view of questionnaire methods being used to measure individual differences in the strength of motives. Atkinson (1981), McClelland (1980), and Nicholls (1984) criticized the fact that the validation of achievement-motive questionnaires was actually limited to testing the extent to which self-reported achievement behavior (e.g., "I prefer difficult tasks to easy ones") corresponds with the behavior actually displayed in achievement situations (e.g., task choice and goal-setting). Although this approach provides data on the criterion validity of questionnaires, it tells us little about the explanatory power of theories of achievement motivation. These theories are supposed to explain why some people prefer challenging tasks, while others prefer easy ones. Yet the common practice of basing the statements to be rated in questionnaire measures on behavioral characteristics typical of achievement-motivated individuals, and then validating the questionnaires on the basis of the self-same behavioral characteristics in real-life achievement situations, provides little insight as to how the achievement-motive operates.

Questions about the reliability and validity of different methods of measuring motives have sparked lively debates (Entwisle, 1972; McClelland, 1980). These debates have overlooked the fact that TAT and questionnaire measures of nominally identical motives share hardly any common variance. Since the early 1950s, evidence has been growing that the motives captured by TAT and questionnaire measures (a) predict different kinds of behavior, (b) are activated by different situational characteristics, and (c) are associated with different factors in development and socialization. McClelland, Koestner, and Weinberger (1989; see also Weinberger & McClelland, 1990) were the first who integrated all of these findings into a coherent theoretical framework that assumes the coexistence of two different types of motives:

- Implicit motives: These are inaccessible to introspection, meaning that they can only be measured indirectly (e.g., by interpreting stories produced spontaneously in response to the motive-arousing picture cues that are based on the TAT).
- Explicit (or "self-attributed") motives: These reflect the individual's self-image, as assessed by means of self-report measures (questionnaires).

In the same vein, Stern (1935) had argued that motivation research should distinguish between

"phenomotives," which can be deduced from the surface characteristics of observable behavior, and "genomotives," which determine behavior without the awareness of the acting individual. Whereas phenomotives essentially just describe behavior, genomotives serve to explain what people do.

In the following sections, I will report research providing empirical support for the distinction that McClelland et al. (1989) made between implicit and explicit motives. Furthermore, I will consider differences in the needs underlying implicit and explicit motives. Even if we assume that the two types of motives are largely independent of each other, this does not rule out the possibility that they can have a combined impact on behavior and experience. Accordingly, I will discuss the interplay between the two types of motives – be it in the form of coalitions into which implicit and explicit motives enter or be it in the form of conflicts arising from contradictory motivational tendencies.

Summary

The line of thought that prompted David McClelland to distinguish "implicit" from "explicit" motives runs as follows: Implicit motives stem from affectively charged preferences for certain kinds of incentives (e.g., in the case of the achievement motive, task difficulty) that are learned early in life. Because these preferences develop from early, prelinguistic experiences, they are not represented in the medium of language and cannot be tapped by self-report methods. Neither the activation of an implicit motive nor its translation into instrumental behavior necessitates conscious acts of self-reflection or behavioral control. Explicit motives, in contrast, reflect the self-images, values, and goals that people attribute to themselves and with which they identify. They document people's conscious conceptions of the motives underlying their own behavior. Often, self-attributed motives do not correspond with the motives that drive people's action. In the following sections, I will present empirical evidence that supports these assumptions by showing that the two types of motives can be distinguished from each other in terms of their discriminant validity (i.e., they are empirically independent) and prognostic specificity (i.e., they predict different classes of behavior).

9.2 Evidence for the Independence of Implicit and Explicit Motives

9.2.1 Low Convergence Between Direct and Indirect Measures of Motivation

According to the traditional view on personality assessment, two tests that are supposed to measure the same construct (e.g., a specific motive) must correlate sufficiently with each other, even if their methods differ (Cronbach, 1990). In the TAT method, respondents are presented with ambiguous pictures, and an open-ended response format is used to record their reactions to these pictures (i.e., there are no structured responses; respondents generate stories of their own). In questionnaires, on the other hand, respondents react to structured statements, rating each in terms of how strongly it applies to them. Despite these differences, the scores yielded by the two instruments are expected to correlate substantially if they indeed capture the same motive:

- This criterion, known as convergent validity, is not met when motives are assessed using TAT and questionnaire measures. Rather, findings indicate that TAT-assessed and questionnaire-based measures of motives have discriminant validity, i.e., that they measure different constructs, even when both measurements pertain to the same theme (e.g., achievement, power, or affiliation).

DeCharms, Morrison, Reitman, and McClelland (1955) were among the first authors to report that marked discrepancies often emerge between implicit (TAT) and explicit (questionnaire) motives. They used TAT measure and self-descriptions (e.g., "I set myself challenging

goals") to assess respondents' striving for achievement. None of the self-ratings correlated significantly with the TAT measure of achievement motivation (nAchievement). This was no isolated finding. In an early meta-analysis, Spangler (1992) computed a mean inter-test correlation of just $r = 0.088$ for 36 same-sample comparisons of TAT and questionnaire measures of achievement motivation. Thus, someone classified as being high in achievement motivation on the basis of his or her TAT responses might describe him- or herself as being either high or low in achievement orientation on a questionnaire measure.

Similar results have been reported for other motives. Schultheiss and Brunstein (2001) obtained TAT scores for the achievement, power, and affiliation motives from two student samples and correlated these with the participants' scores on the nominally similar scales of the "Personality Research Form" (Table 9.1). The correlations between the TAT and the PRF scores were 0.06 (achievement), 0.04 (power), and 0.13 (affiliation). Schultheiss and Brunstein also administered the German version of the NEO Five-Factor Inventory (Borkenau & Ostendorf, 1993) to one group of participants. When motives were measured with the TAT, none of the 15 trait-motive correlations (5 traits × 3 motives) turned out to be significant. The correlation between extraversion and the affiliation motive was. 0.05, between conscientiousness and the achievement motive 0.00, and between agreeableness and the power motive 0.06. In contrast, when motives were measured using questionnaire methods, substantial correlations with the scales tapping fundamental personality traits were observed (e.g., power and affiliation correlated with extraversion; cf. Costa & McCrae, 1988).

The methodological variance of the two procedures, i.e., the differences in stimulus material and response formats, might explain why TAT motives share practically no common variance with their nominally similar counterparts in questionnaire measures. However, more recent studies show that the motives measured by TAT procedures are not substantially related to self-reported personal life goals either. Personal goals are assessed using open-ended formats rather than structured questionnaires, with respondents being instructed to describe in their own words their current intentions, projects, and concerns (Brunstein & Maier, 1996). Similar to TAT picture stories, this written material is then coded in terms of dominant themes. In four studies published in the 1990s, motives (TAT) and goals (free self-reports) relating to the same theme were compared directly (e.g., the TAT-measured achievement motive was compared with self-reports of achievement goals). The relationships discerned between motives and goals in the same domain were moderate (Emmons & McAdams, 1991) to nonexistent (Brunstein et al., 1995; Brunstein, Schultheiss, & Grassmann, 1998; King, 1995). This means that, although some people's explicit goals correspond thematically with their implicit motives, many others pursue goals that are not congruent with their motives as

Table 9.1 Test correlations between TAT motives and questionnaires tapping motivational self-descriptions (*PRF*; $N = 195$) and personality traits (*NEO*; $N = 111$) in two student samples

TAT			
	Power motive	Achievement motive	Affiliation motive
PRF: dominance	0.04	−0.00	−0.05
PRF: achievement	−0.02	0.06	0.01
PRF: affiliation	−0.06	0.15	0.13
NEO: extraversion	−0.01	0.00	0.05
NEO: neuroticism	0.05	−0.11	0.10
NEO: openness	0.04	0.00	−0.18
NEO: conscientiousness	−0.05	−0.00	0.13
NEO: agreeableness	0.06	−0.01	0.12

Based on Schultheiss and Brunstein, (2001), p. 80
NEO five-factor inventory, *PRF* Personality Research Form

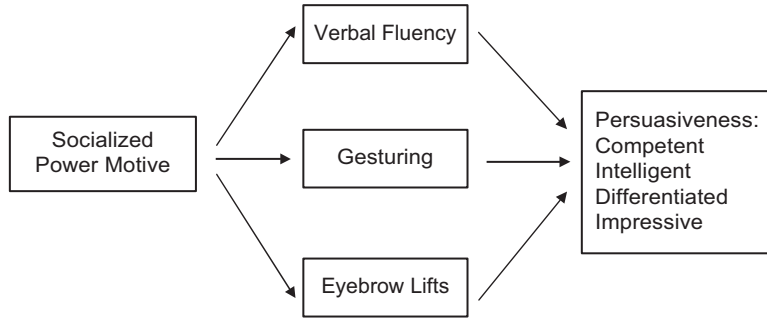

Fig. 9.1 Predicting persuasiveness: the effect of (a socially acceptable variant of) the power motive on external ratings of persuasiveness is mediated by paralinguistic and nonverbal behavior (Diagrammatic representation of the findings of Schultheiss & Brunstein, 2002)

measured by the TAT. More recently, Rawolle, Schultheiss, and Schultheiss (2013) confirmed these findings in three further samples (two from the United States and one from Germany). The extent to which participants aspired toward goals that were thematically linked to achievement, power, and affiliation was completely unrelated to the strength of their same-named TAT motives. In one case (power), there was even a negative correlation with the TAT measure. When motives were "explicitly" assessed with questionnaires, however, their strength corresponded with the pursuit of thematically related goals.

When correlations are calculated in single studies, there are at least three caveats that need to be kept in mind with regard to their interpretation: (a) the specificity of the respective sample, (b) the specific features of the testing and evaluation methods chosen, and (c) the limited number of participants. In a meta-analytic review including 56 samples with more than 6,000 participants, Köllner and Schultheiss (2014) investigated all available evidences of the (missing) convergence of direct (self-report) and indirect (TAT) measures of motivation. The correlations between implicit and explicit measures for thematically related motives were 0.116 (affiliation), 0.139 (achievement), and 0.038 (power). Even though slightly positive correlations were found for affiliation and achievement, direct and indirect measurements did not share more than 2% of variance for any of the three thematic domains.

In the studies reported thus far, all data were derived from a common source, namely, the respondent under investigation. Taking a rather different approach, Schultheiss and Brunstein (2002) explored how well external raters are able to infer an implicit motive, such as the power motive, by observing the behavior of another person. The participants in this experiment were given the task of presenting their position on animal experiments as persuasively as possible to a person sitting opposite them. According to the ratings of external observers, who were shown video recordings of the participants' arguments, participants high in the power motive (more specifically, a variant of the power motive associated with socially acceptable behavior) performed this task much more convincingly than participants low in the power motive (Fig. 9.1). However, power-motivated participants were not judged to be more dominant, more assertive, or less agreeable than their counterparts. Rather, they were ascribed attributes such as higher levels of intelligence and competence. These characteristics, however, are associated with achievement and success. The observers formed these impressions primarily on the basis of nonverbal and paralinguistic features of the participants' communicative behavior, i.e., on characteristics that do not tend to be consciously controlled by the acting individual. Participants with a strong power need were characterized by the speed of their speech and by lively gestures and facial expressions. These participants did not differ from other less power-motivated participants in the quality of their arguments, however.

These findings show that the motives driving behavior cannot simply be "read off" from observable behavior. This seems to apply to both

external observations and self- perception. Depending on the demands of the situation, social norms, and personal abilities and attitudes, one and the same motive may be expressed in a variety of different behaviors.

Veroff, Depner, Kulka, and Douvan (1980) reported that power-motivated men tend to choose achievement contexts to satisfy their need for social recognition and interpreted this finding as indicating that crude ways of exercising power (e.g., social oppression) are increasingly discredited as modern societies embrace the principles of democracy (see also Peterson & Stewart, 1993). The power motive may be expressed in socially competent and responsible behaviors, including achievement-oriented behavior, or in socially unacceptable behaviors (Winter & Barenbaum, 1985; Winter & Stewart, 1978). As Stern (1935) had already pointed out, it thus is important to distinguish the purpose of behavior (e.g., striving for personal strength and social recognition) from the outer appearance of this behavior (e.g., using communicative strategies that give the impression of competence). There is otherwise a danger that the explanations given for the observed behavior are circular. Simply suffixing the attribute "motivated" to the behavior observed may be a common approach in everyday life, but it does not serve the scientific explanation of behavior – the "explanation" is spurious.

Given the weak relationships observed between TAT and questionnaire measures of certain motives, the practice of using the same label (e.g., "the" achievement motive) for both types of measures seems a questionable one. The same term is used to describe constructs that are not or only weakly related to each other. As Kagan (1988) and Block (1995) pointed out, this lack of linguistic precision can contaminate even the level of theorizing. Yet the weak correlations observed between different instruments might equally be due to psychometric shortcomings in one of the two instruments (e.g., a lack of reliability of the TAT or response bias tendencies in questionnaire methods).

- Correlations between different tests are not a sufficient basis for conclusions to be drawn on the similarities or differences between the constructs the respective tests were designed to measure. Rather, we need to answer the question whether the instruments differ in their predictions of relevant behavioral characteristics.

9.2.2 Behavioral Correlates of Implicit and Explicit Motives

McClelland (1980) advanced the hypothesis that implicit and explicit motives influence behavior in different ways. The former are expressed in "operant" behavior and the latter in "respondent" behavior.

Definition

According to McClelland's definition, operant behavior is behavior that a person enacts spontaneously, i.e., without premeditation, and that entails recurrent preferences for particular experiences over extended periods of time (e.g., striving for career success). Respondent behavior, on the other hand, is elicited by clearly identifiable environmental stimuli, may be the subject of conscious thought and deliberation, and can be wittingly influenced by an acting person. This applies, for example, to decisions or appraisals that an individual thinks through carefully or that are imposed from outside.

The following studies illustrate McClelland's argument. Using a time-sampling method (participants were beeped several times a day via an electronic diary), Constantian (cf. McAdams & Constantian, 1983; McClelland, 1985b) surveyed the affiliative behavior of students in everyday situations and found that the implicit affiliation motive (TAT) predicted the frequency with which participants were in direct (e.g., engaged in conversation) or indirect (e.g., writing a letter) contact with others when beeped. Questionnaire measures of the same motive did not predict

behavior in the same way. Conversely, when asked directly whether they would rather undertake certain activities alone or in company, the students' stated preferences reflected in the strength of their explicit but not of their implicit affiliation motive. In other words, students who described themselves as sociable also reported that they would rather engage in the activities in question with someone else than on their own.

Studies on the achievement motive have revealed a similar pattern of results. DeCharms et al. (1955) and Biernat (1989) both found that, in contrast to self-reported achievement orientation, the TAT-assessed achievement motive predicted higher levels of effort expenditure and steeper learning gains when participants were administered tasks without being specifically instructed to do well. In both studies, task choice and personal values were predicted by questionnaire measures, but not by the TAT. Individuals who described themselves as achievers were more likely to express views on the quality of paintings that were in line with the opinions of alleged experts. Moreover, they voiced high levels of approval for people who had been successful in their lives and discredited less successful people. Given the choice of taking on a leadership role in a teamwork setting, they regularly chose to do so. In other words, the behavior of achievement-oriented individuals in situations involving decisions and evaluations was in line with their self-image and thus consistent with the expectations made of them.

In an experimental study, Brunstein and Hoyer (2002) contrasted the capacity of implicit (TAT) and explicit (self-report) achievement motives to predict effort-related and choice-dependent criteria of achievement behavior. They found that the implicit achievement motive predicted effort expenditure (i.e., performance gains on a repetitive task), whereas the explicit achievement motive predicted the continuation of an achievement-related activity (i.e., the decision to carry on working on an achievement-related task rather than to switch to a neutral task).

Study

Predicting Effort-Related and Choice-Dependent Criteria of Achievement Behavior by Indirect (TAT) and Direct (Questionnaire) Motive Measures

Brunstein and Hoyer (2002) investigated how well implicit (TAT) and explicit (questionnaires) achievement motives predict effort expenditure and task choice as criteria of achievement behavior within one and the same experimental setting. The effort criterion was intended to tap spontaneous achievement behavior, the task choice criterion to tap controlled achievement behavior. Student respondents working on a computerized mental concentration test were given continuous feedback over a number of trials on how their achievement changed relative to their previous performance (individual appraisal) as well as in social comparison (normative appraisals). Feedback was manipulated to signal either an increase or a decrease in achievement. After a scheduled number of tasks, participants were given the choice of continuing with the same kind of task or switching to a neutral activity (judging the aesthetic quality of pictures). The findings are presented in Fig. 9.2. Task performance (change in working speed on the mental concentration task) was predicted by the implicit achievement motive, but not by self-reported achievement motivation. Participants high in the achievement motive (TAT) tended to increase their working speed when informed that their performance was falling short of their previous achievement (Fig. 9.2a). Task choice, on the other hand, was predicted by self-reported achievement motivation. When achievement-oriented participants (questionnaire) were given feedback that was detrimental to their self-image (indicating a drop in

(continued)

performance relative to other participants' performances), they tended to decide to continue working on the task at hand (Fig. 9.2b). Thus, implicit and explicit achievement motives were responsive to different evaluation norms (individualized vs. normative feedback) and predicted different achievement criteria (effort expenditure vs. task choice).

These findings fit the notion that the achievement motive as measured by the TAT energizes behavior aimed at increasing one's competence, whereas the self-reported desire for achievement is influenced by social standards and comparisons and has an impact on people's conscious decisions. What both motives have in common is that they are most responsive to negative achievement trends. When feedback indicated an increase in achievement, neither of the two motives significantly predicted behavioral criteria. Where task choice is concerned, this pattern of results can be explained as follows: People with an achievement-oriented self-image generally have a positive self-concept of their abilities. A decrease in performance relative to others contradicts this view and prompts achievement-motivated individuals to obtain further information about their capacity to perform the task at hand (Trope, 1986). Positive normative feedback (indicating an improvement in performance relative to others), on the other hand, corresponds with the expectations of achievement-oriented individuals, meaning that there is no further need to sound out their ability on the task. Likewise, people with a high implicit achievement motive (TAT) respond to an alleged decrease in individual performance by mobilizing effort, illustrating that the driving force behind this motive is the need for self-improvement. Effort expenditure is triggered by a status quo considered to be unsatisfactory (decrease in one's own performance) and the prospect of being able to turn this situation around by investing more effort (increase in one's performance). When feedback is positive, there is no corresponding reason for the achievement motive (TAT) to trigger an increase in effort.

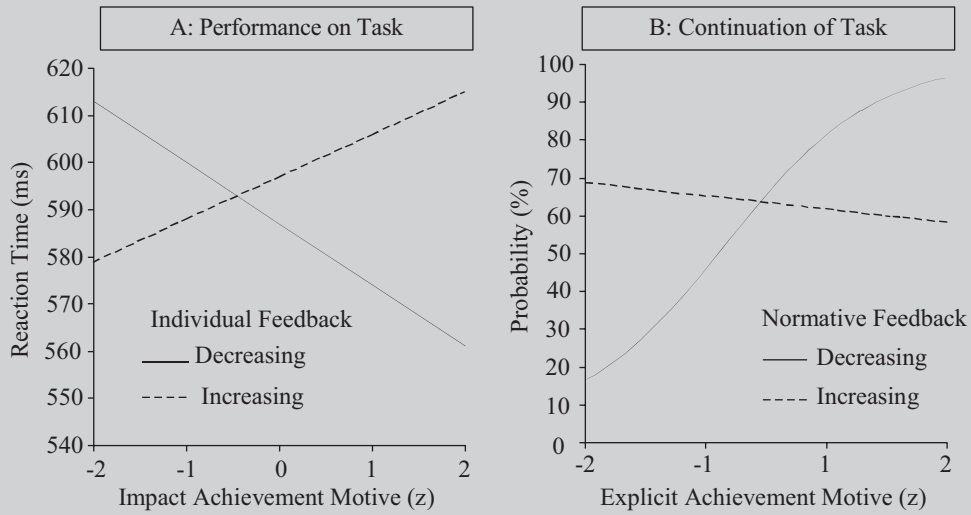

Fig. 9.2 Effort expenditure and task choice as a function of achievement motivation and feedback. (**a**) An alleged drop in individual performance (*decreasing* individual feedback) prompts participants high in the implicit achievement motive (TAT) to increase their working speed. (**b**) An alleged drop in performance relative to the social reference group (*decreasing* normative feedback) increases the likelihood of participants high in the explicit achievement motive (questionnaire) deciding to continue working on the task at hand (Based on Brunstein & Hoyer, 2002, p. 58)

In a study with sports students as participants, Wegner and Teubel (2014) found that such decoupling in the prediction of implicit and explicit achievement criteria can be observed not only in the laboratory but also in real-life contexts. Whereas the self-chosen target distance in throwing games (e.g., handball, basketball) was determined most accurately by using explicit achievement motivation, the in-game performance in a tournament-like competition depended only on the strength of implicit achievement motivation.

9.2.2.1 Findings on the Achievement Motive in Academic Settings

Studies conducted in realistic achievement situations have yielded further evidence for the validity of McClelland's (1980) distinction between operant and respondent behavior. Dahme, Jungnickel, and Rathje (1993) found that a questionnaire measure of the achievement motive (AMS) predicted whether or not young people considered entering a prestigious competition for young researchers. Yet the same questionnaire failed to predict how hard entrants in the competition actually worked on their projects. It is in precisely this domain that implicit motives show predictive power.

- A high achievement motive (TAT) predicts occupational, business, and economic success (Chap. 6) – sometimes independently (McClelland, 1961) and sometimes in combination with a high power motive (McClelland & Boyatzis, 1982). This relationship remains intact even when controlling for differences in educational level, intelligence, temperament, and socioeconomic status (McClelland & Franz, 1992).
- Explicit motives do not have comparable validity in predicting aspects of productivity, innovation, and creativity in adulthood.
- In comparison, educational outcomes tend to correlate more strongly with explicit than with implicit achievement motives. McClelland (1980) explained this finding by reasoning that there is little scope for spontaneous and self-determined work and learning to occur in school settings. Rather, tasks are assigned by teachers, and outcomes are evaluated using standardized procedures. McClelland's explanation is something of an overgeneralization in this form, however. It is, in fact, possible to activate the implicit achievement motives of individual students in the classroom setting by tailoring academic demands and achievement feedback to their specific needs (Heckhausen & Rheinberg, 1980; O'Connor, Atkinson, & Horner, 1966). For example, achievement-motivated students seem to prefer their performance to be measured against individual rather than social reference norms (Rheinberg, Duscha, & Michels, 1980). What is more, gearing task difficulty to individual abilities creates an atmosphere in which all students are able to focus on their own performance (Rheinberg & Krug, 2005).

Although the distinction between operant and respondent behavior provides some insight into the differences between implicit and explicit motives, it is still based on a drastic oversimplification, with motives being set in direct relation to specific behavioral characteristics. In actual fact, the correlations between motive measures and behavioral criteria rarely exceed the level of 0.30 (Spangler, 1992). Correlations of this kind may provide initial evidence for the specific validity of a given motive measure. Yet to establish more substantial relationships between motives and behavior, it is imperative to take the incentives present in the respective situational context into account as well.

9.2.3 Motive-Arousing Incentives

One of the fundamental principles of motivation psychology is that a motive first has to be activated by a corresponding incentive before it can unfold its influence on behavior. An incentive is defined as a situational characteristic that, based on previous learning experiences, is associated with the possibility of satisfying a motive and, as a result, experiencing a rewarding affect (feelings of pride, strength, interpersonal attachment, etc.). The following study by Andrews (1967) on the advancement of employees in two very different companies illustrates this principle.

Example

One of the companies, denoted as the Achievement company, offered its employees a broad range of achievement-related incentives, such as autonomy, variety, challenging tasks, and informative feedback. The other company, dubbed the Power company, was characterized by a hierarchical management structure. Using the TAT method, Andrews measured the achievement and power motives of employees in both companies. He then ascertained how often these employees had been promoted in the previous years. A strong achievement motive was associated with more rapid advancement in the Achievement company, but not in the Power company. The opposite was true of the power motive, with employees high in the power motive being promoted much more often in the Power company than in the Achievement company. Neither motive was a general predictor of promotion. Rather, the critical factor was whether the incentives offered at the workplace coincided with the employees' motivational preferences (for similar findings, see Jenkins (1994)). It is only when the environmental incentives – and hence the motivating potential of a situation – correspond with a person's dominant motives that these motives can be expected to have an impact on behavior (Kleinbeck, 1996).

Numerous studies indicate that implicit and self-attributed motives react to different classes of incentives. Provided that tasks are tackled in a task-oriented atmosphere, with no pressure being exerted by external agents, the implicit achievement motive triggers high levels of effort and persistence. The incentive resides solely in the difficulty, complexity, or novelty of the task at hand and the opportunity it affords to do something better, faster, or more effectively. In the presence of external incentives, such as time pressure and social evaluation, however, the prognostic power of the achievement motive as measured with the TAT decreases markedly. This has been shown in experimental studies (Entin, 1974; Horner, 1974; Miller & Worchel, 1956; Wendt, 1955) as well as in real-life achievement settings.

McKeachie (1961) reported that highly achievement-motivated (TAT) college students do particularly well in classes if their lecturers refrain from setting goals, voicing demands or expectations, or laying down rules. But precisely these kinds of additional incentives, which are not inherent in the task itself, seem to be needed to activate the explicit achievement motive. People with an achievement-oriented self-image often only really apply themselves when they are explicitly challenged to demonstrate their ability and secure social recognition in competition with others (Patten & White, 1977). Such incentives divert attention from the actual task of mastering a given challenge and direct it toward the social and personal implications of potential success or failure. For this reason, they are often termed "extrinsic" incentives and contrasted with the "intrinsic" incentives inherent in a task (Chap. 13). In contrast to individuals high in implicit achievement motivation, individuals high in self-attributed achievement motivation experience joy, fun, and interest precisely when they are able to measure their abilities in direct competition with others (Tauer & Harackiewicz, 1999).

In the above meta-analysis, Spangler (1992) undertook a thorough investigation of whether and how different types of incentives predict achievement behavior. Regarding individual characteristics, Spangler distinguished between indirect (TAT) and direct (questionnaire) measures of the achievement motive; regarding situational characteristics, between activity incentives (challenging tasks) and social incentives (e.g., social recognition as a consequence of success); and regarding behavioral characteristics, between operant criteria (e.g., life outcome variables) and respondent criteria (e.g., attitudinal measures). Spangler classified studies on

achievement motivation along these three dimensions, with the following results:

1. Neither the implicit (TAT) nor the explicit (questionnaire) achievement motive was substantially correlated with criteria of achievement behavior.
2. The implicit achievement motive predicted operant, but not respondent forms of achievement behavior. The validity of questionnaire measures was low, even when the analysis was limited to studies investigating respondent behavior.
3. This picture brightened up when the different kinds of incentives that had been used in the various studies to activate achievement-motivated behavior were taken into account. The validity of the TAT achievement motive increased from $r = 0.22$ to $r = 0.66$ when operant behavior was measured in the presence of activity incentives and without social incentives. Likewise, the validity of the achievement motive questionnaires increased when only studies involving social incentives were considered. However, the validity coefficients computed for the questionnaires could not compete with those determined for TAT measures of the achievement motive.

From these findings, Koestner, Weinberger, and McClelland (1991) concluded that only individuals high in implicit achievement motivation (TAT) are genuinely interested in mastering difficult tasks. For individuals with an achievement-oriented self-image, significant achievements have another function entirely – they serve as a means to the end of gaining the recognition of the social environment.

- The main lesson to be learned from Spangler's (1992) findings is that motivation analyses can only produce satisfactory results if different types of incentives are taken into account as well as differences in personality motives when predicting achievement behavior (see also Bornstein, 2002).

9.2.4 Differences in Child-Rearing Practices and Development

9.2.4.1 Child-Rearing Practices

McClelland et al. (1989) speculated that implicit and explicit motives have different antecedents in child-rearing and socialization. McClelland and Pilon (1983) (see also McClelland (1985b)) reported one of the few studies that has related implicit and explicit motives measured in adulthood to the way that respondents were brought up (for a detailed account of motivational development, see Chap. 15). In a longitudinal study initiated by Sears, Maccoby, and Levin (1957), a total of 379 mothers were interviewed on their child- rearing practices in 1951, when their children were 5 years old. Twenty-six years later, the social motives of the 31-year-old "children" were measured using the TAT and self- descriptions (adjective scales). McClelland and Pilon found that implicit (TAT) and explicit (self-report) motives were associated with different child-rearing practices. Because this only applied to the achievement and power motives, the following account is limited to these two motives (Table 9.2).

Adults scoring high in implicit power were, according to their mothers' reports, brought up in a permissive atmosphere, characterized by tolerance of both aggressive and sexual behavior on the child's part. Women high in the power motive had been expressly encouraged by their mothers to fight back in conflict situations. In contrast, adults who described themselves as power oriented had been punished and spanked more often as children, particularly when they showed hostility toward their parents. Adults high in the implicit need to achieve had been toilet trained very early in childhood, and their mothers had insisted on fixed mealtimes. The self-attributed achievement motive correlated with different parenting practices. Achievement-oriented adults had been expected to show independence and to succeed on difficult tasks at an early age.

These findings must be interpreted with due caution. Neither do we know what happened in

Table 9.2 Correlations of child-rearing variables (mothers' reports) with implicit (TAT) and explicit motives (self-descriptive adjective checklists) in adulthood ($N = 76–78$)

Child-rearing practices	Correlations with motive variables	
	Implicit achievement motive (TAT)	Explicit achievement motive (self-report)
Scheduled feeding	0.33[a]	0.06
Strict and early toilet training	0.41[a]	−0.10
Early and difficult tasks set for child	−0.10	0.31[a]
Permissiveness about sex and aggression	0.31[a]	0.08
Punishment of aggression toward parents	−0.17	0.32[a]
Physical punishment (spanking) by mother	−0.07	0.39[a]

Based on McClelland & Pilon, (1983), pp. 567, 570; McClelland et al., (1989), p. 699
[a]Statistically significant

the lives of the "children" between the ages of 5 and 30, nor is it possible to say with any certainty that the child-rearing practices reported by the mothers determined the development of the children's implicit and explicit motives. Despite these limitations, the findings of McClelland and Pilon (1983) are worthy of note in at least two important respects:

1. They lend support to the idea that implicit motives are acquired earlier in life than explicit motives. In the sample examined, toilet training had been completed long before parents began teaching their children to act independently and responsibly. Furthermore, verbal communication is much more relevant to the parenting practices that McClelland and Pilon (1983) found to be associated with the acquisition of explicit motives than to the practices found to correlate with the development of implicit motives. Parental demands, expectations, and even punishments tend to be communicated in words or at least accompanied by verbal messages. Neither the establishment of fixed mealtimes nor permissive child-rearing practices necessitate a similar extent of verbal communication and language comprehension.
2. The findings presented by McClelland and Pilon (1983) correspond with other observations, as well. It seems that a strong implicit power motive develops only if children are able to enjoy early experiences of efficacy unhindered – though reservations seem warranted where aggressive behavior is concerned. Other studies have shown that a strong power motive can be channeled into prosocial behavior when children are slightly older by teaching them to behave responsibly. The father is an important role model here (Winter & Stewart, 1978). In the study by McClelland and Pilon, a high self-attributed power motive was related to less pleasurable experiences in childhood, at least if the mothers' reports are to be believed. The mothers of dominant adults tended to endorse physical punishment. It is conceivable that self-images characterized by the need for superiority develop as a form of compensation, i.e., in reaction to childhood experiences of inferiority. Clearly, without further evidence this interpretation remains pure speculation.

Similar observations can be made for the implicit and explicit achievement motives. The data presented by McClelland and Pilon (1983) indicate that the control of physical needs plays a key role in the development of the implicit achievement motive. In a sense, this idea is in line with findings reported by Mischel and Gilligan (1964), who observed that achievement-motivated children are particularly good at resisting temptation and delaying gratification. Control of physical needs and the capacity to resist competing incentives are important prerequisites enabling people to apply themselves to difficult tasks and work with persistence and mental concentration over longer periods.

High explicit achievement orientation, on the other hand, is socialized in the context of verbally

controlled and culturally mediated demands, as shown by the findings of McClelland and Pilon (1983). Besides parenting, experiences in the school setting play a major role here. Students form their assessments of their own ability by engaging in social comparisons with their classmates (Koeller, 2000; Marsh, 1989; Stipek, 1996). As early as primary school age, students who describe themselves as achievers rate their mathematical and verbal abilities to be higher than those of their peers (Helmke, 1997).

9.2.4.2 Development of Two Types of Achievement Motives

Along the same lines as McClelland (1987) and Veroff (1969) suggested that children develop two different kinds of achievement motivation. First, the autonomous achievement motive develops at preschool age (or even earlier). At this stage, standards of achievement are personal, and the achievement motive is satisfied by gradual gains in mastery. Children with an autonomous achievement motive compete with themselves, aiming to build on their abilities progressively. This description is reminiscent of the concept of the implicit achievement motive introduced later, which is also held to be closely linked to efforts to improve one's self, i.e., one's knowledge and skills (see Breckler & Greenwald, 1986; Koestner & McClelland, 1990; Koestner et al., 1991). At this first stage, then, achievements are evaluated on the basis of (temporal) self-comparisons ("What can I do now that I couldn't do before?" or "What can't I do yet that I'd like to be able to do better?"). Situations characterized by this motive produce a motivational state that Nicholls (1984) termed "task involving": People are completely focused on the challenge posed by the task at hand and infer their ability from the learning gains they observe as they gradually come to master the task.

It is only later, at primary school age that a social achievement motive develops (Veroff, 1969). Standards of achievement are now social; performance is assessed with reference to normative demands and in comparison with one's peers. It is at around the same age that children recognize the concepts of difficulty, effort, and ability as factors having distinct effects on performance (Nicholls, 1978). Only then is it possible for children to draw specific conclusions about their own abilities based on their performance (Nicholls, 1984). There are strong parallels between the ensuing efforts to obtain information about one's strengths and weaknesses by systematically comparing one's abilities with those of one's peers and the concept of explicit achievement motive, as assessed by self-report methods (cf. Koestner & McClelland, 1990). Nicholls (1984) termed this form of achievement motivation "ego involving."

Definition

Ego involvement means that individuals rank their performance relative to the performance of others in order to gauge their relative position on an ability dimension. Ego involvement is intensified when it comes to demonstrating competence in socially desirable activities and gaining social recognition.

The development of a self-concept of ability based on self-other comparisons prompts a change in the character of achievement-motivated behavior. The focus is no longer on increasing one's personal competence and mastering tasks by means of effort and persistence. Rather, it is now important to seek out information about one's abilities in social comparison and to demonstrate one's command of these abilities in competition with others (Nicholls, 1989). Studies on the development of self-evaluation in children and adolescents (Butler, 1999; Stipek & Gralinski, 1996; Stipek, Recchia, & McClintic, 1992) show that the social ranking of abilities becomes the main focus of achievement behavior in the early and middle school years. The autonomous achievement motive that developed earlier in life becomes less relevant, but it does not disappear altogether. According to Veroff, the two motives can in fact be combined in an integrated system, permitting great flexibility across different situations. Butler (1999) reported that young people with this kind of fully developed self-evaluation system can gauge their abilities either

with reference to their own gains in mastery or relative to the abilities of others, just as the situation requires. In the following section, it will be reported that these two forms of self-evaluation reflect the different needs at the root of implicit and explicit motives.

Summary

The motives tapped by picture story exercises (TAT) and questionnaire measures (self-reports) do not correlate substantially, even when they relate to the same theme. This suggests that the motives captured by the TAT are either not readily accessible to introspection or that they are not easily tapped by self-report measures owing to response tendencies (e.g., social desirability bias). Another explanation would be that the TAT does not correlate with other motive measures simply because it is not sufficiently reliable. However, the finding that external observers also ascribe to the behavioral expression of a specific motive (as measured with the TAT) characteristics that are not associated with that motive (e.g., achievement-related characteristics in the case of the power motive) contradicts this view. Overall, correlational findings show that motives assessed by indirect (TAT) and direct (self-report) measures have little convergent validity, meaning that they do not tap the same construct, even though the use of identical labels would seem to indicate otherwise.

Three groups of findings provide evidence for the prognostic specificity of implicit and explicit motives:

1. The two types of motives are related to different patterns of behavior. Implicit motives predict spontaneous behavior and behavioral trends over time. Explicit motives, in contrast, have an impact on deliberate choices and conscious responses that can be intentionally attuned to a person's self-image.
2. Implicit and explicit motives are responsive to different types of incentives – implicit achievement motives are responsive to incentives inherent in an activity or task (difficulty and challenge); explicit achievement motives are responsive to evaluative or social incentives (e.g., competition for social recognition).
3. Evidence from developmental psychology suggests that the two types of motives emerge via different socialization experiences. Implicit motives develop via preverbal experiences, whereas explicit motives are acquired somewhat later, as self-concepts become represented in the medium of language. It can be assumed that implicit achievement motives involve internal standards of excellence (competing with oneself), whereas explicit achievement motives involve normative standards of excellence (competing with others). Self-comparisons occur earlier in development than social comparisons, which may explain why the implicit achievement motive is developed earlier than the explicit achievement motive. The question of whether, when, and how the two motives are combined to form an integrated system cannot yet be answered with any certainty. Depending on the demands of the situation, young people can evaluate their abilities on the basis of either self-comparisons or social comparisons.

9.3 Cognitive and Affective Needs

The findings reported thus far suggest that the motives captured by the TAT are not rooted in the same needs as the motives tapped by self-report measures. Explicit motives are closely linked to self-concepts. People who describe themselves as achievers tend to have a positive image of their intellectual capacity. In fact, the empirical relationship between questionnaires measuring the achievement motive and self-assessments of intellectual ability is so substantial that many authors consider differences in perceived ability to be the true core of the (explicit) achievement motive (Brunstein & Schmitt, 2004; Covington & Omelich, 1979; Kukla, 1972; Meyer, 1984; Nicholls, 1984; Trope, 1986). Self-concepts of ability can affect achievement-motivated behavior in a multitude of ways. They are closely related to the anticipated probability of success,

which in turn mediates their influence on personal levels of aspiration and hence task choice (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). The much cited finding that people who are confident of success tend to attribute their accomplishments to different factors than do people who are afraid of failure also falls into place against this background (Weiner & Kukla, 1970; see also Chap. 14).

In the respective studies, participants were divided into success- and failure-oriented groups based on their scores on the Mehrabian scale (MARPS). Yet responses on this scale also reflect how people evaluate their abilities (Chap. 6):

- Success-oriented individuals (i.e., people scoring high on the Mehrabian scale) are confident in their capabilities. Thus, it is logical for them to attribute their successes to innate ability but explain their failures with a lack of effort or external influences (e.g., bad luck).
- Failure-oriented individuals (i.e., people scoring low on the Mehrabian scale) are much more skeptical about their abilities relative to those of others. Accordingly, they put their failures down to a lack of ability but attribute their successes to luck or to the ease of the task:
- The same pattern of results does not emerge when the TAT is used to measure the achievement motive. The reason for this is that – as McClelland had intended – the achievement motive tapped by means of the TAT method is not significantly related to the self-concept of ability (Chap. 6).

If interindividual differences in the strength of the achievement motive are reduced to differences in perceived competence or ability, one may well ask whether the concept of motives still has a meaningful part to play. Terms such as "hope for success" and "fear of failure" indicate that what we are dealing with here is not in fact the study of motives but the analysis of affectively tinged expectancies. Yet the expectancy of being able – or unable – to achieve a goal should not be equated with the motive of aspiring to attain that goal. Trope's (1986) studies on task choice provided important insights here. His data showed that achievement-motivated individuals are much keener to obtain meaningful information about their abilities than are less achievement-motivated individuals. Like Weiner and Kukla (1970), Trope used the Mehrabian scale to tap differences in the strength of the achievement motive. People scoring high on this scale evidently have a strong need to seek new information about their abilities. Following Sorrentino, Short, and Raynor (1984), these efforts can be interpreted as an expression of a cognitive need. In this context, the term "cognitive" means quite literally that people strive to acquire information about, and gain insights into, their abilities, just as Festinger (1954) postulated in his theory of social comparison processes. Knowledge of one's own strengths and weaknesses is crucial, e.g., when it comes to choosing tasks or fields of activity (e.g., deciding on a career) where it is of the essence to be competent and successful (Trope, 1986). This cognitive need for self-assessment may at times be eclipsed by other needs that also relate to self-evaluation of one's abilities (Sedikides & Strube, 1997). Some authors argue that achievement-motivated individuals are more interested in demonstrating their abilities than in seeking realistic feedback (Kukla, 1972; Sorrentino & Hewitt, 1984). The need to obtain accurate information about one's abilities does not always prevail over the need to bolster one's self-concept and thus enhance one's self-esteem. This suggests that affective processes associated with self-esteem are always involved in the evaluation of one's personal abilities.

In Heckhausen's (1975) model of achievement motivation (Chap. 6), self-evaluative emotions are assumed to play an important role in the self-regulation of achievement-related behavior. Individuals who fear failure tend to avoid challenging tasks in order to avoid thoughts and feelings that would be detrimental to their self-esteem and that would ensue from failures being attributed to lack of ability. In general, however, cognitive models of motivation tend not to introduce affect until much later phases of operation. For example, in Weiner's (1986) emotion theory

affect first emerges in direct reaction to the evaluation of an outcome; only then is it further elaborated in a multistage process of causal attribution (Chap. 14).

9.3.1 The Function of Affect

McClelland (1985b) viewed motives as affective needs. In his model, emotions have a dual function (McClelland et al., 1953; Schultheiss & Brunstein, 2005; Weinberger & McClelland, 1990):

- First, affect serves to satisfy motives and to reinforce the behavior executed (e.g., in the form of the pride a person experiences when she or he has mastered a difficult task).
- Second, affect is the driving force behind motivated behavior.

Cues that previous experience has shown to be associated with the satisfaction of a specific motive can activate motives in anticipation, i.e., before people begin to act. In this way, they trigger affective states that then take on the form of anticipatory emotions (e.g., hope for success or the pride associated with a potential success). This foretaste (or anticipated affect) serves to activate instrumental behavior. The driving force here is the prospect of effecting a change from a state of low need satisfaction to a state of higher need satisfaction. Differences in the strength of an implicit motive can thus be interpreted as differences in the individual capacity to take pleasure in the incentives present during or after an activity. This links up with Atkinson's (1957) notion that the success motive describes the ability to take pride in success:

- For an implicit motive to be activated, it is essential that the anticipatory affect be weaker than the affect experienced upon attainment of the desired goal state. There would otherwise be no reason to take action.

Thus, failure leads to the activation and success to the satisfaction of the (implicit) achievement motive (McClelland, 1985b; McClelland et al., 1953). The tension between an unsatisfactory situation (a difficult task that cannot be solved straight away) and the anticipation of a more satisfactory state of affairs in the future (mastering the difficulty) prompts achievement-motivated individuals to intensify their efforts to achieve that goal state. But it is only when this tension is shored up by positive anticipatory emotions that it has an energizing effect on behavior (see the following example). In this sense, the incentive to succeed is generated by the experience of failure itself, because individuals know from previous experience that they have the capacity to master even difficult challenges. A success attained only after repeated efforts is worth more to us than one that "comes naturally" (because the task was easy). Thus, the striving for competence is at the very core of the achievement motive.

Example

We are not proud of things that come easy to us but of things that we work hard to achieve by means of effort, persistence, and resourcefulness. People who do not experience positive anticipatory emotions when faced with difficult tasks are less motivated to invest effort in achieving the desired goal state. For them, achievement is not a way of making the transition from subdued mood to pleasure. This may be the result of people being understretched for lengthy periods of time or of a lack of encouragement and support being provided for those tackling achievement-related demands (e.g., when children doing their homework are not encouraged to keep trying to solve the problems themselves; Trudewind & Husarek, 1979).

As Kuhl (2001) has argued, these observations imply that achievement-motivated behavior is rooted in the inhibition of positive affect – it is only under this condition that the achievement motive takes effect (Chap. 12). A state of complacency and self-satisfaction is unlikely to activate the achievement motive. However, satisfaction and pride can function as rewards, and – if associated with the experience of attaining success through the exertion of effort – can positively reinforce achievement-motivated behavior. Thus, we come full circle: Based on this experience, positive anticipatory emotions are activated whenever individuals come up against challenges in new situations or actively seek out such challenges themselves.

9.3.2 Hormonal Correlates of Motives

In his later work, McClelland moved away from the links between implicit motives and the expression of feelings such as pride (achievement), strength (power), and joy (affiliation and intimacy) and instead advocated the hypothesis that each motive is rooted in a specific hormonal process that functions to reward the preceding instrumental behavior (see Chap. 10). Studies conducted by Schultheiss into the power motive have provided particularly interesting data here (Schultheiss, Campbell, & McClelland, 1999; Schultheiss & Rohde, 2002; for an overview, see Hall, Stanton, & Schultheiss, 2010; Schultheiss, 2007). Schultheiss reported that the gonadal steroid testosterone is directly related to the need for power. He set up a competition in which two respondents sitting opposite each other thought they were performing against each other. In fact, the winner and loser had already been determined by chance. Immediately after the competition, power-motivated (TAT) "winners" showed the highest increase in testosterone, as measured in saliva samples. High testosterone scores were also linked to steeper learning gains (the task involved connecting sequences of numbers). Power-motivated "winners" outperformed all other participants on this aspect, as well.

What is more, Schultheiss found that the testosterone levels of highly power-motivated participants increased even before the competition began. The mere idea of competing with another person and emerging victorious triggered increased testosterone production in power-motivated participants. Yet the increase in testosterone levels observed before the competition began was much smaller than the surge shown by power-motivated participants after "winning" the competition. In line with previous testosterone studies (Mazur & Booth, 1998), self-attributed power motives did not predict either testosterone scores or learning gains in the studies by Schultheiss.

Research on autobiographical memories (Conway & Pleydell-Pearce, 2000) shows that implicit motives are closely related to affectively charged experiences. More specifically, these findings show that when respondents are asked to describe the emotional highlights of their lives, they tend to report events that correspond with their implicit motives. Power-motivated individuals remember experiences of personal strength, whereas intimacy-motivated individuals remember experiences of interpersonal attachment (McAdams, 1982). Explicit motives are also linked to episodic memories. Unlike implicit motives, however, they are associated with routine experiences. In her extensive studies, Woike (1995, Woike, Gershkowich, Piorkowski, & Poco, 1999; for an overview, see Bender & Woike, 2010) found that the retrieval of memorable affective experiences was predicted by TAT motives, whereas the retrieval of behavioral routines was predicted by self-reported motives. Thus, people's explicit motives are not reflected in their most memorable affective experiences but in habitual everyday activities.

Summary

The findings summarized in this section suggest that affect is a key factor in the activation and satisfaction of implicit motives. Implicit motives are related to our most memorable affective experiences in life. What is more, they have neuroendocrine correlates that are assumed to reinforce the preceding instrumental behavior (e.g., testosterone in the power motive). Explicit motives, on

the other hand, express cognitive needs associated with the formation and maintenance of positive and stable self-concepts and tend to be expressed in the routines of daily life rather than in particularly memorable experiences. Weinberger and McClelland (1990) speculated that implicit motives are rooted in a system of incentives that developed relatively early in evolution but was later supplemented and overlaid by a cognitive motivational system. The development of language, and the opportunity it affords to plan and reflect on one's behavior in view of culturally mediated rules, was decisive here. Assuming that two independent motivation systems do coexist side by side, the next question to arise is whether and how these systems are coordinated and interact with each other in the regulation of behavior.

9.4 The Interaction of Implicit and Explicit Motives

The findings reported thus far lend support to the notion that implicit and explicit motives constitute two different motivation systems that are activated by different incentives and are expressed in different types of behavior, even within the same domain (e.g., achievement, power, or affiliation). However, this duality hypothesis does not rule out the possibility that the two types of motives can interact with each other to jointly affect human behavior and experience. What evidence is there for such an interaction hypothesis? In this section, I will first report findings on coalitions observed between implicit and explicit motives and then move on to the conflicts that may occur between the two systems.

9.4.1 Coalitions

McClelland (1985a) and Biernat (1989) suggested that implicit and explicit motives frequently enter into productive partnerships:

- When working in coalition, implicit motives have an energizing function and explicit motives a directive function in the regulation of behavior.

Implicit motives imply generalized preferences for certain forms of incentives that can be present in various domains of life. "Where" (i.e., in which situations) and "how" (i.e., through which behaviors) an implicit motive is expressed hinges largely on a person's conscious goals, values, and attitudes, as well as on the opportunities and constraints of their life situation.

First indications that implicit and explicit motives may enter into coalitions were found in a study reported by French and Lesser (1964). The study was designed to investigate the behavioral expression of the achievement motive (as measured by the TAT) in women with a traditional role orientation and in more career-minded women. French and Lesser administered tasks tapping intellectual competence and tasks tapping social competence to both groups of women. Among career-minded women, the strength of the achievement motive predicted achievement on the cognitive tasks. Among women with a traditional role orientation, a high achievement motive was associated with higher scores on the social competence tasks. We tend to think of the concept of achievement as being intimately bound up with the demands of academic and working life. Yet the influence of the implicit achievement motive is not restricted to school settings or occupational contexts. Rather, it implies increasing one's own efficiency and mastery, regardless of the skills involved. The achievement motive can thus be expressed across a broad variety of behavioral domains and situational contexts, depending on the individual's outlook on life and personal values.

Interaction effects of this kind have not only been observed in the lab, but they can also occur in real life. In a reanalysis of data collected as part of a motivation training program for Indian businessmen, Langens (2001) analyzed how the implicit achievement motive (TAT) interacts with discrepancies between actual and ideal selves (in short, self-discrepancies). The level of business activity after the training program served as the dependent variable. Self-discrepancies (e.g., between actual and desired work-related selves) did not produce either particularly stimulating or particularly inhibiting effects on business activities. In combination with the need to achieve,

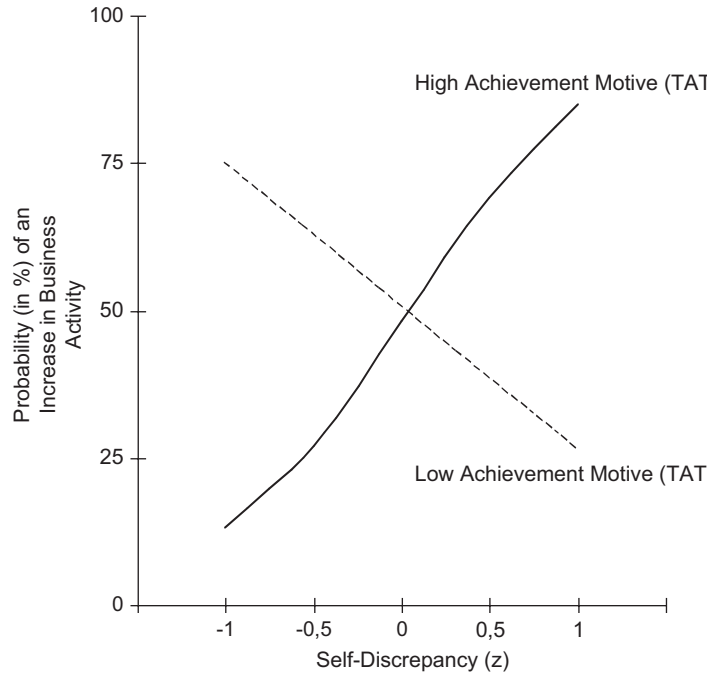

Fig. 9.3 Interaction between self-discrepancy and (implicit) achievement motive (TAT) in predicting the business activity of participants in a motivation training program (Based on Langens, 2001, p. 9)

however, self-discrepancies predicted marked differences in such activities (Fig. 9.3). Participants who reported a marked discrepancy between their actual and their ideal work selves, and were high in the achievement motive, turned out to be the most active. In the absence of this motive, a negative correlation was observed between self-discrepancies and business activity. But even a strong achievement motive did not trigger increased business activity among businessmen who were satisfied with the current state of affairs. Metaphorically speaking, self-discrepancies acted like a lock channeling achievement-motivated behavior. In addition to a strong achievement motive, the precondition for this happening was that the lock gates were open (i.e., that there were discrepancies between current states and hoped-for future selves).

Two studies that provided direct evidence for an interaction between implicit and explicit achievement motives were reported by Brunstein and Maier (2005) and Lang, Zettler, Ewen, and Hülsheger (2012). In a laboratory setting, Brunstein and Maier (2005) examined how student participants reacted to challenging feedback on their performance in a mental concentration test presented either in a task-involving or in an ego-involving context.

When the feedback focused on task incentives, the (implicit) TAT-assessed achievement motive predicted an increase in effort once a participant's performance became worse in comparison with a personal standard (similar to the study by Brunstein & Hoyer, 2002; see Sect. 9.2.2). The results for ego-involving situations, in which the importance of good performance was particularly stressed through the experimental instruction, were different. Participants who had both a strong implicit achievement motive (TAT) and a strong explicit achievement motive (questionnaire) displayed the most favorable achievement development in this case. In contrast to all other participants, this group of participants very effectively battled feedback that signalized a threat to their social standing. Brunstein and Maier (2005) explained this interaction finding by arguing that a strong explicit achievement motive is required to attract a person to ego-relevant achievement goals. If this requirement is met, a person with a strong implicit desire to achieve will be drawn

into social comparisons and will be energized to show behavior that serves to improve his or her achievement ranking. Veroff (1969) had reported similar findings in studies about reactions to failure in school children.

Lang et al. (2012) also reported that the combination of a strong implicit achievement motive (Operant Motive Test by Kuhl & Scheffer, 1999) and an equally strong explicit achievement motive (confidence to succeed in a short version of the Achievement Motives Scale by Lang & Fries, 2006) represents a very solid foundation for performing well in social-evaluative contexts. The sample consisted of employees whose work performance was evaluated by their supervisors. The implicit achievement motive predicted the quality of an individual's work performance (the stronger the motive, the better the performance) but only if their explicit achievement orientation was above average. Employees who were implicitly and explicitly characterized by a strong desire to perform well performed best based on supervisors' evaluations. If one of the two motives was weak, supervisors' ratings became more negative. Lang et al. interpreted these findings in accordance with the aforementioned assumption by McClelland and Biernat: A strongly developed explicit motive directs or "channels" the energizing effect of the implicit achievement motive toward taking on challenging tasks in social-evaluative contexts. If, however, the achievement-oriented self-image is weak, the expression of the implicit achievement motive is blocked in a behavioral context characterized by social competition.

9.4.2 Conflicts

Implicit and explicit motives do not always interact as harmoniously as the examples reported above might suggest. Indeed, the two types of motives can come into conflict with each other, which may increase the risk of negative developments or emotional struggle.

The two examples that follow illustrate this point. Using data from two longitudinal studies, Winter et al. (1998) analyzed how personality traits interact with motives to shape the development of adult women. They focused on the trait of extraversion–introversion and the motives of power and affiliation, both of which were measured by a TAT (remember that power and affiliation constitute facets of extraversion if measured with questionnaires rather than the TAT method). In line with the interaction hypothesis outlined above, Winter et al. assumed that traits determine the ways in which (implicit) motives are expressed in behavior. The criteria they assessed were significant events and outcomes in the domains of personal relationships, careers, and leisure activities. The statistical interactions between extraversion– introversion, on the one hand, and power and affiliation motives, on the other, indeed proved to be significant predictors of the life outcome variables under investigation. The following example highlights some of the findings.

Study

Women's Motive Profiles

Winter et al. (1998) found that extraverted women high in the power motive had careers associated with high levels of social impact and prestige. They attached great importance to maintaining social relationships at work. Extraverted women high in the affiliation motive, in contrast, were characterized by having achieved satisfying intimate relationships and by involvement in volunteer work. The picture to emerge for introverted women was a different one entirely. For them, the power motive was not linked to having a prestigious career, nor was the affiliation motive associated with the development of satisfying relationships. On the contrary, marital problems and divorces were particularly common among introverted women who were high in the affiliation motive. Relative to extraverted women, it seems to be much more difficult for introverted women to express their social needs in interpersonal relationships. Indeed, it is only logical that a person

who would rather be alone than with others will find it difficult to fulfill a latent need for close relationships. Yet shy and withdrawn individuals can have a strong need for interpersonal attachment, as illustrated by the findings reported by Winter and colleagues. The same holds for introverted individuals who crave social recognition. In other words, whether and in what way a motive is expressed in behavior hinges on the personality traits that distinguish a person's actions, thoughts, and feelings.

To summarize, the findings presented by Winter et al. (1998) demonstrate that more precise – and arguably more interesting – predictions can be made about social behavior when a combination of different personality characteristics (here: traits and motives) is taken into account than when just only one kind of personality variable is examined.

Incongruence between implicit motives and explicit life goals can also trigger emotional problems, as Brunstein and colleagues (1995; Brunstein et al., 1998; for an overview, see Brunstein, 2010; Brunstein, Schultheiss, & Maier, 1999b) reported in studies on the emotional well-being of college students. In these studies, the participants reported their current agentic (achievement and power) and communal (affiliation and intimacy) goals representing the consciously accessible and personally meaningful objectives, purposes, and projects they were striving for and sought to attain in their present life situation. At the same time, the strength of their implicit agentic and communal motives was assessed using the TAT. The participants rated their emotional well-being on scales of positive and negative mood in everyday life, with ratings being taken regularly over a period of several weeks to months. The results can be summarized as follows (Fig. 9.4): The more strongly committed students were to goals that corresponded with their motives (i.e., agency-motivated students to agentic goals and communion-motivated students to communal goals), the higher their emotional well-being. Conversely, participants who were committed to goals that were ill-suited to satisfying their implicit motives or were even in direct opposition to these motives (i.e., communion-motivated students pursuing agentic goals or agency-motivated students pursuing communal goals) reported a marked decrease in positive affect and a corresponding increase in negative affect in everyday life. Even when participants succeeded in accomplishing goals that did not correspond with their motives, this was not reflected in a relevant increase in emotional well-being. In fact, successes of this kind must often be considered Pyrrhic victories: The more intensely participants focused on achieving goals that were incongruent with their needs, the more they neglected other goals that would have been better suited to satisfying their motives.

Brunstein et al. (1998) explained these findings as follows (see also Schultheiss, Jones, Davis, & Kley, 2008). If self-generated goals exhibit incentives that are compatible with strongly developed (implicit) motives, the respective incentives are affectively enhanced, in accordance with the idea that the valence of a goal is equivalent to the multiplication of incentive and motive (see Chap. 6). The satisfaction felt once the goal in question is accomplished is proportionately intensive in this case – as is the disappointment if its realization fails. The reason for this is that success implies that a strong motive is satisfied whereas failure signalizes that a strong motive remains unsatisfied. If, however, incentives are paired with weak motives, the goals in question remain relatively neutral. Accordingly, emotional reactions to successes and failures when trying to achieve the goal are comparatively subdued.

Follow-up studies focused primarily on the idea that a high degree of motivational congruence exerts positive effects on certain aspects of mental health while motivational incongruence represents a risk factor potentially impairing psychological well-being. Hofer and colleagues (e.g., Hofer, Chasiotis, & Campos, 2006b; for an overview, cf. Hofer, 2010) have been able to show these relationships consistently in Western and non-Western cultures. Another trend is that

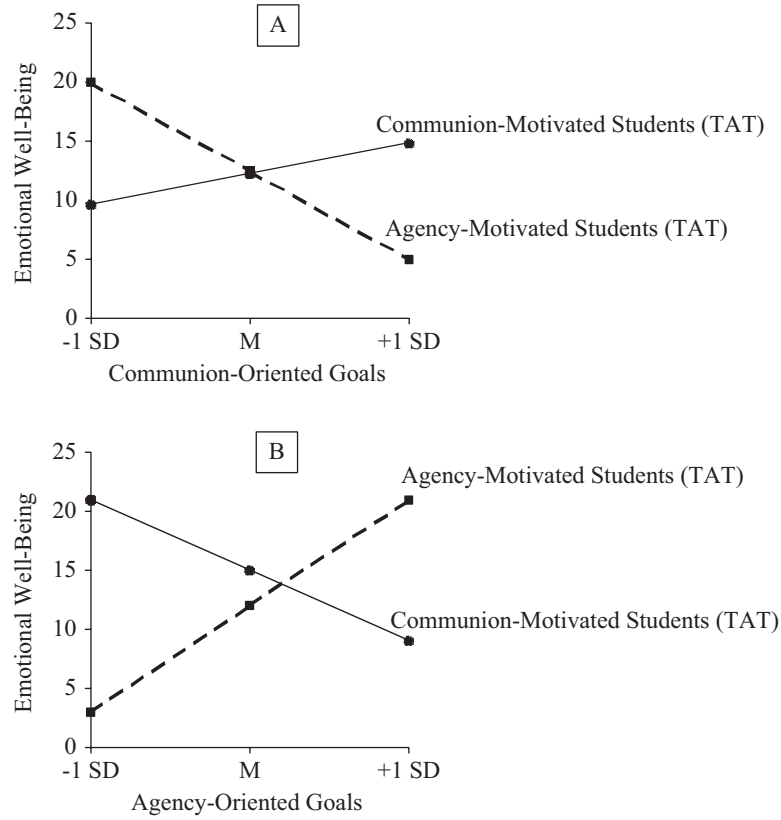

Fig. 9.4 Emotional well-being as a function of implicit agentic motives (achievement and power) and communal motives (affiliation and intimacy) and self-reported goals in everyday life. (**a**) Communion-oriented goals (self-report) are associated with high emotional well-being among participants high in implicit communal motive (TAT) but with relatively low emotional well-being among those high in implicit agentic motive. (**b**) Agency-oriented goals (self-report) are associated with high emotional well-being among participants high in implicit agentic motive (TAT) but with relatively low emotional well-being among those high in implicit communal motive (TAT) (Based on Brunstein et al., 1995, p. 7)

the concept of motivational incongruence is receiving an increasing amount of attention. Baumann, Kaschel, and Kuhl (2005) suggested that motivational incongruence acts as a "hidden stressor," i.e., as a source of tension that is located within the individual, yet difficult to identify, and that creates internal conflicts and negative affect (see Chap. 13). The following study about couple relationships shows that it is quite useful to consider all available information, covered by the interaction between implicit and explicit motives, when analyzing motivational phenomena (for a similar example about work, see Sect. 9.5).

9.4.2.1 Study: Quality and Stability of Couple Relationships as a Function of Implicit and Explicit Needs for Closeness

Hagemeyer, Neberich, Asendorpf, and Neyer (2013) measured the needs for closeness to the partner in a sample of 547 heterosexual couples, both as implicit motives (with a picture story test they had created for this purpose) and explicitly stated needs (questionnaires). They then analyzed how these two motive measures were involved in the prediction of relationship satisfaction (measured both concurrently with the two

motives and 1 year after the motive measures had been taken) and stability (continuation of the relationship or breaking up within 1 year). The authors based their predictions and statistical tests (a moderated regression analysis adapted for dyads) on a careful analysis of all possible combinations of the two measured needs.

Hagemeyer et al. expected positive effects on perceived quality of relationship particularly in cases in which both the implicit and the explicit need for closeness are strong (congruence among strong needs), but not if both are weak (congruence among weak needs) – because it is much more likely in the first scenario that closeness to the partner is established and perceived as rewarding. Results confirmed these expectations. Participants who had expressed a strong need for closeness, both implicitly and explicitly, were the most satisfied with their relationship. This was true regardless of whether the prediction was tested concurrently or 1 year later. Congruence in cases of weaker needs, on the other hand, was associated with far lower relationship satisfaction. Motivational incongruence was particularly important for predicting relationship stability, and it did not matter in which direction the two needs for closeness differed (high implicit/low explicit or low implicit/high explicit). Either way the risk of breaking up was higher for participants with incongruent needs compared to their counterparts whose needs were congruent. Remarkably, this finding was still significant when differences in couple satisfaction were controlled statistically. For instance, participants who expressed a strong explicit desire for closeness although their implicit need was only weak were more prone to break up with their partner even in cases in which they had not been particularly dissatisfied with their relationship.

The analysis conducted by Hagemeyer et al. (2013) is relevant to research on motivational (in) congruence in multiple ways. Firstly, it is not enough to reduce the concept of motivational congruence to a small difference between implicit and explicit motives. To put it in algebraic terms, Hagemeyer et al.'s findings about couple satisfaction were based on a *multiplication* (implicit times explicit) rather than a *difference* (implicit minus explicit) of the indirect and direct measures of need for closeness. Without considering the strength of the needs in this way, the authors would not have been able to find their reported results on relationship quality. The prognostic capacity of direct and indirect motive measures can only be fully exhausted if both are combined with each other in every way possible. Secondly, the analysis furthermore shows that motivational incongruence *alone* is a risk for relationship maintenance: the direction of discrepancy (implicit < explicit or implicit > explicit) does not matter. This was not the result of a preliminary calculation (making an absolute difference of the two need measurements) but instead the result of the statistical analysis. Thirdly, Hagemeyer et al.'s findings confirm Baumann et al.'s (2005) assumption that motivational incongruence constitutes a *hidden* stressor. How participants with incongruent needs rated their relationship satisfaction was not a red flag indication for an increased risk of breaking up.

Winter (1996) distinguishes two kinds of discrepancies that may arise between implicit and explicit motivational tendencies:

- First, a person might set a goal that is not backed up by a corresponding motive (e.g., a career goal despite a weak achievement or power motive).
- Second, achieving a personal goal might come into direct conflict with satisfying a motive in another domain (e.g., forming a harmonious relationship despite a strong need for exercising power).

Given discrepancies of this kind, it is all the more important for strategies of self-control to be applied in goal attainment settings (Kuhl, 2001; Sokolowski, 1993; see also Chap. 12). The first kind of discrepancy may make it necessary to boost the incentive value of a goal that is not very attractive in its own right. The second kind of discrepancy may make it necessary to control impulses emanating from a latent motive that impede the realization of consciously selected goals, values, and norms. However, behavioral

regulation of this kind is steered by volitional control rather than emotional preferences, and thus requires effort and mental resources that, to use the analogy introduced by Muraven and Baumeister (2000), resemble a muscle that can become fatigued up to the point of exhaustion by constant exertion. Volitional self-control may be indispensable for adaptive behavior, but it can have adverse effects on mental health if accompanied by long-term conflict and stress (Kuhl, 2001). In a study with managers, Kehr (2004a) showed that chronic discrepancies between implicit and explicit motives are associated with the risk of volitional depletion or exhaustion, one effect being reduced well-being.

9.4.3 Harmonization of Explicit and Implicit Motives

The notion that implicit and explicit motives often exist side by side but that discrepancies between the two types of motives increase the risk of adaptation problems raises two further questions:

1. How do people whose implicit and explicit motives are compatible differ from people whose implicit and explicit motives are less well attuned?
2. Which interventions can reduce or bridge the gap between implicit and explicit motives?

9.4.3.1 Moderating Variables

Both of these questions have been addressed in studies with a primary focus on short-term and long-term goal setting. To answer the first question, we need to identify personality characteristics that moderate the relationship between implicit motives and explicit goals. The finding that the relationship between implicit motives (TAT) and explicitly stated goals (self-reports) tends not to be significant only really indicates that, although some people commit to need-incongruent goals, there are others whose goals do correspond with their motives. In accordance with their function in statistical analysis, variables that allow these two groups of people to be distinguished are known as moderators. Subsequently, I will discuss three known examples for this (for an overview of the application of the moderator concept to questions of motivational congruence, cf. Thrash, Cassidy, Maruskin, & Elliot, 2010).

Action Versus State Orientation Brunstein (2001) established in a student sample that the disposition for failure-related action versus state orientation, as described by Kuhl (1983; Kuhl & Beckmann, 1994a, 1994b; see Chap. 13), is associated with the strength of the correlation between implicit motives (TAT) and explicit goals (self-report). The study included motives and goals pertaining to agency (achievement and power) and to communion (affiliation and intimacy). Whereas action-oriented individuals pursued goals that thematically matched their motives well, the goals of state-oriented individuals did not show any clear relationship with their implicit preferences. In their studies on achievement motivation, Baumann, Kaschel, and Kuhl (2005) showed for both student and clinical samples that state-oriented individuals tend to take on goals that differ substantially from their implicit motives, particularly under stressful circumstances.

The explanation for such findings is the difficulty state-oriented individuals have with regulating negative affect (Kuhl, 2001). Even smaller instances of failure can cause them to ruminate, which effectively creates negative affect, such as feelings of tension, to last longer. In a state of continuous tension, personal emotional preferences can no longer be evaluated and integrated into the formation of personal goals. The situation for action-oriented individuals is quite different. They are specialists in alleviating states of tension (e.g., unpleasant or threatening situations; Kuhl, 2001) and transforming them into more relaxing states. According to Kuhl, relaxation is an important condition for accessing motive-relevant memory systems ("extension memory") when setting personal goals. Such memory systems store information about personal preferences that are represented in an associative network linking the execution of behavior to affective experiences. This information is fre-

quently inaccessible to state-oriented individuals, particularly when they face smaller or larger stressors. When setting personal goals, individuals high in state orientation are thus affectively blind with regard to their own intrinsic needs. Instead, their intentions are determined by social expectations and external influences (Baumann & Kuhl, 2003; Kuhl & Kazen, 1994).

Self-Determination and Identity Development Based on Deci and Ryan's (2002) self-determination theory, Thrash and Elliot (2002) demonstrated that students whose sense of self-determined behavior was strongly developed showed a higher similarity between implicit motives (TAT) and explicit goals (self-report) with regard to achievement. Students whose behavior tended to be influenced by the expectations of others showed clear differences between the strength of their implicit achievement motive and the degree of self-ascribed achievement orientation. The self-determination scale (SDS) functioned as moderating variable. This questionnaire measures two aspects of self-regulated behavior: (a) the extent to which individuals' behavior is based on their own choices and core interests and (b) the extent to which individuals are aware of their own feelings and their sense of self. Further studies by Thrash, Elliot, and Schultheiss (2007) showed that high scores on scales that measure attentiveness to internal states (e.g., a person's physical awareness) were associated with higher motivational congruence. Scales that measure attentiveness directed toward social demands and expectations, however, correlated negatively with the degree of motivational congruence. Hofer et al. (2010) reported further evidence for the assumption that motivational congruence benefits from self-determination. They confirmed the moderating effect of self-determination (SDS) cross-culturally in samples in Germany, Hong Kong, and Cameroon. This study, too, focused exclusively on achievement.

Two further sources match these findings: Hofer, Busch, Chasiotis, and Kiessling (2006a) tested what kind of relationship exists between motivational congruence (measured by TAT and questionnaires thematically relating to affiliation) and interpersonal differences in identity development (measured with scales that determine different aspects of identity status according to Marcia, 1980) in a study with high school students and college freshmen. Participants who had made substantial progress in forming a "self-developed identity" (high degree of personal commitment to chosen aspects of identity paired with intensive exploration of alternatives) showed much higher motivational congruence than those who lacked similar development. The opposite was true for aspects of "adopted identity" (high personal commitment paired with little exploration). The higher the extent to which identity targets were oriented toward social expectations, the higher was the probability that the implicit need for affiliation, depending on its strength, did not have a match in the participants' motivational self-image.

A study by Schattke, Koestner, and Kehr (2011) contributed important insights into the developmental origin of motivational incongruence. These authors reexamined archived data from the aforementioned (see 9.2.4) longitudinal study by Sears et al. (1957). Based on the young adults' (31 years) responses to a TAT and adjectives for self-description, the authors constructed an aggregate index of motivational incongruence covering the three areas of achievement, power, and affiliation. This index represented the dependent variable of interest. The authors extracted potential predictors of incongruence from available data relevant to development and upbringing which had been collected for the same individuals at age 5. High incongruence in young adults was predicted by (a) parenting styles that constrained autonomy during childhood and (b) experiences of separation during the time of inchoate language development as well as excessive parental demand in the relationship between mother and child. As Schattke et al. argued, both factors can impair the development of a self-aware personality. Symptomatically, such individuals are unable to sufficiently integrate latent wishes, needs, and interests into their own self-image.

Referential Activity The moderators discussed so far are without exception variables that are

measured with questionnaires. Even though there are theoretically sound reasons for the effect of these variables on the degree of motivational congruence, the question remains which mechanisms lead to the observed moderating effects. A study by Schultheiss, Patalakh, Rawolle, Liening, and MacInnes (2011) provides interesting insights with regard to this question. Their central assumption was that implicit motivational systems primarily process nonverbal information whereas the system of explicit motives is based on verbal representations. An exchange of information between both systems is a prerequisite necessary for their coordination. For this it is required that nonverbal information is "translated" into verbal information and vice versa. This process is known as "referential activity."

Bucci (1984) had developed a color-naming test in order to measure referential activity. Participants of the test have to both read words and name colors; a score of referential activity is then formed based on the difference of the respective latency periods (the smaller the difference, the higher the referential activity). Schultheiss et al. tested this method with student samples from the United States and Germany. They first discovered that the resulting difference scores of referential activity made it possible to determine reliable differences across people. In further studies, they measured implicit motives for achievement, power, and affiliation with the TAT and thematically corresponding goals with self-report methods. The absolute discrepancy between implicit motives and explicit goals was determined and subsequently summed up for each theme in order to create a total score of motivational congruence. As expected, a higher degree of referential activity was associated with a higher level of congruence between the motives measured by TAT and the goals based on self-report. In addition to correlational studies, Schultheiss et al. also conducted a study in which they experimentally manipulated referential activity. Based on their results, it seems more likely that a high degree of referential activity is the cause – rather than the consequence – of high motivational congruence.

9.4.3.2 Interventions

The second question mentioned above is about the identification of processes that can increase the congruence between conscious goals and implicit motives. Schultheiss and Brunstein (1999) reported that goal imagery serves this kind of mediating function that promotes congruence.

Definition

Goal imagery can be defined as the perception-like mental simulation of the pursuit and attainment of a potential goal.

Goal imagery is initiated even before an individual has committed to a particular goal (see the following study). It simulates a course of action, is rich in sensory details, focuses affective experiences, and involves the direct experience of one's (imagined) behavior (e.g., the feelings that occur when one engages in the respective behavior). To use Epstein's (1994) terminology, goal imagery is an "experiential" form of information processing, to be distinguished from the rational processing of symbolic and linguistic information.

Experiential means that information is processed quickly and intuitively, with people being guided by their previous affective experiences. Rational, on the other hand, means that information is processed analytically and usually involves conscious deliberation and considered judgments.

Study

Study on Goal Imagery

Schultheiss and Brunstein (1999) assumed that the functioning of implicit motives is much better suited to an experiential than to a rational form of information processing (for a detailed account of this model, see Schultheiss, 2001). Therefore, they hypothesized that implicit motives only affect the formulation of intentions if a goal is translated from its original format in the medium of language to the experiential format. Goal imagery is ideally suited to fulfill this translative function, as Schultheiss and Brunstein (1999) found in two studies. After exploring a specific goal and the actions associated with it in

a goal-imagery exercise, students only felt committed to the goal if it corresponded with their implicit motives (TAT). Without goal imagery, no systematic relationship was observed between participants' implicit motives and their goal commitment. Furthermore, it emerged that participants in the goal-imagery group were more likely to achieve the respective goal than participants who had not engaged in the goal-imagery exercise. Langens (2002) corroborated this finding in a field study that examined the effects of daydreams on the attainment of personal goals. Daydreams led to the "revitalization of goal incentives" in achievement-motivated individuals, with positive effects on the execution of goal-directed behavior.

Goal imagery leads to the activation of implicit motives in the context under consideration. This puts people in a better position to decide whether the goal in question corresponds with their needs – or contradicts them. Moreover, goals can be attained much more effectively if they are backed up by corresponding motives (Kehr, 2004b), on the condition that people are able to visualize clearly and vividly what pursuing and attaining a specific goal will mean to them emotionally.

The method of goal imagery is rather complex and requires external guidance, at least initially. Job and Brandstätter (2009) showed that the formation of motive-congruent goals can be facilitated with a comparatively parsimonious procedure, namely, the activation of *affect-focused goal fantasies*. Student participants were asked to indicate which goals they would pursue in a hypothetical job scenario (starting a job as project leader). For this purpose, they were provided with a list of goals that could be classified into the categories achievement, power, and affiliation. Even before making their choices, one group of participants were asked to imagine how much the respective goals would elicit emotions that are associated with the pursuit of affiliative- (study 1) or achievement-related (study 2) concerns, namely, feelings of joy and happiness in the case of affiliation and feelings of interest and challenge in the case of achievement (for the motive specificity of affect, see McClelland, 1985b). Subsequently, participants were asked to compare how much the different goals suited them and pick accordingly. If the focus was on affiliation-related emotions, the proportion of affiliation-related goals in the total number of chosen goals grew alongside the strength of the affiliation motive (TAT). In an analogous manner, if the focus was on achievement-related emotions, the proportion of achievement-related goals increased, the higher the individual's achievement motive was. Participants who had not dived into a goal fantasy did not show a systematic relationship between the goals chosen and the strength of their implicit motives. The procedure chosen in this study, however, can only be used with people who are able to imagine themselves in the respective scenario. Nevertheless, in a third study, Job and Brandstätter could show that the congruence-increasing effect of affect-focused goal fantasies can also be found for more daily or realistic goals.

Summary

Explicit preferences, traits, role images, and values influence the way that motives are expressed in behavior. Certain combinations, such as high extraversion in conjunction with motives for power and affiliation, facilitate the satisfaction of implicit motives, whereas other combinations make it harder for implicit motives to be satisfied (e.g., high introversion in conjunction with power and affiliation motives). Both for achievement and interpersonal relationships, simultaneously high implicit and explicit motives are associated with positive effects on how successful people act and feel satisfied with the outcomes of their behavioral engagement.

Discrepancies between implicit and explicit motives, however, can have two kinds of adverse effects:

1. Motivational conflicts can occur, resulting in emotional strain.
2. There is a need for increased self-control, the effects of which are limited if attempts to harmonize the two types of motives do not succeed.

A self-determined approach to goal setting and the ability to visualize the emotional implica-

tions of one's future actions are two examples of ways in which explicit goals can be attuned to implicit motives.

9.5 Challenges and Perspectives

The research discussed in this chapter demonstrates that there is solid empirical support for the notion of distinguishing implicit from explicit motives. The two types of motives are associated with specific behavioral characteristics. They are responsive to different kinds of incentives and reflect different types of needs. It can also be assumed that the two types of motive are influenced by different child-rearing practices, operational in different stages of development. McClelland, Weinberger, and Koestner's (1989) model of dual motives has led to more insightful interpretations of empirical findings in the field of motivation psychology. Originally this analysis was based on a post hoc interpretation of studies that had only in a few cases tried to distinguish between implicit and explicit motives. In fact, the two kinds of motives have rarely been assessed in the same study, let alone in the same sample. In the meantime, however, the pioneering work of the aforementioned theorists has stimulated a large number of new and insightful studies. These studies do not only analyze the specific or separate effects of the two types of motives but also address the issue of how implicit and explicit motives interact with one another and work together in the prediction of behavior and subjective experiences.

Findings have shown that a high level of coherence between implicit and explicit motives is associated with greater efficiency and better adaptation, whereas conflicts between implicit and explicit motives are interpreted as potential causes for motivational conflicts and their resulting detriments for behavior and well-being. Which challenges and perspectives can be delineated based on empirical evidence so far?

1. The observation that direct and indirect motive measures taken within the same thematic content area are (almost) uncorrelated could be interpreted as evidence that implicit and explicit motives represent constituents of two independent motivational systems. However, there are two caveats.

   On the one hand, low correlations resulting from a lack of covariation of two variables across individuals are not the same as independence within the same person. Correlations provide hardly any information about whether implicit and explicit motives work independently or in a parallel manner, whether they interact with one another, create conflicts or cooperate synergistically. However, such questions about the internal dynamics of motivational systems, including relevant external factors (triggers, incentives and stimuli that are relevant to motives), must be addressed in order to develop strong explanations for how implicit and explicit motives work and relate to each other in the prediction of behavioral correlates.

   On the other hand, it is important to keep in mind that convergence across procedures is low even among different indirect motive measures (e.g., TAT, OMT, grid technique). Inter-test correlations are low enough to be virtually indistinguishable from zero (see Schüler, Brandstätter, Wegner, & Baumann, 2015). Because of this it seems difficult, or even impossible, to map different indirect motive tests on the same latent variable (e.g., the construct of implicit need for achievement) yielding unbiased parameter estimates in the prediction of motive-relevant behavior. Methodological variance remains an inveterate problem for the measurement of implicit motives. It is therefore all the more impressive that such barely correlated instruments have been able to deliver so much consistent empirical evidence.

2. In the meantime various moderators that might influence the strength of the correlation between implicit and explicit motives have been identified. In general, motivational congruence appears to be more strongly developed among people with high levels of self-regulatory abilities (self-determination,

action orientation) and people with a high sensibility to inner experiences, respectively. However, both the moderators tested and the motivational dispositions that were measured mostly represent trait-like variables. From a statistical point of view, it is completely arbitrary which feature is treated as predictor, which one as criterion and which one as moderator variable. It is impossible to draw any clear conclusions about the causal direction. For instance, it is imaginable that individuals with higher levels of motivational congruence compared to those with lower levels are more adept at regulating their own behavior and emotions. Therefore, further research that experimentally controls the phenomenon of motivational congruence will be necessary. Such research requires a clear understanding of interventions that can create or potentially dismantle a connection between implicit and explicit motives.

Apart from moderators that provide information about the conditions of motivational (in)congruence, more and more attention has been directed toward moderators pertaining to the effects of motivational (in)congruence. In a study with employees, Thielgen, Krumm, and Hertel (2015a) found that motivational incongruence for achievement and affiliation can have negative effects on job motivation. Cases in which strong implicit motives (measured with the Multi-Motive Grid by Sokolowski, Schmalt, Langens, & Puca, 2000) did not have a corresponding counterpart in participants' self-attributed motives (measured with the Personality Research Form) were particularly problematic. Due to the size of their sample (N = 756) Thielgen et al. were able to further refine their analysis. They found that job motivation was much less afflicted by motivational incongruence in older employees as was the case for younger ones. The more conflicts between motives were added through a close network of motive-stimulating incentives in participants' work environment, the stronger this age difference became. The authors explained this age dependence of the observed incongruence effects with the age-correlated ability to use volitional strategies to overcome motivational conflicts (for similar findings on job satisfaction, see Thielgen, Krumm, Rauschenbach, & Hertel, 2015b). In addition to the aforementioned studies by Hagemeyer et al. (2013) and Lang et al. (2012), the findings reported by Thielgen et al. (2015a) provide another example for how impressive progress has been made in modelling the effects of congruence and incongruence, particularly in the applied fields of motivational psychology (relationships and work). What remains is the analysis of intervening processes that could explain the observed effects even better, e.g., by integrating in the analysis of moderator variables the examination of mediating processes.

3. The conceptual introduction of dual motives was inspired by the assumption that implicit and explicit motives represent two independent motivational systems. Consequently, the introduction of the conception of motivational (in)congruence focused on the interplay of implicit and explicit motives (Brunstein, 2010; Brunstein, Maier, & Schultheiss, 1999a). The idea that incongruence between the two systems increases the risk of negative developments has been particularly influential. This idea has even applied in clinical psychology and psychotherapy (Neumann & Schultheiss, 2015; Pueschel, Schulte, & Michalak, 2011; Schultheiss et al., 2008). It is important to remember, however, that a completely coherent (total) system of motivational tendencies would be neither dynamic nor flexible and therefore at best a desirable temporary state in which all motivational forces are in balance.

Essentially, motivational (in)congruence is about interactions into which the various motivational systems can enter under certain circumstances (i.e., in the presence of adequate situational incentives). The resulting questions are complex, however. On the one hand, interactions between implicit and explicit motives are possible not only within the same domain but also across different domains (see Trapp & Kehr, 2016). On the other hand, conflicts and coalitions

are also imaginable between motives of the same system (e.g., between implicit desires for power and intimacy) as well as motives of different systems. Moreover, it is possible that motives that are frequently co-activated merge into complex configurations that then influence behavior as a crystallized combination of closely interlinked preferences (McClelland, 1992). Even though such interactions are theoretically sound, restrictions of empirical research make it anything but easy to find evidence for them. Big samples are the minimum requirement for reliable findings. Right now, there is no indication that a unifying theory drawing on a small number of principles to explain the interaction between different motivational systems (implicit and explicit motive incentive entanglements) in different behavior domains (achievement, power, affiliation, intimacy) will be developed anytime soon. For the time being, it therefore seems reasonable to analyze coalitions and conflicts between implicit and explicit motives – including their relevant situational influences and processing mechanisms – using clear and well-defined problems. This chapter provided several such examples.

Review Questions

1. *Which findings inspired and lend support to the idea that implicit and explicit motives represent two different constructs?*

   McClelland et al. (1989) reported four groups of findings.

   Measurements of the two types of motives are statistically almost independent of each other. Direct (questionnaire) and indirect (TAT) methods of measuring nominally similar motives have only 2% or less of their variance in common.

   The two types of motives predict different classes of behavior. Implicit motives predict spontaneous, unprompted behavior and long-term behavior trends (e.g., investing more effort in difficult tasks; the frequency of engaging in social contact with others in everyday life). Explicit motives predict behavior that is subject to volitional control and that corresponds with the self-concept (e.g., deliberate decisions and considered appraisals).

   The two types of motives are activated by different incentives. Implicit motives are activated by incentives inherent in the activity or task itself (e.g., difficulty and novelty in the case of the achievement motive). Explicit motives are activated by social incentives (e.g., the recognition and appreciation of an achievement).

   Implicit motives develop via early, affectively charged learning experiences (e.g., increasing mastery of a task, unhindered experience of social efficacy), whereas explicit motives are not developed until later in life, usually hand in hand with the development of self-concepts represented in the medium of language.

2. *Outline an experimental design to test the results of Spangler's meta-analysis. Which factors would have to be varied systematically?*

   Three factors would have to be accounted for:

   The method used to measure the achievement motive (indirect/TAT vs. direct/questionnaire)

   The type of behavioral criterion (spontaneous behavior vs. behavior that is under volitional control)

   The type of achievement incentive (activity incentives vs. social incentives)

3. *Explain the concept of "affective" needs with reference to the implicit achievement motive (in particular for the "hope for success" component of this motive).*

   The activation of the implicit achievement motive is tied up with anticipatory emotions (hope for success). These give a foretaste of the self-evaluative emotions (pride in mastering a challenging task)

experienced upon reaching the desired goal state and are the driving force behind the behavior instrumental in attaining a goal. The achievement motive specializes in change of affect. It is activated by the prospect of converting an unsatisfactory situation (difficulty in mastering a task) into an emotionally more satisfactory one (mastering the difficulty). This is where effort and persistence come in. If the efforts are successful, they are rewarded by satisfaction and pride.

4. French and Lesser (1964) *found that the behavioral expression of the achievement motive is influenced by people's role orientations. How might the power motive interact with prosocial value orientations?*

   Social responsibility might be assessed as a value orientation alongside the power motive (cf. Winter & Barenbaum, 1985). In conjunction with high social responsibility, we can expect the power motive to be associated with prosocial and generative behavior (e.g., involvement in human rights organizations, willingness to assume management duties in groups, support for weaker members of society, choice of a teaching career). In conjunction with low social responsibility, we can expect the power motive to be expressed in egocentric and socially unacceptable behaviors (criminality, physical conflicts, impulsive and inconsiderate behavior toward others, high-risk behavior in traffic, promiscuity and sexual possessiveness).

5. *Name three examples of studies that could show that high congruence between implicit and explicit motives is only adaptive in cases in which this congruence is achieved in the presence of strong needs.*

   Brunstein and Maier (2005) found that only individuals who had both a strong implicit need and a strong explicit need for achievement increased their efforts in ego-involving situations if their performance was at risk of worsening in comparison to others.

   Lang et al. (2012) reported that supervisors evaluated the performances of employees highest when the latter had both a high implicit and a high explicit achievement motive.

   Hagemeyer et al. (2013) could show that satisfaction in close relationships was highest when the need for partner-related closeness was strongly developed both implicitly as well as explicitly.

6. *Explain why motivational congruence is less beneficial if the strength of the needs involved is weaker.*

   If implicit and explicit motives are weak in a specific domain (e.g., achievement or intimacy), the valence of all incentives within this domain is to a large extent neutralized (valence = incentive times motive). No strong behavioral impulses are generated – at least not spontaneously. Furthermore, the rewarding experiences that make the respective domain attractive and appealing are missing.

7. *Which personality traits have an impact on the extent to which people commit to goals that correspond with their implicit motives?*

   It is ability to "tone down" negative affect and thus gain access to the affectively charged networks in which one's preferences are stored. This ability is more pronounced in action-oriented than in state-oriented individuals (Chap. 13).

   High levels of self-determination (cf. Deci & Ryan, 2002) make it more likely that people will choose goals that are congruent with their inner needs and protect them from rashly adopting goals that reflect the interests of others rather than their own needs. Referential activity (cf. Bucci, 1984) can be understood as the ability to

(continued)

translate verbal into nonverbal information and vice versa. According to Epstein (1994), this facilitates the exchange between the experiential format in which implicit preferences are processed and the rational-verbal format in which explicit motives are stored (see Schultheiss, Patalakh, Rawolle, Liening, & MacInnes, 2011).

8. Schultheiss and Brunstein (1999) *reported that goal imagery leads to higher congruence between implicit motives and the goals pursued. What other methods or interventions might help to harmonize implicit and explicit motives? Give examples and explain how they could work.*

Possible examples include:

Social assertiveness training (to reject goals induced by others)

Fantasizing about one's wishes and desires (to explore one's action preferences)

Acquiring the necessary skills to self-regulate emotional well-being (and reduce the negative affective states that block access to implicit motives)

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Biopsychological Aspects of Motivation

10

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10.1 A Primer on Biopsychology and Its Methods

As a discipline, biopsychology aims to explain experience and behavior based on how the brain and the rest of the central nervous system work. Biopsychological approaches to motivation, then, seek to explain motivational phenomena based on an understanding of specific functions of the brain. Most research in this area uses mammalian animal models, such as rats, mice, and sometimes primates, on the assumption that the way motivational processes and functions are carried out by the brain is highly similar across related species and that findings obtained in other mammals will therefore also hold for humans.

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When studying motivational processes, biopsychologists often use lesioning (i.e., selective damaging) techniques to explore the contributions of specific brain areas or endocrine glands to motivational behavior, reasoning that if destroying a specific brain area or gland alters a motivational function, then the lesioned substrate must be involved in that function. Other techniques often utilized in this type of research include direct recordings from neuron assemblies in the behaving animal to determine, for instance, which brain cells fire in response to a reward, and brain dialysis, which allows the researcher to examine how much of a neurotransmitter is released in a behaving animal in response to motivationally relevant stimuli. Finally, biopsychologists frequently use pharmacological techniques, for instance, to increase synaptic activity associated with a specific neurotransmitter by administering a transmitter agonist (which mimics the action of the neurotransmitter) or to decrease synaptic activity by administering a transmitter antagonist (which blocks neurotransmitter activity). This is often done locally in the brain, allowing the researcher to determine the contribution of specific neurotransmitter systems to a function subserved by a circumscribed brain area. These methods are often combined with one another, and they are almost always used in combination with behavioral or learning paradigms designed to reveal the contribution of a brain area, neurotransmitter, or hormone to specific

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aspects of motivation (e.g., instrumental learning, responding to reward).

One major advantage of the biopsychological approach to motivation is that it can go beyond the circular explanations of motivation that often arise when only behavioral measures are used to infer the causal effects of motivation. For instance, the observation of aggressive behavior (the explanandum) might be explained by the presumed existence of an underlying aggression drive (the explanans), which is in turn inferred from the observation of aggressive behavior. As long as there is no independent means of assessing the presumed aggression drive, the explanation for aggressive behavior will remain circular (e.g., "Why is he shouting at Mary?" "Because he has a strong aggressive disposition." "How do you know that?" "Because he's shouting at Mary."). In contrast to purely behavioral accounts of motivation, biopsychologists would argue that the activity in certain brain regions or the release of certain transmitters and hormones, in interaction with environmental cues, precedes or causes aggressive behavior, thus separating the explanandum from the explanans. One very successful account of aggressive behavior, Wingfield's challenge hypothesis (Wingfield, Hegner, Dufty, & Ball, 1990), holds that increased levels of testosterone predispose animals to assert their dominance but only if their dominance is challenged by competitors and in certain situational contexts, such as breeding seasons. Clearly, the explanans here (testosterone) is not only more specific and concrete than a postulated "aggression drive," it is also distinct from the explanandum (aggressive or dominant behavior), and its causal relationship to the explanandum can be studied empirically by, for instance, removing the animal's gonads, administering testosterone, or a combination thereof.

What animal models of motivated behavior cannot reveal, however, is the relationship between the brain and the subjective states that accompany and characterize some aspects of motivation. Animal research is therefore increasingly complemented by studies on humans that allow researchers to relate measures of brain activity or physiological changes to both behavior and subjective states. With the advent of sophisticated brain-imaging methods, such as functional magnetic resonance imaging (fMRI), which provide relatively high temporal and spatial resolution in assessments of the active human brain, biopsychological research on motivational and emotional processes has both experienced an unprecedented growth spurt and undergone a remarkable transformation, resulting in the new and burgeoning field of affective neuroscience (Panksepp, 1998).

In the present chapter, we will review the current status of biopsychological research, focusing on the key brain systems and processes that have been found to mediate motivational phenomena in studies on animals and humans. Our aim is to provide the reader with an overview of the key substrates of motivation and emotion and to highlight some important recent findings and developments in the field. For more comprehensive and detailed accounts of the biopsychology of motivation, we refer the reader to the excellent books by LeDoux (2002), Panksepp and Biven (2012), Rolls (2005a), and Toates (1986).

10.2 Hallmarks of Motivation

To make sense of biopsychology's contributions to the understanding of motivation, we feel it is important to first provide an overview of the core phenomena and processes of motivation on which biopsychologists tend to focus. This will equip us with the proper conceptual framework to understand biopsychological contributions to the science of motivation. We will therefore outline what biopsychologists consider to be the hallmarks of motivation in this section, before moving on to describe the key brain structures and processes involved in motivation in Sect. 3.

10.2.1 Motivation's Affective Core

One common thread in the rest of this chapter is that motivation entails emotions and affective responses to stimuli, and this is actually the backbone on which virtually all biopsychological research on motivation is built. Motivation is, at its very

core, about affect. We do some things because they feel good; we shun others because they would make us feel bad; and we are indifferent about many things, because we have neither a positive nor a negative affective response to them. But why is affect so central for motivated regulation of behavior? Physiologist Michel Cabanac (1971, p. 1104) gave the following answer:

PLEASANT = USEFUL

Things that we experience as pleasant were the ones that aided our survival in our evolutionary past and frequently continue to do so. And the flip side of this is that unpleasant things or events are detrimental and/or were at some point during evolution. Thus, according to Cabanac (1971, 1992, 2014), pleasure/displeasure codes for the survival value of the stimuli and events that can happen to an organism and provides a common currency to weigh the many different options for action against each other and come up with a decision about what to do next. Imagine yourself on a hot day. Should you have an ice cream? Jump into a cold pool? Or sit in the sun? Rake the leaves from the lawn? If you take only the anticipated (immediate) pleasure/displeasure of each option into account, you will go with the one that maximizes your pleasure (but see also Sect. 3.4 for how long-term goals can override the impulse to act based on short-term pleasure and displeasure alone). So regardless of how different your options are and what kinds of different stimuli, contexts, and events they would make you encounter, (dis)pleasure brings it all into one shared currency according to which an action's potential value can be judged and ranked.

Note, however, that hedonic value is not a fixed property of things but depends on the current needs of the individual. Think about the previously described options for action from the perspective of a day with freezing temperatures and a corresponding greater need for the body to generate warmth. Suddenly options that promised pleasure on a hot summer day do not appear attractive anymore (e.g., jumping into a cold pool), because they would further decrease your body temperature, which would be bad for survival. In contrast, actions that would have been unpleasant in the summer show an increase in predicted hedonic value (e.g., raking the leaves), because they would help you get warm and thus increase your chance of survival.

Study

The Role of Pleasure in Motivation

In one of his many studies of the role of pleasure in motivation and decision-making, Cabanac (2014) had two hedonically relevant factors – playing a pleasant computer game and sitting in an unpleasantly cold room – "compete" against each other. Research participants were seated in a climate-controlled chamber in which they were allowed to play a computer game. As time progressed, they repeatedly rated the pleasantness of this activity on a scale. Meanwhile, the temperature in the chamber was continually lowered, and participants also repeatedly rated the unpleasantness of the ambient temperature on another scale. Figure 10.1 shows the ratings of two participants from this study (note that the originally negative unpleasantness scale ratings were flipped such that higher numerical values on the combined evaluation scale represent both higher ratings on unpleasantness and on pleasantness). In both cases, shortly after the unpleasantness of the cold ambient temperature exceeded, in absolute values, the pleasantness of playing the computer game, participants left the chamber. The same effect was found for all participants tested. Here, too, pleasure was the common currency for deciding which of two very different things – playing a computer game and sitting in a cold chamber – determined what to do next.

It is important to keep in mind that pleasure can be experienced both as an evaluation of a currently encountered stimulus/situation and as

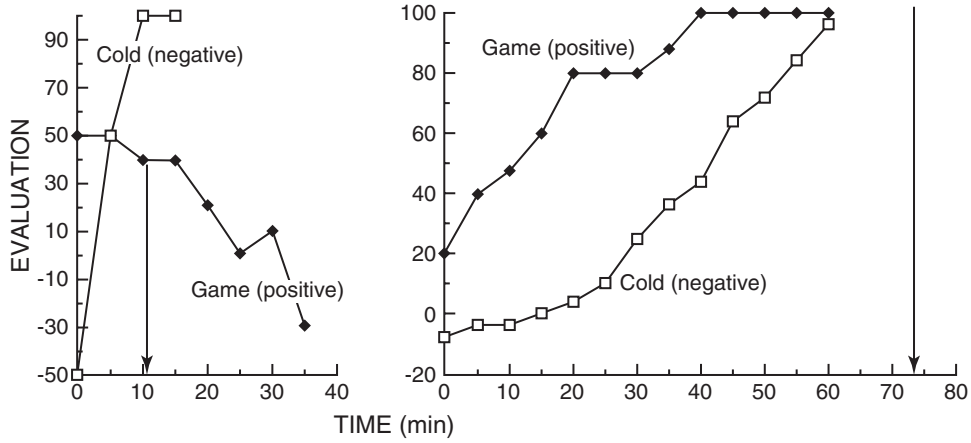

Fig. 10.1 Plots of two research participants, continuously rating the pleasantness of playing a computer game and the unpleasantness of doing this in a room whose temperature keeps going down (for the sake of comparison, both ratings are scaled in the same direction). The *arrow* marks the time when participants decided to stop playing and leave the room. Across the entire sample, participants quit approximately 5 min after the displeasure associated with the dropping temperature exceeded the pleasure associated with playing the computer game (Adapted with permission from Cabanac (2014))

an expectation of a future situational outcome based on remembered affective responses to similar situations in the past. For instance, your prediction of how tasty your next ice cream will be is based on your remembered pleasure in response to past ice creams eaten. This prediction is what motivates you for buying the next ice cream, and the higher the predicted pleasure, the stronger the motivation. But of course, you may find out that your prediction was flawed, that the next ice cream is dramatically more unpleasant (or pleasant) than predicted. Such an outcome should have consequences for your future behavior. And that is a key reason why motivation has different phases, an issue to which we turn next.

10.2.2 Motivation Consists of Two Distinct Phases

Biopsychological studies strongly support the view that motivation consists of relatively distinct segments or phases that serve different functions. Most theorists agree that the motivational process features at least two consecutive elements: a *motivation phase* during which the organism works to attain a reward or to avoid a punishment and a *consummation phase* during which the outcome is evaluated – i.e., during which the organism consummates the act and determines the actual pleasantness of the reward or assesses whether a danger or punishment has been successfully avoided (e.g., Berridge, 1996; Craig, 1918). Thus, an animal may become motivated to eat either because it sees a tasty morsel or because its hunger indicates a state of nutrient depletion (or a combination of the two) and start working toward the goal of obtaining food. The motivation phase can be as simple as taking few steps toward a food trough and starting to eat or as complex as hunting down an elusive prey in the jungle. Note also that the motivation phase is characterized by observable behaviors (instrumental activity to attain a reward or avoid a punishment) and an affective-motivational state, which in humans can be characterized subjectively by such terms as craving, longing, or being attracted to (or repelled by) the goal object but in animals can only be inferred from behavior. Berridge (1996) has labeled this phase of the motivational sequence *wanting* and differentiates it from *liking*, that is, the evaluation of the hedonic qualities of the reward (or punishment) accompanying the consummation of an incentive (see Fig. 10.2). From the perspective of regulating adaptive behavior, it is absolutely necessary

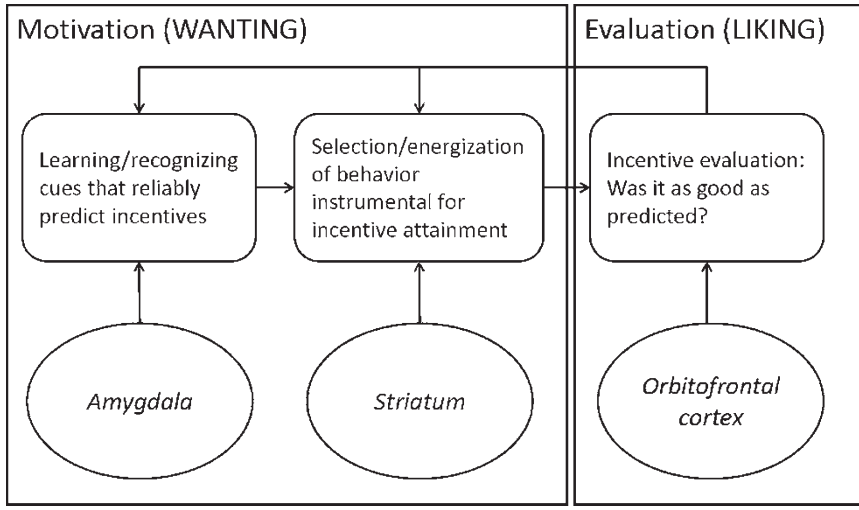

Fig. 10.2 Overview of the two main phases of the motivational process, the functions and anatomical substrates associated with them and the functional connections between them (see Sect. 3 "Brain Structures Generally Involved in Motivation" for further details)

to have an evaluation phase that is separate from the motivation phase. This ensures that individuals will calibrate their motivated future behavior to their most recent experience with the hedonic value (usefulness; Cabanac, 1971) of the goal state or object. If it is less pleasant – and hence less useful – than predicted, future motivational responses to predictive cues are reduced. If it is more pleasant – and hence more useful – than predicted, future motivational responses will be enhanced. This fundamental point was already made some time ago by Rescorla and Wagner (1972) in their theoretical analysis of Pavlovian conditioning, that is, the process by which cues that reliably predict rewards and punishments become imbued with affective-motivational properties.

While most people intuitively assume that you want what you like and vice versa, research indicates that the two phases of motivation are in fact dissociable. For instance, drug addicts feel compelled to take "their" drug, even though there is no longer any pleasure in taking it (wanting without liking; cf. Robinson & Berridge, 2000). Conversely, people subjectively and objectively respond to tasty food with signs of liking, irrespective of whether they are hungry or have just eaten a big meal – thus, liking can remain constant despite strong differences in wanting (Epstein, Truesdale, Wojcik, Paluch, & Raynor, 2003). As we will see later, the two phases of motivation are also associated with distinct brain systems.

10.2.3 Motivated Behavior Comes in Two Basic Flavors: Approach and Avoidance Motivation

A key characteristic of motivated behavior is that it can be aimed either at attaining a pleasurable incentive (reward) or at avoiding an aversive disincentive (punishment). This hallmark of motivation has assumed a central role in the conceptual frameworks proposed by major motivation theorists (e.g., Atkinson, 1957; Carver & Scheier, 1998; Craig, 1918; Gray, 1971; Mowrer, 1960; Schneirla, 1959) and is today an important and active area of research in biopsychology and the affective neurosciences. While an organism in the approach motivation mode works to decrease the distance from a desired goal object (e.g., prey,

a food pellet, or a good exam grade) until that object is attained, an organism in the avoidance motivation mode seeks to increase the distance from an aversive goal object or state (e.g., a predator, starvation, or a bad exam grade). Avoidance of a disincentive may take two fundamentally different forms: active avoidance or passive avoidance.

Active avoidance characterizes the behavioral strategy of actively executing behavior that is instrumental in distancing the individual from the disincentive. This behavior can be as simple as fleeing from a dangerous object or as complex as spending a great deal of time studying for a biochemistry exam in order to avoid a bad grade. Some theorists have posited that avoidance motivation is a particularly inefficient form of motivation, because the individual can never be quite sure how far is far enough (Carver & Scheier, 1998). Approach motivation terminates upon contact with the goal object or state, but when does avoidance motivation stop? When a predator is 100 yards away? When it is out of sight? But if the predator is out of sight, how can the organism be sure that it is away far enough? In other words, it could be argued that avoidance motivation is problematic: first, because it requires the presence of the disincentive as a reference point, enabling the organism to gauge its spatial or psychological distance to the aversive object or state, and, second, because there is no clear-cut criterion of when that distance is far enough for the organism to terminate behavior aimed at avoiding the feared goal object or state.

Based on earlier work, Mowrer (1960) and Gray (1971) proposed that one way out of the active avoidance dilemma would be to conceive of objects or places that have been associated with nonpunishment during the past learning episodes as safety signals with actual reward value. In other words, instead of running away from a feared object, the individual reframes the situation and, in a sense, switches from avoidance to approach motivation by reorienting his or her behavior with reference to a safe and thus rewarding object or place. This also solves the problem of how far away the individual needs to be from the aversive object in order to feel safe: as soon as the safety object or place is reached, the motivational episode ends.

Study

Switch From Avoidance of Danger to Approach to Safety

A classic study by Solomon and Wynne (1953) illustrates this switch from avoidance of danger to approach to safety. Solomon and Wynne trained dogs to jump from one compartment of a box to another as soon as a stimulus signaling impending foot shock appeared. Remarkably, most dogs not only learned to avoid the shock by jumping to the safe compartment within very few trials; they were also amazingly resistant to extinction: some continued to jump to the safe compartment upon presentation of the warning signal for more than 600 trials! Equally remarkably, they soon ceased to show any sign of fear once they had learned how to cope with the threat of shock.

The other mode of avoidance motivation is *passive avoidance*. The following are all examples of this behavioral manifestation of motivation: an animal ceasing all foraging behavior and keeping very still when it spots a predator; a rat that learns to stop bar-pressing in the presence of specific discriminatory stimuli, because bar-pressing then reliably produces foot shock; and a student refraining from participating in a class discussion in order not to be ridiculed for saying something stupid. The fundamental difference between passive avoidance, on the one hand, and active avoidance and approach, on the other, is that the former involves the *inhibition* of behavior in order to avoid a certain goal state or object, whereas the latter entails the *execution* of behavior in order to avoid or attain something. Thus, active and passive avoidance represent behaviorally very different solutions for dealing with the same problem, namely, avoiding a punishment.

10.2.4 Many Qualitatively Different Types of Rewards Can Stimulate Motivation

Many different types of rewards (or punishments) can stimulate motivated behavior, and what motivates behavior can vary both across individuals

and within an individual across time. Learning psychologists often conceive of rewards as unconditioned stimuli toward which all Pavlovian and instrumental learning is ultimately directed. The types of reward and the associated motivational systems that have enjoyed a long history of research in biopsychology include food in the case of feeding and hunger motivation, water in the case of thirst, orgasm in the case of sexual motivation, social closeness in the case of affiliation motivation, and being on top of the social hierarchy in the case of dominance motivation. Social and personality psychologists, who study humans rather than animals, would add achievement motivation, in which mastery experiences are rewarding; intimacy, in which deepening one's relationship to a specific other is rewarding; and power motivation, in which having impact on others is experienced as rewarding (similar to, albeit more subtle than, the dominance motivation studied in animals). Another fundamental motivational system, curiosity or exploration, does not seem to be associated with a specific reward, with the possible exception of the discovery of *any* kind of pleasurable unconditioned stimulus that was hitherto unpredicted. Some of these rewards can be differentiated into several kinds of specific rewards. For instance, research on hunger and feeding reveals that the amounts of protein, fat, or carbohydrates contained in food all represent distinct kinds of rewards to which organisms are differentially sensitive, depending on the kind of nutrient they most urgently need.

While these are all very different kinds of rewards, fulfilling a variety of functions related to the organism's individual and genetic survival, they are also similar in the sense that animals (including humans) want them, feel compelled to attain them repeatedly, and will show invigorated responding in situations in which their behavior could lead to the attainment of a reward. Whether an individual feels more or less wanting for a given reward depends, of course, on his or her need state (e.g., how long has it been since he or she last ate?), as well as on his or her liking of that reward or, in the parlance of human motivational psychology, on whether the individual has a *motive* for attaining a given reward (McClelland, 1987; Schultheiss, 2008). The more he or she responds with pleasure to obtaining the reward, the stronger the motive to seek it out in the future.

10.2.5 Motivation Is Dynamic

Another key feature of motivation emerges from the interplay of wanting and liking, namely, that motivation is a dynamic process. For instance, even the most dedicated glutton will not spend all available time eating but will switch to the pursuit of a different kind of reward once he or she has eaten to satiety. However, because the glutton enjoys food so much (high liking for the reward), he or she will sooner become motivated to eat again and will thus eat with greater frequency or intensity than a person who takes little pleasure in the reward of tasty food. Moreover, the degree of liking for one and the same reward can change as a function of how much of that reward an individual has already consumed. One piece of chocolate can be quite tasty and rewarding. But even a chocoholic is likely to experience nausea and disgust if forced to eat 2 lb of the stuff at once. Cabanac (1971) termed this changing subjective evaluation of the same reward over time as *alliesthesia*. This phenomenon is assumed to track the usefulness of a given reward as a function of the changing needs of the organism. Clearly, food is highly useful and thus very pleasant, for a semistarved individual but becomes less useful and thus less pleasant, for someone who has already eaten to satiety.

Thus, motivation for a particular type of reward waxes and wanes, depending on the recency of reward consummation, on the degree to which the reward is experienced as pleasurable and on other factors, such as the presence or absence of cues in the environment that predict the availability of a particular reward or the strength of competing motivational tendencies. The dynamic nature of motivation, which can even be mathematically modeled (cf. Atkinson & Birch, 1970), is clear to anyone who studies motivation through observation in humans and other animals but has frequently been overlooked by personality trait researchers, who emphasize the consistency of behavior over time (for a discussion of this issue, see Atkinson, 1981).

10.2.6 Motivation Can Be Need-Driven, Incentive-Driven, or Both

Obviously, motivation is often triggered by the physiological needs of the organism. Falling nutrient levels induce hunger; increasing blood saltiness induces thirst. As a consequence, we seek food or drink to quench the need. Somewhat less obviously, however, motivation can also be triggered solely by cues in the environment. These motivation-arousing cues are called *incentives*, and a good illustration of incentive motivation is the salted-peanut phenomenon (Berridge, 2001). Imagine you are sitting in front of the TV after a good, filling dinner. Next to you, there is a bowl of salted peanuts. You are actually full, but why not try one? After you have eaten one and found it quite tasty, your hand goes back to the bowl for more, and half an hour later, you have eaten the entire contents of the bowl, even though you were not at all hungry! In this case, it was something rewarding about the peanuts themselves that made you eat them, rather than an unsatisfied physiological need for nutrients. Thus, how pleasurable a reward is depends not only on our need state but also on the nature or quality of the reward itself. An enticing reward can sometimes motivate us, even when we are not experiencing any need at all.

Study

Independent Effects of Incentive and Need

This principle is illustrated by an experiment investigating the independent effects of incentive and need factors on food intake behavior (Panksepp, 1998; see Fig. 10.3). Animals' need state was manipulated by allowing them to eat regular lab chow whenever they wanted (ad-lib group; low need state) or by starving them for 24 h (high need state). Half of the animals were then offered regular lab chow (low incentive value), and half were offered a hamburger (high incentive value). Among the animals offered chow, there was a clear effect of need state: hungry, food-deprived rats ate more than did rats that had had constant access to chow. However, the results also document a clear incentive effect on motivation to eat: regardless of need state, *all* animals gorged themselves on the hamburger treat. These findings illustrate that motivation sometimes reflects differences in need state (in the chow condition) and sometimes reflects differences in the incentive value of a goal object (in the hamburger condition).

Of course, need- and incentive-driven motivations frequently go hand in hand. Incentives can be more attractive, rewarding, or pleasurable when a person is in a high-need state and less so when he or she is in a low-need state. For instance, a hungry person may perceive and experience a bland piece of bread as deliciously tasty but consider that same piece of bread to be considerably less attractive when in a state of satiety.

10.2.7 Motivation Is Characterized by Flexibility of Cue-Reward and Means-End Relationships

Motivation drives, and in turn is influenced by, Pavlovian and instrumental learning processes. Hungry rats are quicker than satiated rats to learn that a certain sound (the conditioned stimulus or CS) reliably predicts the presentation of a food pellet (the unconditioned stimulus or US), and anxious people (i.e., individuals who are particularly motivated to avoid punishments) are quicker to learn that a particular face (CS) presented on the computer screen predicts an aversive noise (US) presented on their headphones (Pavlovian conditioning, e.g., Morris, Öhman, & Dolan, 1998). Similarly, hungry rats show better learning of bar-pressing behavior if the bar-pressing produces a food pellet. Anxious people are better at learning to respond to a complex stimulus sequence presented on the computer screen if a speedy response to the stimuli prevents the loss of points or money (instrumental learning; e.g.,

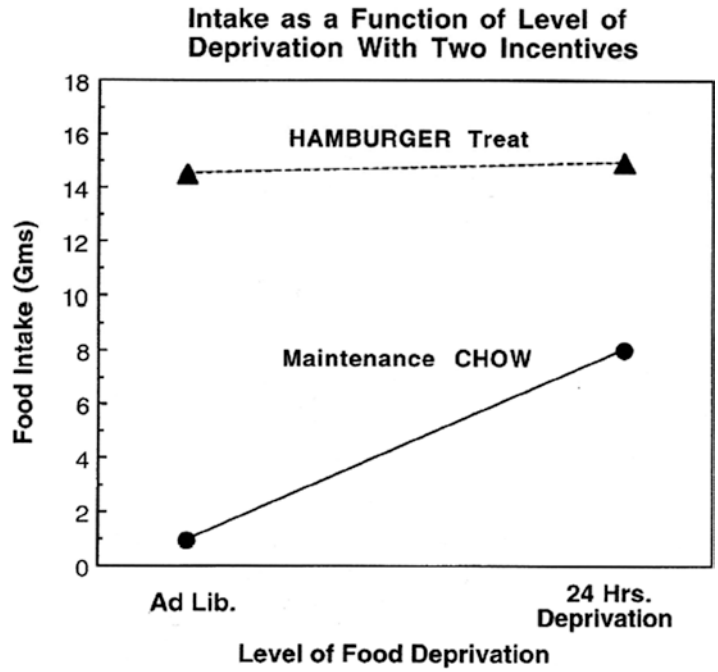

Fig. 10.3 Effects of incentive (hamburger vs. chow) and need factors (food deprivation vs. ad-lib feeding) on food intake (Adapted with permission from Panksepp (1998))

Corr, Pickering, & Gray, 1997). Finally, power-motivated individuals show enhanced implicit learning of a visuomotor sequence if their execution leads to the presentation of a face with a low-dominance expression and impaired learning if the sequence is followed by a face with a high-dominance expression (Schultheiss, Pang, Torges, Wirth, & Treynor, 2005).

Learned cues can, in turn, trigger motivation. This phenomenon is powerfully demonstrated in the case of post-traumatic stress disorder (PTSD; Brewin, Dalgleish, & Joseph, 1996). PTSD is typically acquired during a traumatic episode of life. One key characteristic of the disorder is that any stimulus that happened to be present in the original, PTSD-inducing situation can trigger a stressful reliving of the traumatic event. For instance, a sudden loud noise can elicit a powerful panic response in someone who has been in combat and has learned to associate this noise with the imminent danger of enemy fire, whereas the same noise will only lead to a slight startle response in a person without PTSD. Thus, for the PTSD patient, sudden loud noises are conditioned danger signals that trigger a strong fear response. On the brighter side, mice and rats that have learned to associate a particular place in their environment with access to a sexual partner will show hormonal changes characteristic of sexual motivation whenever they revisit this place (Graham & Desjardins, 1980). Here, the place is the conditioned cue that elicits the motivational state.

In a sense, Pavlovian and instrumental learning processes make motivation possible in the first place, because they free individuals from fixed, instinctual responses to built-in trigger stimuli, allowing them to become motivationally aroused by a wide variety of stimuli that predict the availability of a reward and to develop an adaptive repertoire of behaviors that are useful for obtaining that reward. Although these learning processes are not entirely unconstrained in many species and domains of behavior (e.g., Seligman, 1970), they nevertheless make goal-directed behavior enormously flexible and adaptive.

10.2.8 Motivation Has Conscious and Nonconscious Aspects

Traditionally, biopsychology has not dealt with the issue of consciousness in the study of motivation, because most research in this field has been carried out in animals that lack the capacity for symbolic language and introspection. Almost by default, then, the majority of biopsychological accounts of motivation assume that consciousness is not a necessary prerequisite for goal-directed, reward-seeking behavior. Researchers working at the intersection of biopsychology, neuropsychology, psychopharmacology, and social psychology have examined the issue more closely but still come to essentially the same conclusion. For instance, Berridge (1996) reviewed evidence suggesting that, even for as fundamental a motivational system as feeding, humans rarely have accurate insight into what drives their appetites or what makes them start or stop eating – self-reports of motivation often contradict behavioral data. Similarly, Rolls (1999) has suggested that most of the brain's considerable power for stimulus analysis, cognitive processing, and motor output primarily serves implicit (i.e., nonconscious) motivational processes representing the organism's various needs for physical and genetic survival. Conscious, explicit motivation, by contrast, is the exception to the rule in the brain; it is language dependent and serves primarily to override implicit processes.

Berridge and Robinson (2003) have pointed out that implicit/explicit dissociations exist not only in the domain of motivation but can also be documented for emotion and learning. For instance, learning and memory can be divided into declarative (conscious, explicit) and nondeclarative (nonconscious, implicit) processes, with the former including memory for events and facts and the latter including Pavlovian conditioning and instrumental learning (Squire & Zola, 1996). In this context, it is worth noting that much of the human brain's evolution took place in the absence of symbolic language, that is, without the ability to report on mental states. Accordingly, it is perhaps not surprising that language-based functions are relatively new in an otherwise highly developed and adaptive brain and that many motivational, emotional, and cognitive functions, which ensured our prelinguistic ancestors' survival, do not depend on or require conscious introspection.

Excursus

Aims of Biopsychological Research

Biopsychological research focuses on a set of intersecting properties of motivation. Motivated behavior is set in motion by the anticipation of rewards or punishments (that is, incentives and disincentives) whose (un)pleasantness signals the usefulness or harmfulness of such outcomes. The motivational process consists of two phases, one that involves decreasing or increasing the distance from a reward or punishment, respectively (wanting), and one that involves evaluating the hedonic qualities of the reward or punishment (liking) once it has been attained or (not) avoided, respectively. Motivation can be directed toward a positive incentive (approach motivation) or away from a negative incentive, through either behavioral approach toward a safe place (active avoidance) or suppression of behavior until the danger is over (passive avoidance). Different types of incentives (e.g., novelty, food, water, sex, affiliation, dominance) can give rise to motivated behavior. Motivated behavior changes its direction dynamically, depending on how recently a given need has been satisfied and what kinds of incentives are available in a given situation. Motivation can reflect the presence of a strong need state (e.g., energy depletion); it can be triggered solely by strong incentives, even in the absence of a profound need (pure incentive motivation); or it can be the product of the confluence of a need state and the presence of suitable incentives. Motivation is characterized by flexibility of cue-incentive and means-end relationships and drives and in turn is

influenced by Pavlovian and instrumental learning processes. Finally, biopsychological approaches to motivation do not assume that motivation requires conscious awareness but acknowledge that, in humans, specialized brain systems support the conscious setting and execution of explicit, language-based goals.

On the other hand, humans are able to formulate goals and to pursue them in their daily lives. If we were governed exclusively by phylogenetically shaped motivational needs, it would be almost inconceivable that any human would ever return to the dentist after experiencing the pain of a root canal procedure. Of course, conscious regulation of motivational processes is not restricted to overriding raw motivational impulses and needs but also extends to the formulation of short- and long-term goals and the elaboration of plans to attain them. Traditionally, the brain's contributions to these uniquely human faculties have been studied by neuropsychologists and neurologists, who examined the role of frontal lobe lesions in higher order brain functions in humans. Presently it remains unclear to what extent brain structures subserving conscious self-regulation and goal pursuit are integrated with, dissociated from, or interact with brain structures subserving implicit motivational processes and systems. It is also unclear to what extent behavior executed in the pursuit of explicit, language-based goals represents motivation proper or a different type of behavioral regulation, because the successful implementation of explicit goals does not per se elicit pleasure (Schultheiss & Köllner, 2014). The elucidation of these issues will be an important task for affective neuroscience in the coming years.

10.3 Brain Structures Generally Involved in Motivation

While different motivational needs engage different networks of brain areas and transmitter systems, some systems fulfill such general, fundamental motivational functions that they are recruited by almost all motivational needs. This is particularly true of the amygdala, the striatum, and the orbitofrontal cortex (OFC) (cf. Cardinal, Parkinson, Hall, & Everitt, 2002). We will also examine the lateral prefrontal cortex (LPFC), one of several brain structures involved in the regulation of motivational impulses. Figure 10.4 provides an overview of the location of these structures in the human brain.

10.3.1 Amygdala: Recognizing Rewards and Punishments at a Distance

The amygdala is an almond-shaped structure located in the temporal lobes of the brain. Its critical role in motivational processes was first documented by Klüver and Bucy (1937, 1939), who observed a phenomenon that they termed "psychic blindness" in monkeys whose temporal lobes had been lesioned. Klüver and Bucy (1939, p. 984) described what they observed in one monkey as follows: "The […] monkey shows a strong tendency to approach animate and inanimate objects without hesitation. This tendency appears even in the presence of objects which previously called forth avoidance reactions, extreme excitement and other forms of emotional response." Thus, loss of the amygdala leads to an inability to assess the motivational value of an object from afar ("psychic blindness"); the monkey needs to establish direct contact with the object to determine its significance. Also notable is the loss of fear accompanying amygdala lesioning.

Research over the last 60 years has led to a much more nuanced understanding of the "psychic blindness" phenomenon observed by Klüver and Bucy. Specifically, the amygdala has been identified as a key brain structure in Pavlovian conditioning. It helps to establish associations between stimuli that do not initially carry any motivational meaning and unconditioned rewards or punishers, provided that the former reliably predicts the latter (LeDoux, 1996). Thus, an intact amygdala enables an individual to learn

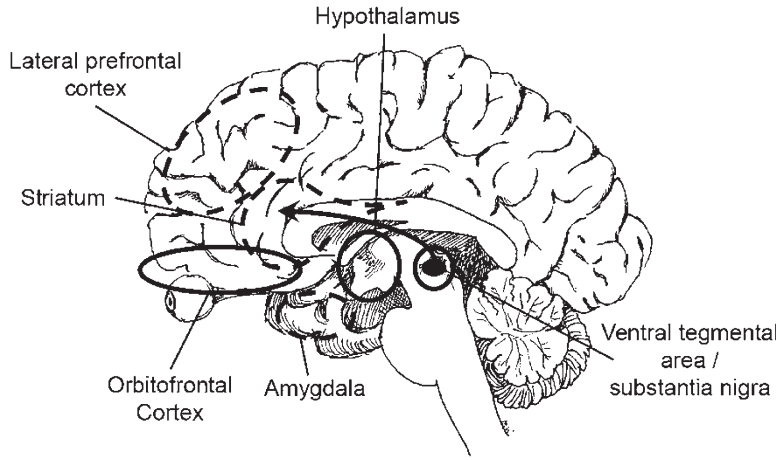

Fig. 10.4 Sagittal cut of the brain at the midline, with approximate locations of key structures of the motivational brain. *Closed circles* represent structures fully or partly visible in a sagittal cut; *dashed circles* represent structures hidden from view in a sagittal cut. The amygdala is hidden inside the frontal pole of the temporal lobe; the lateral prefrontal cortex is located on the outer side of the prefrontal cortex; the striatum is situated at the front of the subcortical forebrain. The ventral tegmental area and substantia nigra modulate activity in the stratum via dopaminergic axons (*arrow*)

that the sight of a banana (conditioned visual cue) predicts a pleasant taste when the banana is eaten (food reward), whereas the sight of a rubber ball does not predict a rewarding taste if the ball is taken into the mouth. Similarly, the amygdala is necessary for rats or humans to learn that a visual stimulus like a blue light predicts a shock and thus to express fear upon presentation of the blue light. With an intact amygdala, CS-US associations can be learned within a few trials and sometimes even on the basis of a single trial; with a lesioned amygdala, humans and animals need hundreds of trials to learn such associations and may even fail to acquire them altogether.

The amygdala consists of several, highly interconnected nuclei (i.e., groups of neuronal cell bodies that serve similar purposes), two of which are particularly important in emotional and motivated responses to CS and US (cf. Fig. 10.5; LeDoux, 1996, 2002). Through its *central nucleus*, the amygdala influences primarily *emotional reactions* mediated by hypothalamic and brainstem structures. For instance, the central nucleus triggers the release of stress hormones (e.g., cortisol) through its effect on the endocrine command centers in the hypothalamus; it increases arousal, vigilance, and activation through its projections to major neurotransmitter systems (e.g., dopamine); and it activates various autonomic nervous system responses (e.g., galvanic skin response, pupil dilation, blood pressure). Through the *basolateral nucleus*, the amygdala influences *motivated action* through its projections to the striatum, a key structure of the brain's incentive motivation system (see below).

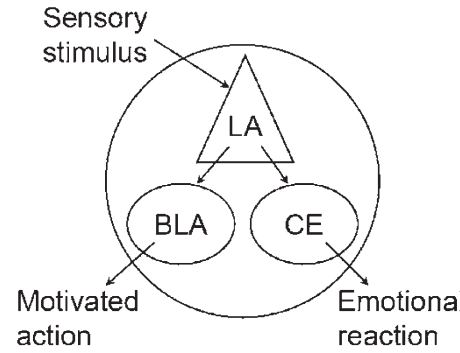

Fig. 10.5 A schematic overview of the amygdala and some of its nuclei (LA, lateral nucleus; BLA, basolateral nucleus; CE, central nucleus) and the emotional-motivational functions they mediate (After LeDoux (2002))

If the central nucleus is lesioned, animals are still able to show motivated responses (e.g., bar-pressing for food) in response to a CS, but preparatory emotional responses are impaired (e.g., salivation is lacking). Conversely, if the basolateral amygdala is lesioned, animals will still show an emotional response to a CS, but fail to learn instrumental responses to elicit (or avoid) the presentation of affectively charged stimuli (Killcross, Robbins, & Everitt, 1997).

Another important feature of the amygdala is that it receives input from virtually all stages of sensory processing of a stimulus (LeDoux, 1996). This starts at the earliest stages of stimulus analysis at the level of the thalamus, which can elicit a "knee-jerk" amygdala response to crude stimulus representations (e.g., something that roughly looks like a snake) and extends all the way to highly elaborated multimodal representations from cortical areas that can trigger or further amplify amygdala responses ("It really is a venomous cobra slithering toward me!") or dampen down amygdala responses ("Oh, it was just an old bicycle tire lying on the ground."). The amygdala in turn sends information back to stimulus-processing areas like the visual areas at the occipital lobe, thus influencing stimulus processing and potentially prompting various forms of motivated cognition, such as an enhanced focus on emotionally arousing features of the environment (Vuilleumier, Richardson, Armony, Driver, & Dolan, 2004). The amygdala also influences memory for emotional events (Cahill, 2000).

The involvement of the amygdala in emotion and motivation has frequently been studied using procedures that involve punishments, such as foot shock, because many noxious stimuli are universally aversive, making it relatively easy to elicit fear-related amygdala activation and learning with such procedures (LeDoux, 1996). Despite this research focused on states of fear and other negative emotions, it should not be overlooked that the amygdala also plays a critical role in approach motivation and reward (Murray, 2007; Wassum & Izquierdo, 2015). For instance, Pavlov's famous dogs would have had a hard time learning to salivate in response to the bell sound (CS) predicting food (US) if their amygdalae had been damaged. Other research shows that an intact amygdala is crucial for second-order reinforcement learning in animals (i.e., learning to bar-press in order to switch on a light that has previously been paired with the presentation of food or a sexual partner, e.g., Everitt, 1990) and that humans depend on the amygdala to generate affective "hunches" that guide their decision-making and behavior (Bechara, Damasio, Tranel, & Damasio, 1997).

In summary, the amygdala can be characterized as a motivational "homing-in" device whose activity is influenced by sensory information at all stages of cognitive processing, and that allows individuals to adjust their physiological states and overt behavior in response to cues predicting the occurrence of unconditioned rewards and punishers. In the case of rewards, an intact amygdala allows the individual to learn about cues that signal proximity to a desired event or object and to navigate the environment in order to approach the reward, moving from more distal to more proximal reward-predictive cues until the reward itself can be obtained. In the case of punishers, the amygdala enables individuals to respond to punishment-predictive "warning signals," either by freezing and an increase in vigilant attention or by active avoidance behavior that removes the individual from a potentially harmful situation.

10.3.2 Dopamine and the Striatum: Response Invigoration and Selection

The striatum, consisting of the caudate and putamen, is a comet-shaped subcortical structure, with a bulbous anterior head and a thinning posterior tail (see Fig. 10.4). It is part of the basal ganglia, brain structures that are critical for movement. However, the striatum is particularly important for the wanting phase of motivation, because this brain structure is responsible for the selection and invigoration of behaviors aimed at incentives or away from disincentives. So it's not just about movement – it's about motivated movement!

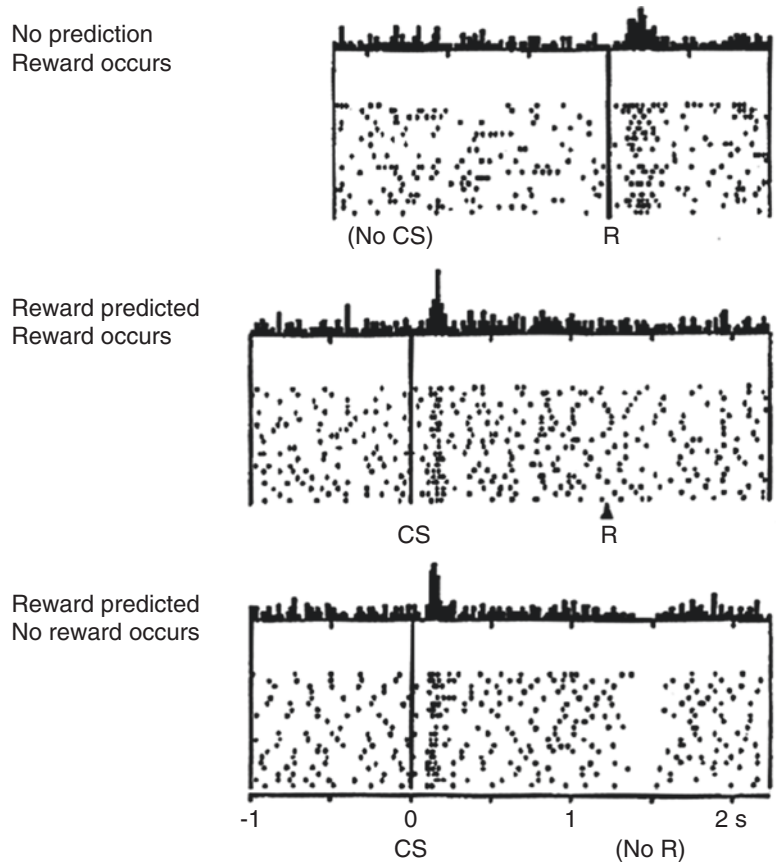

Fig. 10.6 Recordings from a striatal dopamine (*DA*) cell of a monkey who received rewarding drops of fruit juice (*R*) that it learned to associate with a predictive visual or auditory cue (*CS*). The histogram on top of each panel shows when the cell fired most frequently; single lines of dots below the histogram represent repeated recordings of the time before, during, and after the reward or cue was administered. Each *dot* indicates when the neuron was firing (Adapted with permission from Schultz et al. (1997))

To support these functions, the striatum depends on the neurotransmitter dopamine (DA), which is released by axons projecting from a relatively small number of cells located in regions in the upper brain stem called the ventral tegmental area and the substantia nigra (Bromberg-Martin, Matsumoto, & Hikosaka, 2010; see Fig. 10.4). These cells do a couple of remarkable things (Schultz, Dayan, & Montague, 1997). First off, they respond with a brief burst in firing rate when the organism encounters an unexpected reward (see Fig. 10.6, upper panel). This observation might lead you to think, like it has some researchers, that DA is a reward transmitter. However, DA neurons stop responding to the actual reward and instead show a burst in response to a predictive cue (a CS) after several trials of learning (see Fig. 10.6, middle panel). And if one extends this by adding another, second-order CS that predicts this CS, one would observe the DA neurons to increase firing as soon as the second-order CS is presented, but no longer if the original CS is subsequently presented, and so on. In short, DA neurons respond with a brief burst of firing activity to the first unpredicted stimulus that is associated with an incentive.

But what if the CS no longer predicts a reward? When that happens, DA neurons initially still show the increased firing rate in response to the CS. But when the time comes for the US to appear and it does not, DA neurons, which normally have a baseline, "idle" firing rate, suppress even this baseline activity for a little while, thus demarcating the absence of the predicted US (see Fig. 10.6, lower panel). These observations have prompted researchers to think of DA neurons as coding for "reward prediction error"; that is, if the state of affairs is better than expected, DA

neurons mark this with increased firing and if it is worse than expected, they mark this with decreased firing (Schultz et al., 1997). If everything is exactly as predicted (including actual rewards), they retain their baseline firing pattern. In a sense, these DA neurons code for *motivational value*, because they show differential responses to rewards or punishment (here: absence of reward).

Complicating matters somewhat, there are also DA neurons that increase firing whenever a reward OR a punisher is encountered. Clearly, these neurons are not exclusively dedicated to reward prediction but instead fulfill a function that has been termed *motivational salience* (or incentive salience) attribution (Berridge & Robinson, 1998; Bromberg-Martin et al., 2010; Matsumoto & Hikosaka, 2009): They imbue any type of stimulus that is relevant for survival, be it pleasant or aversive, with neuronal significance, turning it into something that the organism feels strongly compelled to deal with in an active manner (note that passive avoidance is not supported by DA).

DA neurons project to two different portions of the striatum: the dorsal part (i.e., the top) and the ventral part (i.e., the bottom), which includes an area called the nucleus accumbens. In the latter structure, DA neurons, particularly those that code for motivational salience, appear to fulfill a primarily invigorating function, prompting strong behavioral urges to deal with incentives, be they positive or negative. This function is illustrated by a study with rats in which the function of DA neurons projecting to the nucleus accumbens was experimentally manipulated (Ikemoto & Panksepp, 1999). Rats were trained to run down a runway to a goal box filled with a tasty sucrose reward. At each trial, they received either varying amounts of a DA antagonist dissolved in a fluid (vehicle) and injected into the nucleus accumbens or just the vehicle as the control condition. The DA antagonist was intended to block the effects of natural DA release on synaptic transmission in the accumbens; treatment with the vehicle was not expected to interfere with the effects of DA release. After the first trial, rats who had received the highest dose of DA antagonist differed from all other groups in that they traversed the runway to the goal box much more slowly than any other group (left panel of Fig. 10.7). This difference persisted in subsequent trials. Notably, these rats' consumption of the sweet sucrose solution was just as high as all the other rats once they reached the goal box (right panel of Fig. 10.7).

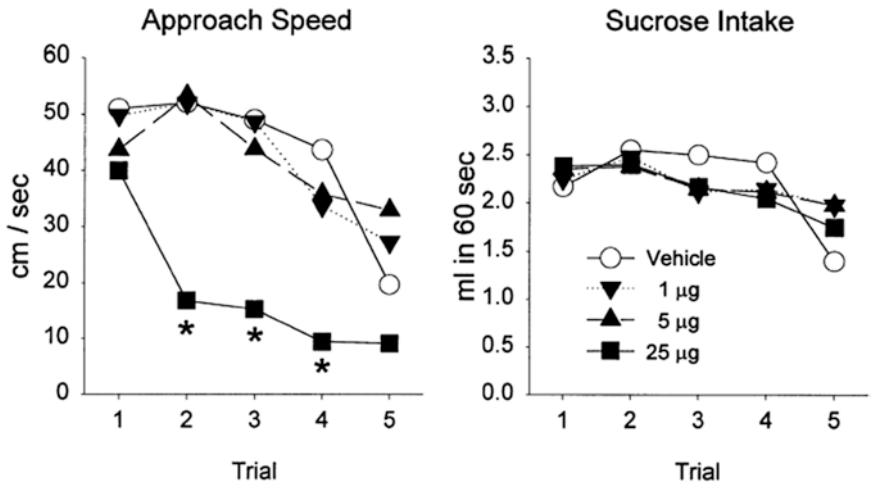

Fig. 10.7 An illustration of the dissociation between wanting (running speed to goal box, *left panel*) and liking (intake of sweet solution, *right panel*) for different degrees of dopamine suppression via the administration of an antagonist (Adapted with permission from Ikemoto & Panksepp (1999))

These findings illustrate that DA transmission in the accumbens is required for the invigoration of goal-directed behavior (i.e., running toward the goal box) but does not have an impact on the hedonic response to the incentive itself (i.e., consumption of the sucrose solution). In other words, DA in the nucleus accumbens is highly relevant to wanting a reward but does not mediate its liking (Berridge & Robinson, 1998). In a sense, then, the ventral striatum DA system functions like an internal magnet, pulling the organism closer to a desired goal or object.

Brain-imaging studies have shown that synaptic activity in the accumbens is also related to incentive seeking in humans. In these studies, accumbens (and sometimes VTA) activation has been observed in response to such varied incentives as social approval and social punishment, beautiful opposite-sex faces, chill-inducing music, or computer games (Aharon et al., 2001; Blood & Zatorre, 2001; Koepp et al., 1998; Kohls et al., 2013). It is notable in this context that the human trait of extraversion seems to be related to the sensitivity of the DA system (see the excursus below).

10.3.2.1 Extraversion: An Incentive Motivation Trait?

Extraversion is perhaps the most salient personality trait. As early as the second century AD, the Greek physician Galen proposed that individual differences on the continuum from introversion (low extraversion) to high extraversion have a biological basis. The first modern biopsychological account of extraversion was formulated by Hans Eysenck (1967), who mapped individual differences in extraversion onto differences in brainstem arousal systems. Eysenck argued that extraverts suffer from low levels of arousal and engage in vigorous social and physical activities to achieve a comfortable level of brain arousal at which they can function properly. Introverts, in contrast, have high baseline arousal levels and appear withdrawn because they avoid vigorous activities that would push their arousal level "over the edge" and thus impair their overall functioning.

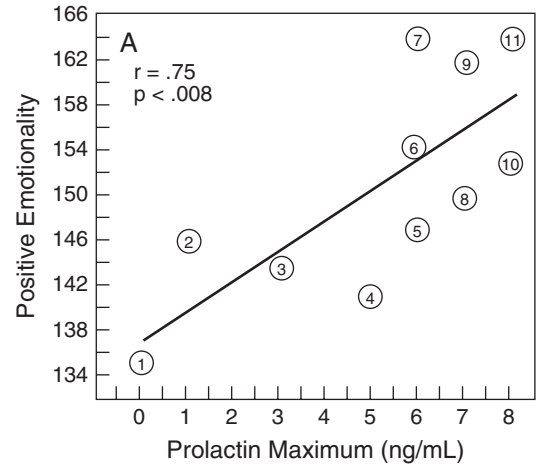

Fig. 10.8 Relationship between responses to a DA agonist as assessed by the amount of prolactin suppression relative to placebo (higher levels = greater suppression) and scale scores on positive emotionality, a measure of extraversion. Greater DA activation is associated with higher levels of positive emotionality (Adapted with permission from Depue et al. (1994))

Although there is evidence supporting the validity of Eysenck's arousal theory of extraversion, it does not seem to tell the whole story. For one thing, as Gray (1981) pointed out, high levels of extraversion resemble a disposition to impulsively seek rewards, whereas high levels of introversion are linked to the avoidance of punishments. Gray's reinterpretation of the extraversion-introversion continuum, which is supported by considerable evidence from animal and human studies, suggests that this trait has less to do with differences in *arousal* than with differences in *motivation* (cf. Matthews & Gilliland, 1999). A second criticism that can be leveled against Eysenck's theory is that the construct of arousal itself is too undifferentiated. Eysenck developed his theory based on pioneering studies conducted in the 1940s on the role of the brainstem in cortical arousal. However, later research indicated that the brain houses several arousal mechanisms that serve a variety of different functions, some supporting sensory processes, others supporting attention and memory, and yet others being involved in motor arousal or activation (e.g., Tucker & Williamson, 1984).

Both criticisms were taken into account in a new theory of the biological basis of extraversion formulated by Depue and Collins (1999). According to these authors, individual differences in extraversion levels are based on variations in the degree to which DA neurons, which can be viewed as representing a motor arousal system, respond to signals of reward with an increase in synaptic transmission. People high in extraversion respond to incentives with greater activation of the DA system and thus stronger *wanting* than people low in extraversion. As a consequence, their behavioral surface appears more activated, lively, and invigorated than that of introverts. To test his theory, Depue et al. (1994) administered DA agonists or a placebo (i.e., a substance lacking any neurochemically active compounds) to extraverts and introverts and measured hormonal and behavioral indicators of increased DA-dependent synaptic signal transmission, such as the suppression of the lactation hormone prolactin and increased eye-blink rate. As expected, after administration of the DA agonist but not of the placebo, extraverts showed more prolactin suppression (Fig. 10.8) and a greater increase in eye-blink rate than introverts. These findings suggest that extraverts have a greater capacity for DA-neuron activation, both naturally stimulated by incentive signals and artificially induced by DA agonists, than introverts.

Depue, Luciana, Arbisi, Collins, and Leon's (1994) findings also suggest that people do seem to have some insight into the functioning of their motivational brain. Individuals who endorse many extraversion items on personality questionnaires (i.e., extraverts) may have an accurate perception that they are behaviorally engaged by many more things than people who do not endorse such items (i.e., introverts). Yet this does not mean that they can introspectively access the operating characteristics of their DA system; rather, they may perceive in themselves and in their behavior the same things that people who know them well perceive: namely, that they tend to be outgoing, active, and full of energy. However, they seem to be largely unaware of what exactly it is that engages their incentive motivation system in the first place. As Schultheiss and Brunstein (2001) have shown, people's implicit motives, which reflect the incentives they *like* and will work for, do not correlate with measures of extraversion. In other words, although people do not have introspective access to what is particularly rewarding for them (determined by their implicit motives), they do seem to have a relatively accurate perception of how strongly they respond to reward-predictive cues when they encounter them (represented by their self-reported extraversion level).

In contrast to the invigorating functions of DA in the ventral striatum, DA in the dorsal striatum is involved in the selection of behaviors that are instrumental for obtaining rewards or avoiding punishments (Balleine, Delgado, & Hikosaka, 2007; Bromberg-Martin et al., 2010). Here, the reward-prediction-error function of DA neurons promotes actions that have resulted in better-than-predicted outcomes (i.e., reward) and suppresses actions that have resulted in worse-than-predicted outcomes (i.e., punishment) – the neuronal basis of Thorndike's (1927) law of effect.

Study

Key Role of Dopamine For Instrumental Behavior

Research by Robinson et al. (2007) illustrates the key role of DA in the dorsal striatum for instrumental behavior. These authors used DA-deficient mice and trained them on a two-lever task. Pressing one lever, with blinking cue lights above it, led to food reward; pressing the other, without blinking lights, did not. Prior to training, one group of mice was injected into the dorsal striatum with a virus that infected nonfunctional DA cells projecting there and restored their ability to actually produce DA and hence to function as DA cells. Thus, mice treated in this way had restored DA function in the dorsal striatum only but not in the ventral striatum or other brain regions. Across a series of experiments, Robinson and colleagues were able to show

(continued)

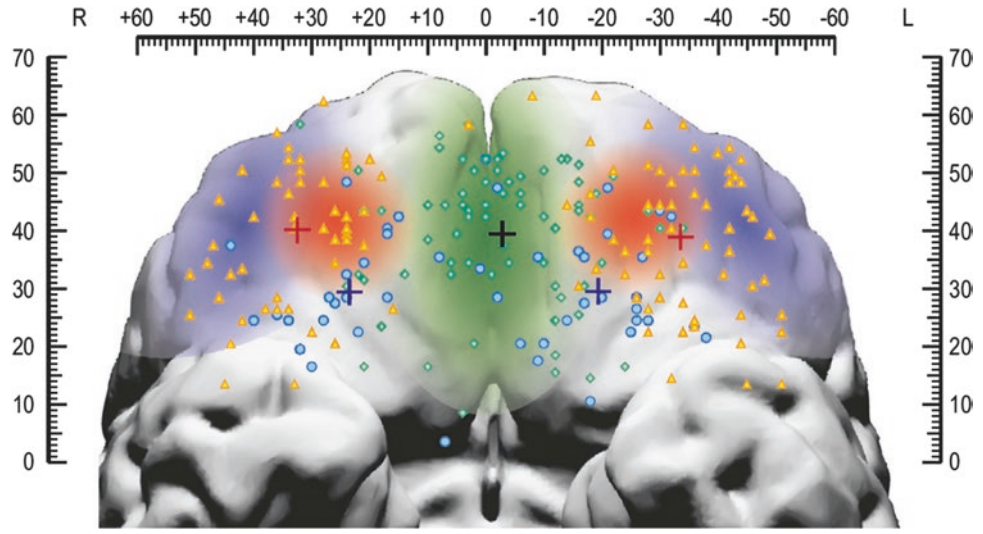

Fig. 10.9 The OFC, viewed from below, with results of a meta-analysis superimposed. *Dots* represent activation maxima from single brain-imaging studies with human participants. The *orange* (middle) area on each side of the OFC appears to be most strongly related to acute subjective pleasure responses to diverse rewards, such as food or sex. The *green* area toward the midline appears to be more involved in memory and learning of rewards. The *blue* areas toward the outer rim of the OFC are active in response to punishers (Adapted with permission from Berridge & Kringelbach (2015))

that the untreated DA-deficient mice never learned to press the food-reward lever preferentially. But once their dorsal-striatum DA levels were virally restored, their learning curve was steep, clearly favoring the food producing (reward) over the inactive lever (no reward), and indistinguishable from controlled mice with normal DA function.

This research demonstrates that learning of action-outcome contingencies – like *lever pressing* > *food* – relies on DA in the dorsal striatum. It may also be helpful to highlight a key difference between this research and the Ikemoto and Panksepp (1999) study described previously: in that earlier study, lowered DA in the ventral striatum (nucleus accumbens) only reduced running speed. It did not abolish this motor behavior entirely, nor did it entail a choice between two different behaviors. Thus, it was about a change in general motivation, in invigoration, and in wanting proper. In contrast, the research by Robinson and colleagues (2006) documents a selective increase of behavior followed by a reward (pressing a lever resulting in food) and an equally selective decrease of behavior followed by non-reward (pressing a lever resulting in no food). There was no evidence of a general increase of vigorous behavior, only for a selecting, instrumental learning effect.

10.3.3 The Orbitofrontal Cortex: Evaluating Rewards and Punishments

The OFC is situated directly above the eye orbits, on the ventral (i.e., downward facing) side of the frontal cortex. It receives highly processed olfactory, visual, auditory, and somatosensory

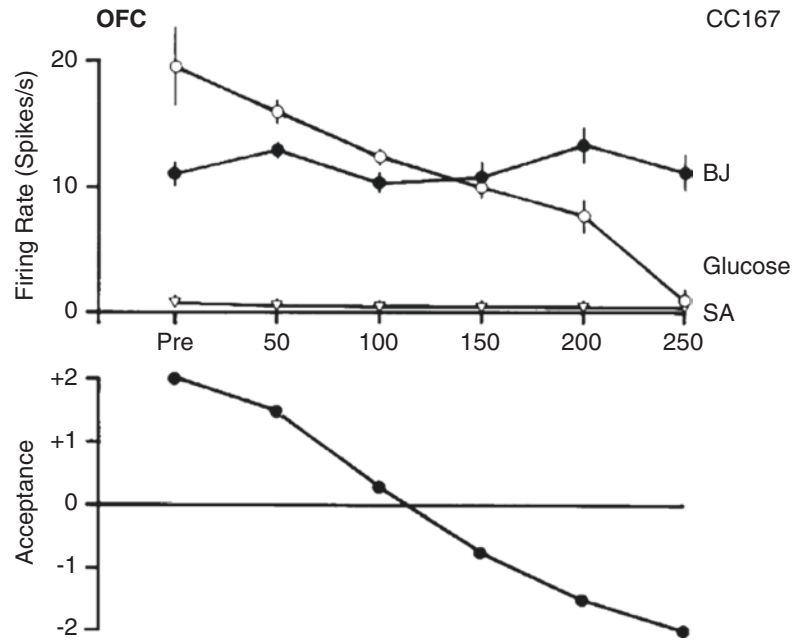

Fig. 10.10 An illustration of need-dependent reward evaluation in a monkey's OFC. In both panels, the x-axis displays amount of glucose solution fed (in ml). *Upper panel*: the y-axis displays the firing rate of sweet-responsive neurons in response to glucose, relative to responses to drops of saline (*SA*) or blackcurrant juice (*BJ*). *Lower panel*: behavioral acceptance of glucose solution (Adapted with permission from Rolls (2005b))

information. It is interconnected with both the amygdala and the striatal DA system, making it one of three major players in the brain's incentive motivation network. The OFC plays a key role in scaling the hedonic value of a broad array of primary and conditioned reinforcers, including perceived facial expressions, various nutritional components of food, monetary gains and losses, and pleasant touch (Kringelbach, 2005; Rolls, 2000).

Two notable features characterize the OFC. First, different types of reinforcers are represented by anatomically distinct areas of the OFC (see Fig. 10.9). Second, each area's activity changes with the motivational value of a given reinforcer. Evidence for the existence of anatomically distinct reward areas comes from studies conducted by Rolls and colleagues (reviewed in Rolls, 2000, 2004). These studies showed that different subregions of the OFC respond to the degree to which a given foodstuff contains glucose, fat, salt, or protein (e.g., de Araujo, Kringelbach, Rolls, & Hobden, 2003). Similarly, brain-imaging studies conducted with human subjects show that specific OFC regions are activated in response to monetary gains and losses (O'Doherty, Kringelbach, Rolls, Hornak, & Andrews, 2001). Monetary punishment was associated with activation of the lateral OFC (i.e., toward the side), whereas monetary reward was associated with activation of the medial OFC (i.e., toward the body's midline).

The OFC's response to a specific reward is not fixed but changes dynamically with exposure to or consummation of a given reward and with changes in reward contingencies. Data from responses of single neurons recorded through hair-thin electrodes in primates provide a powerful illustration of the dynamic representation of reward value in the OFC (Rolls, 2000, 2004). If a monkey is given a single drop of glucose syrup (a highly rewarding, energy-rich food substance), glucose-specific cells in the OFC show a strong burst of activity. If the monkey is fed more and more glucose over time, however, the firing rate in these neurons decreases in a fashion that is closely correlated with the monkey's acceptance of further glucose administrations, up to a point at which the OFC neurons stop firing and the animal completely rejects the glucose syrup (cf. Fig. 10.10). If the animal is given sufficient time after it has gorged itself on glucose syrup, however, it will eventually accept more syrup again, and its glucose-specific OFC neurons will resume

their vigorous firing in response to the sweet taste. Findings such as these suggest that OFC neurons encode the individual's hedonic response to reinforcers and that as the individual becomes "satiated" on a given reinforcer, neural responding dies down – a neurobiological manifestation of the alliesthesia effect.

Findings from brain-stimulation reward studies are consistent with this interpretation of OFC functioning (Rolls, 1999). In this type of research, an electrode is implanted in the brain, and the animal can activate the flow of current at the electrode tip by pressing a lever. Depending on where in the brain the electrode is located, the animal is sometimes observed to press the lever frantically, as if that stimulation triggers a pleasurable sensation, and this increase in lever pressing is taken as an indication that a brain reward site has been located. Brain-stimulation reward effects have been documented for many OFC sites, suggesting that pleasurable emotions are indeed experienced when these sites are activated. Notably, for food-related OFC reward sites, it has been observed that lever pressing varies with the need state of the organism: hungry animals display vigorous lever pressing at this site, but lever pressing ceases when they have eaten (Rolls, 1999). This suggests that OFC reward sites are sensitive to the degree of satiation that an organism has reached with regard to a specific reward and must therefore integrate information about the reward's incentive value with the organismic need states.

OFC reward areas can also become activated by conditioned incentives (e.g., sights or sounds that predict food; Rolls, 2000, 2004). For instance, an area that responds strongly to the taste of food can, through learning, also become activated by the sight of that type of food. Together with the findings on the pleasurable properties of OFC activation, this observation suggests that conditioned incentives can feel just as pleasurable as the "real thing," that is, the actual reward. This idea is at the core of many modern theories of incentive motivation (e.g., Bindra, 1978). Interestingly, the OFC is also able to break or even reverse learned CS-reward associations very rapidly (Rolls, 2000, 2004). For instance, through learning, OFC neurons will respond to a triangle shape that reliably precedes food reward but not to a square shape that is not associated with food. As soon as the relationship is reversed and the triangle no longer predicts food but the square does, the same OFC neurons will cease responding to the triangle and start responding to the square. Thus, the OFC encodes not only the reinforcement value of rewards but also of the stimuli associated with them, and it can rapidly change its evaluations as soon as the reward value of a conditioned incentive changes. Not surprisingly, lesions to the OFC abolish the individual's ability to represent changing CS-reward contingencies, and emotional responses may become "unhinged" and persevere for long periods (Damasio, 1994; Rolls, 1999).

The OFC is not the only site of the "incentive motivation network" that codes for the pleasantness of a reward. Some research suggests that portions of the nucleus accumbens and of the ventral pallidum (both parts of the basal ganglia, a subcortical brain structure involved in motor control and instrumental conditioning) code the pleasantness of food reward (Berridge & Kringelbach, 2015). Conversely, the OFC is not only involved in reward evaluation but also plays a role in response inhibition and the regulation of emotion (Bechara, Damasio, & Damasio, 2000).

10.3.4 The Lateral Prefrontal Cortex: Motivational Regulation and Override

The lateral prefrontal cortex (LPFC) is the portion of the frontal cortex just behind the forehead, extending to the temples. Along with the OFC and the medial PFC, it is one of the last parts of the cortex to appear phylogenetically and is the last to come to maturation, not reaching its full functional capacity until early adulthood (Fuster, 2001). The LPFC supports a host of important mental functions, including speech (Broca's area in left LPFC), working memory, memory encoding and retrieval, and motor control. The most important from a motivational perspective are two

specific functions of the LPFC. First, the LPFC is the place in the brain where goals and complex plans to enact them are represented. Second, and related to the first function, the LPFC can regulate the activation of core motivational structures of the brain, such as the amygdala.

Evidence for the key role of the LPFC in goal-directed action comes from neurological case studies (Luria, 1973; Luria & Homskaya, 1964). It is perhaps not surprising that individuals with LPFC lesions that destroy language capability and working memory find it difficult to initiate and execute voluntary behavior, particularly if that behavior is complex. They lack the ability to instruct themselves and to pace themselves verbally through complex action sequences (language center lesion) and may not be able to retain all elements of a complex plan in memory for long enough to execute the plan in its entirety (working memory lesion). More subtle forms of volitional deficits are observed when LPFC lesions do not affect either working memory or speech centers. Neuropsychologist Alexander Luria (1973; Luria & Homskaya, 1964) described people with this type of lesion who were perfectly able to understand and remember a verbal action command, such as "Please take the pencil and put it on the table," and could repeat it to the experimenter, but were unable to use it to guide their behavior. Thus, an intact LPFC is critical for the execution of complex plans that rely on working memory and language for the representation and updating of their elements and to feed these plans to the motor output. Note that the key role of language in the pursuit of complex goals and plans also makes the LPFC a critical point of entry for the social regulation of behavior. Specifically, although people with LPFC lesions may be relatively unimpaired in their ability to respond motivationally to innate or learned nonverbal social cues (e.g., facial expressions, the prosody of spoken language, or gestures), they lose their ability to coordinate flexibly their behavior with that of others through the pursuit of verbally shared goals or to adapt their behavior to the changing demands and expectations of their sociocultural environment.

The LPFC's capacity to represent and enact complex, verbally "programmed" goals implies an ability to regulate and override ongoing motivational needs and impulses and to resolve conflict between competing behavioral tendencies. Anyone who has ever had to study for an exam on a beautiful sunny day knows that it takes some effort and self-control, often mediated through verbal commands directed at oneself, to focus on one's books rather than jumping up and running outside. The LPFC seems to achieve this feat through its inhibiting effects on activity in structures related to incentive motivation, such as the amygdala. Studies show that nonverbal stimuli with strong incentive properties, such as facial expressions of emotion or pictures with negative affective content (such as depictions of mutilated bodies; Adolphs & Tranel, 2000), cause activation of the amygdala in humans. However, these findings are usually obtained under conditions of passive viewing that do not require LPFC participation in the task. As soon as participants are asked to verbally label the expression of a face or to reappraise a negative scene such that it becomes subjectively less aversive, LPFC becomes activated and amygdala activation decreases (Lieberman et al., 2007; Ochsner, Bunge, Gross, & Gabrieli, 2002). This disrupting effect of LPFC activation on amygdala activity may enable people to refrain from impulsive aversive responses, for example, to remain seated at their desk to study for an exam instead of giving in to their impulse to engage in motivationally more exciting activities. These findings suggest that engagement of the LPFC's verbal-symbolic functions to deal with an emotionally arousing stimulus dampens down activity in emotion generators such as the amygdala (cf. Lieberman, 2003).

In summary, LPFC supports the planning and implementation of complex behavior through its ability to adopt or formulate explicit (i.e., verbally represented) goals and to keep them activated in working memory and by controlling activation in the brain's incentive motivation network and thereby inhibiting impulsive responses to motivational cues.

The Brain's Incentive Motivation Network

Many motivational processes make use of what we have termed the brain's incentive motivation network, consisting of the amygdala, the mesolimbic dopamine system, and the orbitofrontal cortex. The amygdala is involved in learning in which environmental cues predict the occurrence of a reward or punishment and thereby guiding the organism toward pleasant and away from noxious outcomes. The striatal dopamine system regulates how vigorously the individual engages in reward seeking, but also in active avoidance of punishments, by receiving information about conditioned cues from the amygdala. It is also involved in the selection of behaviors that maximize pleasurable outcomes. The orbitofrontal cortex evaluates the "goodness" of primary and learned rewards, based on the individual's current need state and learning experiences. Motivational processes rely on these three structures to act in concert, such that cues that predict (amygdala) stimuli that have been experienced as pleasant (orbitofrontal cortex) elicit behavioral selection and invigoration (striatal dopamine system) directed at reward attainment. Behavioral impulses generated by this incentive motivation system are influenced by other functional structures, such as the lateral prefrontal cortex. The lateral prefrontal cortex guides behavior through the formulation of complex, verbally represented goals and plans for their implementation and can shield explicit goals from the interference of incentive-driven motivational impulses by regulating the output of the brain's incentive motivation network.

We should emphasize at this point that the preceding sections have selectively discussed just some of the most important brain areas involved in motivation and its regulation and omitted other key structures such as the hippocampus (involved in context-dependent modulation of emotional and motivational states) and the medial prefrontal cortex including the anterior cingulate cortex (involved in the regulation of attention, response conflict resolution, and movement initiation). Instead, we will dedicate the remainder of the chapter to the discussion of specific motivational systems that are rooted in hypothalamic structures (Schultheiss, 2013; see Fig. 10.4 for the location of the hypothalamus in the human brain) and that harness the brain's incentive motivation network to guide behavior.

10.4 Specific Motivational Systems

Certain tasks and goals in an organism's life are recurrent. All animals need to find food and eat regularly to get energy; they need to drink so as not to dehydrate; they are driven to find a mate to pass their genes on to their offspring. The attainment of these recurring needs and goals involves challenges such as competing with and dominating other same-sex members of the species. Of course, the tasks and challenges facing currently living beings also occupied their ancestors, reaching back millions of years in evolutionary history. Hence, it is hardly surprising to find that evolution has equipped brains (and bodies) with special systems that ensure that the recurring needs for day-to-day individual survival and the need for genomic generation-to-generation survival are met adaptively and efficiently (LeDoux, 2012). Such specialized systems that coordinate and support the attainment of specific classes of incentives have been identified and described in considerable detail for drinking, feeding, affiliation, dominance, and sex. In the following, we take a closer look at how evolution has shaped four of these motivational systems.

How Many Specific Motivational Systems Are There?

As many other chapters in this book document, the question of how many fundamental motivational systems exist is a consequential one in motivation science. If

research focuses on motivational phenomena that lack any specific and identifiable foundation in our mammalian brains or if it fails to uncover such biologically based systems, the study of motivation will be based on a very weak foundation.

Jaak Panksepp (1998; Panksepp & Biven, 2012) has taken a distinctly biopsychological approach toward determining which motivational systems are truly fundamental. Combining causal analysis with an evolutionary approach, he contends that when electrical stimulation of specific brain sites gives rise to the same affectively charged instinctual behavioral patterns in several mammalian species, a fundamental emotional-motivational system has been identified. "Affectively charged" means that the stimulation elicits intrinsically positive or negative affective states that animals will strive for or avoid. Learning psychologists would call the overall pattern of affective and behavioral responses to such stimulation an unconditioned response (UR). Because such responses are not normally elicited by brain stimulation but by stimuli that over the course of evolutionary history have been recurring and critical for the survival of species, each must have suitable natural elicitors. Learning psychologists would call such natural elicitors US. For instance, Panksepp and Biven (2012) argue that natural elicitors activating the FEAR system are pain, startling stimuli, and, in some species such as rats and mice, the scent of predators. And the FEAR system responds with an affective state, ranging from mild anxiety to full-blown terror, depending on the kind and intensity of the elicitor. It also orchestrates instinctual, hard-wired physiological and behavioral responses, such as pupil dilation, heart rate changes, freezing, or panicky flight.

With this approach toward identifying fundamental motivations, Panksepp has outlined seven distinct systems, which he calls SEEKING, LUST, CARE, PLAY, PANIC/GRIEF, FEAR, and RAGE. Distinct positive affective states are at the core of the first four systems, whereas distinct negative affective states are critical for the latter three. For all systems, Panksepp has located the affective "hot spots" in subcortical brain areas. Each system consists of a complex network of subcortical brain sites and neurotransmitters, and these sites and transmitters partially overlap between systems, often reflecting shared evolved functionality. Table 10.1 provides a brief sketch of Panksepp's seven systems (based on Panksepp, 1998, 2006; Panksepp & Biven, 2012).

Panksepp's model converges with the approach presented in this chapter when it comes to characterizing a general-purpose system that energizes behavior aimed at incentives. His SEEKING system largely overlaps with the striatal dopamine system we have described as being critical for response selection and invigoration. It also converges with our approach by drawing attention to the fact that the phylogenetically evolved, fundamental US-UR connections at the core of each system can be elaborated and extended in an individual's development through conditioning processes – a feature that in his and our approach critically depends on the amygdala. However, Panksepp's model departs from our approach, which assigns a critical role to the OFC as the neuronal basis of pleasant and unpleasant affective responses to incentives, in that he argues that specific affective states are rooted in subcortical brain sites, with the periaqueductal gray (PAG) in particular representing an epicenter of raw affects. We suggest that this apparent contradiction can be resolved, however, if one realizes that the affects generated by Panksepp's motivational systems are frequently associated with the first phase of motivation (motivation proper) and may represent what individuals experience when they feel compelled to go after certain incentives (e.g., greed, lust) or avoid certain disincentives (e.g., fear, sadness). In

Table 10.1 Panksepp's seven emotional-motivational systems

System	US	Affective state	Brain areas	Neurotransmitters and neuromodulators
SEEKING	Novel stimuli	Craving	Ventral tegmental area (VTA), ventral striatum, medial forebrain bundle, lateral hypothalamus	Dopamine, glutamate, opioids
LUST	Scents, bodily contact	Lust	Amygdala, bed nucleus of stria terminalis (BNST), preoptic area (males), ventromedial hypothalamus (VMH, females), periaqueductal gray (PAG)	Testosterone, estradiol, progesterone, vasopressin, oxytocin, cholecystokinin, luteinizing-hormone-releasing hormone
CARE	Crying	Love	Anterior cingulate, BNST, preoptic area, VTA, PAG	Oxytocin, prolactin, dopamine, opioids
PLAY	? (presence of another individual)	Joy and glee	Dorsomedial diencephalon, parafascicular area, PAG	Opioids, glutamate, acetylcholine
PANIC/GRIEF	Separation	Separation distress, sadness	Anterior cingulate, BNST, preoptic area, dorsomedial thalamus, PAG	Glutamate, corticotrophin-releasing factor, opioids (−), oxytocin (−), prolactin (−)
FEAR	Pain, scents, sudden changes	Fear, anxiety	Amygdala, medial hypothalamus, PAG	Glutamate, cholecystokinin, corticotrophin-releasing factor, neuropeptide Y
RAGE	Restriction, frustration	Anger	Amygdala, hypothalamus, PAG	Substance P, acetylcholine

contrast, the affects generated by the OFC appear to be related more to the second, consummatory phase of motivation, evaluating the quality of the outcome brought about by the preceding motivational episode on a fundamental hedonic pleasure-displeasure continuum. Finally, Panksepp's model also diverges from the ideas presented in this chapter in another, subtler way. When looking at the overview of the seven systems he proposes, you may note that not all of the special-purpose systems we present toward the end of this chapter are listed here. While affiliation and attachment can be roughly mapped onto either CARE or PANIC/GRIEF or both and sex can be matched to LUST, feeding and dominance do not appear on Panksepp's list. Panksepp (1998) clearly acknowledges feeding as a fundamental system, but categorizes it as a homeostatic system (i.e., as being dedicated to restoring and maintaining vital balances in our bodies' nutrient levels) and thus not quite on par with the motivational-emotional systems described in the list presented above. The absence of dominance from Panksepp's list reflects the fact that Panksepp sees no strong evidence for the existence of such a brain system (see Panksepp & Biven, 2012). He contends that what many researchers characterize as dominance or power motivation is merely a by-product of either the LUST or the RAGE system or their combined functions (see van der Westhuizen & Solms, 2015 for further discussion of this issue).

So how many motivational systems are there? From the discussion of Panksepp's approach, we think it is safe to draw three conclusions. First, the final list will not be long. Over the course of evolutionary history, only a handful of problems have recurred for our

ancestors so frequently and consequentially that they exerted persistent selective pressure for the development of brain systems dedicated to dealing with them efficiently (LeDoux, 2012). Panksepp's seven systems may provide a good approximation. Second, we think that Panksepp's criterion of electrical stimulation eliciting specific affective-instinctual patterns across individuals and species is sensible and hard-nosed at the same time. It may help to separate the wheat from the chaff in theorizing about the nature and number of motivational systems. Our third conclusion is that despite this, more research is needed to parse the biopsychological systems supporting different kinds of motivation with sufficient precision and differentiation and to reconcile apparent contradictions between approaches (e.g., is dominance motivation supported by a distinct, separate motivation system or is it an emergent property of other systems?).

10.4.1 Feeding

The primary reason to eat is to provide energy for the body to function. Hunger reflects the need to replenish nutrients. In the modern, developed world, however, where food is overabundant, there are many other factors that motivate us to eat. These include routine (i.e., "It's noon – it's lunchtime!"), stress, pleasure, and social factors (i.e., when other people are eating). The physiological mechanisms that control the regulation of eating involve an interplay between the brain (especially the hypothalamus, a key brain area in the regulation of basic physiological needs) and other organs, such as the liver, stomach, and fat stores. In this section, we will cover some of the neurobiological signals that activate and deactivate the drive to ingest food: the need for energy as well as the desire for the pleasures of taste.

10.4.1.1 Energy Needs

All organisms need nutrients to provide the energy necessary to sustain the chemical processes of life. Our cells use glucose as their primary energy source. Glucose can be stored as *glycogen* in the liver, and fat is used for the longer-term storage of energy. The body has multiple ways of sensing when more energy might be needed; e.g., when glucose levels drop, fat stores decline, or intestinal motility changes. These conditions trigger activity in brain circuitry that generates a feeling of hunger or motivation to eat.

Many of the body's systems for sensing energy needs begin in the digestive tract. The stomach contains stretch receptors that send signals of fullness to the brain. The gut also produces many neurohormones that act on the brain to let it know how recently and how much food has been consumed. One such neurohormone is *cholecystokinin* (CCK). The more food enters the gut, the more CCK is released. CCK acts on the vagus nerve, which sends a satiety (i.e., fullness) signal to the brain. Thus, CCK helps to inhibit motivation to eat. High levels of CCK actually induce nausea – a "warning signal" that tells us to stop eating (Greenough, Cole, Lewis, Lockton, & Blundell, 1998) (Table 10.2).

Another satiety signal comes from fat. Fat cells produce a hormone called *leptin* (see the excursus below), which travels through the blood and acts at the hypothalamus to inhibit food

Table 10.2 Neuropeptides that affect hunger and feeding

Neuropeptide	Source	Effect on feeding	Effects on other neuropeptides
Leptin	Fat cells	Decrease	Increases α-MSH, decreases NPY
CCK	Intestine (and brain)	Decrease	Increases α-MSH, decreases NPY
NPY	Brain (hypothalamus)	Increase	
α-MSH	Brain (hypothalamus)	Decrease	
AGRP	Brain (hypothalamus)	Increase	

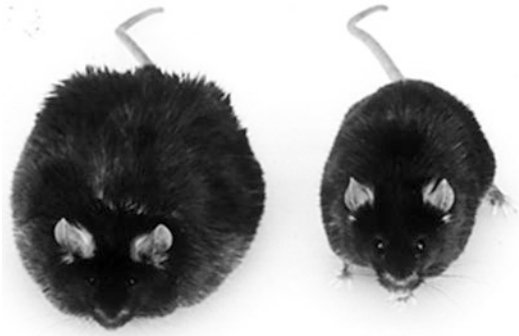

Fig. 10.11 The mouse on the left lacks the *ob* gene, which codes for the protein leptin. Without leptin, this mouse overeats and becomes obese. The mouse on the right is genetically "normal" (Photo copyright Amgen Inc., used with permission)

intake. The more fat there is on the body, the more leptin is produced. When leptin levels are low, we feel hungry and eat more; when they are high, we eat less. Leptin thus serves as a signal to the brain, indicating the amount of fat stored in the body, and helps to regulate body weight in the long term. Leptin also acts as a short-term signal: leptin levels in the blood increase at the end of a meal, promoting satiety, and decrease some hours post-meal, promoting hunger (Friedman & Halaas, 1998).

10.4.1.2 Genes and Obesity

Researchers discovered leptin via a mutant mouse strain that overeats and becomes very obese (cf. Fig. 10.11). This strain has a defective gene, which scientists termed the *ob* gene (for obesity). Later, it was found that, in normal mice, the *ob* gene codes for the hormone now known as leptin. Without a functioning *ob* gene, the mutant mice cannot produce leptin. Their brains respond as if their bodies contained no fat: the animals act as if they were starving and eat voraciously. Injections of leptin return the mice's body weight and food intake to normal (Friedman & Halaas, 1998).

Melanocortins were known to affect skin pigmentation in rodents, but their role in food intake was likewise discovered via a mutant mouse strain. This strain also overeats despite extreme obesity, and it has yellow fur – hence its name, the *agouti mouse*. Researchers found that this mouse strain has a defective gene for a particular melanocortin receptor. The lack of this receptor means that melanocortins like alpha-melanocyte-stimulating hormone (α-MSH) cannot act in the brain or on the skin, resulting in obesity and different pigmentation (Carroll, Voisey, & van Daal, 2004).

Do genetic mutations cause obesity in humans? For most obese people, the answer is no. A melanocortin precursor defect that leads to obesity, a pale complexion, and red hair have been discovered in humans, but this mutation is very rare. A complex confluence of genetic predispositions certainly influences the propensity to gain weight, but diet and exercise are the most important factors in human obesity (Martinez, 2000).

The brain also contains specialized neurons that monitor levels of glucose in the blood. These "glucostat" neurons, located in the hypothalamus, react when glucose levels drop and send a signal to other regions of the hypothalamus to trigger feeding (e.g., Stricker & Verbalis, 2002).

Which are the brain systems to which CCK, leptin, and glucostat neurons communicate? They are numerous but include neurons in a subregion of the hypothalamus called the arcuate nucleus that produce *neuropeptide Y* (NPY), a potent hunger-inducing molecule. Miniscule amounts of NPY injected into the brains of laboratory animals cause them to eat voraciously. One of the ways that leptin acts in the brain is by inhibiting the neurons that produce NPY and thus staunching hunger. Similarly, CCK inhibits NPY production in the hypothalamus (Levine & Billington, 1997; Billington & Levine, 1992).

Neurons producing and responding to a class of neuropeptides called *melanocortins* are also active in the hypothalamus. Peptides that activate melanocortin receptors, such as alpha-melanocyte-stimulating hormone (α-MSH), lead to satiety, whereas peptides that block these receptors, such as agouti-related protein (AGRP), stimulate hunger (Irani & Haskell-Luevano, 2005; Stutz, Morrison, & Argyropoulos, 2005). In addition to deactivating NPY, leptin and CCK

cause α-MSH neurons to increase their firing rate, releasing more α-MSH and thus promoting satiety.

Gonadal steroids, which have a role to regulate fertility and sexual motivation (see Sect. 4.4), also have an impact on feeding. In female animals, estrogen has a significant restraining effect on food intake. After ovariectomy, which stops the production of estrogen in the ovaries, female rats increase their food intake and gain about 25% of body weight. Progesterone counteracts the effects of estrogen. High levels of progesterone lead to increased food intake and body mass, an effect that is consistent with progesterone's role as a hormone that promotes and safeguards pregnancy, which is characterized by steeply increasing energy needs.

10.4.1.3 Reward

The need for energy is obviously not the only reason we eat. Eating is pleasurable and, like other pleasurable activities (sex, addictive drugs, etc.), causes release of dopamine (DA) in the nucleus accumbens, part of the brain's reward learning system (see Sect. 3.2, "Dopamine and the Striatum: Response Invigoration and Selection"). In particular, sweet and/or fatty foods are naturally rewarding to humans, rats, and other omnivores. In rats, it has been shown that diets containing extra fat or sugar lead to greater activity in brain structures involved in pleasure and reward (Levine, Kotz, & Gosnell, 2003).

The body's natural opioids contribute to the pleasurable experience of eating. Opioids are released in the brain during intake of sweet or fatty foods, in particular. Injecting laboratory rats with opioids causes them to eat somewhat more regular lab chow but a great deal more of a palatable sweet or high-fat chow. Whereas NPY seems to be involved in hunger driven by energy needs, opioids are more involved in the rewarding aspects of motivation for food. This was seen in a study that showed that injecting NPY to the brain increased animals' intake of bland yet energy-rich chow, but not of tasty, but energy-dilute sugar-sweetened, water. On the other hand, injecting opioids caused a marked increase in sugar-water intake, without having much effect on chow intake (Levine & Billington, 2004).

Sweet and fatty foods are not the only foodstuffs we seek out. A flavor called *umami,* present in meats, seafoods, and soy, is very rewarding to humans and laboratory animals, possibly because it serves as a good indication that the food is rich in protein (Yamaguchi & Ninomiya, 2000). The food additive monosodium glutamate (MSG) powerfully activates umami taste receptors on the tongue, which is why foods containing MSG taste so good to us.

Finally, we are naturally motivated to seek out a variety of foods. Humans and laboratory animals exposed repeatedly to a single flavor, even one that is highly rewarding at the start, will rapidly tire of it and consume less of it. However, if they are then exposed to a different flavor, the rewarding nature of the first one will be renewed (Swithers & Martinson, 1998). Because of this phenomenon (alliesthesia), the best way to make a lab rat gain weight is to put it on a "cafeteria diet": a choice of multiple foods (e.g., Gianotti, Roca, & Palou, 1988). That rat will gain considerably more weight than rats offered just one highly tasty food. This phenomenon is anecdotally observable in humans, as well.

Recently, researchers have found that different flavors activate different parts of the OFC in humans (O'Doherty, Rolls, Francis, Bowtell, & McGlone, 2001). Thus, different tasty flavors seem to be registered by distinct parts of this brain structure as different kinds of pleasurable reward. This finding seems to point to the neurobiological basis of the phenomenon that we crave a variety of flavors, rather than just one (Rolls, 2005b).

Hormonal signals from the organs, such as leptin (from fat) and cholecystokinin (from the digestive tract), enter the brain and act on neurons in the hypothalamus to affect hunger and satiety. In the hypothalamus, neuropeptide Y and agouti-related protein stimulate hunger, whereas alpha-melanocyte-stimulating hormone reduces hunger. Opioids play a role in the pleasurable aspects of eating.

10.4.2 Affiliation and Attachment

While almost all organisms have social interactions with others of the same species, attachments formed between parents and young or between mates are only common in mammals and birds. Parent-offspring attachments, which can be thought of as motivations to be near the parent or the offspring, probably evolved in mammals and birds because these animals require extended parental care, including warmth and nourishment, during immaturity. Mating-pair bonds, which give rise to a long-term motivation to be near the mate, exist in species that cooperate in rearing their offspring. Interestingly, the majority of bird species form mating-pair bonds, but very few mammalian species do – humans being a notable exception.

In this section, we will cover the basic biopsychology of the parent-offspring bond and the mating-pair bond. We will also briefly discuss neurobiological aspects of other kinds of attachments, such as friendships.

10.4.2.1 Parent-Offspring Attachments

Maternal-offspring attachments have been extensively studied in the rat and the sheep. In these species, there is little or no paternal involvement in brood care – in fact, paternal involvement tends to be restricted to those mammals that form mating-pair bonds.

Rat pups cannot regulate their body temperature in infancy, so the dam (mother) spends much time huddled over them to provide warmth. She also nurses the young and retrieves pups that get separated from the rest of the litter. Male rats and nulliparous females (females that have not borne offspring) do not display these behaviors upon initial contact with pups. In fact, nulliparous females find the odor of rat pups aversive and avoid them.

How, then, do females develop the motivation to care for their young? Estrogen and progesterone levels are very high during pregnancy and set the stage for maternal behavior. As the levels of these hormones drop at the end of pregnancy, levels of *prolactin* and *oxytocin* rise – these two hormones released by the pituitary gland are necessary for lactation. The oxytocin surge at the end of pregnancy also induces the uterine contractions of labor. All of these hormones are needed for full expression of maternal behavior (Mann & Bridges, 2001). Nulliparous female rats or castrated male rats treated with progesterone and estrogen followed by prolactin and a jolt of oxytocin – mimicking the hormonal status of the end of pregnancy – engage in maternal behaviors toward pups as frequently as a dam that has just given birth. A major site of action for these hormones is the medial preoptic area (MPOA), a brain region in the hypothalamus that is also important for sexual behavior (Young & Insel, 2002; see Sect. 4.4 for more on the MPOA and sexual behavior). The hormones also influence the brain's olfactory system (which handles perception of odor) such that the dams do not mind the odor of pups. There is evidence that hormones also affect the olfactory system in humans at the end of pregnancy: new mothers rate smells associated with human babies as less unpleasant than do nulliparous women or men (Fleming et al., 1993).

The same hormones are also necessary for maternal behavior in sheep, where oxytocin has an important function in early recognition of young. Sheep live in large herds, and a lactating ewe must allow her own lambs to nurse while keeping other lambs away. Without a sufficient oxytocin surge at the end of pregnancy, however, ewes will reject their own lambs as well. It turns out that oxytocin is needed for the ewe to learn to recognize the smell, sight, and sound of her lambs as distinct from others. Once this learning process is complete, oxytocin is no longer required for offspring recognition (Keverne & Kendrick, 1994; Kendrick, 2004).

In species where fathers help take care of the young, such as Siberian hamsters, tamarin monkeys, and humans, male animals undergo hormonal changes that facilitate paternal behavior toward the end of their mate's pregnancy. Prolactin appears to be important for paternal behavior in many species, including humans, with both mothers' and fathers' prolactin levels increasing at the end of pregnancy. In male

wolves, prolactin fluctuates seasonally, increasing in the season in which pups are born. Other hormonal changes also tend to echo those of females in pregnancy. For example, testosterone levels increase in both mothers and fathers in species that need to defend their pups against hostile intruders (Wynne-Edwards, 2001).

Hormones may serve to initiate parental behavior, but the hormones of pregnancy quickly subside, whereas the behavior, once learned, continues. Hormones like oxytocin may cause long-term changes in the nervous system that support attachment to one's young and the motivation to care for them. Rats that have already had litters in the past provide better, faster maternal care than new mothers. In primates, learning may be even more important. Monkeys that have not grown up in a normal social environment show severely deficient maternal behavior in adulthood (Harlow & Harlow, 1966). One famed female chimpanzee raised in captivity had to be trained by humans to provide her infant with proper nursing and care (Matsuzawa, 2003). Clearly, in this species and most likely in humans, hormones alone do not suffice to produce maternal behavior or a bond to one's offspring.

What about the bond of the infant to its parent(s)? When rat pups are separated from their dams, they show signs of distress, including ultrasonic vocalizations that alert the dam to the fact that the pup has become separated from the litter. Applying warmth to the pups calms them and makes them cease vocalizing. Injections of opioid peptides – brain chemicals involved in pleasure and suppression of pain – achieve the same effect. Similar effects have been seen in young dogs, chickens, and primates: opioid drugs reduce separation distress, even at doses too low to cause sedation or other effects (Nelson & Panksepp, 1998). More evidence for opioid involvement in affiliation and attachment will be addressed in the Sect. "4.2.3"

In many of the species studied, opioids and warmth are not the whole story. Rat pups prefer to huddle close to a warm object that smells of their particular dam, indicating that they can recognize their dam by smell (e.g., Sullivan, Wilson, Wong, Correa, & Leon, 1990). In other species, too, the young seem to form a particular attachment to their primary caregiver. For example, young dogs prefer their mother to other dogs, even in adulthood, when they have not had contact to her for 2 years (Hepper, 1994). In primates, including humans, infants quickly learn to recognize and prefer to be with their primary caregiver(s) (e.g., Porter, 1998). Again, it is thought that hormones like oxytocin may play a role in the formation of these bonds by facilitating long-term changes in the nervous system, which persist (along with the bond) after the hormones have subsided.

10.4.2.2 Mating-Pair Bonds

The best studied neurobiological animal model of pair bonding is in the prairie vole. When these small rodents mate for the first time, the pair forms an attachment that lasts until one of the animals dies. They live in a nest together, both participate in rearing their young, and they continue to mate with each other and to produce young in subsequent seasons. When separated, the voles exhibit considerable distress, similar to that experienced by infants of many mammalian species during separation from the mother.

Oxytocin and a closely related hormone, *vasopressin*, are crucial for the formation of this pair bond. Oxytocin and vasopressin levels surge during mating. As in the case of mother sheep learning to recognize their young, these hormones establish an attachment to the mate, which persists – represented in long-term changes in the brain – long after hormone levels have returned to normal. Experimentally blocking oxytocin/vasopressin effects in the brains of voles before their first mating prevents the formation of a pair bond. Conversely, pair bonds can be formed without mating by injecting these hormones into the brains of a pair of animals. Oxytocin seems to be the key hormone in females and vasopressin in males (Insel 1997; Insel, Winslow, Wang, & Young, 1998), although more recent research implicates oxytocin in pair bonding in both sexes.

While prairie voles form pair bonds, a closely related species, montane voles, do not. Like many other mammals, montane voles mate with multiple partners, and only the females care for the

young. The difference between these two species lies in the pattern of oxytocin and vasopressin receptors in the brain. Pair-bonding prairie voles have many oxytocin and vasopressin receptors in the nucleus accumbens and ventral pallidum, areas of the brain involved in reward. The oxytocin and vasopressin released when two animals mate for the first time act at these brain sites, permanently changing the dopamine (reward learning) system such that being with the mate becomes rewarding. In a sense, after mating, the brain develops an "addiction" to the mate (Keverne & Curley, 2004).

Does oxytocin underlie pair bonding in other species, such as humans? Although some researchers have speculated this to be the case (e.g., Taylor et al., 2000), conclusive evidence is still lacking. It is clear that humans do not form attachments in the same way as prairie voles: in our species, a single sex act does not lead to a life-long commitment! Nonetheless, oxytocin may play a role in the formation of bonds or attachments in humans. As in other mammals, oxytocin levels rise during sex (in particular, at orgasm) and during massage or other soothing tactile contact (Uvnas-Moberg, 1998). This oxytocin increase may facilitate bonding. Moreover, brain-imaging studies have revealed comparatively greater activity in the ventral striatum – a region encompassing reward-related circuitry, such as the nucleus accumbens – when people view photos of their significant other or own children than when they are shown photos of acquaintances or of other children (Bartels & Zeki, 2000, 2004). Thus, the reward circuitry that is crucial for vole pair bonding also seems to play a role in human attachment.

10.4.2.3 Other Attachments

Mating bonds and parent-offspring bonds are not the only attachments that animals form. Individuals of many species show signs of stress and pathology if isolated. Rodents, canines, and primates, for example, tend to live in close-knit groups and have strong motivations for contact and interaction with others in their group. In primates, in particular, attachments can form between unrelated, non-kin individuals. These are often supported by mutual grooming, which serves to strengthen ties and to soothe distressed apes. Motivation to be groomed seems to involve *beta-endorphin*, a naturally occurring opioid. Levels of this opioid in the nervous system rise during grooming, and individuals seek out grooming when opioid levels are low (Keverne, Martensz, & Tuite, 1989; see also Taira & Rolls, 1996).

Some studies suggest that opioids are involved in human affiliation, as well. After viewing an affiliation-related movie, people high in a "social closeness" trait felt more affiliative and had higher tolerance to heat-induced pain (opioids help to reduce pain). Both of these effects were blocked by naltrexone, an opioid antagonist (Depue & Morrone-Strupinsky, 2005). These findings suggest that the affiliation-related movie caused an increase in opioid release in this group of people.

Oxytocin has social functions beyond parent-infant and pair bonds, including an important role in social memory. When mice lacking the gene for oxytocin encounter a familiar mouse, they behave in the same way as they would with a stranger. When the missing oxytocin is replaced in their brains, they learn who is who in the same way as normal mice (Winslow & Insel, 2002).

Study

Oxytocin Associated with Trust Toward Strangers

Some intriguing studies suggest that oxytocin also plays a role in the trust that humans show toward strangers. Participants in one experiment played an economic game in which Player 1 was given a sum of money, some of which he or she could entrust to Player 2, in whose hands the money would triple. Player 2 then returned an amount of his or her choice (which might be nothing at all) to Player 1. It emerged that Player 2s who received higher sums of money from

Player 1s had higher blood levels of oxytocin; likewise, oxytocin levels were related to how much money Player 2s returned to Player 1s (Zak, Kurzban, & Matzner, 2005). In a follow-up study, one group was given a dose of oxytocin intranasally (some small molecules like oxytocin are able to enter parts of the brain, such as the hypothalamus, via the nose), and another group received a placebo. In the oxytocin group, Player 1s entrusted more money to Player 2s (Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005). In both studies, when people played the game with a computer that allocated money at random, oxytocin had no relationship to money received or given. This suggests that oxytocin actually increases the ability of humans to trust others.

The hormones estrogen, progesterone, prolactin, and oxytocin are involved in the initiation of maternal behavior. Similar hormones are also involved in paternal behavior. In mothers, oxytocin facilitates early recognition of and bonding with offspring. Oxytocin and vasopressin are also necessary for the formation of pair bonds. Once an attachment has been formed, these hormones are no longer needed to sustain the bond. Opioids are involved in the attachment of an infant to its parent, as well as in affiliation in primates.

10.4.3 Dominance

Most animals not only have to evade predators, find sustenance, and gain access to a mate to survive as individuals and as sets of genes; they also have to compete with members of their own species to secure resources necessary for survival. Behaviors directed at defeating others in resource competitions are called dominance behaviors, and they often give rise to relatively stable dominance hierarchies within a group.

10.4.3.1 Mechanisms and Benefits of Dominance

Dominance issues are most obviously at stake when the males of a species compete with each other for a mate. The competition can be carried out intrasexually, with the aim of defeating other males and keeping them away from females, and/or intersexually, with the aim of attracting the attention of a female by advertising genetic fitness. In Darwin's (1871) own words, this is the difference between "the power to conquer other males in battle" and "the power to charm females." The two often go hand in hand, e.g., when a male's large body size makes him more likely to win fights with other males and more attractive to females (Wilson, 1980).

Dominance extends beyond assertiveness and success in the mating game, however, and often involves privileged access to other resources, such as food or protected nest sites. In some species, including many birds, dominance is a relevant attribute only during mating and has to be renegotiated every mating season; in others, particularly animals living in social groups, dominance rank is a more stable individual attribute, determined and changed in occasional violent fights and reinforced frequently by nonviolent signals of dominance (e.g., a warning stare, bared teeth) and submission (e.g., exposure of the throat area in dogs and wolves).

The establishment of stable dominance hierarchies within a social group benefits both the "top dog," the alpha animal at the tip of the hierarchy, and the lower-ranking animals (Wilson, 1980). A stable dominance hierarchy means that all group members can save energy by adhering to a pecking order at the food trough – there is no need to fight over who gets the first pick at each feeding occasion. In many species, the dominant animal actively enforces peace among subordinate group members by breaking up fights. Although dominant animals are usually more successful at procreating, subordinate members also get to promote their genes, either by "sneak copulations" or by helping dominant animals with whom they share genetic ties to raise their offspring.

In humans, of course, things are more difficult, because it is much harder to pinpoint one specific dominance hierarchy that is binding for all. A student in a course may be subordinate to the high-expertise professor. Yet that professor may rank rather low among his or her colleagues in the department, whereas the student may be an undefeated ace on the tennis court and excel in the college debating society. Thus, humans' dominance ranks are much more fluid than other animals', reflecting the fact that each of us is a member of many different groups, not just one.

10.4.3.2 Brain Correlates of Dominance

The biopsychological roots and correlates of dominance have been extensively studied in the rat, biopsychology's favorite animal model (Albert, Jonik, & Walsh, 1992). A male rat tries to establish or maintain dominance by launching an attack that involves pushing an intruder with his hind legs or flank and then chasing him away. He also shows piloerection; i.e., the hair on his body rises to make him look bigger and more intimidating. This pattern of lateral attack and piloerection is also observed in rat mothers trying to protect their pups. A hypothalamic network centered on the anterior nucleus (AN) of the hypothalamus plays a critical role in lateral attack and piloerection and thereby in rats' dominance behavior (Albert et al., 1992; see also Delville, DeVries, & Ferris, 2000). If the AN is lesioned, lateral attack is no longer displayed against intruders; if it is stimulated, lateral attack can be elicited much more quickly and is more intense. This effect is particularly strong in the presence of high levels of testosterone in males or testosterone and estradiol in females. The hypothalamus interacts with other brain areas involved in incentive motivation and reward learning to regulate dominance behavior. For instance, lesions of the nucleus accumbens decrease rats' inclination to attack intruders (Albert, Petrovic, Walsh, & Jonik, 1989). Conversely, elevated levels of gonadal steroids like testosterone and estradiol facilitate motivation to attack intruders in nonlesioned rats by binding to steroid receptors and thereby increasing transmission at dopaminergic synapses in the accumbens (Packard, Cornell, & Alexander, 1997). Some more recent work has also started to examine dominance motivation in the human brain. For instance, one study has shown that viewing facial expressions that signal a dominance challenge (anger), relative to non-challenging expressions, is associated with activation of the striatum and the insula, a part of the cortex that is involved with affective processing of somatic responses (Craig, 2009), in individuals with a strong need for power (Schultheiss et al., 2008; Hall, Stanton & Schultheiss, 2010). This suggests that individuals with a strong disposition to seek dominance response with an activation of their incentive motivation system to dominance challenges, whereas individuals lacking this need do not.

10.4.3.3 Dominance and Aggression

At this point, a word of caution is in order about the relationship between dominance and aggression. First, aggression is just one way of attaining and securing dominance in many species, a fact that may be obscured by a narrow focus on the rat as an animal model of dominance. Aggressive and violent behavior as a means of attaining dominance often backfires in primate groups and is almost universally outlawed in humans. Work on primates suggests that high levels of the neurotransmitter serotonin, which has a restraining effect on impulsive aggression, promote the attainment of high social rank (Westergaard, Suomi, Higley, & Mehlman, 1999). Thus, considerable social finesse is required to become dominant, and in humans more than most other species, nonaggressive means of achieving dominance have become critical for social success.

Second, not all forms of aggression are related to dominance (Panksepp, 1998). Besides the type of offensive aggression associated with dominance in many species, there is also defensive aggression elicited by threat and predatory attack directed against prey. The latter two are mediated by brain systems other than those we have described for offensive aggression; they serve very different functions, and they are not influenced by hormone levels.

Thus, it would be a mistake to equate dominance with aggression, because many forms of dominant behavior (particularly in higher mammals) are not overtly violent or aggressive, and some forms of aggression have nothing to do with dominance.

10.4.3.4 Hormonal Factors in Dominance Behavior

As indicated by the facilitating effect of gonadal steroids on AN-mediated offensive aggression, hormones play a key role in dominance interactions. In many species, including humans, high levels of testosterone facilitate aggressive and nonaggressive dominance behaviors (Nelson, 2011). For instance, seasonal variations in testosterone levels are strongly associated with seasonal changes in aggression and territorial behavior in many species: when testosterone is high, aggression is high. As testosterone production increases in male mammals and birds around puberty, there is a concomitant increase in aggression; castration abolishes both increases. In humans, it has been observed that those male and female prisoners who are high in testosterone are the ones engaging in more aggressive behavior and rule infractions, although the cause and effect are not clear, since aggressive behavior can boost testosterone (see below) (Dabbs, Frady, Carr, & Besch, 1987; Dabbs & Hargrove, 1997). In most species, those high in testosterone are more likely to engage in battles for dominance.

However, a recent study in which testosterone or a placebo was given to research participants underscores our caveat that dominance and aggression should not be equated (Eisenegger, Naef, Snozzi, Heinrichs, & Fehr, 2010). Participants played a game in which they were given money and could pass a share of this money on to another player. It was up to them how big a share they wanted to give. The other player could only accept the share or reject it. If the latter happened, neither player retained any money. Thus, the second player had a "veto" over the decision of the first player, and second players exercise their veto if they perceive the offer to be unfair. Contrary to the folk wisdom that testosterone equals aggression, testosterone-treated players offered fairer shares (i.e., closer to 50%) than placebo-treated players. After ruling out other explanations for this finding, the authors argued that this behavior protects the elevated dominance status of the money-giving player over the receiving player, because the latter could turn the tables by rejecting an offer. By making offers less likely to be rejected, the money-giving player remains the decision-maker.

Success or defeat in dominance contests in turn leads to increased or decreased levels of testosterone. Elevated levels of testosterone have been observed, for instance, in winners of sports competitions, in chess matches, and even in simple games of chance, whereas losers' testosterone typically decreases (Mazur & Booth, 1998). These differences in testosterone responses to contest situations even extend to observed dominance. Research has shown that after a democratic election, supporters of the winning candidate have stable or increased testosterone, whereas supporters of the losing candidate have decreased testosterone (Stanton, Beehner, Saini, Kuhn, & Labar, 2009). Thus, the relationship between testosterone levels and dominance outcomes is a two-way street, in which testosterone levels influence dominance seeking and the results of this behavior affect testosterone levels (Mazur, 1985; Oyegbile & Marler, 2005).

Although basal levels of gonadal steroids like testosterone are usually under hypothalamic control (the hypothalamus regulates the release of hormones from the pituitary, which in turn regulates the release of hormones such as testosterone from glands in the body), this mechanism is relatively sluggish, and changes can take an hour or more. The testosterone increases and decreases typically observed in winners or losers of dominance contests occur within 10–20 min, however – much faster than hypothalamic control would permit. So what is it that drives these rapid changes in testosterone levels?

Robert Sapolsky (1987) solved this riddle in a series of elegant field experiments with wild-living baboons in Kenya. He exposed both high-ranking and low-ranking male baboons to stress by darting and immobilizing them (baboons, like many other mammals, experience immobiliza-

tion as stressful). Sapolsky observed that, within minutes, low-ranking animals showed a drop in testosterone, whereas high-ranking animals' testosterone surged. To find out what explained these differences in testosterone response to a stressor, he next applied a variety of hormone agonists and antagonists and studied their effect on testosterone release. Sapolsky observed a greater increase in the stress hormone cortisol in low-ranking than in high-ranking baboons; moreover, administration of dexamethasone (a cortisol-like substance) suppressed testosterone release in all animals by making the testosterone-producing cells in the testicles less sensitive to signals from the pituitary. In contrast, administration of a substance that inhibited the release of the sympathetic catecholamines epinephrine and norepinephrine (also called adrenaline and noradrenaline) abolished the post-stress testosterone increase in high-ranking baboons, which suggests that these hormones normally have a stimulating effect on testicular testosterone release. Sapolsky concluded from these findings that the balance between cortisol, which is more likely to be released in response to overwhelming stressors, and sympathetic catecholamines, which are released very quickly in response to stressors that are perceived as manageable, has a rapid and direct effect on testosterone. If the cortisol response to a stressor outweighs the catecholamine response, testosterone levels dip quickly – an outcome that is more likely in low-ranking, powerless animals. If the catecholamine response to a stressor outweighs the cortisol response, testosterone increases – a typical outcome for dominant animals that are used to calling the shots.

These findings from a relatively unusual darting-and-immobilization procedure mirror exactly what Sapolsky and others have observed in many mammalian species. Often, dominant and nondominant animals do not differ substantially in their basal testosterone levels (Sapolsky, 1987; Wingfield et al., 1990). When they are challenged, however, dominant animals respond with a rapid increase in testosterone, which increases muscle energy and aggressiveness and thus makes them more likely to win the fight, whereas nondominant animals respond with a testosterone decrease, lowering their pugnacity and thus their likelihood to get hurt in a fight. In humans, high levels of implicit power motivation may be the equivalent to dominant status in animals (Schultheiss, 2007; Stanton & Schultheiss, 2009). Power-motivated people respond to dominance challenges in which they can keep the upper hand with increased sympathetic catecholamines and decreased cortisol (Wiemers, Schultheiss, & Wolf, 2015; Wirth, Welsh, & Schultheiss, 2006). The net result is a testosterone increase within 15 min of the challenge. In contrast, low-power individuals respond to dominance challenges with increased cortisol levels and low catecholamine levels, suggesting that, even when they are able to keep the upper hand, they feel stressed and uncomfortable with the situation. The result is a drop in testosterone (Schultheiss, Wirth, Torges, Pang, Villacorta, & Welsh, 2005).

Excursus

Dominance

Dominance behaviors are aimed at gaining privileged access to resources that ensure the individual's personal and genetic survival. Established dominance hierarchies bestow benefits on dominant and subordinate members of a group by lowering the incidence of energetically costly fights for resources. Dominance is not synonymous with aggression – while offensive, hormone-dependent forms of aggression clearly play a role in the establishment of dominant status, dominance also encompasses nonaggressive behaviors, and predatory and defensive aggression typically are unrelated to dominance. Dominance motivation is supported by the anterior nucleus of the hypothalamus and its interconnections to brain substrates of incentive motivation and by high levels of gonadal steroids such as testosterone and estradiol, which

facilitate signal transmission in brain structures related to dominance motivation. In many species, high testosterone facilitates dominance and aggression, and the outcomes of dominance encounters cause rapid changes in testosterone, particularly in males, with winners registering an increase and losers a decrease. These testosterone changes are triggered by the effects of stress hormones on the gonads. Elevated cortisol levels inhibit while elevated sympathetic catecholamine levels stimulate the release of testosterone. In humans, high levels of implicit power motivation predispose individuals to respond to dominance challenges with low cortisol, elevated sympathetic catecholamines, and increased testosterone, whereas low-power individuals respond with increased cortisol, low sympathetic catecholamines, and decreased testosterone.

10.4.4 Sex

The need for sex is at once one of the most potent and most peculiar of all motivational systems. One does not have to be a Freudian to recognize that much of what goes on in the lives of humans and other beings revolves around sexual reproduction. At the same time, not having sex does not threaten our survival as individuals in the same way as not having food, water, or social protection does. But given that the transmission of genes to offspring is the ultimate and perhaps most magnificent goal of all sexually reproducing animals, extending an unbroken, billion-year-old chain of life by another generation, it makes sense that evolution ensured that no living being would forget about procreating by making the sexual urge an extremely powerful one. In the following, we review how sexual motivation is shaped by the interaction of biological factors and experience.

10.4.4.1 Developmental Origins of Sex and Gender

Although, for birds and mammals, biological sex initially resides in the genes, the gonads take over fairly early in fetal development. For the rest of our lives, the gonads govern sexual behavior to a large extent, partly through their permanent (organizational) effects on the developing brain and partly through their temporary (activational) effects on the adult brain (Nelson, 2011). If a gene on the Y chromosome that is present only in males is expressed at conception, testes develop and start producing testosterone and other androgenic hormones, leading to male body morphology (e.g., development of male genitals) and brain organization. If the gene is not activated at conception – as is the case in females, who do not carry the Y chromosome – ovaries develop. Because ovaries release almost no hormones during fetal development, the brain and the body develop in the female mode. It should be noted that sexual development is not all or none, either male or female. Rather, different parts of the body and of the brain are influenced by the interplay of hormones, hormone-metabolizing enzymes, and the expression of hormone receptors at different times during intra- and extrauterine development, which can lead to variations in the fit between "brain sex" (sexual identity, sexual preferences) and body sex. Thus, although in many cases male body sex is associated with male sexual identity and a preference for female partners and female body sex is associated with female sexual identity and a preference for male sexual partners, this is by no means a certain outcome and variations (e.g., transsexuality, homosexuality) do occur (LeVay & Hamer, 1994; Panksepp & Biven, 2012).

10.4.4.2 Hypothalamic Command Centers of Sexual Behavior

The differential "marinating" of the brain in gonadal hormones during fetal development leads to differences in the organization of hypothalamic control of sexual behavior. These differences, and their effect on sexual motivation and behavior, have been most thoroughly studied in rats (Nelson, 2011; Panksepp, 1998). In

female rats, the key command center of sexual behavior is the ventromedial nucleus (VMN) of the hypothalamus. If this nucleus is lesioned, female rats will not show any interest in mating with a male, as reflected in the absence of proceptivity (the active solicitation of male sexual interest) and receptivity (the readiness to allow males to mate with them). In rats, receptivity is easily observable as a behavior called lordosis, which consists in the female arching her back and deflecting her tail to allow the male to copulate with her. Electrical stimulation of the VMN, on the other hand, can trigger both proceptivity and receptivity, but only in the presence of the gonadal steroids estrogen and progesterone, which bind to steroid receptors in the VMN and are released during the fertile phase (estrus) of the rat's estrous cycle. Of course, the central coordinating function of the VMN is functionally integrated with the operation of brain structures supporting incentive motivation generally. For instance, female rats in estrus show increased DA release in the nucleus accumbens at the sight of a male rat, and this increased DA release reflects increased motivation to approach the male (Pfaus, Damsma, Wenkstern, & Fibiger, 1995).

The key command center of male sexual behavior is the medial preoptic area (MPOA) of the hypothalamus, which, as a result of organizational effects of gonadal steroids, is larger in males than in females. MPOA lesions in males lead to an inability to copulate, whereas electrical stimulation of the MPOA makes male rats ejaculate earlier than normal. Testosterone treatment in castrated male rats restores normal levels of neuronal firing in the MPOA. As in females, the hypothalamic control of sexual behavior in males is integrated with general-purpose motivational brain systems and hormonal factors. In a series of elegant studies, Everitt (1990) showed that MPOA lesions led to a loss of copulatory ability, while sexual motivation remained intact (e.g., animals continued to bar-press for access to females). Conversely, if the basolateral amygdala was lesioned and the MPOA was spared, animals were no longer motivated to gain access to a female in estrus but were able to copulate with her once placed on top of her. Likewise, a reduction of DA transmission in the mesolimbic DA system led to a decrease in sexual motivation but did not affect copulatory ability. Notably, castration, which leads to an almost complete loss of testosterone, impaired both sexual motivation and copulatory ability.

10.4.4.3 Hormonal Factors in Sexual Motivation

This last finding suggests that hormones, which bring about differential organization of the hypothalamus in males and females in the first place, later play a key role in sexual motivation. Even with a fully functional brain, sexual behavior in mammals and other species is strongly dependent on sufficient levels of gonadal steroids (i.e., testosterone, estrogen, and progesterone; Nelson, 2011). In females of many species, including our own, initiation of sexual activity coincides with the high-estrogen phase of the reproductive cycle (Wallen, 2001; note, however, that in most other species, females not in estrus show no sexual interest at all). Removal of the ovaries leads to a loss of sexual appetite, which can be restored through the administration of estrogen (Zehr, Maestripieri, & Wallen, 1998). Similarly, male sexual motivation in humans and other species depends on sufficiently high levels of testosterone (Nelson, 2011). Notably, in many parts of the brain, testosterone needs to be converted to estrogen first before it can have an effect on behavior, and studies have shown that male sexual motivation requires the presence of both testosterone and testosterone converted to estrogen in the brain (Baum, 1992).

The release of gonadal steroids does not just fuel sexual motivation but can itself be the outcome of a motivational process. For instance, research on rats has shown that conditioned sexual cues can trigger the release of testosterone in males (Graham & Desjardins, 1980). By the same token, a study with human subjects revealed that heterosexual men experience a transient testosterone rush when they meet an attractive woman (Roney, Lukaszewski, & Simmons, 2007). Conversely, being committed to a romantic partner is associated with a reduction of

testosterone in men, perhaps as a safeguard against aggression within the relationship and the lure of potential partners outside the relationship (Gray et al., 2004).

10.4.4.4 Learned Sexuality

Findings about the roles of the hypothalamus and hormone levels in sexual motivation may be taken to suggest that sexual motivation is a purely biological phenomenon that is not influenced by environmental factors.

However, biopsychologists have collected ample evidence that sexual behavior is strongly dependent on social learning processes, to the extent that some researchers even speak of "learned sexuality" (Woodson, 2002).

The conditioned hormone release effect described above is one example of learned sexuality. Moreover, rats reared in social isolation show clear deficits in sexual motivation and copulatory performance later in adulthood, and even animals that were reared socially need to learn, through Pavlovian and instrumental conditioning processes, how to tell male from female, what types of signals are sent by a potentially willing partner, and how to copulate appropriately. Even something as "biological" as male sperm production is amenable to learning: male Japanese quails release more spermatozoa and a greater overall volume of semen during copulation if they have been exposed to a Pavlovian-conditioned sexual cue that stimulated sperm production in the gonads in a preparatory fashion before copulation (Domjan, Blesbois, & Williams, 1998). This dependence of sexual behavior on learning may also explain why, in species whose behavior is particularly open to learning, such as humans, sexual motivation and performance can remain intact for a long time even after sudden loss of gonadal function and why the females of our species and some other primates (e.g., the bonobo chimpanzee) show sexual motivation and behavior even during low-estrogen, nonfertile phases of the reproductive cycle.

Hormonal factors play a critical role in the organization of gendered body morphology and brain structures during development. After maturation, sexual motivation and performance depend on the activational effects of gonadal steroids. The ventromedial nucleus and the medial preoptic area are the hypothalamic control centers for sexual behavior (particularly copulation) in females and males, respectively, and are functionally integrated with the brain's incentive motivation network (i.e., amygdala, striatal dopamine system). Adaptive sexual behavior also depends on learning processes that allow organisms to learn about and discriminate sexual cues and to acquire behaviors that are instrumental for successful mating.

10.5 Conclusion

In this chapter, we have sought to provide an overview of the biopsychology of motivation – an incredibly vast, multifaceted, fascinating, and lively field of study that is often overlooked by social-cognitive motivation psychologists, who tend to rely primarily on self-report and experimental studies with humans. As a consequence, with relatively few exceptions, the biopsychological and social-cognitive approach to the study of motivation have pursued quite separate research agendas for a long time, with the former exploring the brain correlates of basal needs such as hunger, sex, or affiliation and the latter examining people's goals, self-views, attributions, and information-processing biases. However, the fact that we were able to weave numerous studies involving human subjects into this chapter suggests that the divide between the two fields of motivation research is gradually vanishing. It is our hope that, as biopsychologists become more interested in the way that fundamental motivational needs play out in the human brain, human motivation researchers will become more interested in how motivational processes and constructs that are uniquely human are "embrained" and embodied.

Review Questions

1. *Describe three research strategies that are frequently used in the biopsychology of motivation. What are these strategies almost always combined with?*

   Biopsychological research on motivation often uses (1) lesioning techniques to study the contributions of specific brain areas to a behavior, (2) recording techniques (e.g., single-cell recording, in vivo dialysis) to study the behavior of specific neurons, and (3) pharmacological manipulations of synaptic signal transmission to study the role of specific transmitter systems. These strategies are almost always combined with behavioral methods (e.g., Pavlovian or instrumental learning procedures) to illuminate the contributions of specific brain areas or transmitter systems to specific cognitive or behavioral functions

2. *What are the hallmarks of motivation from the perspective of biopsychology?*

   Motivation is based on the (anticipated) experience of pleasure or displeasure upon encountering an incentive or a disincentive as a common currency for prioritizing possible courses of action. Motivated behavior can be directed toward the attainment of rewards (approach motivation) or away from punishers (avoidance motivation). Motivation consists of two distinct phases: a motivational phase proper, during which the individual engages in the pursuit of a reward (or avoidance of a punisher), and an evaluation phase, during which the individual consummates the reward and evaluates its "goodness." Although there are many different classes of reward (e.g., food, sex, dominance), they can all engage similar motivational processes (e.g., response invigoration, learning). Motivated behavior changes its goals dynamically, depending on how recently a given need has been satisfied and what kinds of incentives are available in a given situation. Motivation can be induced through a physiological need, the presence of incentive stimuli, or both. Motivation makes use of, and shapes, learning of stimulus-stimulus (Pavlovian conditioning) and means-end (instrumental conditioning) relationships. Biopsychological approaches to motivation do not assume that motivation requires conscious awareness but acknowledge that specialized brain systems support the conscious setting and execution of goals in humans

3. *What is a key function of the amygdala in motivation?*

   The amygdala forges associations between affectively neutral stimuli (CS) and the affectively charged events or stimuli (US) that they reliably predict. In the process, the predictive stimuli take on affective meaning themselves and can induce motivational states. The amygdala thus acts as a motivational "homing-in" device that allows individuals to adjust their physiological states and overt behavior to cues that predict the occurrence of unconditioned rewards and punishers and bring them closer to the former or distance them from the latter

4. *What is the key function of the striatum in motivation?*

   The striatum has two main functions in motivation, both mediated by the neurotransmitter dopamine: the ventral stratum is critical for reward-driven invigoration of behavior, whereas the dorsal striatum plays a key role in learning about action-outcome contingencies and selecting behaviors that are instrumental for obtaining rewards (or avoiding punishers)

5. *What is the key function of the orbitofrontal cortex (OFC) in motivation?*

   The OFC evaluates the "goodness" of primary and secondary (i.e., learned) rewards based on the individual's current need state, learning experiences, and previous exposure to the reward.

6. *What is the key function of the lateral prefrontal cortex (LPFC) in motivation?*

   The LPFC guides behavior through the formulation of complex, verbally represented goals and plans for their implementation. It also influences behavior by regulating the output of the brain's incentive motivation network and can shield explicit goals from interference by incentive-driven motivational impulses

7. *What is the difference between active and passive avoidance? Which structure of the motivational brain plays a critical role in the former but not in the latter?*

   The difference between passive avoidance and active avoidance is that in the former, behavior is *inhibited* in order to avoid a punisher, whereas in the latter, behavior is *executed* in order to attain safety. Functions of the mesolimbic dopamine system play a critical role in active but not passive avoidance

8. *What is alliesthesia? Give an example*

   Alliesthesia is the changing subjective evaluation of a reward over repeated exposures or across changing stimulus contexts. For instance, most people experience one piece of chocolate as quite tasty and pleasant but would respond with nausea and aversion after eating a pound of it

9. *Imagine you have just finished a large meal. Describe the signals sent to your hypothalamus to indicate that you are full and how neuropeptide systems in the hypothalamus would respond*

   Leptin levels increase in the bloodstream; levels of CCK from the gut also rise. CCK sends signals to the vagus nerve. Leptin and the CCK signal from the vagus nerve act on the hypothalamus to increase the activity of α-MSH neurons and decrease the activity of NPY neurons

10. *How do opioids and NPY differ in their control of food intake/motivation to eat?*

    NPY is involved in hunger driven by energy needs. NPY causes animals to prefer the most calorically dense food available, even at the expense of taste. Opioids are involved in motivation to eat for pleasure. Opioids drive animals to choose the tastier option, at the expense of calories/energy

11. *Describe one role of opioids in affiliation or attachment*

    Any of the following: (a) Opioids reduce distress in infant mammals separated from their mothers, implicating opioid systems in infant-to-parent attachment. (b) In primates, opioids are involved in motivation to engage in mutual grooming. (c) In humans, opioid systems may be involved in feelings of affiliation, as evidenced by higher pain tolerance in people high in a "social closeness" trait after they watched an affiliation-related movie, an effect that was blocked by an opioid antagonist

12. *Describe the role of oxytocin in parent-offspring attachments and pair bonds. Is oxytocin necessary for the initiation of attachment? For the maintenance of the attachment? Is it sufficient?*

    High oxytocin levels in the bloodstream are necessary for the formation of parent-offspring attachments and pair bonds. However, oxytocin is not sufficient – other hormones and learning factors are also necessary. Oxytocin is not necessary for the maintenance of the attachment once it has been formed

13. *What is the difference between intrasexual and intersexual competition?*

    Intrasexual competition occurs when members of one gender fight or compete with each other to establish who will be allowed access to members of the other

(continued)

gender, whereas intersexual competition occurs when members of one gender vie, as potential mates, for the attention and acceptance of members of the other gender

14. *What is the relationship between dominance and aggression?*

    Aggression is one form of dominance behavior. However, not all forms of aggression serve dominance functions (e.g., predatory or defensive aggression are not aimed at dominance), and dominance also encompasses nonaggressive behaviors, which are particularly critical for success in primate species

15. *Which hypothalamic structure plays a critical role in dominance, and how can this be demonstrated?*

    The anterior nucleus (AN) of the hypothalamus plays a critical role in dominance, as assessed by piloerection and lateral attack. If the AN is lesioned, dominance behavior ceases; if the AN is stimulated, dominance behavior is facilitated

16. *What is the relationship between dominance and gonadal steroid hormones?*

    High levels of gonadal steroids (primarily testosterone but also estradiol) facilitate dominant and aggressive behavior, and success in dominance interactions can in turn increase gonadal steroid levels. Thus, the relationship between dominance and gonadal steroids is reciprocal

17. *Which mechanism drives the rapid testosterone changes observed in the context of male dominance challenges?*

    In males, rapid changes in testosterone release are governed by the stimulatory effects of sympathetic catecholamines (norepinephrine and epinephrine) and the inhibitory effects of cortisol on the testes. In dominant individuals, the effect of sympathetic catecholamines outweighs that of cortisol, producing a net increase in testosterone. In nondominant individuals, the effect of cortisol outweighs that of the sympathetic catecholamines, leading to a net decrease in testosterone

18. *Which hypothalamic centers regulate male and female sexual behavior, and which specific aspects of sexual behavior are particularly dependent on these centers?*

    The ventromedial nucleus (VMN) and the medial preoptic area (MPOA) are the hypothalamic control centers for sexual behavior in females and males, respectively. In females, both proceptivity (active solicitation of male sexual interest) and receptivity (readiness to allow males to mate with them) depend on an intact VMN and sufficiently high levels of estradiol and progesterone. In males, copulatory ability depends on an intact MPOA and sufficiently high levels of testosterone, whereas sexual motivation does not depend on the MPOA

19. *What evidence is there to suggest that hypothalamic control centers of sexual behavior are functionally integrated with other structures of the brain's incentive motivation network in sexual motivation?*

    Female rats in estrous show increased dopamine (DA) release in the nucleus accumbens at the sight of a male rat, and this increased DA release reflects increased motivation to approach the male. In males, a reduction of DA transmission in the mesolimbic DA system leads to a decrease in sexual motivation but does not affect copulatory ability. Moreover, MPOA lesions lead to a loss of copulatory ability in males, while sexual motivation remains intact. Conversely, if the amygdala is lesioned and the MPOA

is spared, male rats are no longer motivated to gain access to an estrous female but are able to copulate with her once placed on top of her. These findings suggest that sexual motivation depends not just on the hypothalamus for copulatory ability but also on the amygdala and the mesolimbic DA system for guiding and invigorating an animal's behavior to gain access to a mate

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Goals

11

Veronika Brandstätter and Marie Hennecke

11.1 Introduction

Every day we encounter the word "goal" in a variety of different contexts. Companies, for example, define business goals (e.g., increasing profits by 5% compared to the previous year) that are the basis for concrete individual goals regarding what employees in all organizational units should achieve (e.g., close 50 new insurance contracts monthly). Curricula at school define goals for what students are expected to learn each year (e.g., understanding and applying trigonometry). Finally, individuals have personal goals that are related to the various areas of life, can be abstract or concrete, and have different timeframes (e.g., learning Italian vs. studying the 100 most important Italian expressions for a particular semantic field).

All of these situations have one thing in common: Having a goal means to direct our behavior purposefully toward something desirable in the future whose realization we consider to be positive. Having a goal allows us to gather our strength by regulating attention, concentration, readiness to work, and perseverance and suggesting possible behavioral strategies for achieving our goal. It also means, however, to possess a specific competence or develop such competence and apply standards to our behavior that enable us to decide whether we are succeeding or failing. The more demanding and challenging our goals are, the more important this final aspect becomes.

Goals control our behavior, structure our everyday life, and create coherence among various seemingly unrelated parts of our behavior (e.g., buying the latest novel by an Italian author; travel to Italy; meeting up with a colleague who speaks Italian) (for an overview see Aarts & Elliot, 2012; Moskowitz & Grant, 2009). We contemplate goals as they open up or close opportunities to make particular experiences by prompting us to seek out or avoid certain situations. Thereby, goals affect learning and personal development (see Chap. 17). They are in fact one of the most important sources of personal identity and an individual's emotional state (Brunstein, Schultheiss, & Maier, 1999; Brandtstädter, 2007).

Goals do not only integrate cognitive, affective, and behavioral processes; they also facilitate an interactionist perspective of the relationship between individual and environment that Lewin's behavioral formula requires as an indispensable condition for an informed psychological analysis (see Chap. 5):

> "In general terms, behavior (B) is a function (F) of the person (P) and of his environment (E), B = F (P, E). In this equation the person (P) and his environment (E) have to be viewed as variables which are mutually dependent upon each other. In other words, to understand or to predict behavior, the person and his environment have to be considered as one constellation of interdependent factors […]." (Lewin, 1951, pp. 238–240)

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Pursuing goals depends thus strongly on the characteristics of our surroundings. Simply being determined to achieve a particular goal is not enough to ensure that the goal can be realized successfully if environmental factors strip us of possibilities to act accordingly (incentives; see Chap. 5 in this volume).

Before we can have a look at influential goal-oriented approaches, we need to answer the question how the scientific literature has defined goals. One of the most frequently cited of the various existing definitions was developed by Austin and Vancouver (1996):

"We define goals as internal representations of desired states, where states are broadly construed as outcomes, events, or processes." (p. 338)

There are different reasons for why people pursue goals. They might look forward to the activity that leads to goal realization (activity incentive) or anticipate certain outcomes that take the forms of achieving something pleasant or avoiding something unpleasant (incentive of purpose, Rheinberg, 1989, Chap. 14 in this volume; approach vs. avoidance, Elliot, 2008; overview in Heckhausen, 1977). Because humans are able to regulate their behavior based on anticipated incentives, goals are cognitive representations of future events (see Chap. 5 in this volume). Without this ability, we would only act in ways that are triggered by immediate internal or external stimuli (e.g., looking for food when we are hungry; running away from a dangerous animal). It would be impossible to make long-term plans. Wishes are also directed at the future ("It would be great if…"). However, they lack the definitive and binding quality of goals to act (intention; the primary act of will "I want that!," Ach, 1935) in order to achieve the desired goal, particularly if obstacles need to be overcome (Bargh, Gollwitzer, & Oettingen, 2010). Commitment to a goal activates various volitional processes that support its realization (e.g., self-control, Baumeister, Vohs, & Tice, 2007; implemental mindset, implementation intentions, see Chap. 12 in this volume; strategies of behavioral control, see Chap. 13 in this volume).

Committing to a goal (i.e., forming an intention) is in fact the decisive step from wish to action. Psychologists clearly differentiate between goal setting and goal striving (Bargh, Gollwitzer, & Oettingen, 2010; Gollwitzer, 1990; Kuhl, 1984). Very different questions can be asked about the two important phases: What kinds of goals do people set? What determines how strongly they commit to certain goals? What is the relationship between goal striving, performance and well-being? What determines which goals are realized successfully? Is it possible to commit too strongly or to persist for too long?

Apart from the distinctive processes of goal setting and goal striving, the third central issue in the research on goals is the cognitive representation of goals. Goals need to remain active even if there is currently no way to realize them or if we have to interrupt a behavioral sequence (Goschke & Kuhl, 1993). If we forgot an intention like we forget a phone number we never call, goal pursuit would be extremely difficult.

This chapter is structured based on four topics that occur in chronological order when people pursue goals: (a) determinants and processes of goal setting, (b) cognitive aspects of goals, (c) determinants and processes of goal striving, and (d) determinants and processes of goal disengagement.

The theoretical approaches presented in this chapter can be divided into process-oriented and non-process-oriented approaches. Process-oriented theories discuss the dynamic interaction between relevant factors over time during the various phases between goal setting and goal attainment or disengagement (e.g., action phase model, Heckhausen & Gollwitzer, 1987; see Chaps. 12 and 17 in this volume). Non-process-oriented theories subscribe to a static view of the individual factors that contribute to goal setting and striving (e.g., approach vs. avoidance orientation, Elliot, 2008).

11.1.1 Types of Goals and How They Are Measured

Researchers look at all types of different goals: specific goals in experimental tasks in the laboratory (e.g., Förster, Liberman, & Higgins, 2005) or in the workplace (Locke & Latham, 1990) but also people's very personal everyday goals (Brunstein, 1993; Emmons, 1986). In the context of slightly different theoretical foci, personal

goals are referred to as current concerns (Klinger, 1977), life tasks (Cantor & Fleeson, 1991), possible selves (Markus & Nurius, 1986), personal projects (Little, 1989), personal strivings (Emmons, 1996), self-defining goals (Wicklund & Gollwitzer, 1982), identity goals (Gollwitzer & Kirchhof, 1998), or developmental goals (Heckhausen, 1999; Heckhausen, Wrosch, & Schulz, 2010; see Chap. 17 in this volume).

Research on goals uses various methodological approaches, ranging from experimental laboratory and field studies to correlative studies that assess data at one point in time (cross-sectional) or at several different times (longitudinal study design). Questionnaires (with closed-ended or open-ended questions), behavioral observation (e.g., reaction times, observing goal-oriented behavior and performance), and psychophysiological and neuropsychological methods are used. Goals might be represented as dependent variables in the analysis of determinants of goal setting or as independent variables in the analysis of the cognitive aspects or determinants of goal realization. Either way, their description always needs to satisfy certain criteria and theoretical dimensions, particularly if participants are asked to list a selection of their own personal goals. The technique of using uniform aspects (e.g., importance, likelihood of success, opportunities to act, progress) to evaluate and compare individual goals is known as the idiographic-nomothetic method.

Goals regulate thinking, emotions, and behavior. Psychological research examines very different types of goals, ranging from specific goals defined in a laboratory setting to personal goals.

11.2 Determinants and Processes of Goal Setting

Which kinds of goals do people set and what determines whether they strongly commit to these goals? Searching for the determinants of goal setting would be a trivial task if everybody did the same at any given point. Yet, there are tremendous individual differences. And even though different people often set their own goals, there are certain situations in which different people tend to form very similar intentions (e.g., moving out of our parents' house as young adults; looking for a job after school; engaging in small talk at social gatherings). This suggests that goal setting is in part influenced by situational-normative variables (e.g., developmental tasks, e.g., Salmela-Aro, 2009; Heckhausen, 1999; Chap. 17 in this volume). We do not only set our own goals; sometimes others (e.g., parents, teachers, doctors, coaches, employers) assign them to us. Regardless of a goal's origin, however, it is crucial that the acting individual commits to it. Otherwise, it is fated to remain merely a well-intended wish or vague expectation. Only individuals who have committed to a goal will persist on the way toward its realization when they face challenges (Brunstein, 1993; Locke & Latham, 1990; Oettingen, 2012). So what determines the strength of our commitment?

11.2.1 Expectancy-Value Theory of Goal Setting

"Commitment […] describes the extent to which personal goals are associated with a strong sense of determination, with the willingness to invest effort, and with impatient striving for goal implementation." (Brunstein, 1993, p. 1062)

This definition shows that even though goal setting is a binary event, the strength of the resulting commitment can differ gradually. This perspective is supported by the influential social psychological theory of planned action by Ajzen und Fishbein (1980) according to which the strength of an intention is central for explaining consistency between attitude and behavior.

Various theories on commitment and intention strength are based on assumptions of expectancy-value theory (Ajzen & Fishbein, 1980; Bandura, 1977; Brunstein, 1993; Custers & Aarts, 2005; Gollwitzer, 1990; Hollenbeck & Klein, 1987; Vroom, 1964). The central claim of expectancy-value theory is that the desirability (value) and feasibility (expectancy) of a

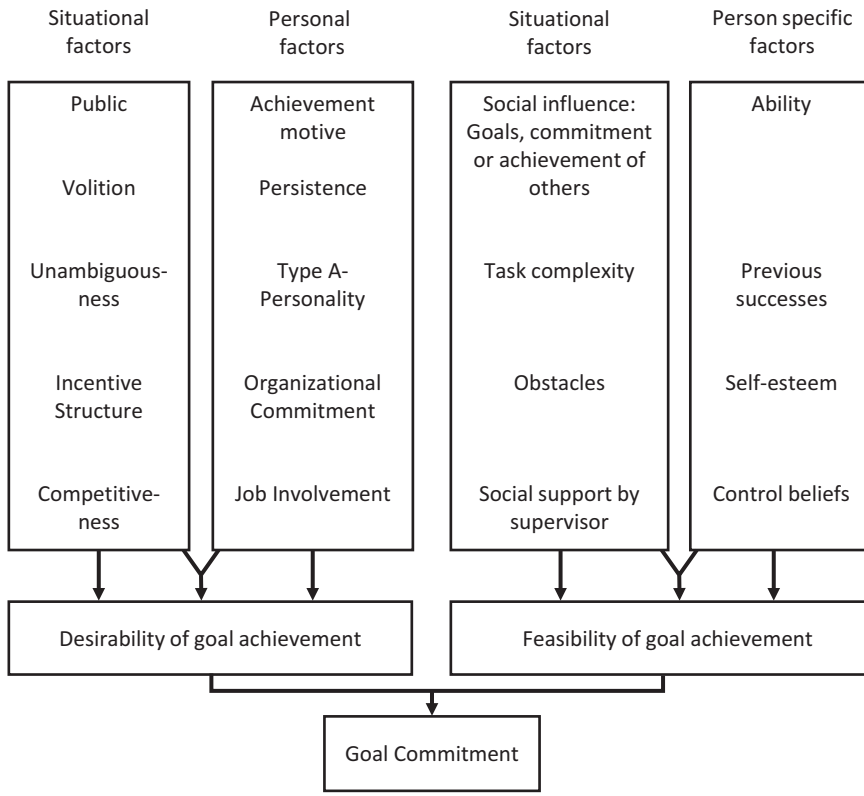

Fig. 11.1 Antecedent determinants of goal commitment after Hollenbeck and Klein (1987, p. 215)

goal determine which goals an individual selects and how much they commit to the selected goals (see Chap. 5 in this volume). Hollenbeck and Klein (1987) adopt this perspective in their organizational psychological model and specify the two determinants desirability and feasibility for a work context. They distinguish between personal and situational determinants (Fig. 11.1) and thus provide an interactional explanation of behavior.

More generally, the determinants Hollenbeck and Klein identified in the context of work can be complemented as follows:

Personal Determinants of a Goal's Desirability (D) and Feasibility (F)

- Implicit achievement, affiliation, and power motive (Schultheiss & Brunstein, 2010; see Chap. 5 in this volume) (D)
- External factors that allow for the satisfaction of the needs for competence, social relatedness, and autonomy (Deci & Ryan, 1985) (D)
- Relevance of a goal to superordinate identity goals (self-definitions; Gollwitzer & Kirchhof, 1998; Heckhausen, 1977) (D)
- Anticipated evaluation by self and others (Heckhausen, 1977) (D)
- Personality traits (Elliot & Thrash, 2002) (D)
- Personal values and social norms (Schwartz & Bilsky, 1990) (D)
- Belief that personality traits can be altered (growth vs. fixed mindset; Dweck, 2006) (F)
- Self-efficacy and locus of control (Bandura, 1997; J. Heckhausen, 1991; Krampen, 1988) (F)

- Attributional style (Stiensmeier-Pelster, 1988, see Chap. 15 in this volume) (D, F)
- Experience with similar tasks (Bandura, 1997) (F)

Situational Determinants of a Goal's Desirability (D) and Feasibility (F)

- External reward (Vroom, 1964) (D)
- Attractive opportunities to act (Atkinson, 1957) (D)
- Task difficulty (Atkinson, 1957) (F)

This might not be an exhaustive list of all factors that determine the desirability and subjective feasibility of goals. Moreover, the distinction between personal and situational determinants is not always completely clear (e.g., different people perceive external rewards differently depending on their personal preferences or values). However, the approach by Hollenbeck and Klein nevertheless made an important contribution to the analysis of goal commitment, one of the central constructs of motivational psychology that is also of practical relevance. Employers, teachers, coaches, and parents might look for the factors that cause their employees, students, athletes, and children to commit to a task, persist, and ideally even enjoy the process of executing it. Commitment is thus of utmost importance for applied motivational psychology (see Chaps. 18, 19, and 20 in this volume).

However, a central question remains unanswered. Common expectancy-value models do not specify how expectancy (or feasibility) and value (or desirability) interact (for an exception see Atkinson, 1957). How can we assure that individuals commit to goals that are both desirable *and* feasible? Is it enough to simply "think positively" as suggested by countless self-help books and focus on the desired outcomes ("I will be so proud when I pass the exam!") while hoping that we will somehow manage to realize our goals? Fantasy realization theory (Oettingen, 2012, see Chap. 12 in this volume) shows that this is definitely not enough.

11.2.2 Fantasy Realization Theory

In spite of the inclusion of the word "realization" in the name of the theory, the authors (Oettingen, Pak & Schnetter, 2001) developed their fantasy realization theory as a process-oriented explanation of goal setting. The central focus of the theory is how non-binding wishes, so-called fantasies ("It would be great if…!"), are transformed into binding goals that regulate behavior ("I intend to…!"). According to the authors, this is only possible if positive fantasies about the future are mentally contrasted with the current situation. If we keep our eyes on our goals for a desired future, sometimes even indulge in positive fantasies about said future, we realize what is important to us and what we strive for. Of equal importance, however, is an assessment of our current reality to allow us to determine the behavioral requirements for goal realization (Which actions will be necessary to get from here to there? Which challenges could occur on the way?). Mental contrasting links future and present and shows the acting individual what to do and which obstacles to expect. Thus, the assessment with regard to how feasible or realistic a certain goal is, becomes a second pillar in the foundation of goal commitment alongside the desirability of its outcomes. This process allows us to drop goals that appear unrealistic and instead commit to realistic goals, which is the condition ensuring successful goal striving.

On the other hand, if we exclusively indulge ourselves in goal-oriented fantasies, we experience the positive outcomes of goal realization in advance and do no longer feel the need to put particular effort into pursuing the goal. In particular, however, the (average) strength of goal commitment is independent of the subjective likelihood of success. After all, we can also dream of unrealistic things. Studies by Oettingen and colleagues (overview in Oettingen, 2012) demonstrate the demotivating impact of pure indulgence in positive fantasies.

Study

Wish versus Reality: The Formation of Binding Goals (Oettingen et al., 2001, Study 1)

Student participants were asked to list their most important interpersonal problems at the moment (e.g., to get to know better someone I like; to improve the relationship to my partner) and rate their expectation of success (e.g., How likely do you think it is that the named problem will have a happy ending?). Subsequently, participants briefly described four positive aspects of their interpersonal problem coming to a happy ending (e.g., feelings of being needed; being loved) as well as four aspects of their current reality that stand in the way of a happy ending (e.g., being shy; too much work). Next, participants were assigned different mental tasks across different experimental conditions (mental contrasting; indulging in positive fantasy about the future; ruminating about the negative reality). Participants in the mental contrasting condition were asked to describe a first positive aspect of goal realization on a piece of paper following these instructions: "Think about this aspect and depict the respective events or experiences in your thoughts as intensively as possible! Let the mental images pass by in your thoughts and do not hesitate to give your fantasies free reign. Take as much time and space as you need to describe the scenario. [...]." Following the description of the first positive aspect, a negative aspect of reality should be described in the same way. The same procedure was then applied to a second positive and negative aspect. Participants in the other two experimental conditions were asked to simply write down and elaborate on the four positive or negative aspects. How motivated and energized participants felt immediately after the mental task and how promptly they started to act afterward was interpreted as an indicator of goal setting. As predicted, a strong positive relationship between expectation of success and the two indicators of goal setting was only found in the mental contrasting condition (see Fig. 11.2).

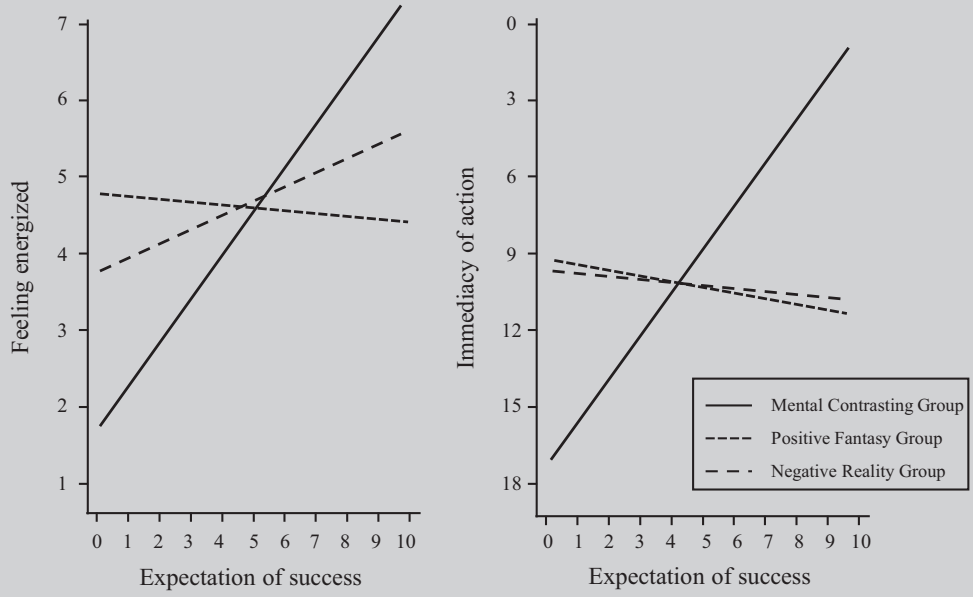

Fig. 11.2 Relationship between expectation of success and behavioral indicators of goal commitment (feeling energized, immediacy of action) depending on experimental condition after Oettingen et al. (2001, p. 744)

11.2.3 Unconscious Goal Setting

The approaches introduced so far all assume that goal setting takes place once goal-related values and expectations have been assessed consciously. Some researchers, however, investigate goal setting in the context of *unconscious* affective processes (Aarts & Custers, 2012; Bargh, 1990; Bargh et al., 2010; see also excursus in Sect. 11.4.3.1). Their central assumption is that goals can be set without involvement of conscious assessment when goal-related concepts are linked with positive affect (even if this happens unconsciously; Custers & Aarts, 2005). In one of the first studies on this question, Custers and Aarts (2005, Study 1) used so-called evaluative conditioning. They presented participants with neutral activity-related words (e.g., doing puzzles) that were quickly followed by affectively positive (e.g., pleasant) or neutral words (e.g., around) without a chance of conscious detection. As predicted, participants indicated that they were more inclined to realize activities that had been presented alongside positive words than those presented alongside neutral words.

11.3 Cognitive Aspects of Goals

11.3.1 The Cognitive Accessibility of Goals

The definition above stated that goals are cognitive representations of desired states. Just like other cognitive representations (e.g., semantic knowledge about what a dog is or the name of our own mother), goals are stored in our memory (Kruglanski et al., 2002). While the cognitive accessibility of semantic knowledge gradually fades since its latest activation, goal-related representations remain cognitively accessible until the goal in question is realized (e.g., Goschke & Kuhl, 1993). Zeigarnik (1927) already demonstrated this effect when she showed that people tend to remember unfinished tasks better than finished ones. Förster, Liberman, and Higgins (2005) replicated this finding using a lexical decision task (Meyer & Schvaneveldt, 1971).

Study

The Cognitive Accessibility of Active vs. Inactive Goals (Förster et al., 2005, Study 1)

Participants were shown four series of pictures depicting everyday objects (e.g., glasses, umbrella, bell). Those in the goal condition were instructed to contact the experimenter as soon as they saw the picture sequence "glasses – scissors" that was actually presented during the third series. Participants in the control condition did not receive instructions to look for a specific sequence of pictures. Following each series, participants worked on a lexical decision task in which they saw several different words alongside meaningless combinations of letters. They were asked to decide as quickly as possible whether each presented stimulus was a real word or not. If a goal is activated (in this case the goal was to look for the sequence "glasses – scissors"), the reaction to goal-relevant words should be sped up compared to control words. As had been expected, only participants in the goal condition showed this advantage in the tasks following the first two series of pictures when they were still looking for the sequence "glasses – scissors." In an analogous manner, their reaction times were also reduced for words that were semantically connected to the word "glasses", such as "reading" or "sun". Following the third series during which participants in the goal condition saw the sequence they had been looking for, the increased cognitive accessibility of the active goal disappeared. Instead, reaction times to goal-relevant words in the goal condition were even longer after the third and fourth series. The authors interpreted this last result as an inhibition of goal-related content once the goal had been realized (see Fig. 11.3).

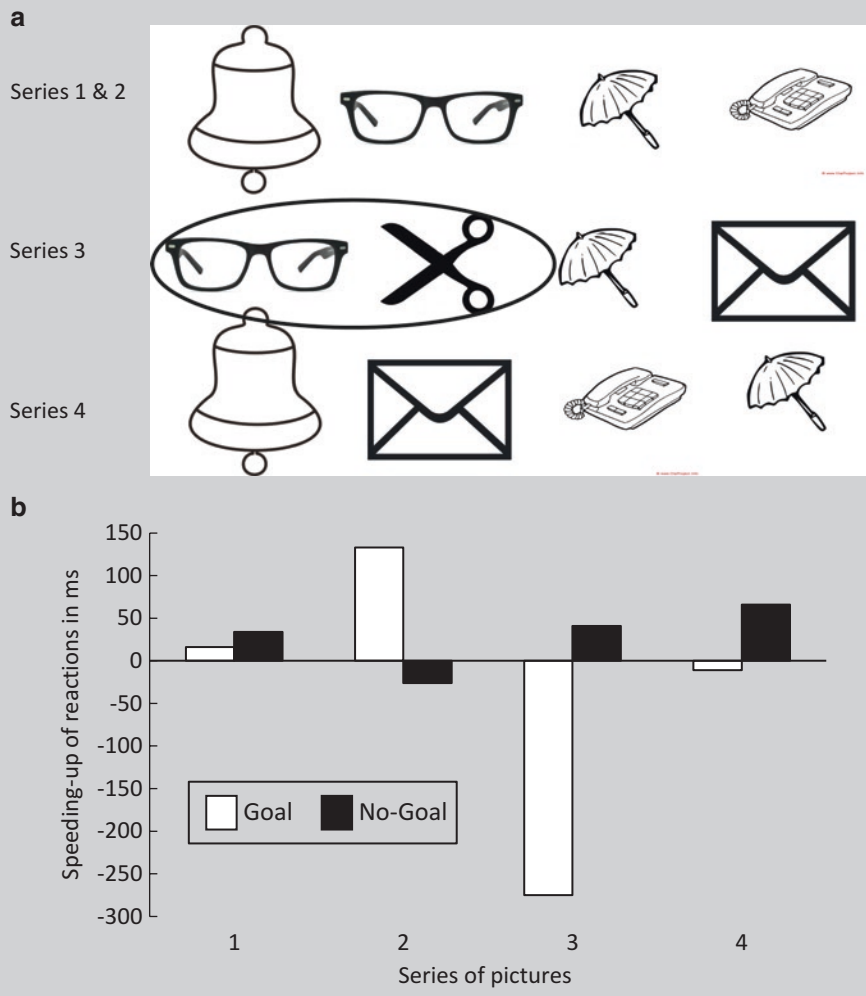

Fig. 11.3 An example of the experimental material (a) and results (b) of Study 1 by Förster et al. (2005)

11.3.1.1 Goal Systems Theory

Goals are embedded in goal systems consisting of interconnected means and goals (Kruglanski et al., 2002), that can mutually activate each other cognitively. If we, for example, pass the post office (a means for mailing letters), we might remember that there was still a letter that we need to mail (a goal). In the past this mechanism was researched as a form of bottom-up goal priming ("bottom-up" because means are subordinate to goals within goal hierarchies; Shah & Kruglanski, 2003). If students, for example, saw the word "study" on a screen for only 50 ms, which precludes conscious detection, they subsequently reacted faster to attributes they deemed desirable, such as "educated," compared to control attributes, such as "strong," that do not represent goals for the means "study." The extent to which the activation of "study" in turn activated the goal "educated" was furthermore influenced by how helpful students deemed the activity of "studying" to be to become "educated." New mean-goal connections that were established in the laboratory also showed equivalent bottom-up priming effects. Moreover, Shah

and Kruglanski (2002) demonstrated with a mediation analysis that bottom-up priming resulted in stronger persistence and improved performance due to the increased accessibility of the goal in question. Thus, they discovered a functional mechanism that seems to work automatically.

How strongly means co-activate goals (bottom-up) and goals co-activate means (top-down) also depends on how many different means allow us to reach the same goal or how many other goals we can achieve using the same means. Very often "many roads lead to Rome," which means that the same goal can be reached with more than only one means (equifinality). On the other hand, the same means can help us with reaching multiple goals, to proverbially "kill several birds with one stone" (multifinality).

Example

Christina has been unhappy and despondent for a while, which is why she decides to actively make herself feel better. She intends to reach this superordinate goal by means of three subgoals: First, she would like to exercise and go on a diet to lose 10 lbs. Second, she would like to gain new positive experiences and decides to go on a vacation. Third, she would like to develop a more laid-back lifestyle and thus joins a club to learn the relaxation technique autogenic training. Her vacation should also help with this third goal.

Exercising and dieting are equifinal means as they both contribute to the same goal, namely, to lose weight. Going on vacation, on the other side, is a multifinal goal that contributes to two goals at the same time: gaining more positive experiences and becoming more relaxed. However, Christina's vacation unfortunately clashes with her other goal to lose 10 lbs because she wants to enjoy good food on her trip. Thus, her vacation is contrafinal (Kruglanski, Chernikova, Babush, Dugas, & Schumpe, 2015) to losing weight. Finally, autogenic training represents a unifinal means because it only serves the goal of making Christina more relaxed (see Fig. 11.4).

In situations in which multiple means are functionally connected with multiple goals or vice-versa, effects of "dilution" can occur because if a means is associated with more than one goal, each individual associative pathway that transmits activation is weaker than in cases in which a means is only linked to a single goal. Similarly, the priming effect of means on goals is less pronounced if the same means is instrumental to other goals as well. Unifinal means for single goals are perceived as more effective, and people tend to prefer them over multifinal means if only one goal is active at a given time. In a study where writing was the active goal, for example, participants picked a pen that can only be used for writing over another pen that doubled as a laser pointer (Zhang, Fishbach, & Kruglanski, 2007). Dilution can also be observed when multiple equifinal means are given. In such situations the associations with each means are weaker, and they are perceived as less effective to reach the goal (Bélanger, Schori-Eyal, Pica, Kruglanski, & Lafrenière, 2015).

In addition to cognitive activation, goal systems also transmit motivational qualities. One such quality is commitment: If an individual considers a specific goal to be particularly important, the same should be true for means that enable the individual to pursue the goal (Kruglanski et al., 2002). Moreover, both physical objects (Ferguson & Bargh, 2004) and other people (Fitzsimons & Fishbach, 2010; Fitzsimons & Shah, 2008) are implicitly and explicitly rated more favorably if they are instrumental to reaching a currently active goal.

Inhibition in Goal Systems

Activation across the different components of goal systems can not only be transferred but also inhibited. This is, for example, the case if two goals are incompatible, such as being skinny and indulging. If a person commits strongly to a goal, its activation is accompanied by a simultaneous reduction of the accessibility of other goals. This effect is known as "goal shielding" and has also been demonstrated with lexical decision tasks (see Study). Goal shielding is an important process because our resources (e.g., attention, time, money, energy, or social support) for the pursuit

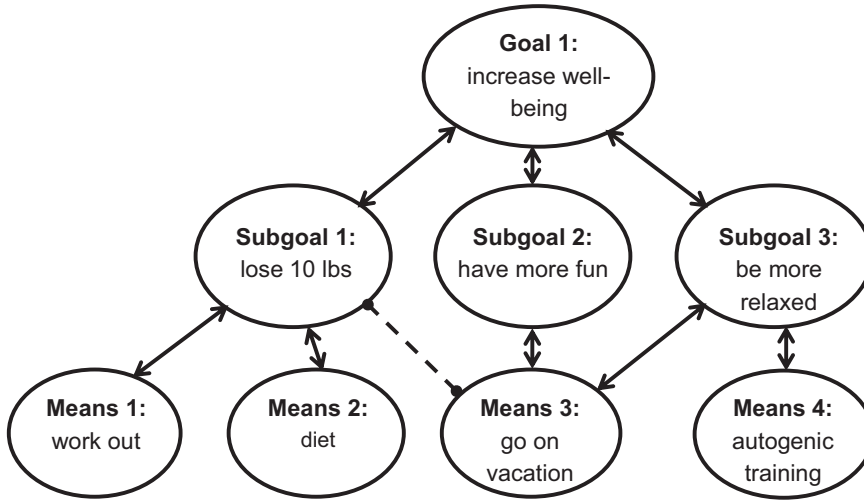

Fig. 11.4 Example of a goal system after Kruglanski et al. (2002)

of any goal are limited. To avoid running out of steam, we ideally focus on our most important goals until we reach them and it becomes easier to commit to other goals. The importance of goal shielding is exemplified by findings that suggest that individuals who tend to be more successful in realizing their goals in general also tend to shield their goals more strongly.

Study

Shielding a Focal Goal from Potentially Conflicting Goals (Shah, Friedman, & Kruglanski, 2002, Study 2)

Students were asked to list three qualities that they would like to possess, e.g., "intelligent" and "happy." In addition, they should name other positive traits that they did not desire and thus did not constitute currently activated goals (e.g., "rugged"). In a subsequent lexical decision task, they were then instructed to press buttons to indicate if a presented word described a trait or not. The traits presented were the ones the students had listed earlier while the control words did not describe characteristics (e.g., "house," "planet"). Before each trait, a prime was presented for 50 ms, so participants were unable to consciously detect it. The authors tested whether the reaction to a target trait, e.g., "happy," was inhibited after another target trait (e.g., "intelligent") as opposed to a control word (e.g., "house") was presented subconsciously. The findings confirmed this. Moreover, the strength of inhibition increased the more important participants had initially indicated they considered a particular goal that was used as a prime. The more important a goal was, the more strongly priming thus inhibited the cognitive accessibility of other target traits.

Goal shielding is particularly relevant when several goals are of similar importance to us and thus compete for resources with one another. In such cases we often need to prioritize one of them. Goals can also be threatened on short notice by competing temptations. Passing candy at the supermarket can, for example, tempts us when we want to lose weight. What happens in such situations on a cognitive level? Fishbach, Friedman, and Kruglanski (2003) were able to show that although being confronted with temptations (e.g., a prime word like "chocolate" in a laboratory study using a lexical decision task) activates the goals with which these temptations clash (e.g., "slim"), goals do not, in turn, activate thoughts about temptations. If we are offered a

piece of chocolate, we might remember immediately that we want to watch our weight as long as it constitutes one of our current goals. Goal activation triggered by temptation also predicted successful goal striving.

Excursus

Goals and Temptations

Goals are cognitive representations that remain cognitively active until they are realized. They control our attention by directing it toward potential means for goal striving and shielding themselves from competing goals. Temptations, on the other hand, automatically activate thoughts about the goals with which they are clashing, which is another mechanism that facilitates goal striving. Objects and other people are implicitly and explicitly seen in a more positive light if they are conducive to a currently unrealized (i.e., active) goal.

11.4 Determinants and Processes of Goal Striving

We have already seen that goals influence our way of thinking in various ways. In the end, however, goals are only useful if they are able to motivate our behavior in ways that allow us to eventually realize them. Indeed, many of the aforementioned studies show that persistence in goal striving and performance increases alongside the cognitive accessibility of goals.

Goals also have an impact on how we feel (Brunstein, Schultheiss, & Maier, 1999). Not feeling committed to personally meaningful goals compromises well-being (Klinger, 1977). If we pursue a goal, however, we are happy about making progress toward its realization and frustrated, sad, or upset when obstacles and setbacks get in the way. Many studies have in fact found these effects of progress toward goal realization on well-being and general life satisfaction. We will discuss some of these studies in more detail here.

Before starting this discussion, however, it is important to note that not all goals have the same positive effects on our behavior and experiences. Some goals are less beneficial to our performance and well-being than others. We will first have a look at process-oriented theories that explain how goals influence performance and well-being before providing an overview over the most important qualitative dimensions along which goals and their consequences differ.

The subsequent section will then expand our perspective on goal striving by no longer focusing exclusively on the individual aspects of goals but instead on general processes and strategies of self-regulation that people use to overcome challenges of goal striving.

11.4.1 Process-Oriented Goal Theories of Performance and Well-Being

11.4.1.1 Goal Setting Theory

Goal setting theory discusses which types of goals have optimal effects on performance (Locke & Latham, 1990, 2013). In particular, the theory claims that concrete and challenging goals tend to be superior in this regard to vague goals of the "do your best" type. One of the authors' studies examined whether lumberjacks whose task was to load trucks with trunks without exceeding a permissible maximum weight performed better when specific and challenging goals were defined. If they were simply told to do their best, which was a common goal set by the company, employees frequently only reached a mere 60% of the permitted weight. If, however, the concrete goal of reaching 94% of the permitted maximum weight was set, employees indeed improved their performance to about 90% (Latham & Baldes, 1975).

However, the effect of specific and challenging goals does not always kick in. People only perform better if they possess the necessary abilities and means to solve a task and feel like they do (self-efficacy, Bandura, 1997), commit to the current goal, and receive feedback about their performance. Locke and Latham (1990) illustrate these conditions in their high performance cycle of high performance (see Fig. 11.5). This cycle tries to answer the question how companies should set goals and reward their employees to motivate them

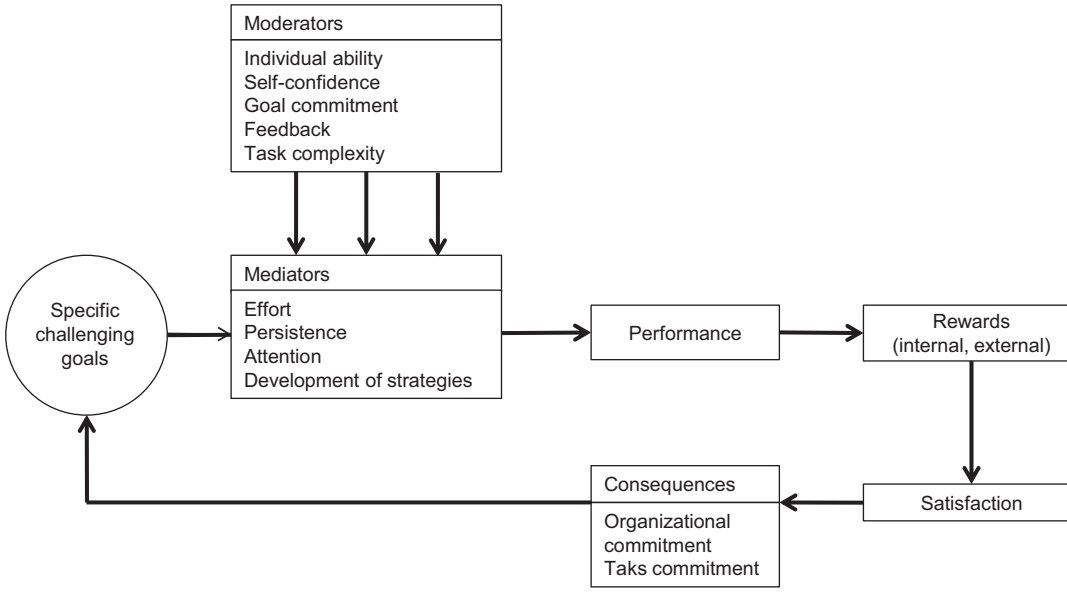

Fig. 11.5 High-performance cycle according to goal setting theory by Locke and Latham (1990)

to perform well. In addition to the conditions under which challenging and specific goals have a positive impact on performance, the high performance cycle also specifies the processes through which goals can influence performance in theory. Thus, individuals adjust their efforts to present goals, persist until these goals are realized, focus their attention on goal-relevant information, and develop strategies of goal realization. The cycle furthermore stresses the relevance of extrinsic (e.g., money, prestige) and intrinsic (e.g., pride in one's performance) rewards to motivate employees to commit to challenging goals (see Fig. 11.5).

11.4.1.2 Motivational Intensity Theory

Motivational intensity theory can explain why the difficulty of goals influences performance. According to this theory, the effort people put into pursuing a goal or working on a task increases proportionally to the requirements as long as the goals are deemed realistic or the given tasks solvable and worthwhile. If tasks are too easy or seemingly impossible, however, people tend to save their resources and reduce their efforts accordingly (Brehm & Self, 1989; Gendolla & Richter, 2010).

Study

Effects of Task Difficulty on Effort Mobilization (Richter, Friedrich, & Gendolla, 2008)

Participants were asked to decide whether a particular letter had appeared in a previously presented sequence of letters (e.g., FKDR) in a computer-assisted task. The difficulty of the task was manipulated by changing the time for which the sequence was presented between four options: 1,000 ms (low difficulty), 550 ms (moderate difficulty), 100 ms (high difficulty), or 15 ms (impossible). Participants' effort was measured with several psychophysiological indicators, namely heart contractibility (measured as the duration of the pre-ejection period [PEP], which is the time interval between the beginning of electrical activation of the left heart chamber and the ejection of blood into the aorta) and systolic blood pressure (SBP reactivity). Figure 11.6 shows that participants mobilized more effort as task difficulty increased, except for when the task became impossible. Thus, people seem to preserve their resources and only invest as much as seems potentially required to complete a (still possible) task.

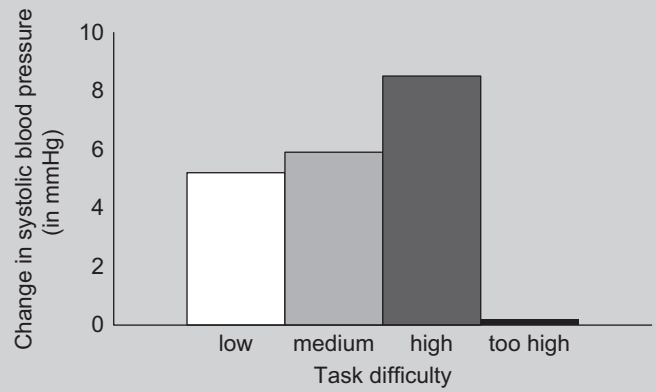

Fig. 11.6 Effort mobilization: principle of resource conservation (after Richter et al., 2008)

11.4.1.3 Cybernetic Control Theory

As we have already seen, goals do not only influence our behavior (e.g., how much effort we put into an activity) but also how we feel. Cybernetic control theory (Carver & Scheier, 1990, 1998, 2013) specifies the dynamic interaction between affective state and effort mobilization during goal striving. The theory assumes the existence of control loops and borrows from the field of robotics. Its central claims are that human behavior is oriented toward goal states and that control loops check if the direction and intensity of the goal-oriented behavior facilitate the realization of these goal states (see also Miller, Galanter & Pribram, 1960; Powers, 1973). The first control loop checks for potential discrepancies between current state and desired state. If we, for example, have a target weight of 130 lbs but still weigh 135 lbs, we notice this discrepancy and are motivated to further reduce our weight (see also Higgins, 1987). This motivation initiates goal-oriented behavior. The second control loop checks if the rate at which the discrepancy between the current and desired states is reduced is sufficient or not. Unexpectedly slow progress results in negative emotions, whereas unexpectedly big progress results in positive emotions. These emotional responses can in turn influence our motivation: According to the theory, individuals who experience positive emotions reduce their goal-related efforts ("coasting") or start pursuing other goals. Individuals who experience negative emotions, on the other hand, are thought to increase their efforts to reach their goals after all. Thus, the cybernetic control theory also describes the important role of affective responses as feedback for prioritizing goals that help people with simultaneously pursuing multiple goals. If we think that we have made enough progress, we can invest some of our resources in other goals (Carver, 2015; Carver & Scheier, 1990).

All three theories discussed here – goal setting theory, motivational intensity theory, and cybernetic control theory – assume that individuals proportionally adjust their efforts to unfinished goals and only invest as much effort as they deem required. Cybernetic control theory furthermore stresses the feedback function of affective states in the regulation of this effort. Several studies have confirmed that insufficient progress in goal striving reduces well-being, while big progress increases it (e.g., Brunstein, 1993; for an overview see Carver & Scheier, 2013). There is also empirical evidence for the claim that positive affect or big progress can reduce effort, while negative affect and little progress have the opposite effect (Fulford, Johnson, Llabre, & Carver, 2010; Louro, Pieters, & Zeelenberg, 2007). Several factors need to be considered, however: If progress makes a person realize that the current goal is of great personal significance, it can motivate the mobilization of further efforts (Fishbach & Dhar, 2005).

11.4.2 Some Important Goal Dimensions

All three theories discussed above primarily focus on main effects: Progress toward a goal causes positive affect and allows for the reduction of effort put into the focal goal, while lack of progress toward a goal causes negative affect and motivates the further mobilization of effort (as long as achieving the goal seems possible). Goal striving and its effects on our experiences and behaviors, however, also depend on various dimensions with regard to which goals can differ. In the context of goal setting theory, we already saw that goals can, for example, differ regarding how specific or challenging they are (e.g., "do your best" vs. "reach a capacity of 90%"). In this section we will have a look at a few other such dimensions.

11.4.2.1 Degree of Abstraction of Goals

Goals vary with regard to their relative position and degree of abstraction within a given goal system. This also means that different people can place the same goal-oriented behavior on different levels of abstraction: Not everyone may identify the concrete goal-directed a ction of throwing trash in a recycling bin as advancing a more abstract goal of protecting the environment.

Emmons (1996) investigates individual differences in whether people tend to describe goals in narrow, concrete or rather in broad, abstract ways. Although concrete goals come with the advantage of explicitly directing behavior – it is clear what needs to be done to throw trash in the recycling bin – they might be perceived as less meaningful (Little, 1989). More abstract goals feel more meaningful, on the other hand, but are usually more difficult to achieve because they tend to consist of several subordinate goals and require goal-oriented behavior across different situations and over an extended period of time (Emmons, 1992). This is why progress toward abstract goals can feel tediously slow. It might even be difficult to detect any progression at all: While it might be easy to determine if we successfully recycled our trash, it can be fairly difficult to judge how much our action contributed to the superordinate goal of protecting the environment (Emmons, 1992). As we already explained for cybernetic control theory, however, experiencing progress toward a goal is an important predictor for emotional well-being. Accordingly, it has been shown that pursuing more abstract goals is associated with higher levels of stress and a higher prevalence of depressive symptoms (Emmons, 1992). Even within the same goal, e.g., losing weight, people can moreover either focus on the more concrete means of goal striving (process focus) or on the desired result (outcome focus). Studies have shown that a process focus tends to be associated with more positive emotions, higher enjoyment during goal striving, and objectively higher progress (Fishbach & Choi, 2012; Freund & Hennecke, 2012; Freund, Hennecke & Riediger, 2010).

11.4.2.2 Promotion vs. Prevention Focus/Approach vs. Avoidance Goals

In principle, motivated behavior strives to achieve positive outcomes (e.g., positive emotions, success) or avoid negative outcomes (e.g., negative emotions, failure) (Atkinson, 1957; Carver, Sutton, & Scheier, 2000; Gray, 1990). Even though these two tendencies function relatively independently of each other (e.g., Carver, 2006; Elliot & Thrash, 2002). People differ with regard to how much they tend to direct their personal goals toward achieving positive states or avoiding negative ones (Elliot & Thrash, 2002; Higgins, 1997). Students' thinking about an upcoming exam, for example, might either strive to get a good grade or avoid flunking. The frame of reference for the evaluation of success or failure can thus be phrased in positive or negative terms.

This distinction has been applied to the analysis of human behavior in many different ways. On the level of biologically explained personality traits, for example, the *approach temperament* (characterized by extraversion, positive affectivity, and behavioral activation) is often distinguished from the *avoidance temperament* (characterized by neuroticism, negative affectivity, and behavioral inhibition) (Elliot & Thrash, 2002). Regulatory focus theory assumes that people differ from one another with regard to their disposition to either base their behavior on ideas about their future ideal self (how we would like to be) or ideas about their ought self

(how we think we should be) (Higgins, 1997). People whose behavior is based on their conception of ideal self tend to acquire a *promotion focus* that aims at establishing positive states (personal growth, learning something new, financial gain) and thus engenders enthusiasm and effort to approach this ideal. In contrast, people whose behavior is based on their conception of ought self tend to acquire a *prevention focus* and strive to avoid negative states (failure, rejection, financial loss), which in turn causes them to live in a more reserved and careful manner. Individuals with a promotion focus try not to miss out on opportunities, are happy, enthusiastic, and more motivated when they succeed and feel sad, disappointed, and less motivated after failure. Individuals with a prevention focus, on the other hand, are more concerned about avoiding mistakes, tend to be relieved and less motivated after success, and experience fear, tension, and increased motivation after failure (Higgins, 1998).

Finally, goals can also be divided into *approach goals* that try to achieve something positive and *avoidance goals* that try to avoid something negative. Pursuing goals with a strong avoidance focus can have a negative impact on the subjective availability of resources for self-regulation (self-control, resistance to stress, physical energy) and subjective well-being (Oertig et al., 2013). Strong avoidance behavior is also detrimental to performance. Students who indicated that they were primarily trying to avoid poor grades performed more poorly and tended to study materials less in depth and less critically. Students who indicated that they wished to perform well, on the other hand, worked more persistently and put more effort into their preparations, which in turn resulted in better grades (Elliot, McGregor, & Gable, 1999).

Approach and avoidance goals also influence social relationships. People with strong approach goals (e.g., intensifying friendships) tend to feel less lonely and indicate higher satisfaction with their social relationships in self-reports. People with strong avoidance goals (e.g., avoiding conflicts) are in contrast more prone to loneliness and report a more negative perspective on their social relationships while also being more insecure (Elliott, Gable, & Mapes, 2006; Gable, 2006). Similarly, romantic partners can differ substantially regarding how keen they are to avoid arguments or to deepen their relationship (e.g., Impett, Strachman, Finkel, & Gable, 2008). Avoidance goals predict negative communication patterns during arguments between romantic partners (Kuster et al., 2015). Whereas the use of negative verbal communication (e.g., defensiveness, hostile retreat) decreased during 8-minute-long argument in partners with weak avoidance goals, it remained the same in partners with strong avoidance goals or even increased in cases in which the other partner also used negative communication. Approach goals, on the other hand, help maintain sexual desire among partners and have a positive impact on relationship satisfaction (Impett, Gable, & Peplau, 2005; Impett et al., 2008).

The most common explanation for the negative consequences of avoidance goals is that they sensitize people for negative stimuli and thus precipitate a focus on negative and unwanted potential outcomes, such as not passing an exam. This causes fear and the desire to avoid goal-relevant situations instead of seeking them out (Derryberry & Reed, 2002; Elliot & McGregor, 1999; Öhman, Flykt, & Esteves, 2001).

11.4.2.3 Learning vs. Performance Goals

Academic contexts frequently differentiate between two classes of goals. So-called performance goals are about demonstrating our abilities or hiding our inability, while *learning (or mastery) goals* reflect our desire to learn something new or acquire new skills (e.g., Dweck & Elliott, 1983).

Whether or not performance goals actually affect performances depends on what people think of their own abilities and the probability of success. If we do not believe that our abilities suffice to be successful, performance goals become detrimental to how we perform while learning goals are beneficial (Ames & Archer, 1988; Butler, 1987; Elliott & Dweck, 1988; Grant & Dweck, 2003; Jagacinski & Nicholls, 1987; Meece, Blumenfeld, & Hoyle, 1988). This is because individuals with learning goals interpret setbacks and failures as useful information that they still need to improve instead of indicators of

(stable) ineptitude. Their intrinsic motivation is also higher (e.g., Harackiewicz, Barron, Tauer, & Elliot, 2002).

Furthermore, performance goals come in different shapes. People who are keen to prove their abilities (*performance approach*) are more likely to perceive an upcoming exam as a positive challenge to aim high and perform well. People who wish to hide their potential inability (*performance avoidance*), however, tend to think of upcoming exams as threats and thus become scared, set the bar low, and get poorer grades (Grant & Dweck, 2003; McGregor & Elliot, 2002).

Different people have different "implicit self-theories" that are in part responsible for whether they tend to pursue learning or performance goals (Dweck & Grant, 2008). *Entity theorists* (with so-called *fixed mindsets*) assume that personal attributes such as intelligence or personality are fixed and for the most part cannot be altered. In contrast, *incremental theorsts* (*with a* so-called *growth mindset*) believe that these kinds of attributes can be influenced and changed. Thus, people who see intelligence as an attribute that in principle can be affected by their actions are much more likely to set learning goals and interpret failure as a potential for personal growth. The opposite tends to be true for people who think of intelligence as an unchangeable attribute. They tend to set performance goals as they are either keen to prove their intelligence or hide potential shortcomings.

Interestingly, the effects of learning and performance goals have also been found in studies that did not measure goal orientation but rather chose to manipulate it experimentally (e.g., Elliott & Dweck, 1988). Accordingly, these results can, for example, also be applied to educational settings because they suggest that teachers are able to influence the goal orientation of their students (Rattan, Savani, Chugh, & Dweck, 2015; Roeser, Midgely, & Urdan 1996).

People differ with regard to whether they pursue concrete or abstract goals, wish to avoid negative states or achieve positive ones, and try to learn new things or prove their own abilities. All of these dimensions influence how we perceive goal striving and if our striving is ultimately successful. Research has shown that pursuing abstract goals, focusing on results, and setting avoidance goals (particularly performance avoidance) often result in negative consequences.

11.4.3 Intrapsychic Goal Conflicts

Goal striving is not always free of conflicts. Interpersonal conflicts might arise if, for example, romantic partners or athletes on the same team pursue incompatible goals. Conflicts can also exist within a person between different goals.

11.4.3.1 Conflicts Between Goals and Implicit Motives

People do not only consciously set and pursue different goals but are also driven by different implicit motives. Implicit motives refer to unconscious needs that direct people to particular incentives satisfying said needs (for a detailed discussion see Chap. 9 in this volume). McClelland (1985) distinguished between three implicit motives: *affiliation*, *achievement*, and *power*. The strength of these three motives differs across people and influences which situations they approach and experience as rewarding. People with a strong power motive are particularly drawn to situations that allow them to influence others in order to feel strong and self-efficacious. People with a strong affiliation motive are particularly drawn to situations in which they can form, maintain, and reestablish positive relationship with others in order to feel secure and connected. Lastly, people with a strong achievement motive are drawn to situations in which they can independently overcome challenges, compare themselves to certain standards, and feel pride (Schultheiss & Brunstein, 2010).

Implicit motives can sometimes clash with explicit goals (see Chap. 9 in this volume). Somebody who has set the explicit goal of being promoted at work and thus earn a higher salary

might run into trouble if their implicit power motive is too weak. Accepting the tasks that come with promotion might be difficult if behavior is not energized by the necessary implicit motive. People who do not enjoy influencing others tend to feel worn out if they have to give orders to their colleagues. Studies have in fact shown that our subjective well-being is impaired and that we feel more stressed and exhausted if our goals are not accompanied by corresponding motives (e.g., Baumann, Kaschel, & Kuhl, 2005; Hofer & Chasiotis, 2003; Kazén & Kuhl, 2011; Kehr, 2004; Schüler, Job, Fröhlich, & Brandstätter, 2008).

Research on implicit motives focuses in particular on how interindividual differences in the three motives affect our experiences and behavior. In contrast, self-determination theory and its subordinate theory of basic needs (e.g., Deci & Ryan, 1985) claim that we *all* require to satisfy three psychological needs for ideal personal development. These are the need for autonomy (DeCharms, 1968), the need for competence (White, 1959), and the need to belong (Baumeister & Leary, 1995). According to this theory, our well-being depends on whether our personal goals allow us to satisfy the basic needs to feel autonomous, competent, and connected to others (Sheldon & Elliot, 1999; Chap. 14 in this volume).

11.4.3.2 Conflicts Between Several Goals

We have already seen that goals are interconnected with other goals and means within so-called goal systems (Kruglanski et al., 2002). In fact, Emmons (1992) notes that people seem to be able to simultaneously pursue up to 15 goals without difficulty. These goals can be related to various domains such as job, family, leisure, social relationships, or health. Sometimes various goals can support one another if pursuing a goal also benefits other goals. If we, for example, wish to become fitter and make new friends, joining a fitness club can be a multifinal means advancing both goals. For some people these two goals might be incompatible, however, because they might prefer individual sports and thus have less time to invest in their social contacts. This causes a conflict of resources due to which pursuing one goal becomes more difficult because of the pursuit of another goal (Lewin, 1935).

Our subjective well-being is also affected by whether different goals clash or support one another (Emmons, 1986; Emmons & King, 1988; Riediger & Freund, 2004). One study found that students who were pursuing conflicting goals reported experiencing more negative affect, depression, and psychosomatic symptoms. How strongly their goals clashed also predicted how often they went to see a doctor or got sick. In part, these negative consequences could be explained with limited progress toward realizing the various goals (Emmons & King, 1988).

Fortunately, goals can not only clash but also support one another. Studies have shown that people put more effort into the pursuit of their goals if they perceive them as facilitating one another (Riediger & Freund, 2004). Our mood is also positively affected: People who feel that their work-related goals also benefit their family-related goals tend to be more satisfied with their jobs (Wiese & Salmela-Aro, 2008).

Excursus

Goal-Related Conflicts

Goal striving can lead to conflicts: If our goals clash with the individual strength of our implicit motives, we lack the energy and affective foundation to pursue them. Studies have also shown that people pursue their goals with less intrinsic motivation and decreased well-being if they do not make them feel autonomous, competent, and socially related (see Chap. 14 in this volume). Due to our limited resources, goals can also clash with other goals, which can in turn result in little progress toward their realization as well as impaired well-being.

11.4.4 Self-Regulation During Goal Striving

Let us quickly review the goal theories we discussed in the previous sections: They all make claims about goal selection, the cognitive correlates of goals, and the importance of specific characteristics of goals for performance and well-being. In spite of their differences, all of these theories share the same implicit assumption: If we have a goal, we persistently pursue this goal until its completion. Frequently, however, things are much less straightforward. We often have to interrupt our goal striving for instance due to certain circumstances (e.g., we might not be able to pursue family-related goals at work) and return to them at a later point, which can sometimes be difficult because of other conflicting intentions. Thus, we do not always pursue the goals we set and occasionally postpone their realization indefinitely. A different example is a situation in which we cannot resist temptations (e.g., a box of chocolates) and thus abandon our resolutions (e.g., dieting). Finally, the goals we set might lose their incentives over time or become increasingly unrealistic; yet, we might be reluctant to disengage. All of these typical challenges can occur during goal striving and affect different aspects of self-regulation.

The two most influential theoretical approaches to self-regulation during goal striving (the action phase model by Heckhausen & Gollwitzer, 1987, alongside the concept of implementation intentions, Gollwitzer, 1993, which was derived from it, see Chap. 12 in this volume; and the theory of action control and the personality systems interaction theory by Kuhl, 1984, 2001, see Chap. 13 in this volume) were developed almost at the same time during the 1980s and initiated a radical in change motivational theorizing. The authors addressed the theoretical questions about goal setting and realization that had remained unanswered for decades since the contributions by Narziss Ach (1935) and Kurt Lewin (1926). Classic expectancy-value theories of goal selection are, for example, unable to explain why we sometimes fail to pursue attractive and realistic intentions. The key claim was that we have to differentiate between processes of goal selection and processes of goal realization. While processes of goal selection are determined by goal desirability and feasibility, processes of goal realization are controlled by volitional variables. A short quote from the key article by Heckhausen and Gollwitzer (1987) illustrates the conceptual difference between motivation (goal selection) and volition (goal realization):

> "Motivation encompasses all processes related to deliberation on incentives and expectancies for purpose of choosing between alternative goals and the implied courses of action […] Volition entails consideration of when and how to act for the purpose of implementing the intended course of action". (Heckhausen & Gollwitzer, 1987, p. 103)

Study

Delay of Gratification

When behaviorist approaches were in their heyday, Walter Mischel (1974) designed his famous paradigm of *delay of gratification*. His research focused on how to overcome stimulus control, i.e., how to resist an impulse triggered by our surroundings (temptation). An experimenter placed some candy (e.g., a marshmallow) in front of preschoolers and told them before leaving the room that they were allowed to call the experimenter back in and eat the marshmallow anytime they wanted. However, they were also told that if they waited for the experimenter to return at an unspecified time, they would be given a greater reward (i.e., two marshmallows; a video provided by Stanford University shows clearly how difficult it is for children to endure this behavioral conflict: www.youtube.com/watch?v=Y7kjsb7iyms; viewed on November 14, 2017). The study measured how long children waited until they called the experimenter back into the room to receive the smaller reward. Results indicate that older children can wait for longer periods than younger children. The ability to delay gratification during the task was also

correlated with indicators of life success (e.g., academic performance; Mischel, Shoda, & Rodriguez, 1989). Mischel and his colleagues (Metcalfe & Mischel, 1999) explained children's ability to delay gratification with certain cognitive processes that weakened the impulse of immediate gratification (e.g., distraction from the tempting object [thinking about playing with other toys] or mentally reappraising the object [imagining that it was just a picture instead of a real marshmallow]). In adults, the ability to delay gratification can be measured with *temporal discounting* tasks (e.g., Ainslie, 1975; Loewenstein, 1992). An individual discount rate (i.e., tendency to wait for later gratification) is determined with a series of imaginary decisions between immediately receiving a smaller amount of money or a larger amount (in varying intervals) at a later point. As predicted, the rate is positively correlated with measures of behavioral self-control.

11.4.4.1 The Rubicon Model of Action Phases and the Concept of Implementation Intentions

The Rubicon model of action phases by Heckhausen and Gollwitzer (1987; Gollwitzer, 2012) provides a theoretical distinction between motivation and volition by postulating specific cognitive characteristics for motivational (goal setting) and volitional (goal realization) phases, respectively. The process of goal striving – from the emerging of numerous wishes over the formation of a clear intention to its realization – is divided into four phases: (a) *deliberating* different wishes until one is selected to become a goal intention, (b) *planning* the realization of a selected goal intention, (c) *acting* toward goal realization, and finally, (d) *evaluating* the results. The theory perceives weighing and evaluation as motivational phases because they are related to considerations of value (desirablity of goal) and expectancy (feasibility of goal). In contrast, planning and acting are seen as volitional phases because goal realization is primarily determined by processes of self-regulation. The central assumption of the Rubicon model is that each phase is associated with a specific cognitive orientation (mindset) that supports meeting their respective requirements. Research has so far focused on the phases of weighing and planning once an intention is formed. Several studies have found support for the postulated differences in the cognitive characteristics of their respective mindsets (see Chap. 12 in this volume; Gollwitzer, 2012). In comparison to the implemental mindset during planning and implementation, the deliberative mindset is thus, for example, characterized by (a) a high (vs. low) openness to available information, (b) a preference for processing information related to desirability and feasibility of a potential goal (vs. information related to implementation), and (c) an impartial consideration of both positive and negative incentives as well as an accurate estimation of feasibility (vs. a one-sided focus on positive incentives and a [partially illusionary] optimistic estimation of the goal's feasibility). Thus, when we make decisions and set goals, we tend to be balanced, whereas we tend to see things in a very positive light when we plan how to and actually realize our goals, which can sometimes cause us to overestimate our possibilities in order to shield these goals from doubt.

The Rubicon model does not address individual differences. Still, a few studies (Puca, 2005) suggest that at least in an achievement context, the theoretically postulated mindsets during deliberation and planning/implementation only apply to hope-motivated as opposed to failure-motivated people (see Chap. 6 in this volume). In general, little research has been done on the question of moderators (conditional variables that qualify the postulated effect) (e.g., Puca, 2004).

Despite the many advantages of the implemental mindset with its optimistic perspective on goal striving, difficulties that preclude quick goal realization might occur during the acting phase (e.g., we miss opportunities; our actions are aversive). Gollwitzer (1993) refined the

theoretical framework of the Rubicon model by introducing a strategy of self-regulation, so-called implementation intentions, that can be used easily and successfully to support goal realization under such circumstances. These intensions are mental links between a suitable behavioral opportunity and the planned action that have the following format: "If opportunity X occurs, I will do Y." Whereas we commit ourselves to a desired target state (e.g., "I want to get a language certificate for Italian") when making goal-related intentions, we specify how to concretely act in order to achieve our goal when making implementation intentions. A student who wants to get an Italian language certificate might form the following implementation intention: "When I get home tonight, I will register for a preparation course on the website of the language center."

Numerous studies have not only documented the effectiveness of implementation intentions with regard to higher rates of goal realization (for an overview see Gollwitzer & Sheeran, 2006) but have also identified associated cognitive (e.g., increased activation of specified opportunities) and neural (e.g., brain activity in areas that are associated with stimulus-dependent bottom-up regulation) mechanisms. Applied research has adopted the theoretically elaborate and empirically supported concept of implementation intentions in various contexts (e.g., health psychology, child and youth clinical psychology) (e.g., Gawrilow, Gollwitzer, & Oettingen, 2011).

Excursus

Implementation Intentions

Implementation intentions precipitate the "automation" of specified behavior. If a specified opportunity arises, the behavior is promptly initiated even if only limited cognitive capacity is available (e.g., because we are busy with something else) or if the opportunity is not consciously detected (e.g., it only arises for a split second). This means that implementation intentions combine consciously controlled and automatic processes of behavioral regulation.

Unconscious Goal Pursuit

We know from routines (e.g., cycling, typing on a keyboard) that behavior can occur automatically without conscious control. It is a much more remarkable discovery, however, that goals can be activated and associated behavior initiated without us being consciously aware of it. John Bargh (1990) developed automotive theory to investigate this phenomenon further. Several studies have shown that goals (e.g., acting in a considerate way) can be activated by stimuli in our surroundings (e.g., reading room at the library) and lead to corresponding behavior (e.g., talking in a low voice) without us being consciously aware. Unconscious goals regulate our behavior with the same processes (e.g., direction of our attention) and effects (e.g., effort, persistence, emotional responses to success or failure) as consciously set goals (Bargh et al., 2010). Automatic goal activation, however, requires that the necessary behavior has repeatedly been associated with the triggering opportunity as is the case for habits and acquired skills (Aarts & Custers, 2012).

Both volitional approaches discussed so far noticeably focus on cognitive processes (mindsets, detecting behavioral opportunities, automatic activation of reactions) while neglecting affective processes. They also provide general frameworks without discussing potential differences between individuals. Both of these aspects are covered by the highly influential Action Control Theory or Personality Systems Interaction (PSI) theory by Julius Kuhl (see Chap. 13 in this volume) that stresses that people differ with regard to their self-regulation, which results from differences in their affect regulation.

11.4.4.2 Action Control Theory and the Theory of Personality Systems Interaction (PSI)

The starting points for Kuhl's theory are two frequent challenges faced during goal striving: persistently pursuing our intentions in spite of

temptations and distractions, on the one hand, and not giving up after setbacks, on the other hand. Action control theory (Kuhl, 1984) describes so-called strategies of action control that are conducive to overcoming these challenges.

Strategies of Action Control by Kuhl (1984)

Strategy	Description
Attention control	Focusing our attention on information that is beneficial to realizing our goals
Encoding control	Store those characteristics of stimuli that are relevant to our current intention
Motivation control	Imagining the positive incentives of our goals
Emotion control	Putting ourselves in an emotional state that is beneficial to realizing our goals
Environmental control	Removing distractions from our environment

According to Kuhl (1994), it depends on the personality disposition of action vs. state orientation whether or not people make use of these strategies. Action-oriented individuals are able to flexibly react to given circumstances by using the strategies, while state-oriented individuals have a hard time doing so. Psychologists distinguish between two types of action vs. state orientation: the prospective type and the failure-related type. This distinction is a reference to the aforementioned two central aspects of successful self-regulation: realizing intentions even if we are tempted by something more pleasant (willpower) and overcoming setbacks by not getting trapped in negative thoughts and achieving "personal growth," i.e., integrating the setback into our self (self-growth).

Kuhl (2001) further developed his perspective of self-regulation in his PSI theory that postulates a complex interaction between affective and cognitive functional systems. The quality of self-regulation (willpower, self-growth) depends on our affect regulation. In this context the disposition of action vs. state orientation is understood as the individual competence to regulate affect, i.e., to mobilize positive affect or to dampen negative affect, depending on what the situational requirements are. It is assumed that positive affect benefits the realization of our intentions, whereas the absence of positive effect (e.g., when we are feeling weary and sluggish) has a paradoxical effect: While it causes unfinished intentions to come to the fore, paradoxically it impedes their realization. Intenion-related concepts are more strongly activated in prospectively state-oriented individuals as compared to prospectively action-oriented individuals. At the same time, however, prospectively state-oriented individuals are less likely to realize their intentions. In extreme cases they constantly think about what they have to do without ever pulling themselves together to actually do it (Kuhl & Goschke, 1994).

The inability to regulate negative affect down blocks our access to self, i.e., our sense of our own needs, values, and experiences. Attention is focused on the negative aspects of the current situation, and we lose track of the challenges we have already overcome in the past while also being unable to discern which goals we hope to achieve in the future. In fact, failure-related state-oriented people become "helpless" when they face setbacks as they begin to ruminate and perform more poorly. In general, their implicit motives are also incongruent with their goals, which can result in intrapsychic conflict (Baumann et al., 2005; Kuhl & Kazén, 1994; Chap. 9 in this volume).

Kuhl's notion of self-control means to "power through" when it is difficult to focus on our goals in spite of obstacles and distracting behavioral impulses. According to the theoretical assumptions by Baumeister and colleagues (1998), this exhausting process results in the gradual depletion of willpower. This perspective is an interesting addition to volitional psychology as it typically only looks at the positive consequences of self-regulation.

11.4.4.3 The Strength Model of Self-Control

Baumeister and colleagues (1998) state that people only possess a limited reservoir of self-control. Similar to a muscle, self-control is thought to be exhausted when used, making acts of self-control

more difficult for a certain amount of time afterwards. Baumeister and colleagues (1998) called this phenomenon "ego depletion" and defined it as follows:

"The core idea behind ego depletion is that the self's acts of volition draw on some limited resource, akin to strength or energy and that, therefore, one act of volition will have a detrimental impact on subsequent volition …" (Baumeister et al., 1998, p. 1252–1253)

How can we detect a ego depletion empirically? The 83 studies on the strength model of self-control included in a meta-analysis by Hagger, Wood, Stiff, and Chatzisarantis (2010) all basically chose the same approach (so-called *sequential task paradigm*). Participants work on a first task that either requires self-control (experimental group) or does not require self-control (control group). All participants then receive a second, allegedly unrelated task that requires self-control. Their performance in the second task provides information about the (still) available resources for self-control. Hagger et al. (2010) report a moderate to strong effect of ego depletion on performance in the second task (Cohen's $d = 0.62$; for a critical view of this meta-analysis see Carter, Kofler, Forster, & McCullough, 2015).

At first, the contributions made by Baumeister and colleagues had been received well by the academic community and they have become particularly well known through several popular science publications such as "Willpower: Rediscovering Our Greatest Strength" and "Willpower: Why Self-Control Is the Secret of Success." Critical voices have, however, pointed out that the postulated mediating mechanism (depletion of a limited resource) has never been demonstrated directly but only indirectly through poorer performances in the second task. Thus, it remains unclear what kind of resource the strength of self-control popularized by Baumeister actually is (Inzlicht & Schmeichel, 2012).

Further doubt has been cast on the assumption of limited resources by studies that showed that ego depletion does not occur if participants are in a positive mood (Tice, Baumeister, Shmueli, & Muraven, 2007), are rewarded for performing well on the second task (Muraven & Slessareva, 2003), or possess an implicit theory of willpower as a nonlimited resource (Job, Dweck, & Walton, 2010). In additon, some researcher groups failed to independently replicate the ego depletion effect, further casting doubt on its robustness.

11.5 Determinants and Processes of Goal Realization

All theories so far have concentrated on determinants and processes which benefit commitment and persistence and thereby help us to select the "right" goals, start pursuing them without much delay, and eventually realize them despite interruptions, distractions, or even setbacks. Without a doubt persistence and even a certain degree of tenacity are crucial to realizing any goal at all!

However, this is only one side of the coin. Too much effort can sometimes have negative consequences: We might end up wasting our resources (e.g., energy, time, money) that are then lost for other goals and projects, while constant frustration can impair our psychological and physical well-being (Brandstätter, Herrmann, & Schüler, 2013; Wrosch, Scheier, & Miller, 2013). In order to successfully realize goals, we also need the ability to disengage from problematic goals, which can mean to abandon them completely or at least adjust them to a certain extent (e.g., by lowering our expectations) (Brandtstädter, 2007; Brandstätter & Herrmann, 2017; Heckhausen et al., 2010; Wrosch, Scheier, Miller, Schulz, & Carver, 2003).

Motivational psychology neglected this crucial component of successful goal striving for a long time, even though Eric Klinger was one of the first scholars to take a look at commitment to and disengagement from goals in his 1977 book. Klinger made clear that disengaging from a goal can be a lengthy process and an incisive experience to the individual that is accompanied by profound emotional, cognitive and behavioral changes – a kind of "psychological earthquake" (Klinger, 1977, p. 137).

Excursus

The Process of Goal Disengagement According to Klinger (1977)

1. Phase: Invigoration
   Setbacks experienced while pursuing a goal initially lead to a phase of increased effort and engagement.
2. Phase: Aggression
   If efforts continue to be thwarted, frustration is met with a phase of aggression.
3. Phase: Depression
   The phase of depression is accompanied by a waning interest in all kinds of incentives. This allows for the detachment from goal-relevant incentives.
4. Phase: Recovery
   The cycle of commitment and disengagement ends with recovery during which the individual recovers from despondency and is able to commit to new goals.

It seems to be fairly difficult to disengage from (personally relevant) goals once their realization becomes increasingly unlikely due to persisting difficulties. A recent study (Wrosch et al. 2003; see also Brandtstädter & Rothermund, 2002) stresses that people differ with regard to how quickly they disengage from (subjectively) unrealistic goals (*goal disengagement*) and commit to alternative goals (*goal reengagement*). Although they do not always go hand in hand, both goal adjustment tendencies have a significant impact on our mental and physical conditions because goal disengagement can shield us from further failures while reengagement can rekindle our enthusiasm (e.g., Miller & Wrosch, 2007; Wrosch, Scheier, & Miller, 2013).

Klinger's (1977) model also highlights another aspect: Disengaging from a goal is by no means a binary event taking place over the course of a clearly defined time but rather an ongoing and dynamic process. Another current theoretical approach takes a closer look at exactly this critical phase during which the problems of goal striving become increasingly clear and disengagement becomes an attractive alternative (Brandstätter, Herrmann, & Schüler, 2013). This approach analyzes the cognitive, affective, and behavioral processes taking place when we begin to doubt our personal goals and ask ourselves if we should persist or give up. The emotionally draining conflict between goal striving and disengagement is known as *action crisis* (Brandstätter, Herrmann, & Schüler, 2013; Brandstätter & Herrmann, 2017). This crisis initiates a second deliberation of costs and benefits associated with striving and disengagement (Brandstätter & Schüler, 2013). Based on the Rubicon model of action phases, this process should weaken the volitional cognitive orientation and implemental mindset associated with the binding commitment to a goal, a process which Heckhausen perceived as dysfunctional:

> "Once a goal intention has been formed, all thoughts are focused on its implementation. … Returning to thoughts about value and expectancy aspects of the chosen goal would be disruptive, especially if they would once more cast doubt on the earlier formed goal intention." (H. Heckhausen, 1991, p. 176)

The affective impairment resulting from the conflict (continue or game over?) and the ambiguous cognitive orientation between weighing and acting ("being in two minds") also has a negative impact on performance. Students who were not sure whether to continue their major and who were considering to drop out, for example, performed significantly more poorly over the course of several terms than students who did not entertain similar thoughts (Herrmann & Brandstätter, 2015). Having shown the problematic aspects of an action crisis, researchers have directed their attention toward two other questions: What is it that initiates and maintains an action crisis? And in which adaptive consequences does an action crisis result? Action crises seem to be primarily initiated by doubt about the feasibility of a goal followed by the subsequent depreciation of the goal's desirability, which prepares the individual for disengagement and commitment to a new (desirable and feasible) goal just as Klinger claimed (Herrmann & Brandstätter, 2015; Ghassemi, Herrmann, Bernecker & Brandstätter, 2017).

By trying to explain goal disengagement, motivational psychological research has expanded its view on goal striving. While older

approaches had focused on binding goal selection and persistent goal striving, acknowledging that pursuing an unachievable or too demanding goal can negatively affect our well-being and behavioral regulation turns goal disengagement into a relevant topic for research and application.

11.6 Conclusion

Goals are an important part of current research in motivational and volitional psychology. The construct of goals combines several lines of thinking in both disciplines that are illustrated in this book.

Goals as representations of future events are based on the human ability to transcend the present and regulate our behavior toward anticipated incentives in the future, which in turn results in a feeling of control over our self and our environment (Moskowitz & Grant, 2009, p. 3; see Chap. 1 in this volume). Thus, goals determine whether we feel accomplished or defeated. A lack of goals is a taxing experience and in extreme cases a central diagnostic criterion for depressive episodes (DSM-5, criterion 2, American Psychiatric Association, 2013). Setting "good" goals and realizing them successfully, on the other hand, are essential conditions for a feeling of competence and psychological and physical well-being.

Review Questions

1. *Which factors and processes affect goal setting?*

   According to influential expectancy-value theories, the decision to pursue a particular goal (goal setting) depends on the goal's feasibility (expectancy) and attractiveness (value), which, in turn, depend on various personal and situational factors (e.g., self-efficacy, locus of control task difficulty, attributional style, implicit motives, values). How strongly we commit to a goal is an important predictor of successful goal striving. Commitment can be strengthened through mental contrasting (see Oettingen, 2012), during which we fantasize about the anticipated positive outcomes of goal realization but contrast these fantasies with the reality of the difficulties and missing steps that still separate us from goal attainment. As a consequence, we are more likely to commit ourselves to feasible rather than unrealistic goals.

2. *What is the functional advantage of the fact that goal-related concepts are represented by increased memory activation?*

   Goals remain strongly activated until they are realized. This means that we do not forget about them even if there are currently no opportunities to act or if we need to interrupt our goal striving (Goschke & Kuhl, 1993). Thus, we can return to them once new opportunities arise or obstacles are taken care of. Goal activation also makes it easier for us to recognize opportunities for goal striving in the first place. If we intend to send a letter, for example, we are more likely to notice mailboxes in our surroundings if the goal "sending a letter" remains cognitively activated until we find a mailbox. At the same time, active goals inhibit thoughts about conflicting temptations (Fishbach, Friedman, & Kruglanski, 2003) as well as thoughts about other, less important goals (goal shielding; Shah, Friedman, & Kruglanski, 2002). This way, our behavior can be directed toward the goals we have committed ourselves to instead of being primarily impulse-driven.

3. *Discuss advantages and disadvantages resulting from the observation that people tend to pursue multiple goals in various areas of life. Under which conditions can this be advantageous and what are resulting challenges?*

   Goals can support one another. If we pursue such mutually facilitative goals

(e.g., winning a marathon and losing 10 pounds), we experience more positive emotions (Riediger & Freund, 2004). It can also be helpful not to "put all one's egg in one basket" by focusing on a single goal given that setbacks could require us to disengage from it and commit to alternatives (e.g., Miller & Wrosch, 2007; Wrosch, Scheier, & Miller, 2013).

A potential challenge can result from the fact that we only have limited resources (e.g., time, energy, money, social support) to pursue our goals. If we intend to simultaneously participate in a triathlon and spend more time at the office to get a promotion, we might simply not have enough time to do both. According to a study by Emmons and King (1988), people who pursue conflicting goals are more prone to negative affect, depression and psychosomatic symptoms, which can in part be explained by their lack of goal progress.

4. *What is the role of positive and negative affect in goal striving? How do they develop during goal striving, and which consequence do they have for goal-related behavior?*

   According to cybernetic control theory (e.g., Carver & Scheier, 1990) and empirical evidence (e.g., Brunstein, 1993), positive affect results from goal progress whereas negative affect is caused by lack of progress. (Cybernetic control theory makes the specific claim that unexpectedly rapid or slow progress results in positive or negative affect, respectively.) Thus, positive and negative affect function as a form of feedback and regulate future behavior: Negative affect encourages increased effort in pursuing the focal goal ("pushing") while positive affect indicates that effort can temporarily be reduced ("coasting") and that available resources can be used for other goals.

5. *What are the characteristics of "good" goals that benefit performance and well-being?*
   1. According to goal setting theory, specific and difficult goals are better than "do your best" goals for improving performance. It is important, however, that even difficult goals should still be feasible: People need to possess the necessary resources and abilities and be able to recognize whether or not they are making progress (e.g., Locke & Latham, 1990, 2013).

   Relatively specific goals also have an advantage over fairly abstract ones. They enable us to evaluate more easily whether or not we are making progress, which is an important condition for the adjustment of our behavior. In contrast, pursuing abstract goals can result in higher levels of stress and a higher prevalence of depressive symptoms (Emmons, 1992).

   Furthermore, approach goals tend to have a more positive impact on performance and well-being than avoidance goals. This is particularly true for young adults. Avoidance goals reduce our resources for self-regulation as well as our well-being (Oertig et al., 2013). In contrast to approach goals, they also tend to reduce our effort and persistence in goal striving, which in turn yields negative results for our performance (Elliot, McGregor, & Gable, 1999). This is because avoidance goals direct our attention toward undesired possibilities – such as failure – which causes us to avoid goal-relevant situations instead of seeking them out (Derryberry & Reed, 2002; Elliot & McGregor, 1999; Öhman, Flykt, & Esteves, 2001).

   If people doubt their own aptitude, learning goals enable them to constructively deal with setbacks whereas performance goals are detrimental to performance (e.g., Ames & Archer, 1988;

(continued)

Eliott & Dweck, 1988, Grant & Dweck, 2003). Performance avoidance goals, which are aimed at hiding our own inability in particular, cause us to be afraid of tests and perform poorly. Performance approach goals, in contrast, can have a positive impact because they let us view tests as positive challenges rather than threats and encourage us to be ambitious and eventually perform better (Grant & Dweck, 2003; McGregor & Elliot, 2002).

6. *Oettingen and colleagues showed in their research on fantasy realization that pure indulgence in fantasies (following the slogan "think positive!") impairs commitment and goal engagement. How can this frequently replicated finding be explained?*

   If we indulge ourselves in positive fantasies (e.g., vividly picturing the positive outcomes of goal realization), we anticipate some aspects of goal realization which leads to a certain degree of need satisfaction (e.g., positive experiences, self-assurance). This reduces the necessity to act.

7. *What is "ego depletion" according to Baumeister et al. (1998)? What is the authors' explanation for this phenomenon?*

   It refers to the finding that people tend to perform less well in a task that requires self-control if it follows another such task. Baumeister, Bratlavsky, Muraven, and Tice (1998) explain this phenomenon by suggesting that willpower is a limited resource that is gradually depleted when used (similar to a muscle that becomes weaker when exercising) and subsequently needs time to recover.

8. *What are the theoretical similarities and differences between the following three central concept of volitional psychology: strategies of action control (Kuhl, 1994), the implemental mindset (Heckhausen & Gollwitzer, 1987), and implementation intentions (Gollwitzer, 1993)?*

   1. These three central concepts of volitional psychology have in common that they all deal with factors affecting goal realization and that they extend the scope of constructs found in expectancy-value theories by including more relevant factors and mediating mechanisms. Proponents of all three theories assume that even highly attractive and feasible goals might not be realized because all kinds of different obstacles can get in the way (e.g., conflicting goals, distractions, aversion to the required action). Another similarity is that all three concepts discuss cognitive processes (e.g., with regard to attentional processes; cognitive representations of goal-related behavior) while assuming that both consciously controlled and unconscious (automatic) processes are relevant for goal realization. A crucial difference is that individual differences usually are not discussed for the implemental mindset and the use of implementation intentions, whereas individual differences are assumed to predict the extent to which people use strategies of action control. The latter are also linked to affective processes. This is not the case for the other two concepts.

9. *Which goal orientation (learning vs. performance goals) do you think is more suitable for managers and teachers?*

   Managers who pursue learning goals communicate the importance of acquiring new knowledge and skills to their employees. This makes it more likely that they will support measures that facilitate personal growth and that employees will make use of such measures (because their leadership style supports this behavior). Managers with learning goals also make it possible to react constructively to mistakes: Instead of suggesting that employees who make mistakes have "failed"

because they lack certain abilities (as performance goals would suggest), they highlight that mistakes reveal potential for improvement in employees or the working process. A performance approach can be helpful if managers trust in their own abilities and the abilities of their employees. Approach orientation can result in more ambitious goals in this case, which in turn predict higher performance, according to Locke and Latham (e.g., 1990; 2013). Performance avoidance, on the other hand, results in less ambitious goals because managers are keen to hide their own and their employee's inaptitude, which is easier to achieve when less difficult goals are set.

10. *How can disengagement from a goal be a sign of successful behavioral regulation?*
    1. For a long time, motivational psychology focused on the conditions that benefit persistence and tenacity during goal striving (e.g., Wrosch et al., 2003). This is hardly surprising as we would be completely unable to achieve any of our goals or gain new skills without any persistence (in the face of difficulties, setbacks, and interruptions). At the same time, however, it is also important that we are able to disengage from increasingly unrealistic or unattractive goals, because disengagement can have positive effects on our well-being and performance. If we continue to pursue doubtful goals, we are likely to experience more and more failures and frustration, which results in impaired mood and a loss of resources (e.g., time, money, energy) for the pursuit of more productive goals.

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Motivation and Volition in the Course of Action

12

Anja Achtziger and Peter M. Gollwitzer

12.1 Characteristics of the Action Perspective

For Kurt Lewin (cf. Lewin, Dembo, Festinger, & Sears 1944), there was never any doubt that motivational phenomena can only be properly understood and analyzed from an action perspective. Indeed, as he pointed out in support of this claim, processes of goal setting and goal striving are governed by distinct psychological principles. These insights went unheeded for several decades, however, probably for the simple reason that goal-setting research based on the expectancy-value paradigm proved so successful (Atkinson, 1957; Festinger, 1942) and captured the full attention of motivation psychologists. It was not until the emergence of the psychology of goals (starting with Klinger, 1977; Wicklund & Gollwitzer, 1982) and the psychology of action control (based on Kuhl, 1983; see Chap. 12) that the processes and potential strategies of goal striving began to receive the attention that Kurt Lewin had already felt they deserved back in the 1940s (Oettingen & Gollwitzer 2001). In contrast to the behaviorist approach, an action perspective on human behavior means extending the scope of analysis beyond simple stimulus-response bonds and the execution of learned habits. The concept of action is seen in opposition to such learned habits and automatic responses; it is restricted to those human behaviors that have what Max Weber (1921) termed "Sinn" ("meaning" or "sense"). In Weber's conceptualization, "action" is all human behavior that the actor deems to have "meaning." Likewise, external observers apply the criterion of "meaning" to determine whether or not another person's behavior constitutes "action": are there discernible "reasons" for that behavior?

Definition
From this perspective, actions can be defined as all activities directed toward an "intended goal."

The motivation psychology of action focuses on questions of action control. These issues are important because – as action psychology research has shown repeatedly – a strong motivation to achieve a certain outcome or engage in a certain behavior does not normally suffice for that behavior to be implemented and the goal to be realized (Gollwitzer & Bargh, 1996; Gollwitzer & Sheeran, 2006; Heckhausen, 1989;

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Kuhl, 1983). In fact, successful goal attainment often requires the skilled deployment of various action control strategies (e.g., formulating "if-then" plans, resuming interrupted actions, stepping up efforts in the face of difficulties; cf. Gollwitzer & Moskowitz, 1996; Sects. 5, 6, and 7).

12.2 The Rubicon Model of Action Phases

The focus of this section is on the course of action, which the Rubicon model of action phases understands to be a temporal, horizontal path starting with a person's desires and ending with the evaluation of the action outcomes achieved (Gollwitzer, 1990, 2012; Heckhausen, 1987a, 1989; Heckhausen & Gollwitzer, 1987). The Rubicon model seeks to provide answers to the following questions:

- How do people select their goals?
- How do they plan the execution of those goals?
- How do they enact these plans?
- How do they evaluate their efforts to accomplish a set goal?

- The major innovation of the Rubicon model was to define clear boundaries between motivational and volitional action phases. These boundaries mark functional shifts between mindsets conducive to goal deliberation and mindsets conducive to goal achievement. The three most important boundaries are at the transition from the motivational phase before a decision is made to the subsequent volitional phase, at the transition from this planning phase to the initiation of action, and finally at the transition from the action phase back to the motivational (postactional) evaluation phase.

12.2.1 Action Phases

Heckhausen's Rubicon model of action phases was inspired by the necessity to distinguish two major issues in motivation psychology – the selection of action goals and the realization of those goals (Lewin, 1926) – and, at the same time, to incorporate both within a single, unifying framework (Heckhausen, 1987a, 1989; Heckhausen & Gollwitzer, 1987). In a manner of speaking, the model examines the transition from wishing to weighing in goal selection and from weighing to willing in actual goal pursuit (Heckhausen, 1987b). Importantly, it highlights the distinctions between goal setting and goal striving and is careful not to confuse or confound the two. It was precisely that kind of indiscriminate approach that generated confusion in the history of motivation psychology and resulted in volitional phenomena being neglected for decades (Gollwitzer, 1990, 1991, 2012; Heckhausen, 1987c; Kuhl, 1983). Given that the processes of goal setting and goal striving serve a common function, however, it was important that they should not be seen as isolated, independent phenomena either. The Rubicon model gets around this difficulty by tracking the emergence of a motivational tendency over time – from the awakening of wishes to goal selection and commitment and finally goal deactivation. It seeks to describe the emergence, maturation, and fading of motivation, dividing a course of action into four distinct, consecutive phases separated by clear boundaries or transition points. These four action phases differ in terms of the tasks that have to be addressed before the individual can move on to the next phase. The distinctions the model draws between consecutive action phases are thus both structural and functional in nature.

According to the Rubicon model, a course of action involves a phase of deliberating the positive and negative potential consequences of various nonbinding wishes and action alternatives (predecisional phase), a phase of planning concrete strategies for achieving the goal selected at the end of the predecisional phase (preactional/postdecisional phase), a phase of enacting these strategies (actional phase), and finally a phase of evaluating the action outcome (postactional phase; Fig. 12.1; see also Fig. 1.3 in Chap. 1).

- The four phases of the Rubicon model differ in terms of the tasks that have to be addressed before the individual can move on to the next phase. Motivational episodes are thus broken

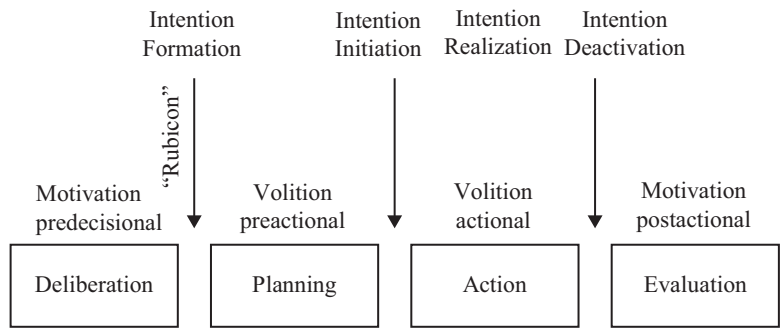

Fig. 12.1 The Rubicon model of action phases (Heckhausen & Gollwitzer, 1987)

down into distinct and seemingly independent phases. Critically, the Rubicon model seeks to explain both goal setting and goal striving.

The Predecisional Phase

The first phase (predecisional phase) is characterized by deliberation. An individual first has to decide which of his or her many wishes to pursue. A person's motives are assumed to produce certain wishes. For example, a person with a strong achievement motive (Chap. 6) and a weak affiliation motive (Chap. 7) is expected to experience more wishes related to achievement than to affiliation. Yet because people's needs and motives produce more wishes than can possibly be enacted, they are forced to choose among them, committing themselves to certain selected goals. To this end, they weigh the desirability and feasibility of their many wishes. The objective of the predecisional phase is thus to decide – based on the criteria of feasibility (i.e., the expectancy that the desired action outcome is attainable) and desirability (i.e., the value of the expected action outcome) – which of their wishes they really want to pursue. Individuals contemplating the feasibility of a potential goal will ask themselves questions such as the following:

- Can I obtain the desired outcomes by my own activity (action-outcome expectancy)?
- Is the situational context facilitating or inhibiting (action-by-situation expectancy)?

The following questions are also crucial:

- Do I have the necessary time and resources to pursue the desired outcome?
- Might favorable opportunities to pursue it arise?

The desirability of a potential goal or desired outcome is determined by reflecting on questions such as the following:

- What are the short- and long-term consequences of pursuing this goal?
- How positive or negative might these consequences be for me?
- How probable is it that these consequences will occur?

In addressing these questions, the individual weighs the expected value of a wish or potential goal; reflects on its positive and negative, short- and long-term consequences; and assesses the probability that achieving the desired outcome or potential goal will bring about these consequences. It is assumed that people do not contemplate their wishes and potential goals in isolation but see them in relation to other wishes and potential goals. A wish associated with a number of attractive consequences may thus suddenly appear less desirable in the light of a superordinate wish. Conversely, a wish may appear more feasible when contemplated in the context of other wishes than when seen in isolation. The duration of the deliberation process varies from case to case. It is rare for answers to be found to all questions. In fact, many of the questions have no hard and fast answers (e.g., it is difficult to gauge outcome-consequence expectancies when the consequences in question involve external evaluation or progress toward a superordinate goal), and in most cases, there is not even enough time to address all of the questions that one might want to find answers to.

The Rubicon model thus postulates the facit (i.e., concluding) tendency to facilitate predictions

of when the motivational task of deliberation will be completed. The more thoroughly an individual has weighed the positive and negative short- and long-term consequences of engaging or not engaging in a particular behavior, the closer the person comes to the belief of having exhausted all possible routes of action. The chances of gaining new insights into potential consequences decrease, and the facit tendency, i.e., the tendency to decide on a certain wish or potential goal, increases apace. However, a decision is only made when a previously stipulated level of clarification has been attained. This level of clarification is positively correlated with the personal importance of the decision and negatively correlated with the costs incurred in acquiring information on potential consequences and thinking that information through. As shown by Gollwitzer, Heckhausen, and Ratajczak (1990), however, the process of deliberation can be shortened by thinking in depth and detail about how one of the alternatives under consideration might be translated into action. In an experimental study, these authors found that participants who anticipated a decision and planned their subsequent actions were quicker to make a decision.

However, even a wish with a high resultant motivational tendency (i.e., high expected value) does not necessarily gain access to the executive. Rather, it first has to be transformed into a binding goal. This transformation is often described as crossing the Rubicon in allusion to Julius Caesar's crossing of the river that once marked the boundary between Italy and Cisalpine Gaul. By leading his army across the Rubicon and marching toward Rome, Caesar committed himself irrevocably to civil war. The transformation of a wish into a goal involves a shift from a fluid state of deliberating the value of a potential goal to a firm sense of commitment to its enactment, i.e., to the formation of a "goal intention" (see Sect. 5 for a definition of "goal intention"). Phenomenologically, it results in a feeling of determination and certainty of taking the necessary action (Michotte & Prüm, 1910). The goal specified in the wish thus becomes an end state to which the individual feels committed to attain.

- In the predecisional phase, individuals contemplate the feasibility of certain wishes as well as the desirability of potential action outcomes. This process of deliberation culminates in commitment to a binding goal (goal intention) – in crossing the "Rubicon" between wishes and goals. The transformation of a wish into a binding goal or goal intention results in a firm sense of commitment to translate that goal into action.

Preactional Phase

It may not be possible for newly formed goal intentions to be implemented immediately. The individual may first have to complete other activities or wait for suitable opportunities to arise. Moreover, many goal intentions specify goal states (e.g., spending more time with one's family, graduating from college, etc.) that cannot be achieved instantly. Consequently, people may be forced to wait for favorable opportunities to arise before moving toward the intended goal state. According to the Rubicon model, individuals in this waiting stage are in the second phase of a course of action – the volitional preactional (or postdecisional) phase. The term "volition" indicates that the motivational deliberation of potential action goals (wishes) has been terminated by crossing the Rubicon and that the individual is now committed to achieving a chosen goal. The task facing individuals in this postdecisional (but preactional) phase is to determine how best to go about attaining the chosen goal. Thus, it is no longer a question of selecting desirable and feasible goals but of determining how to facilitate the achievement of the goals chosen, e.g., by means of routine behaviors that are more or less automatic or newly acquired behaviors that require conscious thought. Ideally, people in the preactional phase should also develop plans specifying when, where, and how goal-directed behavior is to be performed (Gollwitzer, 1993).

These plans are called implementation intentions (Sect. 5). According to the Rubicon model and the theory of intentional action control (Gollwitzer, 1999, 2014), implementation intentions concerning the initiation, execution, and termination of actions help people to overcome the difficulties that can be anticipated as they progress toward their goals (e.g., to get started and staying on track).

How, then, is action initiated when a more or less favorable opportunity arises? The concept of the fiat tendency was introduced to answer this question. By crossing the Rubicon, people commit themselves to enacting their chosen goals. The strength of this commitment, which the Rubicon model labels volitional strength, is a positive linear function of the strength of the corresponding motivational tendency (i.e., the desirability and feasibility of the intended goal). The strength of a goal intention's fiat tendency is the product of its volitional strength (i.e., the commitment to pursuing the goal state) and of the suitability of the available situation for its initiation. The suitability of a situation is not determined in isolation, but relative to other opportunities that might occur in the future (longitudinal competition). The fiat tendencies of an individual's other goal intentions also have to be considered, however. It would be wrong to assume that people always take action to promote a goal with a high fiat tendency. Many situations are conducive to a whole range of intentions, not all of which can be implemented at once (cross-sectional competition). In this case, the goal intention with the highest fiat tendency gains access to the executive, and actions seeking to accomplish it are initiated.

- In the preactional phase, individuals contemplate how best to pursue the goal to which they committed at the end of the predecisional phase. They choose strategies and formulate plans (e.g., implementation intentions; see also Sect. 5) that seem conducive to attaining the aspired goal state.

Action Phase

The initiation of action designed to further the plans formulated in the preactional phase signals the transition to the action phase. In this phase, the individual's efforts are focused on pursuing goal-directed actions and bringing them to a successful conclusion. These efforts are best facilitated by steadfast pursuit of goals, which implies stepping up effort in the face of difficulties and resuming goal-directed actions after every interruption. Whether or not an action is executed and is determined by the volitional strength of the goal intention. The level of volitional strength acts as a kind of threshold value for effort exertion. Although this threshold is primarily determined by the strength of the motivational tendency, it may be spontaneously shifted upward when situational difficulties are encountered. The primary source of increased volition is the extra effort mobilized in response to situational difficulties. In this phase, action implementation is guided by the mental representation of the goal to which the individual has committed, which may well be outside his or her conscious awareness.

- In the action phase, individuals seek to enact the plans made in the preactional phase with the aim of enacting the goal formulated at the end of the predecisional phase. These efforts are best facilitated by steadfast pursuit of the goal and by stepping up the effort exerted in the face of difficulties.

Postactional Phase

The transition to the fourth and final action phase, the postactional phase occurs once the goal-oriented actions have been completed. The task to be addressed at this stage is again a motivational one. Specifically, individuals measure the results of their actions against the goal set at the end of the predecisional phase, asking questions such as the following:

- How well have I succeeded in achieving my goal?
- Did the action result in the positive consequences anticipated?

- Can I now consider my action intention completed?
- If the goal was not attained, do I need to keep working toward it, perhaps by other means?

Individuals in the postactional phase thus look back at the action outcome attained and, at the same time, cast their thoughts forward to future action. If the action outcome corresponds with the aspired goal state, the underlying goal is deactivated. In many cases, shortcomings in the predecisional deliberation of an action's positive and negative, short- and long-term consequences may become apparent at this point. It may, for example, emerge that the desirability of the goal was overrated because certain outcome expectancies were overestimated or overlooked. Of course, not all comparisons between intended and achieved outcomes result in the deactivation of the goal: the action outcome may deviate from the intention in qualitative or quantitative terms. The goal may then be adjusted to the outcome by lowering the level of aspiration. Alternatively, individuals may choose to retain the original goal standard despite the unsatisfactory outcome and renew their attempts to achieve it. Deactivation of a goal that has not been achieved seems to be facilitated by the prospect of a new goal taking its place. For example, Beckmann (1994) showed that participants could only detach mentally from a poor score on an intelligence test if they expected a new test to be administered in the next round. Participants who did not have this prospect kept thinking about the poor test result, i.e., engaged in self-evaluative rumination.

- In the postactional phase, individuals evaluate the action outcome achieved. If they are satisfied with the outcome, they deactivate the goal set at the end of the predecisional phase. If they are not satisfied with the outcome, they either lower the level of aspiration and deactivate the goal or retain the original level of aspiration and increase their efforts to achieve the desired goal.

12.2.2 Motivational vs. Volitional Action Phases

Kurt Lewin (1926) and Narziss Ach (1935) understood volition to be the form of motivation involved in goal striving and goal striving to encompass all processes of motivational regulation that serve the pursuit of existing goals. Thus, volition concerns the translation of existing goals into action and, specifically, the regulation of these processes. Motivation, in contrast, concerns the motivational processes involved in goal setting. The focus here is on which goals a person wishes to pursue. People who have to decide between different goals are assumed to weigh the expected value (desirability) and attainability of the available options (feasibility) very carefully (Gollwitzer, 1990). Classic motivation theories rely on this narrow definition of motivation, assuming the motivation to act to be determined by both the perceived desirability and feasibility of the aspired goal. If someone does not believe him- or herself capable of doing what is needed to attain a goal, or does not consider a goal particularly desirable, he or she will not be motivated to do all she can to pursue it.

In the early 1980s, Kuhl reestablished the distinction between motivation and volition and drew a clear line between modern volition research and the more philosophical debate on "free will" (Kuhl, 1983; see also Chap. 12). Kuhl was the first modern motivation researcher to draw attention to the contrasting functions and characteristics of "choice motivation" and "control motivation," and strongly advocated that a distinction be made between motivational and volitional issues in research (Kuhl, 1984, 1987).

Summary

Motivation concerns the processes and phenomena involved in goal setting, i.e., the selection of goals on the basis of their desirability and feasibility. Motivational processes dominate in the predecisional and postactional phases of the Rubicon model. Volitional processes and phenomena, on the other hand, concern the translation of these goals into action. Volitional processes dominate in the preactional and actional phase.

12.3 Action Phases and Mindsets: How Can Psychological Processes Be Incorporated into an Idealized Structural Model (i.e., the Rubicon Model of Action Phases)

The Rubicon model of action phases implies that goal-directed behavior can be broken down into a series of consecutive phases. The premise for this kind of research approach is that the phases identified describe qualitatively different psychological phenomena that correspond to the different functions of each action phase. The Rubicon model is thus both structural and functional in nature (Heckhausen, 1987a). The main functions of the four action phases identified are listed in the following overview.

Functions of the action phases in the Rubicon model:
1. Predecisional phase: deliberation
2. Postdecisional, preactional phase: preparation and planning
3. Actional phase: action
4. Postactional phase: evaluation

Each of these functions is assumed to be associated with a different mindset: a form of information processing that is appropriate to the action phase at hand. Based on the terminology of the Würzburg school (Chap. 2), the concept of mindset refers to the states of mind that are associated with adopting and executing specific tasks (Gollwitzer, 1990; Marbe, 1915).

Definition
The term "mindset" describes a certain kind of cognitive orientation (i.e., the activation of distinct cognitive procedures) that facilitates performance of the task to be addressed in each action phase.

Mindset research is based on the idea that distinct tasks have to be solved in each phase of the Rubicon model. In their comprehensive research program, Gollwitzer and colleagues (see the overviews by Gollwitzer, 1990, 1991, 2014) have found evidence for qualitative differences between action phases, and they have shown that task-congruent mindsets determine the content and form of information processing in each action phase. Within the research paradigm, the characteristic task demands of the deliberation, implementation, action, and evaluation phases are first analyzed, allowing hypotheses about phase-specific differences in information processing to then be derived and systematically tested (Gollwitzer, 1990; Gollwitzer & Bayer, 1999). These hypotheses, which are outlined below, concern the cognitive orientations that are functional for addressing phase-specific tasks. It is assumed that each phase is associated with a certain mindset (i.e., with the activation of specific cognitive procedures) that facilitates performance of the task at hand.

Deliberative Mindset
The deliberative mindset is associated with the predecisional phase and thus with the task of goal setting. What kind of cognitive orientation characterizes this mindset? How do people in this mindset attend to and process information? Individuals in the predecisional phase are faced with the task of deciding which of their wishes to translate into action; they have to weigh the relative desirability and feasibility of their wishes in order to select comparatively attractive and attainable action goals. Solving this task requires individuals in the deliberative mindset to be primarily concerned with information about the incentives (desirability) of different goals and expectancies (feasibility) of attaining them. The positive and negative incentives and/or potential consequences of specific action outcomes also have to be considered as impartially as possible; it is important that negative consequences are not overlooked. Likewise, feasibility assessments should be as accurate as possible, i.e., neither overly optimistic nor unnecessarily pessimistic. Only if expectan-

cies and incentives are assessed in an objective and impartial manner can the predecisional task of selecting a comparatively desirable and attainable goal be accomplished successfully.

Implemental Mindset

The implemental mindset is associated with the preactional phase; its task is to prepare for goal striving, e.g., by undertaking efforts to initiate appropriate actions. The concrete approach taken depends on the type of goal set. If, upon crossing the Rubicon, the goal was furnished with implementation intentions (Sects. 5, 6, and 7) specifying when, where, and how actions are to be initiated, all that remains to be done is to wait for the critical situation to arise (i.e., the "when" and "where" specified in the implementation intention). As soon as the critical situation is encountered, the respective goal-directed behavior is initiated. The same holds for goals that do not require implementation intentions because they are habitually initiated in a specific way. Here, too, the individual simply has to wait for a suitable opportunity to arise and respond with the goal-directed behavior. If neither implementation intentions nor habits that might facilitate goal achievement are in place, corresponding action plans first have to be formulated. Solving these tasks requires individuals to be receptive to and process information that facilitates the initiation of goal-oriented behavior and that prevents its postponement. To this end, there is cognitive tuning toward information relevant to where, when, and how to act. At the same time, there should be closed-mindedness in the sense that people should concentrate on information relevant to task performance and ignore incidental, less relevant information. Thus, attention is focused on a specified opportunity to act, and the individual is shielded from the distractions of competing goals, etc. This shielding function also applies to information about the desirability and feasibility of the goal selected at the end of the predecisional phase, which is irrelevant to the initiation of goal-directed behavior and is, in fact, distracting.

- Individuals in the implemental mindset are particularly receptive to information relating to the initiation of goal-directed behavior. At the same time, there is closed-mindedness in the sense that only information that will help to promote the chosen goal is processed.

Action Mindset

The action mindset is associated with the action phase, the task of which can be described as acting toward the goal such that goal achievement is promoted. Solving this task requires individuals to avoid disruptions in goal-facilitating behavior, because any halting of the flow of action postpones goal achievement. The action mindset should therefore evidence characteristics of what Csikszentmihalyi (1975) called "flow experience" and Wicklund (1986) labeled "dynamic orientation." Specifically, individuals in this mindset no longer reflect on the qualities of the goal to be achieved, or on their abilities and skills to achieve that goal. They do not consider alternative strategies, neither do they form implementation intentions or action plans specifying when, where, and how to act. Rather, they are totally absorbed in the actions being executed. Accordingly, they only attend to those aspects of the self and the environment that sustain the course of action and ignore any potentially disruptive aspects (e.g., self-reflective thoughts, competing goals, or distracting environmental stimuli). The actional mindset is therefore hypothesized to be one of closed-mindedness to any information that might trigger reevaluation of the goal selected at the end of the predecisional phase, reevaluation of the implementation strategy chosen, or any form of self-evaluation (e.g., "Can I be proud of my performance thus far?", "Do I have the necessary skills to achieve the goal?"). Rather, the action mindset should evidence cognitive tuning toward internal and external cues that guide the course of action toward goal attainment. The processing of this information should be as accurate as possible; its evaluation should not be positively biased. The action mindset should emerge whenever people move effectively toward goal attainment.

Evaluative Mindset

The evaluative mindset is associated with the postactional phase, when the task is to evaluate the action outcome and its consequences in order

to establish whether goal pursuit has led to the intended outcome and desired consequences. Solving this task requires individuals to be primarily concerned with the quality of the action outcome and the actual desirability of its consequences. In other words, individuals in the evaluative action phase compare what has been achieved (outcomes) and obtained (consequences) with what was originally expected or intended. Accurate assessments of the quality of the outcome and objective, impartial views of the desirability of its consequences are thus required. Accordingly, the evaluative mindset should evidence the following characteristics: cognitive tuning toward information relevant to assessing the quality of the achieved outcome and the desirability of its consequences, accurate and impartial processing of that information, and a comparative orientation: the intended outcome and its expected consequences are compared with the actual outcome and its consequences.

Summary

The action phases of the Rubicon model are characterized by four different task-oriented activities: deliberating, planning, acting, and evaluating. Because each phase involves a unique challenge, each is associated with a typical mindset conducive to rising to it. The cognitive characteristics of each mindset can be inferred by critically analyzing the demands of the distinct tasks addressed in each action phase. For example, the deliberative mindset is characterized by open-mindedness and by the objective processing of all available information on the positivity/negativity of potential consequences of a desired action outcome (desirability) and the viability of attaining this outcome (feasibility). The implemental mindset is characterized by cognitive tuning toward information that facilitates the initiation of goal-oriented behavior and that prevents its postponement. The action mindset focuses attention on those aspects of the self and the environment that sustain the course of action; any potentially disruptive aspects (e.g., self-reflective thoughts, competing goals, or distracting environmental stimuli) are ignored. Finally, in the evaluative mindset, there is cognitive tuning toward information that helps to assess the quality of the achieved outcome as objectively and accurately as possible. To this end, the individual compares what has actually been achieved (action outcome) and obtained (consequences of that outcome), with the intended or expected outcomes and consequences.

12.4 The Cognitive Features of Deliberative Versus Implemental Mindsets

Having discussed the theoretical background to the four mindsets in Sect. 3, we now present empirical findings in support of the hypotheses formulated about the deliberative and implemental mindsets. We focus on these two mindsets simply because research has yet to examine the action and evaluative mindsets or to test the hypotheses derived about information processing and cognitive orientations in these last two phases of the Rubicon model. We begin by describing how the deliberative and implemental mindsets can be induced experimentally.

Study

Experimental Studies Comparing Deliberative and Implemental Mindsets:

- Induction of the Deliberative Mindset
  Participants are asked to identify a personal concern (problem) that they are currently deliberating, without yet having decided whether to make a change (i.e., to act) or to let things take their course (i.e., to remain passive). For example, they may be contemplating whether it makes more sense to switch majors or to stick with their current one. Participants are then asked to list the potential short-term and long-term, positive and negative consequences of making

or failing to make a change decision and to estimate the probability of those consequences actually occurring (cf. Gollwitzer & Kinney, 1989, Study 2; Gollwitzer & Bayer, 1999; Hügelschäfer & Achtziger, 2014; Keller & Gollwitzer, 2016; Rahn, Jaudas, & Achtziger, 2016a).

- Induction of the Implemental Mindset
  Participants are asked to identify a goal (project) that they intend to accomplish within the next 3 months, e.g., applying for a grant to study abroad. They then list five steps that have to be taken to accomplish that goal and finally write down concrete plans on when, where, and how to take each step. They thus specify the exact time, place, and manner in which each step toward realizing the goal is to be taken (cf. Gollwitzer & Kinney, 1989, Study 2; Gollwitzer & Bayer, 1999 Hügelschäfer & Achtziger, 2014; Keller & Gollwitzer, 2016; Rahn et al., 2016a).
- Alternative Ways of Induction
  Puca (2001) as well as Puca and Schmalt (2001) induced the deliberative mindset by interrupting the decision-making processes of participants who were poised to make a decision, such that they continued to deliberate on the alternatives available. They induced the implemental mindset by allowing participants to make a decision (between alternatives). Participants were then administered tasks that had nothing to do with the decision task but served to investigate the effects of the respective mindset on different cognitive processes. Gollwitzer and Kinney (1989, Study 1) had already taken a similar approach, inducing an implemental or a deliberative mindset by presenting participants with a decision task. Specifically, the implemental mindset was induced by asking participants to decide on a certain sequence of trials before the dependent variables were assessed. The deliberative mindset was induced by interrupting participants shortly before they made a final decision on a sequence of trials. Rahn, Jaudas, and Achtziger (2016b) asked participants to evaluate arguments pro and con wearing a bicycle helmet concerning their persuasiveness. Only participants in the implemental mindset condition were required to decide whether they are for or against passing a law of wearing a bicycle helmet after having evaluated all arguments. In other words, in contrast to deliberative mindset participants, they had to make a decision and thus crossed the Rubicon. Still another mindset manipulation is described by Brandstätter, Giesinger, Job, and Frank (2015). Participants listened to a story in which the narrator talked either about being in a deliberative or in an implemental state of mind.

12.4.1 Cognitive Tuning Toward Task-Congruent Information

The implemental mindset is assumed to promote goal attainment by helping people to overcome the classic problems of goal striving, e.g., doubting the attractiveness and hence the desirability of the goal being pursued, the practicability of goal-directed strategies, or the feasibility of the aspired project. Empirical data support these assumptions, showing that the implemental mindset evokes toward information related to goal attainment. Participants in an implemental mindset report more thoughts relating to the execution of an aspired project (i.e., "implemental" thoughts of the type "I'll start with X and then move on to Y") than participants in a deliberative mindset (who tend to report "deliberative" thoughts of the type "If I do this, it will have

positive/negative consequences; if I don't, then X, Y, or Z is likely to happen"; cf. Heckhausen & Gollwitzer, 1987; Taylor & Gollwitzer, 1995, Study 3; Puca & Schmalt, 2001).

In a series of studies, Gollwitzer, Heckhausen, and Steller (1990) induced either an implemental or a deliberative mindset using the procedure described in Sect. 4. Participants were then presented with three fairy tales that were cut short at a certain point in the plot. In what was ostensibly a creativity test, they were asked to continue the story. Participants in the implemental mindset were more likely to have the protagonists of their stories plan how to carry out a chosen goal than were participants in the deliberative mindset. In a second study, participants in an implemental or a deliberative mindset were shown a series of slides, each presenting an image of a person along with sentences reporting that person's thoughts on the pros and cons of a specific course of action and plans to put it into practice. After viewing the slides and working on a short distracter task, participants were administered a cued recall test of the information presented. Implemental participants were better able to recall information relating to the when, where, and how of goal achievement than information relating to the pros and cons of a change decision. The recall performance of deliberative participants showed the reverse pattern.

Summary

The thoughts of individuals in the deliberative mindset are more attuned to action alternatives than to strategies of goal achievement; likewise, individuals in the deliberative mindset recall information associated with the deliberation of alternatives better than information pertaining to the accomplishment of goal-directed actions. Individuals in the implemental mindset devote more thought to planning goal-directed behavior than to contemplating action alternatives and find it easier to recall information relating to the planning of actions than to the contemplation of action alternatives.

12.4.2 Processing of Relevant and Irrelevant Information

Gollwitzer and Bayer (1999) report that the implemental mindset leads to "closed-mindedness," to the extent that individuals in this mindset do not allow themselves to be distracted by irrelevant information but focus exclusively on information relevant to the accomplishment of their goal. This finding is substantiated by the empirical data of Heckhausen and Gollwitzer (1987, Study 2), who found that implemental participants have shorter noun spans (a good indicator of reduced cognitive processing speed; Dempster, 1985) than do deliberative participants. In a set of studies using a modified Müller-Lyer task, it was observed that implemental participants' visual attention is more centrally focused than that of deliberative participants (Büttner, Wieber, Schulz, Bayer, Florack, & Gollwitzer (2014, Studies 1 and 2)). This finding was confirmed by a third study that measured eye movements by means of an eye tracker. Participants in a deliberative mindset intensely viewed the background of the presented pictures, compared to implemental mindset participants who focused on the objects presented in the center of the pictures instead. But there are even some studies that investigated the selective processing of information that was presented rather incidentally. These studies also confirmed that a deliberative mindset is characterized by open-mindedness, whereas the implemental mindset is associated with closed-mindedness (Fujita, Gollwitzer, & Oettingen, 2007). It was shown that the recognition of incidentally presented information was better in the deliberative mindset than in the implemental mindset. This finding supports the hypothesis of a widened versus narrowed focus of attention in the deliberative versus implemental mindset, respectively. Further evidence for the widened versus narrowed focus of attention notion is provided by an experiment contrasting the predictions of the Rubicon model with Festinger's dissonance theory. In this experiment, Beckmann and Gollwitzer (1987) observed that information relevant to the

ongoing action is processed preferentially in the implemental mindset, even when it is not in line with the decisions that have been made. Moreover, in a series of studies on the effects of the implemental mindset on attitude strength, the following results were observed: attitudes became more extreme, their ambivalence decreased, their cognitive accessibility increased, and the consistency between the attitude and behavior increased (Henderson, de Liver, & Gollwitzer, 2008). Henderson et al. (2008) explain these results by assuming that the implemental mindset (the reported effects on attitudes were not observed in the deliberative mindset), by means of the associated narrow-mindedness, promotes the evaluation of information in one direction only.

Summary

Empirical research has shown that people in the deliberative mindset are more likely to be distracted by information that is irrelevant to goal attainment. This finding is in line with the observation that individuals in the deliberative mindset attend to incidental information. The reverse holds for the implemental mindset. Here, processing is attuned to information of direct relevance to goal attainment, and attention is centrally focused.

12.4.3 Biased Processing of Information Relating to Goal Feasibility and Desirability

Mindset research assumes that the implemental mindset fosters a positive evaluation of the chosen goal (i.e., its high desirability) and, at the same time, promotes a highly optimistic assessment of its practicability and attainability. The deliberative mindset, by contrast, is assumed to generate objective assessments of the positive and negative consequences of goal attainment and a more careful evaluation of the probability of achieving the goal. Various studies (cf. Gollwitzer, 1990) have been conducted to test these hypotheses; one of the classic studies is described on the next page.

Study

Classic Study on Illusions of Control" in the Implemental Mindset

In what is known as the "contingency learning task" (Alloy & Abramson, 1979), participants perform a series of trials on a single-stimulus apparatus. Their task is to determine to what degree they can influence the onset of a target light (i.e., the intended outcome) by choosing to press or not press a button. In other words, participants are told that alternative actions (pressing the button/not pressing the button) can lead to the outcome "target light onset." What they do not know is that target light onset is in fact entirely independent of whether or not they press the button; it is determined by a random generator.

The experimenter can vary the apparent degree of control by changing the setting of the random generator, thus manipulating the frequency of target light onset associated with each of the action alternatives (i.e., pressing or not pressing the response button). An extensive body of research using this contingency learning task (cf. Alloy & Abramson, 1988) has shown that non-depressed participants believe themselves to have control over target light onset when this desired outcome occurs frequently (e.g., when the target light comes on in 75% of pressing and 75% of non-pressing responses) as compared to infrequently (e.g., when the target light comes on in 25% of pressing and 25% of nonpressing responses). Given that target light onset is in fact noncontingent to participants' actions, but governed by a random generator, these findings of inaccurate, optimistic judgments of control are remarkable.

Gollwitzer and Kinney (1989) assumed that this unrealistic *illusion of control* over target light onset would be less pronounced in deliberative mindset participants than in the implemental mindset participants. The authors assumed that people in the implemental mindset tend to see themselves and their abilities in a much more positive light than do people in the deliberative mindset (Sect. 4). They therefore modified the contingency learning task by adding a second apparatus and asking participants to work on 5 sets of 20 trials. A single trial consisted of the choice to press or not press the response button followed by task light onset or non-onset. A deliberative mindset was induced by telling participants that their objective in the first part of the experiment was to decide which of the two available apparatuses to work on during the second part of the experiment. Deliberative participants were encouraged to try out both apparatuses before the experiment proper began to ensure an informed decision. The implemental mindset was induced by asking participants to specify which apparatus they would use in each trial *before* starting the first set. After making this decision, they were instructed to try to produce as many light onsets as possible, whether by pressing or not pressing the response button. The participants were thus instructed to "find out" for themselves whether pressing or not pressing the button gave them more "control" over target light onset. Of course, the experimenter knew that target light onset was in fact governed by a random generator and entirely independent of participants' actions. Besides the two mindsets, a "target light onset" condition was implemented:

- Either the "high frequency of target light onset" condition, in which the target light comes on in 75% of pressing and 75% of nonpressing responses
- Or the "low frequency of target light onset" condition, in which the target light comes on in 25% of pressing and 25% of nonpressing responses

Accordingly, both apparatuses presented either noncontingent frequent or noncontingent infrequent onset of the target light. When target light onset was frequent and thus seemed to be "contingent" on participants' actions (pressing/not pressing the response button), implemental mindset participants reported inaccurately high judgments of the degree of control they exerted over target light onset (illusionary optimism), whereas deliberative mindset rated their level of control to be much lower. The deliberative mindset participants evidently recognized that high frequency of an event was not necessarily a valid indicator of their own influence over it. The deliberative mindset thus seems to prevent people from adopting unrealistically optimistic beliefs about how much influence they have over uncontrollable events. When, on the other hand, target light onset was infrequent and thus seemingly noncontingent, both mindset groups showed rather modest control judgments. This finding indicates that people in an implemental mindset can adapt to external constraints if necessary. If environmental feedback tells them otherwise (e.g., a high rate of "non-hits" in the button-press task), they do not cling blindly to a belief of being in control over target outcomes but abandon this illusion of control.

On the subject of "illusionary optimism" in the implemental mindset, Gagnè and Lydon (2001a) report that individuals in an implemental mindset see the future of their current romantic relationship in a more optimistic light than do individuals in a deliberative mindset. Likewise, Puca (2001, Studies 1 and 2) established that the implemental mindset is associated with an optimistic approach to the choice of test materials of varying difficulty (Study 1) and the prediction of future task performance (Study 2). Relative to deliberative participants, implemental participants opted for more diffi-

cult tasks and were more optimistic about their chances of success. Finally, Harmon-Jones and Harmon-Jones (2002, Study 2) discerned differences between the deliberative and implemental mindsets in terms of how information on the desirability of chosen and nonchosen alternatives is processed. Dissonance research discovered that, once a choice has been made, the chosen option is seen in a much more positive light than the nonchosen option. Harmon-Jones and Harmon-Jones observed that induction of an implemental mindset increases this effect, whereas induction of a deliberative mindset reduces it.

Summary

Relative to the deliberative mindset, the implemental mindset is associated with increased optimism about the degree of personal control over intended action outcomes and with a preference for difficult tasks. Moreover, the implemental mindset is associated with higher estimates of the probability of success than the deliberative mindset.

12.4.4 Mindsets and Self-Evaluation

Deliberative and implemental mindsets have also been shown to affect the way people see themselves. Experimental findings show that people in a deliberative mindset score much lower on the Rosenberg Self-Esteem Scale (Rosenberg, 1965) than do people in an implemental mindset. Likewise, students judge themselves to be more creative, intelligent, popular, etc., when an implemental mindset is induced than when a deliberative mindset is induced (Taylor & Gollwitzer, 1995). Induction of an implemental mindset evidently boosts people's belief in themselves and their abilities. Where self-ratings of susceptibility to various risks are concerned, moreover, findings show that people in an implemental mindset consider themselves less likely to fall victim to various strokes of fate (e.g., developing diabetes) than comparable others (i.e., one's peers), and this difference between self and others is less pronounced in the deliberative as compared to the implemental mindset. Table 12.1 presents the results of this study.

Table 12.1 Effects of deliberative and implemental mindsets on different variables (Taylor & Gollwitzer, 1995)

Dependent variables	Mindsets	
Implemental	Control	Deliberative
Mood 11.30	10.05	−2.52
Risk 9.71	6.05	6.00
Self-esteem 41.08	41.77	37.55
Optimism 29.03	30.55	27.36

Scores measured on the following scales: *mood* Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin 1965), *risk* Measure of Relative Perceived Risk (Perloff & Fetzer 1986), *self-esteem* Rosenberg Self-Esteem Scale (Rosenberg 1965), *optimism* Life Orientation Test (LOT; Scheier & Carver 1985)

Recent research on the topic of one's vulnerability to negative future events as compared to others shows that this difference between the two mindsets no longer prevails when the critical negative events are seen as uncontrollable (e.g., becoming a victim of a terrorist attack; Keller & Gollwitzer, 2016, Study 1). Importantly, Keller and Gollwitzer (2016, Study 2) also analyzed whether this reduction in perceived vulnerability to risk associated with the deliberative mindset is mirrored by actual risk-taking behavior. Compared to participants in a deliberative mindset, participants in an implemental mindset indeed showed more risk-taking behavior in a well-established risk assessment tool, the Balloon Analogue Risk Task (BART).

It appears than that the implemental mindset is quite useful whenever beliefs in one's own skills should be strengthened. Indeed, females who systematically underestimated their cognitive skills in a standardized IQ test were able to overcome this under evaluation after the induction of the implemental mindset. When being in an implemental state of mind, they now judged their

cognitive skills more realistically (i.e., closer to their actual level); this was not the case when being in a deliberative mindset. Males already slightly overestimated their cognitive skills measured by the same IQ test in the deliberative mindset but completely overestimated themselves when being in the implemental mindset (Hügelschäfer & Achtziger, 2014).

12.4.5 Moderator Effects in the Deliberative and Implemental Mindsets

Mindset research has by now also established that the effects of deliberative and implemental mindsets are moderated by both individual differences (see the following overview) and context variables (cf. Gollwitzer, 2003).

Individual differences found to moderate the effects of deliberative and implemental mindsets:

1. Level of achievement motivation: only success-motivated individuals show the mindset effects outlined above; failure-oriented individuals do not (Puca & Schmalt, 2001).
2. Level of social anxiety: only people low in social anxiety show the mindset effects described; those high in social anxiety do not (Hiemisch, Ehlers, & Westermann, 2002).
3. Positivity of self-concept (Bayer & Gollwitzer, 2005).
4. Comparing oneself with competing others (Puca & Slavova, 2007)
5. Gender (Hügelschäfer & Achtziger, 2014).

With respect to the positivity of the self-concept, for instance, Bayer and Gollwitzer (2005) discovered that students with a high self-view of intellectual capability look for both positive and negative information that is highly diagnostic with respect to their achievement potential when in a deliberative mindset, but focus only on positive information, whether its diagnosticity is high or low, when in an implemental mindset. In contrast, individuals with a negative self-view of intellectual capability focus on positive information (irrespective of its diagnosticity) when in a deliberative mindset and look for highly diagnostic information, whether positive or negative, when in an implemental mindset.

Puca and Slavova (2007) investigated how social comparison processes are affected by deliberative and implemental mindsets. They observed that participants in an implemental mindset devaluate a potential competitor to a greater degree than participants in a deliberative mindset – but only if they believe that they do not have to actually compete with that person. However, when being told that they would have to compete with that person in an upcoming game (and thus will receive feedback concerning their own performance compared to the other's performance), the differential effects of the deliberative and implemental mindsets on the evaluation of the competitor vanished.

Hügelschäfer and Achtziger (2014) observed that females in a deliberative mindset made more risk-averse decisions than females in an implemental mindset. Male decision-makers, however, showed a reversed pattern of results. In the same study, the impact of the deliberative and the implemental mindsets on price estimation of everyday consumer goods was examined. A gender x mindset interaction revealed that males in a deliberative mindset resisted a price anchor, while females were clearly influenced by the anchor. These are hints that economic decision-making of females and males might be influenced by mindsets differently.

The situational context has also been shown to moderate the effects of deliberative and implemental mindsets. To date, research on this aspect has focused on predictions on the stability of participants' romantic relationships (Gagnè & Lydon, 2001a; Gagnè, Lydon, & Bartz, 2003). For example, Gagnè and Lydon (2001a) found that deliberating on decisions that have already been made can initiate defensive processing of relationship-related information. Participants who were involved in a romantic relationship were asked to consider the positive and negative consequences of a goal decision that was either associated with the relationship or had nothing to do with relationships in general, and the probability that those consequences would occur

(see Sect. 4 for details of mindset induction). Gagné and Lydon found that participants gave their partner much higher ratings if the goal decision they had considered was related to the relationship than if it was not. Interestingly, the partner ratings given by participants in a deliberative mindset were more positive than those given by participants in an implemental mindset. Gagné and Lydon concluded that deliberation on one's relationship may be perceived as threatening and that participants evaluated their partner in more positive terms in order to ward off this threat. In a further study, Gagnè and Lydon (2001b) assessed the commitment participants felt to their relationship using a questionnaire measure. It emerged that only highly committed participants boosted their ratings of their partner to defend their relationship against the threat posed by deliberating on a relationship problem; low-commitment participants did not. Thus, commitment to the relationship is another important moderator of the effects of the deliberative and implemental mindset in the context of romantic relationships. In sum, the research by Gagné and Lydon indicates that having people deliberate a decision that has been made anew cannot be expected to create a deliberative mindset with its cognitive features of open-mindedness, impartiality, and realism; rather, it will create self-defensiveness that expresses itself in a fierce holding on to the decision that has been made which is particularly pronounced when the commitment to the decision made is high (see also Nenkov & Gollwitzer, 2008).

Summary

Individual differences (e.g., self-concept, gender) qualify as moderators of the effects of deliberative and implemental mindsets. Self-concept, for instance, moderates mindset effects on the processing of high or low diagnostic information about personal strengths or weaknesses. But context variables also play an important role (e.g., the presence of competitors). It also matters whether deliberation is focused on an irrelevant or relevant decision, occurs pre- or postdecisional, and if postdecisional, whether the commitment to the decision made is high or low; all of this needs to be taken into account when one wants to predict a person's open-mindedness or self-defensiveness.

12.4.6 Mindsets and Goal Achievement

Studies on the effects of deliberative and implemental mindsets on goal achievement supported the hypothesis that the implemental mindset is more conducive to goal attainment than the deliberative mindset, because both information processing and self-evaluation are focused on attaining the aspired outcome (Sect. 4).

A good predictor of goal attainment in everyday life is persistence of goal-directed behavior, i.e., the tenacity people show in their endeavors to overcome difficulties and master challenges. Accordingly, some authors have investigated the effects of the deliberative and implemental mindsets on persistence of goal striving. Findings presented by Pösl (1994) and Brandstätter and Frank (2002) suggest that people in the implemental mindset show greater persistence when faced with difficult tasks. For example, Brandstätter and Frank (Study 1) found that participants in the implemental mindset persisted longer at a difficult puzzle than did participants in the deliberative mindset.

The findings presented by Pösl (1994) paint a more complex picture. When both the perceived feasibility of the goal-directed behavior and the perceived desirability of the goal were either high or low, the persistence of goal striving was not influenced by the mindset induced. However, when perceived feasibility and desirability were in opposition (i.e., one was high and the other low), participants in the implemental mindset showed greater persistence in goal-directed behavior than did participants in the deliberative mindset. Importantly, moreover, the persistence of goal-directed behavior associated with the implemental mindset is not rigid and inflexible. Brandstätter and Frank (2002, Study 2) observed that as soon as a task is perceived to be impossible, or persistence in what was assumed to be goal-directed behavior proves to be aversive, individuals in the implemental mindset are quicker to disengage from goal pursuit than are individuals in the deliberative mindset. Thus, the persistence instigated by the implemental mindset seems to be flexible and adaptive.

Another feature of the implemental mindset that supports goal attainment seems to be the

activation of a learning mode (Rahn et al., 2016b). This mode could be based on concrete feedback on one's own skills. In a motoric task in which performance (hitting a peg) was rewarded by financial incentives, participants in an implemental mindset showed a learning mode over ten tosses. They started with choosing rather moderate risks (small distance to the peg), in the first couple of tosses, while getting more and more confident in their own skills from the middle until the end of the ring toss game (Atkinson & Litwin, 1960). This learning behavior was successful insofar because the overall profit in the game depended on the chosen risk (distance to the peg) and performance (actually hitting the peg). Hence choosing only moderate (or even low) risks would mean earning less money in case of success than choosing high risks. But smart participants should also take into account the feedback (hit/loss) on their own skills in order to choose the optimal risk from toss to toss. Participants in the deliberative mindset chose moderate risks from the beginning of the experiment over all ten tosses until the end and hence earned less money than implemental mindset participants.

With respect to the effectiveness of goal striving in the implemental and deliberative mindsets, experimental findings reported by Armor and Taylor (2003) indicate that implemental mindsets are associated with better task performance than deliberative mindsets and that this effect is mediated by the cognitive orientation of the implemental mindset, e.g., enhanced self-efficacy, optimistic outcome expectations, etc. (Sect. 4.4). A strong factor determining the higher performance of individuals in an implemental mindset could be their higher achievement motivation compared to people in a deliberative state of mind. First evidence for this explanation is provided by Brandstätter et al. (2015) and by Rahn et al. (2016b). Moreover, this idea is supported in a study by Rahn et al. (2016a) that measured eye movements in economic decision-making. These authors found that participants in an implemental mindset invested more time and more effort (more and longer fixations) in information search in a lottery choice task than participants in a deliberative mindset and control participants.

- The implemental mindset is more conducive to goal striving than the deliberative mindset. All effects of deliberative and implemental mindsets identified to date are documented in Table 12.2.

Table 12.2 Effects of the deliberative and the implemental mindset

	Deliberative mindset	Implemental mindset
Effects on self-concept	Low self-esteem Respondents rate themselves only somewhat higher on positive characteristics (e.g., intelligence, creativity) than compared to others High ratings of own vulnerability to controllable risks	High self-esteem Respondents rate themselves much higher on positive characteristics (e.g., intelligence, creativity) than compared to others Low ratings of own vulnerability to controllable risks
Effects on information processing	Open-mindedness to information of all kinds Thoughts tend to focus on "deliberative" behavior Good recall of others' deliberative behavior Open-mindedness to incidental information	Preference for information conducive to the enactment of an intention Thoughts tend to focus on "implemental" behavior Good recall of others' implemental behavior Attention is centrally focused
Effects on optimism/ pessimism	Low feeling of control over uncontrollable events Realistic view of one's future performance Comparatively negative rating of one's relationship/partner	Illusionary feeling of control over uncontrollable events Optimistic view of one's future performance Comparatively positive rating of one's relationship/partner
Effects on motivation	Lower persistence in putting intentions into practice	Higher persistence in putting intentions into practice

12.4.7 Concluding Discussion: Mindsets and Self-Regulation of Goal Striving

The findings presented above raise questions about the self-regulation of goal striving. Can people intentionally induce a certain mindset in order to increase their prospects of reaching a certain goal, or to facilitate disengagement from a goal, should it prove unrealistic or undesirable? The implemental mindset is particularly effective in promoting goal striving (Sect. 4.6). In the study by Armor and Taylor (2003) mentioned above, the optimistic assessments of goal success associated with the implemental mindset led to more effective self-regulation of goal striving and to better outcomes on an achievement-related task than the less optimistic expectations associated with the deliberative mindset. Likewise, Pösl (1994) and Brandstätter and Frank (2002, Studies 1 and 2) showed that induction of an implemental mindset increased the likelihood of goal attainment; this effect seems to be primarily attributable to the greater persistence in goal striving associated with the implemental mindset.

In any discussion of the relationship between the implemental mindset and goal realization, it is important not to forget that the positive effects of this mindset apply primarily to tasks conducted immediately after it has been induced. The more time elapses between the induction of the implemental mindset and task performance, the less pronounced its positive effects on goal attainment, as Gagnè and Lydon (2001a) and Puca (2001) have shown. However, Rahn et al. (2016b) observed that by continuously providing feedback on participants' performance over the course of the experiment, mindset effects do not fade out quickly. Instead, they affect participants' behavior until the experiment is officially quit by the experimenter.

Summary

Critically, the induction of a mindset does not have a permanent influence on information processing, self-evaluation, and performance; the effects of the deliberative and implemental mindsets only apply for a certain period of time. What widens or narrows this time period still needs to be investigated.

12.5 Different Kinds of Intentions: Goal Intentions and Implementation Intentions

Both scientific psychology and naive everyday theories often advocate goal setting as a good strategy for enacting wishes and meeting demands. Yet numerous studies have shown that goal setting alone does not guarantee the accomplishment of those goals – even highly motivated people often find it difficult to translate their goals into action (Gollwitzer & Sheeran, 2006). Sometimes they are simply hesitant to actually take action to achieve their goals, and do not initiate goal-directed behavior for this reason. Sometimes they strive for too many, often competing, goals at the same time, including long-term projects that call for repeated efforts over extended periods. Sometimes the situational conditions are not conducive to goal attainment. For example, someone whose attention is captured by intensive emotional experiences will be distracted and may thus fail to notice an opportunity to act on his or her goals.

- Contrary to the widespread notion that goal setting is a sufficient condition for the accomplishment of personal goals and projects, an extensive body of research shows that many goals are never actually put into practice.

Drawing on the work of Narziss Ach (1905, 1910, 1935) and Kurt Lewin (1926), Gollwitzer (1993, 1999) addressed the difficulties of translating goals into action from the perspective of self-regulation. He concluded that goals can often only be attained when goal pursuit is supported by the self-regulatory strategy of planning. Planning is understood to be the mental anticipation of goal striving. Based on this conceptual background, two types of intentions are distinguished:

- Goal intentions
- Implementation intentions

The concept of "goal intentions" has much in common with Lewin's (1926) conceptualization of intentions.

- Goal intentions specify desired end states that have not yet been attained. Hence, goal intentions are "goals" in the conventional sense.

Examples of goal intentions are: "I intend to be a good psychologist" or "I intend to be friendly to a certain person."

- Implementation intentions are subordinated to goal intentions; they are plans that promote the attainment of goal intentions. In forming implementation intentions, individuals specify the anticipated situations or inner states that will trigger a certain goal-directed response (see the example below). Implementation intentions have the structure of "When (if) situation X arises, then I will perform response Y" and are often called if-then plans.

Example
An implementation intention for people who would like to improve their diet (in which case the superordinate goal intention might be "I intend to eat healthily") would be "When my order is taken at a restaurant, then I will ask for a salad." Implementation intention research works on the assumption that once this implementation intention has been formed, the onset of the situation "ordering food" suffices to trigger the behavior "I will ask for a salad."

How, then, do implementation intentions differ from habits? In both cases, behavior associated with a certain situation or stimulus is initiated automatically as soon as that situation or stimulus is encountered.

- Implementation intentions differ from habits in that they originate from a single act of will: the conscious pairing of a desired goal-directed behavior with a critical situation or stimulus. By contrast, habits are formed by the repeated and consistent selection of a certain course of action in a specific situation (cf. Fitts & Posner, 1967; Newell & Rosenbloom, 1981).

12.5.1 How Do Implementation Intentions Work?

Numerous studies have investigated the psychological processes underlying the effects of implementation intentions (see meta-analysis by Gollwitzer & Sheeran, 2006). The focus of research has been on the chronic activation of the mental representation of the situation specified in the implementation intention and on the automatic initiation of the action specified.

The Situation Specified: Chronic Activation
Because forming an implementation intention implies the conscious selection of a critical situation or stimulus for the if-part of the implementation intention, the mental representation of this situation is assumed to be highly activated and thus easily accessible (Achtziger, Bayer, & Gollwitzer, 2012; Gollwitzer, 1999; Gollwitzer, Bayer, & McCulloch, 2003). This heightened cognitive accessibility makes it easier for people to notice the critical situation in the surrounding environment, even when they are busy with other things (e.g., Achtziger et al., 2012, Study 1; Parks-Stamm, Gollwitzer, & Oettingen, 2007), and to recall the critical situation in terms of where and when one wanted to act on one's goal (Achtziger et al., Study 2). A classic cognitive accessibility study focusing on improved attention to specified cues is described below.

Study
Classic Study on the Cognitive Accessibility of Situations Specified in Implementation Intentions

Findings from a dichotic listening experiment shows that words describing the anticipated critical situation are highly disruptive to focused attention. Achtziger et al. (2012, Study 2) presented participants with words to both ears simultaneously via headphones. Participants were instructed to "shadow" the words presented on one channel, i.e., to repeat these words as soon as they heard them and to ignore the words

presented on the other channel. Attention was thus focused on one channel. It emerged that participants' shadowing performance was much slower when words relating to the critical situation were presented to the nonattended channel than when unrelated words were presented. In other words, critical words attracted attention, even when efforts were made to direct attention to the shadowing task. The same effect was not observed either in a group of participants who had only formulated a goal intention without furnishing it with implementation intentions or in a group who had not formulated any intentions at all on how to approach the task at hand. This finding indicates that the critical situations specified in implementation intentions are unlikely to escape people's attention, even when they are busy with other things.

The findings of a study using the Embedded Figures Test (Gottschaldt, 1926) provide further evidence for the enhanced cognitive accessibility of the critical situation. The objective of this test is to see smaller "a-figures" that are concealed within larger "b-figures." Participants who had specified the "a-figure" in the if-part of an implementation intention were better able to perceive these hidden figures than participants who had only formulated a goal intention (Steller, 1992). A recent study by Janczyk, Dambacher, Bieleke, and Gollwitzer (2015) using a different task paradigm confirmed that if-then plans manage to improve perceptual processing of the critical situation specified in the if-part of the plan.

In a cued recall experiment, participants had to decide when, where, and how to play certain games by choosing between a number of set options offered by the experimenter. In a surprise memory test administered both immediately and 48 h later, participants who had specified their choices in an implementation intention recalled these options much more effectively than participants who had formulated goal intentions only (Achtziger et al., 2012, Study 2).

Aarts, Dijksterhuis, and Midden (1999), using a lexical decision task, provided further support for the assumption that implementation intentions lead to heightened activation of the mental representation of the specified situational cues. Participants who had specified critical cues in implementation intentions showed faster lexical decision responses to words describing these cues than did participants who had only formed goal intentions (concerning cognitive accessibility see also Achtziger et al., 2012; Webb & Sheeran, 2007, 2008).

Finally, neuroscientific research measuring electrocortical activity showed that implementation intentions in general automatically draw attention, even if an individual is strongly involved in completing a task irrelevant for the if-then plan. This effect was reported by Hügelschäfer, Jaudas, and Achtziger (2016), who demonstrated that an implementation intention can control highly automatic gender categorization indicated by early event-related potentials (i.e., the N170). Moreover, the implementation intention also modulated the P300 on stimuli that were potentially relevant for its execution in a task that was definitively not relevant for carrying out the if-then plan.

- The chronic activation of the situation specified in the implementation intention is reflected in its heightened cognitive accessibility, which in turn facilitates effectively perceiving, readily attending to, and successfully remembering critical situational cues.

Implementation Intentions and Action Initiation

As mentioned above, action initiation becomes automatic once an implementation intention has been formulated through a single act of will. In forming implementation intentions, individuals can strategically switch between the conscious and effortful control of goal-directed behaviors and the automatic control of these behaviors in response to selected situational cues. Gollwitzer et al. (2004; e.g., Gollwitzer & Schaal, 1998;

Gollwitzer, Fujita, & Oettingen, 2004) call this type of automatic action control strategic automaticity. The goal-directed behavior specified in the implementation intention is assumed to be triggered immediately, efficiently, and without conscious intent whenever the critical situation is encountered. Thus, someone who has consciously formed an implementation intention does no longer have to invest cognitive resources in conscious and effortful control of the goal-directed behaviors specified in an implementation intention; rather, their performance is placed under the direct control of situational cues.

Implementation intentions are thus more effective than goal intentions alone in various respects. For example, it has been shown that participants who have formed implementation intentions respond to the critical situation immediately, even at high levels of distraction. The findings of dual-task experiments attest to the efficiency of automatic action initiation in this context (Brandstätter, Lengfelder, & Gollwitzer, 2001; Hügelschäfer et al., 2016). Participants in these experiments have to perform two tasks at the same time. A decrease in performance on one task is interpreted as indicating that the other task taxes cognitive resources. A series of studies using this dual-task paradigm have shown that cognitive resources are not required to initiate the responses induced by implementation intentions. For example, two experiments by Brandstätter et al. (2001, Studies 3 and 4) showed that students working on a task that required them to press the response button as soon as a particular stimuli appeared on the computer screen responded substantially faster if they had formed an implementation intention, even when a dual task had to be performed at the same time. Students who had only formed a goal intention to respond as quickly as possible did not show enhanced reaction times under the dual-task condition. The results of this study are presented in Fig. 12.2.

Studies with clinical samples. In further studies, Brandstätter et al. (2001) showed that even patients who have severe problems with action control from chronic cognitive load can benefit from implementation intentions. For example,

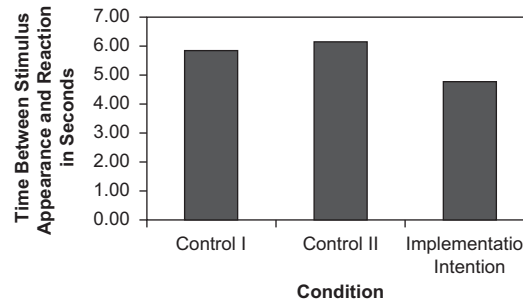

Fig. 12.2 Reaction times in a dual-task experiment with and without implementation intentions (Brandstätter et al., 2001)

drug addicts under withdrawal benefited from forming implementation intentions specifying when and where to perform actions that would facilitate their return to "normal" life. Most implementation intention patients succeeded in writing a curriculum vitae to be used in job applications before a set deadline, whereas goal intention participants missed the deadline. In other words, the chronic cognitive load associated with withdrawal did not inhibit goal-directed behavior if an implementation intention had been formed.

Lengfelder and Gollwitzer (2001) tested the hypothesis that implementation intentions automate action initiation in studies with frontal lobe patients. Individuals with frontal lobe injury typically have problems with the conscious control of automated actions or habits. Whenever they see a pair of scissors, for example, they will reach for the scissors and begin cutting and are not able to consciously and deliberately interrupt that action, no matter how hard they try. In other words, a stimulus associated with the execution of a particular action will involuntarily and inevitably trigger that action in these patients. Against this background, Lengfelder and Gollwitzer administered a go/no-go task to frontal lobe patients. In this type of task, participants have to respond to selected stimuli (e.g., to press a button when two of five visual patterns appear on a computer screen), but not to others (i.e., selective attention). If implementation intentions are indeed based on automatic processes, as assumed by Lengfelder and Gollwitzer, the patient group should show faster reaction times to the situational

cues specified in an implementation intention in the go/no-go task than a control group of healthy individuals. This prediction was confirmed, with frontal lobe patients showing significantly faster reaction times than the control group.

- This finding indicates that the executive functions governed by the frontal lobe are not required in action guided by implementation intentions, thus suggesting that implementation intention effects are primarily based on automatic processes.

Further experimental support for the assumption that implementation intentions should work even in samples with reduced executive functions has been provided by Gawrilow and Gollwitzer (2008) and Hügelschäfer et al. (2016).

Gawrilow and Gollwitzer (2008) demonstrated the effects of implementation intentions in a group of children diagnosed with attention deficit hyperactivity disorder (ADHD). Children with ADHD are known to have important deficits in executive functioning and hence in processes that tax cognitive resources. They consequently find it very difficult to respond quickly and reliably to stop signals. Before being administered by a variation of the stop signal task (cf. Logan, Schachar, & Tannock, 1997), children with ADHD were asked to formulate an implementation intention specifying that they would stop what they were doing as soon as they encountered a certain stimulus. Findings showed that, having formulated this implementation intention, ADHD children managed to inhibit the behavior in question just as well as a control group of healthy children. Thus, the study provided further evidence that implementation intention effects are primarily based on automatic processes, and not on processes that involve central executive functions (e.g., inhibition), and hence tax cognitive resources.

In the EEG Study by Hügelschäfer et al. (2016) on the control of automatic gender categorization by the use of implementation intentions, an automatic initiation of the inhibition response was also observed. In this study, the if-then plan controlled gender categorization already 170 ms after the presentation of faces. This finding is quite notable because an effect of an if-then plan within 170 ms is far beyond conscious control of cognition (conscious control only sets in after 300 ms) and thus confirms the automaticity of action control by implementation intentions.

Gollwitzer and Brandstätter (1997, Study 3) demonstrated the immediacy of action initiation as soon as the critical situation is encountered. One group of participants formed implementation intentions that specified viable opportunities for presenting counterarguments to a series of racist remarks made by a confederate of the experimenter; another group formulated goal intentions to the same effect. As expected, the implementation intention participants initiated their counterarguments to the racist comments more quickly than did the goal intention only participants. The study presented below provides empirical evidence that implementation intentions lead to action initiation even in the absence of conscious intent.

Study

Action Initiation in the Absence of Conscious Intent

Bayer, Achtziger, Gollwitzer, and Moskowitz (2009) conducted two experiments to test whether implementation intentions lead to action initiation without conscious intent once the critical situation is encountered. In these experiments, the critical situation was presented subliminally (i.e., below the threshold for perception).

In Study 1, Bayer and colleagues investigated whether participants were able to achieve their goal of asserting themselves against a rude experimenter by formulating an implementation intention. Half of the participants were encouraged to set the goal of reprimanding the experimenter by drawing attention to her rude behavior (goal intention condition); the other half were additionally instructed to plan to take this action as soon as they set eyes on her (implementation intention condition).

Afterward, faces of either the experimenter who had shown the rude behavior or a neutral, unknown person were presented subliminally (as primes) to all participants by means of a tachistoscope (presentation times of less than 10 ms). Primes are stimuli that serve to activate associated cognitive contents. These cognitive contents are presented subsequent to the primes, and their effects are measured, usually in terms of reaction times. Immediately after each prime, participants were presented with certain words, some of which were associated with rudeness (e.g., offensive, aggressive, arrogant). Participants were asked to repeat all of the words as quickly as possible, and the latencies of their responses were measured by the computer. After the subliminal presentation of the critical primes, participants who had formed an implementation intention to reprimand the experimenter as soon as they set eyes on her showed faster response times to words related to rudeness than did participants who had only formed goal intentions.

This finding provides further confirmation that the goal-directed behavior specified in implementation intentions is initiated automatically – i.e., triggered immediately, efficiently, and without conscious intent – as soon as the critical situation is encountered.

The role of commitment in implementation intention effects. Might the effects of implementation intentions be attributable in part or even completely to an associated increase in goal commitment? If furnishing goals with implementation intentions indeed produces an increase in the level of commitment to superordinate goal intentions, the assumption that implementation intentions achieve their beneficial effects on goal attainment by automating the initiation of goal-directed behavior and other cognitive processes would have to face an alternative explanation. However, this hypothesis has not received any empirical support (Achtziger et al., 2012; Gollwitzer, 2014). For example, Brandstätter et al. (2001, Study 1) found that the positive effect of an implementation intention to submit a curriculum vitae before a specified deadline was independent of the patients' general commitment to writing a curriculum vitae. Patients in the implementation intention group were no more committed to the goal than were patients in the goal intention group. Analogous results have been reported in numerous studies from domains such as disease prevention (e.g., Orbell, Hodgkins, & Sheeran, 1997), social impression formation (Seifert, 2001, Studies 1 and 2), and tennis competitions (Achtziger, Gollwitzer, & Sheeran, 2008, Study 2).

All mechanisms known to underlie the effects of implementation intentions are listed in the following overview.

Mechanisms underlying the effects of implementation intentions

1. Chronic activation of the situation specified in the implementation intention (effectively perceiving, readily attending to, and successfully remembering critical situational cues)
2. Automaticity of goal-directed behavior (no taxing of cognitive resources)
3. Automatic initiation of the action specified in the implementation intention (immediately and in the absence of conscious intent)

12.5.2 Implementation Intentions and the Initiation of Wanted Behavior

Because implementation intentions facilitate attending to, detecting, and remembering situations conducive to goal-directed behavior and, in addition, help to automatize action initiation, people who form implementation intentions can be expected to show higher goal attainment rates than people who do not furnish their goal intentions with implementation intentions. The results

of a host of studies in very different domains provide empirical support for this hypothesis.

Effects of Implementation Intentions on Achievement- and Health-Related Behavior

Research on implementation intentions tends to examine goal intentions that are difficult to attain for reasons already mentioned, e.g., because of external or internal distractions or because the action required is unpleasant or painful. For example, Gollwitzer and Brandstätter (1997) analyzed a goal intention that had to be performed during the Christmas vacation. Students were given the task of writing a report about Christmas Eve no later than 48 h after the event. As expected, students who had formed a corresponding implementation intention were significantly more likely to write a report within the allotted time than students who had only formed a goal intention.

Orbell et al. (1997) found that women who had set themselves the goal of performing regular breast self-examinations greatly benefited from forming implementation intentions. Similar patterns of results have emerged for participation in voluntary cancer screening (Sheeran & Orbell, 2000), resumption of functional activity after hip replacement surgery (Sheeran & Orbell, 2000), and engagement in physical exercise (Milne, Orbell, & Sheeran, 2002). Furthermore, implementation intentions have been found to facilitate the attainment of goal intentions that are otherwise easily forgotten, e.g., regular intake of vitamin tablets (Sheeran & Orbell, 1999) or signing each page of an intelligence test (Chasteen, Park, & Schwarz, 2001). Achtziger et al. (2008, Study 1) showed that people can control their fast food consumption by means of implementation intentions. A recent summary of implementation intention effects on health behavior is provided by Prestwich, Sheeran, Webb, and Gollwitzer (2015).

Significant Moderators of Implementation Intention Effects

The strength of implementation intention effects depends on the presence or absence of various moderators. Some studies (e.g., Gollwitzer & Brandstätter, 1997, Study 1) show that the more difficult it is to initiate a goal-directed behavior, the more pronounced implementation intention effects become. The findings of the study with frontal lobe patients described above (Lengfelder & Gollwitzer, 2001, Study 2; Sect. 5.1) are relevant here as well. Patients with a frontal lobe injury typically have problems with the conscious control of behavior because their access to executive functions and cognitive resources is limited. Findings show that patients who formed an implementation intention in preparation for a reaction time task outperformed a sample of college students who had formed the same implementation intention. Because the reaction time task can be assumed to be more difficult for the patients than for the healthy students, this finding confirms that forming implementation intentions is particularly beneficial to people faced with difficult tasks.

Commitment to the goal intention also seems to moderate the effects of implementation intentions. Orbell et al. (1997) report that implementation intentions only enhanced compliance in performing breast self-examinations in women who strongly intended to examine their breasts, i.e., who were committed to the superordinate goal intention. Similarly, Gollwitzer et al. (2004, Study 3) found that beneficial effects of implementation intentions on participants' recall of critical situations were only observed when the goal intention had yet to be translated into reality. If it had already been accomplished, no implementation intention effect on memory performance was detected. Furthermore, Sheeran, Webb, and Gollwitzer (2005, Study 1) showed that the beneficial effects of implementation intentions concerning the goal of preparing for an upcoming exam increased as a function of the amount of studying required. In addition to strength of commitment to the goal intention, commitment to the specific implementation intention is required. In the memory study by Achtziger et al. (2012, Study 2), the strength of the commitment to the implementation intention was varied by telling participants (after administering a battery of personality tests) that they were the type of person who would benefit either from strictly adhering to their plans (high

commitment condition) or from staying flexible (low-commitment condition). Participants in the latter group showed notably weaker implementation intention effects than those in the former group.

Sheeran et al. (2005, Study 2) found that implementation intention effects only occur when the respective superordinate goal intention is activated. The implementation intention to move on to the next item in an intelligence test immediately after finishing the previous one enhanced speed of task processing only when the goal intention of working as quickly as possible was activated. Likewise, in an experiment using the Rogers and Monsell (1995) task-switch paradigm, Cohen, Bayer, Jaudas, and Gollwitzer (2008) found that implementation intention effects are dependent on the superordinate goal being activated.

Finally, it can be assumed that the strength of the mental link between the if- and then-parts of an implementation intention moderates its effects. For example, if a person invests a lot of time and concentration in encoding an implementation intention in long-term memory and/or mentally rehearsing that intention, stronger mental links should be forged between the two parts, which should in turn produce stronger implementation intention effects. This was supported by Webb and Sheeran (2007, 2008) and by Papies, Aarts, and de Vries (2009) who could show that this strong link is quite stable over time.

Summary

The difficulty of initiating goal-directed behavior, the strength of commitment to goal intentions and implementation intentions, and the activation of the goal intention have proved to be significant moderators of implementation intention effects. Recent research has discovered further moderators (see Gollwitzer, 2014). These pertain to attributes of the person who forms if-then plans (e.g., the willingness to make if-then plans is low in people high on social perfectionism) and features of the situational context (e.g., the current emotional state of the person and her mindset). The emotion of anger seems to benefit if-then planning effects (Maglio, Gollwitzer, & Oettingen, 2014), whereas a deliberative mindset seems to weaken them (Wieber, Sezer, & Gollwitzer, 2014).

12.6 Implementation Intentions and the Control of Unwanted Behavior

Research has focused primarily on how implementation intentions can help to translate goals into action by facilitating wanted, goal-directed behavior, and particularly the initiation of goal-directed behavior. Yet merely initiating goal pursuit rarely suffices to achieve a goal. Once initiated, a process of goal striving has to be maintained. People need to shield their goals from distractions or conflicting bad habits (Adriaanse et al., 2011a). Ways in which implementation intentions can be used to control these "unwanted" effects are outlined below.

Unwanted responses that hamper the successful pursuit of goals can be controlled by different types of implementation intentions. For example, someone who wants to avoid being unfriendly to a friend who is known to make outrageous requests can protect herself from showing the unwanted response by forming the goal intention "I intend to stay friendly" and furnishing it with one of the following three suppression-oriented implementation intentions:

- First suppression-oriented implementation intention: "And if my friend makes an outrageous request, then I will not respond in an unfriendly manner." The strategy here is to control and suppress unwanted behavior by specifying the critical situation in the if-part of the implementation intention and ruling out the unwanted response in the then-part. Alternatively, the focus may be on facilitating the initiation of a wanted response.
- Second suppression-oriented implementation intention: "And if my friend makes an outrageous request, then I will respond in a friendly manner." In this case, the critical situation is again specified in the if-part, and the wanted response that is threatened by disruptive unwanted responses is endorsed in the then-part.
- Third suppression-oriented implementation intention: "And if my friend makes an outrageous request, then I will ignore it." In this variant, the critical situation is again specified

in the if-part of the implementation intention, and the then-part focuses the person away from the critical situation.

Gollwitzer and colleagues have conducted a series of studies using these three types of suppression-oriented implementation intentions. Most of these studies investigated the control of unwanted spontaneous responses to distractions or of automatic activation of stereotypes and prejudice.

12.6.1 Suppression-Oriented Implementation Intentions

When goal pursuit is threatened by distracting stimuli, implementation intentions should be formed to inhibit those distractions, as illustrated by the study described below.

Study

Implementation Intentions and Resistance to Distractions

In a computer-based experiment (Gollwitzer & Schaal, 1998), college students performed a series of arithmetic problems while distracting clips of popular commercials were shown at random intervals on a TV screen mounted above the computer monitor. Findings showed that goal intentions ("I will not let myself get distracted") were less effective in protecting participants from the distractions of the commercials than were implementation intentions. Moreover, implementation intentions phrased as distraction-inhibiting ("And if a distraction arises, then I will ignore it") produced better results than those phrased as task-facilitating ("And if a distraction arises, then I will focus my attention on the arithmetic tasks"). Specifically, distraction-inhibiting implementation intentions helped participants to ward off the distractions of the commercials regardless of their motivation to do the tedious arithmetic problems, whereas task-facilitating implementation intentions were effective only when motivation to do the problems was low. When motivation was high, task-facilitating implementation intentions did not shield participants against the distractions of the commercials, and performance on the arithmetic tasks was poor. These findings suggest that task-facilitating implementation intentions may result in overmotivation in distracting conditions and thus undermine performance.

Controlling stereotypes and prejudice. Researchers have also investigated the function of implementation intentions as strategies for controlling unwanted stereotypes in impression formation. In general, models of impression formation (e.g., Brewer, 1988; Devine, 1989) assume that the effects of social stereotypes and prejudices on the way people judge others are governed by processes that require attention, cognitive resources, and conscious effort. Until recently, stereotype research assumed that the application of stereotypes – but not their activation – can be intentionally controlled (cf. Brewer; Devine). Stereotype activation was thought to be an unavoidable, automatic process and stereotype use to be controllable by effortful correctional strategies. Based on the studies of the automaticity of implementation intentions described above, Gollwitzer's research group conducted a series of experiments to test whether implementation intentions can inhibit the automatic activation of stereotypes and prejudice, and not just their application. The assumption was that an automatic process such as the activation of a stereotype can be blocked by other automatic processes such as those triggered by implementation intentions. Experiments using different priming paradigms showed that the automatic activation of the stereotype "old person" was inhibited when participants formed an implementation intention ("When I see an old person, then I will tell myself: don't stereotype!") but was still observed

in a group of participants who had formed a goal intention only ("I intend to judge fairly") and in a control group who were simply instructed to form an impression of the people presented (Gollwitzer & Schaal, 1998). Analogous results emerged from a study in which male participants were asked to inhibit the stereotype "women," and studies in which participants of both sexes were asked to inhibit the stereotypes "homeless person" or "soccer fans" (Achtziger & Gollwitzer, 2005).

Other studies investigated the extent to which implementation intentions can prevent the application of stereotypes. Seifert (2001, Study 1) tested whether the discrimination of female job seekers applying for jobs in technical domains can be controlled by implementation intentions. Computer science students were presented with a number of applications for the position of computer scientist and a profile of the job's requirements. Half the fictional applicants had a woman's name, the other half a man's name. In a preliminary study, in which all applicants had male names, all applicants were judged to be equally qualified for the job. When male and female names were assigned to the applications at random, however, the computer science students were considerably more likely to hire male candidates, thus discriminating against the female candidates. Only a group of students who had formed the implementation intention "When I evaluate an application, then I will ignore the candidate's gender" managed to overcome this bias. A further study on the expression of stereotypes was conducted by Mendoza, Gollwitzer, and Amodio (2010) showing that implementation intentions can be used to improve precision in the so-called shooter paradigm; participants have to play the role of a sheriff who is facing a person with or without a pointed gun, and the skin color of the person is either black or white.

Stereotype research has shown that individuals under cognitive load are unable to process stereotype-inconsistent information about unknown others (cf. Macrae, Hewstone, & Griffiths, 1993). Hügelschäfer et al. (2016) presented female and male faces in an odd-ball paradigm previously used to measure automatic gender categorization by measuring electrocortical information (Ito & Urland, 2003). A group of participants in this study was asked to form an implementation intention geared at instigating individual processes of impression formation (see Brewer, 1988). For this purpose, participants formed the if-then plan to judge each face by itself. Previous studies (e.g., Tomelleri & Castelli, 2012) reported a stronger N170 on gender incongruent faces compared to gender congruent faces as an indicator of automatic gender categorization. Hügelschäfer et al. showed, however, that the N170 modulation does not occur after forming the implementation intention.

Suppression of emotional responses. Research has shown that, apart from regulating unwanted behavioral responses (e.g., to distractions) and precluding unfair evaluations of others, implementation intentions can also inhibit unwanted emotional responses. For example, Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer et al. (2009) report a study examining how "ignore" implementation intentions and "stay calm" implementation intentions can be used to inhibit disgust and spider fear. Female participants were presented with picture cues from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999). Some of these pictures showed photographs of injured and mutilated individuals and activated the emotion of disgust; others showed spiders and activated the emotion of fear. Participants were able to suppress their disgust and fear by means of an implementation intention, but not by means of a goal intention alone. This was also indicated by the modulation of ERPs (i.e., the P100) by "ignore" implementation intentions during the presentation of spider pictures in an EEG study.

Summary

Suppression-oriented implementation intentions have proved effective in inhibiting spontaneous attentional responses, stereotypical and prejudicial responses, and reflexive negative emotional responses.

12.6.2 Blocking Detrimental Self-States by Planning Wanted Behavior

In the research presented in Sect. 6.1, the critical situation specified in the if-part of an implementation intention was linked to a then-part that served to suppress unwanted responses. Implementation intentions may also protect against unwanted responses in another way, however. Instead of focusing on anticipated obstacles and the unwanted responses they trigger, implementation intentions may be designed to stabilize an ongoing goal pursuit. For example, an exchange of opinions can soon develop into an argument if the parties are tired and worn out, even if they did not intend the situation to escalate. However, if the parties planned in advance how to respond constructively to conflicting opinions, the self-states of fatigue and exhaustion should not have a negative impact on the discussion. These assumptions have been tested in a series of studies, one of which is described below.

Study

Blocking Negative Self-States

One of the studies on the use of implementation intentions to block negative self-states (Bayer, Gollwitzer, & Achtziger, 2010, Study 3) was based on the theory of symbolic self-completion (Wicklund & Gollwitzer, 1982) and tested the extent to which the negative effects of self-definitional incompleteness on social sensitivity (cf. Gollwitzer & Wicklund, 1985) can be attenuated by forming implementation intentions. Participants were law students who were highly committed to becoming successful lawyers. As a cover story, they were told that the study had been designed to analyze how goals affect how people get to know each other. To this end, they would be introduced to another student; their goal was to take that person's perspective during the conversation. Half of the participants were instructed to furnish this goal with the following implementation intention: "And if my partner expresses a preference for a certain topic of conversation, then I will direct the conversation to that topic." They were then administered a questionnaire on how they approached their studies ("no sense of incompleteness" condition) or the same questionnaire with three supplementary questions drawing attention to shortcomings in their current skills and experience (e.g., "Do you have courtroom experience as a judge or district attorney?"). This second questionnaire was designed to create a sense of self-definitional incompleteness.

Finally, all participants were informed that the person they were to meet was called Nadia and that she had already indicated her preferences for potential topics of conversation. Participants were then handed a sheet of paper listing these preferences. It was quite clear that Nadia did not want to discuss law but would prefer to talk about her last vacation and popular movies. To assess whether self-definitional concerns would increase the likelihood of participants' choosing law as a preferred topic of conversation despite Nadia's preferences, all participants were asked to note down their own preferred topics for Nadia. In the control condition, a self-completion effect was clearly apparent: participants with an incomplete self-definition were more likely to want to talk about law than participants with a complete self-definition, even though Nadia was clearly not interested in discussing this topic. The same effect was not observed in the group of participants who had formed an implementation intention, however – these participants showed the same low preference for law as a potential conversation topic, whether their self-definitions were complete or incomplete.

These findings show that implementation intentions are able to block the negative effects of the self-state "self-definitional incompleteness" on goal-directed action (specifically, taking someone else's perspective).

Implementation Intentions and Self-Regulatory Performance

According to ego-depletion theory (Baumeister, 2000; Muraven, Tice, & Baumeister, 1998), performing a task that demands a high level of self-regulation will encroach on performance on a second task that also requires self-regulation. Bayer et al. (2010, Study 2) were interested in whether this effect could be countered by implementation intentions. In a classic ego-depletion paradigm, participants were first shown a humorous movie and instructed either to express their emotions freely or to show no emotions at all. They were then presented with a number of difficult anagrams. All participants had formed the goal intention to solve as many anagrams as possible. Half the participants had furnished this goal intention with an implementation intention: "And if I have solved one anagram, then I will move on immediately to the next." Participants who had only formed a goal intention showed the classic ego-depletion effect, with those who had been instructed not to show their emotions during the film performing less well on the anagram task than those who had given free rein to their emotions. This effect was not observed in participants who had furnished the goal intention to perform well with an implementation intention, however.

Webb and Sheeran (2003, Study 2) also demonstrated that implementation intentions can offset ego-depletion effects. First, half the participants were instructed to balance on their "weaker" leg while counting down in sevens from 1,000 (ego-depletion manipulation). Participants in the control condition counted to 1,000 in fives while standing normally on two legs. All participants were then given the goal intention of naming the ink color of words presented in a Stroop test as quickly as possible. Half the participants furnished this goal intention with an implementation intention: "When I see a word, then I will ignore its meaning and name the color in which it is printed." No ego-depletion effect was observed for implementation intention participants; those who had been ego-depleted in the initial task performed as well in the Stroop test as those in the non-depleted control condition. However, participants who had only formed a goal intention showed a marked ego-depletion effect, with those who had been ego-depleted scoring notably lower on the Stroop task than their nondepleted counterparts.

Summary

The negative effects of both self-definitional incompleteness and ego-depletion can be blocked by forming implementation intentions.

12.6.3 Blocking Adverse Contextual Influences by Planning Wanted Behavior

People may see the outcomes of their actions in terms of gains or of losses (Kahneman & Tversky, 1979). Conflict-resolution research suggests that cognitive processes triggered by "loss framing" or "gain framing" have a strong impact on negotiation processes and their outcomes (De Dreu, Carnevale, Emans, & van de Vliert, 1994). Loss framing results in comparatively unfair agreements and other negative effects. Trötschel and Gollwitzer (2007) investigated whether these negative loss framing effects can be overcome if prosocial goals, such as finding a fair or integrative solution, are furnished with corresponding implementation intentions. This hypothesis was tested in two experiments, the first of which is described below.

Study

Overcoming Loss Framing Effects by Means of Implementation Intentions

Pairs of participants were assigned the roles of heads of state of two rival countries and asked to negotiate the partitioning of a disputed island. The island was made up of 25 regions, each representing one of four terrains: mountains, cornfields, pastures, or forests. Within each pair of negotiators, one participant was subjected to loss framing as follows:

- *Loss framing condition:* The participant was handed a table listing the four different types of regions and specifying the

loss that would be incurred if each were relinquished to the other participant in terms of a negative score. The other participant in each pair of negotiators was subjected to gain framing.

- *Gain framing condition:* In this condition, the regions listed in the table were allocated positive scores, indicating the gain that would be incurred if that region were appropriated.

Both participants were told that they had to come to an agreement on the distribution of the 25 regions within 15 min. A fairness goal was instilled in some participants by handing them a sheet of paper informing them that fair negotiation outcomes are often very difficult to achieve and instructing them to set themselves the following goal shortly before entering the negotiations: "I want to find a fair solution." Half the participants with a fairness goal were additionally instructed to furnish this goal intention with an implementation intention: "And if my opponent makes a proposal, then I will make a fair counterproposal." Participants in the control condition were not instructed to specify either a fairness goal or an implementation intention. Outcomes were assessed in terms of individual "profits" within each pair of negotiators. In each of the three conditions, the authors tested whether the difference in profits within each dyad was significantly different from zero.

In both the goal intention condition and the control condition, significant differences in profits were observed as a function of the framing condition. Participants who had been subjected to loss framing made higher profits than those subjected to gain framing. Unfair outcomes of this kind were not observed in the implementation intention condition, where profits were equally distributed between participants.

Intentions and Performance Feedback

Goal attainment can also be negatively affected by unfavorable performance feedback conditions. One example here is the "social loafing" phenomenon often observed at workplaces where employees are given collective rather than individual performance feedback (cf. Latané, Williams, & Harkins, 1979; Karau & Williams, 1993): people when working in groups where individual performance cannot be monitored have been observed to show lower performance levels. Gollwitzer and Bayer (2000, Study 4) tested whether this phenomenon can be counteracted by means of implementation intentions. Their participants were asked to generate as many uses as possible for a common knife under one of two conditions:

- "Collective performance feedback" condition: Participants were told that their responses would be pooled with those of seven other participants and that the experimenter would not be able to tell how many uses each individual had generated.
- "Individual performance feedback" condition: Participants were told that the experimenter would be able to assess each participant's performance separately.

Before beginning the task, all participants formed the goal intention "I intend to name as many uses as possible." Half of the participants furnished this goal intention with the implementation intention: "And when I have noted down a use, then I will immediately go on to the next." The number of uses generated in 12 min was taken as the dependent variable. Goal intention participants generated notably fewer uses in the "collective performance feedback" condition than in the "individual performance feedback" condition. This pattern of results, which replicates the classic social loafing effect, was not observed in implementation intention participants, who generated an equal volume of responses, regardless of the feedback condition.

Formation of Implementation Intentions and Competing Goals

Automotive theory (Bargh, 1990; Bargh & Gollwitzer, 1994) holds that when goal striving is activated repeatedly and consistently in response to a given situation, this situation will eventually acquire the potential to trigger the critical goal pursuit without conscious intent. A goal intention that can be activated in this way is called a "chronic goal." Gollwitzer, Sheeran, Trötschel, and Webb (2011) tested whether implementation intentions can shield ongoing goal pursuit against the effects of directly activated chronic goals.

Participants had to navigate a car along a race track in a simulator. The mean driving speed and number of errors were measured in two baseline circuits. Participants were then given precise instructions on how to drive the next two circuits.

- Participants in the goal intention condition were instructed to set themselves the goal of reaching the finishing post as quickly and with as few errors as possible.
- Participants in the implementation intention condition were additionally instructed to form the following implementation intentions: "And when I enter a curve, then I will reduce my speed. And when I enter a straight section of the track, then I will speed up again."

Before participants were allowed to drive the final two circuits of the track, auto-motive priming was used to activate two goals beyond the participants' conscious awareness. All participants were asked to join the numbered dots presented on different sheets of paper as quickly as possible to produce various shapes (flowers, animals, and other objects). Those in the "move quickly" priming condition were instructed to complete as many figures as possible in 5 min. Those in the "move slowly" priming condition were told to join the dots as carefully and neatly as possible, taking as much time as they needed for each shape. Findings showed that this automotive priming had pronounced effects on goal intention participants' driving in the last two circuits: those in the "move quickly" condition drove faster and made more mistakes than those in the "move slowly" condition. No such priming effect was observed for implementation intentions participants, who drove at a moderate speed and made few mistakes in both priming conditions. These findings indicate that goal pursuits furnished with implementation intentions are not affected by competing, nonconscious goals that are activated by situational cues.

Table 12.3 documents all effects of implementation intentions that have been identified to date.

12.7 Potential Costs of Implementation Intentions

As we have shown, implementation intentions facilitate goal pursuit in various ways. It seems reasonable to hypothesize that such an effective means of self-regulation may have certain unforeseen costs. This section examines the three following potential costs of implementation intentions:

1. It is possible that implementation intentions lead to a certain rigidity of behavior that may be detrimental when task performance requires high levels of flexibility.
2. It is possible that implementation intentions cause a high degree of ego-depletion and thus undermine self-regulatory resources.
3. It is possible that thoughts, feelings, and actions may resurface later in a different context (rebound effects), although implementation intentions successfully suppressed unwanted thoughts, feelings, and actions in a given context.

12.7.1 Implementation Intentions and Behavioral Rigidity

Do people who have formed implementation intentions also recognize alternative opportunities to act toward their goal, or do they insist on

Table 12.3 Effects of implementation intentions

Controlling unwanted behavior	Promoting wanted behavior
Suppressing unwanted thoughts, feelings, and actions ("suppression-oriented implementation intentions") Inhibiting automatic activation of stereotypes (e.g., age stereotypes, gender stereotypes) Expression of stereotypes and prejudice (e.g., discrimination of women in male-dominated professions) Shielding against distraction during complex tasks (e.g., distracting effects of commercials while working on arithmetic problems) Controlling impulsive behavior in children with ADHD (e.g., enhancing response inhibition in a reaction time task) Replacing unwanted behavior by other behavior Inhibiting the automatic activation of prejudice (e.g., toward homeless people) Inhibiting negative emotions (e.g., disgust) Inhibiting behavior that is detrimental to health (e.g., cigarette and alcohol consumption)	*Fostering the initiation and execution of goal-directed actions* Increasing the latency of counterarguments to racist remarks Increasing the probability of participation in cancer screening (e.g., mammography) Facilitating the processing of stereotype-inconsistent information despite cognitive load (e.g., on the central executive)
Shielding wanted behavior from unwanted internal and external influences Blocking unfavorable contextual influences (e.g., deindividualization, competing goal activations, framing effects) Blocking detrimental self-states (e.g., self-definitional incompleteness, mood, ego-depletion)	*Fostering persistence of goal-directed actions* Supporting the regular intake of vitamin tablets and essential medication Helping challenged patient groups to perform difficult everyday actions (e.g., drug addicts under withdrawal to write a CV) Fostering engagement in physical exercise (e.g., after hip replacement surgery)

acting only when the critical situation specified in the implementation intention is encountered? The strategic automaticity created by implementation intentions – i.e., the delegation of behavioral control to situational cues – can be assumed to free up cognitive resources, thus allowing effective processing of information about alternative opportunities. This assumption has been confirmed in a number of studies showing that individuals who had formed an implementation intention were not blind to changed situational contexts or unexpected opportunities to achieve their goal. Instead of sticking rigidly to their plans, participants responded appropriately to new situations.

For instance, Achtziger (2003, Study 2) showed that participants are able to form implementation intentions that are only applied in certain contexts. A study on prejudice toward soccer fans showed that participants were able to apply the implementation intention "And if I see a soccer fan, then I'll not evaluate him negatively" flexibly, dependent on the context. In this study, the presence of a signal tone indicated that the implementation intention should be applied, whereas the absence of the tone indicated that it should not. In line with the assumption that implementation intentions do not necessarily lead to behavioral rigidity, the inhibition of prejudice toward "soccer fans" was only observed when pictures of soccer fans were accompanied by a signal tone. Likewise, another study (Jaudas & Gollwitzer, 2004) showed that participants who encountered an unexpected opportunity to pursue a goal intention – i.e., an opportunity other than the one specified in the if-part of the implementation intention – were able to recognize and seize this new opportunity. Participants were shown two symbols (e.g., flower, heart) on a monitor and asked to select the symbol with the highest score. Before the study began, they had been told the score of each symbol, and some participants had formed the implementation intention to select the symbol with the highest score especially quick by pressing the button as soon as it appeared. After a while, a new symbol with an even higher score was presented on the screen. Participants in the implementation intention condition succeeded in selecting this new symbol rather than the one that previously had the highest score (see Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2009).

12.7.2 Implementation Intentions and Ego-Depletion

The assumption that implementation intentions automate the control of goal-directed behavior implies efficient and relatively effort-free behavioral control. In other words, the self is not implicated – and should therefore not become depleted – when behavior is controlled by implementation intentions. Empirical support for this assumption has been provided by the studies of Bayer et al. (2010) and Webb and Sheeran (2003) reported in Sect. 5.2. Whether the initial self-regulating task was to control one's emotions (Bayer et al., 2010) or to perform well on a challenging task (the Stroop task; Webb & Sheeran, 2003), implementation intentions successfully preserved self-regulatory resources. It would thus seem that self-regulation based on implementation intentions is not costly in terms of self-regulatory resources.

12.7.3 Implementation Intentions and Rebound Effects

Wegner (1994) observed that conscious attempts to control or suppress one's thoughts – e.g., "I will not think about pink elephants!" – lead to rebound effects in the sense that the thoughts controlled become more readily accessible and thus more likely to surface in subsequent thoughts and behavior. Participants in his studies set themselves suppression goals of this kind and were instructed to ring a bell whenever their thoughts turned in the proscribed direction. Participants with the goal of not thinking about pink elephants initially succeeded in suppressing these thoughts. However, findings from a second phase of the experiment, in which participants engaged in free association and wrote down all of their thoughts, showed that participants who had resolved not to think about pink elephants in the first part of the experiment were now considerably more likely to report thoughts relating to pink elephants than participants who had not set a suppression goal. This effect is termed the rebound effect:

- The rebound effect involves a marked increase in certain thoughts following the "extinction" of a goal to suppress or inhibit those thoughts.

Against the background of these research findings, it would seem reasonable to hypothesize that suppression-oriented implementation intentions may inhibit unwanted thoughts and feelings to begin with but that these suppressed thoughts or feelings resurface later, i.e., that rebound effects occur. Gollwitzer et al. (2004) conducted two experiments to test this hypothesis. The participants in these studies were first asked to suppress stereotypical thoughts about a carefully described homeless person in an impression formation task. Rebound was measured either in terms of subsequent expression of stereotypes in a questionnaire tapping participants' evaluation of homeless people in general (Gollwitzer et al., 2004, Study 1) or in a lexical decision task assessing the cognitive accessibility of stereotypical contents regarding homeless people (Gollwitzer et al., Study 2). It emerged that the participants who had only set themselves the goal of suppressing stereotypical thoughts when forming an impression of the homeless person experienced pronounced rebound effects in both studies, showing more stereotypical judgments of homeless people in general (Study 1) and a higher accessibility of homeless stereotypes (Study 2). Participants who had furnished this goal intention with a corresponding implementation intention did not experience rebound effects. However, it seems possible that only implementation intentions that do not mention the to-be-suppressed response are capable of avoiding rebound effects (i.e., "ignore" implementation intentions or implementation intentions that specify an antagonistic response to the unwanted response), whereas implementation intentions that specify the "not-showing" of the concretely specified unwanted response will not. Indeed, recent research shows that implementations which specify "not-showing" of a certain response in the then-part are the least effective type of implementation intention (Adriaanse et al., 2011b).

Summary

Findings on the potential costs of implementation intentions can be summarized as follows:

- Implementation intentions do not lead to behavioral rigidity (e.g., in the suppression of prejudice or in performance on choice tasks).
- Implementation intentions do not lead to ego-depletion (e.g., performance levels are not reduced when emotions are controlled by means of implementation intentions).
- Implementation intentions may not lead to rebound effects (e.g., when stereotypical thoughts are suppressed).

12.8 Discussion and Future Perspectives

12.8.1 Implementation Intentions: A Foolproof Self-Regulation Strategy?

Although implementation intentions seem to function effectively without significant costs in terms of behavioral rigidity, ego-depletion, or rebound, they do not always result in the desired outcome. First, the behavior specified in the then-part of an implementation intention may be beyond the person's control (Wieber, Odenthal, & Gollwitzer, 2010). For example, somebody who intends to eat healthily may plan to order vegetarian food but then finds themselves in a restaurant with no vegetarian options. Second, it makes no sense to specify situations in the if-part of one's implementation intentions that barely, if ever, occur. For example, it would be pointless for someone to plan to eat healthily by ordering vegetarian food the next time they go to a fine restaurant if they usually eat in cafeterias or at home. Third, the behaviors specified in the then-part of the implementation intention may not be instrumental to reaching the goal. For example, someone who plans to eat healthily may order a vegetarian meal in a restaurant, not knowing that the dish chosen is full of fatty cheese.

12.8.2 Cognitive Aspects and Neuronal Substrates

In the years to come, the focus of implementation intention research will likely shift to cognitive neuroscientific aspects. From the cognitive perspective, implementation intention research stands to benefit from prospective memory research (cf. Smith, 2003), which examines the processes by which intentions are stored in and retrieved from long-term memory, as well as from ongoing attempts to examine the different components of working memory (e.g., the central executive, the phonological loop, and the episodic buffer as proposed by Baddeley (1986, 2000)) and their functions in the realization of goal intentions and implementation intentions. From the neuroscientific perspective, different strategies of goal setting (mental contrasting vs. indulging in the positive future; see Oettingen, Pak, & Schnetter, 2001) were investigated concerning their neural substrates by means of the MEG (Achtziger, Fehr, Oettingen, Gollwitzer, & Rockstroh, 2009). It was observed that the goal-setting strategy of mental contrasting goes along with a heightened activity of the brain as compared to mere indulging in the positive future.

Research assessing ERPs has also found that the control of negative emotions (i.e., spider fear; Schweiger Gallo, 2009) by means of implementation intentions versus goal intentions involved different modulations of the P1 in a time window of about 120 min after the presentation of spider pictures. By means of these EEG analyses, it was found that implementation intentions control fear in a very early time window and therefore can be assumed to be realized without further conscious intent. Another neuroscientific study investigated whether it can actually be argued that action control by means of implementation intentions involves self-regulatory processes that depend on bottom-up processes to a greater degree than on top-down processes. It was assumed that action control by implementation intentions should be associated with brain activity in the medial BA 10 because their realization should be driven by externally cued processing. However, action control by mere goal intentions (i.e., goals that are not

supported by if-then plans and therefore can be assumed to depend primarily on self-generated processing) should be associated with brain activity in the lateral area 10. This hypothesis was supported by an fMRI study in which a goal intention and an implementation intention were compared concerning their associated brain activity (Gilbert, Gollwitzer, Cohen, Oettingen, & Burgess, 2009).

Hallam et al. (2015) also used fMRI recordings in order to identify the areas in the brain that are involved in the execution of implementation intentions. Their research revealed that turning implementation intentions into reality recruits other brain areas than the realization of goal intentions. Hügelschäfer et al. (2016) demonstrated in an EEG experiment that implementation intentions were able to control rapid processes of gender categorization. Additionally, they noticed neuronal indicators of a specific kind of unconscious goal striving, prompted by implementation intentions that shows features that were only described for unconscious goal striving instigated by unconsciously activated goals so far (see Aarts, 2007), but not for implementation intentions. Note that Wieber, Thürmer, and Gollwitzer (2015) provide a comprehensive overview over neuroscientific research on processes underlying the effects of implementation intentions. Finally, in a study testing mindsets as described by the Rubicon Model of Action Phases (Gollwitzer, 1990; Harmon-Jones, Harmon-Jones, Fearn, Johnson, and Sigelman 2008) observed that the action mindset is associated with a heightened left frontal brain activity. Generally speaking, however, there is still much to be learned about the neuronal substrates of action control by means of goal intentions versus implementation intentions and indeed about intentional states in general.

12.8.3 New Research Questions

One avenue for future research on implementation intentions is using them to enrich behavior change interventions (Rothman et al., 2015). Implementation intentions are known to unfold their beneficial effects in particular when goal commitment and implementation intention commitment is high (Achtziger et al., 2012; Sheeran et al., 2005, Study 2) and when implementation intentions are personalized (i.e., specify personally relevant if- and then-parts; Adriaanse, De Ridder, & De Wit, 2009). Accordingly, behavior change interventions involving implementation intentions need to assure these prerequisites. One intervention that does this very effectively is called mental contrasting (Oettingen, 2012). Engaging in mental contrasting (Oettingen et al., 2001) requires from participants to juxtapose fantasies about desired future outcomes with obstacles of present reality. This mental exercise not only creates strong goal commitments but also guarantees the identification of personally relevant obstacles that can then be specified as the critical cues in the if-component of implementation intentions; moreover, mental contrasting has been found to create a readiness for making plans that link obstacles to instrumental behaviors. Recent intervention research has combined mental contrasting with forming implementation intentions (i.e., created MCII). MCII intervention studies observed lasting behavior change with regard to physical exercise and healthy eating (4 months to 2 years, respectively; Stadler, Oettingen, & Gollwitzer, 2009; Stadler, Oettingen, & Gollwitzer, 2010). Also, MCII helped to control the negative eating habit of unhealthy snacking in college students (Adriaanse et al., 2010). Here, MCII worked for both students with weak and strong such habits, and it was more effective than either mental contrasting or forming implementation intentions alone. Finally, MCII has been found to have beneficial effects outside of the health domain as well (see Oettingen, 2014, for a summary). For example, it benefited study efforts in adolescents preparing for standardized tests (Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011), promoted integrative bargaining in dyads negotiating over the sale of a car (Kirk, Oettingen, & Gollwitzer, 2013), and helped working mothers to achieve a better time management in everyday life.

Another new line of implementation intention research pertains to the use of implementation intentions in groups. The questions addressed in

this research are twofold: First, it is asked whether individual group members can use implementation intentions to promote collaboration and thus improve group performance. Second, it is asked whether groups can also use we-implementation intentions ("If we encounter …, then we will …!") to promote group performance and which type of implementation intention (Ivs. We-Implementation Intentions) is more conducive to promoting the various types of group performance (Wieber, Thürmer, & Gollwitzer, 2013). So far it looks like both types of implementation intentions enhance the group performance, but it seems that it is only the second type (i.e., the we-implementation intention) which does so by enhancing the interaction between group members.

A final new line of implementation intention research pertains to facilitating social interactions. For instance, Stern and West (2014) report that implementation intentions specifying how to act when feeling anxious boosts interest in sustained contact and close interpersonal distance in interracial interactions. Moreover, it was demonstrated by Przybylinski and Andersen (2013) that transference (which is known to run off outside of conscious awareness and often affects ongoing social interactions negatively) can be effectively prevented by using implementation intentions. And finally, Wieber, Gollwitzer, and Sheeran (2013a) found that mimicry effects on social interactions are controllable by forming implementation intentions – even though people are not usually aware of the influences that mimicry exerts on their judgments and behavior.

Summary

The study of motivation in the course of action has made it possible to distinguish phenomena of goal setting (motivation) from phenomena of goal striving (volition). Whereas research to date has focused on the cognitive orientations associated with the respective action phases (mindset research); the aim of future research will be to identify self-regulatory strategies that facilitate effective accomplishment of the tasks necessary at each phase in the course of action. The theory of intentional action control (Gollwitzer, 1993, 1999, 2014) has taken first steps in this direction, showing how implementation intentions can facilitate the performance of tasks that necessitate the initiation of goal-directed behavior, the shielding of that behavior against distractions, the timely termination of goal striving, and measures to ensure that the capacity for action control is not overstretched during goal striving.

Future research should take a two-pronged approach. On the one hand, it should seek to identify further self-regulatory strategies that help to address these kinds of difficulties and thereby help people to attain their goals; on the other hand, the search for effective self-regulatory strategies should be extended to other action phases. The predecisional phase of goal setting has already been examined. Fantasy realization theory (Oettingen 1996, 2000, 2012) distinguishes three different goal-setting strategies (mental contrasting of desired future and actual present, indulging in positive fantasies about the future, and dwelling on negative aspects of the present) and has found that only mental contrasting guarantees that the goals people set are in line with their perceived expectations of success. In other words, mental contrasting ensures that people do not pursue goals that are excessively high or low but aspire to goals that help them realize their full potential. Future research should examine the postactional phase in which completed goal strivings are evaluated and seek to identify self-regulatory strategies that are conducive to a person's goal striving in subsequent endeavors. The ultimate goal of this research is to develop intervention programs that will provide individuals with action control strategies that enable them to address the problems that set goal striving in the different action phases of the Rubicon model more successfully.

Review Questions

1. *Which four phases are distinguished in the Rubicon model of action phases?*
   The predecisional, preactional, actional, and postactional phase.

2. *At the end of which phase of the Rubicon model does the individual "cross the Rubicon" by committing to a goal intention?*
   At the end of the predecisional phase.

3. *What effects do the deliberative vs. implemental mindsets have on self-evaluation?*
   Studies have shown that an implemental mindset is associated with more positive self-evaluations than a deliberative mindset.

4. *How are the implemental and deliberative mindsets experimentally manipulated?*
   There are two methods of inducing each mindset: Implemental mindset: (1) Participants are asked to choose between alternatives, i.e., to make a decision; (2) participants are asked to plan the steps required to translate a given project into action, specifying when, where, and how to take each step.
   Deliberative mindset: (1) Participants are interrupted during the decision-making process; (2) participants weigh the positive and negative short- and long-term consequences of making or failing to make a change decision.

5. *What effects do the deliberative vs. implemental mindsets have on information processing?*
   Individuals in the deliberative mindset generally engage in more "deliberative" thoughts, are able to recall deliberative thoughts better than implemental thoughts, and tend to be open-minded (i.e., to process information in an objective and unbiased manner); moreover, their attention is not centrally focused. The opposite effects are observed for individuals in the implemental mindset.

6. *After induction of which mindset are goals more likely to be attained?*
   After induction of the implemental mindset.

7. *What are the effects of a deliberative mindset on people's evaluations of their romantic relationships?*
   It depends on the person's commitment to the relationship. If commitment is high, the partner is rated more positively after induction of a deliberative mindset than after induction of an implemental mindset; if commitment is low, the effects are reversed.

8. *What is a "goal intention"?*
   Goal intentions specify desired end states that people wish to attain. They have the structure "I intend to reach X."

9. *What is an "implementation intention"?*
   Implementation intentions are "if-then" statements that specify the conditions under which goal-directed behavior is to be initiated.

10. *What function do implementation intentions serve?*
    Implementation intentions facilitate the enactment of goal intentions that are particularly difficult to attain.

11. *Which factors moderate the effects of implementation intentions?*
    The following moderator variables have been identified: difficulty of the goal intention, commitment to the goal intention, commitment to the implementation

intention, and degree of activation of the goal intention.

12. *Are cognitive resources required to put implementation intentions into practice?*
    Implementation intentions are initiated automatically and thus do not tax cognitive resources.

13. *What positive effects can implementation intentions have on health-related behavior?*
    Examples: regular intake of vitamin tablets, participation in cancer screening, and regular exercise after hip replacement surgery.

14. *How can implementation intentions inhibit unwanted effects, such as stereotypical views of others?*
    Unwanted behavior can be inhibited by forming an implementation intention that inhibits either its activation or its application. The if-part of the implementation intention should specify a situation or a stimulus that is likely to trigger activation or application of the stereotype; the then-part should specify a goal-directed behavior with the potential to inhibit the stereotype (e.g., by initiating or upholding individualized processes of impression formation).

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Individual Differences in Self-Regulation

13

Julius Kuhl

Even a casual observer of human behavior can see that there are profound differences in how individuals regulate their actions. Some individuals doggedly pursue a single goal or ideal for many years, making many personal sacrifices and at great personal cost. Others seem to give in to their immediate impulses with barely a thought for the consequences. Some students earn their highest grades under severe stress and in the face of adversity. The same levels of stress and adversity may lead other students to drop out and abandon their academic goals altogether. Indeed, many students seem to perform best under more relaxed conditions. At the workplace, some employees demonstrate high levels of initiative and set their own agenda, regardless of what others may think. Others prefer to follow the instructions of their superiors and are eager to learn what is expected of them.

These and other individual differences in self-regulation are the central focus of the present chapter. The following sections offer some preliminary reflections on the neglect of individual differences in psychological research. Next, the chapter considers individual differences in motives and needs and how global notions of self-regulation and the will can be decomposed into more specific psychological functions and mechanisms. Finally, this chapter shows how this functional analysis of the will can be used to understand a wide array of effects of individual differences in affect regulation (i.e., action vs. state orientation). Throughout the present chapter, the overarching goal is to illuminate the basic psychological functions that may underlie individual differences in self-regulation.

13.1 Reflections on the Neglect of Individual Differences in Psychological Research

There is still no general consensus among experimental psychologists on the significance of individual differences. It therefore seems appropriate to begin this chapter with some reflections on individual differences in self-regulation. Most cognitive psychologists and many social psychologists take no account of individual differences. The reasons for this neglect are not discussed systematically in psychology. In fact, wherever the exclusion of individual differences occurs, it seems to be based on a tacit a priori assumption rather than an explicitly discussed decision. When asked about their reasons for disregarding individual differences, researchers often cite sociopolitical arguments. As they see it, paying

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attention to dispositional factors risks missing opportunities for social change. This kind of thinking is based on the assumption that situational influences are always easier to change than individual ones. Yet we know from everyday experience that people are often exposed to situational influences that are not easily changed, such as a chronically ill relative, a low income, or a floundering economy.

Note that personality characteristics are not necessarily fixed and unchangeable. The laws of falling bodies in physics, which take account of individual differences in the mass of falling objects, do not require this variable to remain unchanged across the "lifespan" of an object. The only constraint is that there is no change in the measured mass of an object, while each individual measurement is taken and the laws are applied (incidentally, the same applies to situational factors). If the mass of the object changes (e.g., because fragments of the stone under investigation break off), this change is taken into account in the next measurement, before the laws are applied again.

Against this background, neglecting personality characteristics in psychological research is like throwing the baby out with the bath water. Rather than excluding personality dimensions from their work altogether, researchers critical of the static nature of psychological concepts of personality might want to put some thought into the true nature of personality dispositions. Psychology needs a dynamic rather than static conception of personality. One such theory is presented in Sect. 13.5: The theory of Personality Systems Interactions (PSI) assumes that individual dispositions play a role in the ever-changing exchange of information between psychological systems. Depending on the social context of the interaction, this exchange of information in turn has the potential to influence and change personality functioning.

Besides the sociopolitically motivated reluctance against the study of personality, there is another, even more deeply rooted reason for the widespread neglect of dispositional determinants of behavior. It is based on the misunderstanding that the pursuit of general laws, which is, of course, critical for a young experimental science like psychology, would be impeded if different laws were allowed to apply to different people. If there were idiosyncratic laws for each individual person, so the reasoning, there would be no room for a general psychology. This concern seems to be influenced by the development of experimental psychology in the first decades of the twentieth century. Specifically, the beginnings of experimental psychology were characterized by enormous difficulties in abandoning the introspective "observation of the soul" that psychologists associated with "armchair psychology" and that seemed incompatible with the agenda of the newly emerging experimental discipline. The experimental psychologists of the time, who called themselves "behaviorists," only accepted observations that could be made directly and from an external perspective as the basis for the development of scientific psychology; they sought to discover general psychological laws.

Even today, researchers who take individual differences into consideration are sometimes implicitly suspected of obstructing that agenda, which is of existential importance for scientific psychology. In reality, however, there is no inherent contradiction between personality psychology and a psychological science in search of general law. Again, comparison with laws of nature, such as the laws of falling bodies, helps to illustrate the point. No physicist would ever suggest that averaging the masses of a random sample of objects would produce more general laws of falling bodies. Clearly, the laws of falling bodies are only generally applicable if the individual characteristics (i.e., the mass) of the object in question are included in the equation. The findings on individual differences in self-regulation (e.g., action vs. state orientation) reported in this chapter indicate that – in psychology as in physics – results are only replicable when individual characteristics are taken into account.

- Failure to measure unwelcome potential influencing factors – e.g., personality dispositions that are believed to reduce the general applicability of a law – does not constitute scientific rigor; on the contrary, it is a parascientific denial strategy. Scientific "objectivity" requires researchers to consider all potential

influencing factors and, if their influence can be established, to incorporate them in psychological "laws." General applicability of a paradigm cannot be achieved simply by ignoring influencing variables. In other words, individual differences whose influence has been established empirically lend general applicability to models that do not a priori include personality parameters (Lewin, 1935).

13.2 Motives as Need-Oriented Self-Regulatory Systems

Motivation psychology is concerned with what motivates people to behave in certain ways. Different approaches offer very different answers to the question of what these motives are. The idea that cognitive representations of goals motivate behavior has been popular for a long time now (see Brunstein & Maier, 1996; Cantor & Zirkel, 1990; Emmons, 1992; Little, 1989). The advantage of the focus on cognitive motives for behavior is that it coincides with what is currently the most fruitful area of psychological research: In formulating cognitive theories of motivation, researchers are able to capitalize on both the theoretical and the methodological advances of cognitive psychology within the study of human motivation. An exclusive focus on the cognitive determinants of behavior does not paint the whole picture, however. Even if I know which cognitively represented goals an individual is pursuing, I still do not know why this person has set himself or herself those particular goals and whether a cognitive representation of a goal is a necessary condition for motivated behavior or whether behavior may be motivated by sources other than conscious intentions and other cognitive sources of motivation (Kuhl, 2010).

Other sources of motivation we might consider are needs and affects that are not cognitively represented (e.g., if a person starts talking to somebody because of his or her need for closeness but is unaware of that need and has not consciously set himself or herself the goal of satisfying it). Furthermore, we do not know whether the existence of a goal is a sufficient condition for engaging in the corresponding behavior. In fact, as will be discussed in the present chapter, whether or not a cognitively represented goal is translated into action hinges largely on regulatory processes that are described by the terms self-regulation, volition, or will.

13.2.1 Needs: Subaffective Detectors of Discrepancies Between Actual and Desired States

Self-regulatory processes are also investigated in fields of psychology other than motivation psychology, e.g., as "executive processes" in cognitive psychology (Chudersky & Smolen, 2016; Norman & Shallice, 1986) and as central coordinating processes in the frontal lobe in neuropsychology (Damasio, Tranel, & Damasio, 1991; Friedman & Miyake, 2016; Wheeler, Stuss, & Tulving, 1997). To appreciate the specific perspective that the motivational approach brings to volitional processes, it helps to consider some of the key terms and concepts of motivational theory. To come back to the defining question of motivation psychology introduced above, what are the processes that determine the goals that people set themselves?

Definition
Motivational processes that are not characterized by cognitive representations of a target state can be called *precognitive* or *subcognitive*, because they exist even before cognitive goal representations are generated.

Neurobiology attributes these subcognitive processes to brain structures that, in terms of phylogeny, ontogeny, and brain anatomy, are located "below" the structures mediating cognitive representations. These subcognitive structures may be regarded as detectors of discrepancies between actual and desired states, similar to the detectors in the hypothalamus that are known to monitor blood sugar level, which plays a major role in feelings of hunger and motivating food intake (Leibowitz, Weiss, Walsh, & Viswanath, 1989). These detectors are more comparable with mechanical detectors of discrepancies between

actual and desired states (e.g., thermostats) than with cognitive representations. In case of a discrepancy between actual and desired state, a thermostat is able to regulate the temperature without "having a goal in mind."

Definition
Needs may be defined as subcognitive and subaffective detectors of discrepancies between actual and desired states.

Animal experiments show that subcognitive motivational processes can regulate behavior. Specifically, electrical or chemical stimulation of certain nuclei in the hypothalamus has been shown to trigger motivated behavior, such as attacking, suckling, drinking, grooming, etc., independent of the brain structures involved in generating cognitive representations (e.g., when the cortex and hippocampus have been inhibited or removed; Clemente & Chase, 1973; Himmi, Boyer, & Orsini, 1988; Pawlow, 1930/1953, p. 369; Peck & Blass, 1975).

Freud popularized the assumption that human behavior is motivated by basic (subcognitive) biological needs (drives). Starting from the energetic basis common to all drives (libido), which he associated with the drive to procreate, Freud differentiated needs such as:

- The need to eat (oral)
- The need to exercise control (anal)
- The need for love (genital)

The psychoanalytic school is known for its propensity to attribute the needs manifested in adulthood to basic drives and the childhood experiences ("vicissitudes") associated with them. Psychoanalysts assumed that individuals whose oral needs are either over- or undersatisfied in childhood will develop a fixation not only on needs that are directly linked to the intake of food (drinking, eating) but also on needs associated with the need for food and drink in early infancy, e.g., the needs for skin contact, closeness, and a sense of security (oral dependency). The reasoning was that early experiences of feeding are closely linked to the satisfaction of needs for contact and a sense of being cared for.

13.2.2 Affective and Cognitive Systems: Need-Relevant System Configurations

Psychoanalysts were mainly concerned with explaining pathological development and paid much less attention to healthy psychological development. If we were to take a similar approach to inferring the needs that develop from an infant's oral needs in the case of healthy development – i.e., when oral needs are neither over- nor undersatisfied – we might assume these needs to be strongly associated with independence, rather than with dependence. In a normally developing child, the need for food can be seen as prototypical of a need that progresses from being satisfied in a dependent manner to being satisfied in an ever more independent manner. The child becomes increasingly independent of the mother – skin contact is no longer necessary during food intake, children learn to feed themselves, and gradually begin to decide by themselves what to eat and drink and what to reject. They also find more and more ways to obtain the food they want, even if that food is not actively provided by the mother or is forbidden, i.e., if difficulties (obstacles) are to be overcome.

Looking at the manner in which a need is satisfied rather than its actual content, we can even discern a gradual progression from the need for food to other needs that likewise imply increasing independence. The prototype here is the need for achievement, which centers on the attainment of difficult goals and development of the necessary skills. Early studies on the achievement motive confirmed that independence is indeed a basic prerequisite for the development of the need to achieve. Winterbottom (1953) found that individuals whose mothers emphasized their child's independence from an early stage (e.g., who let them do things without help or interference) tended to produce Thematic Apperception Test (TAT) stories on achievement-related themes. Likewise, Scheffer (2005) found that when adults who associated a large number of achievement-related contents in response to various stimuli (i.e., who had a high achievement motive) were administered an indirect test on the structure of the family of origin, they portrayed their mothers

as interfering little in their affairs, i.e., as allowing them a great deal of independence.

These mothers do not always show their support for their child but withhold warmth in certain situations (i.e., they let their child experience the frustration associated with the difficulties encountered). The child then will then seek his or her own solutions to the problem, i.e., engage in instrumental behavior.

- Instrumental behavior (i.e., behavior that is used as an "instrument" to achieve a certain purpose) is one of the foundations of achievement-related behavior. Accordingly, some researchers have measured the strength of the achievement motive in terms of the frequency of imagined instrumental actions (Atkinson, 1958; Heckhausen, 1963a; McClelland, Atkinson, Clark, & Lowell, 1953).

Empirical evidence for the assumption that patterns of oral need satisfaction established early in life (e.g., whether or not a child is encouraged from an early age to eat and drink without help) influence the development of the achievement motive is still lacking. However, the fact that animal experiments typically investigate the prototype of achievement-related behavior (i.e., instrumental behavior) in the context of food intake (Carlson, 1994; Skinner, 1953) might point to a link between the two needs.

13.2.2.1 Needs for Achievement and Power

On the affective level, instrumental behavior is characterized by a typical cycle that begins with the inhibition of positive affect whenever a difficulty or obstacle is encountered. As soon as instrumental behavior succeeds (e.g., a rat finds food in a maze), the second part of the cycle commences. Inhibition of positive affect can now be released. In his influential theory, Gray (1982) describes this frustration effect as an inhibition of the system that facilitates behavior (otherwise known as the reward system). Gray reports numerous experimental findings in support of his theory. If there is no obstacle to be overcome, the system facilitating behavior and the associated positive affect need not be inhibited, and consummatory behavior can be initiated without delay. For example, humans or animals can simply eat the food available without first having to engage in instrumental behavior to obtain it.

The problem with inhibition of positive affect, which this model of achievement motivation sees as the starting point of each instrumental cycle, is that it entails the risk of behavioral inhibition lasting too long. A minimum amount of positive affect seems to be necessary (for many forms of instrumental behavior, at least) to muster the energy needed to facilitate behavior (Gray, 1982). Various models of motivation (see Atkinson, 1964a; Heckhausen, 1989) have proposed a simple solution to the paradox of how an organism can be motivated before the positive affect associated with goal attainment takes effect. The assumption is that moderate levels of positive affect can be generated during the instrumental phase by the anticipation of goal states. This effect is described by the concept of incentive, according to which the sight or mental image of an aspired object suffices to generate positive affect and to facilitate behavior.

Definition

From a functional perspective, the concept of incentive can be likened to Freud's concept of object cathexis. After repeated positive experiences with an object, the cognitive representation of that object also becomes associated with positive affect (or with negative affect in the case of aversive experiences). What Freud termed object cathexis, Lewin (1935), in his theory of motivation, called "incentive character" or "valence." Today, in the language of learning theory, it is described as the conditioning of an affect onto an object representation (i.e., a stimulus). The term incentive, which is a core concept in motivational theory, denotes the association between a stimulus (or, more specifically, an object representation) and the affective reactions conditioned onto it, which motivate approach or avoidance behavior.

In their model of affective change (McClelland et al., 1953), McClelland and associates proposed that the change from inhibited to activated positive affect seen in instrumental behavior corresponds closely with the affective processes characteristic of achievement motivation. Achievement motivation presupposes a minimum degree of difficulty or – as Heinz Heckhausen (1963a) put it – achievement-motivated behavior can only occur "if one can manage a task or fail at it". The shift from inhibited to activated positive affect (i.e., from the perception of difficulty to the anticipation of success) can also apply to power motivation (although not with the frequency typical of achievement motivation): expressing one's feelings and goals in order to influence others (i.e., asserting oneself or exercising power) often constitutes a use of instrumental behavior to attain certain goals.

13.2.2.2 Affiliation and Self-Integration Needs

The affective cycle typical of instrumental forms of motivation (i.e., achievement motivation and power motivation) does not apply to all needs. Instrumental behavior is rather untypical when we seek, for example, to establish or maintain positive, warm, or even loving relationships with others (i.e., need for affiliation or the intimacy motive; Chap. 7). Indeed, instrumental behavior may even disrupt the spontaneous exchange of feelings that is characteristic of close interpersonal relationships. Because instrumental behavior is directed toward a specific goal or purpose, it is bound to strike us as manipulative or false – or at the very least as lacking in spontaneity – when exhibited in social interactions.

- Positive affect (e.g., agreeableness or warmth) facilitates the establishment of interpersonal relationships; it is also the basis for the expression of negative feelings: Any reduction of positive affect inhibits behavior (including emotional expression). Note that negative affect is not identical to inhibited positive affect, which plays a crucial role in achievement motivation. Inhibition of positive affect is extremely disadvantageous in social interactions, whereas we soon learn that expressing negative feelings prompts others to provide care and to display loving behavior (e.g., when an infant's crying expresses a need that is then satisfied by the mother).

The connection between low positive affect and impaired personal relationships is especially apparent in depression, where the loss of positive affect is extreme. Empirical findings indicate that depression is more closely related to a lack of positive affect (e.g., despondency) than to the presence of negative affect (e.g., agitation or anxiety; Higgins, 1987; Watson & Tellegen, 1985; Winer & Salem, 2016). In fact, depression has much more detrimental effects on social relations than anxiety and other negative feelings (including suicidal feelings; Milana, 1981; Spirito & Hartford, 1990). Satisfying social interactions thrive on the exchange of positive feelings, and the absence of positive emotions can have more harmful effects on relationships than the expression of feelings such as anxiety, discussion of which can in fact strengthen relationships (Gilligan, 1997, 2013).

The second motive that presumably is more experiential than instrumental concerns the need for becoming an authentic person by integrating self-compatible experiences into a growing self. Developing an integrated and authentic self is often even undermined by instrumental planning (Fromm, 1976). Feeling free for and open to new experience is facilitated by an experiential rather than instrumental (behavioral) focus (Kuhl & Hüther, 2007; Kuhl & Luckner, 2007). In the humanistic tradition of motivational psychology, authenticity and self-integration are closely related to consciously reflected self-determination (Deci & Ryan, 2000; Rogers, 1961). This close relation between self-integration and *deliberate* self-determination shows a great respect for the individual and his or her conscious reflections as the highest moral authority. In light of the growing consideration of the limitations of the (analytical) consciousness (Deglin & Kinsbourne, 1996; Gigerenzer, 2000), the honorableness and the responsibility of human beings can be even more deeply acknowledged if we expand our conception of self-determination by including the unconscious (intuitive) intelligence of the self.

Following this approach, Alsleben (2008) extended a content-analytic method for assessing implicit needs by categories that indicate various forms of ~~the~~ satisfaction of the need for authenticity and self-integration (Alsleben & Kuhl, 2010).

Alsleben decomposes the need for self-integration (i.e., the need to feel free to open up to experience and authentic being) into the categories *self-confidence* (e.g., to open up, delight in new experiences, display positive self-esteem), *status* (conditional self-confidence, e.g., being the center of attention), unrestrained *self-awareness* (integration of unpleasant experiences, restoration of self-confidence, assertiveness, asking for advice), defensive *self-protection* (building rigid ego borders, justifying one's actions, perceiving oneself in comparison with others), and *self-denigration* (fear of losing freedom, losing self-confidence, misunderstanding or being misunderstood, being charged, being under pressure). Some of those categories have been associated with the need for power (e. g., status, assertiveness). However, an empirical study revealed distinct differences between the need for free self-integration and the need for power: After the presentation of words (as primes) expressing limitations of freedom (obeying, being dependent), the fear of losing power correlated significantly with the abovementioned measurement of volitional facilitation (reduction of the Stroop interference after positive primes: Kuhl & Kazén, 1999). On the other hand, the fear of losing self-esteem or self-integration was associated with a *lack* of volitional facilitation, which is consistent with the Fromm's (1976) hypothesis that the self-integration motive (authentic being) is related to an experiential rather than instrumental state of mind. In contrast, power typically requires volitional action, which is called "instrumental" because it involves enacting behavior that is instrumental for accomplishing a future goal. Findings showing that the left hemisphere is closely related to analytical thinking and instrumental planning (Deglin & Kinsbourne, 1996; Levy & Trevarthen, 1976; Rotenberg, 1993) suggest that instrumental motives such as power and achievement should activate the left hemisphere and experiential motives such as affiliation and self-integration should activate the right hemisphere. Empirical findings are consistent with this expectation (Kuhl & Kazén, 2008).

13.2.3 Implicit Motives: Intelligent Needs Serving the Context-Sensitive Regulation of Behavior

To understand how theories of motivation came to incorporate volitional concepts, it is important to appreciate the difference between needs and motives. In the latter half of the twentieth century, psychologists addressing the perhaps three most important social needs (i.e., affiliation/intimacy, power/assertiveness, and achievement) essentially studied motives rather than needs, although the lack of distinct measurement methods meant that it was not always possible to differentiate clearly between the two (Atkinson, 1958; Heckhausen, 1989; McClelland, 1985). One major reason for the shift of focus to the motive concept is clear. With the birth of behaviorism in the early 1920s, psychologists adopted a new agenda that emphasized the prediction of behavior (as opposed to the traditional experience-based "armchair" psychology), and it was now vital to identify motivational concepts that might further this aim. Simply knowing that a person has a need does not allow conclusions to be drawn on how he or she will behave. Needs were defined above as subcognitive or precognitive detectors of discrepancies between actual and desired states. In fact, we can go so far as to describe them as sub- and pre-affective. Typically, affect occurs only in consequence of a change in either satisfied or unsatisfied needs, i.e., when discrepancies between actual and desired states are reduced or increased (Heckhausen, 1963b):

- Positive affect can occur when a discrepancy is reduced (e.g., when there is an increase in blood sugar level after a meal).
- Negative affect can occur when the discrepancy between an actual and a desired state increases.

Needs may trigger behavior without the involvement of higher cognitive structures, as shown by the animal experiments cited above, in which certain nuclei of the hypothalamus were stimulated. The range of behaviors triggered at this subcognitive and subaffective level is rather narrow and inflexible, however (e.g., clinging to anyone available in the case of need for affiliation or sucking movements in the case of hunger). The potential for varied and adaptive behavior in humans is dependent on the involvement of complex cognitive structures and on the experience of countless previous episodes of need satisfaction. Thousands of experiences of behaviors in different situations are stored in autobiographical memory (Philippe, Koestner & Lekes, 2013; Tulving, 1985); these memories include the conditions prevailing at the onset of each episode, the range of behavioral options tested, and the consequences of those behaviors, including the emotions triggered. Comprehensive networks of need-relevant knowledge and behavioral options can be abstracted from these experiences. These networks, commonly known as motives (McClelland, 1985), allow us to predict behavior much more reliably than do the corresponding needs. Given the innumerable experiences an individual gains over the course of a human lifetime, however, these networks are so extensive that most of this knowledge is available only intuitively. Only some aspects of it can be verbally explicated, provided that the individual in question is capable of accurate self-perception. The cognitive component of motives differs from goal cognitions and other conceptual representations. Motives are preconceptual, often even preverbal, that is, they emanate from a developmental phase during which children may make need-relevant experiences but are not able to express them conceptually or even verbally. Children store pictorial scenes evolving from situations in which some experience occurred that satisfied or frustrated a particular need (Schultheiss, 2010).

Definition

Motives are extensive, not fully conscious cognitive-emotional networks encoded in a pictorial-concrete format that have been abstracted from autobiographical experiential knowledge to generate a large number of context-sensitive behavioral options as soon as a current need, which constitutes the nucleus of each motive, increases.

This definition of the motive concept is consistent with classical definitions (Atkinson, 1958; Heckhausen, 1989; McClelland et al., 1953). However, these did not always differentiate clearly between motives and needs – partly because methods allowing such a distinction to be made had yet to be developed.

13.2.3.1 Motives as Implicit Self-Representations

From the definition of motives formulated in the preceding section, it is clear that there is a close connection between motives and self-regulation. Autobiographical experiential knowledge forms the core of self-representations (Wheeler et al. 1997). Indeed, the highest level of representation of an individual's integrated self is based on the storing of all experiences that are, directly or indirectly, relevant to that person's current state, needs, and functioning. On the basis of these numerous "self-relevant" experiential episodes, individuals develop a more or less coherent model of themselves that can be updated at any time.

- Needs are core components of self-relevant states; motives are their cognitive-emotional elaboration. Based on experiential knowledge, motives tell the individual which behavioral options are particularly likely or unlikely to facilitate need satisfaction in specific situations. They can thus be regarded as integral components of the individual's self-system.

The link between a person's self-system and his or her motives has only recently become theoretically explicable (Kuhl, Quirin & Koole, 2015). For one thing, the motivation psychology of previous decades focused more on the measurement and validation of motives than on the functional architecture of motivated systems and their mechanisms (Atkinson, 1958a; Heckhausen, 1989; McClelland et al., 1953; Winter, 1996). Moreover, the connection between the high level of integration of the self-system, on the one hand, and motives, on the other, was not evident, because self-representations were studied almost exclusively in terms of self-concepts; i.e., consciously held views of one's self, whereas motives are essentially related to implicit representations. Whether or not researchers are able to capitalize on the great potential of the link between motives and self-regulation will depend on whether these theoretical advances are complemented by advances in the measurement of motives, as discussed in the next section.

13.2.3.2 Measurement of Motives

From the very beginning of experimental research on motives, these constructs have been assessed by means of projective measures (McClelland et al., 1953) and conceived of as largely unconscious cognitive-emotional representations. "Cognitive-emotional" means that motives are partly cognitive in nature (e.g., preconceptually encoded experiential knowledge about behavioral options in various need-relevant situations) but that they also have emotional aspects. Indeed, cognitive representations of need-relevant experiences are practically always associated with emotional experiences, dependent on the degree to which need satisfaction was achieved in the respective situations. From the perspective of learning theory, we could say that emotional responses (e.g., joy about success or disappointment about failure) have been conditioned onto cognitive representations of past actions.

Today, neurobiological research sees these emotions, which are integrated in extended cognitive networks, and the bodily perceptions associated with them (somatosensory signals) as navigational aids within these cognitive networks (Damasio et al. 1991). Without the guidance of these emotional and somatosensory indicators, the search for appropriate behavioral options within the extensive network of potentially relevant experiences would be a tiresome, if not futile, endeavor (see the example below). The emotional responses encountered while scanning these extended associative networks help the system to focus its attention on promising behavioral options and to avoid risky ones. It can thus quickly decide which option to pursue.

Example

Patients with certain lesions to the brain have been observed to experience great difficulty in making apparently simple decisions (e.g., deciding whether to schedule their next doctor's appointment on a Tuesday or a Wednesday). Research has shown that the connection between areas of the brain important for representing signals from the body (somatosensory, postcentral areas) and areas of the brain important for self-representations (e.g., the right prefrontal cortex) is severed in these patients (Damasio et al. 1991).

Against this background, it seems quite reasonable to interpret motives as components of the self-system that serve to regulate behavior. Whenever a need is aroused, motives generate behavioral options that are embedded in cognitive-emotional representations of appropriate self-relevant experiences. These cognitive-emotional networks, which are postulated to form the functional basis of motives (McClelland, 1985b; Winter, 1996), are so extensive that they cannot possibly be conscious knowledge structures. Indeed, the pioneers of modern motivation psychology realized that it was not possible to measure motives by means of questionnaires, because these methods presuppose conscious knowledge about the subject of inquiry (McClelland et al., 1953). Today, implicit (unconscious) knowledge is measured by implicit memory tests, such as:

- Free reproduction ("Just tell me what you can remember of the things you've learned")
- Completing word fragments ("Which word can be formed by filling in the missing letters: COFF? ") and similar methods (Goschke, 1997b; Schacter, 1987; Tulving, 1985)
  - These diverse memory tests have one thing in common – participants do not produce memory contents following a direct cue (or "stimulus," as is the case in recognition tests, cued recall, or questionnaires) but spontaneously. In other words, the response is self-controlled rather than stimulus controlled.

The test that was developed to measure motives is based on a principle similar to that of implicit memory tests (see also the Excursus Box "The Measurement of Implicit Self-representations"), although it was originally embedded in a different theoretical context entirely. In the Thematic Apperception Test (TAT), participants are asked to write down a "free reproduction" of associations relating to images – in other words, to produce imagined stories based on a series of picture cues. Showing images is especially suitable for measuring motives because they are stored in a pictorial format. The hypothesis that motives exert an immediate, almost impulsive, effect on behavior is confirmed by findings showing that connecting goals with pictorial imaginations clearly increases the efficiency of motive-congruent action (Schultheiss & Brunstein, 1999; Storch & Krause, 2007).

Excursus

The Measurement of Implicit Self-Representations

On the basis of these theoretical and empirical arguments, the classical TAT would appear to be the ideal instrument for measuring implicit self-representations and specifically for measuring motives as holistic representations which are derived from need-relevant autobiographical experiences. However, the TAT has been criticized for failing to satisfy some of the quality criteria prescribed by classical test theory (Chap. 6). Indeed, the internal consistency and test-retest reliability (i.e., stability) of the TAT's motive scores leave much to be desired, and some studies have found that the instrument's potential to predict school grades is negligible (Entwisle, 1972). According to Winter (1996), however, the instrument's low test-retest reliability can be attributed to the simple fact that participants take the test instructions seriously and try to produce imaginative and original stories each time the instrument is administered. Hence, the consistency of results obtained from successive tests is low. When respondents are told that they can produce similar stories in the second test, test-retest reliability increases (Winter, 1996).

In psychometric terms, this means that test-retest reliability cannot be considered a fair measure of the TAT's quality. A similar argument applies to the instrument's low internal consistency, e.g., the low correlation of scores from two halves of the test, expressed in terms of Cronbach's α values. The assumptions of classical testing theory (e.g., that errors in the measurement of different items are uncorrelated) simply do not apply to motivational processes, which have a sequential dynamic that violates the principle of independence of subsequent measurements. Because needs become less intense when they have recently been satisfied, someone who has just written a story on the achievement motive is much less likely to produce another story dealing with that motive. The impact of the negative recency effect reported by researchers studying memory and attention may also play a significant role in this context. People telling stories tend to avoid repetitions, and the same holds for other cognitive processes.

We try to avoid repeating words in the same sentence, and both human respondents and laboratory animals avoid searching the same area twice when visually exploring a stimulus (Posner & Rothbart, 1992).

In view of the TAT's low reliability (Cronbach's α values approaching zero in many studies), classical test theory would not expect the test to show significant correlations with criteria relating to what it is supposed to measure (because reliability defines the upper limit of validity; Moosbrugger & Kelava, 2007). After all, why should a test that provides imprecise and unreliable measures have high validity? But if test-retest reliability and Cronbach's α values for internal consistency are indeed inadequate measures of the test's precision because the assumptions of classical test theory simply do not apply in this context, we can expect the validity of the TAT to be much higher than its reliability scores indicate. Research findings confirm the latter assumption: Meta-analyses show that the TAT has higher validity than questionnaire measures when it comes to assessing the three basic social motives (achievement, affiliation, and power) in self-initiated behavior, as opposed to behavior initiated by others (Spangler, 1992). When a measurement model that dispenses with some of the unrealistic assumptions of classical testing theory is applied (i.e., Rasch's stochastic model), the homogeneity and unidimensionality of the TAT is superior to that of many questionnaire measures (Kuhl, 1978; Tuerlinckx, De Boeck, & Lens, 2002). Notably, the Operant Motive Test (OMT) has significantly higher internal consistency and test-retest reliability than the TAT (Kuhl & Scheffer, 1999) and also meets the criteria of modern stochastic measurement models (Lang, Zettler, Ewen & Hülsheger, 2012). As explained below, the OMT combines measurement of motives with measurement of components of self-regulation.

Today, generating stories is considered to be closely related to functions of the self-system, which is after all based on abstraction from standard features of autobiographical episodes, that is, on "stories" experienced by the individual. The narration of stories thus activates precisely those mental functions that are involved in the representation of one's own "story." There is also empirical evidence to show that narrating one's own experiences in the form of stories ("narrative format") helps people to cope with stress and anxiety (Graci & Fivush, 2016; Pennebaker, 1993). Given the close connection between the self-system and the narrative format, the self-system might also be assumed to have stress-reducing functions. Indeed, empirical research shows that individuals with a highly developed, differentiated self-system (i.e., who see themselves as having comparatively many, distinct or both positive and negative "self-aspects") show significantly fewer depressive and physical symptoms under stress (Linville, 1987) and recover more rapidly from negative thoughts than do individuals with a less developed self (Showers & Kling, 1996).

13.2.3.3 Motives and Self-Regulation: The Operant Motive Test

The Operant Motive Test (OMT) was developed by Kuhl and Scheffer (1999) to preserve TAT features central to motive measurement (production of fantasy stories based on ambiguous picture cues) and to improve on those features with detrimental effects on measurement. Consequently, respondents are not required to write down their invented stories (which take a long time and, like the relating of dreams, can lead to distortion), meaning that more pictures can be shown (e.g., 15 for the OMT compared with six for the TAT: reliability of a test increases with the number of items). For the purposes of content analysis, it suffices for respondents to note down their spontaneous associations to the following questions, which are also used in the TAT (see overview).

Questions Used for Motive Measurement in the OMT and TAT

- What is important for the person in this situation and what is he or she doing?
- How does the person feel?
- Why does the person feel this way?

The OMT's coding system exploits the theoretical advances that resulted from incorporating self-regulatory processes within motivational theory (Heckhausen, 1989; Kuhl, 1981, 1983). Whereas classical motive measurement differentiates between an approach and an avoidance form of each motive only, the OMT distinguishes four different forms of approach motives (in addition to one avoidance component).

When scoring the OMT, the rater first decides whether any of the three basic motives (affiliation, achievement, and power and more recently also self-integration) are present and whether approach or avoidance motivation is expressed. In the case of approach motivation, the rater then assesses the degree to which either internal, self-regulatory processes (i.e., the "self") or external (situational) stimuli (incentives) are involved. These two "levels" of motive implementation are then evaluated for the presence of positive or negative affect (this affect is not necessarily consciously accessible to the respondent or mentioned explicitly in the associations).

New insights into personality functioning (Kuhl, 2000a, 2000b, 2001) have made it possible to formulate indirect indicators for unconscious affects that influence behavior (Table 13.1). Numerous findings confirm the assumption (second modulation assumption of PSI theory, see page 317) that negative affect impairs access to the self and to other forms of high-level, intuitive intelligence (e.g., the recognition of implicit coherence) and that coping with negative affect facilitates such access (Baumann & Kuhl, 2002, 2003; Kuhl & Kazén, 1994; Rotenberg, 1993). On the basis of these findings, the presence of negative affect can be deduced, even if it is not made explicit in respondents' associations, from a "narrowness" (i.e., neglect of wider context) or "rigidity" of motive implementation (e.g., if no creative or socially integrative form of need satisfaction can be identified: rigid implementation of the power motive according to the "all-or-nothing" principle; achievement motivation with a focus on competitiveness or "being better than others"; narrowing of the affiliation motive to a person offering protection rather than an intimate personal exchange). If, on the other hand, negative affect is expressed explicitly and creative solutions are sought, the self-regulated mode of coping with negative affect in implementing the motive in question is scored. In the case of positive affect, a parallel distinction is made between instances in which the self and its volitional mechanisms are involved in need satisfaction and instances in which there is no involvement of the self. Creativity and flexibility of implementation combined with a positive incentive "emanating" from the activity again indicate a variety of motive implementation that involves self-regulatory processes (intimacy for the affiliation motive, flow for the achievement motive, and prosocial, socially integrative influences on others for the power motive).

- The intrinsic motivation associated with these motive varieties is attributed to the largely unconscious effects of self-regulatory functions that help to maintain interest in and enjoyment of the activity even in the face of (intuitively solvable) difficulties (self-motivation).

Summary

The psychometric properties of the OMT confirm that the new instrument preserves central features of the TAT while making some useful improvements:

- Although the OMT takes less time to administer and score, and despite theoretical objections to the use of classical reliability measures, interrater agreement after a few days' practice is 0.85 (using Winter's formula, 1994). In the upper and lower quartiles of the distribution, Cronbach's α is over 0.70 (Scheffer, Kuhl, & Eichstaedt, 2003). Lower consistencies are theoretically plausible in the middle range of the distribution because motives (unlike cognitive abilities) compete

Table 13.1 The multilevel model and the motive components of the OMT

Columns define needs ("what")	Affiliation	Achievement	Power
Rows (levels) define mechanisms ("how")	Developmental hypothesis	Developmental hypothesis	Developmental hypothesis
	Low family cohesion ("high emotional distance," "low warmth")	Parental expectations of independence (i.e., exposure to difficulties)	Low paternal influence on the child ("eye level")
	Frustration of the need for closeness	Frustration of goal attainment	Frustration of the need for structure/hierarchy
Level 1	Aff1 intimacy	Ach1 flow	P1 guidance
Self and A+: self-access and depth	Warmth, love, joyful exchange	Being absorbed in a task, learning something	Influencing others: explaining, assisting, etc.
Level 2	Aff2 sociability	Ach2 standards of excellence	P2 recognition
Incentive objects and A+: extrinsic (OR)	Having fun together; entertainment	Doing something well, positive goals	Being the center of attention; status; recognition
Level 3	Aff3 networking	Ach3 coping with failure	P3 self-assertiveness
Self and A(−): active coping with problems	Identifying and actively overcoming problems within relationships	Identifying errors and problems and actively seeking a solution	Overcoming the resistance of others; making decisions
Level 4	Aff4 affiliation	Ach4 pressure to achieve	P4 dominance
Action and A−: active avoidance (planning, dogged perseverance (stimulus-free facilitation of IBC))	Seeking security; seeking closeness/affiliation	Persevering under stress; competing; being better than others	Noticing the negative aspects of power; one-sided control
Level 5	Aff5 dependence	Ach5 self-criticism	P5 subordination
Self-inhibition and A−: negative emotions and negative incentives become conscious; paralyzation	Experiencing loneliness and anxiety; feeling distance; asking for help; "clinging"	Acknowledging one's mistakes; becoming passive after failure; accepting help	Experiencing powerlessness; subordinating oneself; yielding to others

A(−) downregulated negative affect, *A*+ positive affect, *A*− negative affect, *IBC* intuitive behavior control, *OR* object recognition system

with each other. Hence, a motive can only be expected to have a consistent influence if its impact is relatively strong or weak. Therefore, motive research typically explores differences between persons in whom a different motives are dominant (correlations between motives and behavioral criteria are not quite compatible with the theoretical notion of competition among motives because the lack of reliable predictions within the middle range of motive strength violates some assumptions underlying statistical models).

- In terms of its validity, the OMT correlates with implicit measures of early childhood development, as outlined above, and with behavior ratings (Kuhl, 2001, pp. 604ff.; Scheffer, 2005). Moreover, the discrepancy between implicit motives as measured by the OMT and conscious goals predicts the development of psychological symptoms (as discussed later, see Fig. 13.5) and affects well-being (Kazén & Kuhl, 2011).
- Research has confirmed that the OMT is independent of questionnaire measures of motives (e.g., Scheffer, 2005; Wegner & Teubel, 2014).
- By contrast, the OMT converges with TAT measures but only when the arousal conditions specific to the motive under investigation are induced (Scheffer, 2000; Scheffer et al., 2003). This finding may indicate that the TAT is more dependent on the induction of arousal conditions

than the OMT. Given that the development of the TAT was closely associated with the situational arousal of specific motives, this assumption seems quite plausible.

13.3 Will Without Homunculus: Decomposing Global Concepts of Self-Regulation

Self-regulatory processes are not only involved in the satisfaction of needs and motives; they also come into play when goals that are not in line with what is currently the dominant motive or strongest need have to be implemented. The following sections are dedicated to the in-depth analysis of processes of self-regulation, independent of the degree to which they serve to satisfy needs, implicit motives or explicit goals in each individual case.

During the era of radical behaviorism, "self-regulation" and other designations for the concept of will were banned from experimental psychology as "unscientific," because it was assumed that they could not be measured on the basis of observational data. This same reasoning probably underlies contemporary attempts to deny the will an independent status and to portray volitional phenomena as "perceptual delusions" (Wegner & Wheatley, 1999; van Elk, Rutjens & van der Pligt, 2015). Indeed, it is inherently difficult to conceive of "will" as an object of observation for empirical science: Precisely those actions that are not caused by external (observable) stimuli but that originate from within the acting person himself or herself are deemed to be caused by will. Thus, the concept of will seems to describe a form of behavior whose causes cannot be observed. Worse still (for the scientifically working psychology), "self-caused actions" seem to be a form of behavior that does not obey the rules of cause and effect and thus eludes experimental analysis.

Today, the philosophical problems relating to the concept of will and freedom of will, in particular, can be resolved: Although the internal processes underlying volitional acts are more complex than behavior attributable to simple stimulus response bonds, this does not necessarily preclude the analysis of their causal conditions. "Freedom" of will does not mean freedom from causal determination but freedom from a certain form of causal determination, i.e., from determination by factors external to the self (Bieri, 2001; Kuhl, 1996; Pauen, 2004).

Examples of behaviors that are not determined by self-regulated processes include all forms of external control. These include instructions and obligations imposed by external sources (Deci & Ryan, 2000), as well as the compulsive performance of automatized behavioral routines and obsessive fixations on certain stimuli that occur in drug addiction and – in considerably milder form – in "extrinsic" motivation, i.e., when the motivation for performing an action does not reside "within the action" (or a corresponding need of the person performing it), but to attain a certain object from a goal that is not in tune with the self.

Habits and incentive-focused behavior are usually triggered by external stimuli, whereas self-determined acts of will are triggered by high-level internal systems, such as the implicit self-system mentioned above, which integrates a huge number of contextually relevant experiences, and the memory for explicit intentions, which might be compared to Freud's ego. Of course, the external and internal causes for a certain behavior may coincide (e.g., when children internalize their parents' expectations). This is not always the case, however.

Even if actions caused by the self or the ego are not seen as free from causal determination, the challenge remains of how to analyze the mechanisms by which these "internal" systems are assumed to trigger behavior. Explanations based on global concepts of will, such as will power, self-regulation, or self-efficacy (Bandura, 1998), are not really explanations at all – they merely attribute behavior to "will" or a similar summary construct which functions as a kind of inner puppet-master, a homunculus, the functioning of which remains unexplained.

- Global concepts of will are intuitively appealing because they can have enormous predictive power: If we know how people evaluate their own self-efficacy, we can make fairly

accurate predictions about their behavior and performance (Bandura, 1998; Barz et al. 2016). However, it is all too easy to forget that high *predictive* power, which radical behaviorism deemed to be so important, does not mean that a variable will have equally high *explanatory* power. The inclination of the gas pedal very well predicts the velocity of a car, but it says little about the car's systems and the functions that make the car move.

Global concepts of will are no better at explaining volitional phenomena than the high correlation between the inclination of my car's gas pedal and its velocity is able to explain how my car works. Only when the specific processes and functions underlying different volitional acts are identified can we expect to arrive at well-founded explanations of volitional phenomena.

The following section describes a functional design approach to "decomposing" global concepts of will.

13.3.1 Internal Dictatorship vs. Democracy: Self-Control and Self-Regulation

Even the very first step toward decomposing global concepts of will is a difficult one. How is it possible that our will is composed of many individual functions when in everyday life we experience our will as an entity? Everyday experience gives us the sense "that we do things, that we cause our acts, that we are agents" (Wegner & Wheatley, 1999, p. 480) – that our will is a single, undivided entity. How, then, can be it possible for the will to consist of a large number of functional components that we do not even experience consciously? The fact that more process components are involved in an act of will than we consciously know can be derived from wrong conscious explanations of acts of will: Many empirical findings suggest that the perception of an integrated will that determines our actions in everyday life may be erroneous. For example, research has shown that people sometimes think that they have chosen an activity themselves, when in fact it was imposed by others (Kuhl & Kazén, 1994), and EEG scans of study participants asked to decide for themselves when to make a certain hand movement (Libet, 1985) show that the impulse triggering the movement occurs a few 100 ms before participants actually decide to perform that movement (see Nisbett & Wilson, 1977, for further examples of false self-ascriptions of objectively externally triggered behavior). Against the background of such data, it is all too easy to conclude that there is no such thing as will and that the concept is not worthy of serious investigation (Wegner & Wheatley, 1999), rather than seeing it as one of the true determining sources of behavior or breaking it down into its functional components.

If we maintain that behavior may sometimes be influenced by the will, even if (as the authors assume) nonvolitional causes dominated in the experiments conducted by Wegner and Libet, another interesting possibility opens up: Could it be that volitional processes influence our behavior even if we have no conscious memory of their effects? If there is something to the effect of a higher-order function that coordinates our thinking, feeling, and acting such that it seems consistent, comprehensible, and coordinated to us and to others, then at least some of this coordinating activity must occur without us being consciously aware of it. Language-based consciousness, which is characterized by sequential processing, would be hopelessly overstretched if all factors impinging on complex decisions (which often have to be made within the space of a few seconds) had to be processed, not to mention the associated feelings and needs (one's own and other people's), not all of which can be consciously expressed in language or otherwise. It has thus been proposed that two modes of volition be distinguished:

1. Conscious, verbally expressible self-*control*, which operates sequentially and analytically
2. Self-*regulation*, which is largely unconscious and not verbally expressible, and which processes and coordinates information from the internal systems (e.g., feelings, beliefs, values, needs) and from the (social) environment largely simultaneously (in parallel) (Kuhl, 1996; Kuhl & Fuhrmann, 1998; Kuhl et al., 2015)

Experiments showing that words relating to a current intention inhibit the processing of words relating to a source of temptation without the respondent's conscious awareness (Fishbach, Friedman, & Kruglanski, 2003) confirm that unconscious processes are involved in shielding intentions against sources of temptation. Many studies show that the right ("unconscious") hemisphere is particularly strongly involved whenever self-referential judgments are made (Keenan, Nelson, O'Connor, & Pascual-Leone, 2001), especially when this occurs unconsciously (Kircher et al., 2002; Molnar-Szakacs, Uddin, & Iacoboni, 2005) and when self-relevant feelings are recognized in the faces of others (Pizzagalli, Regard, & Lehmann, 1999) or regulated (Levesque et al., 2003). According to Rotenberg (2004), the conscious (analytic) self-concept (the ego) and its self-control functions are closely connected to the analytic processing of the left hemisphere. In turn, the implicit (holistic) self, including self-regulation, seems to be more closely connected to the nonanalytic processing of the right hemisphere (cf. Kuhl, 1994b). Rotenberg (2004) calls the processing mechanism of the left hemisphere *monosemantic* because it reduces (polysemantic) context information to the one aspect that is most relevant for immediate action. The processing mechanism of the right hemisphere is called polysemantic because it implicitly and simultaneously considers several meanings of a word or a situation.

- There is now little doubt that conscious and unconscious self-representations (e.g., the conscious self or self-concept vs. the unconscious self-image) have different and independent effects on behavior (Greenwald & Banaji, 1995). Accordingly, an unconscious form of will can be assumed to exist alongside conscious will.

13.3.1.1 Self-Regulation

Summing up, we can describe self-regulation as a largely unconscious form of volition that involves, and yet goes beyond, the integrative intelligence of motives. Volitional self-regulation draws not only on those networks of experiences that are relevant for one's needs but on all autobiographical experiences that have contributed to the development of a coherent self-image. Metaphorically speaking, self-regulation is a kind of "internal democracy," within which many, at times contradictory, "voices" are heard (or votes are taken) – one's own feelings, attitudes, and values and those of others. These internal and external voices "vote" on matters of volition, resulting in a decision that is then implemented by the "government." Implementation may be facilitated by various measures, e.g., attempts to convince dissenting voices to support the goals adopted. The communication psychologist Schulz von Thun (2002) illustrates this integration of internal voices with the concept of an "inner team" consisting of many inner voices that receive guidance by a democratic "leader" who acts in an impartial, understanding, and integrative way. Under this guidance, a decision can be found that integrates all (or at least most) of the seemingly contradictory voices. The integration of all relevant experiences permits high levels of flexibility and creativity in behavior. In this respect, the concept of self-regulation is comparable with the concept of creative will (Rank, 1945) and with "resilient" forms of ego control (Block & Block, 1980) that prove extremely adaptable and flexible under pressure. The integration of one's own (implicit) motives is an example of self-regulation in terms of self-congruent action, which reconciles needs with societal demands (cultural norms) and the needs of others (altruism), instead of construing incompatible contradictions (like the analytical ego). If the "conscious" (analytical) self-concept is congruent with unconscious motives, well-being is increased, and the risk of forming psychosomatic symptoms is decreased. This holds for the need for achievement (Baumann, Kaschel, & Kuhl, 2005) as well as for other motives (Brunstein, Schultheiss, & Grässmann, 1998; Kazén & Kuhl, 2011; Schüler, Job, Fröhlich, & Brandstätter, 2008).

Excursus

Lateralization of Body Perception

The monosemantic processing of the left hemisphere seems to not only reduce the diversity of the holistic, parallel processing of the right hemisphere but also detach emotions and bodily perceptions from cognition (Kuhl et al., 2015). A vivid confirmation of this hypothesis is the study performed by Smeets and Kosslyn (2001) on 22 female patients suffering from anorexia nervosa. These authors presented real and distorted (i.e., thicker and thinner) pictures of the patients, as well as of female celebrities. Anorexic patients more often chose the thicker body shapes as correct but only if their own body (not those of the celebrities) was presented. In addition, this effect only occurred when the pictures were presented in the right visual half-field (i.e., with a processing advantage of the left hemisphere). This effect was independent of acute symptom formation (as measured by a clinical criterion for anorexia nervosa), but it was a function of the anorexic disposition (i.e., an incidence of anorexia nervosa in the patient's biography). These results suggest that distorted perceptions are not outcomes of anorexic symptoms but rather a dispositional risk factor for this disorder. The findings are consistent with the hypothesis that psychosomatic disorders are associated with a dissociation between analytical (monosemantic) and holistic (polysemantic) processing systems (Kuhl, 2011).

13.3.1.2 Self-Control

If the process of integrating "dissenting voices" does not work, then it may be time for the second form of volition, namely, self-control, to take over. Persistence in the self-regulatory mode in the face of a task that is necessary, but not at all pleasurable, would mean that we never get the job done, because "internal democracy lends its ear to the voices of protest."

Fujita et al. (2006) demonstrated that the self-controlled realization of goals is facilitated by the activation of analytical processing. The experimental activation of high-level cognitions, like analytical thinking about one's own motivation (and even abstract thinking in general), facilitated various aspects of self-controlled behavior. The interaction of self-control and the style of cognition (i.e., analytical thinking vs. holistic intuition) remained significant, even when the experimentally induced cognitions had no semantic reference to the content of the subsequent self-controlled behavior. In the experiments conducted by Fujita et al. (2006), high-level analytical processes were activated by asking participants to answer why-questions for each particular goal that they wrote down (e.g., "Why am I doing something for my health?"). Holistic experiences were activated by asking specific questions concerning the details of the implementation.

- The volitional mode of self-control operates in a very different way from self-regulation. The pursuit of goal attainment no longer involves trying to gather as many positive voices as possible in support of the goal. Instead, all voices that are not directly conducive to goal attainment are "switched to mute mode." At the psychological level, this "internal dictatorship" corresponds to the suppression of the self. The self is no longer the source, author, and agent of behavior but the object of controlling or even repressive measures preventing any potential distractions from interfering with goal implementation (Kuhl, 1996).

In motivational terms, this mode of volition includes cases of discrepancy between conscious goals and implicit motives, i.e., when goals that are incongruent with the dominant motive are "introjected." Given the obvious disadvantages of permanently suppressing "self-involvement" in the regulation of behavior, including the risk of psychological disorders (Baumann et al. 2005; Kuhl & Kaschel, 2004), it is easy to overlook the advantages of self-control: It is the classic mode of (potentially conscious) volition and permits many forms of adaptive behavior that are difficult

to realize in the more liberal volitional mode of self-regulation. There is empirical evidence for positive effects of self-control on goal attainment – particularly where unpleasant activities are concerned (Gollwitzer & Brandstätter, 1997; Fuhrmann & Kuhl, 1998) – and on readiness to engage in prosocial actions, especially when these require one's own preferences to be set aside (Finkel & Campbell, 2001).

It seems that negative affect is more conducive to self-control than positive affect (Kochanska, Coy, & Murray, 2001). In fact, a study by Kuhl and Fuhrmann (1998) found that individuals with a preference for the self-control mode show reduced self-regulatory efficiency (implementation of diet goals) when instructed to motivate themselves through positive affect, e.g., by rewarding themselves mentally for small steps forward rather than punishing themselves for mistakes and weaknesses (Fuhrmann & Kuhl, 1998). However, the fact that individuals with high (induced or dispositional) self-control achieve higher efficiency by motivating themselves through negative cognitions and emotions (e.g., by imagining the adverse consequences of not implementing an intention) does not mean that they do not experience positive affect once they achieve their goals. In fact, the opposite is true – respondents' satisfaction increases when experimentally induced self-control ("prevention focus") is combined with elements designed to distract attention from the task at hand (Freitas, Liberman, & Higgins, 2002).

Because the conscious form of will (i.e., self-control) is, by definition, more easily accessible to conscious thought, it is hardly surprising that the concept of will has, historically, almost always been reduced to this mode of volition.

Summary

Self-regulation is not inherently more satisfying or effective than self-control or vice versa. What is important is the fit between the dominant mood, the demands of the situation, and the induced or dispositionally preferred mode of self-control or self-regulation.

Self-regulation works better in the context of positive mood and situations emphasizing freedom of choice (Baumann & Kuhl, 2004; Deci & Ryan, 2000), whereas self-control works better in the context of negative mood, controlling instructions (Baumann & Kuhl, 2004; Fuhrmann & Kuhl, 1998), and situations requiring the suppression of distracters or sources of temptation (Freitas et al. 2002).

Self-regulatory functions (e.g., self-determination, attention control to promote goal implementation, and an action-oriented approach to coping with stress) have less impact when individuals experience high levels of social (normative) pressure than when they perceive less normative pressure (Marszal-Wisniewska, 2002; Orbell, 2003).

13.3.2 Progression vs. Regression under Stress: Volitional Inhibition and Inhibition of the Self-Access

The differentiation between the integrative and control modes of self-management is only part of the story. In everyday life, we often find ourselves in situations where both forms of volition are weakened: In stressful situations we are less capable of performing and have less "will power" than usual. This applies particularly to stressful situations in which it is easy to lose track of things. We may lose sight of what we wanted to achieve or have difficulty making decisions, and we may find it impossible to implement our intentions, even when the opportunity to do so arises (Kuhl, 2011; Kuhl & Kaschel, 2004). The latter phenomenon, in which performance of intended behavior is impeded, is termed volitional inhibition (impairment of self-control). The phenomenon of losing track of things in general, and of personal preferences in particular, is called self-inhibition (reduced self-access and impairment of self-regulation) because the information relevant to decision-making can no longer be accessed in the usual way (reduced self-access). It is important, however, to distinguish between two forms of stress at this point: Volitional inhibition is usually caused by pressure that weakens the positive affect required for behavior (e.g., a lot of unfinished work), whereas self-inhibition is more strongly

associated with threats that lessen the ability to remember personally relevant experiences (related to self; Kuhl, 2011). These two forms of stress-induced inhibition of the awareness and/or implementation of preferences and intentions correspond to Freud's concept of regression: The rational functioning typical of a healthy adult seems to be suspended by traumatic experiences and acute stressful episodes, such that the system "regresses" to simple ("infantile") processes. Pierre Janet proposed a much more elaborate take on the stress-induced inhibition of self-regulatory functions with his concept of psychasthenia ("psychic weakness"), which is currently experiencing a revival (Bühler & Heim, 2002; Hoffmann, 1998).

- In practical terms, the fact that volitional inhibition and self-inhibition are induced by pressure and threats, respectively, means that it is not sufficient simply to measure the efficiency of self-regulation and self-control. Rather, the degree to which these functions are available in stressful situations has to be measured separately. In factor-analytic studies, questionnaire scales measuring functional components of self-regulation (e.g., self-motivation, self-relaxation, decision-making competence, etc.) and self-control (e.g., impulse control, planning, etc.) are often orthogonally related to scales measuring self-regulatory competencies under stress (Kuhl & Fuhrmann, 1998).

13.3.2.1 Neurobiological Findings on Volitional Inhibition

The fact that the stress-induced inhibition of volitional and other high-level functions is driven by independent processes has also been demonstrated at the neurobiological level. The sensitivity of the hippocampus to stress seems to be a key factor here (Kanatsou et al., 2015; Sapolsky, 1992). At excessive stress levels, the hippocampus is inhibited, leaving its cognitive and emotional functions impaired:

- The cognitive functions of the hippocampus are implicated whenever numerous pieces of information from different sources have to be linked together (Sutherland & Rudy, 1989), e.g., in spatial orientation (Meaney, Aitken, van Berkel, Bhatnagar, & Sapolsky, 1988), in the memorization and recall of autobiographical episodes (Kirschbaum, Wolf, Wippich, & Hellhammer, 1996; Squire, 1992), and in the perception and recall of stimulus configurations (Metcalfe & Jacobs, 1998).
- The emotional functions of the hippocampus include its inhibiting influence on cortisol production (Sapolsky, 1992) and its mediation of the inhibiting influences of high-level cerebral processes on elemental (subcortical) processes, such as conditioned fear responses (Schmajuk & Buhusi, 1997). Thus, inhibition of the hippocampus might lead to situations in which fear responses cannot be inhibited, even in safe environments (e.g., fear of caged lions at the zoo).

These findings on the neurobiology of the integrative and affect-regulatory functions of the hippocampus (Kalisch et al., 2006; Metcalfe & Jacobs, 1998; Sapolsky, 1992; Schmajuk & Buhusi, 1997) establish a basic framework for psychological theorizing and offer explanations for many regression phenomena. Excessive stress primarily affects the "intelligent" functions and systems. Under stress, we are no longer able to deal with the normal amount of information, meaning that spatial orientation is reduced, that episodes experienced are "forgotten" (although the affects "conditioned" during those episodes are not), and that the broader context (including motives) is neglected. Instead, the focus is on details. For example, we may start to dislike someone for trivial reasons, "forgetting" the good times we have shared with them on account of a single disappointment.

Even experiences that remain accessible cannot influence elementary responses often acquired in early childhood (e.g., knowing that current relationships do not involve the same degree of threat as those experienced in childhood cannot neutralize traumatic early experiences). The discrepancy between motives and behavior, including its unconscious and conscious triggers (e.g., habits, goals, introjects), can thus be seen as a special case of stress-induced regression. When the influence of high-level systems is disabled under acute or chronic stress, people simply fail to

realize that their conscious goals and behavior are no longer in line with the structures that have evolved from their extensive experience of life (e.g., their motives and self). Analogous effects have also been documented in animals (O'Donell & Grace, 1995). This suggests that the mediation between high-level (cortical) and elementary systems (e.g., limbic system) through the stress-sensitive hippocampus developed early during phylogenesis.

In the stress-dependent regression mode the processing of extended experiential networks is evidently very dependent on the parallel mode of processing in the right hemisphere (Beeman et al., 1994; Rotenberg, 1993, 2004). Unlike the "analytic-verbal" left hemisphere, the right hemisphere is very much involved in the perception and regulation of somatosensory and emotional signals from the autonomic nervous system (Dawson & Schell, 1982; Wittling, 1990). We might therefore infer that motive discrepancies deriving from an overemphasis on goals represented analytically and verbally in the left hemisphere, and their isolation from motives and other implicit self-representations in the right hemisphere, might lead to impaired perception of and coping with emotional experiences, with corresponding effects on symptom development. Empirical data have recently confirmed this hypothesis (Baumann et al., 2005; Kehr, 2004a).

Findings on the hemispheric lateralization of self-congruent motives and explicit goals (including "introjects") have been applied to striking effect in recent experiments (Baumann, Kuhl, & Kazén, 2005) demonstrating that other-induced and self-chosen tasks are no longer confounded (i.e., self-infiltration is reduced) when study participants squeeze a rubber ball with their left hand for 3 min before they classify the tasks, a motor activity assumed to activate the right hemisphere. Activation of the right hemisphere seems to restore self-access. A recent study showed that the stress-dependent tendency to mistake assigned goals as self-chosen was reduced when the activation of a specific region in the right (medial) prefrontal cortex increased (Quirin, Kazén & Kuhl, 2009). Neurobiological studies have repeatedly shown that this region is activated during tasks requiring some holistic self-perception (Northoff & Panksepp, 2008).

13.4 Affect-Regulatory Competencies: Action vs. State Orientation

Investigation of volition and self-access and its potential neurobiological basis (e.g., stress-induced inhibition of the hippocampus) has shown that whether or not the self-regulatory competencies a person has developed remain available in stressful situations (i.e., under demand or threat) depends on that person's ability to regulate affect.

- Not only do affect-regulation competences provide important protection against unpleasant and disease-inducing affects, they also serve to ensure optimal communication among self-regulatory and cognitive systems.

13.4.1 The Core of the Construct: Self-Regulation of Affect

The construct of action vs. state orientation was introduced to further the study of individual differences in the regulation of affect (Kuhl, 1981, 1983). In contrast to classical personality dispositions such as extraversion and neuroticism, which focus on differences in sensitivity to positive vs. negative affect, i.e., the ease with which these affects develop (Gray, 1982; Gupta & Nagpal, 1978), state orientation describes the unwanted persevering of affect, i.e., the inability to terminate an unwanted affective state. It may entail unwanted rumination on an aversive experience (state orientation after failure: SOF) or a protracted state of indecision, hesitation, or lack of energy, all of which inhibit the implementation of intentions (prospective state orientation: SOP) (Kuhl, 1981; 1984).

Example

Action and state orientation are measured by items such as the following sample items from the Action Control Scale (ACS-90):

One of the items measuring prospective action orientation, which facilitates decision-making and implementation of intentions, reads:

- When I need to solve a difficult problem:
  (a) I get started at once.
  (b) I think about other things first before starting with the task at hand.

Response (a) is scored as action oriented (AOP) and response (b) as state oriented (SOP).

One of the items measuring the failure oriented, ruminative form of action orientation reads:

- When I am told that my work is completely unsatisfactory:
  (a) I feel paralyzed for quite some time.
  (b) I don't get discouraged for long.

Response (a) is scored as state oriented (SOF), response (b) as action oriented (AOF).

There is much empirical evidence for the reliability and validity of the scales (Diefendorff, Hall, Lord, & Strean, 2000; Kuhl, 1994a; Kuhl & Beckmann, 1994a). Although action/state orientation and extraversion/neuroticism share common features, as reflected in the theoretically expected correlations between the constructs, empirical research has also identified a number of differences. In contrast to extraversion and neuroticism, action orientation does not consistently predict mood at the beginning of an experiment; however, it does predict change in mood over the course of an experiment (Brunstein, 2001; Kuhl, 1998). These effects and other indicators of the positive influence of action orientation on self-regulation (e.g., compliance with a dietary regimen) persist even when controlling statistically for dispositional sensitivity to affects (e.g., neuroticism; Brunstein, 2001) or current mood (Palfai, 2002).

13.4.1.1 Counter-Regulation of Negative Affect: Action Orientation After Failure (AOF)

Research on learned helplessness (Hiroto & Seligman, 1975) established that exposing people to unsolvable problems leads them to display performance deficits in a subsequent task. These performance deficits were attributed to reduced expectations of success and to a subsequent decrease in motivation, as assumed in the theory of "learned helplessness" (Abramson, Seligman & Teasdale, 1978). An experimental test of the helplessness theory suggested a different explanation of the performance deficit observed after experimentally induced loss of control. According to this alternative model, exposure to loss of control in an initial task causes performance to drop in a subsequent completely different task only if the participants are not able to cope with the negative affect induced by the loss of control manipulation (Kuhl, 1981). According to this view, participants ruminate about the situation (e.g., the failure experienced) and are not able to focus on a new task. In contrast to the learned helplessness model (Seligman, 1975), reduced expectation of success observed after the loss of control experience at the first task was not generalized to the second task. Participants reported reduced expectation of success for the first task (in which they experienced failure), but they were not less confident before starting a second task (of another type), compared to a control group without failure experience. In other words, a generalized reduction in control expectations cannot be the cause of the performance deficits observed under failure conditions. How, then, was it possible to explain the finding that state-oriented participants exposed to loss of control (failure) on one task showed performance deficits on new and completely different tasks?

The questionnaire measure for failure-related action orientation, which was designed to measure individual differences in regulation of affect,

provided an explanation for these helplessness-related performance deficits. Only state-oriented individuals (SOF), whose questionnaire responses indicated that they had difficulty detaching from unpleasant situations and the thoughts associated with them, showed performance deficits. The helplessness phenomena were not replicated in action-oriented individuals (AOF), who showed no performance deficits after failure (Brunstein & Olbrich, 1985; Kuhl, 1981; Kuhl & Weiß, 1994). There was no question of a generalized decrease in expectations causing the performance deficits observed in state-oriented individuals, because they did not report reduced expectations of success after exposure to failure.

Further studies established that state-oriented rumination was in fact caused by deficits in affect regulation (Kuhl & Baumann, 2000). Analogous, though much more pronounced, deficits have been documented for state-oriented alcoholics (Stuchlikova & Man, 1999), who have a significantly worse prognosis when it comes to implementing the intention to steer clear of alcohol (Palfai, McNally, & Roy, 2002). Recent findings (Koole, 2004) confirm the hypothesis that uncontrollable rumination in SOF is caused by inhibition of the implicit self-system. SOF experience an increase in implicit activation of negative self-related cognitions, as measured by means of a priming method, when confronted with threatening thoughts (imagining a frightening person from their own biography).

- Given the many findings showing that the self provides a rather positive "bottom-line" evaluation of one's identity ("self-positivity"; Koole, 2000; Koole, Dijksterhuis & Knippenberg, 2001), the increase in negative evaluations observed in state-oriented individuals supports the hypothesis that self-access becomes inhibited as soon as these individuals are confronted with threatening situations. Given an intact self-access, state-oriented individuals would be able to take advantage of self-positivity, which would make it easier for them to cope with negative affect.

Most likely, AOF find it easier than SOF to detach from negative experiences because they check whether new information is potentially threatening and worthy of attention in the current context in a "preconscious" phase of information processing. This hypothesis was confirmed by an event-related potentials study in which respondents were presented with a list of words, some of which reminded them of painful life events. The results showed that *AOF respondents* paid *more* attention to *negative* than to neutral words after just 180 ms; SOF respondents did not even differentiate between negative and neutral words at that point (Rosahl, Tennigkeit, Kuhl, & Haschke, 1993). Maybe action-oriented participants are able to use this early (pre-attentional) sensitivity to threatening information to dampen (repress) negative affect in a very early stage of processing, provided the information is related to the current context. Once the irrelevant threat information has reached consciousness, attempts to suppress it take up vital processing capacity and are often unsuccessful: Instructing participants not to think of a white bear for a while can result in an excessive amount of thinking of white bears later on (Wegner, 1994).

13.4.1.2 Counter-Regulation of the Inhibition of Positive Affect: Prospective Action Orientation (AOP)

In contrast to the studies on learned helplessness, where (lack of) affect-regulatory competence was easily identified as the reason for performance deficits (questionnaire items referred directly to the inability to detach from negative feelings and thoughts), the affect-regulatory core of prospective action vs. state orientation (AOP) was not immediately apparent. Given that positive affect is known to facilitate behavior (Gray, 1982), however, it could be hypothesized that the hesitation in implementing intentions and the prolonged periods of deliberation reported by prospectively state-oriented individuals were attributable to a lack of behavior-facilitating positive affect.

Although positive affect is not addressed directly in the ACS-90, the experiment by Beckman and Kuhl (1984) described below provided indirect evidence for the assumed affective concomitants of the problems of decision-making and action implementation typically seen in state-oriented individuals.

Study

Regulation of Affect in State vs. Action-Oriented Individuals

Why is it that negative affect is conscious and directly accessible in questionnaires, whereas behavior-facilitating positive affect (or its inhibition) is not always directly accessible? Theoretical reasons for this difference in the measurement of negative and (inhibited) positive affect have been established, and it is now possible to explain why it makes sense to address negative affect directly in questionnaire measures and to measure positive affect indirectly in terms of its impact. Specifically, positive affect is more closely associated with the intuitive mode of information processing than with conscious, analytical processing (see the first modulation assumption of PSI theory below). It follows that consciously thinking about positive affect may in fact reduce that affect. The opposite is true of negative affect, which is intensified by conscious reflection because conscious reflection inhibits affect-reducing mechanisms, like the implicit mode of differentiated self-perception (Linville, 1987; Rothermund & Meiniger, 2004; Showers & Kling, 1996). An increasing number of studies show that coping with negative affect seems to be more efficient when implicit rather than explicit coping strategies are employed. The last part of this chapter will explain implicit coping processes on the basis of a functional analysis of the extension memory (EM) and the integrated self.

In one experiment, Beckmann and Kuhl (1984) asked respondents who were house hunting to assess the merits of various apartments and provided them with all the relevant information. Later on, when the respondents were asked to reassess the apartments, state-oriented respondents provided "objective" responses; because they had not been given any additional information, they made few, if any, changes to their previous assessments. Action-oriented participants, on the other hand, assessed the apartments they had favored at first measurement much more positively than the other apartments, even though there had been no change in the information provided. This mental "amplification" of incentives was interpreted as the result of a process of self-motivation, the aims of which were to bring the process of deliberation to a close and to support the implementation of the resulting decision (Beckmann & Kuhl, 1984).

Self-Motivation

PSI theory, as presented in Sect. 13.5, differentiates self-motivation from other ways of dealing with affect. In contrast to Freud's defense mechanisms and the corresponding coping styles (Folkman & Lazarus, 1988; Janke, Erdmann, & Kallus, 1985; Krohne, 1996), self-motivation (AOP – prospective action orientation) and self-relaxation (AOF – action orientation after failure) are attributed to the affect-regulatory impact of the implicit self (Koole & Coenen, 2007). The implicit self can be aroused through very brief exposure of self-relevant words. Its strength of activation can be measured by intuitive enhancement of positive evaluations of self-relevant items (e.g., the participant's initials: Koole, Dijksterhuis, & van Knippenberg, 2001). In contrast to defensive intensification of positive affect (e.g., embellishment of a sad experience), positive affect generated by self-motivation is not based on an impulsive reaction, such as repression of anxiety (e.g., through embellishment), which functions to protect individuals against experiences that would produce anxiety (Byrne, 1961; Krohne) but is the result of an informed – if largely unconscious – decision made by a system that takes all self-relevant information on the meaning of various affects into consideration before determining whether an affect is to be admitted or altered in the current context (self-confrontational coping). This form of affect regulation can also be applied to the regulation of negative affect (AOF). In lay terms, it is

coping by "looking at the problem instead of looking away." This mode of coping cannot be described in terms of the classical dichotomy of denial ("repression") and sensitization. In fact, it is an adaptive form of sensitization that combines tolerance of pain and anxiety (i.e., sensitization) with nondefensive, active coping.

It is difficult to provide empirical evidence for the implicit (unconscious) status of this form of affect regulation. It is even more difficult to demonstrate that the "self" – which PSI theory regards as the source of personal volition – is involved in this form of affect regulation in action-oriented individuals. Nevertheless, a Dutch team has provided empirical evidence for both assumptions with respect to the regulation of positive affect (Koole & Jostmann, 2004).

Koole and Jostmann (2004) were able to show the following:

- Prospectively action-oriented individuals (AOP) do indeed upregulate positive affect, even when that positive affect is measured at the implicit level (e.g., faster reaction times on a task requiring friendly faces to be picked out from a set of faces with negative expressions).
- The differences in reaction time on these tasks are so slight (in the range of milliseconds) that this upregulation cannot have been consciously controlled.
- The upregulation of positive affect is mediated by self-access, measured in terms of the speed with which self-referential questions are answered (e.g., "Does the following word describe you?").

The mediating role of self-access in action-oriented participants (AOP) is shown in Fig. 13.1. The significant association between the experimental induction of "demand or pressure" and the measure for implicit upregulation of positive affect (upper part of Fig. 13.1) decreases significantly when the assumed mediating variable (i.e., self-access) is entered in the regression model (lower part of Fig. 13.1). This pattern of results reveals the mediating status of self-access: When a relationship between two variables (e.g., drinking lots of beer and a hangover on the next morning) disappears after removing a third variable (e.g., drinking alcohol-free beer), this third variable must be the cause of the relationship.

If self-motivation is literally generated by the self-system, individuals with highly developed access to the self (high self-determination) should be able to motivate themselves better in everyday life and to tackle difficult goals successfully, without having to worry about being permanently discouraged. In fact, there is empirical evidence for the link between self-determination and self-motivation (Kuhl, 2001, p. 613; Lee, Sheldon, & Turban, 2003).

Dibbelt (1997) was able to show that the irresolute behavior of prospectively state-oriented individuals does not derive from a general lack of resolve but from their failure to muster behavior-facilitating energy from the self-system (see the study below).

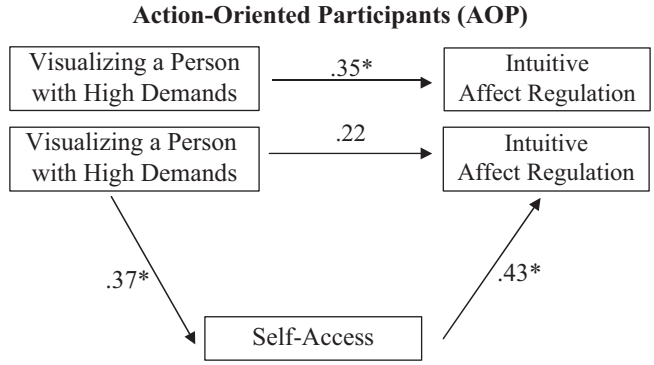

Fig. 13.1 In action-oriented individuals (AOP), the effect of visualizing a person with high demands on a measure of unconscious (intuitive) affect regulation is mediated by self-access, measured in terms of reaction times on self-referential judgments; this mediating effect is not observed in state-oriented individuals (Based on Koole & Jostmann, 2004)

Study

Self-Motivation in State and Action-Oriented Individuals

In Dibbelt's (1997) study, participants used the cursor keys to move a cursor from a starting point to a target point on a coordinate grid. As they approached the target point, a new target appeared on the screen. Participants were instructed to switch to the new target if it was closer than the original one and to keep aiming for the original target if the new one was further away. State-oriented participants did not show a general increase in reaction time when a change in direction was required. However, an increase in their reaction times was observed when the distances between the cursor and the two targets were equal (difference between the target distances is "zero" in Fig. 13.2). In this case, the participants themselves (i.e., their "selves") had to decide which target to aim for; there was no external cue indicating what to do (see Kuhl, 2001, p. 219). However, this increase in reaction time under the "self-determination condition" was observed only when an uncompleted intention was induced prior to the cursor task (e.g., "Could you remind me to save the data at the end of the experiment?"). These findings (Fig. 13.2) are fully congruent with the assumption that positive affect has to be generated before an intention can be implemented. The loading of "working memory" with a behavioral intention leads to inhibition of positive affect that state-oriented individuals are unable to counter-regulate (cf. Koole & Jostmann, 2004). This persevering inhibition has an impact on "self-willed" activities only (i.e., not externally controlled shifts of direction in the cursor task), because activities that need to be regulated by the self also require energy from the self (whose self-motivational ability is impaired in state-oriented individuals). In sum, the mediation analysis by Koole and Jostmann (2004) has shown that action-oriented individuals are able to reestablish positive affect when dealing with difficult "tasks" but that this ability disappears when differences in self-access are statistically removed.

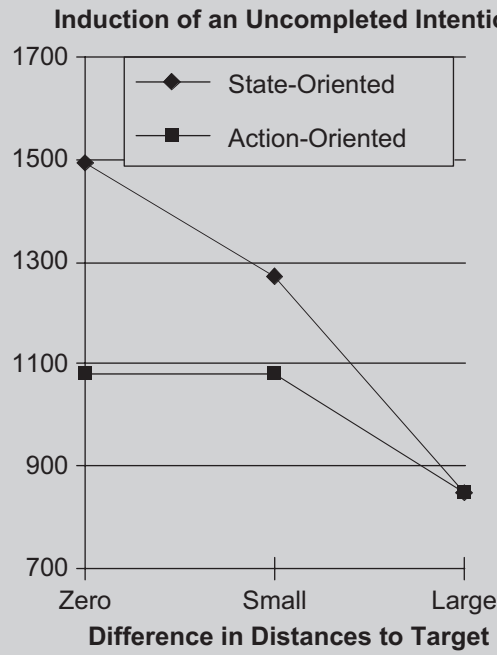

Fig. 13.2 Delayed reaction times in implementing a behavioral change in prospectively state-oriented individuals (SOP) after induction of an uncompleted intention (Based on Dibbelt, 1997)

13.4.2 Effects of Action and State Orientation

Like many other constructs in personality psychology, the constructs of action vs. state orientation have been validated by way of theoretically predicted and empirically obtained associations with numerous other variables. Research has confirmed that it was the right decision not to combine the two forms of action orientation (i.e., AOP and AOF) in a single scale, even though such an approach might seem quite reasonable given the significant correlations and the higher internal consistency of the combined scale (Kuhl, 1994a, 1994b). Today, the findings on this construct can be seen as an example of the feasibility and utility of a dissociation-oriented approach that foregoes the "simplifications" entailed when correlating variables that load on the same factor are aggregated and instead tests for any differences between the variables in terms of their relations to other variables (an approach that is often only possible within experimental designs).

The classical aggregation approach, which is usually based on factor analysis, neglects the dissociation-oriented exploration of relations with other variables whenever there is too strong a focus on the dichotomy between "convergent" and "discriminant" validity (Campbell & Fiske, 1959). The concept of convergent validity is based on the assumption that two correlating tests measure the same construct. However, two variables can be highly correlated without necessarily measuring the same underlying construct. This can easily be illustrated with the two variables body height and weight, which are highly correlated: Taller people are often heavier than smaller ones. Nonetheless, body height and weight refer to two distinct dimensions. This example illustrates a methodological challenge in psychology: How is it possible to ascertain whether two highly correlated variables measure two distinct dimensions? It can be assumed that the two correlating variables are related to different dimensions when they show diverging relationships to a third variable, under theoretically expected conditions.

The correlation between prospective and failure-related action orientation is usually significant, and in the range from $r = 0.30$ to 0.60 (Kuhl & Beckmann, 1994a), meaning that both variables sometimes load on the same factor (e.g., Kuhl & Goschke, 1994, p. 140). Nevertheless, a number of behavioral correlates are mostly replicable for AOP. Prospectively state-oriented participants (SOP) are hesitant to switch to subjectively more attractive activities in experimental situations (manifest alienation; Kuhl & Beckmann, 1994b) and seem to maintain uncompleted intentions in memory, even when there is no opportunity to implement them. This increased level of goal activation in state-oriented individuals can be inferred from their shorter reaction times on tasks that require words relating to previously formed intentions to be recognized (Goschke & Kuhl, 1993). Paradoxically, frequent thoughts about uncompleted intentions seem to inhibit implementation of those intentions:

- Prospective state orientation (SOP) correlates with delaying uncompleted intentions (procrastination: Beswick & Mann, 1994; Blunt & Pychyl, 1998; Fuhrmann & Kuhl, 1998; Kuhl & Fuhrmann, 1998; Kuhl & Goschke, 1994, p. 141).
- State-oriented individuals (SOP) take longer than action-oriented individuals to make a decision, especially when subjectively unimportant alternatives are available (Jungermann, Pfister & May, 1994; Stiensmeier-Pelster, 1994).
- They are less certain of their decisions (Stiensmeier-Pelster, 1994).
- They generate more complex decision-making contexts (Jungermann et al., 1994).
- Moreover, state-oriented individuals find it more difficult to reduce the number of options in the decision-making process (Niederberger, Engemann, & Radtke, 1987).

13.4.2.1 Effects of the Prospective Form of Action vs. State Orientation

One explanation for the nonimplementation of intended actions, which seems rather paradoxical given that uncompleted intentions are so strongly activated (Beswick & Mann, 1994; Blunt &

Pychyl, 1998; Goschke & Kuhl, 1994), is that the formulation of an intention (and its storage in "intention memory") actually inhibits executive functions in the first instance (see Sect. 13.5.2 on intuitive behavior control in PSI theory). Normally, this antagonism between intention formation and behavior control is useful in that it prevents premature implementation of actions. It makes sense for conscious intentions to be formulated whenever it is not yet possible or sensible to put them into practice (e.g., because difficulties have to be overcome or solutions found). When implementation of the intention is imminent (e.g., when the individual sees an opportunity to act), the antagonism between intention memory and behavior control must be overcome by generation of positive affect (Kuhl & Kazén, 1999).

- State-oriented individuals (SOP) find it much more difficult than action-oriented individuals to achieve this volitional facilitation (through self-motivation) (Beckmann & Kuhl, 1984; Koole & Jostmann, 2004). The finding that the interaction between frontal cortex and nucleus accumbens is inhibited in state-oriented individuals provides neurobiological evidence for this assumption (Herrmann, Baur, Brandstätter, Hänggi & Jäncke, 2014). This explains the paradox that state-oriented individuals put fewer of their implementations into practice (Kazén, Kaschel & Kuhl, 2008), even though (or rather: because) their uncompleted intentions are more strongly activated in intention memory (Goschke & Kuhl, 1993).

In fact, the study by Dibbelt (1997) outlined above demonstrates that state-oriented individuals only have difficulties implementing their intentions when they are required to load intention memory and the actions have to be initiated by the self, without external triggers. These findings suggest that impaired implementation of one's "own" intentions, i.e., intentions formed by the self-system (volitional inhibition), heightens sensitivity to external influences on one's behavior. Indeed, there are strong connections between the tendency to submit to the expectations of others (tendency to introjection and external control) and SOP (Kuhl & Fuhrmann, 1998).

According to the theoretical considerations outlined here, these phenomena should be more closely associated with the regulation of positive than of negative affect. Both the aggregation-based factor-analytic approach and the classic confounding of positive and negative affect as opposite poles of a common bipolar dimension (Russel & Carroll, 1999; Wundt, 1896) would lead us to expect that all of the findings are replicable with variables associated with negative affect (e.g., SOF). In the experiments cited, however, the findings of relationships with variables such as goal activation, procrastination, and overly complex and irresolute decision-making processes were not replicated for the failure-related form of state orientation (SOF).

13.4.2.2 Effects of the Failure-Related Form of Action vs. State Orientation

The behavioral correlates of the ruminative SOF differ from those identified above. Individuals characterized by SOF tend to engage in uncontrollable rumination that is at odds with their intentions (i.e., irrelevant to the task at hand; Kuhl & Baumann, 2000), to show higher inconsistency when judging their own preferences, and indifferent reaction times when deciding between alternatives of differing attractiveness (latent alienation: Guevara, 1994; Kuhl & Beckmann, 1994b). Moreover, as shown in Fig. 13.3, state-oriented individuals of the ruminative type often confuse their own wishes with those of others, particularly in the context of negative mood and unpleasant activities (self-infiltration: Kuhl & Kazén, 1994; in Fig. 13.3, "self-infiltration" is reflected in the number of false self-ascriptions of tasks imposed by another person minus the number of self-ascriptions in a baseline condition, i.e., on activities that were neither selected by the participant nor imposed by another person; see also the following study).

Here again, contrary to what the aggregation approach or a one-dimensional theory of positive and negative emotions would lead us to expect, the findings on the validity correlates of SOF

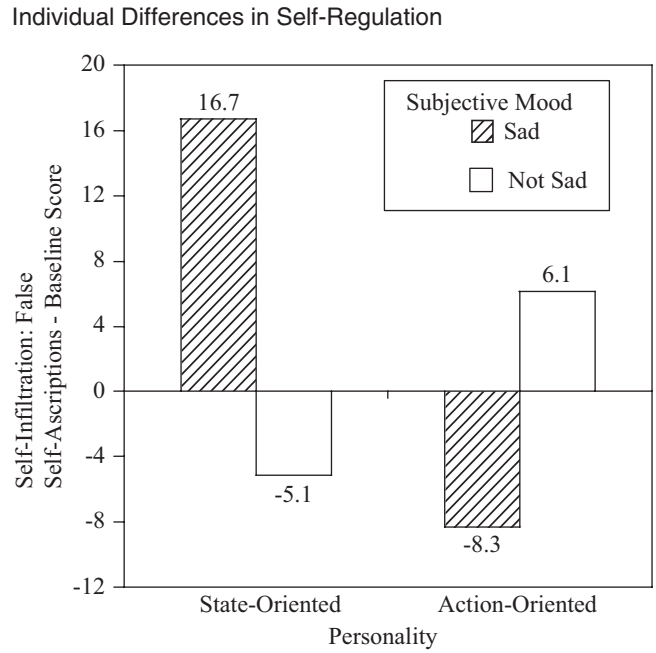

Fig. 13.3 Findings on self-infiltration: In the presence of sad mood, individuals characterized by failure-related state orientation (SOF) confuse their own wishes with those of others (Baumann & Kuhl, 2003)

could not be replicated for prospective state orientation in the studies cited. Again, the theoretical challenge was to explain the pattern of results obtained in terms of a simple functional mechanism. Why is it that uncontrollable rumination and self-ascription of others' wishes (self-infiltration) occur in the same people (those characterized by failure-related state orientation) under the same conditions? Is there a common mechanism behind rumination, self-infiltration, and alienation (e.g., inconsistent judgment of one's preferences)?

Study

Operationalization of the Self-Infiltration Effect

Self-infiltration is operationalized in terms of false self-ascriptions of other people's instructions or recommendations. In a simulation of a working day in an office, participants are invited to play the role of an office worker and to select activities they are willing to perform at the end of the experiment. The experimenter, who plays the part of their boss, then assigns a number of activities. Later on, an unexpected memory test is administered, and participants are instructed to classify each activity according to whether it was self-selected or not (i.e., assigned by the experimenter or not chosen at all). Findings show that state-oriented individuals (SOF) often erroneously recall tasks assigned by the experimenter as being self-selected. These individuals are evidently not always consciously aware of this form of internalized external control (misinformed introjection): The conscious self-concept (i.e., the ego) seems to be infiltrated by the wishes and expectations of others. State-oriented self-infiltration is most likely to occur in association with negative affect (Fig. 13.3); e.g., when the activities to be performed are unattractive or when negative mood is induced (Baumann & Kuhl, 2003; Kazén, Baumann, & Kuhl, 2003). These studies have also produced findings indicating that the rumination on unwanted (i.e., task-irrelevant) matters that is characteristic of state orientation is significantly correlated with self-infiltration.

Interestingly, these correlations can be explained by one common mechanism: The behavior observed in those state-oriented individuals with a propensity to rumination can be explained by inhibited self-access in the presence of negative affect. Uncontrollable rumination occurs when self-access is inhibited because, without this access, the system literally does not know what it wants. Without at least an implicitly activated representation of what is wanted (e.g., of activities appropriate to the task at hand or the current self-representation), it is impossible to identify unwanted thoughts and feelings, let alone to filter them out and neutralize them. Inhibited self-access also explains why these individuals confuse their own wishes with those of others (self-infiltration) and why they show inconsistencies when asked to state their preferences (alienation): Without self-access, one cannot decide whether a wish or a goal has been generated by the self (i.e., is self-determined) nor can one produce consistent judgments of one's own preferences on consecutive occasions. Without self-access, it is difficult to evaluate whether or not some goal or action is self-chosen. Self-access is also necessary to be able to feel consistent preferences at different points in time.

13.4.2.3 Neurobiological Foundations of the Relationship Between Self-Perception and Regulation of Affect

The right hemisphere (especially its prefrontal area):

- Facilitates self-representations, as measured by implicitly self-referential questions ("Does the following word describe you?"; Craik et al., 1999; Molnar-Szakacs, Uddin & Iacobini, 2005) or the recognition of one's own face (Keenan et al., 2001) or endorsement of self-descriptive words (Kircher et al., 2002)

- Supports withdrawal-oriented reactions of the "autonomic" nervous system (Harmon-Jones & Gable, 2017), which are considerably weaker when emotional information is processed in the left hemisphere, (Dawson & Schell, 1982; Wheeler et al. 1997; Wittling, 1990)

- Is directly involved in the downregulation of negative affect (the right hemisphere is activated more strongly than the left hemisphere when study participants successfully downregulate negative affect; Levesque et al., 2003)

  – Taking all these functions together (Kuhl et al., 2015), we can now explain from a functional design perspective why state orientation (SOF) increases the risk of psychological symptoms (Baumann et al. 2005; Hautzinger, 1994; Kuhl, Kazén & Koole, 2006), whereas failure-related action orientation not only protects against stress-induced symptoms but helps to maintain occupational performance (Diefendorff et al., 2000; Kuhl et al., 2006).

Figure 13.4 reports findings from a mediation analysis carried out in a large sample of patients with various psychological symptoms (e.g., depression, anxiety, eating disorders). The significant protection (reflected in a negative regression coefficient) that the interaction between failure-related action orientation and everyday stress (AOF × stress) afforded against aggravation of symptoms (−0.31*) decreased significantly (to −0.23) when motive discrepancies were included in the regression model. In other words, AOF prevents aggravation of symptoms by suspending the effects of motive discrepancies (e.g., the pursuit of introjects or consciously represented achievement goals that are not supported by a corresponding motive and associated needs). AOP did not have this kind of protective function. It did, however, help to predict overall well-being (in contrast to AOF).

Other studies show that the stress-resistant self-access of action-oriented individuals can be operationalized by an objective index called autonoetic interference. In self-infiltration experiments, action-oriented participants show increased reaction times when presented with a list of the unattractive activities they chose themselves (e.g., when they were induced to choose among unattractive activities; Kazén et al. 2003). SOP fail to notice the contradiction between these two incompatible pieces of information from the self-system (i.e., it is an unattractive activity and that they chose it themselves).

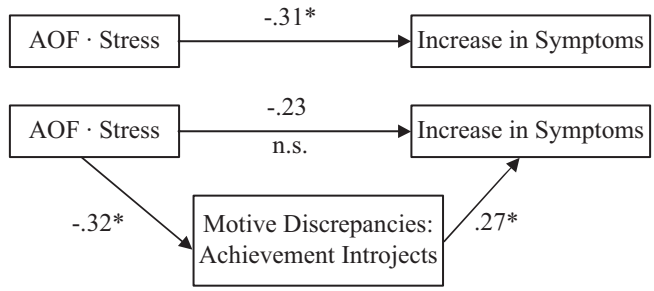

Fig. 13.4 Action orientation after failure protects patients with high levels of everyday stress (AOF × stress) against aggravation of symptoms (increase in symptoms from first to second point of measurement). Motive discrepancies mediate the relationship between AOF × stress and aggravation of symptoms (Based on Baumann et al. 2005)

Because state-oriented individuals are unable to downregulate negative affect, access to the self is inhibited, which explains why they do not show increased reaction times when recalling facts that should, in fact, give them pause for thought (i.e., the fact of having chosen an unattractive activity) when asked to state which of the activities on a list they chose themselves.

13.5 PSI Theory: Affect-Modulated Interactions of Personality Systems

Research findings on stress-induced regression – in terms of inhibition of volition (impaired implementation of intentions) and impaired self-access (e.g., neglect of motives in the formulation of goals) – draw attention to the influence of emotion on the efficiency of high-level ("intelligent") psychological systems:

- Excessive stress and the associated negative affect inhibit high-level holistic processing (self-access), whereas positive affect plays a key role in facilitating behavior.

However, it is difficult to integrate these findings into theories of motivation, which (like personality theories in general) tend not to offer elaborate architectures of psychological functions or processing systems.

Among classic theories of personality, the only exception is Jung's personality theory, which differentiates between two antagonistic modes of processing: analytical thinking and holistic feeling, on the one hand, and intuiting and sensing, on the other. Jung's cognitive typology differs from traditional affective typologies (Hippocrates, Galen), the basic concepts of which continue to play a dominant role in personality psychology and are now supported by the findings of factor analysis (Eysenck, 1990; McCrae & Costa, 1987). However, precisely because he intended to contrast his typology with affective typologies, Jung disregarded the modulatory influence of affect on styles of cognitive processing. Another reason why Jung's four cognitive functions cannot serve as basis for an architecture of the mind in motivation psychology is that – as he noted self-critically in his main typological work (Jung, 1936/1990) – he did not elaborate theoretical concepts of motivation or behavior. Similar limitations apply to modern, empirically grounded approaches that aim to revive holistic and analytical forms of information processing in personality psychology (Epstein, Pacini, Denes-Raj, & Heier, 1996; Strack & Deutsch, 2004).

PSI theory describes the functional characteristics of four psychological systems, which are of particular importance for action control (e.g., the functional characteristics of the intention memory). In contrast to a dualistic differentiation between analytical and holistic processing, PSI theory distinguishes two analytical and two holistic systems. Therefore, intuitive processing is not limited to impulsive behavior (Epstein et al., 1996; Strack & Deutsch, 2004): Apart from the

elementary form of intuition, which facilitates spontaneous behavior, a high-level form of intuition is postulated (i.e., the self), perhaps most important function of which is related to the development of integrated self-representations.

13.5.1 Psychological Macrosystems

The theory of Personality Systems Interactions (PSI theory) seeks to close the gap in motivation theory in terms of functional design. It is based on the assumption that the functions and systems postulated in the various approaches (e.g., Anderson, 1983; Jung, 1936) offered by cognitive or personality psychology (e.g., Jung's main functions of personality; short-term vs. long-term memory; executive functions such as the central, attention-based monitoring system: Norman & Shallice, 1986) do not suffice to answer the questions raised in the preceding paragraphs. Motivation psychology is concerned with the development of need- and behavior-relevant aspects of personal experience, which are expressed in motives and other components of an implicit self-system. It examines the degree to which concrete goals and actions correspond with these motives (self-congruence) and whether or not goals and intentions are implemented in behavior ("volitional facilitation").

- According to PSI theory, *volitional facilitation* is dependent on the interaction of an *intuitive behavior control* system (IBC) and a system that is responsible for maintaining difficult intentions (i.e., intentions that cannot or should not be implemented immediately) in memory so that they are not "forgotten" or displaced by competing action tendencies. The main differences between this *intention memory* (IM) and the construct of short-term or working memory in cognitive psychology (Baddeley, 1986) are that the IM stores action related rather than sensory information and has an inhibitory component that serves to prevent premature implementation of intended actions (Kuhl & Kazén, 1999).

It is possible to measure the activation of an intended action in IM: Words relating to uncompleted intentions are recognized faster than neutral words (Goschke & Kuhl, 1993). In recent years, various other methods have been developed to operationalize the persistent activation of intentions (Förster & Liberman, 2002; Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Shah, Friedman, & Kruglanski, 2002). Activation of intuitive behavior control can be experimentally induced by asking respondents to imagine where, when, and how they will implement their intentions (Armor & Taylor, 2003; Gollwitzer, 1999; Svenson, Oestergren, Merlo, & Rastam, 2002; Wieber, Thürmer & Gollwitzer, 2015). Findings show that the implementation of intentions is fostered by the induction of "implementation imagery." IBC dominates social interaction from birth (Meltzoff & Moore, 1994; Papoušek & Papoušek, 1987) into adulthood (Chartrand & Bargh, 1999).

Self-development (including development of motives) and the self-access on which it depends are assumed to be dependent on the interaction of an object recognition (OR) system and a high-level self-system. The self-system is so extensive that it requires a parallel memory system capable of integrating an enormous number of experiences (Kuhl et al., 2015). This extension memory (EM) is in turn so extensive that it can only be "felt" implicitly and is not fully accessible to conscious awareness (and might thus be seen as approximating "feeling" in Jung's typology). With its parallel network structure at a high level of integration, extension memory is suitable for representing persons, probably the most complex of the challenges facing the four macrosystems. One of these persons is the self, which is represented by numerous references to both internal processes (e.g., needs, feelings, values, identity), and other people (Andersen & Chen, 2002).

The OR system supplies the input required for the development of EM and the motives and other self-aspects stored in it. The "objects" in question are not only items that can be perceived visually but all products of processing that can be extracted from their contexts as single units and

thus recognized and labeled in other contexts. Hence, feelings can be represented as objects, if they are disconnected from the eliciting context and the many subtle cognitive and emotional overtones associated with it.

Definition
Emotions are defined as implicit representations that integrate a large number of both affective and cognitive contents (Ortony, Clore & Collins, 1988), including the relevant contextual information, and that are typically processed at the level of extension memory. An emotion can thus be seen as the experience-centered analogue of a motive, with behavior-relevant representations being more elaborated in the latter.

13.5.2 The First Modulation Assumption: Volitional Facilitation

Affects are subcognitive components of emotions. In neurobiological terms, they are generated on a subcortical level, and may be – but are not necessarily – linked to cognitive elaborations (LeDoux, 1995). In other words, we need to get used to applying terms like "affect" even when the person concerned is unaware of it: Like emotions affects are not always consciously accessible (Quirin et al., 2009). The latter are generated by changes in the discrepancy between actual and desired states on the level of needs (McClelland et al., 1953), which, as defined at the beginning of the chapter, are subcognitive and subaffective detectors of such discrepancies. To date, however, psychological literature has largely overlooked this important connection between affects and their motivational basis. It implies that each affect is directly or indirectly driven by a "vicissitude," i.e., a need episode with a positive or a negative outcome. Analogous ideas on the origins of affect have been proposed for attainment of vs. disengagement from personal goals: Coming closer to achieve a goal generates positive affect, whereas thwarted attempts to reach a goal generate negative affect (Carver, Lawrence, & Scheier, 1996; Martin & Tesser, 1996). This approach needs to be expanded from a motivational perspective because it does not incorporate subcognitive sources of affects. The term *goal* does not describe subcognitive needs but cognitive representations of aspired situations or objects.

The goal- and need-driven basis of affects offers a plausible explanation for the role they are attributed in PSI theory: Affects establish that configuration of psychological systems that is most conducive to satisfying a current need or to implementing the respective motive or goal.

Thus, the ability to tolerate phases of inhibited positive affect [A(+)], which necessarily occur in the context of difficult tasks, is postulated to be an integral component of the achievement motive. This "frustration tolerance" can be traced back to the conditions under which the achievement motive develops, as outlined above. In a parenting climate supportive of the child's independence, parents do not always intervene when the child runs into difficulties or experiences frustration [A(+)]. Instead, they allow inhibited positive affect to occur, though not to an excessive degree (Heinz Heckhausen's principle of motivational fit).

- The first modulation assumption concerns the functional effects of frustration:
  - The inhibition of positive affect activates intention memory, including its inhibitory component (inhibition of IBC).
  - Release of this inhibition – e.g., when a problem is solved or when an individual is given encouragement or motivates himself or herself – reestablishes the connection between intention memory (IM) and intuitive behavior control (IBC). As a result, IBC "learns" which behavioral routines are "wanted" at the level of IM (Fig. 13.5).

Positive affect therefore not only has the function of facilitating intuitive behavior, it can also facilitate volition in the presence of higher-level will. In functional design terms, this occurs when intention memory is loaded with a behavioral intention. The volitional facilitation that occurs in the presence of positive affect permits intuitive behavior control (IBC) to implement conscious intentions more rapidly and accurately,

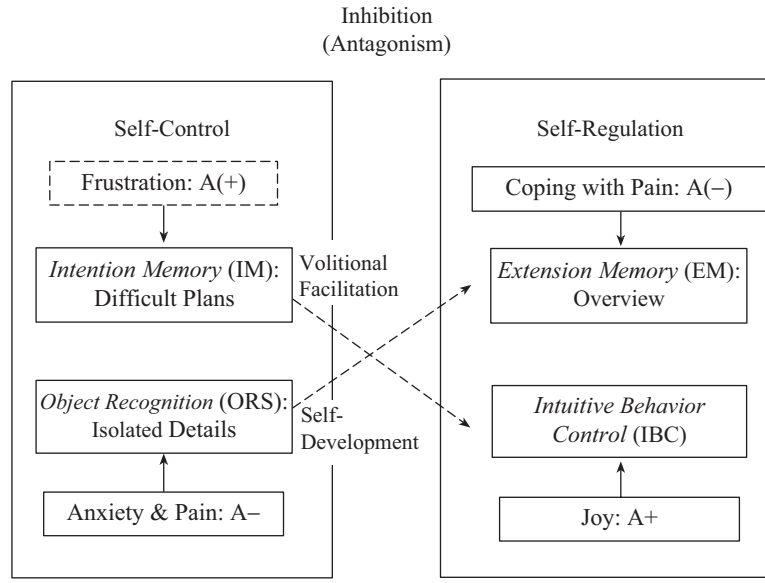

Fig. 13.5 Schematic illustration of PSI Theory (Kuhl, 2001; see text for details)

Study

Volitional Facilitation Effect

Experiments demonstrating that Stroop interference is reduced or completely eliminated when participants are shown positive words such as "success" or "good luck" before presentation of the Stroop stimulus (i.e., color name words printed in nonmatching colors; Kuhl & Kazén, 1999) support the volitional facilitation assumption. According to the first modulation assumption, when intention memory is loaded with the difficult part of the task ("name the color instead of reading the color word"), the positive affect triggered by positive primes serves to connect the task with intuitive behavior control, such that the delay in reaction times typically observed for incongruent color words no longer occurs. In the experiment described above, we tried to increase the probability of participants activating the instruction in IM prior to each trial (not necessarily consciously) by having them work on two Stroop tasks per trial, each introduced by a positive, a negative, or a neutral word. We assumed that maintenance of an intention in IM becomes necessary whenever a sequence of more than one action step is to be performed (the next step has to be kept active in memory in order for the sequence to be performed smoothly).

These results cannot be explained by the impulsive form of the holistic processing (i.e., intuitive action control): If positive primes had facilitated impulsive action control (i.e., the dominant behavioral tendency in the intuitive behavior system), then Stroop interference should have been increased rather than reduced. The first modulation assumption provides an explanation for the paradox that performance on the easy task (i.e., naming the color in which a row of Xs is printed) did not improve in trials with a positive prime but that the difficult task (i.e., naming the incongruent ink color in which a color name word was printed, e.g., responding with "blue" when the word "red" was printed in blue ink) was performed faster when a positive word was presented before the Stroop stimulus. When intention memory is loaded, positive affect does not facilitate simple ("dominant") behavioral routines; rather, it facilitates responses that are difficult but required and intended.

because the release of volitional inhibition reestablishes the connection between IBC and intention memory. The IBC can thus "learn" which of the behavioral routines stored within it correspond with the current intention.

From a neurobiological perspective (Kuhl, 2001, p. 681ff.), this connection is assumed to be established during affective change from A(+) to A+, when activation of the left hemisphere (IM) caused by A(+) gives way to activation of the right hemisphere (EM) caused by A+. Communication between hemispheres is presumably impaired as long as one of the two affective states dominates. Affective change is of critical importance for the interaction between psychological systems, because it is only during affective change that there is a short "window of opportunity," during which both hemispheres are activated to roughly the same degree and are thus able to exchange the information activated to the best possible effect.

Further studies have confirmed that the effect of volitional facilitation is particularly typical of achievement motivation. A reduction in Stroop interference was found after priming with positive achievement-related words (e.g., "success" or "increase in performance"), but not after priming with words alluding to positive affiliative experiences (e.g., "first love" or "being happy together"; Kazén & Kuhl, 2005). This finding confirms the assumption that affects, together with the currently dominant need, establish the configuration of psychological systems that is most conducive to satisfying that need. In the case of achievement behavior, this systems configuration is characterized by a shift from IM to intuitive behavior control. When achievement motivation is aroused, activation of intention memory helps to maintain self-commitment to a difficult task and perseverance until it is completed. Indeed, experimental studies have shown that activation of goal-related information (e.g., by means of experimentally induced priming) can increase perseverance (Shah & Kruglanski, 2003). Volitional facilitation by means of affective change is also crucial, however. In its absence, difficult achievement goals would be maintained for a long time, but concrete efforts to achieve them would be rare ("passive goal fixation").

Beyond the microanalytical level and the Stroop experiments outlined, experimental evidence for volitional facilitation has also been found on the more everyday macroanalytical level. In numerous experiments, Oettingen and colleagues confirmed that successive contrasting of positive aspects of the desired future (goal attainment) and negative aspects of present reality (difficulties still to be overcome) facilitated implementation of realistic intentions, whereas a focus on just one of these aspects reduced efficiency of implementation (Oettingen, 1997; Oettingen, Pak, & Schnetter, 2001).

Higgins's (1987) findings, according to which inhibited positive affect (e.g., "dejected emotions") is closely associated with a focus on unattained, partly unrealistic ideals – i.e., with discrepancies between the "ideal self" and the "actual self" – can also be explained on the basis of the first modulation assumption. Unrealistic ideals may lead to intention memory being constantly loaded with intentions, without the steps needed to realize those ideals ever being taken. According to the first modulation assumption, fixation on dejected emotions or other forms of the inhibition of positive affect impedes the implementation of the corresponding behavioral intentions (through activation of IBC).

13.5.3 The Second Modulation Assumption: Self-Access and Self-Development

PSI theory also assumes the interaction between the systems relevant to self-development to be modulated by shifts between contrasting affective states. As mentioned above, self-development presupposes that individual new experiences are constantly integrated into the growing network of personal experiences (i.e., into the self-system as part of extension memory). According to the second modulation assumption, this process is facilitated by the shift between negative affect (A−), which occurs after painful experiences or experiences that do not fit existing schemata (of EM), and the subsequent downregulation of this negative affect [A(−)] (Fig. 13.5). This shift forms the basis of self-development: It occurs after painful experiences or experiences that cannot easily

be assimilated by existing schemas (of EM) are at first tolerated (instead of repressed) and then slowly integrated into the self, a process that is called self-confrontational coping.

- The second modulation assumption states that:
  - Negative affect intensifies isolated experiences that are abstracted from their contexts (i.e., "objects" from the OR).
  - Negative affect inhibits access to integrated self-representations, motives, and other contents of extension memory.
  - Downregulation of negative affect (that involves self-confrontation) reestablishes access to extension memory.

According to the neurobiological model describing this process (Kuhl et al., 2015) affective change opens a time window during which both hemispheres are activated to approximately the same medium degree and are thus able to exchange information to the best possible effect (e.g., to integrate left-hemispheric isolated experiences or "objects" into right-hemispheric extended self-referential networks: self-development).

For self-development to occur, it is thus necessary to overcome the antagonism between the perception and acknowledgement of individual experiences (i.e., "objects" that are extracted from their contexts) and the extension memory, which unites a huge number of these experiences within integrated "experiential landscapes." Figure 13.5 illustrates the modulating influences of different affects on systems activation and shows that it is possible to overcome the antagonism between the systems by means of shifts in affect ("emotional dialectic"). For example, rather than a painful experience being suppressed, it is first perceived as an isolated experience ("object") and later integrated into the self (part of the extension memory), a process that requires tolerance of pain (A−) followed by the ability to cope with that pain [A(−)]. This integration increases the chances of three distinct processes: the compensation of painful or fear-inducing experiences due to contact with new experiences (either personal or from others); the detection of new solutions and behavioral possibilities in large networks of experiences; and coming to terms with the pain, thanks to meaningful connections with personal (or collective) values, needs, or other parts of self.

Uncontrollable rumination (Kuhl, 1981; Martin & Tesser, 1989; Nolen-Hoeksema, Parker, & Larsen, 1994) can be attributed to the inhibition of self-access owing to persevering negative affect. Without self-access (e.g., in the presence of excessive negative affect that cannot be downregulated), the system no longer "knows" which cognitions are wanted at a certain time and which are not. Moreover, it is not possible to apply high-level filters that admit only wanted thoughts and feelings. A possible neurobiological basis for these relationships was discussed above: the sensitivity of the hippocampus to stress (Sect. 13.3.2). Animal experiments have shown that inhibition of the hippocampus in the presence of excessive stress inhibits the connectivity between high-level processes (e.g., in humans' implicit representations in EM, such as "I want to concentrate on the task") and low-level processes, such as (inhibition of) distracting thoughts or feelings. On a rudimentary level, these functions of the hippocampus can also be found in infrahuman mammals (Schmajuk & Buhusi, 1997).

The phenomenon of self-infiltration can also be attributed to the inhibition of self-access under conditions of persevering negative affect.

Definition
Self-infiltration means confusing one's own wishes and choices with those of others.

As mentioned before, persevering negative affect leads people to recall tasks that were assigned or recommended by others as being self-selected (Baumann & Kuhl, 2003; Kazén et al. 2003; Kuhl & Kazén, 1994). What is more, functions of extension memory that do not relate to the implicit self (but to extension memory itself) are also adversely affected by negative affect. Performance on coherence tasks ("Do the three words goat, pass, and green have anything in common?") is a good example of this phenomenon – the correct answer (in this example, yes) can often be given intuitively even without finding an explicit reason (here, mountain) (Baumann & Kuhl, 2002; Bolte, Goschke, & Kuhl, 2003).

Intuitive coherence judgments are assumed to be a function of extension memory because they require access to remote semantic networks, such that connections between distantly associated words can be "sensed" implicitly if they cannot be explicated directly. Summation priming, which seems to be facilitated more by right than by left-hemispheric processes (Beeman et al., 1994), represents a similar operationalization of intuitive inferences requiring access to wide semantic networks.

13.6 Development: Determinants of Action and State Orientation

Is it possible to overcome adverse effects of state orientation? Can the stress-induced inhibition of self-perception and the related self-regulatory functions be surmounted? Given the significance of the ability to bring about changes in affective states by means of self-regulation, thus activating the psychological system required at a given point in time, potential points of intervention for the training or therapy of affect regulation must be of considerable interest. This raises the question as to the conditions under which the ability to self-regulate affect develops. In the context of PSI theory, this developmental process is described by the systems conditioning model. Its premise is a simple one. If the self is no longer regarded as a phenomenological metaphor, but as a real system with a functional profile that is open to experimental investigation, then "self"-regulation of affect means that the self-system has to establish connections with the systems that regulate affects. In neurobiological terms, these might be connections between subcortical affect-generating systems (LeDoux, 1995) and the right prefrontal cortex, which is activated when participants make implicit self-referential judgments (Craik et al., 1999; Keenan et al., 2001) or try to regulate emotions (Beauregard, Levesque, & Bourgouin, 2001).

How does the brain learn to establish new connections? The best known way is classical conditioning: two stimuli (e.g., the ringing of a bell and the food that triggered salivation in Pavlov's dogs) become linked when they occur sequentially within a certain space of time (contiguity or contingence). Once this connection – for which there has long been neurobiological evidence (LeDoux, 1995; Schmajuk & Buhusi, 1997) – has been established, the conditioned stimulus (e.g., the ringing of the bell) triggers a conditioned response (here, the secretion of saliva).

- According to the systems conditioning model, the reinforcement of connections between systems is analogous to classical conditioning. For the self-system to be connected to affect-regulating processes, such that the individual is later able to regulate emotions "himself or herself" (i.e., without external help), activation of the self-system must coincide with activation of affect-regulating processes sufficiently frequently in the course of development.

Of course, until affect regulation can be achieved by means of self-regulation, external support is required. For example, a child experiencing negative affect relies on the reassurance or consolation of an attachment figure, and a child experiencing loss of positive affect (e.g., when faced with a difficult task or an experience of loss) needs encouragement. But how can an interaction partner (e.g., father, mother, teacher, partner, therapist) know when a person's self-system is activated and provide the necessary reassurance or encouragement within the appropriate time frame? According to the systems conditioning model, the self is active whenever needs or related feelings are expressed (indeed, one of the primary functions of the self-system is to express feelings and needs). Thus, the attachment figure needs only to listen out for such references. This attentional focus on personal information is called responsiveness or "mind-mindedness" in developmental psychology (Meins, 1999) and "mirroring" in the neo-analytical literature (Kohut, 1979). The more differentiated the self becomes throughout its development, the more "exacting" it will be with respect to the feedback expected: at later stages in development, the individual needs to feel understood on a personal level for himself or herself to remain active. If it does not succeed in communicating self-relevant information – i.e., if the person does not feel

"understood" – the self-system becomes inhibited (in accordance with a general principle stating that systems that are not utilized are deactivated or disintegrate). An inhibited self-system cannot be connected to affect-regulating processes, even if the attachment figure succeeds in regulating the feelings of his or her interaction partner.

This might explain why even a very happy childhood by no means guarantees that a child will acquire affect-regulatory autonomy. Children exposed to frequent positive affect (e.g., because their mother is often in a good mood) are more likely to feel happy on a frequent basis (i.e., to find it easier to "enter" positive affective states). According to the systems conditioning model, however, the ability to self-regulate affect will not develop if the restoration of positive affect is not expressed in response to the child's momentary self-expressions or in an understanding personal context. In adulthood, these individuals may always be reliant on others to provide them with encouragement or reassurance in difficult situations. They tend to have "symbiotic relationships"; i.e., they find it hard to accept that those closest to them have feelings "of their own" and are not always prepared to regulate their feelings (Gunsch, 1996; Schülein, 1989).

Empirical Findings on the Systems Conditioning Model

Findings from developmental psychology confirm the assumptions of the systems conditioning model. Even in the first months of a child's life, temporal contiguity of the mother's response to the child's simple self-expressions (e.g., establishing eye contact, smiling, or expressing irritation) is a significant predictor of the child's emotional adaptability later in life. Studies show that children whose mothers do not respond to their child's attempts to establish eye contact within a few hundred ms (i.e., who show low responsiveness) during a 30-min observation period develop significantly more symptoms (bed wetting, physical complaints, aggressiveness, and other adaptive difficulties at preschool age) than children whose mothers respond promptly and appropriately to their child's self-expressions (Keller & Gauda, 1987; Keller, 1997). Like the concept of responsiveness, the concept of emotional availability extends beyond the frequency of positive or negative emotional episodes in parent-child interactions. Availability increases the likelihood that parents will respond promptly and appropriately to their child's self-expressions. An empirical study showed that the emotional availability of parents (especially the mother) covaries with the child's affect-regulatory competencies at age 12 months (Volling, McElwain, Notaro, & Herrera, 2002). It further provided direct confirmation of the chain of cause and effect postulated in the systems conditioning model: from parental regulation of affect contingent on the child's self-expressions ("emotional availability") via the development of self-regulatory competencies to the resulting ability to adapt flexibly to changing situations. One feature of self-regulatory competence ("effortful attention") proved to be a mediator for the relationship between the mother's emotional availability and the child's adaptability to new situations 4 months later. According to the systems conditioning view, the emotional availability of the mother during the first months of life has such a good influence on the future emotional adaptability because the mother's behavior stimulates her child's development of affect-regulatory competencies. Further longitudinal studies show that the development of self-regulation from the quality of early relationships does not only have an impact on the regulation of affect but also on executive functions (e.g., measured with age-appropriate tasks that are analogous to the Stroop test) and even the internalization of behavioral rules in 3-year-olds (Kochanska & Kim, 2014).

- Emotional availability and responsiveness, operationalized by the construct of "mindfulness," have positive effects on the ability to cope with painful events in adult life as well (Brown & Ryan, 2003). By contrast, repeated confrontation with failure impairs emotional regulation, especially in state-oriented individuals, and can even increase the risk for depressive symptoms (Kuhl & Helle, 1986; Hörhold & Walschburger, 1997).

Studies using imaging techniques show that early mother-child interactions activate the same right-hemispheric system (primarily the right

orbitofrontal cortex) that in adulthood provides a (largely unconscious) sense of somatic and emotional self (Devinsky, 2000) and that is activated when people make self-referential judgments (Keenan et al., 2001). Right-hemispheric activation is observed when infants are shown a woman's face (Tzourio-Mazoyer et al., 2002) or express emotions, e.g., a social smile (Holowka & Petitto, 2002); the mother shows right-hemispheric activation when she hears a crying baby (Lorberbaum et al., 2002; Schore, 2003). Results of a twin study (Kästele, 1988) suggest that self-regulatory competencies, measured in terms of action vs. state orientation, are significantly more dependent on experience and less genetically determined than are personality dimensions such as extraversion and neuroticism, which pertain more to the primary emotional reaction than to affect-regulatory competencies.

The systems conditioning model explains why the quality of relationships is so important in child-rearing and therapy, even in therapeutic approaches based on learning theory (e.g., behavior therapy), in which relationships play less of a role than in Gestalt therapy, for example. Even if we were to limit the theoretical scope to classical conditioning, it is vital to recognize the role of relationships: the conditioning processes necessary for affect regulation will only take effect if sufficiently positive personal relationships are experienced at some phase of development (at least if the relationship is "personal," which implies some mutual understanding and communication between the two persons involved). An inhibited self cannot be connected by means of pedagogical or therapeutic measures, however effective these may be. And it is only when this connection is established that the effects of such measures can, at some point, be initiated independently (i.e., self-regulated).

Summary

This chapter focused on individual differences in basic motivational and self-regulatory competencies. Motives can be defined as capacities to regulate the satisfaction of one's needs by drawing on an increasingly intelligent network of experiences acquired across the lifespan. This extended network is based more on need-relevant, pictorial than on conceptual imaginations. It organizes all life experiences in terms of their relevance to the satisfaction of needs but also with reference to other aspects of the *self-system* that are not always directly related to need satisfaction (e.g., individual and cultural values, social roles, self-image, and identity). Intelligent need satisfaction adapts to constantly changing contexts (which the PSI theory explains with the functionality of parallel networks) and overcomes internal and external conflicts by reconciling seemingly contradictory needs (e.g., achievement at work and affiliation in private relationships) and resolving conflicts with the social environment (e.g., with the needs or cultural expectations of others) in a creative way.

The modulation assumptions of PSI theory and the research they are based upon have shown that affect-regulatory competencies are required for the process of self-development on which motivational intelligence depends. It is only when people have experienced a minimum of closeness and affection in their relationships that they seem able to develop a positive basic mood, which in turn enables them to tolerate, rather than repress, painful experiences. Only those who are able to tolerate negative affect have the capacity to learn from painful experiences. And those who also learn to exit painful experiences in a self-regulated manner (downregulation of negative affect) are, after allowing negative experiences, able to activate the extended network of experiences (i.e., extension memory with its self-aspects and motives) into which new experiences must be integrated in order to develop a coherent self. This type of self-development is based on the ("accommodating") revision of existing self-structures when they get in contact with individual experiences that have not yet been integrated. It is this integration of otherwise isolated experiences, and the facility to spontaneously access and process all relevant information in new situations requiring quick decisions rather than prolonged deliberation, that enables people to function as "mature personalities."

Review Questions

1. *Why does taking individual differences into account make it easier to formulate general laws?*

   The neglect of individual differences can be seen as one of the reasons for the many inconsistent effects found in experimental psychology. If, by way of comparison, scholars had attempted to formulate "general" laws of falling bodies without taking individual differences into account, they would never have arrived at the established laws, the general validity of which resides in the very fact that individual differences in object mass are included in the equation.

2. *What is the difference between needs and motives?*

   Needs are subcognitive and subaffective discrepancies between actual and desired states that can trigger (relatively inflexible) behavior, even if they are not cognitively represented or backed up by affect. Motives are largely unconscious cognitive-pictorial preconceptual representations that have been abstracted from need-relevant autobiographical experiences to generate implicit networks of behavioral options and expected outcomes and to facilitate context-sensitive, flexible, and creative behavior as a means to satisfy needs.

3. *Which systems configurations (of affects and cognitive functioning) are particularly adaptive for the achievement and affiliation motives?*

   Stable positive affect can be adaptive for the affiliation motive (e.g., because it facilitates the intuitive regulation of behavior on which interpersonal relationships thrive), whereas affective *change* from inhibition to facilitation of positive affect (from "frustration tolerance" to self-motivation) is crucial for the achievement motive. The ability to tolerate a state of reduced positive affect makes it possible to endure difficulties rather than avoiding them (a process that is supported by the retention of difficult goals in intention memory). Once a solution has been found, the acting individual needs to be able to release inhibition of positive affect and to motivate him- or herself to engage in the appropriate behavior.

4. *Why can motives be seen as components of self-regulation?*

   Motives are need-relevant components of the implicit self-system, which involves emotional and somatosensory processes, serves to integrate information, and is characterized by parallel processing – and thus offers a basis for the monitoring and coordination of all cognitive and affective processes that regulate behavior such that it satisfies a wealth of personal needs, goals, values, and other self-defining characteristics.

5. *Why are motives measured by means of "narrative" methods?*

   Motives develop from an extensive web of autobiographical episodes, i.e., from personal "stories." The high level of cognitive integration characteristic of motives is best attained by asking respondents to generate stories of their own. Questionnaire measures assess conscious goals, which may well deviate from implicit needs and motives (e.g., achievement introjects that have not been integrated into the self and can trigger psychosomatic symptoms: Fig. 13.4).

6. *In what respects does the OMT differ from the TAT?*

   In contrast to the Thematic Apperception Test (TAT), the Operant Motive Test (OMT) does not require participants to

(continued)

relate the stories they generate in full. Instead, they are instructed to note down a few key points. Not only does this approach reduce the distortions that may occur when entire stories are written out, it also saves time, meaning that the number of picture cues shown (and hence the reliability of the test) can be increased. Moreover, the OMT coding system distinguishes four different forms of the approach motive in the domains of affiliation, achievement, and power motivation (with the passive-anxious avoidance form as a fifth variant). The four variants of approach motivation result from combining the type of affect that motivated the imagery reported (i.e., positive vs. negative) with the involvement or noninvolvement of the self (self-regulation vs. incentive-driven motivation; see Table 13.1).

7. *What explanation does the functional design approach offer for the observations that intrinsic motivation resides in the activity itself and is reduced by reward or external control?*

When behavior is driven primarily by incentives or instructions (i.e., "only" performed because of the reward or the instruction), the self is less involved in action control. This means that self-regulatory functions such as self-motivation, which help to upregulate enjoyment of an activity, even if it proves difficult or unpleasant, are lacking. Because self-motivation is largely unconscious, the impression is that enjoyment emanates from the activity itself, i.e., that motivation comes "intrinsically" from engaging in the activity ("flow").

8. *Which four modes of volition can be differentiated?*

The four modes of volition are:

Self-regulation, in which goals that correspond with numerous internal and external needs and values are formulated on the basis of an inner overview (of the self) and positive basic mood; because of their emotional integration with the self, these goals have motivational support.

Self-control, in which the conscious ego focuses on implementing goals despite competing tendencies/alternatives.

Volitional facilitation (vs. inhibition), which provides the energy needed to implement the current action intention, even in the face of difficulties (self-motivation or "prospective action orientation").

Self-facilitation (vs. self-inhibition), which maintains access to self-perception, even in painful or frightening situations, by means of nondefensive (i.e., self-confrontative) downregulation of negative affect (self-reassurance or "action orientation after failure").

9. *Which findings confirm the hypothesis that prospective action orientation maintains action-facilitating affect under stress and facilitates self (rather than other)-initiated behavior?*

Koole and Jostmann (2004) showed that prospectively action-oriented individuals (AOP) respond more quickly to positive stimuli than state-oriented individuals when exposed to demand and that this reaction is mediated by self-access (Fig. 13.1). Dibbelt (1997) showed that prospectively state-oriented individuals only show prolonged reaction times on tasks that require a change in approach after induction of an uncompleted intention (i.e., through loading of "working memory") when that change in approach is "self-willed" and not guided by an external cue (Fig. 13.2).

10. *Why does it not suffice to induce positive control beliefs ("You can do it!") in people who feel helpless or depressed?*

    Helplessness induced by loss of control on a training task leads to objective performance deficits on different kinds of tasks, even when the subjective loss of control is not generalized to the new task. People evidently display generalized performance deficits after experiencing loss of control because they are unable to cope with the negative affect and the rumination it triggers (Kuhl, 1981). Consequently, there is little point in providing depressive individuals with encouragement ("You can do it!") unless they are also helped to develop the objective abilities needed to regulate affect (see Question 15). Otherwise they will soon discover that encouragement was unwarranted because their functional deficits have not been acknowledged or removed.

11. *How is it possible to explain the paradox that ruminating on uncompleted intentions (i.e., activating working memory) actually inhibits their implementation?*

    Prospectively state-oriented individuals (SOP) are characterized by low levels of action-facilitating affect. This leads to activation of intention memory (Goschke & Kuhl, 1993), which is normally associated with action inhibition (e.g., for the purposes of problem solving) and can be overcome only by means of external encouragement (Kuhl & Kazén, 1999) or self-motivation (AOP) (first modulation assumption of PSI theory).

12. *Why is rumination often associated with the confusion of self-selected goals and goals imposed by others?*

    The negative affect associated with uncontrollable rumination inhibits self-access (second modulation assumption of PSI theory), to the effect that the individuals in question are no longer able to distinguish self-selected from other-imposed goals (Fig. 13.3).

13. *How does failure-related state orientation differ from anxiety or neuroticism and prospective action orientation from extraversion?*

    Extraversion (E) and anxiety or neuroticism (N) describe the primary emotional reaction (emotional sensitivity), i.e., a person's propensity to experience positive (E) or negative affect (N) in new situations. Action orientation does not describe how people enter negative affect (AOF) or the inhibition of positive (AOP) affect but how they exit these states.

14. *Why does emotional fixation inhibit goal implementation and self-development?*

    Goal implementation requires communication (interaction) between intention memory (IM) and intuitive behavior control (IBC) and thus a shift from the inhibition of positive affect to its release (by means of self-motivation or external encouragement). Self-development requires contact to be established (interaction) between the system responsible for admitting unexpected or painful isolated experiences (object recognition) and the network integrating all personal experiences (i.e., the self as part of EM), which helps people to cope with pain and anxiety (Fig. 13.5). Contact between the left-hemispheric object recognition system (OR) and right-hemispheric self-perception (EM) can only be established by downregulating negative affect (which enables people to deal with difficult experiences) and thus facilitating access to the self-system.

(continued)

15. *How can emotional fixation be overcome (and affect regulation learned)?*

People learn to regulate their own affects and emotions when the activation of the self coincides sufficiently frequently with the experience of affect being effectively counter-regulated by external encouragement or consolation (provided by parents, friends, spouses, teachers, therapists, etc.; "system conditioning"). The self (like the CS in classical conditioning) can only be linked with affect-regulatory processes (the CR), if the individual expresses his or her own feelings and feels understood by the other person (otherwise, the self is "turned off" and cannot be connected, no matter how effective the experiences of encouragement or reassurance may be).

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Intrinsic Motivation and Flow

14

Falko Rheinberg and Stefan Engeser

14.1 Introduction

Definition
Motivation can be defined as the "activating orientation of current life pursuits toward a positively evaluated goal state" (Rheinberg & Vollmeyer, 2018, p. 15).

The purpose of a definition of this kind is to describe the essential qualities of a term as succinctly as possible. Finer points have to be considered separately.

In the present case, at least two points need further elaboration:

1. The "positively evaluated goal state" may be to avoid or prevent undesired events. The qualities of avoidance motivation may differ from those of approach motivation (Chaps. 4, 5, 6, 7, 8, and 9).
2. The second point is rather more complicated and is the focus of the present chapter. When, as here, the definition of motivation focuses on a goal state, there is a risk of premature conclusions being drawn about where the incentives motivating behavior are located. It is easy to assume that the goal state has incentive value and that the pursuit of the goal-directed activity is purely instrumental to bringing about that goal state, i.e., that the appeal of an activity resides solely in its intended outcomes. This is the approach taken by scholars such as Heckhausen (1977) and Vroom (1964).

Unfortunately, this rather rash conclusion sometimes holds and sometimes does not. It is beyond question that people often engage in activities simply because they want to achieve or modify a particular goal state. When winter approaches, for example, a home owner will go down to the basement and light the furnace (= activity) to ensure that the home is comfortably warm (= desired goal state). If the basement is locked and the key is not where it is supposed to be, he or she will invest time and energy in looking for it. It would not occur to anybody to suggest that he or she simply enjoys going down to the basement or looking for mislaid keys. The incentive of the activity resides almost exclusively in the consequences of its intended outcome. The outcome of his or her endeavors is having lit the furnace; the consequence that

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provides an incentive for his activities is having a nice warm home.

If the incentive of anticipated consequences is high enough, people may even engage in activities that they experience as aversive. A student will finally get around to doing the pile of washing that has been building up all week because he or she wants to cook for friends; a friendly but timid student will muster the courage to complain to his or her noisy neighbor because he or she needs to get a good night's sleep for once.

These last two examples introduce a point that is central to the present chapter: some activities are unpleasant in and of themselves – their incentives are negative. Many people perceive the act of washing up mountains of dirty crockery in a grimy kitchen to be inherently unpleasant, even though the outcome and its foreseeable consequences are attractive. If their volitional competence is low, they will procrastinate until the consequences of their inaction are even more unpleasant than the activity itself. In the second example, the prospect of a power-related confrontation may be so unpleasant and distressing that the timid student puts up with the noise from the next room for months before he or she can finally work himself or herself up to approaching the neighbor about it.

- The performance of an activity may possess either positive or negative incentives. When incentives are positive, individuals may engage in an activity purely for the enjoyment of it.

A diary study showed that students who recorded the events of their day in 10-min intervals spent 46% of their waking time engaged in activities they enjoyed (see Table 10.3 in Rheinberg, 1989). Performing these activities becomes a "goal" in its own right. The word goal is placed in quotes here because it is typically used to describe a desired end state, something that is expected to occur after an action has been completed. Where pleasurable activities are concerned, however, people do not aspire to a specific end state; rather, they want the activity to go on for as long as possible, to occur as often as possible, and to be experienced as intensely as possible. Engaging in the activity is reward in itself.

This incentive structure clearly applies to biologically rewarding activities such as eating or sex, but it can also be demonstrated to apply to countless other activities. People may even enjoy activities known to have very detrimental consequences; this incentive structure is characteristic of behavior patterns such as heavy smoking or overeating.

Of course, the incentives of activities and their results may also share the same valence: an activity that is experienced as positive in its own right may produce desired results.

Example

For example, a highly affiliation-motivated student will enjoy striking up a relaxed and friendly conversation during a train journey and feel happy to have made new friends she can soon visit. Likewise, a power-motivated politician will enjoy the experience of making rousing election speeches and take pleasure in election to an office that secures him lasting influence, respect, and prestige.

Particularly in this kind of single-valence situation, matters are complicated by the fact that people are not always aware of the motives driving their actions. It is easy to forget that a goal-oriented activity is attractive and enjoyable in its own right, particularly when the goal seems very appealing. When this kind of incentive structure applies, people do not tend to celebrate and enjoy the goal state for long after attaining a goal, but soon find themselves on the lookout for a new and worthwhile goal requiring the same form of goal-oriented activity.

A further (unnecessary) complication is caused by a lack of terminological precision. Scientists have long been aware of the issues addressed here. Woodworth (1918) was the first to use the term "intrinsic" to describe incentives residing in the

performance of an activity and to distinguish "intrinsic" from "extrinsic" forms of motivation (Woodworth, 1918, p. 67ff.). As is often the case, however, these early insights went unheeded for some time, and when the terms did reemerge in later research, it was with different specifications. Motivational psychologists are thus in the unfortunate position of having to work with a pair of terms whose definitions are blurred and inconsistent.

The issues under investigation are complex enough without this added difficulty. The following sections discuss various definitions of "intrinsic motivation" (Sect. 14.2), explore the qualities and effects of different incentive structures (Sects. 14.3 and 14.4), and finally examine a specific component of activity-related motivation, namely, the flow experience, in more detail (Sect. 14.5).

Summary

Even when activities are clearly goal directed, their incentives may reside in their performance as well as in their aspired outcomes and consequences. The incentives of activities and their results may have the same valence (e.g., when attractive activities produce desired results) or different valences (when aversive activities produce desired results and vice versa). When valences match, the incentives inherent in actually performing the activity are easily overlooked. People can mistakenly believe that their actions are driven by the anticipated consequences alone. Inconsistency in the usage of the key terms "intrinsic" and "extrinsic" presents an additional difficulty.

14.2 Defining "Intrinsic Motivation": In Pursuit of a Phantom

14.2.1 The Problem

Motivational psychologists are not expected to expound on terminological issues, but to cast light on the mechanisms that energize and direct behavior – and rightly so. Their focus should be on content and substance rather than on labels. In the present case, however, any attempt to progress without first examining the various definitions of intrinsic motivation formulated in the literature would necessarily lead to confusion. In fact, rarely in the scientific literature have terms been used as inconsistently and imprecisely as "intrinsic vs. extrinsic."

The problem would be less severe if different labels were used to describe identical contents. Such a difficulty could soon be cleared up by means of conceptual and/or empirical analysis. In the present case, however, the problem is the opposite, with the same labels being used to describe different contents – a surefire way of confusing readers and hampering research progress.

At a perfunctory glance, things seem reasonably clear. "Intrinsic" means "originating or operating from within, belonging naturally, essential or immanent." "Extrinsic" means "originating or operating from without, not belonging, extraneous." Unfortunately, authors differ in what they mean by "within" and "without." Some do not even make this distinction, but characterize intrinsic motivation in terms of underlying needs. In the following, the major definitions of intrinsic are discussed. Further details can be found in H. Heckhausen (1989), Heckhausen and Rheinberg (1980), and Sansone and Harackiewicz (2000). Should readers be left with the impression that the different conceptualizations are "kind of similar," but lack a common core, they will not be mistaken.

14.2.2 Intrinsic in the Sense of "in the Activity"

In view of what was said above about incentives residing in the performance of an activity, it would seem quite reasonable to use the term "intrinsic" in this context – i.e., to describe incentives relating to an activity itself.

- According to this definition, incentives that reside in the pursuit of an activity are intrinsic, whereas the incentives of events or changes that occur only once an activity has been successfully completed are extrinsic. This definition of intrinsic vs. extrinsic is based on the

structure of an action episode: "intrinsic" pertains to the performance of an activity, "extrinsic" to its intended effects.

A good early example of this kind of structural approach to the incentive concept is found in Bühler (1922). Based on his careful observations in the field of developmental psychology, he distinguished pleasure in functioning and creativity ("Funktionslust" and "Schaffenslust") during an activity from pleasure in satisfaction ("Endlust" or "Befriedigungslust") after an activity. According to the present definition, the former "pleasures" would be intrinsic and the latter extrinsic in nature. Unfortunately, Bühler did not use these specific terms. Had he done so, much of the later terminological confusion might have been averted.

As is so often the case, however, a true historical account must go back to Aristotle. As Schneider (1996) points out, the *Nicomachean Ethics* distinguish between pleasure that is an essential element of an activity and pleasure originating from outside an activity. Aristotle suggested that the latter may inhibit performance of the activity. Deci (1971) returned to this point a good 2,000 years later and has since investigated it extensively (Deci, Koestner, & Ryan, 1999).

The earliest, and very detailed, analyses of incentives residing in the performance of an activity are found in Groos' (1899) work on the *psychology of play*, which is still worth reading today. Not only does Groos provide an accurate description and classification of these incentives, he uses an evolutionary psychology approach that seems astonishingly modern from today's perspective to derive them (giving an idea of just how severely scientific progress was hampered by the behaviorist-experimental approach that dominated subsequent psychological research; cf. Meyer, Schützwohl, & Reisenzein, 1999). Over 50 years later, Koch (1956) renewed the call for qualitative analyses of the incentives residing in activities. More recently, researchers such as Csikszentmihalyi (1997) and Rheinberg (1993) as well as Stops and Gröpel (2016), Rheinberg and Manig (2003), and Rheinberg and Tramp (2006) have presented findings from such analyses (see Sect. 14.4).

Woodworth (1918) was the first to use the terms "*intrinsic/extrinsic*" in his work, albeit rather peripherally. He used the word "intrinsic" to describe "activity running by its own drive" (Woodworth, 1918, p. 70), stipulating that it is only under these conditions that an activity can run "freely and effectively" and result in the absorption on which enduring interest is contingent. When an activity is "driven by some extrinsic motive" (Woodworth, 1918, p. 70), on the other hand, attention is diverted away from the activity, and absorption in it is unlikely.

Woodworth also pointed out that motivation may change over the course of an activity. For example, it is quite possible for someone to take up an activity for extrinsic reasons, but to persist in it for intrinsic reasons. The initial motivation becomes less important as progress is made toward the goal, with the focus shifting to the performance of the activity itself. This process-oriented approach is far in advance of the overly simplistic juxtaposition of extrinsic vs. intrinsic motivation that characterized later research. To be fair, however, we should not forget that Woodworth was free to write about human motivation without having to provide empirical evidence for his conclusions. It is hardly surprising that the theoretical analyses of later authors, who were first obliged to demonstrate their proposed effects experimentally, were at times rather less sophisticated.

Schiefele (1996) made a distinction that has interesting implications for an activity-oriented approach to intrinsic motivation. Because activities generally focus on a certain object, a person's motivation to engage in an activity may be (co)determined not only by the activity itself but also by that object. For example, a retiree avidly reading an article about J. S. Bach might be interested in the object of "Bach" and/or simply enjoy reading. If the object is the main incentive, this form of intrinsic motivation can be described as *interest*.

Definition
Interest is a form of motivation characterized by a focus on a certain object ("interest in XY"; cf. Krapp, 2001).

In our example, the retiree would enjoy virtually any activity relating to the object of "J. S. Bach" (listening to Bach's music, singing along with his cantatas, talking about him, visiting the place of his birth, etc.). If, however, the activity of reading is the main incentive, Schiefele (1996) distinguishes another form of intrinsic motivation, driven by *activity-related incentives* (after Rheinberg, 1989, 1993). In this case, the retiree would enjoy reading texts of all kinds. Activity-related incentives are particularly relevant and have been investigated in contexts such as dancing and playing sports and musical instruments (Sect. 14.4).

Summary
From the very beginning of theorizing on "intrinsic vs. extrinsic motivation," one conceptualization has focused on the structure of an action episode, with activities whose main incentive resides in the performance of the activity itself, rather than in its expected results, being seen as "intrinsically motivated." Besides pioneers such as Bühler (1922), Groos (1899), and Woodworth (1918), this conceptualization is found in the works of authors such as Harlow (1950), Hunt (1965), Koch (1956), McReynolds (1971), Pekrun (1993), and Schiefele and Köller (2001). Further authors have investigated the same issues but using terms such as autotelic motivation (e.g., Csikszentmihalyi, 1998; Klinger, 1971) or activity-related (vs. purpose-related) motivation (Rheinberg, 1989, 1993). The intrinsic motivation deriving from an activity may be driven primarily by interest or by activity-specific incentives, depending on whether the object of an activity or its performance provides the main incentive. (Another conceptualization of interest is presented in Sect. 14.2.4)

14.2.3 Intrinsic Motivation as the Need for Self-determination and Competence

In contrast to the conceptualization outlined above, the decisive factor for Deci and Ryan (1980, 1985) was that "intrinsic motivation" derives from the innate psychological needs for competence and self-determination. Because their approach evolved over time, its emphases vary depending on the date of publication.

In an *early phase* of research, they considered intrinsically motivated behavior to be shown by children in field experiments in the absence of extraneous rewards and extrinsically motivated behavior to be driven by external rewards (Deci, 1971). In an *intermediate* phase that commanded a great deal of research attention, Deci and Ryan (1980) developed Cognitive Evaluation Theory (CET). This theory distinguishes between intrinsic and extrinsic motivation in terms of whether people perceive their behavior to be self-determined ("I do it because I want to") or as dependent on rewards controlled by others. Thus, the "within/without" distinction does not apply to the activity, but to the self as the perceived locus of causality.

It is only at a casual glance that this *self*-based definition is congruent with the previous *activity*-based one (Sect. 14.2.2). Granted, we are more likely to engage in activities on our own initiative and without external pressure if they are enjoyable in their own right. Both definitions would classify motivation in cases such as these, where perceived self-determination and enjoyment of an activity coincide, as intrinsic. When actions have important implications, however, we may take a highly self-determined approach to performing aversive activities (e.g., attacking a pile of dishes, Sect. 14.1) or refraining from attractive ones (e.g., giving up smoking). Such activities might be classified as either extrinsically or intrinsically motivated, depending on the definition applied.

Deci and Ryan (1980) adopted the key concept of *self-determination* (autonomy) from deCharms (1968, 1976). However, deCharms had recognized the risks of definitions and conceptualizations being confounded in the manner outlined above and warned that it would be overly simplistic to equate "intrinsically motivated" with "self-determined/self-autonomous" (deCharms, 1979, p. 20). Deci and Ryan (1980) took a different route.

Beside deCharms' need for autonomy, the authors drew on a second motivational concept, namely, *self-efficacy* or the *need for competence*, as described by White (1959). Strictly speaking, this concept had already been introduced by Groos (1899), who described it as "joy in being a cause" (p. 489), "joy in the active production of effects" (p. 489), or a "drive-like need for causation" (p. 488).

Drawing on deCharms' need for autonomy (1968) and White's need for competence (1959), Deci and Ryan (1980) define intrinsic motivation as a form of motivation deriving from the innate needs for competence and self-determination which, when satisfied, typically result in positive feelings of control and perceived causality (Deci & Ryan, 1985, 2000, 2012).

In a third phase of theorizing, Deci and Ryan (1985) introduced a third innate psychological need – the need for social relatedness – and formulated self-determination theory (SDT). The need for social relatedness is assumed to motivate people to adopt externally imposed behavioral standards: people adhere to the standards, expectations, and wishes of others in order to belong. After an initial phase of "external regulation," these standards are assumed to be assimilated to the self via a process of integration involving the stages of "introjected regulation," "identification," and finally "integrated regulation," at which point it is barely possible to distinguish what was originally external determination from true self-determination. This form of perceived self-determination is, nevertheless, still defined as extrinsic. Despite the differences in labeling, the assimilation of external behavioral standards to the self is assumed to be facilitated by the same measures that facilitate true intrinsic motivation.

Definitional and conceptual lines are thus likely to become blurred. Moreover, the question arises of why especially the psychological needs for self-determination and competence should make performing an activity so attractive that people keep returning to it, even in the absence of contingent rewards or external pressures. There is no doubt that both these motivational systems are extremely important. Passionate hobby enthusiasts refer to them repeatedly when interviewed about the incentives that induce them to engage in their leisure time activities (Rheinberg, 1993). However, besides these two, several other incentives also play a vital role. These include the excitement of exposure to risk (e.g., extreme sports or illegal graffiti spraying) or unusual physical sensations (e.g., riding a roller coaster or motorcycling), being at one with nature (e.g., hiking or mountaineering), and so on (Rheinberg, 1993, 1996; Stops & Gröpel, 2016).

Summary

The approach chosen by Deci and Ryan (1980, 1985) is to stipulate two need systems (self-determination and feelings of competence), in terms of which intrinsic motivation is then defined. In the final version of their theory, they propose a developmental continuum of extrinsic motivation which implies that "higher" forms of extrinsic motivation become difficult to distinguish from intrinsic motivation. Both are experienced as self-determined. In spite of these problems, self-determination theory has gained some popularity, particularly among researchers in educational science (Krapp, 1999; Núñez & León, 2015; for a critical discussion, see Schiefele, 1996). It may be that in the context of education, positively valued goals such as "self-determination," or the assumption of an innate human capacity to assimilate socially mediated norms to the self, render "self-determination theory" particularly attractive.

14.2.4 Intrinsic Motivation as Interest and Involvement

Interest was already mentioned briefly in Sect. 14.2.2, where it was described as a form of intrinsic motivation deriving from the performance of an activity in which the object of the activity provides the main incentive (Schiefele, 1996; Schiefele & Köller, 2001).

14.2.4.1 Individual Interest

The conceptualization of interest as motivation deriving from the performance of an activity does not seem entirely logical from the perspective of an "educational theory of interest," however (Krapp, 1999, 2005). After all, one purpose of interest-driven engagement with an object is generally to find out more about that object. But this knowledge gain is a desired *outcome* of the activity. In other words, it ensues from the activity and would thus be defined as extrinsic in nature. It follows that most interested learning would have to be classified as extrinsically motivated, and intrinsic interested learning would be a rare occurrence in schools and other academic settings (Krapp, 1999, p. 392).

The educational theory of interest proposed by Krapp is not, therefore, based on an activity-related definition of intrinsic motivation, but on the approach taken by Deci and Ryan (1985) described above.

- From this perspective, a learning activity is considered to be "intrinsically motivated" if learners identify with the object of study and hence perceive the learning activity to be self-determined. It is quite possible for the task to be externally imposed and the learner to be working purposefully toward a specific learning goal. The decisive factor is that learners perceive their actions to be self-determined (self-intentional) and consider the object of study to be worthwhile.

It is beyond doubt that there is more scope for classifying motivation to learn as intrinsic when this definition is applied. But this approach necessarily leads to the inconsistency problems that ensue when intrinsic motivation is defined in terms of self-determination theory: although the conceptual category is now more applicable to the context of learning and instruction, it subsumes differing phenomena. Readers should therefore be aware that the interest theory literature defines intrinsic motivation in different ways – sometimes in the sense of "in the activity" (Sect. 14.2.2) and sometimes in the sense of "in the person/the self" after Deci and Ryan (1985) or Krapp (1999).

14.2.4.2 Current Interest

The importance of disentangling different conceptualizations was further emphasized by the recent emergence of a new approach to the concept of interest in the context of intrinsic motivation: "We consider individuals to be intrinsically motivated when their behavior is motivated by the *actual, anticipated, or sought experience of interest*" (Sansone & Smith, 2000, p. 343).

Definition

Interest is defined as a positively charged cognitive and affective experience that directs attention to and focuses it on the activity or task at hand. People want to engage in the activity here and now ("feel like it") and enjoy doing so.

Sansone and Smith (2000) do not see interest in terms of either an enduring preference for a domain ("individual interest") or underlying needs for self-determination and feelings of competence (Deci & Ryan, 1985; see above), but as a "proximate" positive experience that may be encountered during the activity, but also anticipated and sought.

This understanding of interest and intrinsic motivation is very different from the educational theory of interest outlined above and has more in common with the activity-related approaches to interest advocated by Schiefele (1996) or Hidi (2000) (Sect. 14.2.2). In contrast to Schiefele's approach, however, interest is not specified to be object-related, but generalized to *any* form of

positively charged engagement motivated by the enjoyment of pursuing an activity. This brings us back to phenomena of activity-related motivation discussed in Sects. 14.2.1 and 14.2.2.

Sansone and Smith (2000, p. 344) use the term "interest" to describe this kind of activity-related motivation and explain their concept of interest in terms of "involvement" and "feeling like it." Of course, it is possible to switch words around in this manner. In the present case, however, it means that the substantive core of the definition of interest, the aspect that distinguishes it from other forms of motivation, is lost – namely, the fact that interest is always focused on a certain object or domain.

Summary

Researchers attempting to define "intrinsic" motivation in terms of interest have taken various approaches. For Sansone and Smith (2000), the concept of interest is synonymous with (positive) activity-related motivation. Schiefele and Köller (2001) limit the scope of this definition to activities whose main incentive is the object of the activity, rather than the activity itself. Finally, Krapp (1999) draws on self-determination theory (Deci & Ryan, 1985). For him, a learning activity is intrinsically motivated if learners experience their interaction with an object of interest to be self-determined – even if that learning activity is purpose-driven, i.e., directed at outcomes and consequences lying beyond the performance of the activity itself.

14.2.5 Intrinsic in the Sense of a Correspondence Between Means and Ends

Another definition of intrinsic motivation focuses on the thematic correspondence of actions and their goals. Kruglanski (1989), Shah and Kruglanski, (2000), and Heckhausen (1989) are the main proponents of this kind of approach. It is often possible to work toward a goal in a number of ways. For example, someone wanting to lose weight might decide to eat less, change his eating habits, take up jogging, cycle to work, start smoking again, take amphetamines, etc. This kind of structure, in which "all roads lead to Rome," is known as the *equifinality* of behavior (e.g., Heider, 1958). Conversely, a single activity may further the pursuit of numerous goals. Someone might study because he seeks to enhance his general knowledge, is interested in a particular topic, aspires to do well in an exam, thinks good exam grades will increase his chances of being offered an interesting job, etc. The term *multifinality* is used to describe structures in which a single activity furthers the attainment of several goals.

Shah and Kruglanski (2000) work on the rather unusual assumption that both equifinality and multifinality diminish intrinsic motivation. In their opinion, intrinsic motivation is characterized by a clear-cut relationship between means and ends, i.e., between an activity and its goal. Goal X can only be attained by performing activity Y, and people performing activity Y aspire to no goal other than X (Shah & Kruglanski, 2000, p. 114). The authors suggest that this kind of one-to-one relationship is vital if intrinsic motivation is to be promoted (p. 123).

Moreover, Shah and Kruglanski (2000) distinguish two kinds of goals:

- First, "specific target goals" that regulate the ongoing activity proximally
- Second, more general "abstract purpose goals" that provide the reasons for aspiring to the specific target goals in the first place

- Intrinsic motivation is assumed to be facilitated when a specific target goal is clearly assigned to an abstract purpose goal, and both are clearly assigned to a certain activity.

In proposing this threefold correspondence of activity, specific target goal, and abstract purpose, the authors echoed an idea that had already been voiced by H. Heckhausen (1980). Heckhausen assumed intrinsic motivation to ensue when the *action*, the desired *outcome* of the action, and the anticipated *consequences* of that outcome are thematically congruent (Fig. 14.1). A student reads an article carefully (=

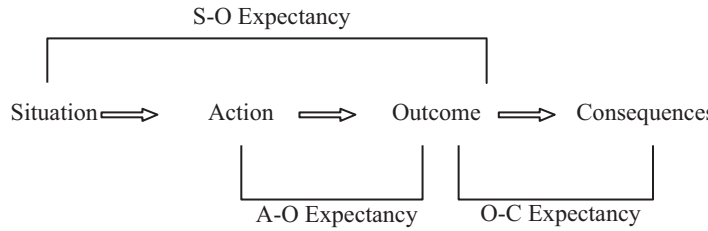

Fig. 14.1 Extended cognitive model of motivation (Based on Heckhausen & Rheinberg, 1980)

action) because she wants to understand a certain topic (= outcome). She wants to understand the topic because she hopes it will help her solve a difficult problem (= consequences). According to H. Heckhausen (1980), this is a case of intrinsic achievement motivation because the same motivational theme – concern with a standard of excellence – runs through the entire structure of the action. The activity itself is performed particularly well (= careful reading), the desired outcome is an increase in competence (= gaining a better understanding of a topic), and its consequences are better prospects of mastering a challenge (= solving a difficult problem). If the anticipated consequences had been related to another motivational theme (e.g., altruism: the student wanted to understand the text in order to help a friend prepare for an exam), it would be a case of extrinsic achievement motivation.

In this conceptualization of intrinsic motivation, the "within/without" distinction reflects whether or not the target goals are located within the same thematic domain as the action itself. In some cases, thematic congruence between an action and its outcome may be a foregone conclusion because the aspired outcome is an inalienable part of the activity. (For example, "restoring something to better condition" is, by definition, an outcome of the activity "repairing.")

The relationship between the outcome of an action and its desired consequences is much more variable. There may be a multitude of reasons for wanting to achieve a particular outcome. "Reasons" are anticipated consequences. For example, a student might make himself a bookshelf in order to have somewhere to put his books and papers and, at the same time, take pride in his do-it-yourself skills. Alternatively, he might make the same bookshelf for somebody else with the aim of earning money, strengthening a relationship, or for any number of other reasons. Because the relationship between the outcome of an action and its intended consequences can be variable and thematically incongruent, it makes perfect sense to specific the motivational structure of an action episode by identifying its aspired consequences and determining the nature of their relationship to the activity. The question remains, however, of whether the use of the term "intrinsic" is actually needed whenever an activity and its intended consequences are thematically congruent.

Summary

Another conception of intrinsic vs. extrinsic motivation found in the literature is based on whether or not an action and its desired consequences are located within the same thematic domain (e.g., gaining competence, helping, exerting power). In the case of thematic congruence, motivation is considered to be intrinsic, while in the case of incongruence, it is deemed extrinsic. This conceptualization was advocated by H. Heckhausen (1989) and Kruglanski (1989), in particular.

14.2.6 Goal Orientation and Intrinsic Motivation

Research in the field of learning motivation, in particular, has shown that a desired outcome can be associated with a number of consequences (Heckhausen & Rheinberg, 1980; Rheinberg, 1989). A student may aspire to a good learning outcome for a variety of reasons, as outlined in the description of multifinality earlier (Sect. 14.2.5).

Especially in the English-speaking countries, two goal orientations have been singled out as particularly relevant:

1. Learning or mastery goal orientation:
   Learners with this kind of orientation study because they want to know and understand more about a topic. Their goal is to acquire knowledge and skills.
2. Performance-goal orientation (Dweck & Leggett, 1988; Nicholls, 1984):
   Learners with this kind of orientation study in order to demonstrate their competence. Their aim is to show that they are more knowledgeable and skillful than others.

According to Dweck and Leggett (1988), a performance-goal orientation is associated with the view that individual ability remains stable across time, whereas a learning-goal orientation is characterized by the belief that ability is changeable. Furthermore, a performance-goal orientation implies comparison with the achievement of others (*social reference norm*), whereas a learning-goal orientation implies comparison with one's own previous knowledge and skills (*individual reference norm*) or with the demands of the object of study (*objective reference norm*). (The concept of *reference norms* was introduced by Heckhausen (1974) and has been examined by Rheinberg (1980) (Chap. 6).

For students with a learning-goal orientation, the learning activity and its aspired outcomes are clearly thematically congruent; these students are concerned with learning and learning gains. According to the arguments presented in Sect. 14.2.5, this thematic congruence implies "intrinsic motivation to learn." The same does not apply to students with a performance-goal orientation. Demonstrating one's superiority over others is not thematically related to the act of learning in any way. The motive of dominating others is associated with other thematic domains of human behavior entirely – most particularly the power motive (Wirth, Welsh, & Schultheiss, 2006). The lack of thematic congruence between the activity and its aspired consequences implies a case of "extrinsic motivation to learn."

This relationship between goal orientation and intrinsic vs. extrinsic motivation to learn has also been established in the literature (e.g., Butler, 2000; Molden & Dweck, 2000; Wigfield & Cambria, 2010). Thus, where motivation to learn is concerned, a further distinction between extrinsic and intrinsic motivation is possible.

Summary
A further distinction can be drawn between intrinsic vs. extrinsic motivation in the context of motivation to learn, with learning-goal orientations (serving the acquisition of knowledge and skills) being considered "intrinsic" and performance-goal orientations (serving the demonstration of knowledge and skills) being considered "extrinsic." This distinction is a special case of the thematic congruence criterion (Sect. 14.2.5).

14.2.7 So What Exactly Is Intrinsic Motivation?

The conceptualizations of intrinsic motivation outlined above are by no means exhaustive. A condensed overview of further approaches is provided in H. Heckhausen (1991, p. 403–408). Surprising numbers of authors have felt compelled to formulate their own definitions of intrinsic motivation using their own (or adapted) constructs, perhaps as a consequence of the implicit positive evaluation of "intrinsic" in the sense of natural, immanent, and real. Obviously, it seems tempting for researchers to express this very positive core of motivation in their own terminology and to go on to identify promising ways of promoting a "true" and "not alienated" form of motivated behavior.

What is unfortunate – for both scientific progress and our understanding of the original literature – is that the products of these attempts to capture intrinsic motivation in words diverge considerably. Furthermore, comparison of the definitions does not disclose a common denominator that could be described as the core of intrinsic motivation (cf. Sansone & Harackiewicz, 2000). The search for "truly intrinsic motivation" thus proves to be the pursuit of a phantom, an undertaking that keeps being revived because people so wants it to succeed.

Consequently, the current debates on whether intrinsic or extrinsic motivation is more conducive to achievement and whether one form of motivation undermines the other will necessarily remain futile (Cerasoli, Nicklin & Ford, 2014; Deci et al., 1999; Eisenberger & Cameron, 1996, 1998; Thierry, 2004). Even the most comprehensive meta-analyses cannot be expected to advance scientific knowledge until theoretical and empirical consensus has been reached on what exactly intrinsic vs. extrinsic motivation is.

The following section describes the ongoing controversy on whether or not extrinsic rewards decrease intrinsic motivation (the undermining effect).

14.2.8 The Undermining Effect of External Rewards: Myth or Reality?

Concerns that the performance and enjoyment of an activity are not always enhanced by the prospect of rewards, but that the opposite is sometimes the case, have a long history. Woodworth (1918), for example, suspected that extraneous rewards would draw attention away from the activity at hand.

A focus on external rewards would necessarily detract from involvement in the activity, with detrimental effects on both achievement and the development of enduring interest in the activity (Woodworth, 1918, p. 69ff.).

The disadvantage of such everyday observations, however, is that it is always possible to find cases in which they apply and cases in which they do not. Deci (1971, 1975) and Lepper, Green, and Nisbett (1973) investigated these effects under experimentally controlled conditions:

- In the first step, the researchers noted what respondents (e.g., preschool children) enjoyed doing of their own accord.
- In the second step, they gave these children rewards for pursuing their favorite activities.
- In the third step, they stopped giving rewards.

Findings showed that the children now no longer performed the activity as frequently as before the reward phase and that they found it less attractive. The extraneous reward had evidently undermined the value of the activity. This phenomenon was labeled the *undermining effect* or *overjustification effect* (Heckhausen & Rheinberg, 1980; Lepper et al., 1973; for a summary, see Heckhausen, 1989).

Researchers have offered various explanations of this effect, based on their different theoretical approaches. Some maintain that the self-determined motivation experienced at the start of the experiment was weakened by the external rewards, leading to a reduction in "intrinsic motivation" (Deci & Ryan, 1980, 1985). Others attribute the effects observed to processes of self-perception, suggesting that respondents evaluated the motivational basis for their actions and concluded that an activity (now at least partly) contingent on an expected reward could not be all that attractive after all (Lepper et al., 1973).

Experimental evidence showing detrimental effects on motivation of external rewards commanded a great deal of attention – especially in educational practice, but also in developmental psychology – and inspired much research. First, the findings had direct implications for everyday behavior; they imply that rewards and praise should be administered with care. Second, and perhaps more important, they were congruent with the ideas of Rousseau, who believed that, if left to their own devices, humans naturally do what is right. It is only when external desires are imposed on them that they become estranged from their true motivational basis and enter a state of alienation that leaves them open to exploitation and ends in unhappiness. Of course, this belief system stood to profit enormously from findings demonstrating the mechanism assumed to underlie these effects under experimental conditions.

14.2.8.1 Validity of the Undermining Effect

But how "true" is the undermining effect really? It soon became clear that the effect is contingent on certain conditions being in place. For example, it

only occurs when people already enjoy pursuing the activity under investigation (Calder & Staw, 1975). In the experiments outlined above, the rewards given were completely unnecessary. How often does this occur in real life? When the activity was not attractive in its own right, rewards often proved to have the opposite – positive – effect (Cameron, Banko, & Pierce, 2001).

This and other findings raised doubts about the validity of the undermining effect. Eisenberg and Cameron (1996) examined the alleged detrimental effects of rewards in a meta-analysis of 61 studies. Their findings indicate that – when the analysis is limited to rewards given under realistic everyday conditions – the undermining effect is more of a myth than reality. They found a (weak) undermining effect only when respondents were given material (not verbal!) rewards simply for tackling a task. Respondents who anticipated these kinds of performance-noncontingent rewards switched to another task sooner after receiving the reward than participants who had not been rewarded.

This publication sparked a scientific controversy, and the body of empirical research covered in subsequent meta-analyses has grown progressively (Deci et al., 1999: 128 studies; Cameron et al., 2001: 145 studies; Cerasoli et al., 2014: 183 studies). The evidence now suggests that rewards do not have detrimental effects on motivation under ecologically valid, everyday conditions. Particularly when rewards are unexpected or given in the form of verbal reinforcement (praise), and when the tasks to be performed are not attractive in their own right, rewards have been shown to have positive rather than negative effects on motivation. Taking the meta-analysis by Cameron et al. (2001), it indicates that the undermining effect occurs only when:

1. The activity is interesting.
2. The rewards are material (rather than verbal) in nature.
3. The rewards are expected.

Thus, rewards only seem to have an undermining effect on motivation under very specific conditions that are arguably fairly unlikely to occur in everyday contexts. In all likelihood, it would be difficult to demonstrate the undermining effect reliably in everyday life without making a number of changes to everyday conditions. For instance, researchers seeking to replicate the conditions created in the experiments of Deci (1971) and Lepper et al. (1973) would need to recruit samples of school students and employees engaged in activities that they would enjoy even without any form of reward. Irrespectively of such conclusions, the latest meta-analysis by Cerasoli et al. (2014) points to another aspect that is easily overlooked in the debate of the undermining effect: extrinsic and intrinsic motivation are not mutually exclusive! However, according to Cerasoli et al. (2014), intrinsic motivation tends to enhance qualitative and extrinsic motivation (rewards) quantitative aspects of performance.

These considerations all seem to be points of detail for Ryan and Deci (2000), however, who see the effects of rewards as a special case of the more general issue of autonomy vs. social control of behavior (Ryan & Deci, 2000, p. 37). They conclude that people who respond to their inner needs and aspire to growth, social relatedness, and community contribution experience greater well-being and better mental health than those who pursue the extrinsic life goals of wealth, fame, and image (p. 48). Given the complexities of research findings about the undermining effect, this conclusion by Ryan and Deci appears perplexing in its simplicity.

Future prospects. Given the heterogeneity of conceptualizations of "intrinsic," it is hardly surprising that the effect sizes obtained for the undermining effect in empirical research tend to be weak, or at best moderate. When respondents are asked to rate the interestingness of a task for which they have been rewarded, for example, there tend to be no effects at all. Rewards are most likely to influence whether, and for how long, participants continue working on a task for which they have been rewarded when given the opportunity to switch to a new task. Until consensus has been reached on the meaning of "intrinsic," scientists cannot expect to find clear patterns of results. A research focus on a clearly defined

conceptualization of intrinsic motivation would, on the other hand, permit interesting phenomena to be examined more carefully.

For example, researchers might focus on intrinsic in the sense of "in the activity" (Sect. 14.2.2) and investigate the probability of undermining effects occurring as a function of the spectrum of activity-related incentives that make an activity attractive (Sect. 14.4.2). They might, for instance, try to establish why some top-earning football and tennis players give up the game altogether when they retire, whereas some former professional skiers and world cup surfers continue to practice their sports enthusiastically, even without the prospect of material rewards. Insights into the magnitude of such differences between sports, and into the activity-related incentives that make a sport more resistant to the undermining effect, would doubtless further scientific understanding of why people engage in activities of their own accord. A predetermined focus on specific needs (self-determination, feelings of competence, social relatedness) would unnecessarily limit the scope of potential insights.

14.2.9 Terminological Implications

The arguments presented in Sect. 14.2 raise the question of what, exactly, intrinsic motivation is. This is not the right question to be asked, however. When a term is defined in various ways, and these definitions do not share a common core, the alternatives are either to opt for just one of the definitions or to abandon the term altogether. The disadvantage of the first alternative is that, no matter how well justified the choice of definition, the term cannot be stripped of its other connotations. The second alternative, which has been recommended elsewhere, is thus preferable: the semantic overload of the term "intrinsic" can be avoided altogether by specifying exactly what is meant in each case (Rheinberg & Vollmeyer, 2018). All of the phenomena covered in this section are fascinating and important in their own right. The problem is that, despite their diversity, they have thus far all been given the same label.

The following sections return to the original conceptualization of intrinsic motivation and examine motivational phenomena residing in the performance of an activity. However, the term intrinsic (vs. extrinsic) motivation is replaced by activity (vs. purpose)-related motivation, and individual components of this motivation (e.g., flow) are discussed separately.

14.3 Purpose- and Activity-Related Incentives in the Extended Cognitive Model of Motivation

14.3.1 The Purpose-Oriented Model of Rational Behavior

A more general model suggests itself as a theoretical framework for analyzing the phenomena described and predicting their effects. The extended cognitive model of motivation proposed by Heckhausen (1977) drawing on Vroom (1964) has previously been applied to the analysis of motivation to learn (Heckhausen & Rheinberg, 1980; Rheinberg, 1989) and seems appropriate for the present purposes.

The model maps out the general structure of goal-directed behavior. A given *situation* presents an individual with various action alternatives, temptations, and potential threats. Any *action* taken in this situation may bring about a specific *outcome*, which may in turn have certain *consequences* (Fig. 14.1).

The strength of a person's current motivation, i.e., tendency to act, depends on three types of expectancies, as well as on the incentives in place:

1. Situation-outcome expectancies:
   These expectancies (S-O expectancies in Fig. 14.1) reflect people's subjective beliefs about how likely it is that a given outcome will ensue without their active involvement. It is highly probable that a red traffic light will change to green (= outcome), whether or not a driver blasts his or her horn (= action). A student who already has a firm grasp of the topics

covered in an upcoming exam may feel confident of doing well (= outcome) without the need for further preparation (= action). If a situation is very likely to result in a desired outcome without active involvement on the individual's part, there is no need to take action. High situation-outcome expectancies thus reduce the strength of the tendency to act.

2. Action-outcome expectancies:
   The opposite holds for action-outcome expectancies (A-O expectancies). These expectancies reflect people's subjective beliefs about how likely their actions are to bring about or influence a possible outcome. Student A may believe that exams are a matter of pure luck and that his results will have very little to do with any preparation on his part. If the right questions come up, he will do well; if not, it will just be bad luck. Student B, on the other hand, may believe that her performance hinges almost entirely on how well she prepares for an exam. Student A has very low action-outcome expectancies; student B has very high action-outcome expectancies.
3. Outcome-consequence expectancies:
   These expectancies (O-C expectancies) reflect the certainty of an individual's beliefs that an outcome – assuming that it ensues – will have certain consequences. This link between an aspired outcome and its consequences is also called *instrumentality* (Vroom, 1964). The higher the outcome-consequence expectancy, the more likely the consequences are to influence the tendency to act. All three expectancies are necessary, rather than sufficient, conditions for this influence occurring.
4. Incentives of anticipated consequences:
   The incentive value of the anticipated consequences is a further factor in the equation. It is only when the instrumentality and incentive value of the consequences are sufficiently high that these consequences have an impact on the attractiveness of an outcome.

The model has been used to predict phenomena such as whether students who have an important exam coming up in 2 weeks will do enough preparation.

Example

All four of the following conditions must be met if a student is to do sufficient preparation for an exam. The student must be confident that:

1. She will not get the desired grade unless she prepares for the exam.
2. She can influence the grade attained by preparing for the exam.
3. The grade is certain to have consequences.
4. These consequences are sufficiently important to her.

The student will not prepare properly for the exam unless all four of these conditions are met. Consequently, four qualitatively different forms of motivational withdrawal can be discerned:

1. It seems unnecessary to study for the exam.
2. It seems pointless to study for the exam.
3. The exam grade is not certain to have consequences.
4. The possible consequences seem unimportant.

As findings from numerous studies on student preparation for tests and exams have shown, predictions made about whether learners do as much preparation as they consider necessary to achieve a desired outcome are accurate in between 70% and 90% of cases on the basis of this model (Heckhausen & Rheinberg, 1980; Rheinberg, 1989). Of course, whether or not students actually achieve this outcome is another question altogether and one that is not solely dependent on the amount of motivation and preparation (Engeser, 2009).

14.3.2 The Role of Activity-Related Incentives

On the face of it, the model seems to achieve a high level of accuracy in its predictions. However,

it is important to remember that the model predicts a one-off event – preparation for a specific test or exam under given conditions – using episode-specific predictors. Proximal measures such as these are bound to result in more accurate predictions than variables such as general personality traits (e.g., Bowi, 1990). The advantage of the latter approach is that it allows predictions to be made across a variety of situations rather than in a single one.

It thus seems reasonable to ask why the one-off predictions made on the basis of these proximal measures do not apply in more than 70–90% of cases. Explorative analyses of motivation to learn have shown that the extended cognitive model of motivation fails to account for an important source of incentives: the incentives involved in the activity itself (Rheinberg, 1989). Activities such as reading, writing, chatting, singing, walking, cycling, and driving may (or may not) have incentives that reside in their outcome-dependent consequences. However, there are also incentives that reside purely in the performance of the activity – no matter what outcome or consequences it may have. Person X prefers walking to sitting – irrespective of where and why he or she is walking. The opposite may hold for person Y.

- The incentives that reside in performing an activity are called activity incentives (Rheinberg, 1989).

To return to students' exam preparation, some students experience the act of sitting down at home to work through the material covered in the last few weeks to be highly aversive. Deviations from the model's predictions were largely attributable to this negative activity-related incentive. In some cases, it was so strong that students did very little or no preparation, despite being well aware that this preparation would be highly effective, necessary, and important. The same problem did not arise for students who found exam preparation to be less aversive, or even attractive.

Activity-specific incentives of this kind were not represented in the original extended cognitive model, which assumed the attractiveness of an activity to reside solely in the incentive value of its anticipated consequences. Enjoyment of an activity does not ensue after its completion, however, but during its performance (Sect. 14.1). In some cases of highly positive activity-related incentives, people do not want an activity to end. This presents a theoretical paradox, particularly in the context of achievement motivation (Sect. 14.4.3). Heckhausen's strictly rationalistic representation of human motivation in the extended cognitive model made it obvious that there must be other sources of incentives inherent in life's activities.

Of course, Heckhausen was perfectly aware of the existence of "purposeless" activities that are pursued for their own sake. He had considered motivational structures of this kind in his early work (1964) on the psychology of play. There was little scope for them within the strictly rationalistic conception of the extended cognitive model, however. Heckhausen and Rheinberg (1980) got around this problem by assuming the three main components of the model – action, outcome, and consequences – to coincide in "purposeless" activities.

This theoretical maneuver made the phenomena of purposeless or activity-related motivation compatible with the extended cognitive model of motivation at a very high level of abstraction. This approach remained too indefinite to be productive, however. The extended model was thus extended further to include activity-related incentives, as independent from purpose-related ones (Rheinberg, 1989). The structure of the resulting model is shown in Fig. 14.2.

Another factor that needed to be included in the equation was a person's propensity to focus on the enjoyment of actually performing an activity or on the value of its potential consequences (activity- vs. object-oriented *incentive focus* in the Incentive Focus Scale; Rheinberg, Iser, & Pfauser, 1997). When activity-related incentives and this incentive focus factor were taken into consideration, the one-off predictions of the model were almost perfect (Rheinberg, 1989).

- The extended cognitive model of motivation permits detailed analyses of motivation in specific situations. A particular strength of the

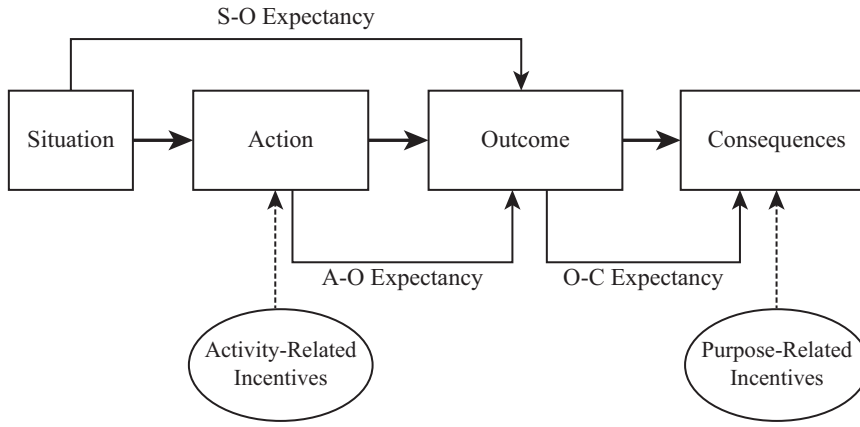

Fig. 14.2 Integration of activity- and purpose-related incentives within the extended cognitive model of motivation (Based on Rheinberg, 1989)

model is that it allows different forms of motivational deficit to be diagnosed. These deficits may be attributable to one or more of the three expectancy types (see the earlier example), or to incentives being insufficient or inappropriate. The latter may apply to purpose-related incentives ("It's not worth it") and/or to activity-related incentives ("I can't face doing it").

Purpose-related incentives only influence motivation if all three expectancy types are endorsed and the consequences of the action are anticipated to be sufficiently important: The activity is (Aellig, 2004) necessary and (Allensbacher Markt- und Werbeträgeranalyse (AWA) (1995–2000), 2000) possible and (Atkinson, 1957) sufficiently likely to have (Baumann, Lürig, & Engeser, 2016) worthwhile consequences. If any one of these four necessary conditions is not met, purpose-related incentives do not apply. As such, this form of motivation is relatively susceptible to interference and highly sensitive to changes in situational conditions.

The functioning of *activity-related incentives* is comparatively straightforward. A situation must simply offer the prospects of an activity being performed without overly negative consequences. The activity is then very likely to be performed. In this case, then, the motivational basis is relatively robust, which may explain why the concept of intrinsic motivation has proved so attractive in the context of learning and instruction. The purpose- and activity-related conditions of motivation have now been integrated within a unifying framework that can be used to predict motivational outcomes (Rheinberg, 2004a). The following section looks at how activity-related incentives can be assessed and examines the specific features of achievement motivation.

14.4 Qualitative Analyses of Activity-Related Incentives

14.4.1 Standardized Assessment of Quality of Experience

What makes an activity so attractive that an individual will keep returning to it even though it has no tangible benefits, but – quite the opposite – has substantial costs in terms of time, money, and effort? This question has been addressed using scales designed to tap affectively charged well-being to measure quality of experience during an activity. Recent studies have focused on the PANAS scales (Watson, Clark, & Tellegen, 1988) and the PANAVA system (Schallberger, 2000).

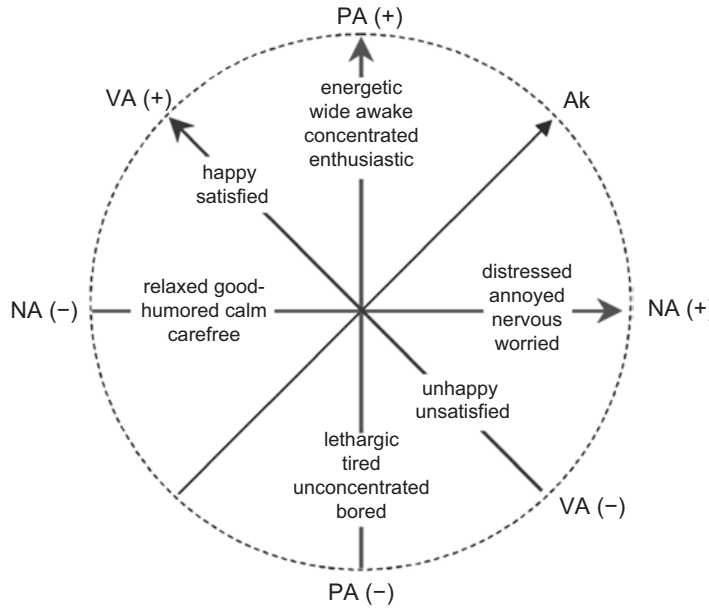

Fig. 14.3 The PANAVA system as a circumplex model (Based on Schallberger, 2000). *Ac* activation, *PA* positive activation, *NA* negative activation, *VA* positive valence/feelings of happiness, (+), high; (−), low

14.4.1.1 The PANAVA System

Both the PANAS scales and the PANAVA system are based on the dimensions of *valence* and *activation* that were originally described by Wundt (1896), but using different terminology. In the PANAVA system, Schallberger (2000) rotates these two dimensions or axes of the original system by 45°. The result of this rotation is shown in Fig. 14.3.

The effect of the rotation is to combine the dimensions of valence and activation to produce two dimensions:

- Positive activation (PA: energetic, wide awake, etc.; sluggish, tired, etc.)
- Negative activation (NA: distressed, annoyed, etc.; relaxed, high spirited, etc.)

The PANAVA system also encompasses the original, i.e., unrotated, valence (VA) dimension. This dimension represents feelings of happiness and satisfaction that seem relevant in their own right and are therefore assessed separately.

The PA dimension is particularly interesting for motivational psychologists. Given our definition of motivation as the "activating orientation of current life pursuits toward a positively evaluated goal state" (Rheinberg & Vollmeyer, 2018, p. 15), PA is clearly the core component of (approach) motivation. NA has more to do with an avoidance and fear component, although its relationship to motivation is less straightforward.

In the PANAVA system, quality of experience is rated on just ten bipolar scales (e.g., "bored 3–2–1–0–1–2–3 enthusiastic") that can be administered, while people are actually engaged in an activity. Thus, motivational data can be obtained "online" and compared across different activities, conditions, and points of time. The following study demonstrates the utility of this method.

Phenomena such as those identified in the study of climbers in Fig. 14.4 would be much more difficult to discern by retrospective methods – in retrospect, the whole day would be cast in the positive light of having mastered a difficult challenge (see evening *VA* scores, point 13 in Fig. 14.4). If these findings can be replicated for less dangerous activities, they would considerably further our understanding of what it is that keeps people engaged in activities. The rock climber data suggest that researchers aiming to predict whether or not a respondent will continue to enjoy an ongoing activity should not ask whether the respondent is feeling happy and satisfied, but rather how "enthusiastic," "wide awake,"

Study

Sampling Experience Data at the Rock Face

When climbers are asked why they spend much of their leisure time scaling rock faces, pushing themselves to the limits in inherently dangerous situations, they often mention "indescribably powerful/enjoyable experiences" or "feelings of exhilaration that are difficult to put into words." Their eyes light up and faces become animated, testifying to the depth and lasting effects of these experiences.

Aellig (2004) equipped rock climbers with a pager and a small block of PANAVA scales, which they wore on a cord around their neck. At each signal of the pager, the climbers got into a relatively stable position and rated their current quality of experience on the PANAVA scales. Although the focus of a climbing trip is on climbing itself, with activities such as leading (the leader is the first in the team to ascend and has furthest to fall) and seconding (the seconder ascends next and is secured from above), it necessarily involves various other activities, such as the journey to the climbing area, the ascent to the rock face, preparing the equipment, abseiling, the descent, the journey home, etc. Figure 14.4 illustrates the quality of experience reported by climbers for these different types of activity.

1. Various activities before departure ($n = 35$ points of time)
2. Journey to the climbing area (by train or car; $n = 26$)
3. Ascent to the rock face, moving to a new crag ($n = 55$)
4. Preparing equipment, packing and unpacking ($n = 37$)
5. Belaying ($n = 87$)
6. Leading ($n = 99$)
7. Seconding ($n = 40$)
8. Abseiling ($n = 47$)
9. During the climb: breaks, eating, drinking, social interaction ($n = 53$)
10. During the climb: waiting, looking for/fetching equipment ($n = 13$)
11. Descent from the rock face, departure ($n = 33$)

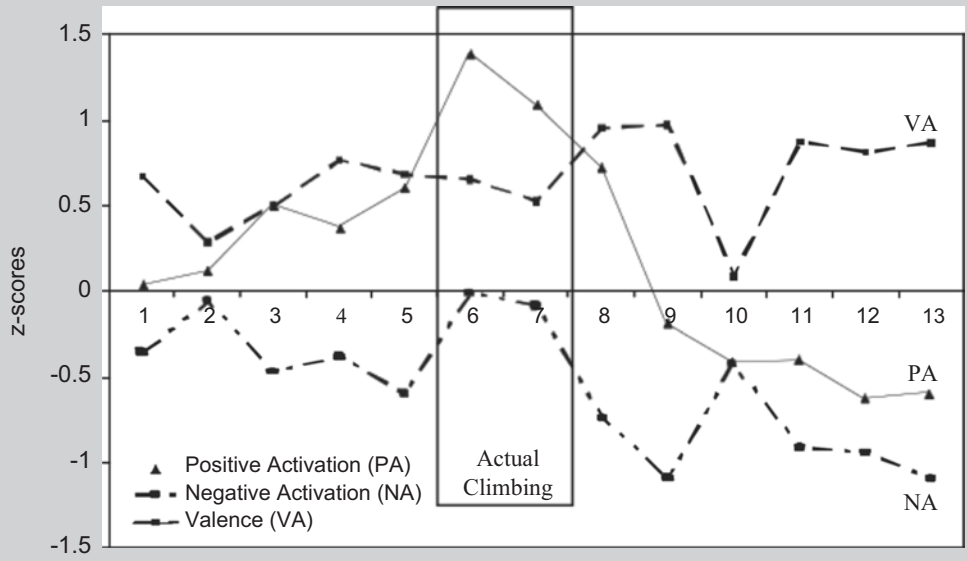

Fig. 14.4 Positive (*PA*) and negative (*NA*) activation and feelings of happiness (*VA*) experienced during various activities associated with a climbing trip (Based on Aellig, 2004, p. 101)

12. Journey home ($n = 46$)
13. Various evening activities ($n = 76$)

As the figure shows, PA peaks during the climb itself (leading and seconding). Somewhat surprisingly, however, the same does not hold for feelings of happiness (valence, VA), which peak subsequent to critical actions (in breaks, when abseiling and making the descent, and at home). The reasons for the decoupling of positive activation and feelings of happiness observed in the rock climbers seem to be rooted in the level of negative activation (stressed, worried, etc.), which also increases in dangerous situations. PA and NA are thus by no means mutually exclusive in life-threatening situations.

NA may inhibit feelings of happiness during the climb, but precisely this effect is conducive to survival in dangerous situations. During the descent (point 11 in Fig. 14.4), strong feelings of happiness and low NA are reported, even though the risk of serious accidents remains substantial. Having just mastered much more difficult and dangerous situations, the climbers no longer seem sufficiently aware of the dangers facing them. Motivational data assessed directly at the rock face thus provide insights into why even highly professional climbers (e.g., Hermann Buhl, who conquered Nanga Parbat) are prone to accidents when making what would seem to be a straightforward descent – when the worst danger has passed.

or "energetic" he or she is feeling. Feelings of happiness seem to predominate during breaks or after completion of an activity (Csikszentmihalyi, 1990; Rheinberg & Vollmeyer, 2004) and to correlate more strongly with the absence of negative activation than with the presence of positive activation (Schallberger, 2000; Schallberger & Pfister, 2001).

14.4.2 Assessing Activity-Specific Incentives

The scales described above have the advantage of being so abstract that they can be applied to any activity and allow comparisons to be made across activities. When the object of research is to determine what exactly it is that makes pursuing a certain activity so enjoyable, however, this very abstraction becomes a drawback. Researchers seeking to identify the incentives specific to rock climbing – those that distinguish it from, say, driving fast cars or performing on stage – will not learn a great deal by asking respondents about positive or negative activation during the activity. Scores on these scales are likely to be similar or identical for all three activities, even though the quality of the experiences acting as incentives is probably quite different.

With this in mind, Rheinberg (1993, 2004a) developed a special interview technique to elicit verbal descriptions of the experiences that make performing a given activity so attractive. Based on these interview data, standardized incentive catalogues suitable for administration to large samples were compiled for each activity, allowing activity-specific incentive profiles to be drawn up. Table 14.1 gives examples of the incentives verbalized for some of the activities examined.

A broad variety of activities (horse riding, painting, computer hacking, bodybuilding, etc.) have been investigated. Some 30–60 categories of incentives that induce enthusiasts to invest time, effort, and money in performing each activity can be identified.

When working with data such as those presented in Table 14.1, it is important to be aware that it is not the experience itself that has been assessed but a verbal transformation of that experience. Internal affective states, kinetic

Table 14.1 Example verbalizations of activity-specific incentives

Experience of power/intensity of feeling (motorcycling)	"You slam your foot down, the bike roars like an animal, and you thunder off at speeds that take your breath away. You can barely hold on. It's pretty wild stuff"
Merging (skiing)	"The experience of beautiful, elegant (esthetic) movements; the merging of the skis with the movements of your body"
Flowing along (music)	"Your fingers run lightly, almost effortlessly, over the instrument. When the melodies soar and flow, time stands still. You forget everything else. I flow along with the music"
Forgetting about everyday problems (graffiti sprayers)	"When you're out spraying, you completely forget all the stress you have at home and at school"
Being alone (surfing in light to moderate winds)	"Not having to talk, being by yourself: silence – just the sound of the board"
Feelings of increasing competence (motorbike)	"The enjoyment of feeling increasingly in control of the bike, of becoming one with it as you ride faster and faster along a stretch of road"

Based on Rheinberg (1989, 1993), Rheinberg and Manig (2003)

and other proprioceptive stimulations, changes in perceptions of the outside world occurring during the activity, and the associative enrichments that they trigger tend not to be coded verbally. They first have to be translated to a linguistic format, which entails some hermeneutic effort and, accordingly, uncertainty of interpretation (Groeben, Wahl, Schlee, & Scheele, 1988; Rheinberg, 2004a).

The advantage of this method is that it gives people who have never engaged in a certain activity a very good idea of its fascination to others. The value of these insights should not be underestimated. Comparison across activities reveals marked differences in the breadth of the incentive spectrum. For bodybuilding, for example, only a very limited spectrum of activity-related incentives was found. Without the purpose-related incentives of an anticipated change in body shape or fitness, bodybuilders would be unlikely to endure the monotony of their training regimes (Gaugele & Ullmer, 1990). The spectrum of incentives involved in activities such as motorcycling, horse riding, and playing a musical instrument is much broader. Numerous qualitatively different experiences keep these activities attractive and provide a robust, durable motivational basis. Analyses of the incentives involved in socially undesirable leisure pursuits, such as illegal graffiti spraying, have provided insights into why some young people show such commitment and dedication to their unpaid night shifts. These insights may help to channel sprayers' energies elsewhere by focusing attention on the kind of incentives that alternative activities would have to provide.

Going beyond the level of individual experience, factor analysis can be used to identify more general dimensions of incentives residing within each activity (e.g., Rheinberg & Manig, 2003). Classes of incentives that run through very different activities can also be identified by empirical-inductive means (Rheinberg, 1993). This opens up new approaches to the prediction of behavior. If we know what someone enjoys about a certain activity, we can draw on established incentive profiles to predict which other activities are likely to appeal to them, even if they do not yet know that they exist (Rheinberg, 1989).

14.4.3 The Activity-Related Incentive of Achievement Motivation

Many of the activity-related incentives identified in the analyses outlined above reflect motivational concepts that have already been described in this volume and elsewhere, testifying to ecological validity of those concepts. Beside the power motive (feeling powerful, strong, and dominant when engaged in an activity; Chap. 8), the affiliation motive (experiencing warm and friendly social interaction during an activity; Chap. 7), *sensation seeking* (enjoying exciting,

but controlled threats), and so on, many of the activity-related incentives identified are associated with the achievement motive.

Definition

The activity-related incentive of achievement derives from the experience of functioning at the peak of one's abilities when pursuing challenging goals, of complete and unselfconscious immersion in tasks, and of losing all track of time (Rheinberg, 2002a; Rheinberg & Vollmeyer, 2018).

In other words, feelings of competence during the performance of an activity are combined with complete immersion in that activity (experience of flow, see below). In terms of the examples given in Table 14.1, there is typically a combination of the incentives "feelings of competence," "merging," and "flowing along."

Theoretical models of the activity-related incentive of achievement are as yet lacking. According to McClelland (1999), the incentive of achievement motivation resides in the experience of "doing better for its own sake" (McClelland, 1999, p. 228) – a kind of "consummatory experience" that is characteristic of achievement motivation. The quality of this experience is so positive that individuals with the corresponding disposition are repeatedly drawn to cycles of activity offering this kind of "consummatory experience."

However, closer inspection of the relevant phenomena reveals a distinction that, although significant, has attracted little attention to date. Achievement-oriented incentives have thus far been seen as residing in the successful completion of achievement behavior: an action outcome is evaluated against a standard of excellence and thereby classified as a success or a failure. Moderated by causal attributions, successful outcomes have certain consequences – feelings of pride (Atkinson, 1957) or positive self-evaluations (Heckhausen, 1972) – that provide the incentives to act in the first place. Seen from this perspective, the incentive to achieve is clearly purpose-related. A consummatory experience can only occur once a goal has been achieved, i.e., once the goal-oriented activity has been completed. If intrinsic is taken to mean "in the activity," this kind of incentive is clearly extrinsic.

It is also possible to anticipate the consumption of achievement-related incentives. At the level of conscious experience, individuals might, for example, imagine the feeling of having overcome a challenge. Are these anticipated self-evaluative outcomes the source of activity-related incentives to achieve? Probably not.

Example

Let us take the example of skiing down a steep slope covered by fresh, untouched snow. As they do so, they enjoy the experience of perfect psychomotor control (combined with the excitement typical of sensation seeking) and the positive feeling of functioning at the peak of their abilities, even in the most demanding of conditions. Given the opportunity, the skier would prolong the descent to savor the experience for as long as possible. The pride they feel upon seeing the track they carved out in the untouched snow has a different quality entirely, the major difference being that they do not experience this outcome-dependent affect until the action has been completed. To give an analogous example from the world of work, the feeling of functioning at the peak of one's abilities while making progress on a difficult task is quite different from the feelings experienced once that task has been successfully completed.

The observation that there are two different ways of consuming the experience of "doing better" explains some interesting phenomena. If, for example, someone celebrates a success at length, savoring its outcomes with lasting satisfaction, then these affective consequences clearly have

high incentive value for that person. The skier in the example above might relax with friends and a beer on the sun deck, looking up at the mountain every now and then and taking great pleasure in having produced the single track in the snow. If, on the other hand, someone only ever takes pleasure in their successes for a short time before starting to look for new and even more challenging goals, it is clear that the "consummatory experience" they are seeking occurs before the experience of success. In our example, after taking brief pleasure in having mastered the challenge, the skier might head back to the ski lift to look for an even steeper slope. Activity-related incentives are clearly decisive here.

The paradox of achievement motivation. The example above illustrates the paradox of achievement motivation. Achievement-motivated behavior is purpose-related in structure; its purpose is to master a difficult challenge. Once this goal has been achieved, activity-related incentives no longer pertain. In other words, actions resulting in the achievement of an aspired goal undermine their own motivational basis. People are not necessarily aware of this structure, however, as reflected in phenomena that are, on the face of it, puzzling. Having reflected on the stress of his current lifestyle, for example, an executive may decide to adjust his or her work-life balance. The positive consequences of his or her commitment to the job no longer compensate for the losses incurred to the domains of leisure, family, or health. Nevertheless, he or she may find that he or she keeps getting involved in high-stress projects after all, putting himself or herself in precisely those situations he had resolved to avoid because the rewards were no longer worthwhile.

According to McClelland's (1999) differentiation between nonconscious, *implicit motives* and conscious values or *motivational self-concepts* (Chap. 9), the executive in this example made the decision to slow down at work on the basis of his or her self-attributed motives. But the crucial factor driving his or her actions is in fact the implicit achievement motive. The executive is constantly drawn to situations that give him or her the feeling of functioning at the peak of his or her abilities under challenging conditions. Because implicit motives can take effect without the involvement of higher, conscious processes of evaluation, behaviors of this kind that run counter to conscious decisions are particularly likely to arise when a person's value beliefs and motivational self-concept do not correspond with their implicit motives (see motivational competence, Rheinberg, 2002a, Rheinberg & Vollmeyer, 2018, Sect. 14.7).

14.5 Flow: Joyful Absorption in an Activity

14.5.1 The Phenomenon

Csikszentmihalyi (1975, 1997) had already observed the achievement motivation paradox described above in his extensive studies of artists' behavior. He noted that some artists would become entirely caught up in a project, working feverishly to finish it, and no longer seem interested in anything else. Once the project was finished, however, it seemed to lose all appeal to them. They would put it away in a corner with the products of their previous labors and forget all about it before getting started on a new project.

There is no doubt that, for these artists, the incentive lies in the act of creativity itself. Although most of them had a fairly clear idea of what the end product of their new project would be, their behavior upon goal attainment indicates that they were in fact driven by the pleasure of creative expression, i.e., by activity-related incentives. They did not work to reach a set goal; on the contrary, they set a goal in order to create an opportunity to perform the work they enjoy. Their goal setting served activity-related incentives (Rheinberg, 1989; Rheinberg & Vollmeyer, 2018).

In a large-scale interview study, Csikszentmihalyi (1975, 1997b) attempted to identify what it is that makes performing an activity so attractive that people engage in it repeatedly. Csikszentmihalyi was not content to document and systematize the incentives associated with certain activities, as has been done in the research on activity-related incentives (Sect. 14.4.2) outlined above. Realizing that a

particular pattern of experience recurred across very diverse activities, he was farsighted enough to focus his work on this state.

- The state in question is characterized by unselfconscious and complete immersion in a pursuit that, although requiring high levels of skill and concentration, results in a sense of effortless action and control. Csikszentmihalyi (1975) gave this state the fitting name of "flow."

Flow can be experienced by surgeons performing operations, chess players, musicians, dancers, computer gamers, rock climbers, etc. Although Woodworth (1918) had already described the state of total "absorption" in an activity and noted its importance (Woodworth, 1918, p. 69), he did not go beyond these everyday observations. Csikszentmihalyi recognized just how significant this exceptional state is and examined it closely in an extensive research program.

14.5.2 Qualitative Flow Research

In a first phase of research, Csikszentmihalyi took a qualitative approach, drawing on interview data to specify the conditions and characteristics of flow. Varying numbers of flow components have been identified over the years; the following summary attempts to provide an integrative overview (based on Rheinberg & Vollmeyer, 2018).

The experience of flow is not limited to achievement-related activities. It also occurs in activities without tangible outcomes measurable against a standard of excellence: dancing, horse riding, driving fast cars or motorbikes, singing, juggling, etc. The activity-related incentive to achieve as described above can thus be distinguished as a subform of flow that occurs in achievement-related contexts.

- In addition to the general components of flow (see overview), the activity-related incentive to achieve is characterized by the enjoyment of functioning at the peak of one's abilities when pursuing a challenging goal. This component is not necessarily present in the general experience of flow.

Because of the strong preference for objectifiable behavioral data in academic psychology, little attention was initially paid to this phenomenological approach (Csikszentmihalyi & Csikszentmihalyi, 1991, p. 20). It was evidently too far removed from what scientists were prepared to accept as exploitable data sources. Nevertheless, it proved hard to ignore this very telling description of a motivational state that many recognized from their own experience

Components of Flow (Based on Csikszentmihalyi, 1975, 2010; Rheinberg & Vollmeyer, 2018)

1. Feeling of optimal challenge: feeling of being in control despite high situational demands (demands and skills are in balance at a high level).
2. The demands of the activity and feedback are perceived as clear and unambiguous; people in flow intuitively know what to do, and how to do it, at any given moment.
3. The pursuit of the action is experienced as smooth. One step flows into the next, as if guided by some inner logic. (This component presumably inspired the term "flow.")
4. There is no need for effortful and volitional concentration; rather, concentration occurs of its own accord, like breathing. Awareness is shielded from all cognitions that do not relate directly to the activity at hand.
5. The sense of time changes: people in flow usually lose all track of time; hours fly by like minutes.
6. People in flow feel a part of what they are doing and become completely absorbed in it ("merging" of action and awareness): loss of self-reflection and self-consciousness.

(Weinert, 1991). Since the late 1980s, the flow approach has evoked considerable interest worldwide, far beyond the constraints of academic psychology. (See Engeser and Schiepe-Tiska, 2017, for the history of the flow concept.)

In Germany, opinion pollsters have been collecting annual data on the frequency of flow experiences in representative samples since 1995 (Allensbacher Marktand Werbetra¨ geranalyse, 2000). According to these surveys, two thirds of the German population experience flow at least "sometimes." This figure includes approx. 25% who report experiencing flow "often." Only 10% of the population never experience flow.

The strategy of examining the frequency and conditions of flow in terms of its individual components provided first insights into the activities and contexts conducive to the experience of flow. Findings showed flow to be experienced most frequently by people engaged in arts and crafts, intellectual pursuits, or socially interactive (especially sexual) activities (Rheinberg, 1996). These results are in line with findings obtained by other methods (Massimini & Carli, 1991).

Although most flow experiences are reported in the context of hobbies and stimulating leisure pursuits, they also occur in work settings (Csikszentmihalyi & LeFevre, 1989; Pfister, 2002; Schallberger & Pfister, 2001). Activities such as the following have been found to be conducive to flow in office workers:

- Working on complicated and unusual tasks
- Working on the computer (e.g., programming)
- Learning new things

Conditions such as the following have been found to inhibit flow:

- Frequent interruptions (e.g., telephone calls)
- Having to work superficially owing to time pressures
- A negative atmosphere (Triemer, 2001; Triemer & Rau, 2001)

Although certain activities and conditions can thus facilitate or impede the occurrence of flow, there seem to be few activities that rule it out altogether. Even the most mundane activities have been shown to elicit flow occasionally (Csikszentmihalyi, 1975; Rheinberg, 1996). In fact, flow seems to have a lot to do with the individual approach to an activity and the attention devoted to it. In view of the fact that even concentration camp internees describe flowlike states, Csikszentmihalyi concludes that humans have the inbuilt capacity to turn any situation into one compatible with flow (Csikszentmihalyi, 1975). As mentioned above, however, the success of these endeavors may vary across activities and conditions.

14.5.3 Quantitative Flow Research

14.5.3.1 The Experience Sampling Method

Measurement of flow is complicated by the fact that people in flow typically have no sense of self. They are so deeply immersed in the activity that there is no room in their awareness for introspection, making it difficult for them to report on the state in retrospect. Methods are thus needed in which data is collected as closely as possible to the execution of the activity. Ideally, flow should be measured directly "online," as the activity is performed.

The development of the experience sampling method (ESM; Csikszentmihalyi, Larson, & Prescott, 1977; Hormuth, 1986) was a major step in this direction. Participants are provided with a "pager" (e.g., a programmable watch or mobile phone) that emits signals at random intervals. At each signal of the pager, they fill out a page in a block of self-report forms or on the mobile phone itself, stating what exactly they are doing and describing their quality of experience. As a rule, the assessments run for a week, with participants being paged five to nine times per day. As in Aellig's study (2004) of rock climbers described above, the ESM collects detailed data that would be practically impossible to obtain by retrospective means (see above) while respondents are actually engaged in an activity. It is admittedly a

time and cost-intensive technique, but has the distinct advantages of high ecological validity and proximity to the action.

The ESM has been used in numerous projects (e.g., Csikszentmihalyi & Csikszentmihalyi, 1991; Csikszentmihalyi & LeFevre, 1989; Delle Fave & Bassi, 2000; Engeser & Baumann, 2016; Moneta & Csikszentmihalyi, 1996; Rheinberg, Manig, Kliegl, Engeser, & Vollmeyer, 2007; Schallberger & Pfister, 2001). Needless to say, the value of the data produced depends on what exactly respondents are asked, i.e., on the scales administered, and it is here that many ESM-based flow studies have run into problems. The ESM scales were not derived directly from the conceptualization of flow that emerged from the qualitative phase of research (Sect. 14.5.2). Rather, the ESM became established as a method tapping key for dimensions of optimal experience and was applied to flow phenomena 10 years later (Csikszentmihalyi, 1991). The scales of established measures tend not to be changed for various reasons, and, unfortunately, the ESM scales cover only a selection of the components known to constitute flow.

The flow components most frequently assessed in ESM studies are concentration, the experience of control, and the balance of skills and demands. The rest of the assessment tends to focus on aspects related to "positive experience" that have little to do with the components of flow identified in qualitative research.

14.5.3.2 Can Flow Be Measured in Terms of a Demand/Skill Balance?

Because the ESM scales did not assess all components of flow, researchers had to decide how to measure flow with this restricted pool of variables. Csikszentmihalyi decided to measure flow in terms of just one of its components, namely, the *perceived balance* between demands and skills, on the assumption that people enter flow whenever their skills match the situational demands (e.g., Csikszentmihalyi & LeFevre, 1989).

This approach was parsimonious, but not unproblematic. Indeed, it is always risky to measure a multifaceted concept in terms of just one of its components. Although interview data show that people describing the experience of flow always say that the situational demands were neither too easy nor too difficult, it does not necessarily hold that the reverse is true and that all those experiencing a balance between their skills and the situational demands enter a state of flow.

Findings presented by Moneta and Csikszentmihalyi (1996) confirm that this reverse conclusion is indeed problematic. The authors found significant interindividual differences in whether or not a demand/skill balance was associated with signs of flow. They did not investigate the reasons for these between-person differences in any depth, however.

- There is, however, a theoretical model that predicts marked interindividual differences under precisely these conditions of a balance between demands and skills whenever an activity is geared toward a specific outcome and can thus result in success or failure. Specifically, Atkinson's (1957) risk-taking model of achievement motivation predicts that ability-appropriate demands (that are neither too easy nor too difficult) represent ideal motivational conditions for individuals high in *hope of success*. These individuals are likely to be drawn to activities that match their skills. These same conditions are anything but motivating for individuals high in failure motivation, however, who struggle with a paralyzing *fear of failure* (Chap. 13).

There is already some empirical evidence for individual differences in the experience of flow. Students were set an intellectually challenging task that was neither too difficult nor too easy for them (an *in-tray exercise* used in personnel recruitment). While working on this task, they were interrupted and asked to complete the *Flow Short Scale* (Rheinberg, Vollmeyer, & Engeser, 2003), which taps all components of flow as well as current worries (Sect. 14.5.6). The strength of the achievement motive had already been

measured using the Achievement Motives Scale (AMS) by Gjesme and Nygard (1970).

Under these achievement-related and intellectually challenging conditions, the flow scores of students working on the in-tray exercise increased as a function of their hope of success score, as measured by the AMS. At the same time, worry (but not flow) scores increased as a function of fear of failure, as measured by the AMS (Rheinberg et al., 2003). In addition, Engeser and Rheinberg (2008) found – in a study of psychology majors who were preparing for their exam in statistics – that the achievement motive (fear versus hope) moderated the relationship between demand versus skill balance and flow experience. Moreover, the first evidence indicates that a dynamic change in demands is important (Baumann, Lürig & Engeser, 2016). Thus, it would be incorrect to assume that a demand/skill balance is associated with the experience of flow in all individuals and under all conditions.

14.5.3.3 Can Challenge and Demands Be Equated?

When the demands of a task or an activity are compatible with the skills of the person performing it, the situation can be experienced as a *challenge*. If the situational demands are too low for a person's skill, the task becomes a monotonous routine; if they are much too high, a task is unlikely to be attempted in the first place (Heckhausen, 1963, 1972). Challenge is thus the product of a *skill/demand balance*. Highly skilled persons perceive this challenging balance at objectively high demands, whereas persons with poor skills perceive challenge at objectively low demands. As outlined above, the ESM measures flow in terms of this balance of skills and demands. In other words, flow is conceived to be unlikely whenever an activity is insufficiently challenging. If the concepts of "demands" and "challenges" were confused for any reason, findings might erroneously suggest that it is impossible to experience flow when the demands of a situation are low.

This is precisely what happened with the ESM scales. Csikszentmihalyi's (1975) theoretical model was logically based on demands (e.g., the objective difficulty level of a climbing route). This difficulty level was then set in relation to the respondents' climbing skills. Beginners perceive challenge when tackling low-level climbing routes and experts when tackling high-level routes. In the ESM, however, respondents do not rate the objective demands of an activity but the result of the skill-demand comparison, i.e., the perceived challenge. It is hardly surprising, then, that flow is barely observed at low challenge scores, even when skill scores are low as well. If the level of challenge is rated to be very low, the individual's skill level in that domain is irrelevant.

A further complication is that respondents seem to have very different ideas of how the demands/challenges of a situation relate to their own skills/ability. For some people, there is a virtually perfect positive relationship between the two ratings (the higher the demands of a situation, the higher my ability). For others, the opposite is the case (the higher the demands of a situation, the lower my ability). The correlations between the two ratings fluctuate between $-0.91 < r < 0.99$, with a standard deviation of SD = 0.52 (Pfister, 2002, p. 123).

- Given the marked differences in people's understandings of the concepts to be rated, it seems problematic to measure flow in terms of "challenge" and skills.

14.5.4 A Revision of the Model

These problems with the wording of the ESM scales led to unclear findings and prompted a revision of the flow model. In the original model, demands were plotted on the y-axis and skills on the x-axis of a coordinate system. A diagonal band represented the "channel" in which demands and skills are balanced (*flow channel model*, Fig. 14.5a) and activities can therefore be experienced as challenging.

The revised model (Fig. 14.5b) was the result of demands being equated with challenges (*quadrant model*). To account for findings showing that flow does not in fact occur at low levels

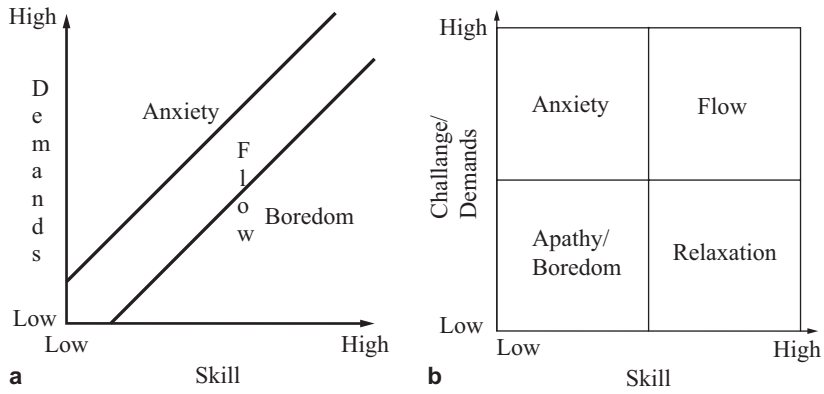

Fig. 14.5 The original flow channel model (**a**) by Csikszentmihalyi (1975) and (**b**) the quadrant model later proposed by Csikszentmihalyi and Csikszentmihalyi (1991) and Csikszentmihalyi (1997)

of challenge, it was now modeled to occur only when challenges are at an above-average level for the individual and – in accordance with a principle of balance that was no longer entirely clear – skill levels are also above average (Csikszentmihalyi, 1997). Not surprisingly, this quadrant model also proved unsatisfactory, and further modifications (*octant model*) followed (e.g., Massimini & Carli, 1991).

Research based on the quadrant (or octant) models typically starts by determining which quadrant the respondent is in at each point of measurement (above- vs. below-average skill × challenge; Fig. 14.5b). The quality of experience ratings for each quadrant is then inspected, and mean scores on each scale are reported for each quadrant. For example, Massimi and Carli (1991) found that respondents in the flow segment reported above-average levels of satisfaction, concentration, clarity, creativity, alertness, activity, wanting to perform the activity, and so on (cf. Delle Fave & Massimini, 2005).

These findings are clearly indicative of "positive experience," but it is unclear to what extent they reflect the experience of flow. Moreover, the mean profiles are not very clearly defined. It is only in exceptional cases that mean ratings in the flow segment are more than half a standard deviation higher than the mean of all other occasions of measurement (see Massimi & Carli, 1991, p. 297). Given the interindividual differences observed in people's responses to the balance of skills and demands (see above), this pattern of results is hardly surprising.

- In conclusion, it seems that the revisions of the flow model are unable to solve the problems inherent in the standard version of the ESM scales, which define flow solely in terms of a demand/skill balance. Nevertheless, one particular effect does, at first glance, seem to provide support for the quadrant model. This effect is considered in the following section.

14.5.5 The Expertise Effect and Resistance to the Undermining of Intrinsic Motivation

14.5.5.1 The Expertise Effect

When the flow experience is not erroneously equated with a balance between challenge and skill, it is possible to investigate empirically how the balance between demands and skill can influence other aspects of flow. In such a study, Engeser and Rheinberg (2008) found that the *importance of the task* plays a major role. Demand skill balance has a greater facilitative effect on flow experience in unimportant tasks (e.g., computer games). In important tasks, flow experience is optimized if demands are perceived to be somewhat lower than one's own skills.

In addition, there is an *expertise effect* in flow experience. For certain activities, it is inherently unlikely that flow will be experienced when skills and demands are both low. This applies to *complex activities* such as certain sports (e.g., Bieneck, 1991), playing musical instruments (Siebert & Vester, 1990), spraying graffiti (Rheinberg & Manig, 2003), and interacting with a computer (e.g., Schubert, 1986). The apparent effortlessness and smoothness typical of flow is experienced only when the necessary basic operations have become automatic (see component 3 of the overview "Components of Flow" in Sect. 14.5.2).

Examples would be a novice's faltering attempts to pick out a tune on the piano, or a first-time surfer's vain attempts to stay upright on the board for any length of time. Although low demands undoubtedly coincide with low skills in these cases, the novice's performance is too far removed from smooth, effortless action for flow to occur. Experts are thus more likely than novices to describe experiences of flow in these kinds of complex activities (Bieneck, 1991; Rheinberg & Manig, 2003; Schubert, 1986; Siebert & Vester, 1990).

- The expertise effect applies only to complex activities that require several basic skills to become automatic before their performance becomes anything like smooth and effortless. However, in more simply structured activities, such as some computer games, a state of flow can reliably be induced in absolute beginners when demands and skills are in balance (Keller & Bless, 2008; Peifer, Schächinger, Engeser & Antoni, 2005; Rheinberg & Vollmeyer, 2003; Vollmeyer & Rheinberg, 2003). The expertise effect can therefore not be cited as evidence for the universal validity of the quadrant model.

14.5.5.2 Resistance to the Undermining Effect

Interestingly, the expertise effect also occurs in purpose-related motivational structures. Hentsch (1992) compared "professional artists," who made a living from their art (and art students who aspired to do so), with "hobby artists," who painted in their leisure time for their own enjoyment. The hobby artists are clearly driven by activity-related incentives. For the professional artists, however, the activity and its outcomes have material consequences; they involve purpose-related incentives (external rewards). According to some definitions, this type of motivation would be classified as "extrinsic" and thus incompatible with joyful immersion in the activity (see above; Ryan & Deci, 2000).

However, as experts, professional artists have a much better command of the basic processes required to translate the images in their mind's eye onto canvas. The flow-fostering effect of expertise proved to be stronger than the flow impeding effect of "extrinsic" motivation just mentioned. Indeed, the professional artists were significantly more likely than the hobby artists to cite aspects of flow as reasons for their creative endeavors. In fact, flow was the strongest incentive category of all for the professional painters (Hentsch, 1992, p. 94). In other words, external rewards do not necessarily prevent people from becoming totally absorbed in an activity. Under certain conditions, people may develop a "resistance" to the undermining effect, becoming absorbed in an activity even when material rewards are expected. A skeptical approach to the overly simplistic contrasts sometimes made in

Excursus

The Flow Short Scale

This method allows the various components of flow to be assessed in 30–40 s and is thus suitable for completed activities, as well as for ESM-based assessments of ongoing activities. The Flow Short Scale has been translated into several languages. Despite the heterogeneity of the ten flow items, the consistency of the scale is high (Cronbach's α of around 0.90 for items 1–10). Ratings of items 1–10 are aggregated to produce a flow score (F). Ratings of items 11–13, which tap worries about the situation, are aggregated to produce a

worry score (W; Rheinberg et al., 2003; see also Rheinberg, 2015). Both scores are standardized (Rheinberg, 2004a). Each item is rated on a 7-point scale from "disagree" to "agree":

1. I feel just the right amount of challenge. (F)
2. My thoughts/activities run fluidly and smoothly. (F)
3. I don't notice time passing. (F)
4. I have no difficulty concentrating. (F)
5. My mind is completely clear. (F)
6. I am totally absorbed in what I am doing. (F)
7. The right thoughts/movements occur of their own accord. (F)
8. I know what I have to do each step of the way. (F)
9. I feel that I have everything under control. (F)
10. I am completely lost in thought. (F)
11. Something important to me is at stake. (W)
12. I mustn't make any mistakes. (W)
13. I am worried about failure. (W)

(Items 1–10: flow score; items 11–13: worry score)

the domain of intrinsic vs. extrinsic motivation (see earlier, Sect. 14.2.8) is thus warranted.

14.5.6 Flow and Achievement

14.5.6.1 A Comprehensive Assessment of Flow

Because the pitfalls of measuring flow in terms of the balance between demands and skills have been recognized, new instruments have been devised to provide comprehensive assessments of the components of flow in different fields of activity. Specifically, instruments have been devised to assess experiences of flow among Internet users (Novak and Hoffman, 1997) and computer users (Remy, 2000) and in the context of physical activity (Jackson & Eklund, 2002) (for further measures, see Moneta, 2012; Schiepe-Tiska & Engeser, 2017).

In addition, a ten-item scale has been developed to measure flow in any domain (Flow Short Scale; Rheinberg et al., 2003). A further three items of the scale tap worries that may arise during activity. The method is short enough to be combined with the ESM, meaning that the whole spectrum of flow components plus current worries can be tapped while an activity is ongoing. The method is standardized (Rheinberg, 2004a) and has been implemented in a broad variety of contexts (Engeser, 2012; Rheinberg et al., 2007). The items of the Flow Short Scale are detailed below.

14.5.6.2 Flow, Learning, and Achievement

The idea that a state of *absorption* fosters the development of knowledge and skills goes back to Woodworth (1918). In the light of the components of flow listed in the overview in Sect. 14.5.2, it seems quite reasonable to assume that flow can have positive effects on achievement. Possible exceptions are high-risk activities that are never entirely under the individual's control and in which total immersion would be too dangerous. A prime example would be motorcycling on the open road, where – relative to the race track – conditions can be unpredictable and beyond the motorcyclist's control. Indeed, a positive correlation has been observed between the intensity of flow experience in these conditions and the frequency of accidents ($r = 0.32$; $p < 0.05$; Rheinberg, 1991). Detailed analyses by Schüler and Nakamura (2013) indicate an increasing danger of taking too much risk especially for inexperienced athletes of high-risk sports.

With the exception of such dangerous activities, however, flow can be expected to facilitate achievement. Nakamura (1991) found that mathematically gifted but low-achieving students were less likely to experience flow in the classroom than equally gifted, but high-achieving students. Do these findings imply that more frequent flow experiences result in better performance?

The problem with cross-sectional comparisons of this kind is that it is impossible to determine the direction of the causal relationship. In line with the expertise effect of flow discussed above, the results reported by Nakamura (1991) may also be caused by high-achieving students finding it easier to enter flow precisely because they are more proficient. Their lower-achieving peers probably get stuck more often and lack the necessary skills to proceed. In other words, even if flow does foster achievement, the reverse may also hold, with higher levels of competence fostering the experience of flow, particularly important tasks (see discussion above). In this case, flow would not (only) be the cause but (also) the consequence of enhanced learning outcomes.

Reciprocal effects of this kind are difficult to disentangle. Empirical evidence indicating that flow fosters academic achievement would help to clarify the situation. Bischoff (2003) investigated university students enrolled in optional language courses. At the beginning of the semester, the students were allocated to different groups depending on their scores on a standardized language test. Over the course of the semester, they were administered the Flow Short Scale a number of times during lessons (Rheinberg et al., 2003). It emerged that achievement at the end of the semester was predicted by the experience of flow during the course (exam grades: $r = 0.38$; $p < 0.01$; subjective learning gains: $r = 0.44$; $p < 0.01$). These predictions remained significant when the effects of achievement level on flow were neutralized by using statistical regression techniques to control for test scores at baseline: flow still predicted an additional 10% of variance in achievement at the end of the semester (Engeser, Rheinberg, Vollmeyer, & Bischoff, 2005).

- Thus, research findings indicate that flow can have positive effects on classroom learning gains.

Engeser (2009) reports similar findings for self-directed learning, based on an investigation of psychology students preparing for a statistics exam. Engeser administered the Flow Short Scale (Rheinberg et al., 2003) 3 weeks before the exam, when the students were working through a set of statistics exercises. Performance-related data were also obtained from the students (prior knowledge of statistics, final school mathematics grade, intelligence data, etc.). Even when statistically controlling for all of the performance-related factors, the flow scores collected while students were working on the exercises predicted an additional 4% of the variance in their exam score. The predictive power of flow experience was approximately equal to that of a test score representing prior knowledge of statistics (Engeser et al., 2005).

Achievement data are now also available from experimentally controlled achievement situations. Rheinberg and Vollmeyer (2003) first showed that it was possible to manipulate the intensity of flow experimentally by varying the difficulty of modified computer games (e.g., Roboguard). The effect sizes observed were large ($d > 1$). As predicted by the flow channel model (Sect. 14.5.4, Fig. 14.5a), increasing demands were associated with a linear increase in scores on the Flow Short Scale, up to the point at which the task was perceived to be too difficult, when flow scores began to decrease again.

This finding was replicated with another computer game (Pacman) (Vollmeyer & Rheinberg, 2003) that provided an objective measure of performance (final score). A correlation of $r = 0.63$; $p < 0.01$ was found between the experience of flow during the game and the score obtained. Weibel and Wissmath (2011) could also confirm a positive relationship between flow (FKS) and performance for various computer games. Although this relationship is substantial, it is important to bear in mind that the influence is bidirectional – flow during the game leads to higher scores and vice versa. Furthermore, worries and fear of failure do not seem to play a discernable role in computer games played on an individual basis. Thus, the motive-dependent differences in response seen in more achievement-related contexts (see the inbox task above; Rheinberg et al., 2003) were irrelevant in these experiments.

14.6 Physiological Correlates of Flow

As described above, it would be advantageous to measure flow directly ("online") while the activity is performed. With the experience sampling method (ESM), a major step in this direction was already made. Yet, with the ESM the activity still has to be interrupted so that the individual can report what it has just experienced. Such an interruption could be avoided if flow could be measured with physiological indicators (resp. correlates) during the activity. Apart from measuring flow without interruption, more knowledge of physiological correlates would help to describe flow from an additional perspective increasing our understanding of flow enhancing process.

One line in the neurophysiological research on flow focuses on phenomena of *neuronal activities*. One basic assumption for flow is a downregulation of activity of central nervous areas not relevant for the activity (Dietrich, 2004; Goldberg, Harel & Malach, 2006; Ulrich, Keller & Grön, 2016; cf. Peifer, 2012). This applies for areas, which are connected to self-reflection, and a downregulation of these areas would be subjectively experienced as a "loss of self-reflection" and "effortlessness." In contrast, areas that are related to other aspects of flow are not downregulated and are even more activated (Ulrich, Keller, Hoenig, Waller & Grön, 2014). In further flow research on this topic, it would be important to separate flow-specific and activity-specific activation of central nervous areas. To do this, the same hypotheses must be tested for different activities. This would allow identifying the activation which is related to a specific activity and which activation in contrast occurs when a person apparently experiences flow irrespective of the activity. However, the technically extensive registration of neuronal activation restricts the activity that could be studied.

In recent years, the *hormone cortisol* and cardiovascular activities have attracted increased attention in flow research (cf. Tozman & Peifer, 2016). Cortisol has been predominantly studied in relation to stress (too high demands). However and in general, the release of cortisol is an adaption to demands such as the shielding of task-irrelevant stimuli and an increased concentration. The obvious links between models of stress and the flow concept have been outlined by Peifer (2012). Accordingly, flow is a coping mechanism that allocates all resources for mastering the task. This should go along with an increase in cortisol. If demands are too high, flow decreases, but cortisol will still increase as long as the task accomplishment is important for the individual. Therefore, flow should initially be positively related to cortisol. If cortisol passes a certain level, the relationship becomes negative. In mathematical terms, this represents an inverted U-shaped relationship. Empirical results confirm this assumption (Peifer, Schulz, Schächinger, Baumann, Antoni, 2014; Peifer et al., 2015; Tozman, Zhang & Vollmeyer, 2016). To what extend this relationship as described by Peifer (2012) also holds for physical activities is still open.

- Flow could be regarded as a coping mechanism in dealing with demands, and there is an inverted U-shaped relationship between cortisol and flow.

Cardiovascular reactivity has also a strong relationship with mental demands. In particular, heart rate variability (HRV) has proved to be a sensitive measure in this respect. As for the hormone cortisol, a U-shaped relationship could be verified for low-frequency HRV (Peifer et al., 2014). Other results, however, are less unambiguous (cf. Tozman & Peifer, 2016). Future research will show how closely flow is related to specific cardiovascular activities. As cardiovascular activities could be well measured in an ambulatory assessment, these measures could inform us "online" about the flow state of a person in various activities. The goal mentioned at the beginning of reliably inferring flow from cardiovascular activity seems not achieved yet (cf. the converse argument for balance and flow outlined above). Possibly, a simultaneous measuring of various

physiological indicators will allow approaching the goal of interfering flow "online" from physiological measures with reasonable confidence (for other physiological correlates of flow not mentioned here, see Peifer (2012) as well as Tozman and Peifer (2016)).

14.7 Future Prospects: The Flow Hypothesis of Motivational Competence

Definition
Motivational competence can be defined as a person's ability to reconcile current and future situations with his or her activity preferences such that he or she can function efficiently, without the need for permanent volitional control (Rheinberg, 2002a).

There are four components to this definition, the most important being an accurate sense of one's own (implicit) motives (Rheinberg & Vollmeyer, 2018). Motivational competence implies congruence between a person's implicit motives and his or her motivational self-concept.

The concept of motivational competence rests on three components, with the most important first component having an accurate sense of one's own (implicit) motives (Rheinberg, 2002a; Rheinberg & Vollmeyer, 2018). This means a congruence between the person's *implicit motives* and his or her *motivational self-concept* (on congruence of implicit and explicit motive measures, see Brunstein, Chap. 9 of this volume). The second component is described as the ability to evaluate given situations correctly according to their inherent incentives and – if necessary – enrich them. The third component is the knowledge on how appropriate goal setting and situational arrangement help to carry out one's own achievement action efficiently and joyfully.

The first component (congruence of implicit and explicit motive) essentially specifies and operationalizes Rogers' concept of self-congruence (Rogers, 1961) for the motivational domain, drawing on McClelland's distinction between implicit, nonconscious motives and self-attributed, conscious motives (McClelland, 1999; see also Chap. 9).It is this theoretical background that distinguishes the concept of motivational competence (based on McClelland, 1999) from the concept of self-concordance proposed by Sheldon and Elliot (1999; based on Deci and Ryan, 1985). Self-concordance concerns the correspondence between the self and a person's *current goals*. Motivational competence might be said to go one level deeper. It concerns the correspondence between an individual's nonconscious motives and the conscious self and how well that individual's current goals correspond with both.

The pursuit of goals that are not congruent with one's implicit motives does not usually lead to increased emotional well-being. High commitment to motive-incongruent goals may in fact decrease well-being. For people whose goals match their implicit motives, however, well-being increases as progress is made toward the goal (Brunstein, Schultheiss, & Grässmann, 1998). These and similar findings make perfect sense in the light of the assumption that implicit motives do not affect the incentive value of consciously chosen goals as much as the incentive value of engaging in motive-congruent activities (Brunstein, 2003; Spangler, 1992).

For example, research on politicians running in the primaries for the US presidential election has shown that candidates high in power motivation persisted even when it became clear that they had no chance of winning. For them, the run-up to the election with its many speeches and televised debates was a pleasure in itself. Achievement-motivated candidates, on the other hand, stepped down when they no longer had a realistic chance of winning. The incentive structure of the goal-oriented activities did not correspond to their implicit motives (Winter, 1982).

Example
Individuals whose motivational self-concept and implicit motives do not correspond are especially likely to set motive-incongruent goals when putting a

lot of thought into goal selection. When reflecting consciously on a decision, people tend to draw on their motivational self-concept rather than on their implicit motives and often end up committing themselves to projects that are not in line with their implicit motives. The pursuit of such goals, which are only ostensibly appropriate and "valuable," requires constant monitoring and volitional control, which is of course incompatible with flow (Sokolowski, 1993).

Individuals whose motivational self-concept corresponds with their implicit motives are more likely to select motive-congruent goals. Accordingly, the incentive structure of the situations they encounter when pursuing their goals is much more likely to offer them motivational support. For example, a challenging project will give individuals high in the achievement motive plentiful opportunities to experience the states they find so attractive: joyful absorption in functioning at the peak of their abilities. There is no need for volitional control. Action seems effortless, and flow is very likely (Rheinberg, 2002a, 2002b, 2004b, Rheinberg & Engeser, 2010). Hence, people with high levels of motivational competence can be expected to experience flow more frequently. (The same perdition is made by the compensatory model of motivation and volition which Kehr (2004a, b) had developed independently of the concept of motivational competence.)

The very low correlations that tend to emerge between implicit motives and the motivational self-concept (Köllner & Schultheiss, 2014) indicate that, for some people, motivational self-concepts correspond with implicit motives, but that, for other people, they do not. For instance, a person who sees himself or herself as persuasive and influential might in fact be achievement motivated rather than power motivated.

14.7.1 Empirical Support for the Flow Hypothesis

The flow hypothesis of motivational competence illustrated in the example above has already received empirical support. Clavadetscher (2003) asked volunteers in a Swiss cultural organization to complete the Flow Short Scale (Rheinberg et al., 2003) for the activities involved in their voluntary work. Additionally, the volunteers' achievement, power, and affiliation motives were assessed in terms of motivational self-concepts (PRF; Stumpf, Angleitner, Wieck, Jackson & Beloch-Till, 1985) and implicit motives (MMG; Schmalt, Sokolowski & Langens, 2000). In line with the flow hypothesis of motivational competence, the more the volunteers' motivational self-concepts corresponded with their implicit motives, the more flow they experienced in their chosen projects ($r = 0.34$; $p < 0.01$).

The longitudinal study by Engeser (2009) outlined above provides further evidence in support of the flow hypothesis. Engeser assessed the implicit achievement motives (TAT after Winter, 1991) and motivational self-concepts (PRF; Stumpf et al., 1985) of 266 psychology students enrolled in a statistics seminar. In addition, the scales of the *Volitional Components Inventory* (VCI) by Fuhrmann and Kuhl (1998) were used to assess how the students motivated themselves to achieve their goals.

Motivational competence was examined in terms of the interaction between the implicit achievement motive and motivational self-concept. Students who were high in both the implicit achievement motive and self-attributed achievement motivation were more likely to identify with their work and to become absorbed in the activity ("self-regulation" scale of the VCI). In contrast, students with a high motivational self-concept reported difficulties in achieving their goals, stating that they often had to force themselves to work ("self-control/volitional inhibition" scale of the VCI). For students with a low implicit achievement motive, the motivational self-concept was of less relevance to the endorsement of the self-regulation scales. This kind of interaction between implicit and explicit motives

was also found in sports (Steiner, 2006). In this study, the dependent variable was the Flow Short *Scale* (Rheinberg et al., 2003).

- It is particularly important that an individual's implicit motives and motivational self-concept correspond – i.e., that motivational competence is high – when his or her implicit motives are strong.

Besides the correspondence of implicit and explicit motives (motive congruence), the concept of motivational competence includes as the second component the ability to evaluate future situations correctly in respect to incentives (see above). This increases the change to engage intentionally in motive-fitting situations. In fact, such motive-fitting incentives seem important for experiencing flow. By now, it has been found that motive congruence especially fosters flow in situations where motive-fitting incentives are more salient. So, for the achievement motive in sports (badminton, climbing), it has been found that motive congruence fostered flow where motive-fitting incentives are especially salient (Schüler, 2010, Experiment 3) or respectively are perceived as salient (Schattke, Brandstätter, Tayler & Kehr, 2015). Thus, to increase the frequency of flow, it would not be enough to reconcile one's own motive correctly (motive congruence).

Study

Flow, Goals, and Happiness: The Paradox of Work

Does flow make people happy? On the one hand, the "positive experience" of flow is directly associated with happiness: "Flow is defined as a psychological state in which the person feels simultaneously cognitively efficient, motivated, and happy" (Moneta & Csikszentmihalyi, 1996, p. 277). On the other hand, empirical studies have established a higher frequency of flow when people are at work than at leisure. Yet respondents state that they would rather be doing something else when at work and report feeling less happy at work than during leisure time. This phenomenon has been termed the "paradox of work" (Csikszentmihalyi & LeFevre, 1989; Schallberger & Pfister, 2001). How might this paradox be explained? Might it be attributable to the way that flow was measured? The studies in question were based on the quadrant model and assumed flow to occur when both the level of challenge and the level of skill were above average. As discussed above, this definition of flow is very problematic.

Rheinberg et al. (2007) took a different approach to assessing flow in an ESM study of 101 adults. Participants were paged seven times a day for 1 week. At each signal of the pager, they (a) completed the Flow Short Scale and (b) rated their current happiness/satisfaction (valence). Figure 14.6 plots the mean trajectories of these two scores over the course of the day during the workweek (top panel) and at the weekend (bottom panel).

Although the Flow Short Scale assesses all components of the flow experience, the "paradox of work" was still apparent. On weekdays, flow scores were higher during working hours (09.15–16.15) than during leisure time, whereas happiness and satisfaction were higher in leisure time than in working hours. A different picture entirely emerged at the weekend, when happiness/satisfaction scores were consistently above average and flow scores consistently below average.

How can these findings be explained? Rheinberg et al. (2007) asked respondents to state whether or not their activity was directed toward a specific goal. A goal orientation was expected to foster flow, because goals organize behavior and thus facilitate smoothness of action. Figure 14.7 shows how goal directedness of behavior was found to affect flow and happiness/satisfaction at work (left panel) and in leisure time (right panel).

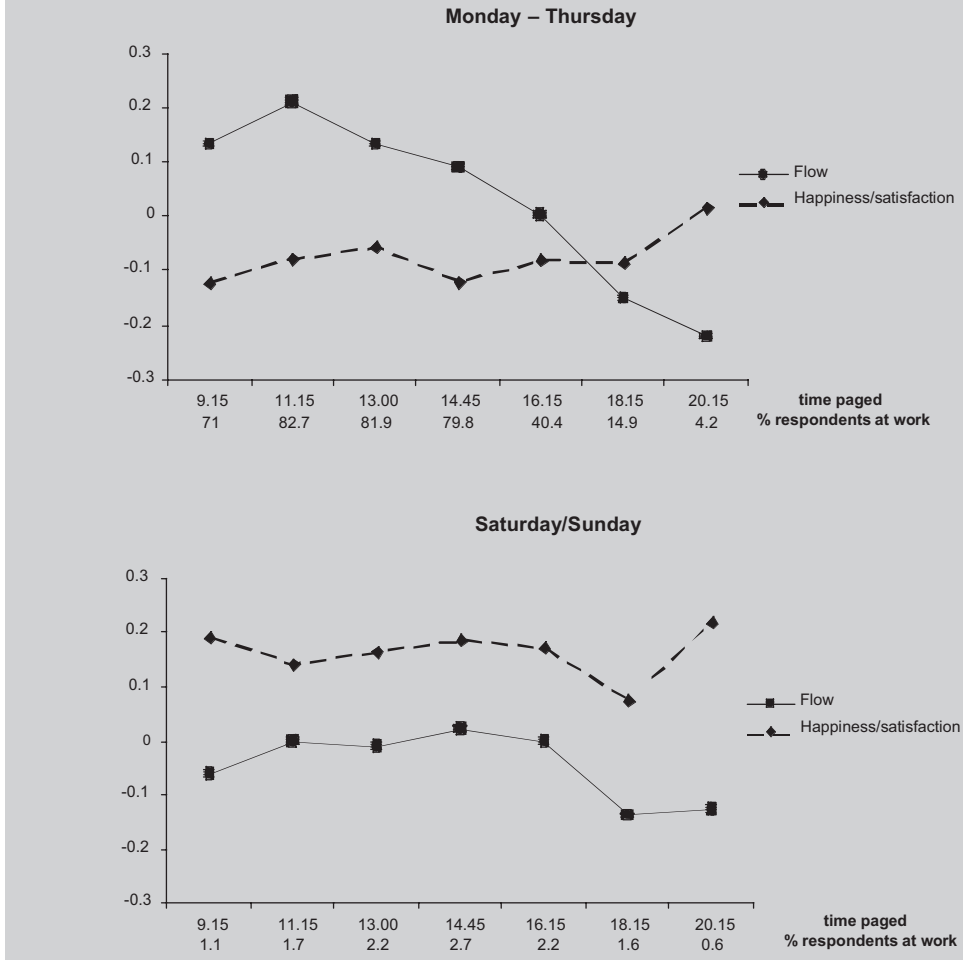

Fig. 14.6 Mean trajectories of flow and happiness scores (z-scores) during the working week (upper panel) and at the weekend (lower panel) (Based on Rheinberg et al., 2007)

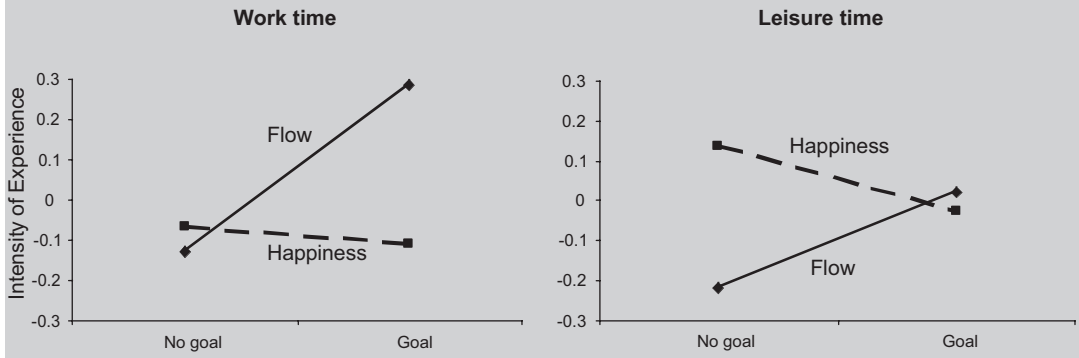

Fig. 14.7 The relationship of goal directedness of behavior to flow and happiness at work (*left panel*) and at leisure (*right panel*) (Based on Rheinberg et al., 2007)

As expected, goal-directed activities were associated with higher scores on the Flow Short Scale in work and leisure time. Goal pursuit was associated with lower levels of happiness and satisfaction, however, particularly in leisure time. Why might this be? A goal is a positively evaluated state that has not yet been attained. Accordingly, there is a differential between valence of the present situation and that of the aspired future situation. This differential may activate behavior and facilitate flow, but it is incompatible with current feelings of happiness and satisfaction. Given that respondents were much more likely to pursue goals at work than during leisure time, the finding that goals facilitate flow but reduce happiness/satisfaction resolves the "paradox of work," revealing it to be an effect of greater goal orientation in work-related settings.

Of course, it is quite possible to experience flow without goals and to be happy at the same time (e.g., when dancing, singing, surfing, taking a long and leisurely motorcycle ride, etc.). In everyday life, goals facilitate flow experience at work. They do not, however, promote happiness and satisfaction. In fact, the opposite tends to be the case.

Interestingly, individuals who had higher flow scores at work scored higher on happiness/satisfaction in the evenings ($r = 0.57$; $p < 0.01$). It may be that flow at work contributes to people's subsequent feelings of happiness and satisfaction – even if they did not experience these feelings at work.

One has also to be able to "read" upcoming situations in respect to their incentives.

These and further results imply that the concept provide a relatively parsimonious explanation for the observation that some people are more likely to be found in a state of joyful immersion when engaged in goal-directed activities, whereas for others goal pursuit necessitates permanent volitional control.

Summary

Motivational psychologists are accustomed to thinking of behavior as being energized and directed by the incentives residing in an aspired goal. It is indisputable, however, that incentives also reside in the performance of the activity itself. When incentives are located in the activity itself, rather than in its potential consequences, an activity is often deemed to be intrinsically, as opposed to extrinsically, motivated.

Upon closer inspection, however, different conceptualizations of intrinsic vs. extrinsic can be discerned. Quite apart from the sense of "in the activity," the term "intrinsic" is sometimes applied to motivation deriving from the needs for self-determination and competence and sometimes equated with interest and involvedness. Another conceptualization focuses on the thematic congruence of means and ends and is sometimes applied to the distinction between learning-goal or mastery orientation and performance-goal or ego orientation in the context of motivation to learn. Recent meta-analyses indicate that the question of whether intrinsic motivation, whatever its definition, is undermined by extrinsic rewards is not yet entirely settled, but hinges on a number of factors. Current usage of the terms "intrinsic" and "extrinsic" is so inconsistent and imprecise that it would make more sense to give each of the phenomena specified new and more accurate labels.

This type of approach was demonstrated for intrinsic in the sense of "in the activity" with an analysis of activity-related incentives. It was shown that activity-related incentives can be integrated within the extended cognitive model of motivation proposed by Heckhausen (1977a) and its further extension by Rheinberg (1989). The quality of these incentives can be investigated and described at different levels of abstraction. Using proximal measures to assess quality of experience while respondents are engaged in an activity (the experience sampling method, ESM) has proved particularly fruitful.

Two of many activity-related incentives were examined in greater detail, namely, the activity-related incentive to achieve and the experience of flow. Flow research using ESM techniques has the potential to provide substantial insights. However, this approach does have some methodological problems. Specifically, a single component of flow – balance between skills and challenge – is often equated with flow, even though there are both theoretical and empirical reasons for assuming marked individual differences in response to the skill/challenge balance. Enhanced assessment procedures have produced interesting findings on the expertise effect of flow and on the resistance of flow experience to the undermining effects of external rewards. Detailed analyses show that the experience of flow can be conducive to achievement. Of course, this does not rule out the possibility that the reverse also holds (i.e., that a high level of achievement is conducive to flow; see the discussion on the expertise effect above).

Physiological correlates of flow and their potential for future flow research have been discussed. Ongoing research on the flow hypothesis of motivational competence was presented according to which individuals whose implicit motives correspond with their motivational self-concepts are more likely to experience flow. Given a free choice of goals, these individuals are more likely to opt for activities with an incentive structure that offers them motivational support. Preliminary findings indicate that it is worth pursuing this hypothesis further. This holds especially for situations that offer motive-fitting incentives.

Review Questions

1. *What are the different conceptualizations of intrinsic, as opposed to extrinsic, motivation?*

   Intrinsic motivation can be defined in the sense of "inherent in the activity":
   - As a form of motivation based on self-determination and feelings of competence
   - As characterized by interest and involvement
   - As a form of motivation in congruent

2. *Can you give examples of phenomena that might be classified as either extrinsic or intrinsic, depending on the definition applied?*

   Experiencing great enjoyment and involvement in an activity (e.g., painting, computer programming), even though you know you will be paid for it.

   Taking a self-determined approach to force yourself to do something you know will not be enjoyable.

   Activities that cannot possibly be thematically congruent with an intended outcome – because there is none – can be a source of great enjoyment and performed repeatedly.

3. *Which types of expectancies and incentives are distinguished in Heckhausen's (1977) extended cognitive model of motivation?*

   Situation-outcome expectancies:
   - Action-outcome expectancies
   - Outcome-consequence expectancies
   - Consequence (purpose)-related incentives

   The model has been further extended to include activity-related incentives.

4. *Apply this model to your current motivation to answer these review questions.*

   Let the situation be that you have read the text up to this point for particular reasons (the consequences of doing so, interest in the topic covered, enjoyment of reading, etc.); let the action be wanting to answer this question now; let the outcome

(continued)

be knowing whether or not you have a sufficient grasp of the material covered; let the direct consequence be a pleasant feeling of being able to turn to other pursuits without jeopardizing further aspired consequences (passing an exam, making a presentation in class, being able to apply the content of the chapter to "real life," etc.). Another expected consequence might be finding out which part(s) of the text you need to think through more carefully.

Having thus specified the elements of the model, your current motivation to answer these review questions can be determined through the following expectancies and incentives. You do not think that you will be able to gauge how well you have understood the text unless you attempt the questions (low situation-outcome expectancy). However, you do think that answering the questions will help you gauge your understanding of the text (high action-outcome expectancy). Moreover, you believe that this knowledge will allow you to turn to other pursuits with a clear conscience, reduce the general level of uncertainty, or tell you how much and which parts of the text you need to read again (high outcome-consequence expectancy). The incentive value of some or all of these consequences is sufficiently high.

Alternatively, it may be that you simply enjoy puzzling over questions of this kind or reflecting on the topics covered. In this case, you would be motivated by positive activity-related incentives. Of course, this would not exclude the possibility that the purpose-related incentives outlined above also play a role.

5. *What methods are used to examine the incentives inherent in performing an activity? Give two examples and discuss the advantages and disadvantages of each.*

Experience sampling methods: Respondents are asked to rate the quality of experience while pursuing the activity. Advantages: Data are obtained "online"; the scales implemented allow comparisons to be made across activities, conditions, and individuals. Disadvantages: Assessments are very abstract and provide few qualitative insights into the specific incentives of engaging in a particular activity.

Explorative interviews on the incentives of specific activities. Advantages: Detailed accounts of specific experiences provide insights into what exactly it is that makes performing an activity so attractive. Disadvantages: Data are collected retrospectively and are not easily comparable across activities.

6. *What is meant by the flow experience and what are its characteristic components?*

Flow is the unselfconscious and complete absorption in a pursuit that, although requiring high levels of skill and concentration, results in a sense of smooth action and effortless control. See the overview in Sect. 14.5.2 for its components.

7. *What is the difference between qualitative and quantitative flow research?*

In qualitative flow research, retrospective exploratory interviews have been used to identify between six and nine components of flow. In quantitative flow research, the experience sampling method (ESM) is used to assess the occurrence of flow, with respondents rating the quality of their experience on various scales at the signal of a pager or watch. These scales are not congruent with the components of flow identified in qualitative research, however.

8. *How was flow defined in the quantitative phase of research based on the ESM? What problems does this definition entail?*

Flow was defined as occurring when skills and challenges are in balance at a level that exceeds the personal average.

Problems: Flow was defined in terms of just one of its many components.

There are theoretical and empirical reasons for expecting marked individual differences in this very component.

In some cases, demands are confused with challenges; moreover, individual understandings of these concepts vary.

9. *What is the expertise effect of flow and when does it occur?*

In complex activities, the apparent effortless characteristic of flow is experienced only when the necessary basic skills have become sufficiently automatic. The same does not apply to simply structured activities.

10. *Why is the relationship between flow and achievement difficult to interpret?*

The influence is bidirectional. Flow can be conducive to (learning) outcomes, but better (learning) outcomes can also increase the probability of experiencing flow (see the expertise effect in Question 9).

11. What kind of relationship has been found between flow and cortisol release? Is it possible to infer flow from physiological indicators?

Flow is positively correlated with cortisol release. If cortisol passes a certain level, the relationship becomes negative. In mathematical terms, this represents an inverted U-shaped relationship. Different labs confirmed this U-shaped relationship. Conceptually, with increasing demands both flow and cortisol increase initially. If demands bypass an optimal level (i.e., demands get too high), flow will decrease whereas cortisol further increases (in case task accomplishment is important for the individual). A very high cortisol blood level is therefore an indication of excessive demands and stress. To what extend this relationship also holds for physical activity (e.g., climbing, windsurfing) is still an open question. Systematic relationships were also found for other physiological measures and flow. However, the goal of reliably inferring flow from cardiovascular activity has not yet been achieved. In fact, flow goes along with physiological changes, but the relationship with specific physiological measures is not particularly strong, and physiological changes are attributable to many other factors. Therefore, based on the current knowledge, inferring flow from physiological correlates is not sufficiently unambiguous.

12. *Why can individuals high in "motivational competence" be expected to experience flow more frequently?*

The major component of motivational competence is that a person's implicit motives correspond with his or her motivational self-concept. At a high level of correspondence, people are more likely to set themselves goals that facilitate in motive-congruent activities. When motivational structures are congruent with implicit motives, volitional control becomes less necessary. Action seems effortless and joyful, and flow becomes more likely. To date, however, there are only three pieces of empirical evidence to support these assumptions.

13. *What is the "paradox of work" and how can it be explained?*

Empirical studies have shown that flow is more likely to occur when people are at work than at leisure. Yet people feel happier in leisure time and are more likely to say they would rather be doing something else when at work. This apparent contradiction is resolved by taking into account that (a) work-related activities are more likely to be goal oriented than leisure activities and that (b) goals facilitate flow experience but tend to reduce current happiness/satisfaction. Flow at work is positively related to happiness/satisfaction in subsequent leisure time, however.

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Causal Attribution of Behavior and Achievement

15

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15.1 Causal Attribution: How Thinking About Causes Influences Behavior

Motivational psychologists are not alone in seeking to understand the reasons for people's behavior and the causes of action outcomes. We all do it; it is an everyday occurrence. We all want to understand what is going on around us. Accordingly, we do not simply observe or note the behavior of others but seek to understand what motivates them to act the way they do. In other words, we try to identify the reasons for their behavior. Insights into these reasons allow us to predict – and perhaps even influence – how they will behave in the future. We also strive to pinpoint the causes for action outcomes, because only a clear understanding of these causes allows us to reproduce desirable outcomes in the future and to prevent undesirable ones, e.g., by eradicating their causes. Knowledge about the causes of the behavior we observe in others lets us moreover judge said behavior as good or bad, moral or nefarious. The following examples serve to illustrate when and why we analyze the reasons and causes for behavior and action outcomes and how the results of this analysis influence our subsequent behavior and the (moral) evaluation of behavior.

Example

A rather mediocre student unexpectedly gets one of the highest marks in a class test. The teacher might well find herself asking a number of questions: Did the student work particularly hard for the test? Was he lucky? Might he have cheated? Her behavior and evaluation of her student's behavior will differ depending on the cause she infers for the student's surprisingly good test score. She might praise him (if she thinks he has worked particularly hard) or treat him with suspicion (if she thinks he has cheated), etc. Let us assume – to give another example – that someone jostles us as we are getting on a bus. Is she trying to push in to get a good seat or did she trip? Here again, our response will depend on the cause we identify for her behavior. If we decide that the woman wants to push in, we will likely be annoyed and may be tempted to give her a piece of our mind. If, on the other hand, we decide that she stumbled, we will probably keep our thoughts to ourselves.

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As these two examples show, causal attributions influence how we judge behavior, which emotions we experience, and how we behave in a particular situation.

Apart from seeking to ascribe causality in an attempt to optimize our own behavior and to predict, (morally) judge, and potentially influence the behavior of others, we also seek to actively influence the causal attributions of others – because we are well aware that causal attributions do affect behavior. If we bump into someone as we are getting off the bus, for example, we might apologize, because we think an apology will prevent them from thinking we jostled them on purpose and considering our behavior mean and that this belief will in turn temper their response (Weiner, 1995).

People's explanations for outcomes and events – i.e., the causes they infer and the effects of these causal attributions on their subsequent behavior and experience – soon became the object of theoretical debate and empirical research (see Eimer, 1987, for a summary). There was a huge upsurge in research after Heider (1958), the acknowledged pioneer of the study of attribution processes, published some fundamental ideas on the phenomenon. The findings of some 50 years of continued research in this area (for on overview of research on attributional psychology that is relevant to motivational psychology see Graham & Taylor, 2016) have had substantial influence on diverse fields of psychological research (e.g., Alloy et al., 2006; Stiensmeier-Pelster & Schwinger, 2008; Tomlinson & Mayer, 2009). Kelley and Michela (1980) distinguish two research approaches within this extensive field of research:

- Attribution theories
- Attributional theories (Fig. 15.1)

Attribution theories are particularly concerned with how causal attributions are reached and seek answers to the following questions:

- When do attributions occur?
- Do causal attributions necessarily involve the conscious, active analysis of the causal structure of events, or are they based on implicit assumptions about the causes of behavior and action outcomes?
- What kind of information is utilized in causal inferences?
- How is this information sought and how is it processed?
- What are the mechanisms and processes underlying our attributions of actions and outcomes to specific causes?

Attribution theories are discussed in the second part of this chapter, before we turn to attributional theories in the third part. Attributional theories are primarily concerned with the effects of causal attribution on people's subsequent behavior and experience. They play a major role in various subdomains of psychology and are, strictly speaking, what make causal attributions so interesting for the psychology of motivation. The question of how we arrive at causal attributions (attribution theories) is really more a matter for cognitive psychology (although motivational factors of course have some bearing on the attribution process and its outcomes). Nevertheless, because the causes to which outcomes and events are ascribed can have a decisive impact on subsequent motivation, we also cover the more cognitive aspects of causal attribution in this chapter.

One of the most prominent approaches to attribution theory is Weiner's attributional theory of motivation, emotion, and behavior (Weiner,

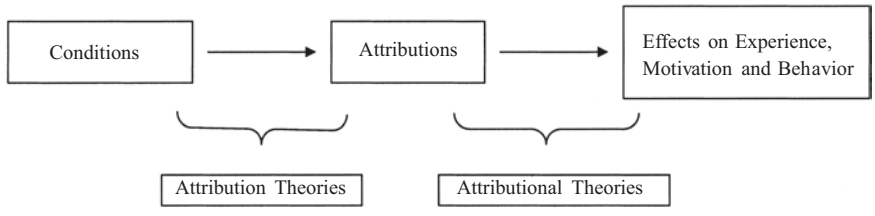

Fig. 15.1 Explanatory domain of attribution theories and attributional theories (Based on Kelley & Michela, 1980)

1985a; see also Weiner, 2006 or Weiner, 2012 for an up-to-date review of theoretical positions and empirical evidence). On the one hand, this theory addresses the processes and mechanisms that are involved in causal search and that terminate in a specific attribution. On the other hand, it provides a comprehensive description of the effects of causal attributions on subsequent behavior and experience. Weiner's ideas form the basis for numerous other attributional theories, such as the attributional theory of the development of depressive disorders (Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978; Stiensmeier-Pelster & Schürmann, 1991), the attributional theory of aggressive behavior (Graham, Hudley, & Williams, 1992; Rudolph, Roesch, Weiner, & Greitemeyer, 2004; Tscharaktschiew & Rodolph, 2015), and the (moral) evaluation of behavior and associated moral emotions (Rudolph & Tscharaktschiew, 2014).

Weiner's ideas have also been incorporated into a number of further theories without the authors always stating this fact explicitly. For example, attributions play a key role in recent theories of learning and achievement (Dweck, 1999; Stiensmeier-Pelster & Schwinger, 2008) and theories of task choice behavior (Dickhäuser & Stiensmeier-Pelster, 2000; Eccles & Wigfield, 1995). The attibution theory of Weiner has also formed the basis for explanations of health-related behavior (Schwarzer, 1994) and sports outcomes (Rethorst, 1994), for predictions of the sales achieved by financial service providers (Mai, 2004), and also for explanations of child abuse (Graham, Weiner, Cobb, & Henderson, 2001).

15.2 Weiner's Attributional Analysis of Motivation, Emotion, and Behavior

According to Weiner's model, action outcomes are first evaluated in terms of their valence, i.e., whether they are positive or negative (Fig. 15.2) (Weiner, 1985b). The result of this evaluation triggers outcome-dependent (and attribution-independent) emotions. A positive evaluation will give rise to general, nonspecific feelings of joy or happiness, whereas a negative evaluation will result in feelings such as sadness or frustration. Under certain conditions, besides evaluating the valence of an outcome, we may undertake causal search, i.e., try to identify the causes of an outcome. Weiner posits causal search to occur whenever an outcome:

- Occurs unexpectedly
- Is important
- Is evaluated negatively

Weiner holds that each of these three conditions is sufficient to initiate causal search. This assumption does not withstand careful theoretical or empirical testing, however, as we will

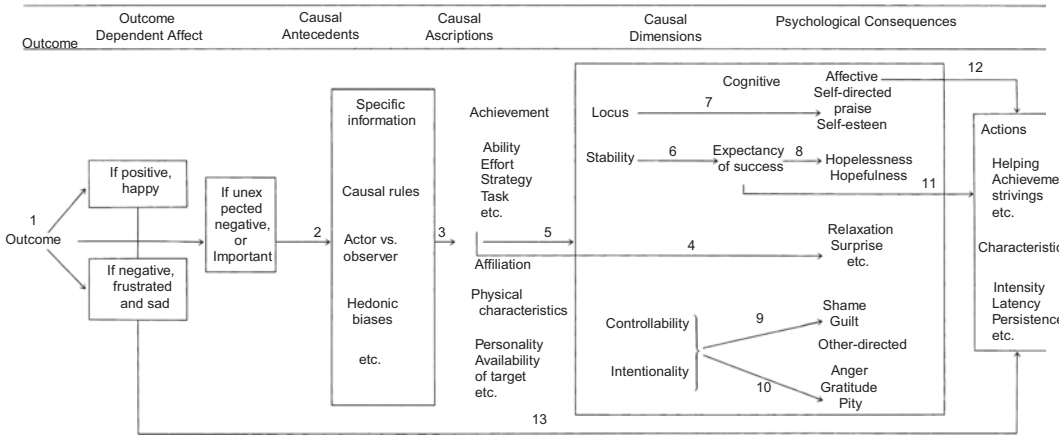

Fig. 15.2 Weiner's attributional approach to motivation and emotion (Based on Weiner, 1985b, p. 565)

show below. The search for causality culminates in a causal attribution. Which cause is inferred for a particular outcome depends on a number of causal antecedents. As will be discussed in more depth in Sect. 15.3, specific information about the action outcome in question may be evaluated to arrive at an appropriate causal attribution. Certain causal schemata may also be activated to this end. Hedonic biases, such as the desire to protect one's self-esteem ("I am responsible for successes, but have nothing to do with failures"), may also play a role, as may the perspective taken on the outcome (i.e., whether I was the actor or merely observed someone else's actions). We will consider these causal antecedents and the processes underlying causal attribution in more detail in Sect. 15.3.

15.2.1 Causal Factors

Attribution theory research has identified a number of causal factors (causal attributions) that are regularly cited to explain academic performance or success and failure in social interactions (i.e., affiliation-related contexts). The causal factors inferred for achievement-related outcomes include high or insufficient ability, high or insufficient effort, task difficulty, and luck. Causal factors that can explain success and failure in affiliation-related contexts include physical characteristics and certain personality features. As shown in the model, these causal factors are then rated along certain dimensions. The most important of the causal dimensions are listed in the following overview.

Causal Dimensions (Based on Weiner, 1992)

1. Locus
   The locus (person dependence, also termed internality) of a causal factor reflects whether it resides within the actor (internal) or in the environmental conditions or other people (external).
2. Stability
   This dimension reflects stability over time, i.e., whether the causal factor remains stable or changes over time (variable).
3. Controllability
   This dimension covers the controllability and intentionality of causal factors:
   - Controllability indicates whether the causal factor was subject to the actor's control (controllable) or beyond it (uncontrollable).
   - Intentionality indicates whether the actor brought about the causal factor deliberately (intentionally) or accidentally. Note that a causal factor or a constellation of causal factors that was brought about deliberately (intentionality is present) is always controllable, whereas a controllable causal factor was not necessarily brought about deliberately.

Other authors have identified further causal dimensions. For instance, it may, under certain conditions, be important to evaluate causal factors on the globality dimension (e.g., Abramson et al., 1978, 1989): can causal factors be generalized across situational domains (global), or are their effects limited to a particular situation (specific)?

According to the distinction made by Kelley and Michela (1980), Weiner's approach is – up to this point – an attribution theory, concerning solely the process from the perception of an event to the identification of its causes. Weiner, however, goes on to describe the influence of causal attributions on behavior and experience, meaning that his approach is in fact an attributional theory.

15.2.2 Psychological Consequences of Causal Analysis

Causal attributions – and especially their characterization in terms of locus, stability, globality, controllability, and intentionality – have certain cognitive and affective implications (psychological consequences).

- The cognitive implications of causal attributions are expectancies of future success (or failure), which in turn elicit feelings of confidence (hope) or hopelessness.

Cognitive consequences of causal attributions. According to Weiner's model, the expectancy of future success or failure largely depends on the attributor's evaluation of the stability and globality dimensions of causality:

- If a student succeeds (fails) on a task and ascribes this outcome to a cause he perceives to be stable, he will continue to expect to succeed (fail) on that task in the future.
- Moreover, if he ascribes the outcome to a global cause, he will generalize these expectancies to other tasks as well; the more global the cause is perceived to be, the broader the generalization.
- If, on the other hand, the student ascribes his success (failure) to a cause he perceives to be unstable (variable), he will anticipate that future outcomes may differ (e.g., failure as opposed to success).

As discussed in greater depth below, however, the relationship between attributions and expectancies of future success is much more complex than assumed by Weiner. As we will show later in this chapter, it is not just a question of the stability and/or globality of the cause to which a success or failure is ascribed but of its impact on behavior over time. The stability of a cause and its effects on behavior are therefore two distinct phenomena.

Assuming the basic premise of attribution theory – as discussed in Sect. 15.3 – that the main function of causal attribution is the prediction and control of environmental conditions or others behavior, then ascriptions to unstable causes must be rather unsatisfactory for the attributor. Unstable causes do not permit reliable predictions of future events or, in consequence, control of the environment. However, this discrepancy is resolved in part by the fact that expectancies of success are also determined by the controllability of their cause. For example, a student who fails because he or she has put little effort into his or her work (unstable but controllable cause) can still make reliable predictions about future outcomes. Specifically, he or she can expect failure on subsequent tasks if he or she does not put in the necessary effort and to succeed if he or she commits to working hard. However, the problem remains if an outcome is attributed to a cause that is both unstable and uncontrollable such as luck. Likewise, attributing failure to lack of ability (stable but uncontrollable cause) is at odds with the assumption that causal ascription serves to predict and to control outcomes. Although this kind of attribution allows us to predict future events (we will expect failure on subsequent tasks), it can scarcely be said to permit their control.

Affective consequences of causal attributions. Causal attributions and the properties ascribed to them not only influence our expectancies but also our feelings (affect). It is important here to distinguish between self-directed emotions and other-directed emotions, i.e., to specify the object of the affect (Meyer, Schützwohl, & Reisenzein, 1993). For instance, we can be proud of ourselves (the object is our self) or sympathize with others (the object is another person). The causal dimension of locus is associated with the occurrence of self-directed feelings, such as pride or self-respect (or self-esteem). These feelings arise when an outcome is attributed to internal causes, such as ability or effort. For example, we will be especially proud of a good performance if we ascribe it to our superior ability or effort but are unlikely to feel pride if we attribute our success to luck or the ease of the task. These attributions will not enhance our self-respect, either. By the same token, self-respect is unlikely to decrease if a failure is attributed to bad luck or other external causes. The controllability dimension is associated with both self-directed and other-directed feelings. These emotions frequently have a moral quality (e.g., guilt, anger, pity, gratitude; cf. Rudolph & Tscharaktschiew, 2014). Thus, they indicate if we attribute the causes for a certain behavior "as illness or sin" (Weiner, 2006) or perceive them as morally reprehensible. A failure attributed to causes that are both controllable and internal (e.g., lack of effort) is likely to lead to feelings of guilt, whereas a failure attributed to uncontrollable, internal causes (e.g., lack of ability) will result in feelings of shame.

Other-directed emotions that are determined by the controllability dimension include anger, gratefulness, and sympathy. For example, we may feel anger toward someone whose behavior has harmed us if we consider the causes for the harmful behavior to lie within that person's control.

Example

If I lend my car to an acquaintance and he damages it because he was talking on his mobile phone while maneuvering into a parking space (controllable cause), I will doubtlessly be much more annoyed than I would have been had the damage been caused in an accident he could not have averted (uncontrollable cause). We will be particularly angry if somebody causes us harm and if we assume that person to have acted deliberately, i.e., if we consider the reasons for their behavior to be intentional. By the same token, we may feel anger toward people experiencing failure or injury if we consider them to be personally responsible for that outcome (i.e., if we think the cause of their failure or injury was within their control). Teachers whose students perform badly tend to feel anger if they think those students did not work hard enough (controllable cause). If, on the other hand, they consider a student to lack the necessary ability to succeed (an uncontrollable cause for the student), they will more likely show a sympathetic response.

According to Weiner, we are generally more likely to feel sympathy for someone if we see that they are in need of help and, at the same time, assume that they are not responsible for their situation but that its causes were beyond their control. Likewise, we feel gratitude when we have received help and assume the helper to have acted selflessly (controllable cause for the helper). We are less likely to be grateful if we suspect the helper was simply complying with social norms or was forced to help.

One feeling that is dependent on the causal factor itself, and that is assumed to be independent of that factor's evaluation on the causal dimensions discussed, is surprise. Weiner assumes surprise to occur whenever an outcome is attributed to chance or luck. This assumption does not withstand careful theoretical (see Meyer, 1988, for a summary) and empirical analysis (Stiensmeier-Pelster, Reisenzein, & Martini, 1995), however. Rather than being the affective result of luck attributions, surprise in fact seems to trigger causal search (we will return to this point later).

Weiner postulates the cognitive and affective consequences of causal inferences to determine our subsequent behavior. His model is not limited to a specific context, e.g., achievement behavior, but seeks to explain behavior in all kinds of domains. Weiner himself applied the model to both achievement-related (see Weiner, 2006) and interpersonal behavior (e.g., assistance or aggression; see Rudolph et al., 2004). Other authors have used it to explain the emergence of certain types of depressive disorders (e.g., Abramson et al., 1989) or applied it to health-related behavior (see above). In all cases, the focus has been on three aspects of behavior:

- Intensity (e.g., how much effort people make, the lengths to which they go)
- Latency (the speed with which action is undertaken)
- Persistence (how long people will keep pursuing a goal, how quickly they give up when difficulties occur)

Looking at Weiner's approach against the background of expectancy-value theories of motivation, it is clear that Weiner's model is no replacement for theories of this kind. In fact, where the proximal determinants of behavior are concerned, Weiner's approach constitutes a typical expectancy-value theory. Specifically, behavior is determined by the expectancy of success (expectancy component), on the one hand, and by affect (incentive component), on the other. In accordance with Atkinson's (1957) risk-taking model, Weiner's approach suggests that people only engage in achievement-related activities if the expectancy of success is sufficient, and if they

have previously experienced pride in success, meaning that they can now anticipate renewed feelings of pride. In contrast to the risk-taking model, however, Weiner assumes previously experienced affect to influence behavior because they anticipated the renewed feeling of these affect. This notion can also be found in recent theories of motivation (cf. Wigfield, Tonks, & Klauda, 2016).

- Thus, Weiner's approach explains the conditions for expectancies of success and the experience of pride. Moreover, his model is not limited to achievement behavior but considers all forms of behavior to be determined by expectancy and value components. For example, the provision of assistance depends on the assumption that our assistance will be effective (expectancy) and a feeling of pity (value). Aggression – to give a further example – depends on the experience of anger (value) and the assumption that our aggression will have positive consequences (expectancy).

Following this overview of when and how causal inferences are made, and how they influence our subsequent behavior and experience, the next section addresses the questions of why, when, under what conditions, and how causal attributions are made – in other words, we now turn to attribution theories.

15.3 Attribution Theories

15.3.1 Basic Assumptions

Following the perspective of Fritz Heider (1958), the fundamental idea of attribution theories has traditionally been that "the man or woman on the street" – i.e., everyone of us – is an intuitive scientist, formulating theories to explain, understand, predict, and influence their own behavior and experience and that of others. More recently several authors have instead chosen the interpretation by Bernhard Weiner (2006) according to which our behavior tends to be reminiscent of a judge who declares the causes of behavior moral or immoral. Regardless of whether we understand ourselves as scientists or judges, our explanations are *implicit theories* and thus differ from scientific theories which are generally explicit. They guide our actions, i.e., we behave in accordance with our theories. Some authors even see the ability to formulate accurate theories about our behavior and experience, and that of our fellow humans, as a type of intelligence. For example, Gardner (1983) postulates the existence of intra- and interpersonal intelligence.

Definition
Intrapersonal intelligence is defined as the ability to faithfully perceive and explain our own behavior and experience, such that we are able to accurately predict and influence it. Interpersonal intelligence, on the other hand, is defined as the ability to perceive, explain, predict, and influence the behavior and experience of others.

Other authors speak of emotional intelligence, with the main characteristics of high emotional intelligence being consistent with those of intra- and interpersonal intelligence (Goleman, 1994; Mayer & Salovey, 1993).

- Our motivation to identify the causes for events and to accurately describe these causes derives from our fundamental need for control and predictability. Apart from wanting to know what is going on around us, we seek to influence and control behavior and events (Heider, 1958).

These ideas, originally posited by Heider, were taken up again and established as the fundamental principle of attribution theory in the 1970s. For example, Kelley (1971, p. 22) pointed out that the causal attribution process is not an end in itself. Rather, we engage in causal attribution with the aim of managing ourselves and our environment more effectively.

To this end, we need to be able to predict events and outcomes. However, we can only make accurate predictions if we understand the causal structure underlying an event. A comprehensive analysis of the situation or event and realistic attri-

butions are two further preconditions. In other words, it is assumed that individuals always strive to behave in a rational manner. The ability to predict events and thus render them controllable also has a value for survival. It enhances the individual's adaption to the environment, thus making it highly functional. "Attributional search as other explanatory behaviors ... have been accounted for with two different principles: functionalism ... and mastery. ... That is, one might explore to promote adaption and survival (functionalism) or to better understand oneself and the environment (mastery)" (Weiner, 1985b, p. 81).

This fundamental postulate has been subject to some criticism. For example, Kuhl (1983) doubts that causal search can be elevated to a general principle of motivation, arguing that people often do not spare a thought for the causes of action outcomes. If they do think about these causes, moreover, this is often an end in itself, which occurs very much as a matter of interest, without the actor drawing any direct consequences for action control. If, for example, someone ruminating on the possible reasons for a failure does so as an end in itself, an attribution of failure to insufficient effort will not necessarily motivate that person to try to solve the problem. Furthermore, Kuhl assumes that causal search can, under certain conditions, be a symptom of a highly dysfunctional state orientation (Chap. 12): "Examples of state-oriented activities may be … examining the causes for not having reached a goal" (Kuhl, 1981, p. 159).

Kuhl bases this assumption on findings presented by Diener and Dweck (1978), who, in their studies, distinguished helpless from mastery-oriented children. These two groups differed in their level of performance, with helpless children performing at much lower levels than mastery-oriented children. Furthermore, the groups differed in terms of the causes to which success and failure were attributed and – of particular significance in the present context – in the extent to which they reflected on the causes of their success or failure. The authors interpreted these findings as indicating that helpless children – in contrast to mastery-oriented children – "waste" too much thought on causes, which is why their performance outcomes are poor. The mastery-oriented children, on the other hand, performed well because they were less concerned with the causes of success and failure. Relative to the helpless children, they evidently considered these attributions to be largely irrelevant.

> Attributions may be considered irrelevant to the mastery-oriented child on this task, because the remedy would be the same regardless of the cause of failure (Diener & Dweck, 1978, p. 460).

Kuhl cites the findings of Diener and Dweck in support of his argument that reflecting on the causes of success and failure has negative implications for the effectiveness of behavior and is therefore dysfunctional. We will come back to the functionality or dysfunctionality of causal search and reflecting on the causes of success and failure in the following section (see the excursus on criticisms of the basic assumptions of attribution theory).

15.3.2 Causal Search: Triggering Conditions, Duration, and Intensity

It is safe to say that we are not engaged in a round-the-clock search for the causes of events or the reasons for behavior. In fact, we make no attempt to establish the origins of most of the things going on around us. This does not imply that we have no idea of their causes, however. Our ideas may be right or wrong, but they guide our behavior, even if we are not always consciously aware of them.

Example

If, while waiting at a red traffic light at a busy junction, I notice that the cars approaching from the left and right are stopping, I do not start wondering why this is the case. Rather, based on my previous experience, I implicitly assume – without a second thought – that they are stopping because their lights have just turned red. I further assume that I can safely cross the junction as soon as my lights turn green, because the traffic lights sequence is such that the lights in the other cars' direction remain red for the duration of the green phase in my direction.

As this example illustrates, we have stable beliefs about the reasons why most of the things taking place around us happen. In the words of Kelley and Michela (1980), we have a set of beliefs, schemata, or hypotheses on how certain effects are related to certain causes. On this basis, we formulate (implicit) expectations of how the world works (cf. Meyer, 1988; Stiensmeier-Pelster et al., 1995). Provided that our experiences correspond with our beliefs, schemata, and expectations, there is no reason to specify the causes of perceived events (in fact, we may not even be consciously aware of events that are congruent with our expectations).

Although attribution theories are based on the fundamental assumption that we seek to identify the causes of events in order to gain a better understanding of the environment and of ourselves, which in turn enables us to exert control over events, there was little research initially into the question of when, how often, and how long we engage in causal attributions. Likewise, there was a dearth of research on the standards of accuracy accepted – i.e., how thoroughly we seek to determine causes – and whether there are individual differences in this respect.

According to Weiner's comprehensive attributional analysis of motivation, emotion, and behavior (see earlier discussion), we seek to establish the causes of any event that is unexpected, negative, or important. Weiner's writings suggest that each of these three conditions is sufficient to initiate causal search. This assumption does not withstand careful scientific analysis, however, as illustrated by the simple example on the next page.

15.3.2.1 The Stage Model of Attributional Activity

Other questions that remain unanswered by Weiner's attributional analysis of motivation, emotion, and behavior are how long the search for causality lasts and what degree of accuracy is accepted. Drawing on the work of Meyer (1988; Meyer & Niepel, 1994), Stiensmeier-Pelster et al. (1995) developed an "expectancy-disconfirmation model" of attributional search, which Stiensmeier-Pelster (2004) recently extended into a stage model of attributional activity (Fig. 15.3). This model seeks to explain when causal search is initiated, how long it lasts, and how intense it is; i.e., its aspired degree of accuracy.

Excursus

Criticisms of the Basic Assumptions of Attribution Theory: How Functional Is Causal Attribution?

The theoretical reflections above and the empirical findings of Stiensmeier-Pelster et al. (1995) are congruent with the basic assumptions of attribution theory that the search for causality is functional, thus contributing to a better understanding of and adaption to the environment and finally to survival. But what about Kuhl's contention (Sect. 15.1) that causal search is dysfunctional? The results of several studies addressing individual differences in the duration and intensity of attributional activity seem to substantiate Kuhl's criticisms. As mentioned above, Diener and Dweck (1978) conclude that helpless and mastery-oriented children do not differ in the type of attributions they make but rather in the intensity of their attributional activity. Likewise, Kuhl concludes that action and state-oriented individuals differ in the extent of their attributional activity rather than in the type of attributions made. Many findings would seem to indicate that causal attribution is a dysfunctional activity. When the differences found are considered more carefully, however, this apparently plausible assumption collapses.

For all three samples cited above, qualitative differences can be found alongside the quantitative ones. For example, in the study by Diener and Dweck, the helpless children also differed from the mastery-oriented children in terms of the kind of attributions they made:

(continued)

mastery-oriented children preferred effort attributions, whereas helpless children tended to ascribe their failures to a lack of ability. Moreover, the quantitative differences observed by Diener and Dweck apply only to lack of ability as the ascribed cause for failure. In other words, there is no general effect in the sense that helpless children think longer and/or more intensively about the causes of any given success or failure than do mastery-oriented children. The only difference is in the frequency of their thinking about lack of effort as the cause for failure. Moreover, we cannot rule out the possibility that the quantitative differences observed do not in fact reflect differences in the extent of causal search. It may be the case that the groups do not differ in the duration and intensity of the causal search but in the extent to which they ruminate on a cause once they have identified it.

Let us not forget that the helpless and mastery-oriented children in the study by Diener and Dweck also differed in the causes they inferred for their failure. Mastery-oriented children tended to attribute failure to a lack of effort; helpless children were more likely to ascribe it to a lack of ability. It seems reasonable to assume that mastery-oriented children get back to work and redouble their efforts to succeed as soon as they have identified the cause of their failure ("I didn't try hard enough"). It is clear from the attribution what kind of approach is required ("Try harder!"). The helpless children may have completed the causal search just as quickly, but because their causal inference ("I'm no good at this kind of task") does not point to a specific course of action, they might find it harder to return to their work. Indeed, there would be little point in doing so, because someone with no aptitude for the task has few prospects of success anyway. These children thus remain caught up in self-doubts ("I'm no good"), begin to ruminate or to search for meta-attributions ("Why am I no good?"), and try to specify the cause of their failure more closely ("Is it a general lack of ability or do I lack specific skills?"). Thus, whereas the "lack of effort" attribution has direct implications for behavior, behavioral implications can only be derived from the "lack of ability" attribution by specifying its causes more closely. Only then can people decide to address the cause identified in a renewed attempt to achieve their goal, or to abandon the original goal in favor of new ones, because the cause is deemed unchangeable.

Example

A student has received E grades on all previous mathematics tests. Given the stability of his performance over the years, he has come to the firm conclusion that mathematics is simply not his thing. Now his school-leaving exams are coming up. Based on his belief that he is no good at mathematics, he expects to get another E grade. And that is precisely what happens. Will this student try to identify the causes for his poor performance? Most unlikely. The E grade is just what he expected; his causal beliefs are not called into question in any way. According to Weiner's model, however, the student should seek causes for his poor performance, because although the grade was expected, the event was indisputably negative (E grade) and certainly important (school-leaving exam).

The first question to arise is whether an individual is sufficiently motivated to analyze the causes of an event. Like traditional expectancy-value theories of motivation, the stage model of attributional activity assumes causal search to be motivated by a specific emotion, namely, surprise. As posited by Meyer (1988) and many other authors (e.g., Charlesworth, 1969; Izard,

1977; Ortony, Clore, & Collins, 1988; Scherer, 1984), surprise is assumed to occur when an expected event does not occur or when the event occurring is unexpected or contrary to expectations (for details, see Stiensmeier-Pelster et al., 1995). It prepares and motivates the individual to engage in epistemic activities (a careful analysis of the situation) as described by Berlyne (1965), of which attributions can be regarded as a specific type (Pyszcynsik & Greenberg, 1987; Weiner, 1985b). Surprise is assumed to prepare the individual to engage in spontaneous epistemic activities (especially causal analysis) by interrupting all ongoing processes (at least briefly) and refocusing the individual's attention on the unexpected event (as demonstrated by Meyer, Niepel, Rudolph, & Schützwohl, 1991) and, at the same time, to motivate the individual to instigate epistemic activities (especially causal analysis). Accordingly, as shown in Fig. 15.3, causal search is only initiated when an event occurs unexpectedly, i.e., when the answer to the question of whether the event was expected is "No." If the answer is "Yes," people continue to

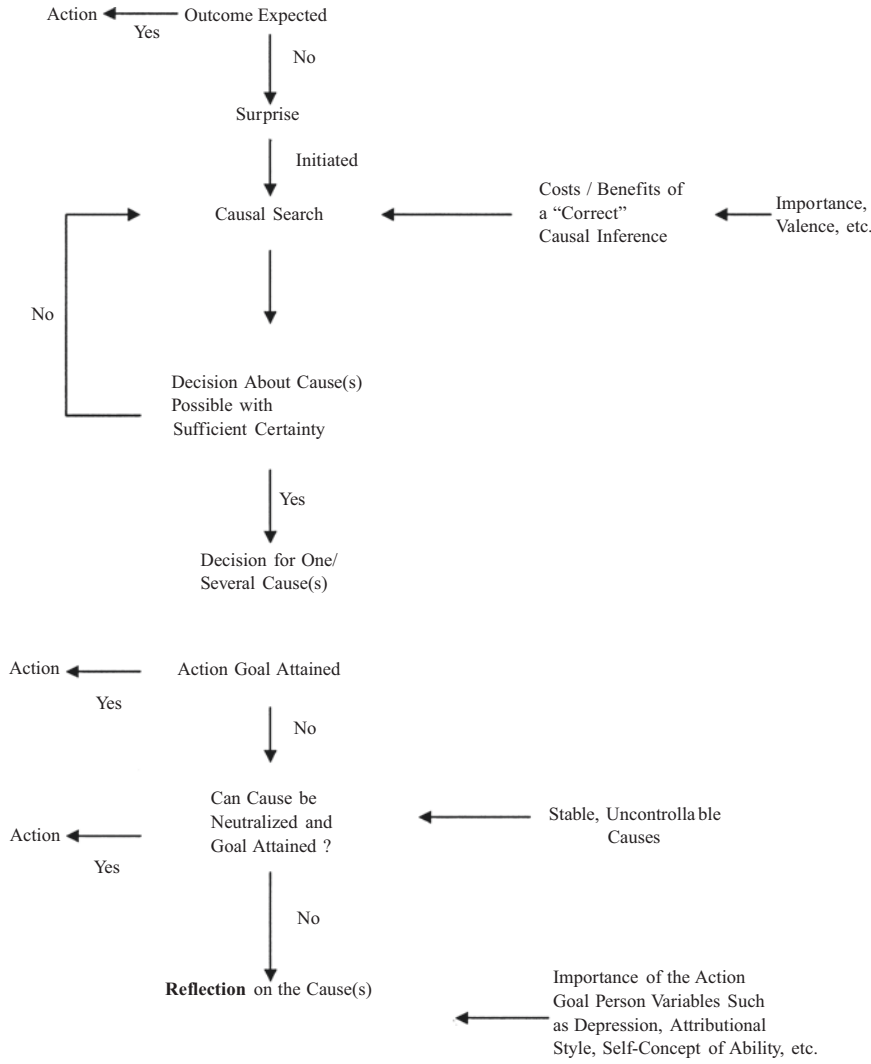

Fig. 15.3 Stages of attributional activity and their conditions (Based on Stiensmeier-Pelster, 2004)

pursue their ongoing activities without thinking about their causes.

Duration of causal search. Surprise is not the only determinant of causal search, although it is sufficient and necessary to initiate the process and sufficient to generate a corresponding action tendency or desire (epistemic curiosity; see Berlyne, 1960). Other factors also play a role. These factors have less to do with the question of whether causal search is initiated (as stated above, the decisive point here is whether or not events are expected) than with its duration, intensity, and accuracy. The intensity and duration of causal search, in particular, are assumed to depend on the perceived costs and benefits of the process. According to the stage model of attributional activity, the greater the benefits of a correct causal inference relative to the costs of causal search, the more intense and thorough the search for causes will be (Fig. 15.3). The benefits of a correct causal inference are thought to increase with the importance of the event and the magnitude of its consequences. The valence of the event is also relevant here: the benefits of a correct causal inference can be assumed to be greater after failure than after success. It is only if we are aware of the causes of failure that we can take steps to avoid making the same mistakes again in the future. Thus, the stage model incorporates Weiner's notion that importance and valence are key determinants of causal search.

The cost of causal search depends on a number of factors, e.g., the effort or exertion it will entail (e.g., to access the necessary information) and the resources the individual can dedicate to it (e.g., time).

Stiensmeier-Pelster et al. (1995, Study 5) examined the influence of the unexpectedness, valence, and importance of an event on causal search. In this study, students were asked to state how long they had needed to determine the causes of a certain event and how intensive the causal search had been. In all cases, the event in question involved a surprising (unexpected) or unsurprising (expected) success or failure on a test that was either highly important or unimportant to them. Table 15.1 reports the findings of this study. As the data show, the length and intensity of causal search hinges primarily on whether the result was surprising (unexpected) or expected (unsurprising). In the case of failure, moreover, the importance of the test affects the length and intensity of causal search. Stupnisky, Stewart, Daniels, and Perry (2011) presented similar findings: Unexpected and negative events lead to the most intensive causal searches. Unexpected failure in important situations stimulates particularly long and intensive searches for causality.

Table 15.1 Mean duration and intensity ratings of the search for the causes of success and failure by degree of surprise and importance of event

	Surprising/ unexpected		Not surprising/ expected	
	Un-important	Important	Un-important	Important
Success	3.8	3.4	2.5	2.1
Failure	3.3	4.6	1.7	3.2

High scores indicate long and intensive causal search. Scores range from 1 to 5

Evidently, the fact of an event being unexpected or contrary to expectations suffices to initiate causal search, and the length and duration of causal search is most pronounced when an unexpected event is negative and important. It is in these cases that the benefits of identifying the causes for failure are greatest.

Accordingly, the stage model of attributional activity proposed by Stiensmeier-Pelster (Fig. 15.3) postulates further stages in the attributional process once the cause of an event or an outcome has been determined. The first question to be addressed is whether the action resulted in the attainment of the aspired goal. If so, the attributional process can be terminated, because the actor is evidently able to pursue his or her actions further. If, however, the goal was not attained, the question arises of whether the cause for that failure can be obviated in the future. If the cause can be neutralized by means of corrective behavior (e.g., increased effort, a new strategy, etc.), the goal-oriented activities can be pursued further, and the attributional process can be terminated. If this is not the case – for instance, whenever a

Table 15.2 Causal rumination by degree of surprise, valence, and importance of event

	Degree of surprise		Valence		Importance	
	Contrary to expectations	Expected	Success	Failure	Unimportant	Important
Causal rumination	3.1	3.3	2.8	3.6	2.8	3.7

High scores indicate long and intensive causal rumination. Scores range from 1 to 5

cause is perceived to be stable and uncontrollable – the attributor will continue to reflect on the causes identified. This reflection is further assumed to depend not only on the valence of the outcome (more pronounced after failure than after success; see above) and the type of cause (more pronounced after stable and uncontrollable outcomes than after variable, controllable ones) but also on the importance of the goal (more pronounced after important events than after unimportant ones).

Causal rumination is also a question of personality, however (Fig. 15.3). Depressive, helpless, and state-oriented individuals and people with low self-concepts of ability seem to put more thought into the reasons for their failures than do nondepressive and mastery- and action-oriented individuals and people with high self-concepts of ability – presumably because the former tend to ascribe failures to stable and uncontrollable causes, whereas the latter are more likely to infer variable and controllable causes for failure.

15.3.2.2 Empirical Support for the Stage Model

Aspects of Stiensmeier-Pelster's (2004) model have been tested in several empirical studies. The first aim of these studies was to show the different conditions underlying the processes of causal search, on the one hand, and causal rumination, on the other. Second, the studies sought to demonstrate that the person variables mentioned above (depression, state orientation, etc.) do not influence causal search but only causal rumination.

Influence of unexpectedness, valence, and importance of an action outcome on causal rumination. In one study, students were asked to rate the duration and intensity of causal search, as well as the duration and intensity of rumination on the causes identified. The successes or failures in question were specified to be either important or unimportant and to be either expected or contrary to expectations. Only main effects for three manipulated variables were found (Table 15.2). As Table 15.2 shows, the duration and intensity of causal rumination hinges solely on the valence and the importance of the event and not on its surprise value. In line with the theoretical assumptions of the stage model outlined above, people are likely to invest more time and effort in reflecting on the causes already identified if an outcome or event is negative or particularly important.

Influence of unexpectedness and depression on causal search and rumination on the causes of failure. Stiensmeier-Pelster (2004) conducted two studies to investigate the effects of unexpectedness of failure and respondent depression on causal search and causal rumination. The procedure used in these experiments was that of a typical helplessness experiment. In the first phase of the experiment, labeled the "training phase," respondents were administered performance-related tasks, subsequent to which they were given negative feedback. They were then invited to participate in another experiment, the "test phase," which took place in a different university building and was administered by another experimenter. The respondents were again administered performance-related tasks, though of an entirely different kind than those implemented in the first experiment. Immediately after receiving the first set of negative feedback in the training phase, respondents were asked how much thought they had put into the reasons for their failure. These responses served as an indicator for the intensity of causal search. The same question was posed while respondents were working on the new tasks in the second phase of the experiment. Their responses at this point were taken as an indicator

Table 15.3 Correlations of depression and unexpectedness with causal search and causal rumination

		*t*1	*t*2
		Causal	Causal
		Search	Rumination
Depression	Study 1 ($N = 35$)	0.22	0.47**
	Study 2 ($N = 30$)	0.30	0.55**
Unexpectedness	Study 1 ($N = 35$)	0.29*	0.13
	Study 2 ($N = 30$)	0.38*	0.09

*$p < 0.05$; **$p < 0.01$

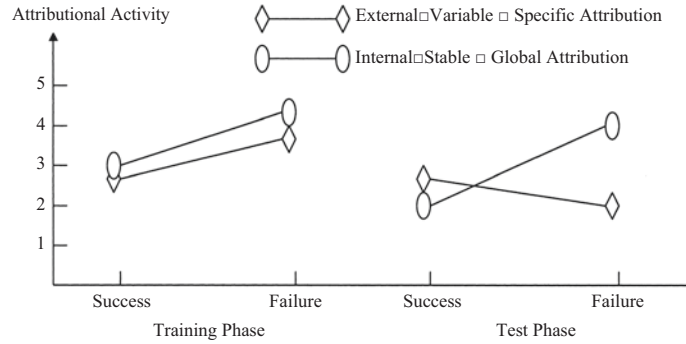

Fig. 15.4 Level of attributional activity during the training and test phases as a function of success or failure and attributional style

for causal rumination. The Beck Depression Inventory (BDI; Beck, 1967) had been administered prior to the experiment to obtain depression scores. The discrepancy between the expectancy of success (expected number of correct answers) and the number of tasks participants were told they had solved correctly served as an indicator for unexpectedness. As shown in Table 15.3, the depression score was significantly correlated with the intensity of causal rumination in both parts of the study, but not with the intensity of causal search. Conversely, unexpectedness was significantly correlated with the intensity of causal search in both parts of the study, but not with the intensity of causal rumination.

Influence of attributions of success and failure on causal search and rumination on the causes of success and failure. In an experiment using a procedure similar to that of the study described above, Stiensmeier-Pelster (2004) investigated the intensity of causal search and causal rumination as a function of the valence of the event (success vs. failure) and the causes to which success or failure are attributed. In this experiment, the properties of the attribution were assessed after feedback (of either success or failure) using a procedure analogous to the "Attributional Style Questionnaire" (ASQ; Peterson et al., 1982; Poppe, Stiensmeier-Pelster, & Pelster, 2005). Specifically, respondents were first asked to identify the main cause for their performance and then to rate this cause with respect to its locus (internality), stability, and globality. Based on these ratings, the sample was split into two groups: "internal-stable-global attribution" and "external-unstable-specific attribution." Figure 15.4 presents the findings of this experiment. As the data show, there is little difference in the intensity of causal search, as measured immediately after feedback, as a function of the valence of the outcome (success vs. failure) or the properties of the attribution. In contrast, the intensity of causal rumination, as measured in the test phase, proved to depend on the valence of the outcome and the properties of the attribution. Respondents who were given failure feedback and who attributed this failure to internal-stable-global factors put much more thought into the causes of this outcome than did respondents in the other three groups. A comparison of the intensity of attributional

activity immediately after feedback and in the second phase of the experiment shows a decrease from the training phase to the test phase for respondents who succeeded on the tasks, as well as for those who failed, and who attributed that failure to external-variable-specific causes. For those who attributed failure to internal-stable-global causes, however, only a very slight decrease in the intensity of attributional activity was identified. These findings are in line with the predictions of the stage model of attributional activity, which states that attributional activity is terminated when a cause is identified, except if failure is attributed to stable and uncontrollable causes, such as lack of ability (an internal-stable cause).

Incidentally, the stage model of attributional activity presented here is congruent with certain assumptions of the theory of action control proposed by Kuhl (cf. Kuhl & Kazén, 2003). In this model, Kuhl distinguishes two basic modes of action control, which he calls action and state orientation (Chap. 12). Action orientation is present when attention is divided more or less equally between the following four domains:

1. The desired goal state
2. The current state
3. The discrepancy between the goal state and the actual state,
4. Potential actions in one's repertoire to overcome this discrepancy

Causal search is part of the analysis of the current state. It can also help to describe the discrepancy between the current and the goal state and is certainly important when it comes to exploring potential options for action. Especially if the pursuit of a certain goal has resulted in failure in the past, a thorough analysis of the causes for this failure is vital. Only then will it be possible to identify an appropriate new course of action. If, on the other hand, the cause of the failure has already been established, any further causal rumination will no longer be action oriented. Rather, analysis of the actual state will be an end in itself – potential options for action will no longer be subject to feasibility testing, neither will the appropriateness of aspired goal states be evaluated. Attention will be focused entirely on the analysis of the current state; i.e., a failure-centered state orientation will ensue. The following example illustrates this kind of situation. A respondent experiences failure in an experiment and then participates in another experiment that has nothing in common with the first. If, while working on the second experiment, thoughts keep returning to the causes for his or her failure in the first experiment, although there is no way of going back to these tasks, his or her thinking about the causes of failure represents a state orientation. If, on the other hand, the first experiment continued after the failure feedback, and the respondent expected to be administered more of the same kind of tasks, thinking about the causes of failure (i.e., causal search) would represent an action orientation.

Summary

The conclusions to be drawn from these theoretical reflections and empirical studies on causal search and causal rumination are as follows. If we wish to explain when attributional activity is instigated, its duration and intensity, and the motives underlying it, it makes sense to distinguish between different stages of the attributional process. Moreover, the attributional activity that can be observed at different stages of the process may have different functions. Unquestionably, causal search serves the function of rendering the world we live in controllable and predictable. Thus, like other epistemic activities, it is initiated whenever something happens that is unexpected or contrary to our expectations, whenever our (causal) knowledge fails to provide an accurate prediction of the course of events. It is only once the causes for the unexpected outcome are identified that we are again in a position to make accurate predictions and exercise control. Causal rumination, by contrast, does not serve the primary goal of providing us with a better understanding of the environment. This goal is realized as soon as a causal inference is made. Causal rumination may help us identify new action alternatives or abandon old goals and formulate new ones. We may, however, find it very difficult to accept that we are unable to exert control in

certain situations (e.g., after attributions to stable and uncontrollable causes). In these cases, our thoughts may end up "going round in circles," revolving around the causes of certain outcomes. This kind of state is certainly dysfunctional, as it does not lead to a better understanding of the world or help us to identify productive new courses of action. In other words, it ties up attention that could be put to better use elsewhere for effective action.

15.3.3 Processes of Causal Attribution: Normative Models

Aside from the questions of when and why causal attributions are made, the main concern of attribution theories is to explain precisely how "the man or woman on the street" determines the reasons for an action or the causes of an action outcome. Whereas our focus thus far has been on the extent to which data is collected to arrive at a causal inference, we now turn to questions concerning the type of information gathered, how the information available is weighted, etc. In other words, we now consider the process of information processing that underlies causal attribution.

In this context Heider's (1958) book, *The Psychology of Interpersonal Relations*, stimulated a great deal of research in various ways. Attribution theory research was subsequently guided by models of information use and information processing. Aside from Heider's fundamental ideas, these included correspondent inference theory (Jones & Davis, 1965), Kelley's (1967) covariation model of causal analysis, and his model of causal schemata (Kelley, 1972).

These models, which have inspired a wealth of research, specify three facets of the attribution process:

1. The aspects of information utilized
2. The causal categories available for selection
3. The rules for drawing inferences from the information

The models are highly rationalistic. They are based on the laws of logic and, as research soon showed, are commonsensical (provided that respondents are not too young). Essentially, they are normative theories describing how attributions ought to be made. The models prescribe the approach to be taken by individuals seeking to arrive at "optimal" or "rational" causal inferences and stipulate how they should decide for or against a cause. In other words, they define standards for causal attribution.

These normative theories can be contrasted with a more descriptive approach to attribution research, which investigates how people actually go about making causal attributions. The latter approach involves describing and explaining the actual process of causal ascription and deciding whether or not the attributions made are correct. Descriptive attribution theory research has addressed numerous phenomena that explain why, in certain cases, an individual's causal attributions deviate from those made from an outsider's point of view or those that would have been made had a normative model been applied. These phenomena include differences in the attributions of actors and observers and apparently self-enhancing attributions. As discussed above, moreover, people do not necessarily look for the most fitting cause but often – having weighed up the costs and benefits – terminate the attribution process as soon as they have found a causal attribution they personally consider satisfactory.

15.3.3.1 Heider's "Naive" Analysis of Action

Heider (1958) based his approach on Lewin's general behavioral equation, which states that behavior (B) is a function of personal (P) and environmental (E) forces: $B = f(P, E)$. Heider further subdivided each of these forces – to use his own terminology, the "effective personal force" and the "effective environmental force" – into two components. The effective personal force is composed of "trying" (which might also be called motivation) and "ability" (Heider frequently uses the more generic term "power"). Trying, in turn, is made up of two components,

which are related in a multiplicative way: what people want to do (intention) and how intensively they seek to achieve it (exertion).

- Hence, trying is the product of intention and exertion; neither is sufficient on its own. Intention requires a minimum of exertion, and exertion requires an intention if any action is to materialize. Trying (intention times exertion) is a variable component of personal force, and ability is a fixed component of personal force.

On the environmental side, there is one (fixed) primary dimension: the difficulty to be overcome in order to reach a certain goal. Chance, in the sense of good or bad luck, may have favorable or unfavorable effects from time to time on the efforts to cope with this difficulty. Thus, Heider had already identified the main causal factors cited to explain achievement-related behavior. Later elaborations by Weiner and colleagues (Weiner, 1974) did not really add any significant new insights in terms of identifying causal factors relevant to the achievement context. These authors can, however, take the credit for classifying the factors identified by Heider in terms of their locus and stability. Only then was it possible to make accurate predictions of the expectancy and self-directed affect variables, both of which are influential in the context of achievement-related behavior.

- An important aspect of Heider's model is that a personal component and an environmental component, namely, ability and difficulty, enter into a subtractive relationship, resulting in "can." "Can" is thus a function of ability minus difficulty.

Heider posits that data on all of these variables can be utilized in the analysis of action. Some of these information variables are linked to form superordinate concepts. The product of intention and exertion gives the concept of "trying" (motivation); the difference between ability and difficulty gives the concept of "can." Finally, the unspecified relationship between "trying" and "can" results in the action and its outcome. Heider's model of action analysis is shown diagrammatically in Fig. 15.5. The top row presents information about the components of personal and environmental forces, the middle row the concepts derived from them, and the bottom row the resultant action and its outcome.

The purpose of action analysis. What purpose does the analysis of action serve; which causal criteria are to be distinguished and selected? The question at issue here is whether a behavioral explanation at "first" or "second" glance is appropriate, i.e., whether an action or its outcome is more a result of personal force or environmental force or – to use Heider's distinction – whether there was personal causality (i.e., something was brought about intentionally) or impersonal

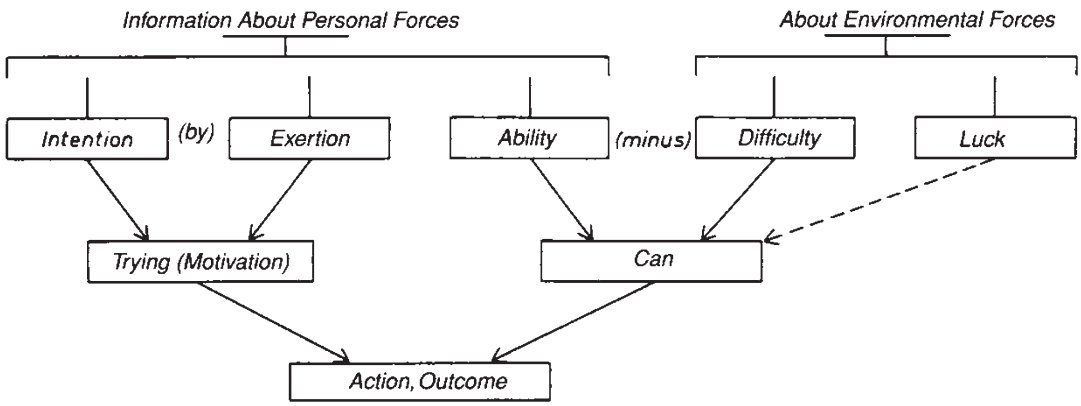

Fig. 15.5 Configuration of Heider's action analysis: from information about components of personal and environmental forces (top row) via the concepts derived from them (middle row) to the resulting action and its outcome

causality. The answer to this seemingly simple alternative is relevant to any observer interested in rendering future events foreseeable and thus controllable. If the observer concludes that the events observed are because of the personal causality of the actor, i.e., to motives and dispositions (implying the stability of causes), then he or she can predict that the actor will behave in a similar manner in many similar situations in the future. Thus, localizing the cause within the person represents a greater information gain for the observer than does inferring causality to reside in the particular situation – i.e., impersonal causality. In the first case, the observer can predict future behavior over a whole class of situations; in the second, only in a very specific situation. Therefore, if we have reason to believe that we are justified in attributing (stable) dispositions – especially (stable) motives – to others, then we have made their future behavior more predictable.

Our efforts to render future behavior more predictable might prompt us to favor localizations of causes within personal causality. Instead of the very rational analysis of causes described by Heider, our attributions might then entail a motive-related bias. For example, we may ascribe too much meaning to indications of personal causality and neglect indications of impersonal causality (i.e., that the cause resides in the specific situation). Drawing on the stage model of attributional activity described in Sect. 15.3.2, it seems plausible to assume that people feel attributions with few benefits (e.g., localizations of causes within specific circumstances) to be unsatisfactory and therefore continue the causal analysis, whereas they terminate the analysis as soon as indications of personal causality are found (see also Sect. 15.3.4 on descriptive attribution research).

Attribution of actions to personal causality. What are the rules that permit us to infer personal or impersonal causality from the data available about the individual components of Heider's action model? Heider provided only a few vague and general responses to this question – mostly in the form of examples. The models proposed by Jones and Davis (1965) and Kelley (1967) were intended to fill this gap and to present a formalized system of rules.

The first crucial issue in attributing personal causality to an action is whether the actor can be ascribed an intention. Three points are to be considered here:

- Is the actor merely a marginal entity in a more comprehensive event?
- Is the action or its outcome merely an unintended side effect or an intermediate phase of a more global intention?
- Is the intention indeed to be carried out?

It is at this point that information about exertion and ability comes into the picture. An intention can only be inferred via the concept of trying if exertion can be observed. If it is not yet clear what should be done to implement an intention, then it is not regarded as an intention in the sense of a necessary condition for personal causality. Information about the ratio of ability to difficulty is also of major concern, i.e., whether the actor presumes himself or herself to have the necessary ability to accomplish the goal.

Heider emphasized the importance of the observed equifinality of an individual's action for inferring intentions that reflect personal motive dispositions. Such motive-indicative equifinality exists when an individual chooses different action paths in different situational conditions, each leading to the same goal. This approach to inferring intentions and motives was expanded and formalized by Jones and Davis (1965) with their model of correspondent inferences (see the following page).

The inclusion of the environmental factor "difficulty" in the analysis of action presented in Fig. 15.5 risks limiting the analysis to achievement-related behavior. Heider by no means restricted himself to this class of phenomena, however. For example, the attractiveness of a certain object can also represent an environmental force. The extensive quote from Heider's analysis of the "attribution of desire and pleasure" that follows is offered here in support of this point. At the same time, it gives an impression of Heider's way of analyzing phenomena and explicates another approach – the individual differences approach – that can be

used to differentiate between personal and impersonal causality.

To quote from Heider (1958):

> "We shall start with the data pattern fundamental in the determination of attribution, namely: that the condition will be held responsible for an effect which is present when the effect is present and which is absent when the effect is absent.
> Now let us see how this principle operates in the case of the attribution of enjoyment to the object. If I always experience enjoyment when I interact with an object, and something other than enjoyment when the object is removed (longing, annoyance, or a more neutral reaction, for instance), then I will consider the object the cause of the enjoyment. The effect, enjoyment, is seen to vary in a highly coordinated way with the presence and absence of the object.
> Now let us see how the principle operates in the attribution of enjoyment to the person. If I sometimes enjoy the object and sometimes do not, then the effect varies, not with the object, but with something within me. I may or may not be able to define that something, but I know that the effect has to do with some fluctuating personal state. It may be my mood, my state of hunger, etc., which, though temporary in character, are often detectable as the conditions highly related to the effect. Notice that in this type of attribution, a temporary state and therefore a more or less nondispositional property of the person is singled out as the source of the pleasure.
> When enjoyment is attributed to a dispositional property of the person, additional data pertaining to the reactions of other people are necessary. Concretely, if I observe that not all people enjoy the object, then I may attribute the effect to individual differences. That is to say, the effect, enjoyment in this case, depends upon who the person is. With o, enjoyment is present; with q, it is absent. We sometimes, then, speak about differences in taste. The important point is that the presence and absence of the enjoyment is not correlated with the presence and absence of the object but rather with the presence and absence of different people. Therefore, o is felt to enjoy x and q to be dissatisfied with x because of the kind of person each is" (Heider, 1958, pp. 152–153).

- Interindividual behavioral consistency is thus a crucial key to the localization of cause. Its presence indicates that it is a particular object – an impersonal causality – that has prompted the behavior.

Kelley (1967) picked up on this criterion and formalized it as a critical dimension ("consensus") of his covariation model in which causes are localized on the side of the person or the environment. Kelley's model and the model by Jones and Davis represent a kind of "division of labor" inasmuch as they focus on opposing aspects of causal localization – Jones and Davis on behavioral explanations "at first glance" (the person) and Kelley on behavioral explanations "at second glance" (the situation).

Another difference is also worthy of note. Jones and Davis deal exclusively with attribution of motivation – in other words, not with the causes of action outcomes but with the reasons for which an action is undertaken. Besides enduring dispositions (which, like motives, represent "personal causes" in the sense of individual differences), these reasons include transitory intentions. Kelley, on the other hand, was less concerned with the actor's reasons (intentions) than with the causal basis for judgment, events, or action outcomes. He was particularly concerned with assigning relative weights to enduring characteristics of the person or the concrete situation (as well as to transitory situational circumstances). But Kelley's model also includes attribution of motivation, namely, in those situations where the "cause" of an action is attributed to an actor's enduring disposition. The two models are presented in more detail below.

15.3.3.2 Jones' and Davis' Model of Correspondent Inferences

In their paper "From Acts to Dispositions," Jones and Davis (1965) delineated a model articulating how people infer the intentions, motives, and attitudes of others from their actions. Inference of this kind represents the greatest information gain for an observer seeking to predict someone's future activities. Insights into people's intentions are also at the core of explanations and evaluations of past actions, such as those undertaken by parliamentary fact-finding committees or juries in criminal trials. The apportioning of responsibility and punishment hinges on the extent to which the author of the action outcome under investigation can be attributed intent. As a rule, those who judge such actions do not observe

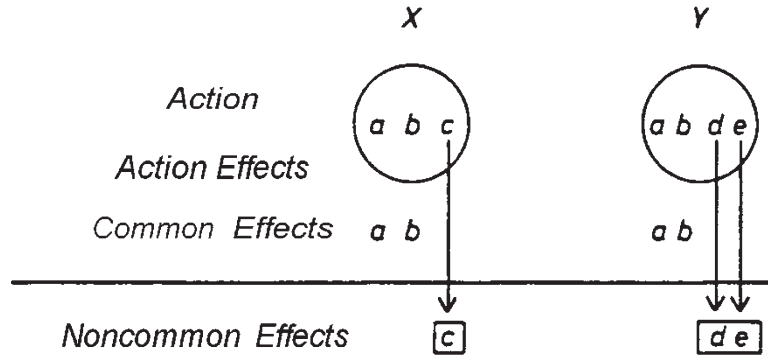

Fig. 15.6 Common and noncommon effects of two action alternatives, X and Y

them directly but instead rely on reports about the actions or even just their outcomes.

We thus start from the facts – an action or at least its outcome. Three steps are required to draw retrospective inferences about dispositions; these steps may, but need not, lead to an attribution of intention.

First step in the attribution of intention. This first step consists in confirming two prerequisites without which the actor cannot have acted with intent. First, he or she must have had prior knowledge about the outcome of the action. Second, he or she must have the ability to bring about the result. If the first condition is not fulfilled, the unforeseen event could not have been intended. If the second condition is not fulfilled, any attribution of this outcome to the actor is doubtful. Looking at Fig. 15.6, what is being confirmed are the two arrows leading from "trying" and from "can" to "action, outcome."

Second step in the attribution of intention. Once we are certain or can assume that these two prerequisites are met, the second step is to determine which consequences – or effects – of the action outcome might have motivated the actor to bring about this particular outcome. To avoid total reliance on speculation, it may be useful to bear in mind that every action initially involved a choice among various alternatives, at the very least the choice of action or not acting. The assumed effects of such alternatives can then be listed. Those effects that are common to all action alternatives cannot have influenced the actor's choice. Only the "noncommon effects" of the chosen action alternatives can have played an influential role. The smaller the number of noncommon effects of the chosen action alternative – in the best case, there will just be one – the less equivocal the inference about the relevant intention will be. Figure 15.6 illustrates this step for two actions – *X* and *Y* – with three and four effects, respectively, where two are common effects. If *X* is chosen, there is only one noncommon effect, *c*. It must have been this effect that prompted the choice of *X* over *Y*. If, on the other hand, *Y* is chosen, there are two noncommon effects, *d* and *e*, and it remains unclear which of the two was decisive.

Even if we identify a single noncommon effect for the chosen action, however, we cannot presume with certainty that the intention is the manifestation of a personal disposition. It could be an effect favored by all or most individuals in a particular reference group. In this case, the action is motivated by the generally desirable incentive value of its goal object. The action arises more from the peculiarity of the goal object and less from the person's disposition.

For example, we might meet two individuals at an exhibition of modern art: one an art historian, the other a task inspector. Without hesitation, we would attribute the art historian's presence to a typical, "category-based" interest in art or to the exhibit's unique appeal. Our deductions in the case of the task inspector would be less trivial. Because an interest in art is not typical of this profession, this individual must be personally disposed to appreciate modern art.

- In general, actions corresponding to the presumed role repertoire of the actor's group

provide no useful information for inferences about dispositions. We do not know whether, along with the role requirement, there was also a relevant individual disposition that precipitated the action. Conversely, knowing that somebody acted contrarily to the situationally appropriate role of his or her social group is very informative for drawing inferences about a disposition.

An example would be two politicians at an election meeting, one who advocates a position favored by those present, the other advocating an unpopular position. Because politicians need voter approval if they are to be elected, we can be more confident that the second politician seriously intends what he says.

Third step in the attribution of intention. The third and final step involves appraisal of the action outcome's general desirability for the group to which the actor belongs. Of course, such "category-based" inferences from typical members of a reference group to the individuality of the actor are fraught with uncertainty. Jones and McGillis (1976) attempted to specify the third step by splitting desirability into two determinants:

1. What is generally considered desirable by a particular culture
2. What is known about what the actor in question considers desirable

Furthermore, both types of desirability are weighted in terms of their chances of implementation. Thus, in the sense of expectancy-value theories, desirability is conceptualized as "expected valence."

With these three steps, it is possible to determine the inferred correspondence between the action observed and the underlying intention as an expression of a personal disposition.

- The smaller the number of noncommon effects of the chosen action alternative, and the lower the presumed desirability (or expected valence) of the noncommon action effects, the closer the correspondence will be.

Table 15.4 Correspondence of the inference from an action to the underlying intention (and personality disposition) by the number of noncommon effects of the chosen action alternative and the assumed desirability (or expected valence) of these effects

		Desirability of the noncommon effects (or expected valence)	
		High	Low
Number of noncommon effects	High	Trivial ambiguity	Interesting ambiguity
	Low	Trivial clarity	High correspondence

Based on Jones and Davis (1965), p. 229

The cross-classification in Table 15.4 shows the four possible combinations of high and low levels of the two determinants of inferences. Only one combination results in high correspondence, providing some assurance that inferences made about the actor's intentions and relevant personal dispositions are valid. This is the only case in which the theory of correspondent inferences leads to a clear information gain.

The question of how individuals attribute actions to intentions, motives, and attitudes remains a topic attracting intense debate and empirical research (e.g., Malle, 1999, 2004; Reeder, 2009). This research keeps the original theoretical propositions of Jones and Davis in focus, specifies them, and in part elaborates them. Malle (1999, 2004), for instance, proposes that observers assess and weigh five criteria when they make attributions about intentionality: (1) Did the actor aim for a particular outcome? (2) Did the actor believe that a specific action would bring about a particular outcome? (3) Was the action planned? (4) Did the actor have the capacity to execute the action? And (5) did the actor believe that his or her own actions could bring about the outcome? In this set of considerations, criteria 2 and 4 converge with the two criteria Jones and David propose to compose step 1 in attributions of intentionality, whereas criterion 1 is consistent with Jones and Davis's step 3 about assessing the desirability of the action outcome. What Malle adds is the planning of the action in criterion 3 and the assessment of the actor's self-efficacy beliefs in criterion 5.

15.3.3.3 Kelley's Covariation Model

This model takes its name from the notion that an effect covaries with its cause. The effect is present when the cause is present and absent when the cause is absent.

In his influential 1967 paper, Kelley outlined the differences between his model and that proposed by Jones and Davis. Whereas Jones and Davis wish to determine what inferences can be drawn on the person side, specifically about personal dispositions, Kelley examines the available information to see whether the causes of an action or its outcome can be localized in the environment or whether it is necessary to see the person as the source of causation – perhaps even the exclusive source. In contrast to Jones and Davis, the information assessed in Kelley's model does not relate to a single person's single action but to several actions carried out by the same person and other persons over time, as well as to actions geared at different goal objects under a variety of circumstances. Because the information material is extended over four dimensions (persons, points in time, goal objects, and circumstances), Kelley can make extensive use of what he calls the "covariation principle," which holds "that the condition will be responsible for an effect which is present when the effect is present and which is absent when the effect is absent" (Heider, 1958, p. 152).

Study

Attribution of Attitudes

Jones, Worchel, Goethals, and Grumet (1971) presented their respondents with an essay arguing for or against the use of marijuana. They were asked to assess how deep-seated the author's attitudes were. Two further pieces of information were given, relating to the two determinants of the model:

- The number of uncommon effects was varied by telling participants that the writer had produced the essay voluntarily or under pressure (in the latter case, there were a number of reasons for writing the essay, some related to the issue itself and some that induced the individual to succumb to the pressure).
- The degree of desirability was manipulated by providing additional information about the author's attitudes toward leading his or her own life, being the master of his or her own fate, etc.

If the author strongly subscribes to these kinds of attitudes, he is also likely to be in favor of the free use of marijuana. The results were in line with the correspondence model. If the author had freely chosen to write the essay and had taken a position that deviated from the expected desirability – in other words, if the number of uncommon effects and their desirability was rather low – he was seen as having a more pronounced attitude.

Hamilton (1980) called attention to another difference between the two models. He sees Kelley's model, which varies persons, entities, and points in time systematically, as a typical scientific analysis, and the model by Jones and Davis, which focuses on just one person and asks whether that person might have acted differently, as a decidedly juridical approach. In other words, we might see Kelley's "intuitive scientist" as a counterpart to Jones' and Davis' "intuitive attorney."

In Kelley's covariation analysis, the cause of a given action (dependent variable) is deduced from the covaration pattern of four criterion dimensions (independent variables; see the following overview).

Criterion Dimensions of Kelley's Covariation Analysis

1. Distinctiveness of entities
   Is the action also triggered by other entities? By entities, Kelley means goal objects or other persons toward whom the action is directed.
2. Consensus between different persons
   Do other persons act in the same manner?
3. Consistency across time
   Does the person always act in this manner?
4. Consistency across modalities
   Does the same action occur when the entity is embedded in other circumstances?

In all cases of high distinctiveness, an individual will respond to the entity in a highly specific manner. If there is a high level of consensus, the individual's reaction to an entity will be similar to that of most other people. If consistency across time is high, the person will react in the same manner whenever that entity is encountered. If there is consistency across modalities, they will act in that manner under varied circumstances.

Example

If someone who particularly enjoyed a certain movie recommends that I go and see it, I must decide whether this recommendation is based on the entity (quality of the movie) or attributable to the person (as one who is easily pleased). If I know that this individual reacts very specifically to different movies (distinctiveness), that he has gone to see the movie several times (consistency across time), that he has seen an adaptation for television by the same director (consistency across modalities), and that his judgment is consistent with that of others who have seen the movie (consensus), then I am willing to attribute his recommendation to the entity (i.e., the movie must be worth seeing). If, on the other hand, someone indiscriminately recommends all movies, some of which I like and some of which I do not, and if other people have a different opinion, then I will attribute the recommendations to the peculiarities of the person (e.g., their personal taste).

Kelley likened the procedure resulting in such inferences to a simple and incomplete analysis of the variance of data that can evidently be carried out by anyone. He portrays the potential pattern of covariations (Kelley, 1967) using a variance-analytical cube with three major criterion dimensions: entities, time, and persons (Fig. 15.7). The shaded areas of the left-hand cube (Fig. 15.7a) represent the case in which I attribute the first person's movie recommendation (in the example above) to the entity (E_1) and not to the person (P_1); the shaded areas of the right-hand cube (Fig. 15.7b) represent the case in which I attribute the second person's (P_2) recommendation to that person rather than the entity. (Here, there is inconsistent behavior at one point in time, T_2.)

Kelley continues this analogy to the analysis of variance up to the F-ratio. The distinctiveness variable is the ratio's numerator, representing the between-conditions factor (entities). The denominator – an expression of "error variance" within conditions (entities) – comprises consistency and consensus as indicators of individual stability and interindividual replicability of actions. The lower the consistency and consensus (i.e., the higher their variability), the greater will be the denominator, the "error term," and the greater must be the distinctiveness value in the numerator to still localize the cause of the relevant effect within environmental events.

Kelley's conceptual framework is thus focused on possible explanations of behavior "at second glance." If an individual's behavior shows high distinctiveness across entities, and at the same time demonstrates high consensus with other individuals and high consistency over time, we can say that this person has a high "state of information regarding the world" (1967, p. 198). Of course, this would also mean that we could hardly ascribe individual dispositions and motives to that person. Table 15.5 shows the various patterns

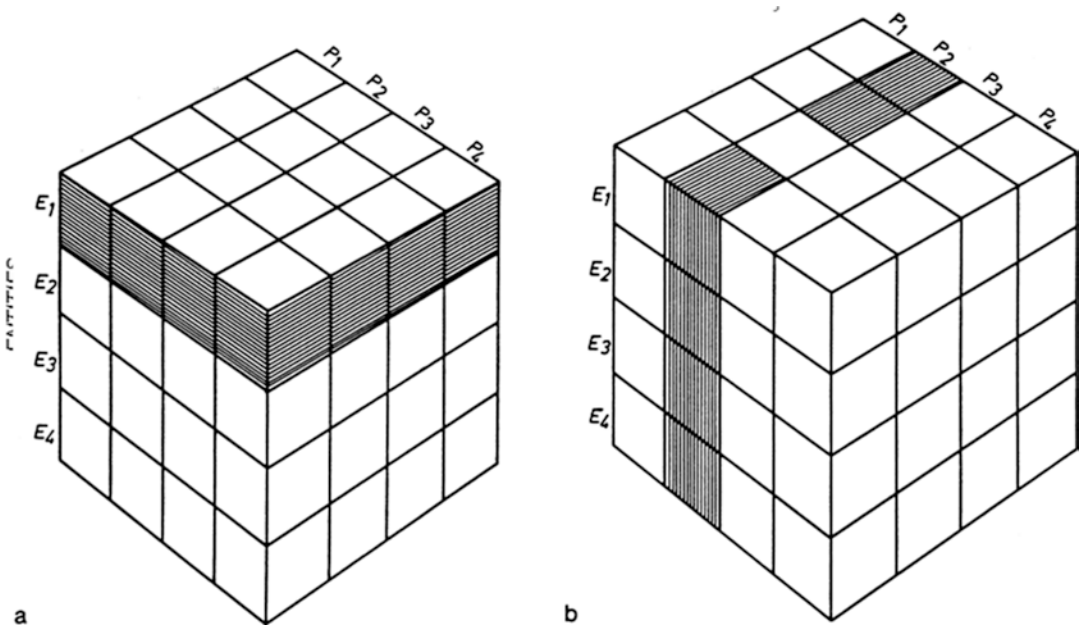

Fig. 15.7 Variance-analytical cubes representing information about the covariation of actions across the three dimensions of "entities," "time," and "persons." (**a**) Shows a data pattern indicating attribution of a person's (e.g., P_1) action to the entity E_1; (**b**) shows a data pattern indicating attribution of the action to the person P_2 (Based on Kelley, 1973, pp. 110, 111)

Table 15.5 Information about actions that, according to Kelley's covariation model, lead to the action's cause being localized in the entity, the circumstances, or the person

Localization of the cause in	Information about distinctiveness (across entities)	Consensus (across persons)	Consistency (across time)
Entity	High	High	High
Circumstance	High	Low	Low
Person	Low	Low	High

of information about actions, which, according to Kelley, lead to causes being localized in the entity, the circumstances, or the person.

It is worth noting that Kelley does not just split the causal weight between person and environment. On the side of Heider's environmental force, he distinguishes between the entity itself and the circumstances surrounding it. Whereas an entity is a constant environmental factor, circumstances can vary. For example, if someone who likes a few special movies (high distinctiveness) that others tend to dislike (low consensus), but occasionally cannot stand one of these otherwise favored movies (low consistency), we would tend to suspect that this reaction, which deviates from that person's typical behavior, was brought on by the circumstances.

Empirical support for the covariation model. Kelley's covariation principles assume information processing to be purely logical and statistical. There is no need for psychological contemplation; a simple computer program would suffice. One might well question whether attributors really proceed in such a logical and statistical manner in their localization of causes when presented with an action episode along with covariation information about its consensus, distinctiveness, and consistency. McArthur (1972, 1976) investigated this question empirically. In the first of her studies, McArthur (1972) presented her respondents with an episodic statement such as the following: "George translated the sentence incorrectly." In addition, supplementary information was provided on each of the

three criterion dimensions (high or low levels of each were induced, giving a total of eight different combinations or patterns of information).

- Consensus: "Almost everyone (hardly anyone) translates the sentence incorrectly."
- Distinctiveness: "George translates hardly any other (almost every) sentence incorrectly."
- Consistency: "In the past George has almost always (almost never) translated the sentence incorrectly."

Based on this information, respondents had to decide whether it was something about the person, the entity, or the specific circumstance – or a combination of these – that had caused the action outcome (or instigated the reaction in the case of actions, feelings, and opinions).

Interestingly, the results show that the cause was most frequently attributed to the person. The same held for a control group given the statements without the supplementary information. As will be discussed in more depth below, this preference for an explanation "at first glance" typically applies to observations made from the perspective of the observer, as described by Jones and Nisbett (1971). Not infrequently, participants invoked a combination of causes, almost always "person and entity," i.e., an explanation of behavior "at third glance." Because the experiment was limited to attributions of others' behavior, the findings cannot be generalized to self-observations.

A glance at the findings presented in Table 15.6 shows that causal attribution is far more influenced by consistency information (20% of the explained variance) than it is by distinctiveness (10%) or consensus information (3%). The weak influence of consensus information has been confirmed in other studies on the attribution of others' behavior (McArthur, 1976; Orvis, Cunningham, & Kelley, 1975). In a series of studies on self-attribution, moreover, Nisbett, Borgida, Crandall, and Reed (1976) found consensus information to have no effect. Consequently, Ruble and Feldman (1976) demonstrated that the effects of consensus information are subject to a position effect. When consensus information was provided at the end of the experimental procedure rather than at the beginning (as was the case in the other studies mentioned), it was almost as effective as consistency and distinctiveness information (recency effect). Its salience can also be enhanced by mentioning the representativeness of the reference group in question (Wells & Harvey, 1977).

Thus, previous studies (e.g., Hansen & Stonner, 1978) show that, as predicted by the covariation model, consensus information may be used to attribute the behavior of others if it is salient and seems representative. Consensus information is remarkably neglected in self-attributions, however. This finding touches again on the discrepancy in observational perspectives discussed by Jones and Nisbett (1971).

- What is more important in the present context is the impact of the total pattern of information on causal attribution from the observational perspective. Empirical evidence confirms the covariation model, i.e., the relationships portrayed in Table 15.5. Person attribution occurs most frequently in the case of low distinctiveness, low consensus, and high consistency. Distinctiveness information is most decisive here (22% of the total variance; see Table 15.6), followed by consistency information (16%). Entity attribution is most frequent in conjunction with high distinctiveness, high consensus, and high consistency. Attribution to circumstances is most frequent if distinctiveness is high and consistency low; consensus plays no role here.

Table 15.6 Percentage (rounded) of the total variance in casual attributions to persons, entities, and circumstances accounted for by the three criterion dimensions of distinctiveness, consensus, and consistency

	Causal attribution				
Criterion dimension	Entity	Circumstance	Person	Person and entity	Overall
Distinctiveness	12	8	22	0	10
Consensus	5	0	6	1	3
Consistency	6	41	16	16	20

Based on McArthur (1972), p. 182

Försterling's elaboration of the model. Since it was first proposed several decades ago, Kelley's covariation model (Kelley, 1967, 1973) has been the subject of much theoretical analysis and empirical testing, leading to numerous elaborations and specifications of the model (e.g., Cheng & Novick, 1990a, b; Försterling, 1989; Pruitt & Insko, 1980; for a summary, see Försterling, 2001). The major point of all these elaborations is that Kelley's model – if it is to be regarded as a "naive analysis of variance" – does not include all of the information necessary for an analysis of variance to be performed. Essentially, it permits only an analysis of the main effects:

- Are, for example, stable-person dispositions responsible or not?
- Are stable characteristics of the entity responsible or not?
- Are the specific circumstances prevailing at the time of the event responsible or not?

The analysis of interactions is not possible, however. For example, it would not be possible to determine whether an effect was caused by a combination of certain person factors, on the one hand, and specific properties of the entity, on the other (see an in-depth discussion of this dilemma and of possible solutions in Novick & Cheng, 2004).

Försterling (1989) therefore expanded on Kelley's original idea of regarding the attribution process as a "naive analysis of variance" to propose a full-blown ANOVA model (from Analysis of Variance in statistics; see the study on the next page). This model views the possible causes (person, entity, and circumstance) as independent variables and the observable effects as dependent variables. In its simplest form, this gives a two (persons)×two (entities)×two (circumstances) experimental design, i.e., two people act with respect to two entities at two points in time. An example would be two students sitting for an exam in two different subjects at two points in time. The dependent variable (the observable effects) would be the students' performance on the two exams at both points in time.

Study

Experimental Testing of the ANOVA Model

Försterling (1989) tested his ANOVA model in a study in which students were instructed to imagine they were on a strange planet and did not know how things were causally related. They were asked to imagine they were, for the first time, observing two people playing two different video games on two different days. The students were then informed about both players' performance (success or failure) on both games on both days. To this end, all of the information specified in the ANOVA model was provided in table form. The respondents were instructed to analyze the data carefully and then to gauge the importance of certain causes named by the experimenter (the main effects: person, entity, time; the two-way interactions of person and entity, person and time, and entity and time; and the three-way interaction of person, entity, and time) in explaining the pattern of results presented. The findings of this study were entirely consistent with the predictions of the ANOVA model. If the data were indicative of a main effect, this effect was, for the most part, correctly identified as being particularly important. Likewise, when the data pointed to an interaction effect, this effect was identified correctly. Thus, the attributions made by individuals provided with a full set of covariation information are remarkably consistent with the ANOVA model.

We would not be far off the mark in spontaneously comparing the task administered to Försterling's participants to a brainteaser. Whether his experiment has ecological validity is an entirely different question. Is it really conceivable that the much cited "man or woman on the street" takes such a logical and statistical approach to establishing the reasons for his or her behavior or that of

others or to determining the causes for the events observed or experienced in everyday life? This would seem unlikely for various reasons:

- The available information is often incomplete.
- We do not tend to observe different people doing different things at different points in time.

Although it may theoretically be possible to procure the necessary information, we are unlikely – unless our interest is professional – to do so, because it would incur a great deal of time and effort. Moreover, if we did go to the trouble of making the necessary inquiries, we would likely be considered highly inquisitive, which is not a socially desirable characteristic.

Unless the anticipated costs of obtaining the necessary information are in reasonable proportion to the expected benefits of making an accurate causal inference, we will be content to make attributions – that may then be less accurate – without access to the full set of covariation information (see Sect. 15.3.2 on the stage model of attributional activity). This is probably the more functional choice, however. What would be the point of a meticulous causal analysis that takes so long that, by the time it has been completed, the window of opportunity for appropriate action has closed?

Summary

Kelley's covariation model and its various elaborations are normative models describing how people are expected to go about causal search, and the attributions they are expected to make, when certain consensus, distinctiveness, and consistency information is available and the aim is to draw a logical, stringent conclusion. However, it tells us nothing about how the search for causality actually proceeds, or about the attributions actually made, in everyday life. The findings of McArthur and Försterling provide no new insights here. They merely confirm that people are able to make causal attributions that correspond with Kelley's model, i.e., that they are intellectually capable of evaluating the available covariation information and of using it to determine the causes of outcomes and events.

In everyday situations, however, we cannot consult a table (cf. Försterling, 1989) that contains all the necessary covariation information and thus permits unambiguous attributions. Neither do we find ourselves on a strange planet, knowing nothing about the living conditions there; rather, we perceive any available covariation information against the background of years of experience. As a rule, we first have to procure this information and to invest a certain amount of time and effort in doing so. Moreover, because attributions in everyday life tend to have personal implications (at least for the way we act), the attribution process may be influenced by certain motivational biases. As mentioned above, people may be less interested in a rational explanation of causes than in one that is satisfying to them personally.

Despite these criticisms, Kelley's covariation model has the indisputable advantage of describing a method that can be adopted when we wish to make rational and accurate causal inferences. It has important implications for therapeutic applications, pointing to strategies that might be fruitfully applied in cognitive behavioral therapy with depressive patients or helpless students, for example (Sect. 15.4.2).

15.3.3.4 Configuration Concepts: Kelley's Causal Schemata

The covariation analysis of causes for action discussed above presupposes various data inputs. In many everyday situations, these data are not available, or we do not have the time to gather and analyze them (see above). If the information available is incomplete, the attributor can apply specific configuration concepts concerning the coaction of various causes, the "causal schemata" proposed by Kelley (1971, 1972, 1973). For example, if someone has solved a problem that we know was very difficult, we assume their success was from high ability. In other words, the successful action outcome has an inhibitory cause, high task difficulty, and a facilitative cause, high ability. Facilitative and inhibitory causes need not be split among the person and the

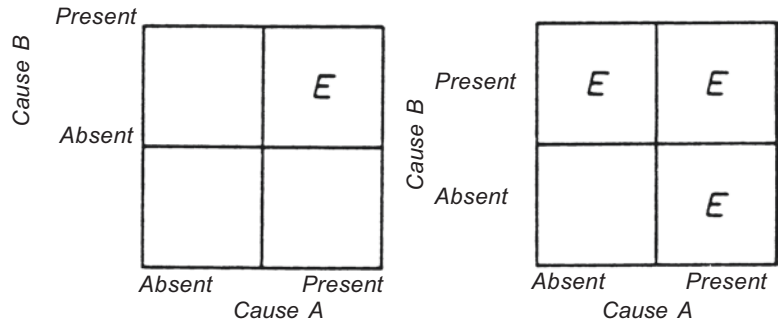

Fig. 15.8 Causal schemata for (**a**) "multiple necessary causes" and (**b**) "multiple sufficient causes" of an effect (*E*) where two causes (*A*, *B*) play a role (Based on Kelley, 1972, pp. 2, 6)

environment, as in this example; they may both be localized within the person or within the environment.

Aside from distinguishing between facilitative vs. inhibitory and internal vs. external causes, Kelley (1972) introduced two configuration concepts reflecting possible links between causes that can serve to bring about an effect:

- Causal schema of "multiple necessary causes"
- All facilitative causes must be present at the same time if the effect is to occur. Figure 15.8a, b illustrates this causal schema for two causes, A and B. Effect (E) occurs only in the presence of both A and B (Fig. 15.8a). If this causal schema is salient, we can immediately infer the presence of A and B once the effect has occurred, without having to identify the two causes separately.
- Causal schema of "multiple sufficient causes"
- In this case, only one facilitative cause is required to bring about the effect (Fig. 15.8b), but here, there is no basis for inferring which of the possible facilitative causes is present.

Which causal schema should be invoked when? Attributors evidently develop certain experienced-based rules here. Rare and unusual events (or particularly significant ones; Cunningham & Kelley, 1975) are likely to be attributed to multiple necessary causes. Several causes must coincide and be multiplicatively intertwined for events of this kind to occur. An example would be success on a very difficult task or failure on a very easy one. Two facilitative internal causes, high ability and high effort, must have been simultaneously present in the first but not in the second case. More common effects, such as success on an easy task or failure on a difficult one, suggest a causal schema of multiple sufficient causes. To succeed on a simple task, just one of the two facilitative causes, either ability or effort, will suffice; to fail on a difficult task, the absence of just one of the two facilitative causes is sufficient to prevent us from overcoming the inhibitory cause (high task difficulty).

Discounting principle. How, though, do we determine which of two facilitative causes was present in the case of multiple sufficient causes? Further information about the occurrence of the effect in question does not help us to answer this question, because one or the other facilitative cause may have been present at every recurrence of the effect (e.g., success on an easy task). According to Kelley (1972, 1973), whenever unidirectional causes are indivisible, the attributor will invoke a discounting principle, whereby "the role of a given cause in producing a given effect is discounted if other plausible causes are also present" (1972, p. 113). (This principle is also consistent with the logic of the variance-analytical model.) We are dealing here with the same phenomenon that Jones and Davis (1965), in their model of correspondent inferences, identified as a determinant for attributing an action to an underlying disposition: the number of uncommon effects. The presence of more than one uncommon effect for a chosen action alternative also confronts the attributor with the indivisibility of multiple sufficient causes. It remains uncertain which of the dispositions associated with the various uncommon effects actually instigated the action. A direct

correspondence between action and disposition cannot be established.

The greater the number of sufficient causes (or effects), the stronger the discounting of individual causes among several plausible ones (or of an individual uncommon effect among several plausible ones) will be. The only thing that might clarify the situation is a differentiation of the causal schema for the effect in question by multiple observations of covariations among entities, circumstances, times, and persons, i.e., the ongoing formation and testing of psychological hypotheses. Furthermore, it would be interesting to find out which of two possible facilitative causes is more strongly discounted by the attributor, if one of them pertains to the person and the other to the environment. This would show whether attributors tend to use explanations "at first or second glance." Discounting the environmental cause would indicate a preference for explanations "at first glance," the approach typically taken by external observers, as described by Jones and Nisbett (1971; cf. also Jones, 1976). Ross (1977) calls this bias the fundamental attribution error. Heider (1958, p. 54) had already called attention to it in stating that "behavior engulfs the field."

Augmentation principle. Causal inferences may also involve the complement of the discounting principle, namely, the augmentation principle (Kelley, 1971).

- The augmentation principle holds that a facilitative cause gains salience whenever it is confronted by an inhibitory cause, e.g., difficulties, risks, and the need to make sacrifices in the run up to the action goal.

There is an exact analogy to the Jones and Davis model of correspondent inferences here as well, namely, the determinant of desirability. The less socially desirable a pursued goal appears to be (e.g., because it contravenes prescribed roles), the more the relevant internal causes will be augmented and the behavior ascribed to a personal disposition rather than to the demand characteristics of the situation.

Experimental demonstrations of causal schemata are usually hypothetical in nature; i.e., they are based on prepared statements from which participants have to select a single cause. Experimental procedures of this kind have justifiably been criticized for their unrealistic presentation of prearranged information and their semantic triviality (Fiedler, 1982; and a critique by Shaklee, 1983). Major (1980) gave respondents access to an array of information material before asking them to make an attribution decision for a behavioral event described. Her respondents made only limited use of this information. They much preferred consistency information over distinctiveness and consensus information. Attributions were only moderately consistent with Kelley's covariation model.

Causal schema for graduated effects. Kelley (1973) went on to analyze further causal schemata. The schemata for necessary and sufficient causes are merely two special cases of a more global schema that is not based solely on the presence or absence of a cause. This schema for graduated (additive or multiplicative) effects has more in common with everyday thinking, because it takes differences in the strength of individual causes into account. Causal schemata of graduated effects are often decisive in achievement behavior, where the effects are success and failure. The graduation of these effects depends on the level of task difficulty. The success effect grows with increasing difficulty level (Fig. 15.9: *S*, *SS*, *SSS*); the failure effect diminishes with decreasing difficulty level (*F*, *FF*, *FFF*). Facilitative causes for success effects are ability and effort, which can be mutually compensating. This also means that both causes are necessary for most effect levels, i.e., neither can be totally absent. Task difficulty, in contrast, is an inhibiting factor for success effects. To this extent, the graded effects of success and failure correspond to the risk-taking model, i.e., the proportionate relationship between difficulty and success incentive and the inversely proportionate relationship between difficulty and failure incentive.

The matrix in Fig. 15.9 represents a compensatory causal scheme for seven graded effects (*FFF*,

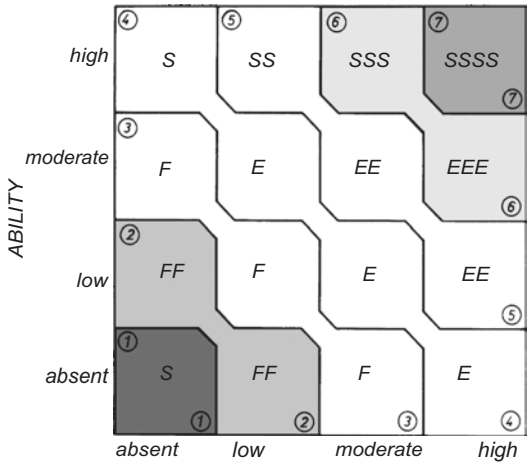

Fig. 15.9 Causal schema for graded effects of achievement behavior and compensatory causes, i.e., for success at increasing levels of difficulty (*S*, *SS*, etc.) and for failure at decreasing levels of difficulty (*F*, *FF*, etc.), with four distinct levels of two additive, mutually compensating, causal factors: ability and effort

FF, *F*, *S*, *SS*, *SSS*, *SSSS*) corresponding to seven levels of difficulty, where – at most difficulty levels – neither of the two facilitative causes (ability and effort) is sufficient, but both are required to bring about success (the exception being difficulty level 4). The intensity of each cause has four levels and is additively (not multiplicatively) linked to that of the other cause. At the level of intermediate difficulty, level 4, there are two combinations where the two causes are linked by a scheme of multiple sufficient causes (the cells in the top left and bottom right corners in Fig. 15.9). Here, one cause is absent, while the other is maximally evident. By contrast, success at very high levels of difficulty (levels 6 and 7) and failure at very low levels of difficulty (levels 1 and 2) constitute unusual effects (shaded fields). In both cases, the scheme of necessary causes is particularly pronounced.

Ambiguity arises when the strength of neither causal factor is known. This invites attribution biases (thereby constituting individual differences in motivation, as we will see later). This ambiguity applies to success at various levels of difficulty (levels 4–6). For example, individuals can attribute their success at difficulty level 6 (SSS) either to high ability and moderate effort or to moderate ability and high effort. The analog holds for failure at various levels of difficulty (levels 2 and 3). A failure at difficulty level 2 (FF) can either be ascribed to low ability and lack of effort or to lack of ability and low effort.

The matrix in Fig. 15.9 can explicate three different schemata of the superordinate causal scheme of graduated effects:

1. Comparison of results at various levels of difficulty (rows or columns) reveals covariation between the intensity of one cause and the strength of the effect, while the other cause remains constant. This can be described as simple covariation (between a single cause and its effect) and holds when a cause (such as ability) remains constant and an improved outcome can only be achieved through increased effort.
2. If clearly unequal effects are compared – i.e., those at least two difficulty levels apart – then both causes can covary with increasing intensity of effect (along the diagonals from lower left to upper right), with both causes contributing proportionately to the increased effect. This can be described as a scheme of combined covariation (with the effect). This combined covariation, like its simple counterpart, serves as a basis for predicting effects when the strength of both causes is known.
3. If, on the other hand, a given effect is to be explained (the diagonals from the top left to the bottom right in Fig. 15.9), then the strength of the two causes is inversely proportionate. This represents a compensatory causal scheme (between two facilitative causes). In the case of effort compensation, given differences in ability are offset by a corresponding increase in the effort to attain a particular effect. In the case of ability compensation, given differences in effort are offset by corresponding differences in ability.

15.3.4 Processes of Causal Attribution: Descriptive Perspectives

15.3.4.1 Motivational Bias

The findings presented thus far give the impression that causal attribution is a logical and rational affair. The fictitious scenarios commonly presented to participants in experimental settings doubtlessly contribute to this impression. When it comes to establishing the reasons for our own behavior, however, the causes determined affect us personally. For instance, if something touches on our self-esteem, self-serving interests may distort the logical and rational use of information.

- Motivational biases in attribution have frequently been investigated and ascertained. Such biases are particularly noticeable after success and failure. They are also apparent in the perspective discrepancy between self-assessment and assessment by others, as well as in the use of consensus information. They are reflected in enduring work habits and in "learned helplessness." They influence feelings of responsibility and culpability.

The first finding often cited in support of the argument that attributions of one's own behavior or self-generated outcomes are subject to a self-serving bias is that people tend to take credit for their successes but to attribute failures to external causes (e.g., Luginbuhl, Crowe, & Kahan, 1975; Poppe et al., 2005; Stiensmeier-Pelster, Kammer, & Adolphs, 1988).

In a study by Poppe et al. (2005), respondents of different ages and occupational backgrounds were asked how they would attribute success and failure in various real-life situations. The respondents then rated these causes in terms of their locus, stability, and globality. The results are presented in Table 15.7. A tendency toward self-serving attributions emerged for all three attribution dimensions. Specifically, successes are more likely than failures to be attributed to internal, stable, and global causes.

Table 15.7 Means and standard deviations (in brackets) of locus, stability, and globality ratings by positive and negative situations

Attribution dimension	Positive situations	Negative situations
Internality	76.1 (11.0)	65.7 (11.0)
Stability	75.1 (10.7)	61.6 (12.5)
Globality	80.6 (13.5)	59.6 (15.3)

High scores indicate strong endorsement of attribution to internal, stable, or global causes. Scores range from 16 to 112 (Based on Poppe et al., 2005)

Miller and Ross (1975) cast doubt on the interpretation that this asymmetry in attributions after success and failure derives from self-enhancing or self-protecting tendencies and proposed three reasons for a rational, nonmotivational bias in information processing:

1. People intend and expect their endeavors to produce success and not failure; accordingly, they are more likely to take responsibility for expected than for unexpected outcomes.
2. People perceive stronger covariation between their efforts and increasing successes than under conditions of repeated failure.
3. People have an erroneous conception that there is a tighter contingency between their effort and success than between their effort and failure.

Experimental testing has focused on the validity of the first two explanations (differences in expectations or in invested effort). Results show that these explanations are unable to invalidate a motivational basis for the asymmetry of self-serving attributions (cf. overview by Bradley, 1978). The first of these studies was reported by Miller (1976) himself. His respondents were asked to complete what was purported to be a test of social competence. Before scoring the test and informing participants of their success or failure, Miller told one half of the sample either that it was an extremely valid test, which tapped various desirable traits, or that it was a new test that had not yet been validated. This post hoc induction of

a difference in the self-relevance of success and failure excluded the possibility of systematic differences between the experimental groups in terms of both expectations and effort (and thus their covariation with the later results). Miller found that success was attributed more to internal factors and failure more to external ones. This asymmetry was more pronounced when the test results had high self-relevance than when they had low self-relevance.

The analysis by Stevens and Jones (1976) was even more stringent. Working on the basis of Kelley's (1967) purely rational covariation model, they provided respondents with covariation information on all three dimensions. In contrast to McArthur's (1972) study, participants were not asked to interpret the behavior of others based on scenarios presented in a questionnaire, but they themselves – successfully or unsuccessfully – carried out tasks containing distinctiveness, consistency, and consensus information (each at two levels, high vs. low). Findings showed consistent deviation from a purely rational interpretation of the information as posited in Kelley's covariation model. Successful participants were more likely than unsuccessful participants to attribute their outcomes to internal sources (ability and effort) and less likely to attribute them to external sources (luck). The more often participants experienced failure when most others were successful, the more pronounced their self-serving attribution biases were. The results for a data pattern indicative of high consistency, low distinctiveness, and low consensus deviated most blatantly from the assumptions of Kelley's model. This pattern ought to be the most compelling case for a person attribution (Table 15.5). In fact, it was here that ability attribution reached its lowest point and luck attribution its highest.

- Rational information processing, as posited in Kelley's covariation model, takes place only when causes are attributed to others' behavior. In the case of self-attribution, processing seems to be biased by self-serving tendencies – especially in the case of experiences that threaten to impair self-esteem.

15.3.4.2 Self-esteem and Attribution

Self-esteem is often assumed to have strong motivational effects on self-attribution. It therefore seems worth examining the extent to which individual differences in self-esteem or self-concept of ability contribute to the asymmetrical pattern of attribution observed after success and failure. This question has been the subject of several studies.

Taken together, the findings of these investigations show that the self-concept of ability has a marked impact on the attribution of success and failure.

Study

Attributional Differences as a Function of the Self-Concept of Ability

In a study by Stiensmeier-Pelster (described in Chap. 6 of Stiensmeier-Pelster, 1988), fifth through seventh graders were asked to state how strongly they would attribute personal successes ("You did very well on a test") and failures ("You got a bad grade on a test") at school to their own (high or low) ability, their own (high or low) effort, task ease or difficulty, or chance (good or bad luck). Findings showed that the lower their self-concept of ability, the less students attributed success to their own (high) ability, and the more they ascribed it to task ease or good luck (Table 15.8).

The reverse held after failure: the lower the students' self-concept of ability, the more likely they were to attribute failure to their (lack of) ability, and the less likely they were to ascribe it to bad luck.

Table 15.8 Correlations between level of self-concept of ability and attribution of success/failure to ability, effort, task difficulty, and luck

Attribution dimension	Self-concept of ability	
	Success	Failure
Ability	0.72**	−0.64**
Effort	−0.19	−0.04
Task difficulty	−0.40**	0.08
Luck	−0.34*	0.25*

*$p < 0.05$; **$p < 0.001$

Findings comparable to those of Stiensmeier-Pelster (1988) have been reported by Marsh, Cairns, Relich, Barnes, and Debus (1984); Schwarzer and Jerusalem (1982), Stiensmeier-Pelster, Schürmann, Eckert, and Pelster (1994), and Stroebe, Eagly, and Stroebe (1977). Thus, empirical research indicates that individuals with a low self-concept of ability tend to attribute failure to a personal lack of ability. By contrast, individuals with a high self-concept of ability tend to ascribe failure to external factors, such as bad luck.

These findings are very difficult to reconcile with the notion of a self-serving bias in information processing that serves to protect self-esteem. If this kind of bias were in operation, individuals with a low self-concept of ability would also tend to attribute success to high ability and failure to bad luck. This is demonstrably not the case, however.

Consistency theory approaches. One approach that seems compatible with the hypothesis of a motivational bias in information processing can, however, be derived from consistency theory (Festinger, 1957; Heider, 1958). The "self-consistency approach" (Jones, 1973) works on the assumption that people endeavor to develop and maintain a consistent image of themselves. Accordingly, they do not necessarily strive to obtain the most complete, accurate, and realistic information about the potential causes for their successes and failures. In fact, they tend to prefer information that leads to attributions consistent with their own self-concept of ability and to ignore information that would suggest attributions inconsistent with that self-concept.

If someone considers himself or herself very able, it will be consistent with their self-concept of ability to attribute success to high ability and failure to external causes such as task difficulty or bad luck. If, on the other hand, someone considers himself or herself less able, it will be consistent with their low self-concept of ability to attribute success to external causes, such as luck or the ease of the task, and failure to a lack of ability.

The attributional differences observed between people with high vs. low self-concepts of ability are not necessarily the result of such efforts to achieve consistency, however. These findings can also be explained in purely rational terms, by reference to the covariation model (Kelley, 1967, 1973) described in detail above. Kelley's model predicts that outcomes will be attributed to person factors such as lack of ability when success or failure varies across persons (you succeed/fail where others do not) but remains constant across entities (you succeed/fail on other tasks as well) and time and/or circumstances (you have succeeded/failed in the past as well). Conversely, the model predicts attributions to situational factors (e.g., luck or situational circumstances) when success or failure is constant across persons (everyone else succeeds/fails as well) and entities (you succeed/fail on other tasks as well) but varies across time (in the past or in other circumstances, your outcome would have been different). The attributional differences observed as a function of the self-concept of ability can thus be explained in the following terms:

- In most of the studies described above, respondents were expected to explain action outcomes on the basis of very vague or nonexistent consensus, distinctiveness, and consistency information. When covariation information is lacking, people are assumed to fall back on their own experience and to infer the missing information by comparing the action outcome in question with earlier outcomes. Because individuals with high and low self-concepts of ability are likely to have different bodies of experience, the covariation information they infer will differ, thus explaining the attributional differences observed.

Table 15.9 presents the covariation information that might be inferred in the case of failure by individuals with high vs. low self-concepts of ability. Considering what goes to make a high or low self-concept of ability, the pattern of information presented seems entirely plausible. People with low self-concepts of ability typically believe that they are not much good at many things and therefore consider themselves less able than many other people. If they are not provided with any (objective) external covariation information

Table 15.9 Consensus, distinctiveness, and consistency information inferred by individuals with high vs. low self-concepts of ability on the basis of previous experience in the case of failure

	Self-concept of ability	
	High	Low
Consensus	High[a]	Low
Distinctiveness	High	Low
Consistency	Low	High
Cause identified	Circumstances/ entity	Lack of ability

[a]For example, a person with a high self-concept of ability will perceive the level of consensus to be high (see text)

(e.g., by others) in the case of failure, but have to derive it all from their own experience, they are likely to assume that many other people succeeded and that they were among the few who failed (low consensus). Furthermore, they will see the failure as one in a long line of supposed or real (prior) failures on other tasks (low distinctiveness) as well as on similar tasks (high consistency). Based on this pattern of information, which has been inferred from prior experience, the failure is attributed to a "lack of ability."

Individuals with a high self-concept of ability, by contrast, believe that they are good at many different task domains, in fact often better than many other people. In case of failure, it will therefore be plausible for them to assume that most others failed as well (especially as others seem less able); in other words, they will perceive a high level of consensus. Furthermore, they will see the failure in contrast to earlier experiences with similar or different tasks, which will invoke a perception of high distinctiveness and low consistency. For people with a high self-concept of ability, the pattern of covariation information inferred on the basis on prior experience makes an attribution of failure to a lack of ability unlikely. It is much more plausible that the outcome will be attributed to the circumstances or the entity (i.e., the type of task).

- From this perspective, attributional differences between people with high versus low self-concepts of ability are to be expected only when the covariation information inherent in the situation or provided by another instance is very vague or nonexistent, meaning that attributors have to rely on their prior experience. The more (objective and credible) covariation information people are given, the fewer attributional differences should be observed as a function of self-concept of ability. In the best case scenario, when the attributor has access to a full set of consensus, distinctiveness, and consistency information, such differences should no longer be apparent.

15.3.4.3 Perspective Discrepancy Between Actor and Observer

Causal attributions have been shown to differ depending on whether they are made from the perspective of the actor or that of the observer. Whereas actors tend to attribute their behavior and its outcomes to situation factors, i.e., to external-variable causes, observers are more likely to attribute (others') behavior to characteristics of the actor, i.e., to internal-stable causes (Jones & Nisbett, 1971). If the actor's preference for situational factors were seen as self-serving, the discrepancy between the actor and observer perspectives (Jones & Nisbett, 1971; Watson, 1982) could be explained in terms of a motivational bias in information processing. However, this explanation is not compatible with the fact that the actor generally has more information to explain his or her behavior and its outcomes than an observer. In this case, the perspective discrepancy is evidently not the result of motivationally determined attribution biases, but of attributional differences deriving from different informational input.

There seem to be two main reasons why behavior is more likely to be attributed to situation factors by the actors themselves and to person factors by observers:

- Differences in the focus of attention
- Differences in the amount of context information

The actor's attention is focused on aspects of the situation; that of the observer is on the actor. Furthermore, the actor has far more information than the observer about the current situation (dis-

tinctiveness): its precedents and background (consistency).

The effects of this perspective discrepancy on attribution can be neatly illustrated by the example of attributional differences in the classroom on the following page.

It is worth noting that teachers who apply individual frames of reference (Chap. 6) are much more likely to infer variable causes for student performance than those who apply social frames of reference. Teachers who use an individual frame of reference evaluate student performance in terms of whether it represents an improvement or a deterioration relative to previous outcomes. A social frame of reference, by contrast, implies a focus on how well students perform relative to their classmates. Teachers who apply individual frames of reference take a keen interest in individual students' development; they are highly sensitive to information signaling that a student's performance has improved or declined. Because this kind of approach focuses these teachers' attention on consistency information, they are more likely to attribute learning outcomes to variable factors (for a summary, see Rheinberg, 1980, 2001).

Example

Teachers tend to ascribe student learning outcomes to stable student characteristics, such as high vs. low student ability. Students, on the other hand, tend to attribute their performance to internal-variable causes (lack of effort, lack of interest) or external-variable causes (luck). Bearing in mind that the teacher has comprehensive access to consensus information (he knows how all students performed) but has only a limited amount of consistency and distinctiveness information (as a rule, his knowledge of their previous outcomes and their outcomes in other subjects is insufficient), it seems quite plausible for him to attribute learning outcomes to student characteristics. This attribution is also rational within the framework of the covariation principle (the teacher attributes the effect to the cause that is present when the effect is present and absent when the effect is absent). The student, by contrast, has superior access to distinctiveness information (the grades she obtained in other subjects) and consistency information (her previous grades). She does not, however, have immediate access to consensus information, but would first have to ask the other students how well they did. Given that her performance may differ over time, it seems quite plausible for her to attribute her outcomes to variable causes.

A reconceptualization of the conditions for perspective discrepancy. Monson and Snyder (1977) critically examined the findings on perspective discrepancy and established that all experimental situations in which evidence for perspective discrepancy had been found had in fact fostered its induction. The actors had not themselves brought the situations about, neither did they have the power to shape them; hence, they logically felt subjected to situational influences. Under conditions such as these, it makes perfect sense to give greater weight to situational than to person factors. Because actors are aware of the situational, experiential, and historical context of their current situation, they should be able to make more appropriate attributions than external observers, whether to situational or to person factors. Monson and Snyder postulate as follows:

> Actors should make more situational attributions than should observers about behavioral acts that are under situational control; by contrast, actors' perceptions of behavior that are under dispositional control ought to be more dispositional than the perceptions of observers. (Monson & Snyder, 1977, p. 96)

Actors will likely be more prone than observers to attribute to situational factors if the actor's behavior is:

(a) Elicited by an experimental manipulation
(b) Performed in a situational context not chosen or controllable by the actor
(c) Performed in the presence of facilitative situational cues provided by those aspects of the experimental manipulation designed to elicit the behavior
(d) Dissimilar to previously manifested behaviors because the actor has no prior exposure to the experimental situation
(e) Inconsistent with previous self-attributions because the actor has had no prior experience with the particular experimental situation
(f) Not part of an extended causal chain (Monson & Snyder, 1977, p. 101)

However, the actor's self-attributions will be more strongly person centered than those of an external observer when experimentally induced or naturally occurring situations permit the following behavior:

(a) Dispositional
(b) Performed in situations chosen and/or controllable by the actor
(c) Performed in the presence of neutral or inhibitory situational factors
(d) Similar to previously manifested behaviors
(e) Consistent with prior attributions
(f) Part of a causal chain with prior dispositional causes (Monson & Snyder, 1977, pp. 101–102)

- Monson's and Snyder's reconceptualization of the conditions for perspective discrepancy does not contradict the explanations of Jones and Nisbett (1971) but rather specifies when person factors come to dominate over situational factors in self-attribution. Because of the greater amount of information available to them, actors are generally better able to make appropriate attributions. Observers are always prone to the fundamental attribution error (Ross, 1977) and tend to overestimate person factors.

All conditions of perspective discrepancy analyzed thus far are rooted in information processing and not in motivational circumstances. Therefore, it is only an apparent contradiction that the actor makes fewer attribution errors than the observer in terms of the perspective discrepancy but displays more bias than the observer in attributing self-relevant actions and their outcomes.

When the two phenomena are considered together, Monson's and Snyder's reconceptualization of perspective discrepancy shows self-serving attribution asymmetry in a new light. The latter phenomenon generally arises in highly controlled experimental situations that expose the actor to a preponderance of situational factors. Thus, the informational input itself favors attribution of unsuccessful outcomes and actions that threaten to impair self-esteem to external causes. Thus, it seems quite reasonable that the self-serving bias of attribution asymmetry should be more pronounced for failure than for success, as reported by Stevens and Jones (1976).

15.3.4.4 Attributional Style as a Stable Personality Trait

Causal attributions not only are a function of situational conditions but also depend on personality traits. Several researchers showed that some people prefer specific patterns or styles of causal attribution for success and failure irrespective of situational conditions. For example, Abramson et al. (1978) postulate a depressive attributional style that is part of a depressive cognitive pattern (Alloy et al., 2006). Dodge (1993) proposes that aggressive children who tend to prematurely attribute hostile intentions to others follow a "hostile bias" in their causal attributions. In the next section, we will discuss the influence of such attributional styles on people's experiences and behavior in greater depth.

Summary

As a rule, the causal attributions made in everyday life do not comply with the normative models presented in Sect. 15.3.3. There can be many reasons for this: incomplete information, the desire to protect one's self-esteem, the desire to experience oneself as consistent and the environment as stable, and also biographically based propensities to attribute one's own or others' behavior prema-

turely to certain causes. Other possibilities are that there is no time for a careful analysis of the causes of an event or that there are no clear benefits of an exhaustive causal analysis. Overall, people seem to be less interested in strictly realistic causal attributions than they are in attributions that facilitate their future actions or promote their well-being.

15.4 Attributional Theories

Attributional theories are concerned with the effects that causal attributions have on people's subsequent behavior and experience (Sect. 15.2). In fact, these are the questions that make the psychology of causal attribution so interesting for motivational psychologists. Moreover, attributional approaches allow more accurate predictions to be made of two key variables in the psychology of motivation: expectancy and value. In this context, it is less the causal factor itself that guides behavior than the properties (attribution dimensions) ascribed to it – its locus, stability, globality, and controllability or intentionality (Weiner, 2006). The first two of these dimensions were identified by Heider (1958) who, apart from distinguishing internal personal forces from external environmental forces, emphasized the dimension of stability vs. variability. On the person side, ability is stable and motivation (effort) is variable. On the environment side, task difficulty is stable and luck is variable. Weiner combined the dimensions of locus and stability in a four-field schema of causation (Table 15.10). Other authors have since proposed further attribution dimensions. Rosenbaum (1972) utilized the first of Heider's two motivational components, intention and exertion, arguing that causes can also be distinguished in terms of their intentionality. Ability is not intentional, but effort is. Likewise, work habits (stable diligence or stable laziness) are intentional, but the psychophysical state (mood, illness, fatigue) is not (Table 15.11).

Table 15.10 Classification scheme for the perceived causes of success and failure

	Locus	
Stability	Internal	External
Stable	Ability	Task difficulty
Variable	Effort	Luck

Based on Weiner et al. (1971), p. 2

Table 15.11 Classification of internal causes by the dimensions of stability and controllability

	Controllability	
Stability	Controllable	Not controllable
Stable	Work habits (diligence, laziness)	Ability
Variable	Effort (momentary)	Psychophysical state (mood, fatigue)

Weiner (1979), "steerability," Rheinberg (1975), "intentionality," Rosenbaum (1972)

"Intentionality" is perhaps not a very fitting label for this distinction, however (quite apart from the fact that "intentionality" describes the reasons for behavior rather than the causes of an event). Attributing failure to a lack of effort does not mean that the failure was intentional in the sense of purposeful or desired. An intention determines what, if anything, is to be done. It is a precondition for, but not a direct cause of, an action outcome. It therefore makes more sense to label this dimension "controllability" (Rheinberg, 1975; Weiner, 1979).

We feel responsible for causes we have the power to control. Therefore, empirical studies often operationalize controllability in terms of responsibility (for a summary, see Weiner, 1992, 1994). Although a clear theoretical distinction can be drawn between controllability and intentionality, there seem to be strong intercorrelations between the two attribution dimensions (Anderson, 1983).

Abramson et al. (1978) proposed that a further (fourth) dimension – global vs. specific – be considered to account for the generalization of expectancies to other task and/or activity domains that is observed after repeated experiences of failure (see below).

When considering the effects of attributions on behavior in terms of their dimensional ratings, i.e., the properties they are ascribed, the objective properties of the cause – or the properties it is ascribed from an external perspective – are irrelevant.

All that matters are the properties ascribed by the attributor himself or herself. The objective causes and the causes ascribed from the external perspective may deviate considerably from the subjective causes. For example, attributional research considers ability to be an internal, stable, and uncontrollable factor (Weiner, 1985a, 1986). Yet Dweck (1986, 1999) showed that people differ in the extent to which they see intelligence and ability as stable and uncontrollable or as changeable (i.e., unstable and controllable) and that this judgment influences their motivation and learning behavior. Likewise, aggression research has shown that aggressive children differ from their less aggressive peers in the extent to which they evaluate the harmful behavior of others as having been caused intentionally (Dodge, 1993; Dodge, Coie, & Lynam, 2006). Aggressive children exhibit a "hostile bias," i.e., they tend to assume that others have hostile intentions and to see harmful behavior as intentional. Finally, research has shown that, as children grow older, parents become more likely to attribute any deviant behavior to causes that are subject to the children's own control (Dix, Ruble, & Zambarano, 1989; for a summary, see Stiensmeier-Pelster, 1995).

- Like causal attribution, which often is a subjective rather than a rational process, the evaluation of causal properties tends to be subjective rather than objective.

In the following, we discuss how attributions influence subsequent behavior and experience. Rather than seeking to provide an exhaustive overview, we focus on three major fields of application that remain the subject of intensive conceptual theorizing and empirical testing:

1. The influence of attributions on expectancy
2. The influence of attributions on the emergence of hopelessness and depression
3. The influence of attributions on the emergence of anger and aggression

Based on the examples of these three fields of application, we will discuss the major theoretical contributions of research into how causal attributions affect behavior and experience. Attributional research has revealed a wealth of further details and stimulated studies in many fields of psychological application (see above). Readers interested in the details of these investigations are referred to the comprehensive reviews by Försterling (2001), Weiner (2006), or Graham and Taylor (2016).

15.4.1 Attribution and Changes in Expectancy

Weiner (1985a) formulated an "expectancy principle" to describe the relationship between attribution and expectancies of success. The principle holds that changes in expectancy are influenced by the perceived stability of causes of previously achieved outcomes.

> Changes in expectancy of success following an outcome are influenced by the perceived stability of the cause of the event (Weiner, 1985a, p. 559)

Study

Relationship Between Expectancy of Success and Attribution

In several trials, Meyer (1973) induced either consecutive successes or consecutive failures. After every progress report, he asked participants to rate the extent to which the outcome had been caused by ability and task difficulty (Weiner's stable causal factors). Meyer then assigned the participants to two groups based on these attributions: one group of participants who tended not to attribute failures to ability and task difficulty and one group who were much more likely to do so. As shown in Fig. 15.10, the findings are fully congruent with Weiner's expectancy principle. The participants who tended to attribute failure to the stable factors of task difficulty and ability reduced their expectancies of success with every failure, whereas the other participants barely modified their expectancies of success at all.

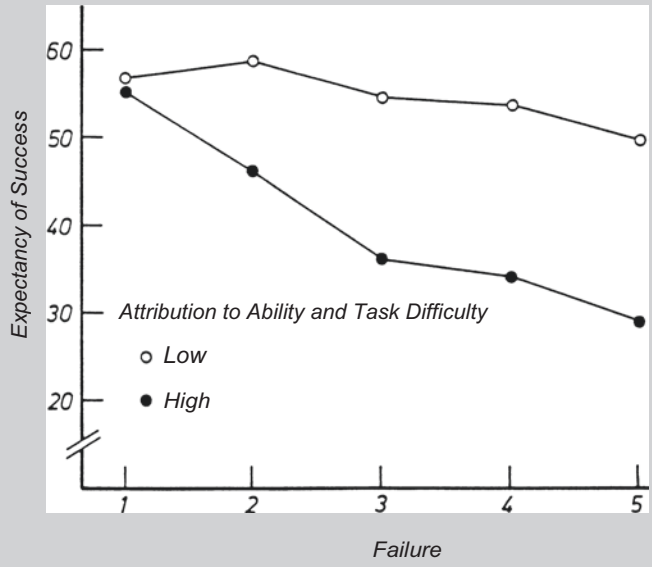

Fig. 15.10 Change in the mean expectancy of success within a succession of failures in groups with low vs. high attribution of failure to ability and task difficulty (Based on Meyer, 1973, p. 105)

Numerous studies have provided experimental evidence for the assumption that stability attributions influence changes in expectancy of success. Meyer (1973) was the first to study this relationship empirically (see study).

The relationship between attribution and changes in expectancy is more complex than either Meyer (1973) or Weiner (1985a) assumed, however. Two strands of argument seem particularly significant here. First, not only can outcome attributions determine expectancies of future success, but expectancies of success can also influence the attribution of future outcomes. The more an outcome deviates from the original expectation, the less likely it is to be attributed to stable factors. This assumption is derived solely from the basic premise of attribution theories, which holds that people strive to predict and influence the things happening around them, an endeavor that can only succeed if they can assume the world around them to show a certain degree of stability. Thus, it is imperative that we do not revise our view of things every time something happens that is contrary to our expectations. If I consider myself to be good at a certain kind of task, then I will tend to approach it with high expectancies of success. Failure on my first attempt at that task is hardly likely to prompt me to revise my self-concept of ability (and to attribute my failure to lack of ability). As discussed in depth in Sect. 15.3.4, I am much more likely to attribute my failure to bad luck, a lack of effort, or another variable factor. As mentioned above, an attribution of this kind would also be in line with Kelley's covariation principle. My positive concept of my ability is based on the notion that I succeed more often than others (low consensus) and at many different times (high consistency). If I now experience failure, neither consensus nor consistency takes on an entirely new aspect. Rather, failure is, at first, simply an exception to the rule. In terms of Kelley's model, there is low consistency, suggesting that the outcome might best be attributed to an unstable factor. It is only if failures begin to occur more regularly that there is a change in the covariation information and, along with it, the attribution.

Data in support of these ideas were recently presented by Dickhäuser and Galfe (2004). The authors instructed students to imagine that their score on a test had been as expected, unexpectedly good, or unexpectedly bad. The students were then asked to state whether they would tend to compare this result with worse, equally good/poor, or better results that they had achieved in the past or in other subjects. It emerged that students were more likely to compare unexpectedly poor results with better results achieved in the past or in other subjects and unexpectedly good results with worse results achieved in the past or in other subjects than they were when their results were as expected.

- Thus, to draw on Kelley's covariation model, results that are contrary to our expectations are associated with the perception of high distinctiveness and low consistency, suggesting that the outcome can best be attributed to situational factors (variable causes). By contrast, results that are in line with our expectations are associated with the perception of low distinctiveness and high consistency, indicating that they are attributable to stable causes.

The second assumption worth querying is whether it is really the stability of a cause that determines changes in expectancies, as Weiner and colleagues posited, or perhaps its implications for behavior. A distinction must be drawn between the stability of a cause and the stability of its behavioral implications. Imagine the following situation that was used in an empirical study (see details below), for example. You are trying in vain to open a file that has been saved on a floppy disk. Let us assume that you attribute this failure to the disk being faulty. Is this a stable cause? Undoubtedly. Will it have long-term implications for your behavior? Certainly not – you will not bother trying to save a file on that same disk in the future. Causes only have behavioral implications from the actor's perspective when they involve stable properties of the actor himself or herself or stable properties of the entity and it is not possible to change the entity (in this case, the floppy disk).

Table 15.12 Perceived stability and controllability of the causal factors "faulty floppy disk" and "lack of knowledge" and resulting expectancies of success

	Faulty floppy disk	Lack of knowledge	*p*
Stable	3.11	1.77	<0.001
Controllable	2.71	4.23	<0.001
Expectancy of success	3.61	2.69	<0.001

High scores indicate strong endorsement of stability or controllability and high expectancy of success. Scores range from 1 to 5 (From Dickhäuser & Stiensmeier-Pelster, 2002)

Empirical findings on the stability of causal factors and their behavioral implications. The ideas outlined above have been empirically tested by Dickhäuser and Stiensmeier-Pelster (2002, Study 2). Students were asked to imagine both of the following situations: "Imagine you are having difficulty opening a file you have saved on a floppy disk. You know the reason for this a fault with the disk (situation 1) or a lack of knowledge on your part" (situation 2). The students were then asked to rate the stability and controllability of the cause and to state their expectancies of future success on opening files from floppy disks. Table 15.12 presents the findings of this study. As the data show, the "faulty floppy disk" causal factor is rated as much more stable and less controllable than the "lack of knowledge" causal factor. Yet, at the same time, the expectancy of future success on opening files from floppy disks is much higher for the "faulty floppy disk" causal factor than for the "lack of knowledge" causal factor. Perceived stability (and perceived controllability) evidently does not determine the expectancy of success in this particular case, because the "faulty floppy disk" causal factor has no long-term implications for behavior.

Another interesting finding to emerge from Stiensmeier-Pelster and colleagues' studies on the stability of causal factors and their implications for behavior was that men were more likely than women to attribute failure on computer-related activities to stable and uncontrollable causes – but, at the same time, they reported higher expectancies of success. When the causes

identified were evaluated in terms of their long-term implications for behavior, it emerged that the causes nominated by men had less impact on behavior than those nominated by women, which goes to explain the men's higher expectancies of success (cf. Dickhäuser & Stiensmeier-Pelster, 2002, Studies 1 and 2).

15.4.2 Attributional Analysis of Hopelessness and Depression

In his original formulation of the theory of learned helplessness, Seligman (1975) posited that people who are consistently confronted with the experience of failure will develop an expectancy of not being able to achieve success in the future either (generalization of expectancies over time) and that this expectancy will also spread to tasks that have little to do with those that originally resulted in failure (generalization over entities/tasks). Although this hypothesis was confirmed in isolated studies (e.g., Hiroto & Seligman, 1975), doubt was soon cast on the assumption of such extensive generalization (cf. Kuhl, 1981). Instead, researchers working with the theory of learned helplessness drew on Weiner's approach to explain the conditions under which expectancies are or are not generalized. In his studies, Weiner had soon shown that expectancies only generalize over time when an outcome is attributed to a stable causal factor. Drawing on Weiner's theoretical considerations and empirical findings, Abramson et al. (1978) reformulated the theory of learned helplessness from the perspective of attribution theory (see also Abramson et al., 1989; Meyer, 2000; Poppe et al., 2005; Stiensmeier-Pelster, 1988), taking both globality and stability of causal factors into account. They posited that the more stable the cause(s) of failure are judged to be, the more likely it is that the expectancies (of uncontrollability) generated by consistent failure will be generalized over time. Likewise, the more global the cause(s) are judged to be, the more likely it is that the expectancies will be generalized to different tasks.

According to Abramson et al. (1978), (1989), however, causal attributions are not classified solely in terms of their stability and globality but also in terms of their locus or internality. An internal attribution of repeated failures would imply that the attributor is the only person incapable of controlling the outcome and this would lead to personal helplessness. Attributions of successive failures to an external cause, on the other hand, reflect a belief that few others would be able to control the outcome either, resulting in universal helplessness. Personal helplessness, but not universal helplessness, is assumed to be associated with impairment of self-esteem. This assumption corresponds to Weiner's suggestion that the locus ascribed to a cause governs self-directed affect, including self-esteem. However, empirical findings do not substantiate Weiner's theory-based assumption that locus determines feelings of self-esteem.

- Based on their empirical findings, Abramson et al. (1989) later concluded that successive failures or other negative life events lead to impairment of self-esteem only when the cause is judged to be internal, stable, and global (e.g., lack of general ability).

15.4.2.1 Attribution Dimensions Relevant to the Concept of Learned Helplessness

Abramson et al. (1978) assume orthogonality of the attribution dimensions of locus (internality), stability, and globality. However, many studies have only been able to substantiate this assumption for the relationship of locus to stability and globality, respectively, but not for that of stability to globality. Rather, almost all investigators who have asked respondents to identify the causes for fictitious or real experiences and then to rate these causes with respect to their locus, stability, and globality have found that stability ratings correlated closely with globality ratings (for a summary, see Poppe et al., 2005; Stiensmeier-Pelster et al., 1994).

Table 15.13 presents a prototypical pattern of findings. The data stem from a study by Stiensmeier-Pelster et al. (1994), in which children and adolescents were asked to identify the main cause for the outcomes of various positive

Table 15.13 Mean correlations among locus, stability, and globality ratings

	Locus	Stability	Globality
Locus		0.12	0.15
Stability	0.25		0.68
Globality	0.28	0.66	

Correlations for positive situations are presented above the diagonal; correlations for negative situations, below the diagonal. (N = 854 students in grades 4–8) (Based on Stiensmeier-Pelster et al., 1994)

and negative situations. Using seven-point scales, they then rated this cause in terms of its locus, stability, and globality. As Table 15.13 shows, correlations between locus ratings, on the one hand, and stability and globality ratings, on the other, were weak for both positive and negative outcomes. The relations between stability and globality ratings, by contrast, were very close for both positive and negative situations.

Because stability and globality ratings have repeatedly emerged to be so closely related, the two dimensions are no longer considered separately in research on the power of the attribution theory model of learned helplessness to explain hopelessness depression. Instead, a generality dimension has been postulated to comprise the two aspects of stability and globality. The perceived generality – it is now assumed – determines the extent to which expectancies are generalized across time as well as across task domains or situations. Impaired self-esteem is assumed to result from failures or from negative events whose causes are judged to be both internal and general.

Looking at the attribution dimensions relevant to the theory of learned helplessness against the background of Weiner's approach, the controllability dimension is conspicuous by its absence. This may be because the theory of learned helplessness originally addressed only the consequences of uncontrollable events, making it pointless to contemplate the controllability of an action outcome or its causes. Had attribution issues not been neglected in the early stages of helplessness research, however, it would have been clear that an attribution process culminating in the action outcome being attributed to an uncontrollable cause is the prerequisite for the perception of uncontrollability.

A look at the empirical research on learned helplessness shows that respondents are generally confronted with uncontrollable negative events and that the uncontrollability of these events is merely assumed by the experimenter. Whether or not the respondents actually perceive these events as uncontrollable is rarely tested. Given the established finding that most respondents (provided they are not suffering from depression) perceive objectively uncontrollable events as controllable under certain conditions (Alloy & Abramson, 1979), this oversight is all the more surprising.

The empirical neglect of the controllability of causes is regrettable in another respect as well. More recent models developed to explain helplessness depression in the tradition of helplessness research no longer see depression as being triggered by uncontrollable events on the situation side; it suffices for a negative event (that may be personally relevant) to occur. Whether the cause of this negative event is perceived to be controllable or uncontrollable is immaterial. At the same time, guilt feelings are an important symptom of depressive disorders.

- From the perspective of attribution theory, guilt feelings arise when negative events are attributed to causes that are within the attributor's control. For example, people sometimes experience deep feelings of guilt when a relative dies after a long illness, and they feel that they failed to provide the necessary support because they had other priorities.

15.4.2.2 The Attribution Theory Model of Depression

Figure 15.11 summarizes the attribution theory model of depression, which was developed in the tradition of the theory of learned helplessness. First, the model distinguishes between depression with and without impaired self-esteem. Depression without impaired self-esteem is determined by hopelessness. Unlike Weiner, who conceives of hopelessness as affect, this model sees hopelessness as an expectancy. Strictly

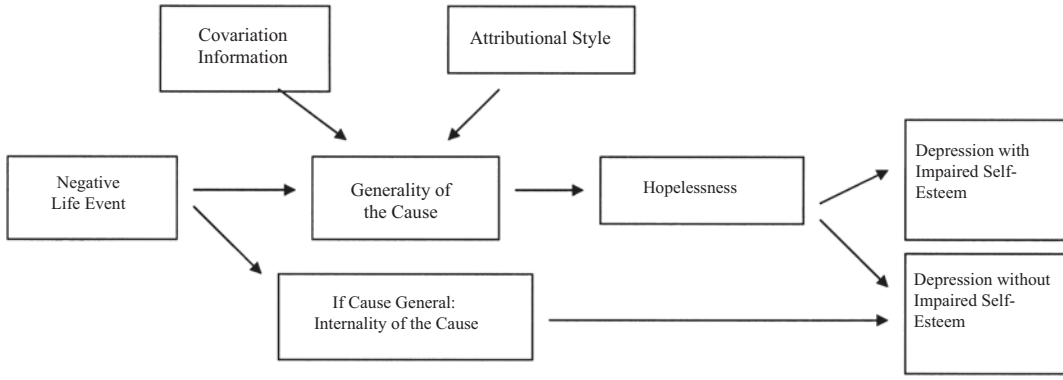

Fig. 15.11 Basic principles of the theory of hopelessness (Based on Abramson et al., 1989)

speaking, the expectancy of hopelessness comprises two expectancies:

1. The expectancy that more negative than positive events will occur, i.e., that aversive events are very probable and desired events rather improbable
2. The expectancy that no response in one's repertoire will change the likelihood of these outcomes

In fact, it is a question of a prototypical expectancy of uncontrollability. An expectancy of hopelessness emerges when a (personally significant) negative life event occurs and is attributed – in the spirit of Weiner – to a stable and global (here: general) cause. Depression associated with impaired self-esteem occurs when the cause of a negative event is additionally located within the attributor's own person (i.e., an internal attribution).

The model also specifies the antecedent conditions of such attributions. On the one hand, they require what is known as a depressive attributional style. People are assumed to have enduring preferences with regard to the causes they infer for positive and negative events. Depressive individuals are assumed to attribute negative events primarily to internal-stable-global causes, and positive events primarily to external-unstable-specific causes, though only the former preference is significant in the present context. Nondepressive individuals are assumed to favor the opposite pattern of attribution (i.e., external-unstable-specific attributions for negative events and internal-stable-global attributions for positive events). Beyond attributional style, the covariation information specified by Kelley (consensus, distinctiveness, and consistency) is also assumed to influence concrete attributions of negative events. In line with the theoretical considerations of various authors (e.g., Jackson & Larrance, 1979; Van Overwalle & Heylighen, 1995), it is assumed that the three attribution dimensions of locus (internality), stability, and globality can be derived directly from the covariation information on consensus, consistency, and distinctiveness of a cause (Kelley, 1967, 1973).

Example

- Low consensus (e.g., "everyone but me succeeds on a certain task") is assumed to prompt internal attributions (e.g., lack of ability) while high consensus (e.g., "it's not just me who fails on the task, everyone else does as well") to prompt external attributions (e.g., task difficulty).
- High consistency (e.g., "I'm not just failing on this task at the moment, I have often failed on it in the past as well") is assumed to lead to stable attributions (e.g., lack of ability) while low consistency (e.g., "I'm failing at the moment, but in the past I have often succeeded on

this task") to variable attributions (e.g., lack of effort).
- Low distinctiveness (e.g., "it is not just this task that I fail on, but most other tasks as well") is assumed to generate global attributions (e.g., lack of general ability) while high distinctiveness (e.g., "I fail only on this specific task") to generate specific attributions (e.g., lack of mathematical ability).

It would be interesting to know how the effect of covariation information relates to attributional style or how these two determinants might interact. For example, does the attributional style only take effect when the covariation information for a given situation is ambiguous, or does it also prevail when the covariation information is unequivocal?

Unfortunately, there have been very few empirical investigations of these questions to date (for a summary, see Poppe, 2002). It would also be interesting to examine whether a depressive attributional style might affect the perception of covariation information. According to the stage model of attributional activity (Sect. 15.3.2), one of the factors determining the intensity of causal search is the degree of accuracy accepted when identifying a cause. Do I identify the cause (e.g., I lack ability) as soon as I have gathered a few vague clues as to its nature, or do I seek to "get to the bottom of things" and decide on a cause only when I have collected a number of valid indications?

Working on the assumption (by all means a plausible one) that our attributional style reflects the concept we have of our abilities, would it not be plausible to accept a causal attribution on the basis of just a few tenuous clues if that attribution is in agreement with our self-concept? In this case, causal search will always be terminated as soon as we come across clues pointing to a cause that is congruent with our self-concept. Let us assume that covariation information is not as coherent in real life as it is in the respective experiments but that it may be contradictory. If, for example, a student fails a test along with three other students, and only one student passes, it would be plausible to attribute the first student's outcome to an external factor (e.g., task difficulty). To do so, however, the student would require full access to the relevant consensus information. Let us assume that this information is not readily available, but first has to be obtained by the student. He or she asks a classmate, who happens to be the only one who passed the test, how he or she did. If our student tends to attribute failure to internal causes, because he or she considers himself or herself less able, this information matches his or her attributional style and, given that it confirms the image he or she has of himself or herself, he or she will probably not bother asking the others how they did, but assume that his or her failure can be attributed to a lack of ability.

As this thought experiment shows, we are unlikely to fully analyze the myriad of covariation information available in everyday life but tend to terminate the analysis as soon as we have come up with a subjectively plausible attribution – in all probability, one that conforms with our own attributional style rather than one that contradicts it (in which case, we would probably continue the analysis).

Empirical findings on attributional style and depression. The attribution theory model of depression outlined above has been the subject of numerous empirical studies, most of which have focused on the impact of attributional style on depression. Attributional style is generally assessed by means of questionnaire measures. The "Attributional Style Questionnaire" (ASQ; Peterson et al., 1982; Poppe et al., 2005) is frequently used in studies with adults. Respondents are presented with equal numbers of successful (positive) and nonsuccessful (negative) situations from performance-related and interpersonal domains. They are then asked to identify the main cause for each event and to rate this cause along the dimensions of locus (internality), stability, and globality.

Numerous cross-sectional studies have established that clinically depressed adults are more likely than nondepressed adults to attribute failure to internal, stable, and global causes (e.g., Eaves & Rush, 1984; Raps, Peterson, Reinhard,

Abramson, & Seligman, 1982; Stiensmeier-Pelster et al., 1988). Moreover, the failure attribution style typical of depressed adults has also been observed in samples of subclinically depressed adults (e.g., Försterling, Bühner, & Gall, 1998; Seligman , Abramson, Semmel, & von Baeyer, 1979).

Apart from these cross-sectional studies, a limited number of longitudinal studies have investigated the relationship between the failure attribution style typical of depressed adults and the onset of symptoms of depression and sought evidence of causality (for a summary, see Barnett & Gotlib, 1988; Coyne & Gotlib, 1983 for a particularly critical approach; Housten, 1995; Kammer & Stiensmeier-Pelster, 1987; Metalsky, Halberstadt, & Abramson, 1987; Metalsky, Joiner, Hardin, & Abramson, 1993; Peterson & Seligman, 1984; Stiensmeier-Pelster, 1989). For example, Metalsky et al. (1987) found that the students in their study who tended to attribute failure to general (i.e., stable-global) causes reported depressive mood directly after receiving a poor grade (stress) and again 2 days later. Those who tended to attribute failure to variable-specific causes also reported depressive mood directly after receiving a bad grade but had recovered completely within 2 days.

- Thus, a tendency to attribute failure to general causes does not determine the onset of depressive mood but its chronicity. This is precisely what would be expected on the basis of Weiner's attributional analysis – the properties of stability and globality do not determine whether failure triggers negative expectancies (and the associated acute depressive mood), but the extent to which these expectancies remain valid over time or are generalized to other tasks (and thus trigger chronic depressive mood). Strictly speaking, this study shows that a depressive attributional style is not a factor that affects the genesis of depression, but one that determines its chronicity and that may impede recovery.

Empirical research has shown that attributions influence the onset of depressive mood in interpersonal as well as performance-related situations. Stiensmeier-Pelster (1989, Study 1) found that the more students who experienced a negative Christmas vacation tended to attribute failures to general causes, the more pronounced the increase in their level of depressive mood.

Recent research also addressed at which age children develop a stable attributional style. In addition, researchers investigated whether and at which age attributional styles moderate the influence of life events on the emergence of depression. Cole et al. (2008), for instance, studied the development of attributional styles and their influence on the genesis of depressive disorders in children and adolescents between 7 and 14 years of age (second to ninth grade). They found that attributional styles change with age. Younger children do not seem to exhibit a consistent attributional style across time and situations, whereas older children and adolescents appear to use a consistent attributional style. Moreover, as children age, the stability dimensions (of causal factors) seem to become more important. Moreover, negative life events affected the development of depression in younger children irrespective of their attributional style, whereas among adolescents (eighth and ninth graders in this study) the impact of negative life events on of depression was moderated by attributional style.

Therapeutic applications. Methods of therapy have also been developed on the basis of the attributional analysis of depressive disorders presented by Abramson and colleagues. All of these efforts were based on the notion that depressive individuals distort reality in a typical manner. Specifically, it was assumed that their causal attributions are not in line with Kelley's covariation model, but that they favor internal, stable, and global causes for failure, irrespective of the situational conditions. Accordingly, teaching depressive individuals to make attributions that conform to the covariation model would seem to be a promising therapeutic intervention. In this framework, patients are first asked to describe in detail a specific experience of failure and then to look for covariation information that contradicts their attributional style, e.g., to make themselves

aware of who else failed on the task, of how often they had succeeded on the same task in the past, and of the similar tasks they had already mastered successfully. Such perceptions of high consensus, high distinctiveness, and low consistency in turn point to an external, specific, and variable attribution (for a summary, see Stiensmeier-Pelster & Grüner, 2005).Changing a negative attribution style can also positively affect learning behavior and performance. If students, for example, struggle with a task and explain their difficulties with internal-stable-uncontrollable causes (e.g., "I am stupid."), they will probably stop trying. If they are instructed to attribute their difficulties to internal-variable-controllable causes, however, they are more likely to give it another try. This increases their chances of being successful in the end. In the past attribution trainings have been shown to yield positive results. Unfortunately, practitioners have not yet started to use them on a regular basis (for an overview, see Chodkiewicz & Boyle, 2014). Moreover, available training options require further optimization. When the purely cognitive procedure was, for example, combined with operant methods – i.e., when new skills were taught and acquired (see the example) – there were marked improvements in the programs' outcomes.

Example

A student who does badly in mathematics attributes his failure to internal, stable, and global causes. In consequence, he will expect to keep getting bad grades, see no reason to make an effort, and may even develop other depressive symptoms (e.g., impaired self-esteem). If it is possible to change that student's failure attributions for the better by means of attribution training, such that he now attributes failure to external, variable, and specific causes, he will respond to the next bad grade by remaining confident of future success and being prepared to keep on trying. If, however, we have not backed up the attribution training program by improving his mathematics skills (e.g., by providing coaching), he will continue to get bad grades, and it will only be a matter of time until he reverts to his old attributional style. We can only genuinely help the student by enhancing his ability as well as modifying his attributional style.

15.4.3 Attributional Analysis of Aggressive Behavior

Aggressive behavior may be either instrumental and proactive (aggression serving the pursuit of goals; e.g., one student hits another to exert power) or reactive and emotional (aggression in response to negative emotional arousal, especially anger or rage, cf. Berkowitz, 1993) in nature. Attributional considerations are relevant in the context of reactive, emotional aggression. One approach that has proved very successful in explaining the emergence of this form of aggression over the past 15 years holds that aggression results from deficits in social information processing (for a summary, see Dodge et al., 2006). Specifically, reactive-aggressive children and adolescents are assumed to differ from their non-aggressive peers in the way they interpret conflict situations.

- Aggressive children are thought to exhibit what is known as a "hostile bias" (see above), i.e., to assume people who cause them harm to have done so on purpose or to see the harmful behavior of others as controllable.

Based on the theoretical ideas and empirical findings of Dodge's research team, and drawing on Weiner's attributional analysis of motivation, emotion, and behavior, Graham and her colleagues (Graham et al., 1992; Graham, Taylor, & Hudley, 2015; Graham, Weiner, & Benesh-Weiner, 1995) presented an attributional theory of reactive-aggressive behavior, almost 20 years ago which has generated much research and drawn

attention to possible points of intervention (for a summary, see Rudolph et al., 2004; Weiner, 2006).

In principle, like Weiner's model, the theory assumes that a person's behavior and experience in social interactions are conditional on the causes to which the situation's emergence is ascribed, that this causal attribution elicits a certain emotion, and that this emotion in turn motivates a certain behavior. Where reactive-aggressive behavior is concerned, the cause inferred for behavior is less relevant than its perceived controllability and intentionality. What really matters is whether the causes of the damage are perceived as being subject to the actor's control (controllability) and whether the harmful behavior or its consequences were intended by the actor (intentionality).

In fact, in the case of reactive-aggressive behavior, it is assumed that the more strongly people who have been harmed believe that the harmful behavior was subject to the actor's control or even intentional, the more anger they will feel toward the actor. The more anger they feel, the more likely they will be to respond with reactive-aggressive behavior. This assumption has been supported by numerous empirical studies and is now widely accepted (for a summary, see Brees, Mackey, & Martinko, 2013).

These hypotheses have been confirmed in several empirical studies (for a summary, see Rudolph et al., 2004). For example, Stiensmeier-Pelster and Gerlach (1997) showed that the anger felt by both aggressive and nonaggressive adolescents toward a peer who had caused them harm, as well as their desire for retribution (i.e., their tendency to engage in reactive-aggressive behavior), increased as a function of their belief that the peer was responsible for the (harmful) behavior. Whether or not the adolescent who inflicted the harm was considered aggressive was immaterial. Congruent with the attributional theory of aggressive behavior, the authors were also able to show that attribution determines anger and that anger in turn determines the tendency to show an aggressive response. Betancourt and Blair (1992) reported comparable findings from a study with college students. Furthermore, these authors were able to show that anger alone, i.e., anger without the antecedent attribution, does not explain differences in the level of aggression.

The study by Stiensmeier-Pelster and Gerlach (1997) yielded two further important findings:

1. In line with the assumptions of Dodge and Coie (1987), aggressive adolescents were shown to demonstrate a "hostile bias," ascribing far more responsibility than their nonaggressive peers to the person who caused the damage.
2. The person who caused the damage was ascribed less responsibility if he or she produced an excuse for the harm caused than if he or she kept quiet.

The excuse consisted in the actor (a) describing the sequence of events and citing an uncontrollable cause for the damage and (b) stating that he or she was sorry for the harm caused. When actors provided an excuse for their behavior, not only were they ascribed less responsibility, but the attributors also felt less anger and were less likely to respond with reactive-aggressive behavior.

The following study by Graham et al. (1995) also examined the role of excuse giving.

Study

Relationships Between Attribution, Emotion, and Behavior

Graham et al. (1995) investigated the extent to which children and adolescents have grasped the relationship between attribution (of controllability and responsibility), emotion (anger), and behavior (reactive aggression) and their appreciation of the effects of excuse giving (citing an uncontrollable cause) on this attribution-emotion-behavior sequence. Awareness of these relationships is an indicator for social competence or, to use Gardner's terminology, interindividual intelligence. Results show that primary school children are largely unaware of these relationships and that awareness increases with age in nonaggressive children but not in aggressive children. Hence, aggressive adolescents are less aware of these relationships than are nonaggressive adolescents. Given their

insufficient knowledge of the relationship between attribution, emotion, and behavior and the impact of excuse giving on the attribution-emotion-behavior sequence, aggressive children are less likely than nonagressive children to give excuses for any harm they cause. Consequently, it is often assumed (precisely because they do not give excuses) that these children could have controlled the cause of their harmful behavior. As a result, people show more anger toward them, and they are more likely to become victims of reactive aggression (cf. Graham et al., 1995).

Approaches to prevent aggressive behavior. Graham and colleagues did not stop at investigating the determinants of reactive-aggressive behavior; they went on to derive strategies of conflict prevention from their findings. The core idea of the intervention is to make children and adolescents more aware of how attributions influence emotion and behavior and to enable them to influence the attributions of others by making effective excuses and apologies, thereby reducing the occurrence of anger and, consequently, aggressive behavior (Graham et al., 2015). These interventions do not necessarily have to be directed solely at those who inflict harm on others but can also apply to those at the receiving end. It may be possible to overcome the well-documented "hostile bias" in aggressive children and adolescents by making them aware of the implications of this attribution tendency and encouraging them to apply a kind of "stop mechanism" ("Stop! Think carefully before you assign hostile intent to others") whenever they notice that they are making a hostile attribution.

Stiensmeier-Pelster and Assimi (2002) used the attributional analysis of aggressive behavior to explain gender differences in levels of aggressive behavior. In their study, students were first asked to describe a situation they had recently experienced in which somebody had caused them harm. They were then asked about certain attributions they had made in that situation (controllability/intentionality), the emotions they had experienced (anger, annoyance), and the behavior they had displayed (direct physical aggression, direct verbal aggression, indirect aggression). In line with the literature (Björkqvist & Niemalä, 1992), it emerged that girls generally responded less aggressively than boys (congruent with the findings of previous studies by Björkqvist, Lagerspetz, and Kaukiainen (1992), the gender difference in direct aggression was particularly apparent). Furthermore, findings showed that both boys' and girls' aggression levels were explained by the attribution-emotion-behavior sequence postulated in the attributional theory of aggressive behavior.

- Hence, the mechanisms that produce reactive-aggressive behavior are the same in both boys and girls.

These results also correspond with the findings of Graham et al. (1992) and Stiensmeier-Pelster and Gerlach (1997). Both research groups found that the mechanisms leading to reactive aggression in habitually aggressive and in nonaggressive children and adolescents do not differ. Thus, there is reason to believe that the gender differences observed in aggression levels can be traced back to attributional or emotional differences.

Summary

Attributions influence behavior in a multitude of ways. For example, the expectancy of success is dependent not only on whether one's previous efforts resulted in success or failure but primarily on the causes to which that success or failure was attributed. Self-directed emotions are also dependent on attributions. We are not proud when we succeed, for example, but when we succeed and the causes for that success reside within ourselves. Likewise, interpersonal feelings are dependent on attributions. If somebody causes me harm, I am most likely to feel anger or rage if I assume he or she to have acted with intent or believe that he or she could have controlled the cause of his or her behavior. Finally, depressive responses to negative life events are particularly likely if those events are attributed to internal, stable, and global causes.

Review Questions

1. *What is the difference between attribution theories and attributional theories?*

   Attribution theories are concerned with how causal attributions are reached, whereas attributional theories deal with the effects of these attributions on people's subsequent behavior and experience.

2. *According to Weiner's attributional theory, when is a search for the causes of an action outcome initiated? Has there been any criticism of this assumption?*

   Weiner's model assumes that we seek to establish the causes of any event that is unexpected, negative, or important. Weiner's writings suggest that each of these three conditions is sufficient to initiate causal search. This assumption does not withstand careful analysis, however, as shown by the example of a student who always gets an E grade in mathematics tests. If this student obtains another E grade in his or her school-leaving mathematics exam, the outcome is indisputably important and negative, but it is expected and, as such, highly unlikely to elicit causal search.

3. *Which antecedent conditions can influence causal attributions?*

   Causal attributions can be influenced by antecedent conditions such as:
   - Specific information about the action outcome
   - Causal schemata
   - Hedonic bias
   - The perspective taken on the outcome (actor vs. observer perspective)

4. *Which causal factors are usually cited to explain academic performance?*

   The causal factors inferred for achievement-related outcomes include:
   - High or insufficient ability
   - High or insufficient effort
   - Task difficulty
   - Luck

5. *Which questions cannot be answered by Weiner's attributional analysis of motivation, emotion, and behavior?*

   Weiner's attributional analysis is unable to answer the questions of how long and intensive the search for causality will be and of the degree of accuracy accepted in the causal analysis.

6. *Which general equation did Heider use as the basis for his "naive" analysis of action, and how did he elaborate on this equation in the analysis?*

   Heider based his approach on Lewin's general behavioral equation, which states that behavior is a function of personal and environmental forces. He subdivides the personal force into "trying" (variable) and "ability" (fixed), where trying is the product of intention and exertion. On the environmental side, Heider posits one fixed primary dimension – difficulty – which, from time to time, may be influenced by chance (good or bad luck, variable). The difference between ability and difficulty gives the concept of "can."

7. *According to Jones and Davis, which steps may lead to an attribution of intention?*

   Jones' and Davis' model of correspondent inferences identifies three steps that may lead to an attribution of intention:
   - Confirming two prerequisites: the actor must have had prior knowledge about the outcome of the action, and the actor must have the ability to bring about the result.
   - Determining which consequences – or effects – of the action outcome might

(continued)

have motivated the actor to bring about this particular outcome.
- Estimating the action outcome's general desirability for the group to which the actor belongs.

8. *According to Kelley's covariation model, which are the four criterion or information dimensions used to infer the cause of a given action?*

   Kelley's four criterion dimensions are:
   - Distinctiveness of entities
   - Consensus (agreement between different people)
   - Consistency of behavior across time
   - Consistency across different modalities

9. *What is the precondition for motivational bias in attribution, and when is it particularly apparent?*

   Motivational bias can occur when an attribution touches on self-esteem in which case self-serving interests may distort the logical and rational use of information. It is particularly apparent after success and failure, with success being ascribed to person factors, and failure to external causes.

10. *What reasons do Miller and Ross (1975) propose for a rational, nonmotivational bias in information processing in self-attributions? Have their assumptions been confirmed in empirical studies?*

    Miller and Ross gave three reasons for rational information processing in self-attributions:
    - People expect their endeavors to produce success rather than failure; accordingly, they are more likely to take responsibility for expected than for unexpected outcomes.
    - People perceive stronger covariation between their efforts and increasing successes than under conditions of repeated failure.
    - People have an erroneous conception that there is a tighter contingency between their effort and success than between their effort and failure. However, studies have shown that these reasons cannot fully invalidate a motivational basis for the asymmetry of self-serving attributions.

11. *How do differences in the self-concept of ability influence the attribution of failure? Are these findings compatible with the hypothesis of a motivational bias in information processing in the attributional process?*

    The findings of attribution research indicate that individuals with a low self-concept of ability tend to attribute failure to a personal lack of ability. By contrast, individuals with a high self-concept of ability tend to ascribe failure to external factors, such as bad luck. These findings are difficult to reconcile with the notion of a self-serving bias in information processing that serves to protect self-esteem. If this kind of bias were in operation, individuals with a low self-concept of ability would also tend to attribute success to high ability and failure to bad luck. This is demonstrably not the case, however.

12. *What is the perspective discrepancy and what are the reasons for it?*

    The perspective discrepancy describes the observation that actors tend to attribute their actions to situation factors, whereas observers attribute those same actions to person factors. There seem to be two main reasons for this phenomenon:
    - Differences in the focus of attention and differences in the amount of context information. The actor's attention

is focused on aspects of the situation; the observer's attention is on the actor.
- Furthermore, the actor has far more information than the observer about the current situation: its precedents and background.

13. *Which motivational variable is influenced by the attribution dimension of generality?* Which dimensions were collapsed to form the generality dimension in research on the explanatory power of the attribution theory model of learned helplessness?

    The perceived generality of a causal factor determines the extent to which expectancies are generalized across time as well as across task domains or situations. Because stability and globality ratings have repeatedly been found to be very closely related, these two dimensions were collapsed to form the generality dimension.

14. *What can be said about the attributional behavior of depressive individuals?*

    Depressive individuals seem to distort reality in a typical manner. Their causal attributions do not seem to be in line with Kelley's covariation model; rather they seem to favor internal, stable, and global causes for failure, regardless of the situational conditions.

15. *What mistake do reactive-aggressive people seem to make on a regular basis?*

    Reactive-aggressive people often exhibit a "hostile bias," meaning that they tend to assume the people who cause them harm to have done so with intent and are more likely to assume that the harmful behavior was controllable.

16. *What role do excuses play in reactive-aggressive behavior?*

    People who give excuses for any harm they cause are ascribed less responsibility for the outcome and are thus less likely to be exposed to aggressive behavior. Aggressive children seem to be less likely to give excuses for any harm they cause. Consequently, people often assume that they could have controlled the cause of their harmful behavior. As a result, people show more anger toward them, and they are more likely to become victims of reactive aggression. Excuses and apologies thus serve to stop a conflict from escalating.

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Development of Motivation

16

Jutta Heckhausen and Heinz Heckhausen

16.1 Development of Control Striving Across the Lifespan: A Fundamental Phenomenon of Motivational Development

This chapter explores the relationship between motivation and development from two perspectives: the development of motivation, on the one hand, and motivational influences on development, on the other. Whether it is a question of the development of motivation or the motivation of development, the regulation of human behavior shifts in accordance with lifespan developmental change in the individual's potential to control the environment. The lifespan theory of control (Heckhausen, 1999; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996) is a motivational theory of lifespan development (Heckhausen, Wrosch, & Schulz, 2010). The theory identifies constructs and articulates hypotheses specifying how individuals respond to the waxing and waning of their potential for effective control at different stages of life and in different areas of functioning and thus provides a useful conceptual framework for the investigation of development and motivation.

The starting point and conceptual core of the lifespan theory of control is the functional primacy of primary control (Heckhausen, 1999; Heckhausen & Schulz, 1999). The striving to exert control on the environment (primary control striving) is hypothesized to be a universal and fundamental characteristic of human motivation that evolved over a long phylogeny of behavioral regulation. A preference for self-produced effects on the environment over effects produced by others has been found in various mammals (see overview in Heckhausen, 2000a; White, 1959) and may even determine the behavior of all those nonmammalian species with a locomotor system that enables them to influence their environment.

As illustrated in Fig. 16.1, primary control striving is expected to remain high and stable throughout the lifespan, despite substantial changes in the potential for effective action. It is primary control capacity that undergoes radical change. From a state of almost complete helplessness and dependence on others in infancy, primary control capacity surges in childhood and adolescence, levels out at some point in young or middle adulthood depending on the biographical path taken, and declines again in old age. This decline is reflected in multiple functional impairments toward the end of life, and finally, death.

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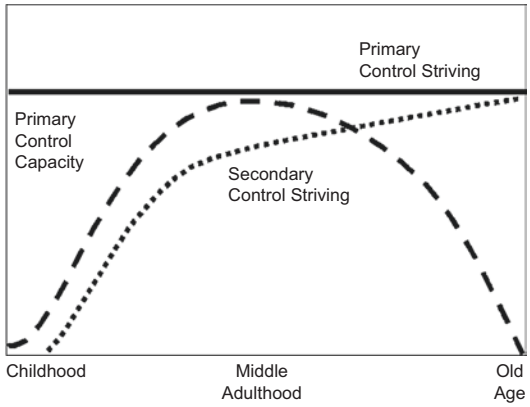

Fig. 16.1 Hypothetical lifespan trajectories of the capacity for primary control, primary control striving, and secondary control striving (Based on Heckhausen, 1999)

The rapid growth in control capacity in early life and its decline toward the end of life present young and old with very different challenges and risks, requiring the investment of quite different resources. Although humans seem to start their lives with a built-in readiness for control striving, neonates are so helpless that almost all experiences of control consist in influencing the behavior of their parents (especially the mother). Apart from compensating for children's lack of manual and intellectual proficiency, adult caregivers provide an external scaffold for the motivational (goal-setting) and volitional (persistence and shielding against distraction) regulation of behavior. Early parent-child interactions thus represent the cradle of primary control striving and of action itself (Sect. 16.5). Given the rapid development of primary control potential from birth to mid-childhood, children frequently find themselves able to master difficulties that seemed insurmountable only a short while ago (Parsons & Ruble, 1977). As a result, they are likely to overestimate their capabilities and may be at risk for setting overly demanding goals. Sozialization agents (i.e., parents and teachers) seek to address this risk by setting tasks appropriate for a child's level of cognitive development and by encouraging children to abandon overly ambitious goals that are doomed to failure.

Age-related decline leads to a complementary pattern of effects in old age. The aging individual has to come to terms with an increasing restriction of social roles (e.g., children moving out, retirement, widowhood) as well as biologically determined functional decline (e.g., in cardiovascular health, physical strength, sensory functioning, and memory). These experiences of permanent loss of control can lead to frustration, experiences of helplessness, and risk of depression and despair, and the danger of older people relinquishing the potential for control prematurely and becoming dependent on others too soon. In contrast to young children, who lack experience in emotional and motivational self-regulation, older adults can apply secondary control strategies (Fig. 16.1), which serve to protect self-esteem and confidence in future success against the negative effects of control loss. These secondary control strategies can help to focus the remaining control capacity on more promising goals.

The motivational and volitional regulation of behavior must respond to these radical shifts in primary control capacity across the lifespan. Take the example of learning how to walk; it is a major accomplishment for 1-year-olds but soon becomes taken for granted as a basic functional competence – usually until old age, when it once again becomes a challenge – and a competence to be protected against age-related decline. How do humans adapt the goals and challenges they set for themselves to such radical changes in primary control capacity? How do they maintain a functional level of stability in the emotional and motivational prerequisites for effective action? These are the research questions addressed within the framework of the motivational theory of lifespan development (also referred to as "lifespan theory of control").

16.2 Early Control Striving

Humans, and at least some animals, seem to be born with a built-in readiness for control striving and for exerting direct or primary control on the physical and social environment (White, 1959). Studies on operant learning have shown that many mammals prefer behavior-event contingencies to event-event contingencies, even in the absence of consummatory behavior (for an overview, see White, 1959). Chimpanzees favor objects that can be moved, changed, or made to

emit sounds and light (Welker, 1956); rhesus monkeys spend hours solving mechanical puzzles (e.g., bolting mechanisms; Harlow, 1953); and both children and rats prefer response elicited rewards to receiving the same rewards regardless of their behavior (Singh, 1970).

- These findings indicate that behavior-event contingency striving is a basic nonconsummatory need in mammals. From the very beginning of life, humans and other mammals are evidently equipped with information-processing strategies and behavioral orientations that help them to detect, strive for, and produce behavior-event contingencies, thus increasing their control of the environment (i.e., primary control). Humans have a natural propensity to focus on self-produced action outcomes. This propensity forms the basis for further developments in the experience of control, such as the ability to compare the effects of an action with an intention or a standard of excellence or to draw inferences about one's own competence on the basis of an action outcome and its evaluation. These two developmental milestones are reached in the first 3 years of life.

The preadapted, innate behavioral orientations that facilitate individual primary control and that – to draw on Fodor (1983) – can be termed motivational behavioral modules (Heckhausen, 1999, 2000a, 2000b) also include exploration striving, which some authors conceptualize as a "curiosity motive." It may be misleading to classify exploration and curiosity, or indeed anxiety, as motives (Trudewind, 2000), because these behavioral tendencies do not in fact relate to specific content categories. Rather, they are general approach or avoidance orientations that regulate behavior in diverse situations and across the major categories of motivated behavior, achievement, power, affiliation (Trudewind, 2000; Trudewind & Schneider, 1994). Curiosity and exploration increase individuals' opportunities to test and develop their control of the environment. The striving for new and discrepant experiences ensures that control striving is not limited to constant repetition of what has already been achieved.

Example

The psychopathological phenomena of echopraxia (i.e., the pathological repetition and imitation of movements) sometimes observed in cases of autism, mental disability, and extreme social deprivation is a negative example for the adaptivity of curiosity. In these cases, contingency striving seems to be in overdrive, running on the spot and thus ironically inhibiting the development of primary control potential.

Another fundamental regulatory mechanism that promotes primary control striving is the asymmetry of affective responses to positive and negative events. As pointed out by Nico Frijda (1988), the fact that individuals quickly get used to the positive affect experienced after a change for the better, but experience stronger, longer-lasting negative emotions after a change for the worse, promotes continuous control behavior that does not "rest on its laurels" but strives to overcome setbacks and constraints to control and to change the environment for the better.

16.2.1 Development of Control Striving

The first manifestations of control striving in human ontogeny can be observed in newborn babies (Janos & Papoušek, 1977; Papoušek, 1967). In fact, the ability to engage in operant behavior may develop in the womb. Papoušek found that babies just a few days old learned head movements contingent on acoustic signals and milk reinforcement. Even when they were no longer hungry and the milk had lost its reinforcing potential, the babies continued to respond to the acoustic signal with a turn of the head and showed positive affect when the milk bottle was presented as expected.

Taking a behaviorist perspective, Watson examined how operant learning can be fostered by providing opportunities for experiences of behavior-event contingency in the first months of life (Watson, 1966, 1972). Watson trained his

3-month-old son to fix his gaze on Watson's closed fist, at which point Watson opened his hand. After just a few days of training, the 3-month-old showed anticipatory arousal, followed by intense pleasure when the expected effect occurred. More recent cross-cultural studies with infants from Africa and Europe have shown that infants' learning of contingencies between their own behavior and external events (e.g., movement of a mobile) universally occurs at the age of 3 months, although its frequency depends on specific experiences in interactions (Graf et al., 2012). Further studies showed that change in the contingencies between behavior and effect (e.g., changing from the right to the left fist, visual fixation on the left fist, opening the right hand) did not lead to extinction of the learned response but was mastered increasingly quickly. Moreover, success was associated with increased positive affect. Watson hypothesized that infants can already develop generalized contingency awareness if exposed to appropriate operant experiences. This assumption was confirmed in a series of studies showing transfer from one contingency experience to another, interference of noncontingent experiences (Finkelstein & Ramey, 1977; Ramey & Finkelstein, 1978; Rovee & Fagan, 1976; Watson & Ramey, 1972), positive affect in response to behavior-contingent outcomes (Barrett, Morgan, & Maslin-Cole, 1993), and negative affect to noncontingent stimulation that had previously been contingent (DeCasper & Carstens, 1981).

Definition
Piaget (1952) labeled this kind of control striving "secondary circular reactions": infants repeat activities that have previously produced certain effects time and again and respond to the effects with positive affect.

This kind of early control striving has been labeled mastery motivation and investigated by two major research groups: the students and associates of Leon Yarrow and of Susan Harter. Harter (1974, 1978) and colleagues have focused on mastery motivation in the early school years, whereas Yarrow and colleagues (e.g., Yarrow et al., 1983) have examined striving for control and mastery in the first 3 years of life. Their definition of mastery motivation is largely congruent with that of achievement motivation:

> Mastery motivation is viewed as a multifaceted, intrinsic, psychological force that stimulates an individual to attempt to master a skill or task that is at least somewhat challenging for him or her (Barrett & Morgan, 1995, p. 58).

These authors have developed a detailed methodology for the measurement of instrumental (i.e., persistence and curiosity) and expressive (i.e., outcome-related affect) mastery behavior and, in a host of studies, have predicted later achievement striving and even cognitive performance itself on the basis of interindividual differences in early mastery behavior (see the overview in MacTurk & Morgan, 1995).

Barrett and Morgan (1995) identify three phases in the development of the multifaceted phenomenon of mastery motivation during infancy and toddlerhood:

Phase 1: early control striving with a primary explorative orientation toward new experiences and challenges to the infant's own control capacity; Phase 2: systematic variation of activities to create an intended effect; and Phase 3: the intended behavioral goal becomes the indicator of behavioral success.

Recent approaches to the development of executive control provide innovative conceptualizations of the emergence of control striving as well as behavioral and self-regulation (Garon, Bryson, & Smith, 2008; Miyake et al., 2000; Zelazo, 2004, 2015; Zelazo & Carlson, 2012). Executive control includes goal-oriented activities that are conscious, deliberate, and based on top-down neurocognitive modulation (Zelazo & Carlson, 2005). In particular, these modulations of behavioral regulation refer to processes that focus cognitive attention and play a crucial role in flexibility (e.g., when changing the goals of a task), inhibition control (e.g., delay of gratification), and working

memory (Miyake et al., 2000; Zelazo et al., 2013). Preschoolers make significant developmental progress in these goal-oriented modulation processes. This progress follows a developmental sequence of different levels of consciousness and reflection (Zelazo, 2004, 2015) that is reminiscent of Piaget's conception of child development but based on fundamental cognitive processes and their neurophysiological foundation: Neonates are on level (1) known as *minimal consciousness* and do not possess conscious representations of control striving and its effects. Their behavior relates to the present and lacks reflection or any connection to a concept of self. At the end of the first year, infants enter level (2) known as *recursive consciousness*. This mode of representation allows them to remember actions beyond their immediate occurrence. Thus, the effects of infants' own behavior can turn into intended goals. These goals are no longer restricted by rigid behavior-effect contingences but can instead be pursued with goal-oriented behavior that can be adapted to changing circumstances. At the end of the second year, children reach level (3) defined by *self-awareness*. Their thoughts, feelings, and behavior become self-reflective. Thus, they are now able to recognize themselves in a mirror or feel pride or shame following success or failure (see Sect. 16.4). When they reach age 3, children enter level (4) known as *reflective consciousness*. They gain the ability to simultaneously think about different rules and their effectiveness. An advanced stage of reflective consciousness later enables 4-year-olds to consider even incompatible rules and perspectives at the same time and thereby initiate radical changes in their behavioral strategies. At this stage, children are also able to assess the perspectives and knowledge of others based on current circumstances (*theory of mind*).

The early development of consciousness continues throughout adolescence and adulthood, albeit at a slower pace. Early advances in executive control thus constitute the universal foundation of a lifelong development of executive functions. Additionally, the development of executive control might also lay the groundwork for individual differences in self-regulation, which have important consequences for long-term development. Longitudinal studies have, for example, shown associations between the development of executive functions and later performances in school and aptitude tests (Bindman, Pomerantz, & Roisman, 2015; Neuenschwander, Röthlisberger, Cimeli, & Roebers, 2012). Other longitudinal findings on the prediction of life success in middle-aged adults based on indicators of self-control (that essentially correspond to executive control) measured before age 10 even suggest extremely long-term influences although the underlying processes, such as higher competence or better adaptability in the social contexts of school and work, are not yet understood (see Moffit et al., 2011).

16.2.2 Early Experiences of Control Striving in Parent-Child Interactions

The first experiences of control do not occur, as Watson had suspected, in experimental manipulations of behavior-event contingencies or in the infant's manipulation of objects but in natural interactions between the infant and the adult caregiver. Long before infants are able to produce direct effects on their environment, they influence their parents' behavior in everyday interactions (see the example below). Papoušek and Papoušek (1987) demonstrated that mother's responses to certain behaviors of their infants show high reliability and low latency and occur without conscious control.

Example

The mother's greeting response to eye contact with her child is a case in point: the mother's mouth is opened, the eyes opened wide, and the eyebrows raised whenever the infant gazes at her face. This reaction is automatized and cannot be suppressed. It provides the infant with repeated, reliable contingency experiences that make minimal demands of the infants' competence to initiate action.

Maternal contingency behavior (also known as responsive behavior) seems to be conducive to the formation of generalized contingency expectations as well as to habituation to redundant stimuli (e.g., Lewis & Goldberg, 1969; Papoušek & Papoušek, 1975, 1987). Furthermore, maternal stimulation and its contingency to the child's behavior seems to be positively related to the development of intelligence (Clarke-Stewart, 1973; Clarke-Stewart, Vanderstoep, & Killian, 1979). Riksen-Walraven (1978) provided compelling evidence for these relationships in a longitudinal study with an experimentally varied intervention design. Mothers were trained either to provide more stimulation for their child, or to be more responsive (i.e., contingent on the child's behavior), or to provide both enhanced stimulation and responsiveness, and to maintain this behavior over a 3-month period. Findings showed that enhanced stimulation levels had favorable effects on habituation rate (shorter habituation times) only and did not have an impact on exploratory behavior or contingency learning. When mothers showed heightened responsiveness in their interactions with their children, thus creating a contingent environment, however, there were very favorable effects on both exploratory behavior and the rate of contingency learning.

Investigation of exploratory behavior, another important component of control striving in early social relationships, necessarily raises the issue of mother-child attachment and the metaphor of the mother as a secure base (Ainsworth & Bell, 1970; Ainsworth, Bell, & Stayton, 1974; Sroufe & Waters, 1977). In Harlow's early work (Harlow & Harlow, 1966; Harlow & Zimmermann, 1959) on bonding behavior in rhesus monkeys, the natural mother was replaced by a "surrogate mother" made of either wire mesh or terrycloth, with milk being provided by baby bottles mounted within the models. It emerged that surrogate (terrycloth) mothers provided emotional support, stimulating young rhesus monkeys to engage in more extensive exploratory behavior and even confrontation with unknown objects. Drawing on these and similar findings, leading researchers in the field concluded that infant-mother attachment is based not only on a need for closeness but on a balanced system of curiosity and caution that permits exploration but evades dangers (Ainsworth, 1972; Sroufe, 1977). This dyadic behavioral system facilitates the gradual extension of mobility and autonomy throughout the infant's motor and communicative development. By the end of the first year, children are able to withdraw from situations independently and to visually (Carr, Dabbs, & Carr, 1975; Passman & Erck, 1978) and auditorily (Adams & Passman, 1979; Ainsworth & Bell, 1970; Rheingold & Eckerman, 1969) seek reassurance from the caregivers' presence.

- A relatively low tendency for maternal interference in the child's exploratory activities (i.e., provision of "floor freedom") has favorable effects on the mother-child bond and was found to be the second strongest predictor of children's intelligence (Ainsworth & Bell, 1970; Stayton, Hogan, & Ainsworth, 1971) after responsiveness (i.e., contingent responses to the child's behavior).

16.2.3 Development of Agency in the Parent-Child Dyad

Infants' early experiences of control are thus bound up with their primary social bonds to caregivers, with their striving for autonomy within these relationships, and the restrictions placed on them. At this early age, experiences of control in the domains of achievement, power, and affiliation are not yet separable. Differentiations in control experiences, control striving, and control behavior soon begin to emerge, however, particularly as infants begin to manipulate objects and as social (affiliation and power/autonomy) and nonsocial motivations (achievement) become distinguishable and, in some cases, collide. Colwyn Trevarthen's observations on the development of intersubjectivity are particularly relevant in this context (Trevarthen, 1980; Trevarthen & Aitken, 2001; Trevarthen & Hubley, 1978). According to Trevarthen children's behavior is driven from birth by two complementary, but sometimes conflicting, motives:

- The motive to have an active influence on objects
- The motive to interact with other humans

Over the first 2 years of life, these two motives for object-related control and social relationships alternate and come into mutual conflict. In their first 3–4 months, infants are focused on other humans, particularly the primary caregiver. Behavioral regulation of aspects such as visual attention and excitability is much smoother and less abrupt in interactions with the mother than in interactions with objects. Furthermore, there is some evidence of mechanisms that foreshadow gestures and language (pregesturing and prespeech; Trevarthen, 1977), indicating that human infants are preadapted to interact with other humans (see also Meltzoff & Moore, 1977).

At about 6 months of age, in what Trevarthen labels the "praxic mode," children begin to play with objects on their own and to pay the primary caregiver less attention than before (Trevarthen, 1980; Trevarthen & Hubley, 1978). If the mother is involved in the child's manipulation of objects at all, she tends not to specify the goal of the activity but rather to be guided by the child's interest in certain objects (see, e.g., Collis & Schaffer, 1975). Conflict often ensues if a caregiver does try to determine the action goal – not because the child rejects the adult per se or prefers the object per se, as Trevarthen suggested, but because the two behavioral intentions are in competition. The child seeks to defend his or her intention against the caregiver's interference and attempts to dominate. In this way, the infant's achievement- and power-related strivings become merged.

In the second year, parent-child interactions with objects become more cooperative at a new level of intersubjectivity, which Trevarthen calls "secondary intersubjectivity" (Trevarthen & Hubley, 1978). The child adopts challenging action goals proposed by the mother, and both work together to achieve them. Cooperation and persistence in pursuing the shared action goal initially relies on the mother keeping the infant's attention focused on the task at hand, thus providing an external scaffold for volitional action control (see the following study and Heckhausen, 1987a, 1987b; Kaye, 1977; Rogoff & Wertsch, 1984; Wood, Bruner & Ross, 1976). As the child becomes increasingly competent, however, the action goal becomes the focus of the joint interaction. Initially, neither party is concerned about who contributes most to goal attainment. During the second year, the mother increasingly emphasizes the child's competence and expects the child to work toward the goal independently. Once children have acquired a categorical self-concept, they internalize these expectations. From the age of about 2 years, the shared goal of a task that is challenging but not overly difficult is no longer the action outcome itself (e.g., building a tower) but the development and demonstration of the child's competence (Heckhausen, 1988). The shift from a focus on producing outcomes to demonstrating the child's competence is triggered by the mother's refusal to provide help, but later vehemently defended by the child, independent of direct maternal influences (see also the study on "wanting to do it oneself" on page 390; Geppert & Küster, 1983).

Study

Behavioral Regulation in the Mother-Child Dyad: From Apprentice to Master

In a longitudinal study (Heckhausen, 1987a, 1987b, 1988) with children ages 14–22 months and their mothers, J. Heckhausen investigated change in the joint regulation of behavior in mother-infant dyads. Early in the child's second year, maternal instruction was explicit and specific (e.g., which shape fits which hole) and involved a highly redundant combination of verbal and nonverbal communication. As the children internalized the task intention (e.g., to build a tower, to put all the shapes in the correct holes), the mothers stopped giving explicit instructions, and their guidance became increasingly implicit. In one task, children had to fit geometric wooden shapes into the corre-

(continued)

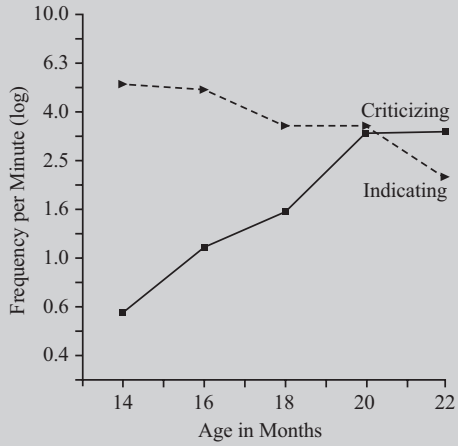

Fig. 16.2 Mothers' instruction on the shape-sorting task: indicating the correct solution vs. criticizing the child's slot choice (Based on Heckhausen, 1987a)

sponding slots in a wooden board. Figure 16.2 shows the change in maternal instruction observed over time from age 14 to 22 months. Early in the study, when the children were just 14–16 months and still found the task very difficult, mothers indicated the correct slot at a high frequency per minute. Provision of this kind of direct, nonverbal help decreased as the children grew older. Instead, the mothers increasingly began saying "No, not that one" or otherwise criticizing the child's incorrect choice of slot by verbal means, without showing them the right solution.

At the same time, the mothers fostered the development of positive self-evaluation at age 12–18 months by praising the children's successes effusively. As the children's ability to regulate their behavior increased – as reflected in repeated attempts to solve a task (persistence) – the frequency of maternal task-centered motivating attempts decreased; by the end of the second year, mothers barely voiced any praise and frequently refused requests for help. Concurrently, the children became increasingly likely to register their own successes and to show joy (gazing and smiling at their "work") or even pride (smiling and making eye contact with their mother) at successful outcomes. This higher frequency of pride responses was associated with increased requests for help after experiences of failure from the 18th to 20th month, indicating the children's growing awareness of their own shortcomings, and recognition of the adults' superiority. By the age of 22 months, help-related communication was observed in most mother-child dyads, whether the child asked for help and the mother refused or the mother offered help and the child rejected it. The shared goal had evidently shifted from a joint focus on completing a task and producing an outcome (e.g., building a tower of blocks) to promoting and demonstrating the child's competence: "I did it myself."

Summary

Control striving is a fundamental motivational process not only in humans but also in various animal species. The behavioral modules that support control striving include exploration and curiosity as well as the asymmetry of affective reactions to positive and negative events. Newborn infants already show first signs of striving for behavior-effect contingencies. They make their first experiences with control in interactions with their parents. Early parent-child interaction is the cradle of action in multiple ways. It is here that the major, universal foundations for individual action regulation are laid: experience of control, goal setting and persistence, autonomy and resistance to the imposition of external goals, mastery of difficulties, enjoyment of intended action outcomes, ability attributions of successful action outcomes, and, finally, defense of ability attributions against the "threat" of outside help. At the same time, the significance of early parent-child interactions necessarily exposes children to certain risks. If parental influences are not appropriate to a child's level of development or are otherwise unfavorable, the development of

motivation and behavioral regulation may be misdirected, resulting over time in maladaptive motivational patterns.

16.3 Focusing on the Intended Outcome of an Action

Between 9 and 12 months, infants gradually begin to determine which means accomplish particular ends and enter a new developmental phase of mastery motivation that lasts until the second half of the second year (Barrett & Morgan, 1995; Yarrow et al., 1983; Zelazo, 2004). Children of this age experiment with different activities or with modifications of actions that have previously produced certain effects. Indeed, children approaching the end of their first year often get completely carried away by an activity, losing sight of their original goal. For example, Jennings (1991) reports that children of this age enjoy collecting objects in a container. When they have collected all of the available objects, they simply empty the container and start all over again. It is not the outcome of the action – having collected all of the objects – that is the focus of their attention but the activity of collecting. Children in this phase of development display an impressive level of persistence in their control striving. This stage of development coincides with what Trevarthen (1980; Trevarthen & Hubley, 1978) labeled the "praxic mode" at age 6–12 months, when children begin turning away from an overwhelming preference for social interaction to increasing interest in manipulating objects (Sect. 16.5).

During the second year, the focus of children's attention gradually shifts to the outcomes of their actions, although they do not yet begin to draw inferences about their competence (Sect. 16.2). The regulatory demands of focusing on an intended action outcome differ depending on the goal in question:

- Sudden, discrete effects:
- Effects such as banging a drum or dropping an object command attention virtually automatically, making them attractive action goals that give children's activities directionality early in the second year (Spangler, Bräutigam, & Stadler, 1984; see also Yarrow et al., 1983, on "effect production").
- Continuous, action-accompanying effects:
- Regulation of a volitional focus on effects such as the nodding of a pull-along duck is significantly more demanding.
- State-related goals in multistep activities:
- Focusing on these goals is particularly demanding. They occur on completion of an action and are only identifiable by the fact that they correspond to the original action intention, e.g., a finished tower of bricks or a tin containing all the available marbles.
- "Respecting one's work":

Hildegard Hetzer (1931) labeled this last type of action goal and the related affect "respecting one's work" (see also Bühler, 1922, on pleasure in satisfaction ["Endlust," "Befriedigungslust"] as opposed to pleasure in functioning and creativity ["Funktionslust," "Schaffenslust"]). From the age of about 18 months, children learn to keep sight of the ultimate goal in a multistep activity (e.g., collecting marbles in a jar) and to terminate the activity no sooner and no later than they have attained that goal (see also experimental studies by Bullock & Lütkenhaus, 1988; Lütkenhaus & Bullock, 1991). Such state-related action outcomes persist even after an action is completed and may prompt children who have developed a self-concept to evaluate the effectiveness of their actions and even their competence (Sect. 16.4).

- State-related goals in multistep activities make higher demands of *volitional action control*, which serves to ensure that attention and behavior remain focused on the chosen action goal, even if its outcome can only be attained after the successful completion of a number of subtasks.

Summary

Between 18 and 24 months, the development of control (or mastery) motivation enters a new phase. The intended outcome of an action now

becomes the yardstick against which its success is measured. It is thus at this point that standards of excellence set by the child or by others take effect as criteria of successful or unsuccessful action. From the age of around 17–18 months, children show increasing interest in attaining specific standards when manipulating objects, especially in situations where they feel observed (Kagan, 1981). For example, they can be quite determined to repeat a sequence of actions accurately, to construct a tower with all the available blocks, or to complete a jigsaw puzzle. These standards are often introduced by parents or older children (Sect. 16.5) but are later adopted by the toddlers themselves.

16.4 Establishment of Personal Competence as an Action Incentive

Anticipatory self-reinforcement is an important motivational resource for achievement-motivated behavior in adults (Heckhausen, 1989). An action goal is not attractive because of the intrinsic value of mastering a standard of excellence alone but also because attaining an action goal allows positive inferences to be drawn about one's competence. It is disputable that these inferences are intrinsic achievement-motivated incentives in the strict sense, because self-evaluation is not activity- or outcome-immanent (Chap. 13). Within the framework of Heinz Heckhausen's (1989) extended model of motivation, self-evaluation can be seen as one of many potential consequences of an action outcome. Which of these consequences are most important to a given person and in a given situation does not depend on the centrality of the self-concept of ability in a given cultural and social context (see, e.g., Heine et al., 1999). In addition to the incentives of the action outcome (reaching a personal standard of excellence) and its internal (self-reinforcement) and external (recognition of others, educational and career advantages) consequences, incentives residing within the activity itself ("activity-related incentives"; Rheinberg, 1989; see also Chap. 13) may also play a major role in achievement-motivated behavior.

16.4.1 Pride and Shame: Emotions Between Achievement and Power

Of the many and diverse incentives for achievement-motivated behavior, three that play a prominent and ubiquitous role are the exploration of personal competence, the emotional and social-cognitive reinforcement of positive conceptions of personal competence, and the demonstration of personal competence to others. Recent research by Tracy and Robins (2008) shows that pride reactions are reliably recognized far beyond Middle European and North American cultures, namely, among socially isolated tribes in Burkina Faso, West Africa.

- The predominant conceptual model of achievement-oriented behavior – the risk-taking model and its extensions (Atkinson, 1957; Heckhausen, 1989) – specifies self-reinforcement to be the decisive motivational force and the emotions of pride and shame to be the major positive and negative incentives for achievement-oriented behavior. Accordingly, research on the development of motivation has paid a great deal of attention to the development of emotional responses to success and failure in early life (Heckhausen, 1988).

Heckhausen and Roelofsen (1962) examined how 2- to 5-year-olds responded to success and failure in a tower-building competition. It was clear from the reactions of the younger children (2- to 3.5-year-olds) that their experience was focused on the effects of their action; as a rule, however, they did not yet show the typical expressions of success and failure associated with self-evaluation. A few children began to show these responses at 27 months, but most did not do so until 42 months. When these older children won, they raised their eyes from their work, smiled, and

Fig. 16.3 Responses to success. (**a**) Annegret (6;3) spontaneously exclaims, "I [won]!". Triumphant, proud "enlargement of the ego" relative to the experimenter (13th trial). (**b**) Maria (4;3) spontaneously: "I [won]!". Sits up straight and "enlarges the self" (4th trial). (**c**) Ursula (5;2) spontaneously: "I finished first again!" Expression of pride: beams at the opponent, upright upper body (2nd trial) (From Heckhausen, 1974, p. 157, Fig. 27, p. 155, Fig. 23, p. 163, Fig. 36)

Fig. 16.4 Responses to failure. (**a**) Claudia (4;6), posture expresses deep shame about failure: tries to disappear from view (sixth trial). (**b**) Franz-Josef (6;0) says, "You [won]", takes hold of his cap, and turns his head away in shame (fifth trial). (**c**) Ursula (5;2) spontaneously: "Hmm, you finished first." Embarrassed smile of failure, bent posture, fails to disengage from her work (ninth trial) (From Heckhausen, 1974, p. 167, Fig. 28; p. 164, Fig. 40; p. 163, Fig. 37)

gazed triumphantly at the loser (Fig. 16.3). They straightened the upper body, and some of them even threw their arms in the air as if to enlarge their ego (see also studies on the social recognition of pride reactions, Tracy, Robins, & Lagattuta, 2005). When they lost, they slouched down in their chair, lowered the head, and avoided eye contact with the winner. Instead, their hands and eyes remain "glued" to their work (Fig. 16.4). These postural expressions of pride and shame reflect a close relationship to dominant and submissive behavior (Geppert & Heckhausen, 1990), which seems to have been elicited by the demands of the competitive situation. Taking a pluralist view on the activity-related and outcome-specific incentives that may motivate achievement-related behavior, these postural responses of pride and shame seem to express emotions between achievement and power, rather than prototypical achievement-related emotions. The achievement vs. power components may be elicited to differing degrees in different situations, producing hybrid forms dominated by either power or achievement. A systematic investigation of conditions triggering different degrees of achievement- and power-related emotions would be a productive field for further research. Another approach that focuses on individual personality differences distinguishes between two distinct facets of pride and its behavioral expression: *Authentic pride* that is clearly related to performance and *hubris pride* that is primarily meant to be a form of self-aggrandizing image presentation (Tracy & Robins, 2007a). Both

forms of pride are known in collectivist and individualist cultures (Shi et al., 2015).

Later studies that did not require some of the cognitive abilities that had been presupposed in the competition study (e.g., the ability to make comparative time judgments; Halisch & Halisch, 1980; Lütkenhaus, 1984) found first pride responses at 30 months and first shame responses somewhat later, at 36 months (Geppert & Gartmann, 1983). Stipek, Recchia, and McClintic (1992) reported similar findings from their competition study: children younger than 33 months smiled and showed pleasure at having completed a tower, regardless of whether they finished first or last, showing that they were simply pleased at having achieved their objective of finishing the tower. Schneider and Unzner (1992) found that children's emotional responses to self-produced effect (without competition) and to success in a competitive situation did not differ until age 4. In another study, Stipek, Recchia, and McClintic (1992) observed that even the youngest children in their sample (12 or 13 months) showed positive affect in response to their own successes but not to the successes of the experimenter. It was not until the age of 22–39 months, however, that winning children sought eye contact with the experimenter, meaning that the self-evaluative emotion of pride could not be inferred before the age of around 2 years. Lütkenhaus (1984) had 36-month-olds do a shape-sorting task with their mothers and noted both positive ("I can do that") and negative ("I can't do that yet") verbal self-evaluative responses at this age.

J. Heckhausen observed even earlier pride responses in a study with mother-child dyads (Heckhausen, 1988). By the age of 20 months, almost half of the children responded to success in building a tower or fitting shapes into the appropriate slots by simultaneously making eye contact with the adult and smiling and in some cases even presenting the product of their work. These responses were associated with intensive and frequent maternal praise at previous points of measurement. The children who showed pride responses at age 20 months had been praised about once every 2 min at age 16 and 18 months. Interestingly, the frequency of praise decreased as the children began to show spontaneous self-reinforcing responses to success (Sect. 16.5).

The development of the capacity to engage in self-evaluative reflection on the outcomes of one's actions goes hand in hand with an important progression in the child's self-concept from the "self as a subject" to the "self as an object" (Geppert & Küster, 1983; see also the study reported below on "wanting to do it oneself"; Heckhausen, 1988; Tracy & Robins, 2007b). This is also in line with more recent conceptions about the development of executive control and conscious reflection, which assume that infants transition to a self-reflective way of thinking about their own control at the end of age 2 (Zelazo, 2004). At about 18 months of age, children begin to explore the self and to evaluate themselves on descriptive dimensions or in terms of categories. Lewis and Brooks-Gunn (1979) term this the "categorical self." The capacity for self-reflection leads to first experiences of pride in successful action outcomes. The child is now able to interpret information about an action outcome as information about the self – "I'm clever because I can build a tower."

The study by Geppert and Küster (1983) reported in the box below provides insights into the developmental prerequisites for both focusing on a self-produced action outcome and relating that action outcome to one's own competence.

Study

Study on "Wanting to Do It Oneself"

Geppert and Küster (1983) observed children ages 9–78 months performing various tasks (e.g., playing with matryoshka dolls, completing picture puzzles, throwing balls at cans). The experimenters made offers of help ("Shall I help you?", "I'll help you!") and announcements of intervention ("Please may I do it?", "I'll do it now"), the directness of which was varied systematically. The objective was to examine the relationship

between the development of the self-concept and the first occurrence of "wanting to do it oneself" (i.e., rejecting an adult's help and interference). Behavioral tests were administered to assess the development of the self-concept. For example, children were asked to pick up the blanket they were sitting on and give it to the experimenter. Children who have not yet developed a basic self-concept are not able to see themselves in elementary, physical terms and do not understand that they must step off the blanket in order to pick it up. These children accepted help without protest, evidently because they were indifferent to who actually executed the action. It was only at the age of about 1.5 years that children who had developed a concept of self began to protest against any kind of intervention. They did not want their goal-directed activity to be interrupted. If the experimenter intervened immediately before the final step in the task (placing the last building block on the tower), their protest took the form of fits of rage, demonstrating just how outcome oriented children are at this developmental stage.

The older children (age 2.5 years and older), who were able to recognize themselves in a mirror, showed another characteristic pattern of behavior. They were more likely to accept interventions and interruptions but vehemently refused offers of help. Their protests often involved verbal articulations of the wish to do it themselves, with utterances of "me!" or their first name. These children with categorical self-concepts obviously had little difficulty in maintaining a continuous stream of activity despite being interrupted by the experimenter. However, offers of help threatened the attribution of success to their own competence and thus weakened the major incentive for engaging in achievement-motivated behavior.

The authors investigated the developmental prerequisites for wanting to do it oneself – an interesting phenomenon in the development of achievement motivation and a defining characteristic of what laypeople call the "terrible twos" (see Kemmler, 1957; Goodenough, 1931, on anger in young children).

Because of the prevailing focus on self-evaluative action-outcome consequences, achievement motivation research has largely lost sight of one key issue that warrants mention here. Every achievement-related action is characterized by a multitude of incentives residing in the activity itself, the action outcome (reaching an intended goal) and the internal (self-evaluation) and external (other-evaluation and social or material consequences) action-outcome consequences (Chap. 13). Analogous to the development of cognition (e.g., Siegler, 2002), the development of motivation may be characterized by intraindividual variability in behavior and experience across the developmental trajectory. The sequence of development of motivational and volitional regulatory capacities is relatively fixed, but early forms of control striving – e.g., the "flow" experience of becoming completely absorbed in an activity (Chap. 13; Csikszentmihalyi, 1975) or the focus on a sudden, discrete action effect (Spangler, Bräutigam, & Stadler, 1984) – remain available and can be used by older children and even adults in concert with more complex patterns of motivation and volition (Jennings, 1991). The system of mastery motivation can thus be seen as a hierarchical structure (Harter, 1978) comprising various subcomponents (enjoyment of the activity, joy on achieving a goal, pride in the competence demonstrated by a performance outcome), which allow affective, cognitive, and social aspects to be combined in new and more complex regulatory systems. Individuals can thus respond flexibly to a multitude of situations and differing incentive patterns (e.g., high activity incentive/low self-evaluation incentive, or vice versa). In fact, the regulatory capacity to achieve congruence between one's motivational orientations and motive state across the various situations in which one wishes to exert control

(see the concept of motivational competence, Rheinberg, 2006) may itself be an important developmental attribute that is first adopted from adult socialization agents but increasingly mastered by the child himself or herself.

Summary

The nature of action-related emotions changes and develops in early childhood, with the focus shifting from behavior-event contingencies in early infancy, to achieving a specific outcome (standard of excellence) from about 1.5 years of age, and finally to self-evaluation against a certain standard of excellence from the age of about 2 (playing with the mother) to 3 (competition) years. Self-related emotions of pride first occur at about the same age, as children acquire the ability to conceive of the self as an object (Bullock & Lütkenhaus, 1991; Geppert & Küster, 1983; see also "categorical self-concept" in Lewis & Brooks-Gunn, 1979). Children who have acquired a self-concept begin to reject adults' offers of help, possibly to ensure that success can be attributed solely to their own competence, Geppert & Küster 1983).

16.4.2 Risks of Self-evaluative Responses

A positive evaluation of one's competence is also considered to be an important motivational resource in theoretical contexts other than achievement motivation – in the present case, for primary control striving. The motivational theory of lifespan development (also referred to as "lifespan theory of control") (Heckhausen, 1999; Heckhausen & Schulz, 1995) highlights the effects of general control, that is, the individual's primary control of the environment, on self-esteem. Although a focus on self-evaluation can have a wealth of positive consequences, it also makes individuals (and their perceptions of their own competence) vulnerable to the negative effects of failure. To the extent that goal-directed actions serve as tests of personal competence, the individual is exposed to the risk of negative self-attributions (e.g., low competence, low self-esteem), particularly in social comparison situations with high levels of ego involvement (Brunstein & Hoyer, 2002; see also Chap. 9). These negative self-attributions can undermine the motivational resources needed for continued control striving and must be counteracted and compensated by strategies of self-serving interpretation and reevaluation, conceptualized within the theoretical framework of the lifespan theory of control as compensatory secondary control strategies (Heckhausen,1999; Heckhausen & Schulz, 1995).

- Self-esteem may be protected by compensatory strategies of secondary control such as the following:
  - Attributing failure to external factors, thus negating personal responsibility for failure
  - Engaging in "downward" social comparisons with people who are even less successful
  - Engaging in intraindividual comparisons with domains in which one is personally more competent

The following paragraphs discuss the development of negative self-evaluations and early forms of compensatory secondary control. Research in this area is still in its early stages, particularly where coping with failure is concerned.

Interestingly, expressions of the self-evaluative emotions of pride and shame parallel power-related gestures of dominance and submission, at least in western industrialized societies. Along with the upside of pride-based empowerment, self-evaluation thus involves the downside of shame-based humiliation and helplessness, which Dweck (2002) has found to characterize children with a strong orientation to performance goals. Stiensmeyer-Pelster and colleagues have examined processes of increasing helplessness in children exposed to repeated failures in the school setting (see the overview in Stiensmeyer-Pelster, Chap. 15). Their findings indicate that repeated everyday experiences of failure can be a major risk factor in the development of maladaptive long-term motivational and evaluative tendencies (Sect. 16.7) in the approach vs. avoidance

components of achievement motivation, mastery vs. performance goal orientation (Dweck, 2002; Dweck & Leggett, 1988), and state vs. action orientation (Kuhl, 2000, Scheffer, 2000; see also Chaps. 3 and 13).

Negative self-related emotions such as shame and embarrassment are not observed until rather later than pride, however, primarily because children younger than 2.5 years respond to failure by changing the task parameters, turning their back on the task, or expressing anger and then abandoning the task (Stipek et al., 1992). In a study of mother-child interactions in task situations, about 30% of children showed anger responses after failure on noncompetitive tasks from the age of 20 months (Heckhausen, 1988). The first signs of children beginning to attribute failure to a lack of personal competence at the age of about 2 years are indirect and implicit in help-seeking behavior after failure, which was observed in some 25% of 22-month-olds (Heckhausen, 1988). Geppert and Gartmann (1983) had children ages 18–42 months build a tower in four different conditions: success without competition, success with competition (finishing first), failure without competition (tower collapses), and failure with competition (not finishing first). Pride responses to success were observable from the age of 30 months, but shame responses to failure were not seen until 36 months, regardless of whether or not a competitive element was involved. Real shame at failure is evidently not experienced until much later than pride, from 3 years of age. This developmental sequence shields children against the potentially harmful effects of negative self-evaluation in early childhood.

Moreover, preschool children's conceptions of their own competence do not yet distinguish between the causal concepts of effort and ability. As a result, children of this age tend not to doubt their ability, even in the face of repeated failures (Rholes et al., 1980). Interestingly, they base their judgments more on socioemotional criteria (Is another child nasty or nice?) than on performance criteria (Sect. 16.6.2, Sect. 16.6.3). By the age of school entry, children have developed a self-concept of ability that is differentiated from effort and tend to experience performance decrements after failure (Miller, 1985).

16.4.3 Strategies to Counteract or Avoid Negative Self-evaluation

As soon as children become aware, at the age of about 3.5 years, that action outcomes reflect on their own competence, they begin to shield their self-esteem against the adverse consequences of negative self-evaluations by engaging in behaviors such as the following:

- Denying the failure
- Reducing the level of aspiration
- Making self-serving attributions
- Reinterpreting the action goal (standard of excellence)

In an early study on task choice in preschool and school-age children, Heckhausen and Roelofsen (1962) found that even 3.5-year-olds lowered their aspiration level after experiencing failure, switching to much easier tasks instead. In the tower-building competition study mentioned above, children between 2 years and 6 years showed a variety of failure-related expressions and behaviors which can be classified according to control theory as follows: disengagement from the goal (e.g., interruption, leaving the room), self-protection (e.g., denying failure, making excuses for failure, remembering past success), and enhancement of primary control (e.g., preparations, getting a head start). Simple denial of failure was observed in almost all of the children up to the age of 3.5 years but became increasingly infrequent with age, only being used by less than a third of children older than 5 years.

The cognitively demanding self-protective strategies of excusing failure (e.g., "My arm is tired now") and recalling earlier successes (e.g., "But I finished first before") were only used by children older than 4.5 years.

Empirical Findings on the Development of Self-regulatory Strategies

More recent research on the development of compensatory secondary control has focused less on experiences of failure and more on coping with negative and stressful events or situations (e.g., getting a shot at the doctor's). During childhood and early adolescence, numerous coping strategies are acquired, including a variety of secondary control strategies (see overview in Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Skinner & Zimmer-Gembeck, 2007). One example is an experimental study by Vierhaus and colleagues, in which children between 7 and 14 years were presented with a challenging situation for the assessment of different coping strategies. The authors found that children begin to increasingly consider the controllability of a given situation when judging the effectiveness of strategies, resulting in a more flexible preference for either active strategies and asking for help or avoiding and internally moderating strategies (Vierhaus, Lohaus, & Ball, 2007). Skinner and Zimmer-Gembeck (2007) list the following central coping behaviors in an overview of 44 related empirical studies: problem-solving, seeking help, flight, distraction, adjustment, opposition and denial, self-reliance, aggression, social isolation, bargaining, helplessness, and positive cognitive reappraisal. These 12 categories of coping behavior can further be grouped into four classes of strategies: problem-solving, seeking help, flight/avoidance, and distraction. Interestingly, these four categories correspond to four (of five) important control strategies in the motivational theory of the lifespan (Heckhausen et al., 2010): selective primary control, compensatory primary control, goal disengagement, and self-protection. As they grow older, children become increasingly adept in flexibly using appropriate strategies depending on a given situation, instead of automatically resorting to their preferred strategies regardless of the circumstances. Over time, many strategies are further refined and integrated into cognitive representations (e.g., when planning problem-solving or anticipating one's own emotional reactions) while their behavioral components become more parsimonious and effective.

Evidence from several studies shows that children of early school age prefer primary control strategies and report very few intrapsychic (secondary) control strategies, even when exposed to uncontrollable stress. One of the most popular control strategies at this age is to escape the unpleasant situation altogether (Altshuler & Ruble, 1989; Band & Weisz, 1988). As children age, they increasingly use the emotional regulatory strategy of self-distraction techniques (e.g., "I think about something fun"; Wertlieb, Weigel, & Feldstein, 1987) to cope with unpleasant situations (e.g., going to the doctor's). Altshuler and Ruble (1989) confronted 5- to 12-year-olds with hypothetical scenarios of uncontrollable stress that required high levels of self-regulation. The respondents were asked to imagine that a child has to wait patiently for either a positive event (a large piece of a candy after half an hour's wait, a birthday party later in the day) or a negative event (going to the dentist, getting a shot). They were then asked to suggest what the child in the story might do. The 5- to 6-year-olds were far more likely than the 7- to 11-year-olds to recommend escape or avoidance behavior. Nevertheless, children as young as 5 years of age generated behavioral distraction techniques (e.g., do something else, watch TV), thus demonstrating an elementary understanding of self-regulatory strategies. With increasing age, the children became more likely to propose cognitive distraction (e.g., thinking of something else or fantasizing).

Secondary control strategies seem to proliferate between childhood and particularly adolescence (Compas & Worsham, 1991). Wrosch and Miller (2009) investigated the sequential interplay between depressive episodes and the developing competence of goal disengagement during adolescence in a longitudinal study with depression-prone girls between 15 and 19 years of age. The authors found that the depressive symptoms measured at the beginning of a 19-month period predicted improved goal disengagement, which in turn resulted in fewer depressive symptoms at the end of the study. These findings suggest that the

development of strategies for coping with failure and other negative events, particularly with regard to the roots of interindividual and intercultural differences, is an extremely prolific field of research. For example, whether someone prefers the self-serving effect of downward social comparison or tends to attribute unpleasant events to external causes may depend largely on the cultural context and on the model provided by the parents. These preferences can have far-reaching implications for behavior and, in turn, for the long-term behavioral consequences of failure. For example, external causal attributions may protect self-esteem in the short run, but eventually lead to helplessness; downward social comparisons may allow people to stay active but fail to provide inspiring role models for control striving.

Summary

When infants discover their own competence, they gain an important behavioral incentive which by means of anticipatory self-reinforcement provides self-generated motivation, independent from external influences. Self-assessment and self-concept develop hand in hand. The flip side of the positive motivation derived from pride of success is shame in reaction to failure. Just as pride and dominance are related, shame is associated with submission, which may result in helplessness and demotivation. These effects, however, can be avoided when suitable self-protective strategies are used. Such strategies and the competence to disengage from impossible goals emerge early during development and become more elaborate and effective throughout childhood and particularly during adolescence in protecting the self and motivational resources from discouragement and even depressive symptoms.

16.5 Developmental Preconditions of Achievement-Motivated Behavior

This section provides an overview of research on the major milestones in the development of achievement-motivated behavior and, in particular, the cognitive prerequisites for the risk-taking model. The research agenda and review of available findings on the risk-taking model presented in the first version of this chapter (see Chap. 13 of Heckhausen, 1980) remains unsurpassed in its differentiated approach, conclusiveness, and theoretical integration. In the last 30 years, research on the developmental prerequisites of achievement-motivated behavior has been rather heterogeneous – there has been a great deal of interest in some aspects (e.g., the conception of ability, reference norms), but others have been neglected altogether. Research on universal motivational development has become less salient, while more attention has been directed at the development of individual differences in achievement goal orientation and behavioral regulation (see Dweck, 2003; Elliot, 1999; Nicholls & Miller, 1983; for an overview, see Elliot, 2005). The subsequent Sect. 16.6 will discuss individual differences in the development of motivation.

16.5.1 Distinguishing Between Degrees of Task Difficulty and Personal Competence

The perception of differences in task difficulty is a prerequisite for the formation of standards of excellence. Task difficulty and competence define each other: the more difficult the task executed, the higher the competence demonstrated. Given that task difficulty cannot be determined independent of the individual's competence,[1] success can just as well be attributed to ease of the task as to high competence, and failure can just as well be attributed to high task difficulty as to low competence. The question to be asked, therefore, is what children do first: do they first explain success and failure in terms of task difficulty or in terms of competence?

- It is not until children are able to process and integrate information relating to individual

[1]The term "competence" is used as a summary construct comprising both ability and effort.

reference norms (How well did I do on other versions of the task at previous attempts?), on the one hand, and social reference norms (How well do other children do on the task?), on the other, that empirical studies indicate a clear preference for difficulty attributions (in intra-individual comparison) or competence attributions (in interindividual comparison).

Research has shown that 3- to 5-year-olds are not yet able to alternate flexibly between individual and social reference norms (Heckhausen & Wagner, 1965) and that 6-year-olds can only do so to a certain extent (DiVitto & McArthur, 1978).

Findings from numerous studies point to a developmental primacy of difficulty attributions – and thus individual reference norms – at preschool age (Falbo, 1975; Heckhausen & Wagner, 1965; Ruble, Parsons, & Ross, 1976). Barrett, Morgan, and Maslin-Cole (1993) observed that even very young children take task difficulty into account, with 15-month-olds already showing more persistence on moderately difficult tasks than on tasks that were too easy or too difficult for them. Preschoolers do not yet draw on social comparison information to assess their personal competence. Ruble and Feldman (1976, Study 1) told the children participating in their study that "almost all" or "very few" children of the same age were able to solve the tasks assigned. The emotional reactions that the 8- and 10-year-olds showed in response to their performance outcomes differed significantly as a function of this information; those of the 6-year-olds did not.

School entry affords children increased opportunities to compare their task-specific performance with that of their peers, with the result that social norms become increasingly dominant (Ruhland & Feld, 1977). In the first 2 years of elementary schooling, children realize that they would have to be particularly clever to solve tasks that few other children are able to answer. This insight is associated with a decreasing self-concept of reading ability (Miller, 1987), but it is not until the age of 9 or 10 years that children are able to rank themselves realistically relative to their classmates (Nicholls, 1978). Rheinberg, Lührmann, and Wagner (1977) examined the reference-norm orientations of secondary students in grades 5–13. As shown in Fig. 16.5, the

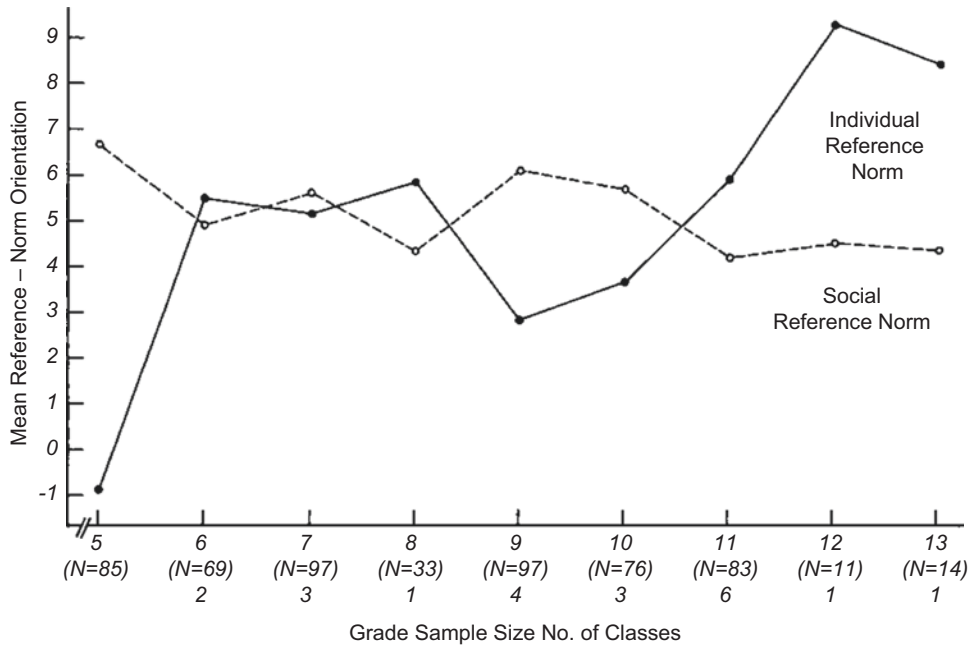

Fig. 16.5 Mean preferences for individual and social reference norms in the self-evaluations of secondary students in grades 5–13 (After Rheinberg et al., 1977, p. 91)

importance of individual reference norms soars at the lower end of this age range. They are as important as social reference norms by grade 6 and become increasingly dominant from grade 11 (i.e., about age 17) onward. Aspects of the social ecology of the school and society as a whole were found to have specific effects within this standard developmental trajectory. For example, students in comprehensive schools, where the range of student ability is broader than in tracked schools, were found to prefer social reference norms for longer. Students approaching graduation began to pay more attention to social reference norms, which were likely to be of greater relevance to future employees.

Recent studies on the so-called "big fish little pond" effect have shown how strongly students' individual reference norms and their self-assessment are shaped in highly selective schools and high-performing classes (Marsh & Hau, 2003, Marsh et al., 2015). If the immediate school environment is dominated by other high-performing students, a students' self-assessment of his/her abilities tends to be low, even if she/he is proud to belong to a highly regarded school at the same time ("reflected glory effect;" Marsh, Kong, & Hau, 2000; Trautwein, Lüdtke, Marsh, & Nagy, 2009).

Another effect of reference norms can be found in comparisons across different fields for the same person, for example, if a student thinks that he/she performs better in mathematics than in language classes. These so-called dimensional comparisons (Marsh et al., 2014; Möller & Marsh, 2013) may have important behavioral consequences as they play a role in the development of subject-related interests and incentives (Schurtz, Pfost, Nagengast, & Artelt, 2014). They also help students to steer clear of subjects in which they expect to perform poorly. Thus, dimensional comparisons between academic subjects and between other achievement areas can influence course selection as well as the investment of time and effort at school and university.

Summary

Children first learn to distinguish different degrees of task difficulty at preschool age and do not start applying social reference norms to evaluate their competence until starting school. At the transition to secondary level schooling, individual reference norms gain in importance, first drawing level with social reference norms and becoming very dominant in the last 2 years of schooling. With the transition to the adult world, social comparison again takes precedence. When social reference norms are dominant, high-performing reference groups tend to result in low self-assessments, whereas low-performing reference groups can boost the self-ascribed competence ("big fish little pond" effect).

16.5.2 Distinguishing Causal Conceptions of Ability and Effort

It is only gradually that differentiated conceptions of ability and effort emerge from a global conception of competence. The conception of effort as a variable causal factor that is under volitional control seems to develop relatively early. It takes longer for children to recognize ability as an individually constant but interindividually variable construct. This understanding is complicated by the children's rapid developmental progression, which means that they frequently find themselves able to perform tasks that were impossible only recently.

The assessment of preschoolers' conceptions of effort and ability poses serious methodological challenges, however, because young respondents are not yet able to rate causal factors on a scale. The findings of studies presupposing this ability (e.g., questionnaire studies on control beliefs in the school context) suggest that children do not begin to distinguish between internal and external causal factors until the age of 9 years and between effort and ability conceptions of personal control

until the age of 10 years (Skinner, 1990; Skinner, Chapman, & Baltes, 1988).

Empirical Assessment of Effort and Ability Attributions Several ingenious assessment methods have been developed to examine young children's conceptions of effort and ability. Gurack (1978) explored the development of ability attributions by asking children to relate visible indicators of ability (physique, strength, height, age) to different action outcomes. She found a developmental sequence of three increasingly complex "conclusions about ability":

1. Direct conclusions drawn from a visibly relevant physical characteristic (e.g., skinniness – ability to crawl through a small hole in a wall) from the age of 3.5 years
2. Indirect conclusions drawn from a visible physical characteristic about an invisible quality (e.g., height as an index of age – height of a tower constructed) from the age of 4 years, universally present at 5 years
3. Conclusions drawn from an unknown person's previous action outcomes (consistency of competence) about his or her future performance from the age of 6 years

   The 6-year-olds based their assessments of ability primarily on consistency information (across attempts at a task), rather than on the visible physical characteristics of height or age. They did not seem to conceive of ability as a constant personal trait, however; at least, they could not articulate such a concept verbally.

Krüger (1978) examined effort attribution by having children blow cotton balls through miniature houses, a task that required careful dosage of effort. Although this procedure focused the children's experience on effort as the causal factor in success and failure, almost all of the children (3- to 6-year-olds) referred only to differences in the degree of difficulty when asked about perceived effort. The developmental primacy of difficulty attribution over competence or even effort attribution thus seems to have a phenomenological basis as well as a psychological one. Even Krüger's 3-year-old participants were able to expend effort flexibly, in accordance with task difficulty. From 5 years of age, intended effort corresponded with actual effort, and most children referred to effort when asked to explain the result attained in freely generated causal attributions.

Nicholls (1978) showed children between 5 and 13 years of age a film of two children sitting next to each other working on mathematics problems. One of the children worked consistently and diligently; the other fooled around, evidently not trying very hard. The participants were told that both children in the film got the same score. They were then asked which of the two children was smarter, why both children had got the same score even though one had tried harder than the other, and whether both children would get the same score if they both tried hard. Findings indicated that 5- to 6-year-olds do not differentiate between outcome, effort, and ability (naive covariance; see also Heyman, Gee, & Giles, 2003). Children from 7 to 9 years of age distinguish between effort and outcome but are unable to say why different effort levels may result in the same outcomes; in other words, they have not yet acquired an independent conception of ability. Between the ages of 9 and 12, children begin to differentiate between effort and ability but do not really understand the compensatory relationship between the two. It is not until the age of 12 that most children come to understand that high ability can compensate for low effort and demonstrate an awareness that effort and ability can function as compensatory causal factors (see also Sect. 16.5.4).

- Findings from several early studies using visually represented attributes of competence show that children as young as 5–6 years old can draw on competence (i.e., not differentiated into effort and ability) factors to explain differences in action outcomes. Effort attributions seem to develop earlier and more quickly than ability attributions.

However, studies that did not provide such clear visual representations of competence have found that preschool children still have very diffuse

conceptions of ability (see the overview in Dweck, 2002). When asked how they know whether another child is smart, for example, preschool children often refer to the child's friendliness and good behavior (Stipek & Daniels, 1990; Stipek & Tannatt, 1984). It seems more important for children of this age to determine whether their peers are friendly and well-behaved than whether they are competent and smart in their everyday social comparisons (Frey & Ruble, 1985). Preschool children also tend to confuse behavioral dimensions such as intelligence, good conduct, friendliness, and kindness (Heyman, Dweck, & Cain, 1992; Heyman et al., 2003; Stipek & Daniels, 1990; Stipek & Tannatt, 1984; Yussen & Kane, 1985). Stipek and Daniels (1990) found that many of the preschoolers they surveyed thought that children who are good at reading also share fairly and are able to jump higher hurdles. Moreover, preschool children's estimations of their own competence are typically also very optimistic; most children of this age believe that they are the best in their class (Beneson & Dweck, 1986).

From the age of about 7 to 8, intellectual and especially scholastic competence and achievement become the focus of attention and of social comparisons (Frey & Ruble, 1985). Children of this age develop domain-specific conceptions of ability, distinguishing between their competence in mathematics, reading, and sports, for example (Wigfield et al., 1997). They see ability as an internal quality (not just mastery of specific tasks) that is normatively defined by comparison with others. For example, Ruble et al. (1980) report that second graders, but not first graders, describe their level of intelligence in social comparison. Significantly, it is at the age of 7–8 years that children first come to see ability and personality traits as enduring person characteristics that permit long-term predictions to be made about performance and behavior (Droege & Stipek, 1993; Rholes & Ruble, 1984; Stipek & Daniels, 1990).

Findings reported by Nicholls and Miller (1983; see the overview in the next section) provide evidence for three stages in the development of conceptions of difficulty and ability.

Development of the Conceptions of Ability and Difficulty (Based on Nicholls & Miller, 1983)

- Up to about 6 years of age: Egocentric conception of difficulty; task difficulty is assessed solely in terms of the subjective experience of its demands.
- From about 6 to 7 years of age: Objective conception of difficulty (or of ability, if the task is mastered); task difficulty is assessed in terms of the objectifiable complexity of its demands (e.g., number of pieces in a jigsaw puzzle).
- From about 7 years of age: Normative conception of difficulty/ability; task difficulty is assessed in terms of the relative number of other people who succeed/fail on it.

Regarding conceptions of ability, Pomerantz and Ruble (1997) investigated several major dimensions of 7- to 10-year-olds' conceptions of ability, namely, perceived uncontrollability, stability, and capacity (i.e., ability makes it possible to succeed without effort; effort exertion leads to especially good outcomes). Whereas perceived uncontrollability remained constant across age groups, conceptions of ability as a stable causal factor increased between 7 and 9 years of age. The conception of ability as a capacity that can be moderated by effort became established between 8 and 10 years of age. Children whose conceptions of ability comprised both stability and capacity dimensions evaluated their school learning outcomes in more realistic terms (i.e., congruent with the teacher's evaluation) than did children who had mastered only one or neither of the concepts. Other studies have shown that children from the age of about 7 to 8 years take success and failure feedback into account when assessing their ability in both individual and social comparison and use this feedback information to predict their future performance (Entwistle & Hayduk, 1978; Frey & Ruble, 1985; Parsons & Ruble, 1977; Stipek & Hoffman, 1980).

In a fascinating study, Butler (1999) first determined whether fourth to eighth graders have differentiated conceptions of ability and effort and then compared their information seeking, performance, and interest in a specific task under task- and ego-involving conditions. Students who had already acquired a differentiated conception of ability showed strivings to learn and information seeking under task-involving conditions and strivings to outperform others and increased interest in social comparison information under ego-involving conditions. They responded to failure with inhibited efforts to learn, restricted information seeking, and subdued interest in the task. In contrast, students who had not yet acquired a differentiated conception of ability were very interested in social comparison information, regardless of whether they succeeded or failed on the task set. The task-involving condition was not conducive to their learning efforts, and the ego-involving condition had no inhibitive effects.

Summary

Between preschool age and second or third grade, independent conceptions of effort and ability slowly emerge from a general, optimistic, and failure-resistant conception of competence. The conception of effort seems to be more closely related to children's experience and thus easier to grasp than the conception of ability. With the transition to school, the conception of effort is consolidated and exposed to the pressures of success and failure in both individual and social comparison. For the first time, ability and effort are set in relation to conceptions of capacity and its limits. These developments lay the foundations for the development of more complex causal schemata for the explanation of success and failure and for realistic and independent assessments of personal capabilities. At the same time, they make children vulnerable to experiences of loss of control and frustration about the limits of their capabilities (see Sect. 16.6 on the development of individual differences).

16.5.3 Cognitive Preconditions for Setting Levels of Aspiration

Before moving on to the development of individual differences in achievement motivation, we first have to consider the development of two cognitively demanding aspects of achievement-related information processing:

- The level of aspiration, with its expectancy and incentive components
- Causal schemata for ability and effort

Both aspects of achievement-motivated behavior are strongly influenced by individual differences, but they also have some universal cognitive developmental prerequisites, which are discussed in this and the next section. There are two cognitive prerequisites for setting realistic levels of aspiration in the achievement domain: expectancy of success and understanding how expectancy of success and incentive value of success for a given task are inter-related.

We start by discussing research on subjective assessments of the probability of success on a given task, including work on subjective beliefs about control and behavior-event contingencies.

Estimating the Subjective Probability of Success

A fully developed conception of the probability of success presupposes a connection being drawn between two constants: personal ability (corrected for the effects of effort) and objective task difficulty (independent of personal ability and effort). Children acquire the highly complex information integration skills necessary over a long process of development. Before their conceptions of success probability are fully developed, children probably use simplified conceptions that require less complex, shorter-term, and more transparent operations. These less demanding but functional operations are based on the principle of covariation of invested competence (i.e., an undifferentiated combination of

effort and ability) and the success or failure experienced on repeated attempts at a task. Such a conclusion was already suggested by the findings of the competition study by Heckhausen and Roelofsen (1962), which found most children younger than 4.5 years to be entirely confident of winning, despite an objective probability of 50%, and older children to show signs of conflict when asked to predict the next result. In this study, competence evaluations may have been colored – and enhanced – by the children's hopes and aspirations. Yet, it may not be entirely unrealistic for young children to take an optimistic view of their capacities. Because their competence increases on a daily basis, achievement goals that were out of the question only recently may suddenly prove attainable. Besides, children's optimism about their performance reserves is by no means immune to failure experiences. In a replication of the competition study with three rates of failure (25%, 50%, and 75%), Eckhardt (1968) found that 3.5-year-olds were as uncertain in their predictions of success at a failure rate of 75% as were the older children at a failure rate of 50%. Thus, the 3.5-year-olds were also able to integrate experiences of failure over several trials and, at a failure rate of 75%, were less likely to be unshakably confident in their capabilities and (developmental) reserves.

Such expectations of success are still not very realistic, however, and they remain overly optimistic for the first decade of life. Parsons and Ruble (1977) exposed children up to 11 years of age to a series of successes or failures and examined their subsequent expectations of success. They found that children 3.5–5 years of age remained confident of success, regardless of the type and the number of successes or failures reported. Older children's interpretations of success and failure feedback became increasingly realistic. The girls were some 2 years ahead of the boys in this respect, probably because boys lag behind girls in general cognitive development. Schuster, Ruble, and Weinert (1998) reported parallel findings from a study with 5-, 8-, and 9-year-olds and college students. The authors systematically varied the information that respondents were provided on the consistency over time of a target child's performance in hypothetical failure scenarios (as an indicator of that child's ability; "When Anne played with this game in the past she did not get it right"), as well as on the performance of other children (as an indicator of task difficulty; "The other children did not get it right either").

- Significant differences in expectations of success were only observed between the 9-year-olds and the college students, indicating that it is not until adolescence that children learn to predict performance outcomes accurately on the basis of consistency and social comparison information.

Research designs in which the outcome of an action is independent of personal competence and effort make much higher demands of children's conceptions of their prospects of success. Weisz et al. (1982) report a study in which preschool children, fourth graders, eighth graders, and college students were asked to predict the success of two players, one who tried very hard and one who made very little effort, in two versions of a card game. In one version, the players chose cards completely at random; in the other ability-dependent version, they had to remember cards. It emerged that even the preschool children distinguished between different levels of effort in the ability-dependent version; like the older respondents, they predicted that the player who tried harder would be more successful than the player who made little effort. There were marked age differences in predictions concerning the chance-dependent version of the game, however. Children of preschool age and even fourth graders (although to a lesser extent) believed that players who tried very hard would be more successful than those who did not, even when the outcome was entirely a matter of chance. It was not until eighth grade (i.e., about 14 years of age) that the children seemed to understand that success on chance-dependent tasks is unrelated to effort.

Self-efficacy and Control Beliefs

Two important research traditions investigating people's expectancies about the success of their actions are Bandura's self-efficacy approach (for an overview, see Bandura, 1977, 1986) and the study of control beliefs (for an overview, see Little, 1998; Skinner, 1996; Weisz, 1983).

- According to Bandura's self-efficacy model, positive beliefs about the efficacy of one's actions in a task situation reinforce effort and persistence, thus increasing the probability of success. The more specific self-efficacy beliefs are to the task at hand, the more accurate the predictions generated by the model.

Seen from the perspective of modern motivation psychology, task-related self-efficacy beliefs – unlike the expectancies of success examined in the risk-taking model – are less a source of information on which challenges to address than motivational resources that make individuals more or less confident of success and thus provide them with more or less energy to implement their intentions (i.e., volition) in an ongoing task situation.

Conceptual models of control beliefs, which tend to apply to broader classes of action (e.g., scholastic performance in general), are more general than the construct of self-efficacy beliefs and, at the same time, more differentiated. What control beliefs and self-efficacy beliefs have in common is that they provide volitional resources for action implementation, rather than guiding task selection or goal setting. Modern approaches to control beliefs distinguish between beliefs about the contingency between causal factors and outcomes (e.g., the impact of teacher behavior on grades) and beliefs about individual access to causal factors (e.g., ability) (see Weisz, 1983; Skinner et al., 1988). An individual will consider himself or herself likely to succeed in an activity only if the following two conditions are met:

1. Success must be dependent on conditions or behaviors that people like me can control. Naive theories or beliefs of this kind are termed contingency beliefs (Weisz, 1983), means-ends beliefs (Skinner et al., 1988), or causality beliefs (Little, 1998).
2. I personally must be in the position to control these behaviors (e.g., trying hard) or be in the presence of the conditions for success (e.g., being the teacher's pet). Conceptions of this kind are terms competence beliefs (Weisz, 1983), capacity beliefs (Skinner, 1996), or agency beliefs.

Causality beliefs (means-ends beliefs) are beliefs about the controllability of certain events (e.g., getting good grades) and the means by which they can be attained (e.g., effort, ability, being on good terms with the teacher). Agency beliefs are individuals' beliefs about whether they personally have access to these means (e.g., access to personal ability or the support of the teacher).

Interestingly, research has consistently shown that overly optimistic expectations of one's general control (combination of causality and capacity) and agency have positive effects on mood, persistence (see, e.g., Weisz, 1983; for adults, see Taylor & Brown, 1988, 1994), and even school learning gains (see also the following excursus). In a 2-year longitudinal study with 8- to 11-year-olds in Germany, Lopez et al. (1998) found that children who overestimated their ability and effort (relative to two measures of academic performance) performed better over time. Contrary to expectations, no relationship was found between the magnitude of this action-control bias and school performance. However, the action-control bias was not independent of performance feedback in the form of test results – the longitudinal effects of test results on students' agency beliefs were of the same magnitude as the effects of their agency beliefs on test results. Analogous results were found in a longitudinal study with Russian 2nd to 11th graders. Not only did these students' beliefs about their scholastic ability (i.e., "agency for ability") affect their learning outcomes, their learning outcomes had an impact on their agency beliefs at a subsequent assessment (Little, Stetsenko, & Maier, 1999).

Strictly realistic assessments of personal prospects of success clearly do not enhance performance. Findings from self-efficacy research indicate that slight overestimation of self-efficacy has positive effects on the level of aspiration, effort expended, persistence, and resilience to experiences of failure (Bandura, 1977, 1986). Students of different ability levels benefit from high self-efficacy beliefs (see the overview in Pajares, 1996). They complete more tasks, show more persistence on tasks they initially found difficult, and use more effective self-regulation strategies. Pintrich and colleagues (Linnenbrink & Pintrich, 2003; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991) have reported parallel results for college students: undergraduates with higher self-efficacy beliefs use more metacognitive learning strategies, apply these strategies more frequently, and persevere for longer after experiences of failure than do students with lower self-efficacy beliefs. Schunk (1982) manipulated children's self-efficacy beliefs on division tasks by giving them feedback that enhanced self-esteem; this intervention led to improvements in the children's performance on these tasks.

Expectations of success and conceptions about one's competence inform both task deliberation (task choice, level of aspiration) and task implementation (work on tasks). A deliberative, realistic approach is required for the selection of manageable tasks. Overly optimistic expectations of success or self-efficacy beliefs would be detrimental in this context because they expose students to the risk of failure and frustration. As a matter of fact, however, there is no call for deliberative processes of task choice in school settings. Students are rarely given the opportunity to choose homework assignments or test questions. Rather, they have no choice but to work on tasks set by their teacher and can thus benefit from high confidence of success. A deliberative, realistic approach is of little help in this context. Because students are obliged to tackle the tasks set by their teacher, they are – to all intents and purposes – permanently in the volitional phase. It is hardly surprising that difficulties arise in the long term. The onset of adolescence, and the concurrent normative transition from elementary to junior high school, marks a pronounced decrease in both the confidence of academic success and the self-concept of ability. Moreover, it can be assumed that students transferring to a school type that gives them more freedom to choose between subjects see the personal significance of the various subjects in more differentiated terms and thus develop more differentiated concepts of ability in each subject. Students may exit the volitional phase for the subjects they give up, leading to a further decrease in their personal capacity beliefs. In contrast, volitional self-commitment can be expected to be maintained and perhaps even increased in the subjects in which they specialize (Köller, Trautwein, Lüdtge, & Baumert, 2006).

Interrelation Between Expectancy and Incentive

It is only when children have grasped the multiplicative relationship between the expectancy of success and the success incentive that they are able to set a level of aspiration as formulated in the risk-taking model. The available data confirm that children who understand the covariation between task difficulty and competence (i.e., from the age of about 4 to 5 years at the latest) show more pronounced responses to success (as indicators of incentive) at higher levels of difficulty (as indicators of expectation).

- The age at which these phenomena are observed depends on the complexity of the covariation information: visible representations of difficulty (e.g., a much bigger weight to lift, a jigsaw puzzle with many more pieces) are easier to grasp than inferences of difficulty drawn from comparing one's performance with that of other children.

Ruble et al. (1976) found that social comparison information did not influence the self-evaluations (children could change the expression of a cardboard face accordingly) of 6-year-olds but had a marked impact on those of 8-year-olds. Children's growing ability to process social

comparison information is also reflected in task choice, as Veroff (1969) found with a large sample of children of different ages. When presented with three different versions of a task, the majority of 4- to 7-year-olds opted for the easy task that "most children your age can do." It was not until the age of 8 years that most children preferred the moderately difficult task "that some children your age can do." The preference for this task type increased with age. Complementary relations between task difficulty and failure affect ("the easier the task, the more unpleasant the experience of failure") were not observed in the age groups investigated (up to mid-childhood).

Excursus

School-Related Control Beliefs in International Comparison

Interestingly, international and cross-cultural studies on school-related control beliefs have revealed uniformity in students' means-ends beliefs about academic success but discrepancies in their agency beliefs. In a series of studies, Little and colleagues (Karasawa, Little, Miyashita, & Azuma, 1997; Little & Lopez, 1997; Little et al., 1995, 1999) showed that children in countries as different as East and West Germany, the USA, Japan, the Czech Republic, and Russia acquire very similar conceptions about the major factors influencing academic achievement in the first 6 years of schooling. As shown in Fig. 16.6, the youngest children's (second graders') importance ratings of all causal factors are similar. As the children progress through school, their ratings of the importance of effort increase steadily, peaking in sixth grade. Importance ratings for ability remain stable, coming second in the older children's ranking after effort. Effort and ability are thus increasingly differentiated as causal factors, from almost perfect correlations in second grade to correlations of about 0.50 in sixth grade. Importance ratings for unknown causes and luck decrease steadily, with sixth graders judging luck to be comparatively unimportant for success at school. The perceived importance of teachers declines between second and fourth grade but increases again after fourth grade. Correlations between these causality-related means-ends beliefs and actual school achievement are low.

In terms of beliefs on personal agency (i.e., individual access to important causal factors),

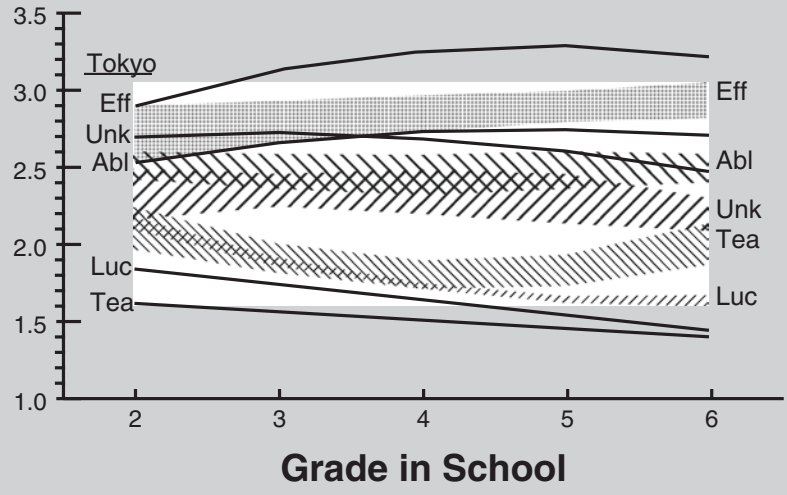

Fig. 16.6 Perceived causes of school achievement from second to sixth grade. Causes: *Eff* effort, *Unk* unknowns, *Abl* ability, *Luc* luck, *Tea* teacher. The shaded areas represent the variation measured across cultural contexts (East and West Germany, the USA, and Russia); the relatively unique trajectories for the sample in Tokyo, Japan, are superimposed on these ranges (From Little in Heckhausen & Dweck, 1998, p. 297, Part B)

however, marked differences emerged across cultures: students in the USA had higher agency estimations for effort and luck than their peers in other nations. At the same time, their personal agency beliefs showed the lowest correspondence with their actual learning outcomes (correlations between 0.16 and 0.32). Before reunification, East German children had the lowest agency beliefs, and the correspondence with their actual performance outcomes was high (correlations over 0.60, except for teacher influence at 0.36). Figure 16.7 illustrates the different patterns of relationship between students' control beliefs and actual school grades in East Berlin (in the summer of 1990; i.e., shortly before political reunification), West Berlin, Los Angeles, and Moscow. Control beliefs only predict a total of 28% of the Los Angeles students' actual school performance, compared with 63% for the East Berlin students; the figures for West Berlin and Moscow fall in between. Longitudinal follow-ups in East and West Berlin in 1991, 1992, and 1993 showed that the relationship between agency beliefs and school grades in the East Berlin students gradually decreased to the level of their peers in West Berlin as the school system was aligned to that of West Germany. The authors attributed this development to two changes in classroom practice in East Berlin schools: students were now given private, rather than public feedback on their individual performance, and group work was introduced alongside teacher-directed instruction (Little, Lopez, Oettingen, & Baltes, 2001).

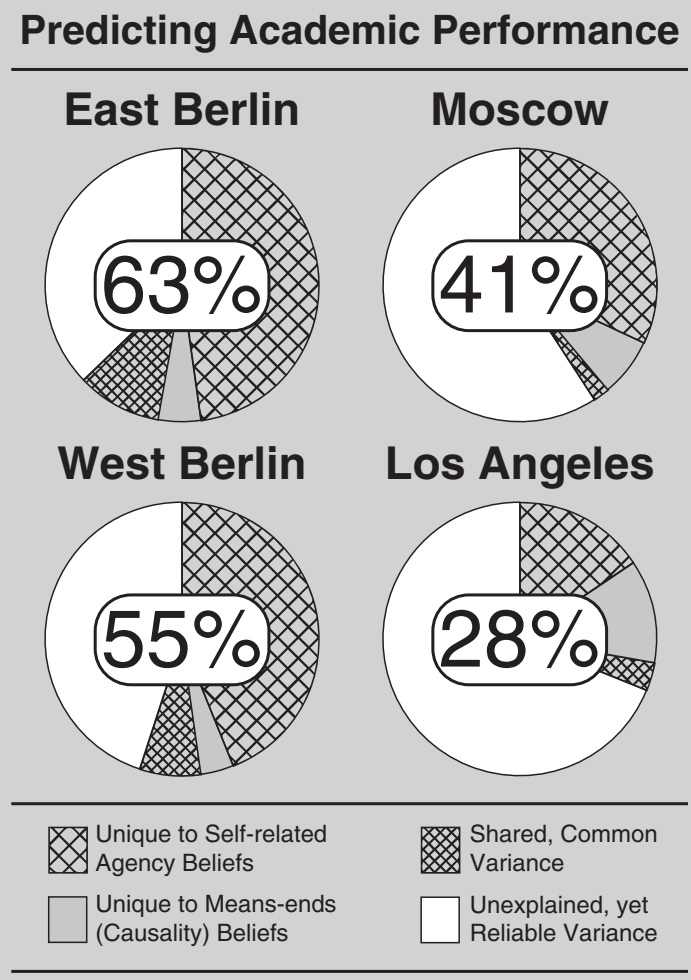

Fig. 16.7 Relationship between control beliefs and school performance in East and West Berlin, Moscow, and Los Angeles (From Little et al., 1995, p. 695, Fig. 5)

The multiplicative relationship between the expectancy of success and the success incentive seems to be heavily dependent on the salience of those two components in the situation at hand. The experience of repeated successes or failures on a single task, the difficulty of which is varied – as in the weight-lifting study (Heckhausen & Wagner, 1965) – seems to prompt even 3.5- to 4.5-year-olds to set modest levels of aspiration and to avoid very difficult tasks. In the context of new tasks or competitive situations (e.g., in the study by Heckhausen & Roelofsen, 1962), however, children tend to focus on the success incentive and to choose overly demanding goals. First indications of individual differences in the offensiveness versus defensiveness of task choice are apparent from ages as young as 4.5 years or even 3.5 years (Heckhausen & Wagner, 1965; Wagner, 1969; Wasna, 1970). Some children focus on the expectancy component, others on the incentive component, and yet others alternate between offensive and defensive choices. It is unclear whether these findings can be interpreted as first indications of individual differences in the weighting of the expectancy and incentive components or whether they simply reflect developmental shortcomings in the cognitive capacity to integrate the two.

Summary

Over the course of development, children must learn to process feedback on their action outcomes in such a way as to generate broadly realistic, but fundamentally optimistic, expectancies of success. This kind of approach is adaptive because it is not usually possible to gauge the exact probability of success, but – in the school setting, at least – it is safe for children to assume that the tasks set are not entirely beyond their capacities and that it is worth investing effort. Research shows that expectancies of success become increasingly realistic until preadolescence. For random events that are not related to ability, such as the random choice of a playing card, developmental gains are still observable even in early adolescence. Interestingly, there are marked individual and cultural differences in how closely children's expectancies of success are related to their actual learning outcomes at school, the major performance domain in childhood and adolescence. Because the developmental context of the school is determined and controlled by adults for the purposes of cultural instruction, with performance demands being set by adult socialization agents rather than chosen by the students themselves, a strictly realistic approach is not in fact necessary and might even inhibit goal striving.

16.5.4 Causal Schemata for Ability and Effort

We now return to the emergence of the ability conception and thus to the establishment of personal competence as an action incentive (Sect. 16.4). As the global competence concept gradually begins to differentiate into a conception of ability as a stable causal factor and a conception of effort as a variable causal factor, ambiguities and uncertainties arise in the causal attribution of the outcomes attained. This is because in most cases, information about effort exerted, individual ability, or task difficulty is incomplete or cannot (yet) be correctly integrated. It is impractical even – and indeed especially – for adults to take all potentially relevant information into account in their everyday decisions and behavior (see the critical discussion of Försterling's hyperrational model in Chap. 15, Sect. 15.3.3, and modern ideas of fast and frugal heuristics, Gigerenzer, 2000; Gigerenzer, Hertwig, & Pachur, 2011). Instead, adults draw on pre-built hypotheses to infer underlying causes, their relationships, and respective weighting. According to Kelley (1972, 1973), these causal schemata (see also the detailed account in Chap. 15) are used to predict ("combined covariation schemata") or causally attribute ("compensatory causal schemata") action outcomes when information is limited. Compensatory causal schemata allow success or failure to be attributed to a causal factor about which no information is available if the other factor is given (Kun & Weiner, 1973). For example, it is reasonable to assume that somebody who passes a difficult exam with flying colors despite making little effort is particularly competent. Combined covariation schemata allow success or failure to be predicted, given a rough idea of an individual's ability and the effort exerted.

- Causal schemata thus permit known outcomes to be attributed to unknown causal factors or, when the main causal factors (primarily ability and effort) are known, predictions to be made about future outcomes. Because they are, in essence, conceptions of the causal significance of effort and ability, both schemata are highly relevant to the development of achievement-motivated behavior.

Effort and ability vary in terms of both their perceived controllability (it is often possible to invest more effort, but it is much more difficult to enhance one's ability) and their affective evaluation (effort is laudable, but it is ability that we take pride in; Nicholls, 1976). Causal schemata can thus cognitively accentuate people's tendencies to be more optimistic or pessimistic in their expectancies of success or to prefer a certain pattern of causal attribution and, in so doing, can amplify individual differences over the developmental trajectory (see also Chap. 14, Sect. 14.4.1, on the attributional genesis of hopelessness and depression). The development of causal attribution schemata in childhood and adolescence is thus central to the emergence of individual differences in achievement motivation and in other domains of life and behavior. Moreover, it provides a window of opportunity for interventions, including training programs designed to modify patterns of causal attribution (Ziegler & Heller, 2000; Ziegler & Stöger, 2004).

Preliminary forms of the two causal schemata – proportionate combined covariation in the prediction of outcomes, and inversely proportionate compensation in the causal attribution of a given outcome – have been identified. One way or the other, they focus on only one of the two causal factors, effort or ability. Such one-dimensional causal attributions can easily lead to errors in the prediction or explanation of performance because they fail to consider the influence of the second factor. This shortcoming is gradually overcome; from the age of about 8 years, effort attributions no longer rigidly follow ability attributions, and from the age of about 9 years, ability can be inferred from effort information (see the overview in Heckhausen, 1982).

Empirical Findings on the Prediction of Performance Outcomes

Empirical research on the development of causal attribution schemata has investigated both the prediction of outcomes when causal factors are known and the explanation of known outcomes (see the detailed reviews in Heckhausen, 1980, 1982, 1983). We start by considering some of the major results on outcome prediction. Kun, Parsons, and Ruble (1974) informed 6- to 11-year-olds and adults about the levels of effort and ability required to solve various puzzles (three levels of each) and asked them to make predictions of success. The predictions of the 6-year-olds evidenced combined covariation; only 31% of these children still centered on effort. Whereas the combined covariation of the 6-year-olds was additive, the 8-year-olds showed signs of multiplicative variation: at higher levels of ability, the same increase in effort was predicted to produce a greater effect. Multiplicative covariation predominated among 10-year-olds and adults. In addition, effort increased in importance relative to ability with increasing age. Surber (1980) used clear visual representations of ability and effort in their study with 6-, 9-, and 11-year-olds and reported similar findings to Kun et al. (1974). In his weight-lifting prediction task, ability was illustrated by bulging muscles and effort by rectangles of different sizes. Even the 6-year-olds combined the causal factors of effort and ability in their predictions, if only additively. The predictions of the 9-year-olds and the adults were indicative of multiplicative combination of effort and ability.

Empirical Findings on the Development of Causal Explanations for Outcomes

Tweer (1976) asked children between 5 and 10 years of age to provide causal attributions for their performance outcomes on a strength task that involved hitting a platform with a hammer, causing a small wagon to slide up a vertical runway. She presented the children with hypothetical scenarios in which either effort ("The first time you don't try at all; the next time you try harder") or ability ("Your right or your left arm" or "You and your father") was varied along with the outcome. Her

findings indicate that children first learn to covary causal attributions to effort and ability with the observed outcome (i.e., if the wagon reached the top, the person must have had high ability and invested much effort). Understanding that greater effort can compensate for lower ability (e.g., a child has to try harder than an adult to get the wagon to the top) is more challenging and not mastered by children in early school age. The most challenging compensatory causal scheme is to understand that someone who achieves the same outcome with less effort has to have higher ability.

Nicholls' (1975, 1978) studies were outlined in Sect. 16.5.2. In one of his studies, Nicholls showed children between the ages of 5 and 13 films in which the effort expended did not correspond with the outcome (e.g., a child fools around and makes no effort but still finishes his mathematics problems quicker than a classmate who had worked diligently). These scenarios can only be explained by ability compensation (i.e., the first child completes the assignment quickly because he is especially clever). Nicholls' findings point to a four-stage developmental sequence, which corresponds to Piaget's sequence of development from preoperational thought to formal operations and is illustrated in Fig. 16.8:

1. Global conception of competence (around 5–6 years): an undifferentiated coupling of effort, ability, and outcome.
2. Effort covariation: effort alone causes the outcome (around 7–9 years).
3. Ability begins to be seen as an additional and autonomous cause – sometimes still coupled with effort, sometimes in the form of ability compensation (around 10 years).
4. Systematic use of ability compensation: ability can compensate for effort in inversely proportionate explanation (ability compensation) and in proportionate prediction of outcomes (around 12–13 years).

Research on the development of compensatory schemata in the explanation of outcomes when one of the two causal factors is known (cf. Karabenick & Heller, 1976; Kun, 1977; Surber, 1980; Tweer, 1976) has revealed that compensatory causal attributions are already used by younger children from the age of 6 to 10 years when the following conditions apply:

1. Compensation is required in terms of effort, not ability (someone who is less good at something has to try harder).

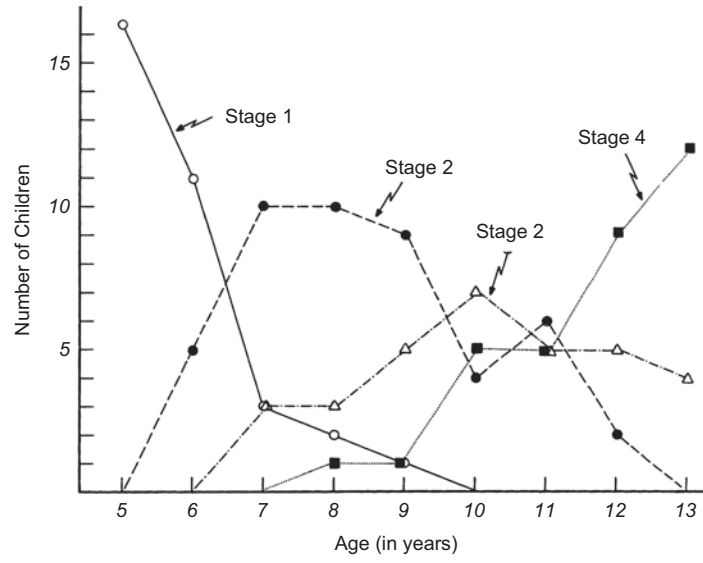

Fig. 16.8 Age trends in the development of the ability concept when the performance outcomes of two children were to be explained. The children's work activities were shown on film and contradicted a simple covariation of effort and outcome. Stage 1: global concept of competence; stage 2: effort covariation; stage 3: ability as an independent cause; stage 4: ability compensation (Based on Nicholls, 1975; from Heckhausen, 1980, Fig. 13.2, p. 661)

2. The information provided is easy to interpret (e.g., picture cues relieve working memory) and not too complex.
3. Answers are given as paired comparisons (who has to try harder?) rather than on absolute scales (see detailed overview in Heckhausen, 1983).

Summary

Causal schemata develop in the following sequence:

- Simple covariation between the effect and one cause from the age of 4 to 5 years; effort covariation precedes ability covariation.
- Combined covariation in the prediction of outcomes at age 5–6 years when both causal factors are given or two cases of unequal effort are to be compared.
- Depending on the method and the sample, effort compensation may be observable at 5 years or not until 10 years of age.
- Ability compensation is obviously more demanding and is only observed from the age of 6 to 11 years (relatively late when a preconceived ability attribution has to be revised or unequal effort clearly violates covariation with outcomes).
- Effort and ability compensation schemata develop earlier for experiences of success than for experiences of failure.

Development of Affective Differences Between Effort and Ability Attributions

Affective differences between ability and effort attributions may influence levels of aspiration, the behavioral consequences of failure, and the development of individual differences in motivation and action.

- The developmental precondition for affective differences between effort and ability attributions is that affective responses do not simply reflect the action outcome (pride after experiences of success, shame after experiences of failure) but vary depending on the causes ascribed.

This differential affective potential of ability and effort attributions has been investigated in numerous studies asking children between 6 and 13 years of age to state how a target person would feel at succeeding or failing on a task requiring high or low levels of effort and ability (Stipek & DeCotis, 1988; Thompson, 1987; Weiner, Kun, & Benesh-Weiner, 1980). In all cases, findings showed that the focus on the outcome decreased with age and that the causal factors of effort and ability came to play an increasingly important role in the emotions ascribed. By the age of 13, the respondents referred to pride and shame only when performance outcomes were attributed to ability or effort in the stories (Stipek & DeCotis, 1988). These findings are in line with earlier studies by Weiner and Peter (1973), which showed that the impact of effort attributions on performance evaluations increased with age.

- In sum, these findings indicate that instruments assuming a differentiated competence concept (i.e., a clear verbal distinction between the concepts of "effort" and "ability") are not appropriate for children younger than 10 years. From the age of about ten, when children have mastered effort and ability compensation as well as simple effort covariation, effort becomes the decisive factor in evaluating the achievements of others. It is at this point that children overcome the coupling schema (effort = ability) and are no longer bound to conclude that success deriving from high ability must be attributable to high effort as well.

Regarding affective differences in self-evaluation, Heckhausen (1978) exposed children between 10 and 13 years of age (i.e., the critical age range for the acquisition of effort and ability compensation) to a series of successes or failures. The more these fifth to seventh graders attributed success feedback to their ability, the more satisfaction they reported. Effort attributions had no effect on self-evaluation. Other studies (Nicholls, 1975; Ames, Ames, & Felker, 1977) confirm the impor-

tance of ability attributions for self-evaluations from the age of 10 to 11 years upward. First signs of individual motive differences were detected in children's self-evaluations after experiences of failure: negative self-evaluations were found to be associated with effort (in success-motivated individuals; Heckhausen, 1978), with ability (Schmalt, 1978), or with neither of the two (Nicholls, 1975). In a study with children of a similar age, Miller (1985) found that only 11- to 12-year-olds who had already developed a full self-concept of ability (i.e., who were aware that the ability level determines the effects of effort) responded to a series of failures in anagram tasks with performance decrements in a subsequent shape-sorting task.

Different observer perspectives can also have differential effects. For adults, effort is the decisive causal factor in evaluations of others, and ability is the decisive causal factor in self-evaluations. Others are evaluated more highly if they have invested effort, but people tend to see cause for pride in their own achievements if they testify to high ability. In a nutshell, "effort is virtuous, but it's better to have ability" (Nicholls, 1976, p. 306). Ability attributions of failure are problematic because they imply that future attempts have little chance of success either, at least when ability is seen as stable and unchangeable. In contrast, effort attributions of failure spur the individual to try again, investing more energy and care this time to ensure success. We return to the implications that these patterns of causal attribution have for the development and amplification of individual differences in Sect. 16.6.3, Sect. 16.6.4 (cf. Dweck, 2002; Heckhausen, 1984).

16.6 Development of Individual Differences

In the past two decades, conceptual development in the field of motivation psychology, and indeed psychology in general, has seen a move away from a strictly cognitive focus toward a perspective that also takes affective dynamics into account. Motivation psychologists now know more and are, at the same time, in the midst of an exciting phase of discovery as to the interactions of implicit and explicit motives, the functions of intrinsic and extrinsic incentives, the cognitions adapted to different action phases (e.g., self-efficacy or causation), and the development of "hot" and "cool" executive functions (Zelazo & Carolson, 2005) that enable behavioral regulation in the first place. The development of individual differences cannot be explained solely in terms of cognitive factors such as levels of aspiration or causal attribution styles, neither can it be clarified by an exclusive focus on how differences in the incentive value of success and failure emerge over the course of socialization.

McClelland's comparison of self-attributed (explicit) and implicit (not consciously represented) motives can serve as a useful organizing framework for an overview of research on the development of individual differences in achievement motivation (McClelland, Koestner, & Weinberger, 1989; see detailed discussion in Chap. 9). There is much evidence to indicate that implicit motives (measured by projective tests) and explicit motives (measured by self-report questionnaires) are two independent motive systems that govern different types of behavior and that may be activated in concert or in opposition depending on the situation. Implicit motives are activated by incentives residing in the activity itself (e.g., to improve one's performance, to master a challenge) and thus generate motivation for more spontaneous behavior that is not prestructured by the environment: the activity itself is attractive to people with a strong motive (e.g., achievement motive), independent of its outcomes. Explicit motives, in contrast, are activated by social incentives (social recognition, reward, status) and thus determine prestructured behavior in socially regulated situations, such as the classroom, where the contingencies for social incentives are transparent (e.g., I have to do my homework carefully to please the teacher and get a good grade).

In this section, we begin by outlining the main strands of research on individual differences in

children's motivational processes. These include research approaches focusing on:

- Implicit motives
- More or less explicit incentives and expectancies
- Explicit goal orientations
- Processes of action regulation

In a second step, we discuss developmental processes that can influence individual differences in achievement motivation at critical phases and transitions, present the available empirical findings, and outline perspectives for future research.

16.6.1 Implicit Motives

The foundations for the development of implicit motive strength are laid in early childhood, before verbal instructions and self-reflection give motivational processes the deliberative character that distinguishes higher cognition (Heckhausen, 1980, 1982; McClelland, 1987; Veroff, 1969). Although achievement-motivated behavior comprises both affective (implicit) and cognitive (explicit) processes – in modern terminology, "implicit" and "explicit" components of achievement-motivated behavior – the preverbal development of individual differences in the incentive value of success and failure is decisive. It is at this early stage that children develop a heightened, probably lifelong sensitivity to situational conditions affording them the opportunity to develop and optimize their control of the environment (of objects in the case of achievement motive and of other people in the case of the power motive) or that threaten to reduce or restrict that capacity.

Influence of Parenting on the Development of Implicit Motives

Consensus has not yet been reached on the contextual conditions that promote this individual sensitivity and readiness to act. Longitudinal data are scarce, and results have been mixed. The findings of a longitudinal study by McClelland and Pilon (1983) provide some valuable insights, however. The authors followed up on a 1950s study on parenting styles by Sears, Maccoby, and Levin (1957), using TAT and questionnaire measures to assess the affiliation, power, and achievement motives of the "children," who were now in their early 30s.

- Parenting behavior was not found to reliably predict the affiliation motive. Parental behavior and influence did, however, predict the development of the power motive and especially the achievement motive.

The children whose mothers had reported that aggressive and/or sexualized behavior on the child's part was tolerated in the home environment developed a strong power motive. If the father was the dominant influence in the child's upbringing, a strong power motive with activity inhibition emerged (also termed "imperial power motive" or "socialized power motive" by McClelland); if the mother was the dominant influence, an uninhibited power motive was observed (termed "conquistador syndrome" or "personalized power motive" by McClelland, and "Don Juan complex" by Winter, 1973). Further, McClelland and Pilon (1983) found that mothers of boys who had high TAT achievement motive scores at age 30 had insisted on fixed mealtimes and been particularly strict about toilet training. These two influences of early parenting behavior cannot be attributed to the effects of parental strictness or punishment in general: neither of these factors was related to the sons' achievement motivation scores at age 30.

It is difficult to interpret these findings without knowing anything about potential mediating processes between childhood and the age of 30. When the mothers were surveyed in the 1950s, it was – in contrast to current practice – generally considered good parenting to get children used to fixed mealtimes and to begin toilet training as soon as possible; indeed, these challenges were seen as normative developmental tasks for the first and second year of life. In other words, mothers who were particularly ambitious in this respect believed – and indeed expected – their children to be capable of achieving these devel-

opmental milestones well within time. They therefore generated interaction contexts, even in the preverbal period, in which positive and negative affect was expressed in response to success and failure on self-control tasks (e.g., "Don't ask for food before mealtimes"). Interestingly, the mothers' expectations for school achievement and other early achievement-related outcomes did not predict their children's achievement motives in adulthood. The socialization effects identified by McClelland and Pilon operate on the purely implicit motive level (see also the discussion of these findings in Chap. 9, Sect. 9.2.4).

A more recent reanalysis of McClelland and Pilon's materials aimed at uncovering precursors in the socialization of 5-year-olds that determine how congruent implicit and explicit motives are in 31-year-olds (Schattke, Koestner, & Kehr, 2011). The authors expected a substantial influence of the individual's degree of early self-determination on the later congruence between the implicit and explicit motives (see Chap. 9 on motive congruence; see also Hofer et al., 2010). The study found that children, who had had conflicts regarding their autonomy and relationship with their mothers at age five, were more likely to develop incongruent implicit and explicit motives as adults.

A number of cross-sectional studies have also investigated how various socialization variables, parenting practices, and aspects of independence training are related to implicit motive strength in later childhood or adulthood (see the overview in Heckhausen, 1980, 1982; for a more recent review, see Eccles et al., 1998, and Trudewind, Unzner, & Schneider, 1997; see also the following excursus). Winterbottom's (1958) early and influential study extended the findings presented by McClelland and Pilon to children of school age. Mothers of 8-year-old boys high in achievement motivation were found to endorse more requirements for independence and competence than mothers of boys low in achievement motivation, particularly for the age range of 5–9 years. Interestingly, these relatively early maternal expectations were not limited to the reliable execution of routine tasks (e.g., getting dressed) to relieve the mother but included child-centered competence requirements that fostered the child's independence in task choice and execution. Like the requirements for early self-regulation of food intake and excretion identified by McClelland and Pilon, these competence requirements in the early school years may be features of the family environment that foster the development of the achievement motive. In subsequent studies, however, the features identified by Winterbottom failed to predict the achievement motive in adolescence (Feld, 1967) or in different social classes (Rosen, 1959) and religious orientations (Smith, 1969), casting doubt on the validity of her findings. Some studies even found negative relations between very early expectations of independence and the tendency to approach success (Hayashi & Yamauchi, 1964; Bartlett & Smith, 1966; Teevan & McGhee, 1972).

In the 1970s, a number of studies (Reif, 1970; Heckhausen & Meyer, 1972; Schmalt, 1975; Trudewind, 1975) taking a more systematic approach to parents' expectations of competence and independence confirmed Veroff's (1969) hypothesis that it is not the earliness but the developmental adequacy of independence demands that promotes the development of a success-oriented achievement motive. Figure 16.9 presents findings from studies by Reif (1970), Trudewind (1975), and Schmalt (1975), showing that child-centered independence training is associated with higher success motives and lower failure motives when it occurs neither early nor late in the child's development. Measuring the earliness of maternal expectations in terms of the child's intelligence level, Heckhausen and Meyer (1972) found a direct relationship between excessive maternal expectations and sons' fear of failure. We return to positive and negative effects on the development of motivation in childhood in Sect. 16.7.5.

16.6.2 Specific Incentives and Expectancies

The risk-taking model (Atkinson, 1964) assumes anticipated self-evaluation to be the crucial incentive motivating achievement-oriented behavior. As such, the implicit motive compo-

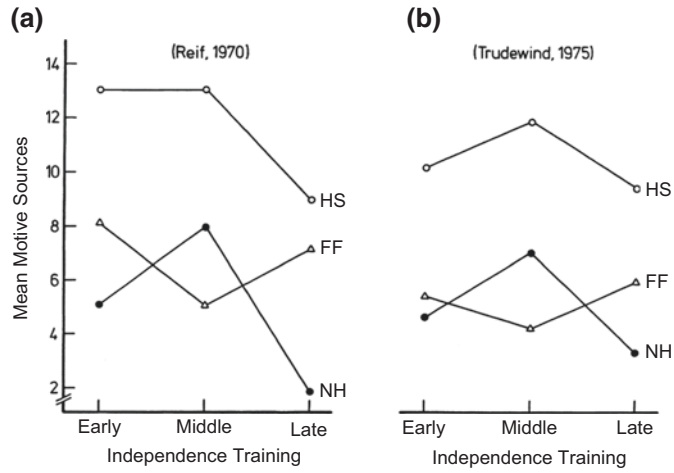

Fig. 16.9 (**a**, **b**) Mean motive scores (*HS*, hope for success; *FF*, fear of failure; *NH*, net hope: HS–FF) as a function of timing of mothers' child-centered independence training in fourth grade (*left*: Reif, 1970) and fourth and fifth grades (*right*: Trudewind, 1975) (Based on Meyer, 1973, p. 181; Trudewind, 1975, p. 122)

Excursus

Change in Implicit Motives Across the Lifespan

To date, only a few isolated studies and research groups have investigated change in implicit motives across the lifespan. Veroff, Reuman, and Feld (1984) reported two large-scale studies in which TAT scores for the achievement motive, affiliation motive, hope for power, and fear of weakness (fear component of the power motive) were obtained from US men and women of different ages and educational backgrounds in the years 1957 and 1976. The overall picture was one of great stability across age groups, but three clear patterns of change did emerge:

1. Women showed a steady decrease in the affiliation motive across young (21–34 years), middle (35–54 years), and older (55 years and above) adulthood. This finding applied to housewives and working women, to married and single women, to mothers, and to women without children (Veroff et al., 1984). The authors reasoned that membership of a peer group, and the reassurance it provides, is crucial for women in young adulthood but becomes less important as they grow older and increasingly confident in their life choices. Nevertheless, the affiliation theme still seems to have a strong influence on the psychological well-being of older women. Halisch and Geppert (2001a) found that the absence of affiliation-related (but not achievement- or power-related) life events is associated with reduced life satisfaction in 65- to 85-year-old women. In contrast to Veroff, Franz (1994) reported an increase in the affiliation motive over time in both women and men between 30 and 40.
2. *According to cross-sectional comparisons reported by Veroff*, the achievement motive of older women is weaker than that of younger and middle-aged women (Veroff et al., 1984). However, careful analysis revealed that this decline applied only to TAT stories generated in response to career-related picture cues (e.g., two women in a laboratory). No age differences were found in stories that involved measuring one's competence in a specific

(continued)

task against a standard of excellence. This finding is in line with the hypothesis that extrinsic and competitive forms of achievement motivation gradually cede to intrinsic and task-oriented forms over adulthood (Maehr & Kleiber,1981). Moreover, Franz (1994) found longitudinal evidence for a decrease in the achievement motive between the ages of 31 and 41. One recent cross-sectional study is a notable exception as it found a stronger achievement motive in older (54–86 years) than in younger (18–32 years) adults (Valero, Nikitin, & Freund, 2015).

3. Men in middle adulthood express more hope for power than young or old men (Veroff et al., 1984). In a study with elderly twins, however, Halisch and Geppert (2001b) found that men's power motive continued to increase even in the seventh decade of life, remaining stable in the eighth and ninth decade. Accordingly, even in old age, power-related life events remained more relevant to men's life satisfaction than achievement- or affiliation-related life events.

nents hope for success and fear of failure, and their relations to the other important motives of power and affiliation, are the only individual characteristics capable of having an impact on achievement-oriented behavior in Atkinson's model (McClelland, 1985). It soon became clear, however, that achievement-motivated behavior cannot comprehensively be explained in terms of an approach vs. avoidance achievement motive and task difficulty. Eccles showed, for instance, that the gender differences frequently observed in individual preferences for certain school subjects cannot be explained by the risk-taking model (Eccles, 1984, 1987; Eccles, Adler, & Meece, 1984; Eccles, Wigfield, & Schiefele, 1998).

- Rather, the choice of subjects and tasks is influenced by the confidence a student has in his or her abilities and by the value of a particular course choice. A wealth of incentives, such as congruence with gender-specific behavioral norms and with the self-concept, and the perceived attitudes of socializers and peers are thus involved in achievement-related choices.

As described elsewhere, numerous incentives residing in the action itself, its outcomes, and the internal and external consequences of those outcomes (see the extended cognitive model of motivation in Chap. 14) influence the choice of achievement-related (and other) activities and the investment of resources in selected goals. Eccles' (2005) general expectancy-value model of achievement choices, presented in Fig. 16.10 (see also Eccles & Wigfield, 2002), provides an overview of the many factors and incentives influencing achievement-related choices.

- A major difference between the Eccles and Wigfield model and the risk-taking model is that Eccles and colleagues do not assume the "objective" difficulty of a task (in social comparison) to be the decisive motivating factor (according to the risk-taking model, the more difficult a task is, the higher its attraction) but predict group and individual norms to determine the subjective value of an activity (e.g., how desirable it is for a girl to do well in mathematics, sports, essay writing, football, or cheerleading).

Another factor that Eccles (2005) assumes to influence the value of achievement-related choices is their potential costs. These include the anticipated threat to self-esteem of failure, the possible negative implications of discrepancies from the self-concept or group norms (e.g., if a girl decides to play football), and the opportunity costs incurred by deciding for one activity and against another. An individual's final choice depends less on the absolute value of an activity than on its relative, subjective value compared with alternatives that must then be abandoned. Empirical findings from a longitudinal study with school leavers show that the values attached to occupational characteristics (e.g., helping others)

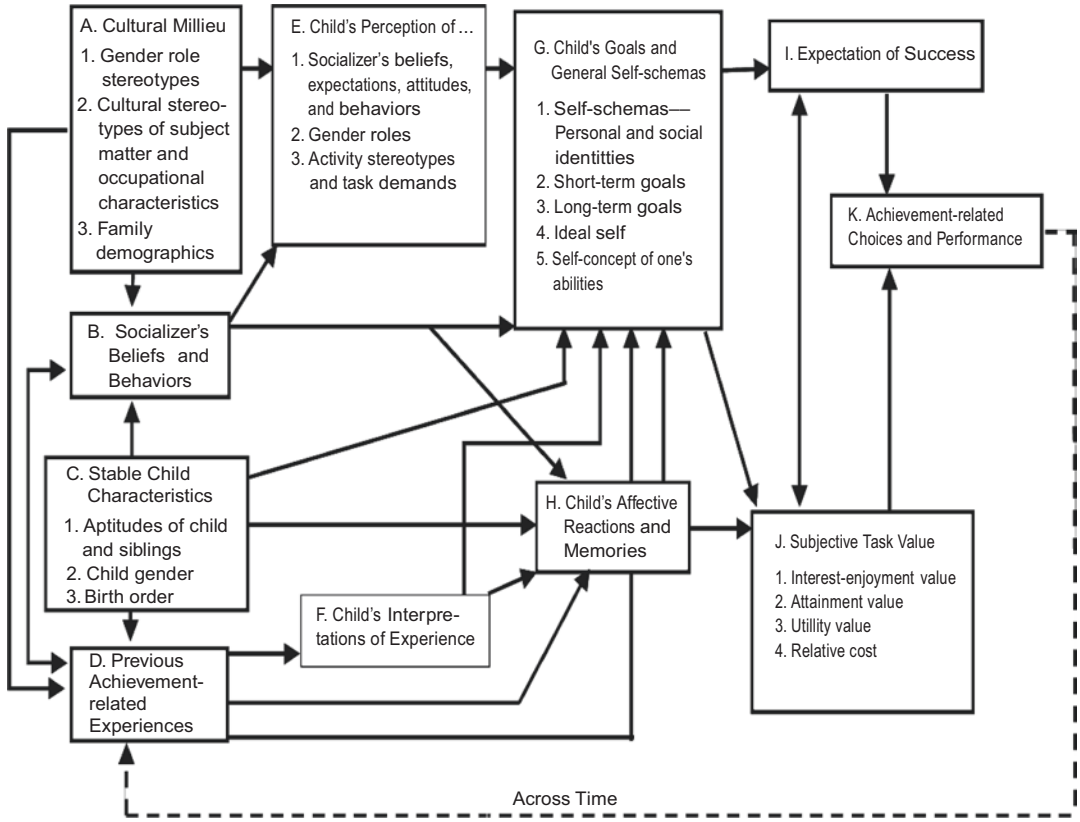

Fig. 16.10 Eccles' general expectancy-value model of achievement choices (From Eccles, 2005)

not only predict plans to enter certain occupations (e.g., nurse, doctor) but also predict not aspiring to others (e.g., natural scientist, business-related profession; Eccles, 2005; Eccles, Barber, & Jozefowicz, 1999).

Furthermore, in the Eccles and Wigfield model, the expectancy component (i.e., subjective difficulty) is shaped over time by the individual's experiences and preferences. Students who decide against advanced mathematics and physics courses, for example, in favor of literature and theater studies, will soon feel at home in the world of literature and drama but have little confidence in their mathematics and physics skills.

- The Eccles and Wigfield model emphasizes change in individual preferences and achievement-related cognitions over time and the impact of that change on long-term competence profiles. The model might thus be described as a dynamic, interactive, and inherently developmental psychological approach. The choices an individual makes over time help shape both subjective and objective influences on achievement-motivated preferences, thus leading – "for better or worse" – to canalized development that increasingly accentuates existing differences between individuals or subgroups (e.g., girls vs. boys, different social classes or ethnic groups; Heckhausen, 1999; Heckhausen & Schulz, 1999).

The Eccles and Wigfield model straddles a middle position between implicit and explicit motives. On the one hand, the authors (Eccles, 2005; Eccles & Wigfield, 2002) emphasize that

there are both conscious and nonconscious components to students' achievement-related value orientations (e.g., culturally mediated value orientations). On the other hand, the research inspired by the model typically uses self-report questionnaires to assess these values and interprets findings as reflecting on self-concepts (Eccles, Wigfield, & Schiefele, 1998).

Further empirical findings from the research program by Eccles and Wigfield are discussed in Chap. 6 in the context of achievement-motivated behavior (see Excursus under 6.4.4), in Chap. 17 in the context of developmental regulatory behavior, and in Chap. 18 in the discussion of academic performance. The construct of interest is also worth mentioning in the context of activity-specific incentives, less from the perspective of self-determination (Krapp, 1999; Krapp, Hidi, & Renninger, 1992) than in terms of the differing attraction that particular topics (mathematics, sports, animals) hold for different individuals (see also the discussion in Chap. 13). Some important empirical findings on interest development are also discussed in Sect. 16.6.5, in the context of canalizing effects in the development of individual differences in motivation.

16.6.3 Generalized Goal Orientations

The concepts considered in this section are more clearly localized on the side of explicit motives. They relate to the explicit goals pursued in achievement-oriented behavior, the goals that respondents can report on relatively spontaneously (i.e., without first having to construct an answer). In the past 20 years, research on the development of achievement-related motivation has focused almost exclusively on explicit achievement goals (conscious, reportable goals; see the overview in Eccles et al., 1998). Accordingly, attention has been centered on cognitions of personal efficacy and competence and on causal attributions of success and failure. This kind of approach is particularly suitable for the investigation of achievement motivation in school settings – achievement-related behavior in the classroom is highly structured, tends to be evaluated in social comparison, and has far-reaching social consequences (recognition of adults and peers, access to higher education and prized careers). Expectancies relating to these action-event consequences are typically both consciously represented and extrinsically motivated.

Learning/Mastery Goals vs. Performance/Ego Goals

In the late 1970s, a group of researchers including Carol Ames, Carol Dweck, Marty Maehr, and John Nicholls began to exchange ideas on achievement motivation in regular colloquia at the University of Illinois. The new and convergent conceptualizations (see the overview in Elliot, 2005) that they developed became known as the achievement goal approach.

- Subsequent research on the development of achievement motivation, especially in the field of educational psychology, was strongly influenced by the models of Nicholls and Dweck, in particular. These achievement goal models were originally conceptualized to account for both situation- and person-dependent variation, but the focus has increasingly shifted to individual differences in achievement goal orientations, particularly in recent research developments.

Based on his findings on the emergence of differentiated conceptions of ability and effort from a global concept of competence, and their coordination within causal schemata (see also Sects. 16.6.2 and 16.6.4), Nicholls (1985) hypothesized two contrasting goal orientations: an undifferentiated competence or mastery goal orientation ("task involvement") and a specific performance or ego goal orientation ("ego involvement").

The aim of mastery goals is to improve one's knowledge and skills, master material, and learn new things; the aim of performance goals is to demonstrate one's competence relative to others with as little effort as possible. These two goal orientations lead to contrasting patterns of behavior in achievement situations:

- Mastery goals are intrinsically motivated; they promote behaviors (e.g., choice of tasks of intermediate difficulty), affect (e.g., joy at success), and cognitions (e.g., learning strategies) conducive to optimizing task mastery.
- Performance goals are extrinsically motivated; they are geared to maximizing favorable evaluations of the self and thus elicit less adaptive behaviors (e.g., choice of extremely easy or difficult tasks), affect (e.g., fear of defeat and shame), and cognitions (e.g., causal attributions of failure that threaten self-esteem).

Dweck drew a similar distinction, having approached the issue from another perspective, namely, her work on the helplessness of older school-aged children in achievement situations. In a series of studies, Dweck and colleagues found that, from the age of around 10 to 12 years, children of the same ability level show contrasting responses to failure (Diener & Dweck, 1978, 1980; Dweck, 1975; Dweck & Leggett, 1988; Dweck & Repucci, 1973). Children who see ability as variable and malleable ("incremental theory of intelligence"; Dweck, 1999), and who thus typically seek to enhance their ability in achievement situations (learning goals), respond to failure by attributing the disappointing outcome to insufficient effort, increasing their effort and persistence and remaining confident of success. In contrast, children who consider ability to be a stable quantity that is relatively difficult to influence ("entity theory of intelligence"; Dweck 1999), and who thus tend to pursue performance goals, show helpless responses to failure, attributing the outcome to a lack of ability, reducing their effort and persistence, becoming less confident of success, and lowering their level of aspiration.

These contrasting responses to failure are reflected in children's general approaches to achievement situations:

- Children with a learning goal orientation or a growth mindset see achievement situations as opportunities to master challenges and to enhance their knowledge and skills.
- Children with a performance goal orientation or a fixed (ability) mindset tend to interpret achievement situations as tests of their ability.

Whether this test situation is experienced as threatening or stimulating depends on whether the children consider themselves competent of accomplishing the task (see also the findings of Spinath & Stiensmeyer-Pelster, 2003; Stiensmeyer-Pelster, Balke, & Schlangen, 1996). If their expectations are positive, children high in performance goal orientations aim to demonstrate a high level of ability in order to maximize positive self- and other-evaluations.

If not, they try to conceal their lack of ability (e.g., by not trying at all or by choosing less demanding tasks).

Ames and Archer (1988) called for research to go beyond goals and concepts of intelligence to see mastery/learning and performance/ego goal orientations as cognitive-emotional networks of goals, beliefs, and feelings relating to success, effort, ability, failure, feedback, and evaluation standards (see also Stiensmeyer-Pelster et al., 1996) by integrating their own approach with those of Nicholls and Dweck. Their take on explicit motivational issues thus approaches the levels of complexity and multifunctionality (e.g., for prospective and retrospective, success- and failure-oriented achievement situations) that have been conceptualized for implicit motivational issues (McClelland, 1985).

- With its focus on optimizing efficiency of task execution, the concept of learning or mastery goals has much in common with intrinsic achievement motivation and can be seen as an explicit counterpart to the implicit achievement motive. In contrast, the concept of performance goals focuses on extrinsic consequences of actions (i.e., self- and other-evaluation of an individual's competence and characteristics). Individuals tend to be higher in one goal orientation than the other, with the dominant goal orientation determining the choice of goals and other aspects of achievement-oriented behavior, unless overruled by strong

situational activation of the nondominant goal orientation (Stipek & Kowalski, 1989).

Numerous studies on the achievement goal approach have confirmed that a learning goal orientation (i.e., a focus on mastering task demands and improving one's competence) has positive effects on long-term achievement behavior under a broad variety of learning and achievement conditions. This usually does not apply to actual performance outcomes (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). In contrast, a performance goal orientation has positive or neutral effects when conceptions of personal competence are positive but negative effects when conceptions of personal competence are negative (see the overview in Harackiewicz & Elliot, 1993; Koestner, Zuckerman, & Koestner, 1987; Miller & Hom, 1990; Sansone, Sachau, & Weir, 1989) and when the individual feels exposed to public evaluation (see, e.g., Witkowski & Stiensmeyer-Pelster, 1998). In the school context, the individual achievement goal orientations interact with the goal orientations established in the particular classroom and can thus have context-specific influences on student behavior and achievement (Murayama & Elliot, 2009). For example, Senko, Hulleman, and Harackiewicz (2011) argue that a learning goal orientation might potentially optimize in-depth learning whose outcomes cannot be detected with the comparatively superficial tests tailored to normative comparisons (i.e., performance-oriented goals such as grades). Findings also indicate that a combination of learning and performance orientations may be particularly motivating (Elliot, 2005) in the workplace (Farr, Hofmann, & Mathieu, 1993), in sports settings (Fox, Goudas, Biddle, Duda, & Armstrong, 1994), and even in educational contexts (Ainley, 1993; Daniels et al., 2008; Wentzel, 1989).

The motivational value of multiple goal orientations may depend on the individual's ability to activate each at the right moment, thus optimizing the motivational fit with the situational potential for achievement and the potential costs of failure (see also Rheinberg's, 2006, concept of motivational competence Sect. 14.7). Butler's (1999) empirical findings show that adolescents are already able to respond to situational conditions by showing incentive-specific strivings, either to master a task or to outperform others. This kind of situation/goal orientation fit hypothesis could prove very productive in future research.

Approach vs. Avoidance Goals

In the early 1990s, Elliot pointed out that research on performance goal orientations had overlooked an important aspect of traditional achievement motivation research, namely, the distinction between approach and avoidance or, to use the terminology of implicit motive research, hope for success vs. fear of failure (see comprehensive review in Elliot, 2008). The approach-avoidance dimension was expected to be particularly relevant to performance goals, regardless of self-assessed competence:

- At high levels of self-attributed competence, individuals can be expected to choose approach goals, whether mastery oriented (improving one's knowledge and skills) or performance oriented (demonstrating one's competence to others).
- At low levels of self-attributed competence, the focus is likely to be on the risk of failure and hence on the goal of avoiding public displays of incompetence (Elliot & Church, 1997). Which goal orientation emerges in a given situation evidently depends on individual preferences and vulnerabilities (motive-dependent incentive weighting of success and failure), on the situational opportunities for success and risks of failure, and on the individual's perception of these opportunities and risks, which is – to a certain degree – motive dependent (Elliot, 1997).

Elliot later extended his trichotomous model of mastery-approach goals, performance-approach goals, and performance-avoidance goals to include mastery-avoidance goals, resulting in a full 2×2 achievement goal model (Elliot, 1999; Elliot & McGregor, 2001). When pursuing

mastery-avoidance goals, individuals seek to avoid loss or stagnation of competence, forgetting what they have learned, failing to complete a task, or misunderstanding things. Mastery-avoidance goals are probably less common in scholastic contexts and in the first two decades of life than they are in older adulthood, when people struggle with losses in cognitive capacity, particularly in situations with high and multiple demands (Heckhausen, 2005).

Numerous empirical studies (see the overviews in Harackiewicz, Barron, & Elliot, 1998; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Moller & Elliot, 2006) have tested Elliot's trichotomous model and 2×2 achievement goal model in the domains of education, sports, and employment and substantiated the distinction between approach and avoidance goals for both mastery and performance goals. Performance-avoidance goals (i.e., not revealing oneself to be incompetent) have proved particularly detrimental for achievement outcomes. Furthermore, a host of studies from the United States have found that performance-approach goals (i.e., demonstrating one's competence) are especially conducive to achievement in school and college contexts, whereas mastery-approach goals often seem to have no positive effects on academic achievement (see the overview in Harackiewicz et al., 1998).

Summary

Concepts of generalized goal orientations (i.e., explicit motives) have come to dominate US research on the development of motivation in the past 20 years. Distinctions are made on two dimensions: learning/mastery vs. performance/ego and approach vs. avoidance. The aim of learning or mastery goals (also referred to as growth mindset) is to improve one's competence; the aim or performance or ego goals (also referred to as fixed mindset) is to demonstrate one's competence to others and in social comparison. Learning and mastery goals have positive effects on achievement-oriented behavior but not on the outcomes attained. Performance and ego goals can induce helplessness in achievement-related contexts at low levels of self-attributed competence. A combination of mastery and performance goals can be particularly motivating under favorable conditions.

Goals can also be distinguished in terms of whether their aim is to approach a desirable action outcome or its consequences or to avoid an undesirable action outcome or its consequences. The approach vs. avoidance orientation determines whether performance/ego goals, in particular, are conducive or detrimental to achievement-related behavior. Goals aiming to minimize displays of incompetence tend to elicit effort avoidance and helplessness responses, especially after failure and when people are exposed to the judgments of others. If the assessment of personal competence is favorable, however, the striving to demonstrate that competence is conducive to effort, and to choosing ambitious, but attainable, levels of aspiration.

16.6.4 Differential Developmental Pathways: Critical Phases, Life-Course Transitions, and Universal Developmental Milestones

In this section, we outline four important factors that trigger and amplify the development of inter-individual differences in motivation and volition, and show how universal motivational development affords opportunities for individual differentiation and canalization of developmental trajectories, while leaving ample scope for plasticity and intervention. Although a wealth of empirical data have been collected on the development of motivation, many of the conclusions drawn to date must remain speculative, and there is considerable potential for further empirical research. Nevertheless, the data available show that a number of life-course transitions and developmental contexts canalize and accelerate development, intensifying both general and differential motivational development, and thus foster qualitative leaps where general, incremental growth had previously been assumed.

Influence of Parent-Child Interaction on Implicit and Explicit Motive Development

Parental interactional behavior is critical to the development of both implicit motives in early childhood and more explicit components of achievement-motivated behavior, such as self-evaluation and levels of aspiration, in the further developmental trajectory (preschool and school age).

In their comprehensive, cross-cultural psychobiological research program, Keller and colleagues (see the overview in Keller, 2000, 2012) identified key dimensions of parental behavior that represent major sources of interindividual variance in early, preverbal, and thus implicit influences. Parents, and especially the primary caregiver (usually the mother), provide infants with their first causal experiences.

- Irrespective of the cultural context and parenting style (Keller, 2016; Keller, Lohaus, Völker, Elben, & Ball, 2003), mothers show contingent responses toward the infant's cues (e.g., the greeting response at eye contact; Papoušek, 1967). This behavioral contingency is clearly a defining characteristic of a biologically predetermined, naturally occurring parenting program.

Keller, Lohaus, Völker, Cappenberg, and Chasiotis (1999) found only slight individual differences in the reliability and latency of mothers' responses to their infants' signals but marked individual differences in the communicative channel used (i.e., visual vs. verbal). These differences in the dominant channel of contingent parental behavior and differences in the reliability, frequency, and latency of contingent parental behavior that may emerge later (in interactions with postinfancy children, when the influence of evolutionarily determined parenting programs declines) can help explain individual differences in the development of generalized contingency awareness (Watson, 1966).

The affective tone of parent-child interactions is another potentially decisive factor in the development of individual differences in motivation. Various research approaches assume the affective tone (or "warmth"; Keller, 2000; Keller et al., 2003) of the interactional exchange between the primary caregiver and the infant to be an early, preverbal, and nonconscious basis for children's sensitivity to positive and negative affect (Kuhl & Völker, 1998; see also Chap. 12) and thus for the development of general approach vs. avoidance tendencies (Higgins & Silberman, 1998, on the development of promotion and prevention focus). Keller et al. (2003) also found that warmth in maternal interaction behavior is not dependent on maternal attitudes to parenting but seems to be just as implicit (preconscious) as the regulatory differences that it may foster in infants.

A crucial point in the development of individual differences in motivation and volition is the gradual transfer of regulatory responsibilities from others (in small children, from the parents, see Vygotsky, 1978; see overview in Holodynski, Seeger, Hartmann, & Wörmann, 2013) to the self. In adaptive mother-child interactions, maternal expectations for child self-regulation and maternal provision of external regulation are closely attuned to the child's current developmental level (Heckhausen, 1987a, 1988).

Parents have also been found to expect and support growing self-regulation of children's self-reinforcing responses to success. Lütkenhaus (1984) observed that 3-year-olds whose mothers displayed positive affect in response to their successes showed more frequent self-evaluations in a second phase of mother-child play. In a longitudinal study of 1-year-olds, J. Heckhausen found that children whose mothers had praised the correctness of task action at an early stage of development showed objector even self-related success responses to successful outcomes (e.g., building a tower) at follow-up 2 months later (Heckhausen, 1988). A similar form of maternal support for the development of motivational self-regulation was observed for "wanting to do it oneself," which closely follows mothers' first refusals to provide help in longitudinal development (Heckhausen, 1988). Unlike contingent parental responses toward infant signals, these and similar aspects of parental behavior are consciously accessible and

can thus be assumed to be more responsive to interventions.

In these transitions from other-regulation to self-regulation at different stages of development, it is crucial that the adult assesses the child's developmental status accurately, rather than on the basis of the child's chronological or apparent age (Heckhausen, 1987b). There may be considerable discrepancies between implicit and explicit levels of aspiration when children are consistently over- or underchallenged because of their height. If early developmental conditions are favorable (contingency and warmth of parental behavior), these children may show an approach orientation when acting on their own initiative (when the implicit motive is aroused) but a strong avoidance orientation in response to external performance demands (when the explicit motive is aroused). Empirical studies have yet to investigate these relationships.

In their extension of PSI theory, Kuhl and Völker (1998) proposed an integrative perspective on the aspects of parental behavior, experiences of control, affective climate, and transition from other- to self-regulation discussed previously. The authors suggested that the association of early expressions of self-efficacy with the affective warmth experienced in parent-child interactions leads to the development of distinct personality styles and disorders. When parental behavior is characterized by positive affect, but low contingency toward the infant's cues, for example, self-expressions cannot be associated with the reward system. The long-term effects of this dissociation, according to Kuhl and Völker, are a decreased capacity for autonomous self-regulation and inhibited access to the self-constituting extension memory, resulting in a fixation on external rewards, such as social recognition or material values, at the cost of intrinsic motives. Kuhl and Völker assume an early dissociation of negative affect and self-regulation to have corresponding effects. Specifically, an early interaction climate characterized by negative affect (e.g., irritability of the mother, frequent separation) that affords the infant little or no opportunity to terminate negative experiences by means of its own behavior (e.g., expressing negative affect such as fear, thus eliciting a reassuring response from the mother) weakens the connection between the system regulating negative affect and the self-system. According to Kuhl and Völker, the infant then becomes helpless and dependent on outside help to downregulate negative affect.

What is the empirical evidence for parental influences on the development of the achievement motive? As children develop, the implicit potential of the home environment to stimulate achievement-related behavior begins to play a role, as do the explicit expectations that parents make of their children. In detailed interviews with the parents of fourth graders, Trudewind (1975) investigated the home and family factors influencing the development of achievement motivation and sought to organize these factors within a taxonomy. A broad range of variables were used to assess three major dimensions of the developmental ecology of the family:

- Potential for intellectual and achievement-related stimulation (e.g., scope of potential experiences; stimulation afforded by toys, arts and crafts, books, and pets; help with homework assignments; intensity of speech training; variety of social contacts; frequency and quality of parent-child interactions)
- Parental achievement pressure (e.g., expectations for scholastic achievement, homework control, sanctions for school grades)
- The child's cumulative experience of success and failure

It emerged that the higher the potential for intellectual stimulation in the family environment, and the earlier parents allowed their children freedom to make decisions, the lower the boys' fear of failure. However, a combination of high intellectual and achievement-related stimulation in the home and high parental achievement pressure proved particularly unfavorable for motivational development. Children in this kind of home environment are evidently exposed to all too frequent, negatively sanctioned experiences of failure. In less intellectually stimulating

households, high parental expectations were not found to foster fear of failure.

- Home environments giving children plenty of opportunity to try out their competence independently seem particularly conducive to the development of a success-oriented achievement motive. Generalized personal standards appropriate to the current developmental status are able to emerge as children interact with the environment without parental achievement pressure. The weight of parental other-evaluations and the detrimental effects they have when children are over- or underchallenged are thus moderated at an early stage, as children develop implicit motive systems based on self-regulation and self-evaluation.

In a 4-year longitudinal study with the entire cohort of children entering grade 1 in the German city of Bochum, Trudewind and colleagues assessed the characteristics of the home environment specified in their taxonomy at three points of measurement. Findings showed that the general achievement-related stimulation potential of the home environment continued to covary with the development of a success-oriented implicit achievement motive during the elementary school years (Trudewind, 1982a, 1982b, 1987) and that parents' academic expectations, control of schoolwork, and sanctions increasingly influenced the development of failure orientation (Trudewind, Brünger, & Krieger, 1986; Trudewind & Windel, 1991).

Finally, parent-child interaction can be assumed to play a key role in the childhood development of behavioral regulation strategies (Heckhausen & Schulz, 1995; Brandtstädter, 2001). Through subtle control of task-related interactions, parents can involve their child in goal-oriented behavior if a task matches the child's developmental level or, if a task is too difficult, either help the child or distract it from the task (Heckhausen, 1987a, 1988). The child thus learns to "switch" from goal engagement to goal disengagement, depending on the controllability of goal attainment (e.g., the developmental adequacy of the task), and parental other-regulation gradually cedes to self-regulation. The longitudinal study by Lütkenhaus, Grossmann, and Grossmann (1985) described in the next section (see Study box) provides interesting insights into the effects of infants' predispositions and parental interaction styles in early childhood.

Study

Effects of Infants' Predispositions and Parental Interaction Styles in Early Childhood

Lütkenhaus, Grossmann, and Grossmann (1985) studied the relations between infants' orienting ability, maternal cooperation when playing with the child at age 3 years, and situational adequacy of the 3-year-olds' effort regulation during a tower-building competition. Three-year-olds who had shown greater orienting ability as babies proved better able to downregulate their effort when lagging behind in the tower-building task. Three-year-olds whose mothers were particularly cooperative in play situations proved better able to increase their building speed when they were about to win. These findings suggest that an innate capacity for reorientation (goal disengagement in the case of failure), on the one hand, and maternal action optimization (optimization of success striving), on the other, foster the development of regulatory behavior that corresponds to the demands of the situation (acceleration when success beckons, deceleration when failure looms).

Parental behavior and explicit parental instruction may also influence the secondary control strategies that can help buffer motivational resources against the negative effects of failure. Parents may teach their children – either by model learning or by direct instruction – to bear in mind that other children did not necessarily do very well either (strategic social comparison) or to focus on extenuating circumstances (self-serving causal attributions), thus communicating a preference for particular secondary control

strategies (Heckhausen, 1993). As yet, however, the conditions under which interindividual differences in control strategies, behavioral regulation strategies, or motivational competence emerge (Rheinberg, 2006) have not been the subject of empirical study.

Summary

The early developmental conditions of implicit and explicit motives are complex, and many pieces of the puzzle are still missing. Three major dimensions of parental behavior, and their fit with the child's developmental status, are particularly influential in early childhood:

- The contingency of parental responses toward the infant's cues
- The warmth and affective tone of the interactional exchange
- The developmental adequacy of (parent-initiated) transitions from other-regulation to self-regulation

The achievement-related characteristics of the family environment continue to play a decisive role throughout childhood. Developmental ecologies combining high potential for stimulation and experimentation with autonomy support and low parental achievement pressure are particularly favorable to the development of an implicit achievement motive. In this kind of family environment, children are encouraged to set themselves challenges that are within their capabilities, to master those challenges, and, in so doing, to become confident of succeeding in a wealth of achievement domains. As yet, little is known about how parenting practices promote or inhibit the development of flexible behavioral regulation strategies that facilitate the switch from goal engagement to goal disengagement or the acquisition of secondary control strategies for dealing with failure.

Transition to Explicit Social Reference Norms at School Entry

In this section, we examine the effects of the school setting on the development of achievement motivation. Unlike the home, the school context is a developmental environment in which other-regulation and other-evaluation are institutionalized as the dominant conditions stimulating achievement-related behavior. Despite attempts to promote individualized and autonomy-supportive instruction, the school context, as an institution of general education, is by definition determined by norm-oriented instruction and performance evaluation.

Children do not typically choose what they are taught at school, which assignments to do for homework, or which skills to master for a class test. It is not up to them to decide between tasks of different difficulty levels. Rather, it is the teacher who sets the level of aspiration by specifying certain achievement goals (which tasks will I try to master?).

Consequently, students' levels of aspiration at school typically relate to their aspired grades, that is, to other people's evaluations of their achievement. These other-evaluations are defined by social rather than individual standards of comparison. Although all children make learning gains over the school year, only those who improve their relative position in the class can actually improve their grades. Even if grades are not given in the first years of schooling, it is impossible for the parties involved – teachers, students, and parents – to ignore the salience of social comparisons in everyday school life. Parents want to know how well their child is doing relative to his or her classmates. Teachers cannot help classifying their students as good, poor, or mediocre. Children soon learn whether they are one of the "good" or the "bad" students in a class, even if this assessment is not made explicit in grades in the first years at school.

- At school entry, social reference norms suddenly become extremely relevant to children's evaluations of their achievement.

The lack of freedom for students to choose their own tasks and set their own levels of aspiration, along with the dominance of social reference norms, make the school an inhospitable developmental ecology for the implicit achievement

motive. There are few opportunities for students to select achievement-related activities independently, and intraindividual comparison (e.g., have I improved?) is difficult, if not impossible. Other-evaluation is dominant and may even cancel out the incentive effects of anticipated self-evaluation and the enjoyment of engaging in an activity, especially when grades have important long-term implications (e.g., for admittance to vocational training or higher education). Apart from influencing the development of explicit performance motives (e.g., aspired grades), these factors can also have adverse effects on the development of the implicit performance motive, leading to the emergence of strong fear of failure or patterns of helplessness (Dweck, 2002) and stress response (Lewis & Ramsay, 2002). The influence of negative preconditions (e.g., slight developmental delays relative to peers) on motivational development may be amplified at school entrance, meaning that the children in question soon lag even further behind their classmates. The longitudinal study by Trudewind and Husarek (1979) described in the next section (see Study box) provides valuable insights into this amplification of negative developmental influences at the critical transition to school.

Study

School Entry, Parental Behavior, and Consequences for Children's Hope for Success and Fear of Failure

As part of the Bochum longitudinal study on the development of the achievement motive at elementary school age, Trudewind and Husarek (1979) investigated how parental influences on the development of the motive's approach and avoidance components are amplified at school entry. Their observation study, which was carried out in the first half of the second grade, showed how parent-child interactions at home can be influenced by the transition to school, with favorable or detrimental effects on motive development. Of the 3,465 children participating in the longitudinal study, the authors selected two groups of 20 boys who did not differ with respect to demographic or other ecological characteristics or intellectual development at school entry or in terms of their school grades in second grade. The boys selected were not strongly motivated by either success or failure when they started school, but their motive strengths differed dramatically by the end of first grade. The boys in one group had developed a strong success motive; those in the other group had acquired a strong fear of failure. The two groups' motives had clearly developed in diametrically opposed directions over the first year of schooling. So, what had happened? What had triggered this divergent motive change in boys whose backgrounds seemed so similar? The authors sought answers to these questions by examining an ecological key situation at the transition to school, namely, mother-child interactions as children worked on their homework. In this context, implicit motive tendencies that have developed at home in infancy and preschool age collide with the explicit performance demands of the school on a daily basis. The mothers' approach to this critical situation during this vulnerable period proved decisive for the boys' motive development. Mothers whose children developed a strong fear of failure during their first year at school differed from mothers whose children became increasingly confident of success in the following respects:

1. They tended to apply social rather than individual or objective reference norms, had higher levels of aspiration for their child, and were less satisfied with the child's homework performance, although the report card grades of the two groups did not differ.
2. They were more likely to structure and control the homework situation and granted the child little freedom to make

his or her own decisions. They gave less encouragement, and their support – although more frequent – took the form of direct intervention rather than indirect pointers that respected the child's independence (see also the findings of Rosen & D'Andrade, 1959).
3. In an interview, they were less likely to attribute their child's homework success to ability and more likely to attribute failure to lack of ability. In the homework situation, they were more likely to criticize their child for lack of ability or effort and to ascribe success to the ease of the tasks.
4. They responded neutrally to success and were less likely to provide praise or encouragement but were more likely to criticize or scold the child when outcomes were poor.

Through a detailed analysis of an ecological key situation, Trudewind and Husarek (1979) succeeded in identifying socializing influences that can explain the divergent patterns of motive change observed at the transition to school. Because the boys' achievement motives did not differ when they began school, it seems reasonable to assume that school entry is a critical phase for motive development. It is possible that the mothers' interactions with their children did not differ markedly before school entry (although no data are available to confirm this). It was only when external levels of aspiration based on social comparison were adopted in the school setting that achievement pressure and negative other-evaluations of failure were introduced to the home environment as well. Some mother-son pairs did not allow these outside influences to affect their hope for success- and learning-oriented interactions; in others, the fear of failure became dominant. A strong failure motive is often associated with the development of explicit performance goals that focus on minimizing negative other-evaluations and that lead to helpless patterns of failure avoidance rather than to efforts to improve competency levels, even more so after failure (see the overview on learning and performance goals in Sect. 16.7.3; for details, see Dweck, 2002).

Teachers are another major factor in the emergence of dominant fear of failure. Rheinberg and colleagues found considerable differences in the reference-norm orientations of elementary school teachers and showed that a preference for individual versus social comparison has significant implications for students' motive orientations and learning motivation (Rheinberg, 1980; Rheinberg, Schmalt, & Wasser, 1978). Children in classes whose teachers tend to apply social reference norms are more afraid of failure, experience higher test anxiety and generalized anxiety, and express higher levels of school aversion. Fortunately, such negative effects are restricted to aspects of the self-concept that rely on social comparisons and do not influence other aspects, such as personal control beliefs and primary control strategies (Marsh, Trautwein, Lüdtke, & Köller, 2008). Even those aspects of the self-concept that are affected by a superior social context do not appear to be irreversibly impaired. A series of intervention and training studies with teachers have shown that students systematically exposed to individual (i.e., myself compared to myself earlier) reference norms in the classroom become more confident of success (Rheinberg & Krug, 2005). A training program in which parents were taught to encourage their (third-grade) children to apply individual reference norms, set realistic goals, and make self-serving causal attributions (Lund, Rheinberg, & Gladasch, 2001) had similar effects. The third graders showed an increase in the approach component of the achievement motive and more realistic levels of aspiration on both the short and the long term (6 months after the intervention).

Another consequence of the focus on social comparison standards and standardized levels of aspiration in the school context is that children are no longer motivated to develop realistic expectations or to set appropriate task-related goals. Rather, the teacher sets the same tasks for all students. This arrangement fosters unrealistically

high expectations that have little to do with task difficulty and that are only loosely related to the children's scholastic achievement. This trend is particularly pronounced in the school-related self-efficacy beliefs of children in the United States (Little, 1998; Little et al., 1995; see also Excursus under Sect. 16.5.3), most likely promoted by the cultural norm of high positive self-esteem that has gained increasing currency in recent decades (Twenge & Campbell, 2008).

However, the standardized achievement goals of the school developmental context, based as they are on a social comparison and value system, also fulfill important regulatory functions. The school domain is determined by explicit, extrinsic achievement goals, such as earning good grades, pleasing the teacher, and getting good qualifications to improve one's chances finding of a high quality apprenticeship or earning a place on a sought-after undergraduate program at a good university. Performance-approach goals such as these, which focus on other-evaluations, social comparison, self-representation, and grades, are better predictors of learning outcomes (grades) than are mastery-approach goals (e.g., learning to understand the material better), which predict interest in the subject (Harackiewicz, Barron, Tauer, & Elliot, 2002; see also Schöne, Dickhäuser, Spinath, & Stiensmeyer-Pelster, 2004, on the relationship between mastery and performance goals and individual vs. social reference norms).

- Explicit achievement goals are needed to regulate the pursuit of worthwhile goals (Barron & Harackiewicz, 2001; Harackiewicz et al., 1998) with long-term developmental consequences for socially regulated educational and occupational careers (Heckhausen, 1999; Heckhausen & Schulz, 1999). Furthermore, volitional pursuit of explicit achievement goals can compensate, at least in part, for adverse developments in implicit motives (see also Brunstein & Maier, 1996, and Chap. 9). Ensuing experiences of success may, in turn, have favorable effects on the development of implicit motives (e.g., reduced fear of failure). Moreover, explicit achievement goals give the implicit achievement motive a structured field of activity by helping attune the equivalence class of achievement-relevant situations to individual skills and abilities, values, personality characteristics, and interests.

In this context, the research group led by Eccles and Wigfield (Eccles, 2005; Eccles et al., 1998; see also Sect. 16.6.2 and the excursus on "School Performance and the Expectancy-Value Theory of Achievement Motivation" in Sect. 6.4.4) has shown that membership of a group (e.g., gender Eccles, Adler, & Meece, 1984 or youth subgroup) has considerable effects on the achievement-related values, expectations of success, and self-concepts that develop during middle childhood (13–14 years, transition from elementary to junior high or middle school) and especially early adolescence (15–16 years, transition to high school), thus focusing the achievement-motivated behavior of children, adolescents, and finally adults on certain domains (e.g., languages and arts for girls), often at the cost of others (e.g., mathematics, science, information technology). This individual differentiation in the contexts that elicit students' achievement motive corresponds with institutional opportunities to drop certain subjects and specialize in others in secondary and postsecondary education in the industrialized world. Interindividual differences are further emphasized here, leading to increasingly divergent developmental trajectories of motivational investment and even different professional careers (Eccles & Wang, 2016).

The object- or school-subject related differentiation of achievement-motivated behavior includes the development of interests. Object-related interests probably begin to emerge with early preferences for physical objects or the world of people (Roe & Siegelman, 1964), continue with gender role identification (Ruble & Martin, 2002), and go on to determine educational and occupational decisions in adolescence and young adulthood. These decisions are based partly on gender roles (Eccles, 1987; Gottfredson, 1981) but increasingly reflect adolescents' idiosyncratic

self-concepts, subgroup affiliations, and personal aspirations for achievement and upward social mobility. In a study with seventh to ninth graders (junior high school), MacIver, Stipek, and Daniels (1991) found that changes in students' conceptions of their ability in different subjects predicted corresponding changes in interest much better than the other way around.

Summary

The transition to school exposes children – and, indirectly, their parents – to an achievement context that is dominated by other-regulation and other-evaluation, social comparisons, and extrinsic incentives. Expectations and evaluations are strongly standardized, leaving little scope for the implicit, self-regulated achievement motive and its focus on intraindividual improvement. At the same time, explicit achievement goals, social comparison and competition with peers, and long-term, extrinsic consequences for educational and occupational careers suddenly become extremely relevant. Children exposed to repeated experiences of failure, parental autonomy suppression, and parental achievement pressure can soon develop chronic fear of failure. However, explicit achievement goals also serve important regulatory functions. For most children, motivation is optimized over the course of development by a combination of implicit and explicit achievement motives. Explicit achievement goals also serve to attune the equivalence class of achievement-relevant situations to individual skills and abilities, values, personality characteristics, and interests.

Consequences of Cognitive Differentiation for Achievement-Related Beliefs

The two examples presented in the following illustrate how cognitive development can amplify or, in some cases, reduce interindividual differences in achievement-motivated behavior.

The first example concerns the differentiation of conceptions of competence and self-esteem in different domains of behavior. Determining factors here are, first, the ability to distinguish causal conceptions of ability and effort (Sect. 16.5.2) and, second, the emergence of domain-specific incentives and expectancies (Sect. 16.6.2). Significant progress in these respects is seen between preschool age, when dimensions such as intelligence, good conduct, strength, and friendliness are still confounded (see the overview in Dweck, 2002), and the elementary school years. From 7 or 8 years of age, notions of intellectual and academic competence begin to emerge from a diffuse conception of competence and self-esteem and are even differentiated according to school subjects (Wigfield, Eccles, Yoon, & Harold, 1997). A stable conception of ability, adjusted for differences in effort, does not begin to develop until the age of 9 years at the earliest (Nicholls, 1978; Tweer, 1976). In other words, competence and self-esteem are distinguished, and the conception of intellectual competence is further differentiated, long before children have developed stable concepts of ability. Accordingly, children's early, diffuse ideas of their value or lack thereof (Heyman et al., 1992) cannot simply be transferred to their conceptions of intellectual and scholastic competence. The increasing cognitive differentiation of different achievement domains makes children more resilient to generalized conceptions of competence that, if negative, can induce helplessness and resignation (Dweck, 1999). Instead, children exposed to failure in one domain can focus on their successes in other domains, thus protecting their self-esteem (see Heckhausen, 1999, on self-protective secondary control strategies).

- Despite the availability of these mechanisms for shielding motivational resources, less able children and/or children experiencing developmental delays remain vulnerable to long-term damage to self-esteem once a stable conception of ability has developed. They are at risk of attributing failure to the stable factor of low ability, the potential consequences of which are avoidance of challenges and failure, impaired self-esteem, and resignation.

A second example of a process of cognitive differentiation that has implications for the development and amplification of interindividual differences in achievement-motivated behavior is the acquisition of patterns of causal attribution. Heckhausen (1984) proposed a detailed developmental model describing the emergence of preferred causal attributions of success or failure. The model postulates a number of stages in the development of two contrasting patterns of causal attribution: positive attributional style and depressive attributional style.

This approach converges with related research programs (see also Chap. 15 Sects. 15.3.4 and 15.4.2) on internal vs. external control (Rotter, 1966), depression (Abramson, Seligman, & Teasdale, 1978), learned helplessness in school students (Dweck & Repucci, 1973), low self-concept (Ames, 1978; Nicholls, 1976), and fear of failure (Heckhausen, 1977). Individuals with a positive attributional style attribute success to the stable, internal factor of high personal ability and failure to a lack of effort or task difficulty. Individuals with a depressive attributional style, in contrast, attribute success to external (e.g., the test was easy), variable (e.g., I was lucky), and specific (e.g., the teacher explained this task type particularly well) causes and failure to a lack of ability.

What are the conditions associated with the development of fear of failure? The foundations for the development of this pattern of causal attribution are laid in preschool age, when children start to show preferences for patterns of causal attribution that leave high ability attributions intact (e.g., I didn't manage the task because it was too hard even for me) or, in the case of a depressive attributional style, attributions of low ability. Even at this early stage, the former attributional pattern encourages children to continue selecting challenging tasks and making as much effort as possible, whereas the latter prompts them to lower their level of aspiration and reduce effort investment. When children start school, social reference norms become more salient, accelerating the development of a more stable conception of ability and inverse-compensatory patterns of causal inferences about the role of ability and effort in known achievement outcomes (Sect. 16.5.4). Differences in the fear of failure and in helplessness seem to develop particularly quickly during this transitional period, not least under the influence of parents who have a strong social reference-norm orientation and who see their child's ability in stable and negative terms (Hokoda & Fincham, 1995; Trudewind & Husarek, 1979). After the first few years at school, most 10- to 11-year-olds have developed either a positive or a depressive attributional style, and the corresponding beneficial or detrimental influences on their achievement-motivated behavior are apparent. Thus, normative cognitive development leads to individual differences in causal attribution really taking effect, with consequences for behavior that cause further divergence in the differential developmental trajectories of success- vs. failure-oriented children. Because attributional patterns are consciously accessible, however, they may provide a means of influencing expectancies and behavior in targeted interventions. In other words, they may offer an opportunity to positively influence the implicit motive system by way of the explicit motive system. Weinberger and McClelland (1990) argued that intervention programs could capitalize on the fact that the cognitive system is more explicit and modifiable and has an impact back on the implicit system. Therapeutic interventions may thus be able to increase the congruence between implicit and explicit motive systems.

The amplification of individual differences prompted by the acquisition of compensatory causal schemata has another detrimental consequence for competence and achievement motivation, namely, effort avoidance. If effort investment in a given action outcome is indicative of low ability, children and adolescents might decide that it is a better idea to avoid effort – or at least to give others the impression of not having tried (see also Jagacinski & Nicholls, 1990, on the concept of "self-handicapping"). For example, Covington and Omelich (1979) found that undergraduate students report low-effort investment after failure and consider failure after effort

investment to be particularly embarrassing and indicative of inability. However, Jagacinski and Nicholls (1987, 1990) concluded that, although retrospective attributions of failure to a lack of effort are widespread, there is no evidence for strategic reductions in effort as a means of protecting self-esteem against these kinds of attributions. Their findings indicate that strategic effort reduction occurs only when social comparison information about other people's performance and effort is salient (Jagacinski & Nicholls, 1987) – as is often the case in the classroom. Students who use effort avoidance as a strategy to buffer self-esteem may become increasingly disengaged in achievement situations and, as a result, increasingly marginalized in terms of motivation and missed learning opportunities.

Summary

Normative developments in cognitive differentiation may accelerate the development of interindividual differences or help reverse them. They thus offer points of intervention for training programs and developmental plasticity. The differentiation of conceptions of ability and effort, as well as the development of domain-specific incentives and expectancies, makes children more resilient to overly general self-appraisals of their competence and characteristics. At the same time, these developments allow conceptions of ability as stable and potentially low to emerge in the first place. The normative development of more complex patterns of causal attribution can make ascriptions of failure to low ability seem inevitable, exposing children to the risk of helplessness and to increased fear of failure. Development in the available patterns of causal attribution can thus consolidate and amplify individual differences by means of cognitive canalization, sometimes leading to resignation. Finally, individuals may use effort avoidance to color others' perceptions of their competence, acting as though an outcome has been attained despite low-effort investment, and can thus be ascribed to high ability. This kind of strategy can be expected to have negative consequences for both motivation and the acquisition of knowledge and skills.

Increasing Independence in the Orchestration of Action Opportunities and Contexts of Development

The increasing independence that children, adolescents, and adults have to orchestrate their action opportunities, levels of aspiration, and contexts of development across the lifespan can also amplify existing interindividual differences. This section leads directly into the next chapter on the motivation of developmental regulation and is thus kept brief.

The normative development of control behavior (or primary control striving) progresses from dominant other-regulation in infancy to high levels of self-regulation (see Vygotsky, 1978; overview by Holodynski et al., 2013) in social institutions (school, college, workplace, family, etc.). Parents are the first (co)producers of experiences of self-efficacy (Sect. 16.2). In granting – and indeed expecting – increasing independence in children's problem-solving behavior and achievement-oriented behavior in general, they have a decisive influence on the development of achievement-motivated behavior and the associated positive and negative emotions (Sects. 16.2 and 16.6 Study First Day of School; see the overview in Trudewind et al., 1997).

With increasing age, partly prompted by their parents, but partly on their own initiative ("wanting to do it oneself"; Geppert & Küster, 1983), children begin to actively strive for independence in their achievement-oriented behavior. In addition, with the gradual expansion of the developmental-ecological life space (Bronfenbrenner & Morris, 1988) from the home to the neighborhood, and later to the school and to recreation sites, children are exposed to new and more diverse influences and, at the same time, play an increasingly active role in selecting social contexts and interaction partners. This increasing involvement in the orchestration of opportunities, social relations, and networks – in other words, developmental contexts – is associated with the stabilization and accentuation of conscious and unconscious preferences, values, beliefs, and self-images (Lang & Heckhausen, 2002). Young people's life goals and developmental goals become increasingly individualized, leading to

divergent developmental trajectories that become increasingly stable, unique, and irreversible as a result of developmental canalization.

This brings us to the transaction between the individual and the developmental ecology, which Heinz Heckhausen sought to address with his call for an "explanation of behavior at fourth glance" (Heckhausen, 1980; see also Chap. 1). From the perspective of action theory and developmental psychology, more can now be said – in specific terms – about this transactional relationship. This is the objective of Chap. 17, which examines the dynamic interaction between biological and societal opportunity structures and individual developmental regulation.

Summary

It is as a function of the progressive shift from other- to self-regulation that interindividual differences really begin to take effect on the developmental trajectory. Beginning in parent-child dyads in early childhood, this development gradually extends to other developmental ecologies as the child gets older and plays an increasingly active role in choosing developmental opportunities and contexts within the framework of what is biologically and socially possible. This increasing self-regulation leads to progressive divergence in individual developmental trajectories and to differences in motive dispositions, values, and goals becoming increasingly stable and less reversible with age.

Review Questions

1. *What is meant by the functional primacy of primary control striving?*

   The striving to exert primary control on the environment is a universal and fundamental characteristic of human motivation. It is a product of behavioral evolution and has been observed in various mammals and nonmammalian species.

2. *How does the potential for primary control change over the lifespan?*

   The potential for primary control describes an inverse U-shaped trajectory across the lifespan. It begins at a very low level at infancy, increases rapidly in childhood and adolescence, peaks and levels out in early to middle adulthood, and declines in old age, especially advanced old age.

3. *Does control striving develop gradually, or is it already present in neonates?*

   Newborn babies already show a clear preference for behavior-event contingencies. They repeat behaviors that regularly lead to certain events (e.g., presentation of a milk bottle), even in the absence of consummatory interest in that event (i.e., when they are satiated), and show positive affect when an expected event occurs as a result of their behavior.

4. *How does the ability to focus on an intended action outcome develop?*

   Toward the end of the first year, children gradually begin to distinguish between actions and action goals. During the second year, their attention comes to focus increasingly on the outcomes of their actions. Different action outcomes pose an increasing challenge to children's mental capacity: First sudden, discrete effects; then continuous, action-accompanying effects; and finally state-related outcomes in multistep activities.

5. *What are the main emotional incentives for achievement-oriented behavior, and what is their order of development?*

   The main incentives for achievement-oriented behavior are pride and shame:

pride is manifested in an upright posture, smiling, and triumphant eye contact with the loser, whereas shame is expressed in slouching, lowering the head, and avoiding eye contact with the winner. Pride develops first, in the second and third year; shame is not observed until the end of the third year or until the fourth year.

6. *What is meant by the phenomenon of "wanting to do it oneself"?*

   "Wanting to do it oneself" is observed in the second year, as the self-concept develops. It is at this point that the child begins to reject adults' offers of help or interference in their activities.

7. *What are the benefits and risks of self-evaluative responses?*

   The major benefit is anticipated positive self-evaluation, which motivates achievement behavior. The major risk is attribution of failure to a personal lack of ability, which may inhibit future achievement behavior.

8. *How can people avoid negative self-evaluations after experiences of failure?*

   Negative self-evaluations can be avoided by applying strategies of compensatory secondary control. Preschoolers are already able to use simple compensatory secondary control strategies (e.g., denying failure, self-distraction). More complex compensatory strategies, such as switching to another goal and self-serving attributions, are not developed until adolescence.

9. *What role do parents play in the early development of action?*

   Parents (especially mothers) are the source of the first behavior-event contingency experiences, intentionally or unintentionally providing contingent responses to the infant's behaviors (e.g., eye contact, opening the mouth). The parent-child bond offers a secure base from which to explore the environment. In the second year, actions are initiated and regulated in natural object-related parent-child interactions. It is within this apprenticeship framework that the child gradually acquires the competence to act independently.

10. *Which concepts must children grasp before they can engage in mature achievement-motivated behavior in the classic sense?*

    They must be able to distinguish task difficulty and personal competence as independent factors, to apply individual and social reference norms, to distinguish the ability and effort components of the global conception of competence (and thus generate expectancies of success), to grasp the multiplicative relationship between the expectancy of success and the success incentive (and thus set appropriate levels of aspiration), and to use compensatory causal schemata to infer the causes of success and failure.

11. *What are the "big fish little pond" effect and the effect of "reflected glory"?*

    According to the "big fish little pond" effect, the students' self-assessed abilities depend on the overall level of performance in their class or school. If the performances of others in the social reference frame of class or school are comparatively low, students feel like big fish in a little pond and perceive their own performances as relatively high. In contrast, high performances in the comparison group lead to comparatively low self-ascribed abilities. The "reflected glory" effect comes about by the individual identifying with a group that exhibits superior performance.

(continued)

12. *Which cross-cultural differences and similarities have been found in children's school-related control beliefs?*

    Empirical data show uniformity in causality (means-ends) beliefs in the school context. Students' ratings of the importance of effort increase steadily until sixth grade and are consistently higher than the corresponding ratings for ability. Cross-national differences have been found in students' perceptions of their personal capacities (agency beliefs). Students in the United States have the highest agency beliefs, but the association between these beliefs and their actual learning outcomes is the weakest in international comparison.

13. *What are the affective consequences of effort and ability attributions of success and failure in school-age children?*

    Ability attributions are associated with positive affect in the case of success and with negative affect in the case of failure; effort attributions have much less of an impact on affect.

14. *Which interactive behaviors, parenting practices, and home environments are conducive to the development of an approach-oriented achievement motive?*

    Parental behavior that is contingent with the child's behavior, emotional warmth, developmental adequacy of independence requirements, child-centered independence training, and a stimulating home environment that affords children diverse opportunities to test their competence on their own initiative.

15. *How does the general expectancy-value model of achievement choices proposed by Eccles and Wigfield differ from Atkinson's risk-taking model?*

    Self-evaluation is not the only motivating (value-giving) factor in the Eccles and Wigfield model. Rather, the value component is assumed to be influenced by task-intrinsic and instrumental incentives, as well as by the costs of goal pursuit. Both the value and the expectancy components are assumed to be influenced by the norms and beliefs of social and cultural subgroups, as well as by individual self-concepts.

16. *What is the achievement goal approach?*

    Conceptual models and research programs relating to explicit achievement motives (i.e., achievement goals) have become known as the achievement goal approach. These research programs distinguish achievement goals on one or both of two dimensions: (1) learning or mastery goals vs. performance or ego goals and (2) approach vs. avoidance goals. Learning/mastery goals and approach goals are preferable to performance/ego goals and avoidance goals in many but not all achievement conditions. In many real-life achievement contexts, it seems advisable to combine different goal orientations flexibly.

17. *How does the transition to school affect the development of achievement-motivated behavior?*

    The school context emphasizes other-regulation and other-evaluation by the teacher, social comparisons with peers, and extrinsic incentives. This focus is rather unfavorable for the development of implicit achievement-motivated behavior, particularly when children are exposed to frequent experiences of failure and parental achievement pressure. The development of explicit achievement goals is fostered at school, however, and can facilitate the development of a flexible and multifaceted repertoire of achievement-motivated incentives.

18. *Which normative developments in the ability to make differentiated causal attributions can aggravate the negative effects of experiences of failure and thus induce helplessness?*

    The development of a stable concept of ability that is independent of effort and compensatory causal attributions of the role of ability and effort in known outcomes.

19. *As a function of which development do interindividual differences really begin to take effect on the developmental trajectory, especially in adolescence and adulthood?*

    The progressive shift from other- to self-regulation, as the individual starts to play an active role in shaping his or her developmental ecology.

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The Motivation of Developmental Regulation

17

Jutta Heckhausen

This chapter is the counterpart to the research on the development of motivation presented in Chap. 16, as it investigates the motivation of development and thus rounds out a dynamic, interactive perspective on the interaction between motivation and development. It is only recently that the part individuals play in actively regulating their own development across the lifespan has emerged as an important theme on the research agenda, particularly in lifespan developmental psychology (Baltes, Lindenberger & Staudinger, 1998; Brandtstädter, 1984, 1998, 2001; Brandtstädter & Lerner, 1999; Freund, 2008; Freund & Baltes, 1998; Heckhausen, 1999; Heckhausen & Schulz, 1995; Heckhausen, Wrosch, & Schulz, 2010; Schulz & Heckhausen, 1996).

The regulation of development is in fact the core concern of lifespan developmental psychology. Particularly in adolescence and adulthood – when cognitive and socioemotional development has reached a certain level, biological maturation processes become less influential, and occupational and family careers open up a wealth of biographical permutations – the question of how individuals choose and adhere to specific occupational and family career paths becomes especially compelling. The force of social constraints and sanctions is decreasing progressively in the developed world (Heckhausen, 1990; Kohli, 1988), and high levels of social mobility between generations and within the individual lifespan, coupled with diversified lifestyles and biographies, give individuals unparalleled freedom to regulate their own developmental trajectories (Dannefer, 1989; Grob, Krings, & Bangerter, 2001; Heckhausen, 1990, in press; Heckhausen & Chang, 2009; Heckhausen & Schulz, 1999b; Held, 1986; Wrosch & Freund, 2001). In modern societies characterized by high levels of social mobility and flexible life choices, individuals play a relatively important role as *producers of their own development* (Brandtstädter & Lerner, 1999; Lerner & Busch-Rossnagel, 1981). Nevertheless, account must still be taken of the constraints due to age-graded structures of both biological maturation and aging (e.g., the "biological clock" and childbearing) and societal institutions (e.g., the age-graded structure of the education system). This age-sequenced structuring of developmental potential provides a framework for developmental regulation (Heckhausen, 1990, 1999, 2007a). Individuals' movements within this framework, the paths chosen, and the consistency of goal pursuit depend largely on the direction and effectiveness of individual motivation and its implicit and explicit motive components. Apart from age-sequenced structuring, there are restrictions caused by social mobility that tend to exclude members of lower social tiers from pursuing upper-class life courses (overview in Heckhausen, in press;

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Heckhausen & Shane, 2015). In the following, we first discuss the lifespan as a field of action within which individuals strive to optimize their development. We then present three conceptual frameworks of developmental regulation. Subsequently, we take a look at several examples of empirical studies that provide insights into developmental goals, self-regulation of motivation, and adaptation to changing life challenges. For this, we will identify adaptive regulation strategies as well as individual differences in developmental regulation and their consequences.

17.1 The Life Course as a Field of Action

Assuming lifelong development to be an active process that individuals influence by means of their actions, the question arises of what opportunities individuals have to act on their own development, and how these opportunities are distributed across the lifespan. To draw on Lewin (1943), the lifespan can be regarded as a field of action. As in Lewin's environmental model, the distance between the individual's current position and desired and undesired states may differ. In the present context, a temporal dimension (age and chronological time) can be added to Lewin's topological one. Developmental milestones such as the transition to higher education acquire incentive character (see the following example) that endows behavior with direction and persistence over time and space (see also the discussion of the concept of incentive in Chap. 5), although this effect becomes weaker with increasing distance from the goal (see the discussion of goal gradients in Chap. 4).

At the beginning of secondary education, for example, students who need good grades to be accepted into college may still be so far from the transition to higher education that the incentive of a college admission does not yet motivate them to do their homework carefully. As graduation approaches, however, the attraction of being admitted to college becomes increasingly powerful.

Another interesting feature of Lewin's field theory in the context of *developmental action theories* is the assumed structure of the psychological sphere of action. The individual's current position and the goal region are not necessarily adjacent; rather, the action paths leading to goals may first have to navigate intermediate goals. Lewin (1934) took a "hodological" perspective (from the Greek hodos, meaning "path"), assuming that the individual will take the action path providing the shortest connection between the current position and the goal region. Psychological distance depends not only on spatial distance; however, it is also a function of any difficulties and dangers to be overcome (see Chap. 5).

This kind of hodological perspective on the effects of aspired goal states in guiding actions is particularly relevant to research on developmental regulation, the goals of which can rarely be accessed directly. People have to ensure that their action paths stay on track over time, despite delays and detours caused by the constraints and complexities of human life. Strivings that span whole phases of life or even an entire life course require huge regulatory efforts, but once an individual has embarked on a particular developmental and life-course trajectory, these efforts are scaffolded to a considerable degree by societal institutions (e.g., channels of admission to educational institutions and careers).

At the simplest level, the lifespan can be seen as a field of action in which control potential first increases rapidly, reaches a temporary plateau in midlife, and declines again with age, especially advanced age. Figure 16.1 at the beginning of Chap. 16 illustrates the inverse U-shaped trajectory described by primary control potential, beginning with almost complete helplessness and dependence on others in infancy; surging in childhood and adolescence; leveling out at some point in adulthood, depending on the biographical path taken; and declining again in old age under the effects of impaired biological functioning and restricted social roles, finally resulting in death.

Striving for *primary control* is typically maintained throughout these radical age-related changes in primary control potential (Heckhausen, 1997). What changes are its objectives, which can be adapted to the waxing and waning of control potential by setting more or less challenging goals or shifting one's focus to another domain of functioning (e.g., focusing on career goals rather than starting a family or on health rather than career goals). These shifts in the objectives of developmental regulation are determined by individuals themselves or adopted from others against the background of biological processes of maturation and aging, societal and institutional structures, and social and cultural norms.

17.1.1 Biological Changes Across the Life Course

Patterns of biological change across the life course generally follow the inverse U-shaped trajectory depicted in Fig. 16.1. In the first half of life, processes of maturation and acquisition dominate, gradually extending the individual potential for control of the material and social environment. Even at this relatively early stage, however, a few domains of functioning are subject to age-related decline. Some can easily be compensated by technical aids (e.g., by wearing sunglasses to respond to the decreased ability to constrict the pupils). Others are not so easily offset. Performance in domains that rely heavily on high-level physical functioning begins to decline long before middle adulthood, leaving only a narrow age window for world-class athletic careers, for example (Schulz & Curnow, 1988; Schulz & Heckhausen, 1996; see Heckhausen, 2005, on the psychological implications of age-related decline in peak performance).

Middle adulthood sees the onset of various sensory and physiological processes of decline that can typically be offset relatively easily by compensatory strategies (e.g., fitness training) or technical aids (e.g., reading glasses). However, first losses of control potential that are difficult or impossible to overcome are also experienced in midlife (e.g., the ticking of the "biological clock" and the deadline it imposes on childbearing). The control strategies used to deal with these regulatory challenges are discussed in detail as follows.

Finally, in old age, processes of physical decline come to dominate. In very old age (beyond 75 years), in particular, it becomes increasingly difficult to offset this decline using aids or special strategies. These functional losses seem to be the costs of evolutionary selection, which sought to maximize functioning during the early, reproductive stages of life but neglected the post-reproductive phase, meaning that late-onset malfunctions and disease were not eliminated from the gene pool (Rose, 1991; Williams, 1957; see also the overview in Heckhausen & Schulz, 1999b). Toward the end of life, most people struggle with multiple chronic illnesses and the associated functional impairments (Brock, Guralnick, & Brody, 1990; Schneider & Rowe, 1990).

17.1.2 Societal and Institutional Structures

The societal scaffolding of the life course provides an age-graded structure, on the basis of which individuals form *normative expectancies* about life-course events. These may take the form of situation-outcome expectancies (What happens at what age without my active involvement? – e.g., school entry, retirement), action-outcome expectancies (What can I achieve by my active involvement? – e.g., a valued career, a fulfilled family life), or outcome-consequence expectancies (Which options will be opened up/rendered inaccessible if I don't achieve X? – e.g., graduating from school with good grades, forming a stable relationship). Some of these structures are provided by societal institutions (e.g., the education system, promotion guidelines, matrimonial and divorce laws) and the sociostructural differentiation of educational and occupational trajectories (e.g., certain qualifications are required for certain jobs). Others derive from normative conceptions about the life course, important life goals, and their age-dependent deadlines, which are internalized by the individual members of a society.

17.1.3 Institutionalized and Structural Constraints

Age-chronological constraints determining the beginning and end of certain phases of the life course (e.g., school attendance) structure developmental pathways, as do the regulations on educational-, occupation-, and family-related transitions (e.g., the educational qualifications needed to pursue certain occupational careers) that are institutionalized in state legislation and company guidelines (e.g., Mayer, 1986; Mayer & Carroll, 1987; Mayer & Muller, 1986).

These institutionalized constraints provide *age-graded opportunity structures* for certain life-course events. Optimal conditions are provided for those who are "on time"; those who are "off time" have to contend with numerous difficulties (Heckhausen, 1990, 1999).

One example is the provision of university grants, summer jobs, and cheap accommodation for students in their early 20s, but not in middle adulthood. Society makes it far easier for younger adults than for older adults to get a degree.

Once a particular life-course track has been chosen, institutionalized opportunity structures can have a *channeling or canalization effect*. Some educational pathways lead almost automatically to certain occupational careers, for example, and the first major steps in starting a family (e.g., getting married) pave the way for subsequent developments in that domain (e.g., buying a home together, parenthood). Individuals can thus follow age-sequential paths that have been carved out by society (Blossfeld & Mayer, 1988; Hogan, 1981; Marini, 1984; Sørensen, 1986) to reach important life goals (Heckhausen, 1990, 1999) without the need for permanent volitional control and decision making. The regulatory effects of these institutionalized paths through the life course can be compared with those of the canalization phenomena known from developmental biology, in which cells specialize according to genetically controlled programs of development that apply to whole complexes of characteristics, meaning that they are better protected against disorders and malfunctions than if every characteristic had to be developed individually and independently (Alberch, 1980; Gottlieb, 1991; Oster & Alberch, 1982; Waddington, 1957). In Waddington's (1957) terminology, the process of development takes place in an "epigenetic landscape," a system of valleys and ridges that may start close together but diverge considerably over the course of development. People from similar origins may make different decisions at a critical points of transition (e.g., whether to pursue higher education), thus opening up different developmental pathways and resulting in different developmental outcomes later in life.

However, while certain developmental pathways are optimized, the directions life courses can take are often restricted by an individual's social class. This applies, for example, to the transition from primary to secondary education in Germany. The less education children's parents have received, the better children need to perform in fourth grade to convince their teachers to recommend them for entering the highest level of secondary schooling ("Gymnasium"; Arnold, Bos, Richert, & Stubbe, 2007). It is thus particularly difficult for working class children to continue their education at a "gymnasium" after primary school. Their normative developmental pathway usually assumes that they transition to the two lower school levels ("Realschule" and "Hauptschule") and later move on to receive blue-collar vocational training. How such social inequity manifests itself differs across countries. In the United States, this inequity is primarily caused by the large differences with regard to how much funding schools in poor and rich neighborhoods receive, alongside highly selective admissions and extremely high tuition fees at elite universities. It would be interesting to systematically investigate whether each society with social inequity applies some form of institutional and/or sociostructural conditions that safeguard the chances of upper-class children to maintain their social rank and undermine lower-class children's chances of moving up.

17.1.4 Normative Conceptions About the Life Course

Besides institutionalized and structural constraints, normative societal conceptions about the life course

are coming to play an increasingly important role in regulating lifespan development (Heckhausen, 1990, 1999). The flexibility and "Weltoffenheit" (openness to the world) of human behavior (Gehlen, 1958) has long given sociological anthropologists reason to see the regulatory function of social groups and their norms as anthropological constants of human life (Berger & Luckmann, 1967; Claessens, 1968). Human behavior is not biologically or genetically predetermined and tends not to be externally enforced by society. Rather, individuals regulate their own behavior on the basis of the social norms and conventions they internalize (Elias, 1969) during socialization, which make this regulation seem natural and inevitable (Berger & Luckmann, 1967; Douglas, 1986). The same reasoning seems to apply to the regulation of life course and would help explain why normative life-course patterns and the age timing of life transitions remain valid for most members of modern societies (Hogan, 1981; Marini, 1984; Modell, Fürstenberg & Hershberg, 1976; Modell, Fürstenberg & Strong, 1978; Uhlenberg, 1974), even when societal frameworks are weakened (Dannefer, 1989; Held, 1986; Neugarten, 1979; Rindfuss, Swicegood, & Rosenfeld, 1987). Life-course sociologists have shown that, during crises such as World War II, the Great Depression, and the postwar years in Germany, the age timing of major life transitions (e.g., graduation from school, marriage) remained largely unchanged (Blossfeld, 1987, 1988), as did normative conceptions about the ages at which people should leave school, get married, and reach other major milestones in life (Modell, 1980).

Definition

Age-normative conceptions about the life course are resilient and powerful regulators of developmental processes and life-course decisions, even and indeed especially when external societal and institutional scaffolds are weakened.

Findings from studies on normative conceptions about psychological development across the lifespan are presented in the next section (Heckhausen, 1990, 1999; Heckhausen & Baltes, 1991; Heckhausen, Dixon & Baltes, 1989;

Study

Normative Developmental Change Across the Life Course

J. Heckhausen and colleagues asked young, middle-aged, and old adults to specify the psychological characteristics (e.g., friendly, forgetful, wise, adventurous) that change over adulthood and to state when this happens and whether it is desirable (Heckhausen, 1990; Heckhausen et al., 1989) or controllable (Heckhausen, 1990; Heckhausen & Baltes, 1991). Figure 17.1 shows the developmental gains (desirable developmental changes) and losses (undesirable developmental changes) identified by the adult respondents throughout adulthood and old age. The diagram clearly shows how the relationship of expected developmental gains to losses shifts over the life course, with gains predominating in early adulthood, but losses gradually increasing in middle and especially old age, and finally coming to dominate in very old age.

Interestingly, another study found the perceived controllability and desirability of developmental changes to be closely related (Fig. 17.2), with fewer desirable and fewer controllable psychological changes being expected as people get older (Heckhausen & Baltes, 1991). Relative to young adults, moreover, older people are more likely to see undesirable developmental changes as less controllable than desirable ones. Findings on the effects of development-related control beliefs on subjective well-being indicate that feelings of personal responsibility for undesirable change or regrettable decisions and life events can diminish older adults' well-being (Lang & Heckhausen, 2001; Wrosch & Heckhausen, 2002).

Heckhausen & Krüger, 1993; Hundertmark & Heckhausen, 1994; Krüger & Heckhausen, 1993; Krüger, Heckhausen & Hundertmark, 1995).

Studies on the development of the age-normative conceptions of psychological development across the lifespan show that layperson's conceptions continue to develop from childhood through adolescence and into old age (Heckhausen & Hosenfeld, 1988; Heckhausen et al., 1989; Hosenfeld, 1988). Eleven-year-olds already have relatively detailed conceptions of how people change over adulthood and old age (comprising 40–60 psychological attributes). These conceptions become increasingly differentiated in adolescence. Interestingly, contact with older people is just as conducive to the differentiation of the age-normative knowledge system as increasing age. In adulthood and old age, developmental conceptions become increasingly elaborate, multifaceted, and differentiated, with older adults endorsing more attributes as change sensitive than middle-aged adults, who in turn endorse more attributes than younger adults (Heckhausen et al., 1989). Individual differences in the expectations about development and aging also have behavioral consequences. Kornadt, Voss, and Rothermund (2015), for example, showed that positive or negative expectations about becoming older are associated with more or less preparations for old age, respectively.

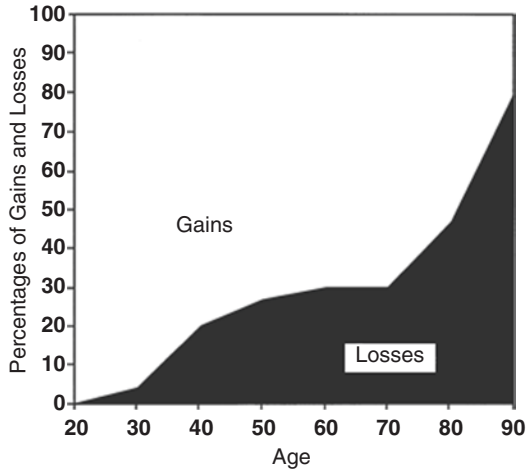

Fig. 17.1 Expectations about developmental gains and losses in adulthood (Based on Heckhausen, Dixon, and Baltes, 1989)

Age-normative conceptions also serve as a frame of reference for evaluating the life-course position of others. As soon as someone deviates from internalized norms on the family or career status considered appropriate at a certain age, there is internal (and, in the social group, external) pressure for biographical justification. Krüger, Heckhausen, and Hundertmark (1995) found that age-inappropriate family or career status (e.g., not having a steady job by the age of 40) elicited surprise and rather extreme evaluations in their respondents (positive evaluations of advanced development, negative evaluations of delayed development).

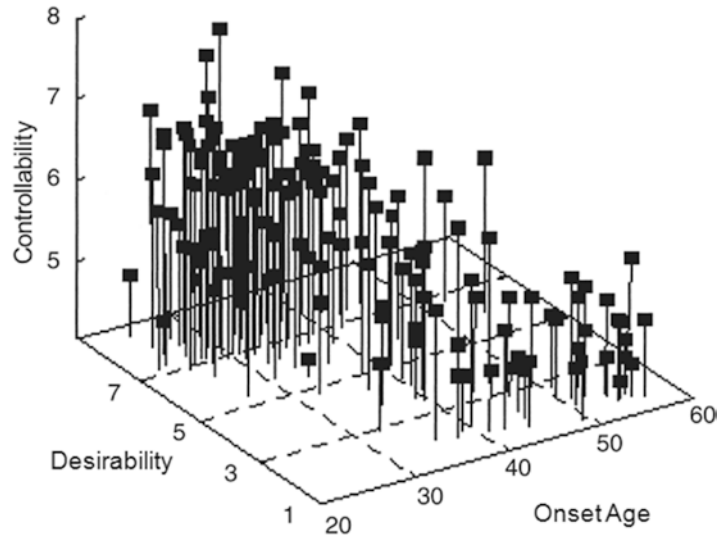

Fig. 17.2 Expectations about the desirability, controllability, and age-related timing of developmental changes in adulthood (Based on Heckhausen and Baltes, 1991)

Age-normative conceptions provide social frames of reference that individuals use to assess when and to what extent they and others are "on time" or "off time" in reaching the major milestones of lifespan development, whether their progress is delayed or accelerated, and whether they need to intervene and make adjustments (see the section on developmental goals later in this chapter) to bring their life back in line with internalized conceptions of a successful life course.

Finally, age-normative conceptions can serve to protect self-esteem by allowing people to see the losses they experience in middle and old age as relatively mild variants of age-related decline (Heckhausen, 1991; Heckhausen & Brim, 1997; Heckhausen & Krüger, 1993). Adults at different ages think that their own developmental prospects in old age are more favorable than for most other people (Heckhausen & Krüger 1993). This discrepancy, which helps buffer self-esteem, was larger for the middle-aged adults than for the young adults and most salient for the old participants. When asked about problems from various areas of life (e.g., money, health, loneliness, marriage, stress, work, and children), people of all ages rate most other people's problems to be more serious than their own (Heckhausen & Brim, 1997). It was particularly interesting that the perceived severity of one's own problems in a particular domain of life was associated with the view that the same problem is especially serious for most other people of one's own age. Participants appear to downgrade the age-normative reference group to protect their own self-esteem. If the area of functioning, in which individuals experience problems, is perceived to be a general trouble spot for people of their age, they need not feel as personally responsible for that problem. This interpretation is supported by Mustafić and Freund's (2012) finding that adults of different ages tend to be more content with their lives if they perceive the cognitive and social developmental prospects of others in the same age group as unfavorable.

Summary

The human life course provides an *age-graded field of action* for individual developmental regulation. Individuals can adapt their goal-related behavior and control striving to the opportunity structures of the life course. In general, the individual potential for control of the environment undergoes radical changes across the lifespan, increasing steeply in childhood, leveling out in middle adulthood, and declining in old age. Biological processes of maturation and aging are one of the main factors determining this inverse U-shaped trajectory. Furthermore, societal opportunities and constraints in the form of institutional and social structures or age-normative conceptions about the life course scaffold important life-course transitions. Sociostructural canalization effects narrow down individuals' options along given life-course tracks but help them stay on track for long-term goals. Normative conceptions about psychological development across the lifespan develop early in life and become increasingly differentiated in adolescence and adulthood. They provide a frame of reference for evaluating one's own development and that of others and can protect the self-esteem of individuals confronted with developmental losses and other stressors in middle and advanced adulthood.

17.2 Motivational and Behavioral Models of Developmental Regulation

17.2.1 Two-Process Model of Intentional Self-Development

Brandtstädter and his colleagues developed a model of intentional self-development that focuses on the important roles of the acting individual and its developmental goals (Brandtstädter, 1986, 1998, 2001). For Brandtstädter, the main function of development-related action and thought is to stabilize the individual's construction of self across the lifespan and to protect it against age-related challenges. This personal continuity depends on the construction and stabilization of self-repre-

sentations, many facets of which are open to development and thus exposed to dynamic processes of gains and losses across the lifespan. Individuals are motivated to offset any discrepancies arising between self-representations and the associated developmental goals, on the one hand, and the self-states that are actually attained or attainable at a given age, on the other. According to the two-process model, this may be done in two ways:

1. *Assimilation* (persistent goal striving): The individual may engage in self-referential activities aiming to bring personal development in line with himself or herself and life goals (e.g., learning to better play the piano). The discrepancy between actual and desired states is addressed by changing the actual state.
2. *Accommodation* (flexible goal adjustment): The individual may adjust self-referential goals to bring his or her self and life goals in line with the given opportunities and constraints. In this case, the desired state is adjusted. According to Brandtstädter, processes of accommodation are typically things that happen to individuals and are thus not intentional and have no conscious representation.

In the past, there was also a version of this model (known as the AAI model) that involved three processes. In addition to assimilation and accommodation, this version of the model also included processes of immunization (Brandtstädter & Greve, 1994). Immunization of the self-concept is made possible by means of altered evaluation criteria (Greve & Wentura, 2003). If somebody, for example, claims to have a good memory, their criterion for "good memory" might come to include the successful use of mnemonic devices instead of reliance on pure recall.

Assimilative and accommodative processes of intentional self-development serve to maintain personal continuity and identity over time. Both processes can be activated when developmental losses lead to discrepancies from the self-image (e.g., in an older adult whose self-image includes a good memory for numbers). Assimilation and accommodation are antagonistic, meaning that the activation of one process inhibits that of the other. For example, a woman who signs up for a memory training course because she is having trouble remembering telephone numbers (assimilation) will not, at the same time, lower her expectations with respect to memory capacity (accommodation). The first cross-sectional study by Brandtstädter and Renner (1990) found that with increasing age, adults (between 34 and 63 years) use assimilative processes of persistent goal striving with decreasing frequency, whereas accommodative processes of flexible goal adjustment are increasingly utilized.

Within the two-process model, assimilation and accommodation are thought to be activated under different functionally suitable conditions. If goals are very important and irreplaceable to self and behavioral resources are available at the same time (controllability), assimilative processes of persistent goal striving are activated. If a goal, however, is very difficult or even impossible to achieve or if the goal is relatively irrelevant to the self, accommodative processes of goal adjustment come into play (Brandtstädter & Rothermund, 2002).

In their extensive research program, Brandtstädter and colleagues have demonstrated the functioning of these assimilative and accommodative self-regulatory processes and their adaptive effects on self-esteem and psychological well-being in various contexts (Brandtstädter, 1998, 2001; Brandtstädter & Greve, 1994; Brandtstädter & Rothermund, 2002; Brandtstädter, Wentura & Rothermund, 1999; Greve & Wentura, 2003; Rothermund & Brandtstädter, 2003a, 2003b). Many of the studies by this group are based on longitudinal research with middle-aged to older (58–77 years) adults who were asked over 4 years about their persistent goal striving (i.e., assimilation), flexible goal adjustment, life goals (i.e., general values), functional status in different areas of life, efforts to change, and subjective well-being. Rothermund and Brandtstädter (2003a, 2003b), for example, reported that efforts to compensate for functional loss due to aging increased until age 70 and then declined at the

same rate as subjective controllability. Overall, participants remained relatively content with their own functional status because they adjusted the framework of their assessment (i.e., compared to the past) and perceived their functional status as less important if they did not see a chance to improve it.

In summary, the research group around Jochen Brandtstädter was able to show that indicators of life satisfaction and mental health stay relatively stable across the lifespan. As people grow older and thus experience functional loss, assimilation loses its importance, and accommodation processes become more common. This change apparently protects aging individuals from the negative affective consequences of aging. At the end of life and when faced with our own mortality, flexible goal adjustment and ego-transcending goals become more important than extrinsic and egocentric, instrumental goals (Brandtstädter, Rothermund, Kranz, & Kühn, 2010).

17.2.2 Motivational Theory of Life-Span Development (MTD)

Within the framework of the Motivational Theory of Life-Span Development (MTD), the efforts individuals make to regulate their development are seen as attempts to gain as much control as possible over one's own development and life course (Heckhausen, 1999; Heckhausen et al., 2010; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). Motivated behavior pertaining to development thus follows the *primacy of primary control striving*. Primary control means that an individual can cause effects in his or her environment. Therefore, the leading principle is not consistency of self (as is the case in the two-process model) or well-being after achieving pleasant states or avoiding unpleasant states (as is the case in the SOC model; see the next section) but rather the maximization of primary control in influencing one's own development and living conditions. Successful development maximizes our primary control over our own life course with regard to the various domains of life and throughout the lifespan. This success depends not only on primary control striving but also on *secondary control strategies* because they help regulate our motivation when pursuing goals or allow us to reconsider and disengage from these goals if we need to reappraise our situation.

The MTD conceptualization of our control striving is realized when we choose, pursue, achieve, or abandon medium-range and long-range developmental goals. The question which developmental goals should be chosen or dropped in order to optimize control (optimization) should be guided by the controllability of goal realization (*congruence principle* of goal selection). Controllability varies of course with age and other situational factors (sex, social class, societal conditions). Important developmental goals (such as graduating from college, entering the job market, starting a family) can be achieved much more easily during particular parts of our lives. Thus, realizing them during those optimal age windows requires less effort, which leaves the individual with the capacity to pursue other important goals.

Individuals take part in the design of their own development by means of motivated behavior as well as the selection, pursuit, and potentially abandonment of goals. All of this happens in cycles of sequentially organized behavioral phases. Figure 17.3 illustrates the typical course of a behavioral cycle according to the action-phase model of developmental regulation, which constitutes the core of the Motivational Theory of Life-Span Development: When individuals select optimizing goals, suitable developmental goals are chosen based on certain heuristics. These heuristics include the *congruence* of goal selection with control and behavioral opportunities, the consideration of potential *consequences* for other areas of life or long-term development, and the *avoidance of developmental dead ends* that would trap the individual on an undesirable life course.

Once an individual decides on a specific developmental goal and thus crosses the Rubicon to enter the phase of volitional behavior (see Fig. 17.3), a volitional mindset that focuses on realization sets in. This process of switching

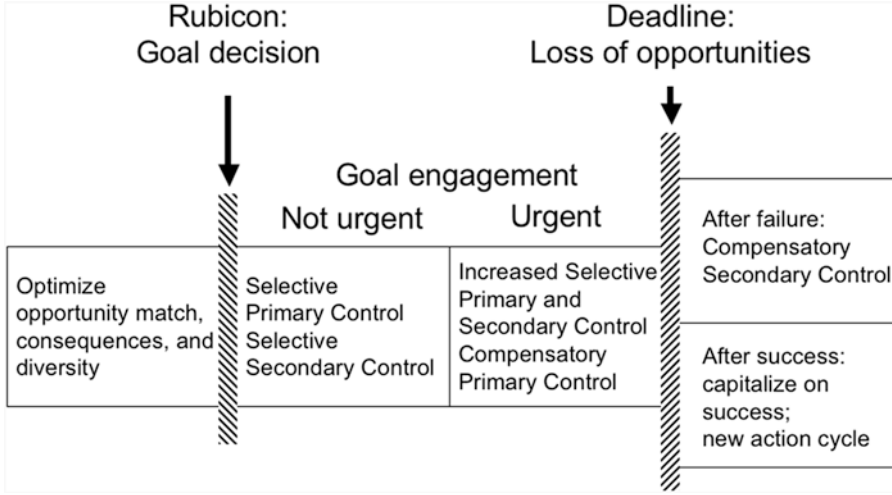

Fig. 17.3 Action-phase model of developmental regulation (Based on Heckhausen, 1999)

between motivational (deliberative) and volitional (implemental) mindset can be found for short-term actions as well as longer-term developmental goals (see Chap. 12). This mindset helps strengthen the efforts made in order to realize the goal and protect them from the potentially weakening effects of encountered obstacles or competing goals. Such volitional protection is particularly important in the case of long-term goals because we need to pursue them in spite of daily distractions and other goals pursued at the same time.

Two control strategies characterize *goal engagement*: *Selective primary control strategies* involve the investment of behavioral resources (time, effort, skills) in goal pursuit, whereas *selective secondary control strategies* use volitional self-regulation to enhance motivational commitment to selected goals by means of meta-volitional approaches (e.g., imagining the realization of the goal, avoiding distraction, increased perceived control). If failure seems to be imminent or if behavioral opportunities are disappearing (see phase of urgent pursuit prior to developmental deadlines), selective primary and secondary control strategies are intensified and frequently accompanied by a third type of control strategies: *compensatory primary control strategies*. These involve asking for help or advice or making use of uncommon compensatory methods (e.g., reading lips in case of hearing loss, using a wheelchair in case of reduced mobility).

If an individual arrives at a *developmental deadline* for a specific goal, she or he loses control opportunities for attaining that goal to an extent that makes it pointless to still pursue that specific goal because the slim chances of success do no longer justify the effort required for realization. If the developmental goal was achieved before the deadline, the life course can continue with related follow-up goals (e.g., positively affecting the development of one's child once it is born; see also "Studies on Childbearing as a Developmental Goal"). If the goal was not achieved (e.g., not having children by a certain age), however, the continuation of an adaptive development can only be ensured if an individual uses compensatory secondary control strategies to motivationally distance her- or himself from the previously preferred goal and change its behavior accordingly (see also Wrosch, Scheier, Miller, Schulz, & Carver, 2003). Compensatory secondary control strategies also include strategies of self-protection that enable individuals to overcome the setback of failed goal realization. This process is necessary to allow for new goal engagement without losing one's motivational and behavioral capacity.

Heckhausen et al. (2010) summarized the existing results on the central assumptions of the Motivational Theory of Life-Span Development in a comprehensive review article. Empirical research

has provided much evidence supporting its core claims about the primacy and adaptiveness of primary control striving, about the match between control strategies and behavioral opportunities over the lifespan, and about the structuring and sequential organization of behavior pertaining to developmental regulation. Other theoretical claims such as the organization of process changes between behavioral phases (e.g., between urgent pursuit and goal replacement), on the other hand, have not yet received much empirical attention.

17.2.3 Model of Selection, Optimization, and Compensation (SOC)

The model of selection, optimization, and compensation (SOC model) was introduced by Baltes and Baltes (1989, 1990) as a general metatheoretical frame of reference for the interpretation of individual behavior and the experience of developmental gains and losses throughout the lifespan. *Selection* refers to the choice of and preference for certain functional areas; *optimization* refers to the investment of resources into these areas; and *compensation* refers to the attempt to make up for developmental losses. The original model places all three core processes at the same level and conceptualizes them as adaptive regardless of the circumstances.

Freund and colleagues founded a behavioral theoretical perspective of the SOC model that is centered around the roles that the availability of resources and the remaining lifetime for pursuing goals play for maximizing developmental gains (elective selection) and minimizing developmental losses (loss-based selection) (Freund, 2008; Freund & Baltes, 2000, 2002; Knecht & Freund, 2016; Riediger, Freund, & Baltes, 2005; Wiese, Freund, & Baltes, 2002). This perspective is based on the assumption that goal selection, optimization of gains, and avoidance of and compensation for loss are activated depending on an individual's resources and remaining developmental opportunities (future time perspective). If sufficient resources are available, gain-oriented goals tend to be preferred; if resources become scarce, avoiding losses becomes central.

By making SOC processes dependent on the availability of resources, Freund and colleagues introduced a criterion for the adaptiveness of developmental regulation processes to the SOC model that is reminiscent of the opportunities of and restrictions on control found in the Motivational Theory of Life-Span Development (Heckhausen & Schulz, 1995; Heckhausen et al., 2010). Regarding this important issue, the two models of developmental regulation converge. Both postulate that processes of developmental regulation – such as selectivity with regard to goals, goal engagement, and compensatory strategies – are not always adaptive. Instead, their adaptiveness (or lack thereof) depends on contextual factors of available behavioral options and developmental potentials.

Empirical studies that apply the resource-oriented SOC approach look at age-related trends in goals related to gains and losses and on the pursuit of multiple simultaneous goals and their conflicting or synergetic dynamics (see related discussions in Sect. 17.3.1 and 17.3.5). In addition, particularly studies in the field of work psychology have found a positive relationship between the use of selection, optimization, and compensation and work performance as well as subjective well-being, primarily among older employees (Abraham & Hansson, 1995; Baltes, & Heydens-Gahir, 2003; Baltes & Rudolph, 2012).

17.3 Developmental Goals as the Organizational Units of Developmental Regulation

Long-term or developmental goals play a crucial role in all important research programs on developmental regulation. Individuals' active attempts to regulate their own development can be conceived of as motivated action. Developmental regulation is directed at goals relating to one's future development and important life-course transitions (Brandtstädter, 2001; Brunstein, Schultheiss, & Maier, 1999; Freund, 2003; Heckhausen, 1999). Within the Motivational Theory of Life-Span Development, these developmental goals organize action into distinct phases – from the selection of a

developmental goal to a phase of active goal pursuit, followed by goal deactivation and finally evaluation of the action outcome – that constitute a development-related cycle of action (see below; Heckhausen, 1999, 2007b; Heckhausen & Farruggia, 2003).

The concept of developmental goals has had various precursors over the history of motivational research. The goal concepts assumed in these models have been located at different levels of abstraction, differed in their assumed conscious accessibility and universality vs. individuality, and spanned different periods of the life course. One of the first models was proposed by Charlotte Bühler (1933; Bühler & Marschak, 1969), who postulated four basic life tendencies, each comprising a number of specific life goals: need satisfaction (life goals: need satisfaction, love and family, sexuality, self-satisfaction), adaptive self-limitation (life goals: self-limitation, caution, adaptability and submission, difficulty avoidance), creative expansion (life goals: self-development, power, fame), and establishment of inner order (life goals: moral values, political and/or religious devotion, success). The basic tendencies and goal categories are conceptualized as universal, but their strengths are expected to vary interindividually.

Like implicit motives, Bühler's basic tendencies and life goals are only partly conscious. Unlike implicit motives (McClelland, 1985), however, Bühler's life goals are age specific to the extent that need satisfaction and adaptive self-limitation predominate in childhood, creative expansion and establishment of inner order become salient in adolescence and adulthood, and old age sees either the continuation of the tendencies dominant in adulthood or a regression to need satisfaction.

Havighurst (1953) drew on normative developmental milestones, rather than individual differences, to formulate his concept of *developmental tasks*. In taking this approach, he sought to reflect the complex interplay between the individual's striving for growth, on the one hand, and the demands, opportunities, and constraints of the social environment, on the other.

Definition
Developmental tasks are age-normative challenges to individual development that derive from processes of biological maturation, cultural traditions, and individual desires, aspirations, and values.

For Havighurst, successful mastery of developmental tasks is conducive to further growth and success in subsequent developmental tasks, whereas failure in a developmental task has negative implications for future development.

Other goal concepts are less specific to development but related to individuals and their motivation more generally; they are on a similar level of abstraction as implicit motives but are more accessible to conscious introspection. They include "current concerns" (Klinger, 1975, 1977), "life themes" (Cskiszentmihalyi & Beattie, 1979), "personal strivings" (Emmons, 1986, 2003), "identity goals" (Gollwitzer, 1987; Gollwitzer & Kirchhof, 1998; Gollwitzer & Wicklund, 1985), and "terminal values" (Rokeach, 1973). These longer-term goal orientations and personal concerns motivate people to keep generating new and specific objectives that concretize their general goal orientations and set a timeframe for action. Short- or midterm, specific personal goals capable of regulating behavior directly have been investigated in research programs on "personal projects" (Little, 1983, 1999), "personal goals" (Brunstein, 1993, 1999; Brunstein et al., 1999; Riediger et al., 2005; Wadsworth & Ford, 1983), "life goals" (Nurmi, 1992; Nurmi & Salmela-Aro, 2002; Nurmi, Salmela-Aro, & Koivisto, 2002), and "personal life tasks" (Cantor & Fleeson, 1991; Cantor, Norem, Niedenthal, & Brower, 1987).

Crucially, specific mid-range personal goals endow an individual's everyday behavior with direction, coherence, and meaning. Their presence alone may enhance psychological well-being (Brunstein et al., 1999; Brunstein, Dargel, Glaser, Schmitt, & Sporer, 2008). Furthermore, congru-

ence between explicit personal goals and implicit motives is central to the efficiency of action and to psychological well-being (see comprehensive overview in Chap. 9).

In a series of studies on the congruence between explicit personal goals and implicit motives in the domains of achievement and power ("agency") versus affiliation and intimacy ("communion"), Brunstein and colleagues found that explicit and implicit motives were not significantly correlated, that the degree of goal attainment on explicit goals influenced emotional well-being only if the goal was congruent with the individual's implicit motives, and that pursuit of motive-incongruent goals had negative implications for attainment of motive-congruent goals and hence for emotional well-being (Brunstein, 1993; Brunstein, Lautenschlager, Nawroth, Pöhlmann, & Schultheiss, 1995; Brunstein, Schultheiss & Grässmann, 1998; see also Chap. 9 in this volume).

Finally, psychological well-being also depends on whether the goal pursued is perceived to be attainable and controllable (Brunstein, 1993). The pursuit of attainable goals has positive effects on psychological well-being, whereas the pursuit of goals classified as unattainable tends to have adverse effects on subjective well-being and may even be associated with depressive symptoms (Lecci, Karoly, Briggs, & Kuhn, 1994; Röhrle, Hedke, & Leibold, 1994). This pattern of results has been replicated in studies with students (Brunstein, 1993), middle-aged housewives (Brunstein, Ganserer, Maier, & Heckhausen, 1991), and older adults (Brunstein et al., 1999).

17.3.1 Congruence Between Developmental Goals and Developmental Opportunities

To ensure successful and efficient investment of personal and social resources (Freund, 2008), goal striving should be synchronous with the age-graded opportunity structures to attain developmental goals across the life course (Heckhausen, 1999; Heckhausen & Farruggia, 2003; Heckhausen et al., 2010; Schulz & Heckhausen, 1996). In other words, developmental goals should be pursued when the biological and societal conditions for their realization are favorable. As discussed in Sect. 17.1, age-normative conceptions about development across the lifespan assume developmental gains to decrease over adulthood and developmental losses to increase (Fig. 17.1). An adaptive selection of developmental goals should reflect these age-normative expectations of gains and losses. This proposition has in fact been supported by several studies (e.g., Ebner, Freund, & Baltes, 2006; Heckhausen, 1997; Heckhausen & Tomasik, 2002; Heckhausen, Wrosch & Fleeson, 2001; Hundertmark, 1990; Hundertmark & Heckhausen, 1994; Wrosch & Heckhausen, 1999). Heckhausen (1997) asked young, middle-aged, and older adults about their developmental goals (e.g., "Please list the five most important hopes, plans and goals for the next five to ten years") and classified them into the categories work, family, health, finances, leisure, and society (e.g., peace). The age differences emerging in the responses reflected the relevance of participants' age and age-graded controllability. Specifically, goals pertaining to work, finances, and family were mentioned less frequently with progressing age, while health, leisure, and society became much more common concerns. Heckhausen also divided the goals by whether they expressed something that participants desired (gain-oriented goals, e.g., harmonious family life, successful career) or wished to avoid (loss-oriented goals, e.g., unemployment, poor health). The responses of the three age groups revealed opposite trends: Young adults responded with the highest number of gain-striving goals, while older adults listed the fewest gain-striving goals. The reverse was true for loss-avoiding goals, with middle-aged adults operating somewhere between the two extremes in both cases. Similarly, Ebner et al. (2006) found changes in goal focus with age: While young adults tended to focus on developmental gains, older adults focused on the preservation of status and avoidance of developmental losses.

These age trends with regard to gain-striving and loss-avoiding developmental goals reflect normative expectations about developmental gains and losses during adulthood (see also Fig. 17.4). Normative expectations seem to represent guidelines and timelines that help

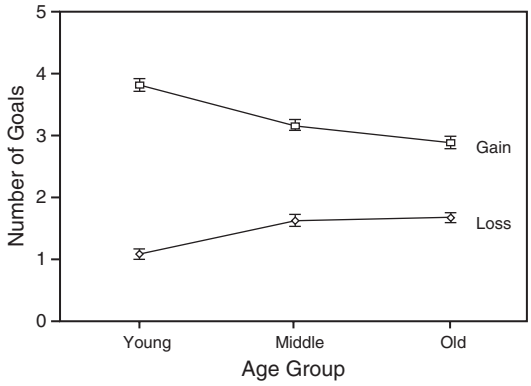

Fig. 17.4 Gain- and loss-oriented developmental goals in young, middle, and late adulthood (Based on Heckhausen, 1997)

individuals with deciding which goals and areas of life they should prioritize at a given time of their lives.

With regard to the general distinction between gain-striving and loss-avoiding goals, most people thus appear to base their personal goal selection on their own expectations about the age-graded opportunity structure. But does the same apply to the fit between specific goals and age-differentiated goal-specific opportunities? This has been a particularly relevant question in the context of the Motivational Theory of Life-Span Development.

Realization of most developmental goals depends on a number of biological, social, and biographical (in the sense of the canalization effect) conditions being in place. Opportunities to realize important developmental goals, such as starting a family or establishing oneself in a career, are thus not distributed at random across the age axis, but vary systematically with age. These waxing and waning curves of opportunity each have ideal timing periods, when opportunities for goal attainment are at a maximum (Heckhausen, 2002a; Heckhausen & Farruggia, 2003). Figure 17.5 shows hypothetical opportunity curves for a selection of major developmental goals (e.g., school graduation, first child) with different gradients of increasing and decreasing opportunities and phases of maximum opportunity of differing lengths. Some opportunity trajectories are steep and have only a short window of opportunity (e.g., graduation from school, first job); others span much longer periods (e.g., first child).

Developmental deadlines Research on age-normative conceptions about psychological change (see the overview in Heckhausen, 1999, and in Sect. 17.1) and findings from life-course sociology (Fallo-Mitchell & Ryff, 1982; Neugarten, Moore & Lowe, 1965; Plath & Ikeda, 1975; Zepelin, Sills & Heath, 1986–1987) have shown that most adults have detailed ideas about when in life certain opportunities are favorable and from which point on goal pursuit no longer seems advisable (Settersten & Hagestad, 1996). The age-graded sequencing of phases of maximum opportunity for major life goals can thus provide a timetable organizing developmental regulation. Age-normative conceptions give individuals a good idea of when it is appropriate to contemplate particular developmental goals and to invest substantially in their attainment and when there is no longer a point in wasting energy on a goal (see example of biological clock for child-bearing). Of course, individuals may decide to deviate from the developmental timetable and pursue goals at unfavorable times (e.g., to study for a degree in middle age). This deviation has its costs, however, because goal pursuit under unfavorable biological or social conditions requires far greater investment of energy and resources, which are then no longer available for other goals (Heckhausen, 1989). Figure 17.6 shows the age-graded opportunity structure for a developmental goal and the investment required as opportunities increase, plateau, and decline.

What is a developmental deadline?
Individuals who have postponed a particular developmental goal, such as childbearing, may miss the ideal "age window" for that goal but still not want to abandon it. As opportunities for goal attainment decrease, they feel an increasing sense of urgency. They may even be able to foresee a point at which opportunities for goal attainment are so slight that any further goal striving will be in vain. This is the developmental deadline.

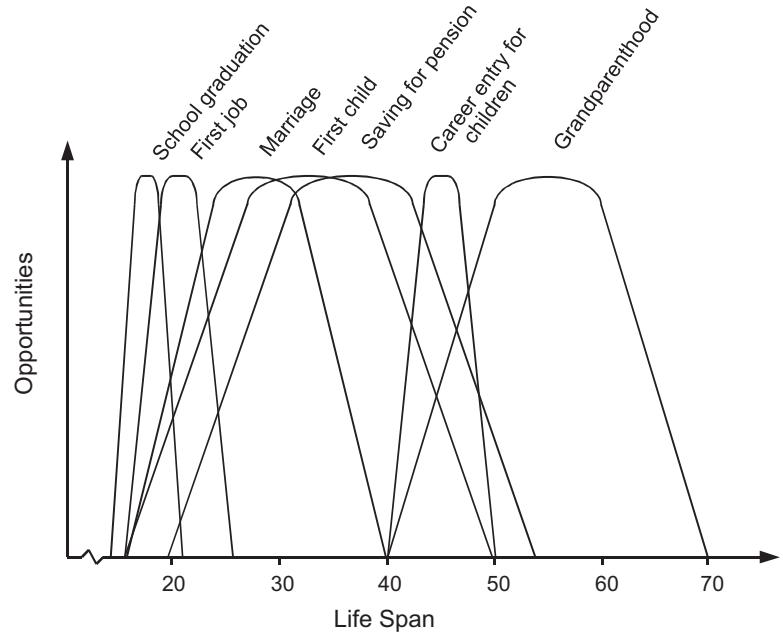

Fig. 17.5 Age-graded sequencing of opportunity curves for different developmental goals, (Based on Heckhausen, 2002a)

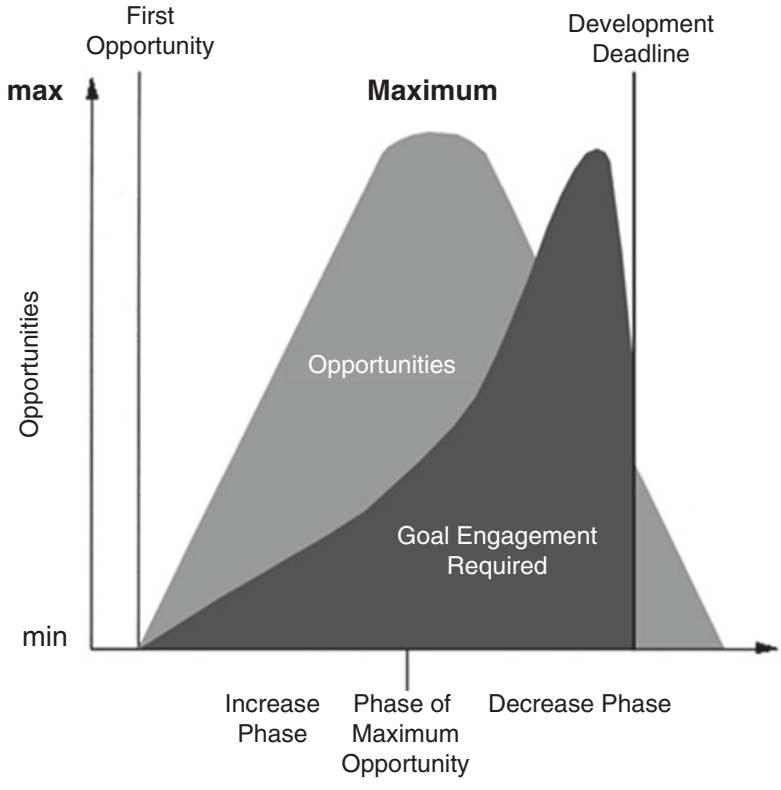

Fig. 17.6 Age-graded opportunity structure and goal striving for developmental goals (Based on Heckhausen, 2000)

Developmental deadlines mark the point at which it no longer makes sense to invest resources in goal pursuit and when the time has come to disengage from that goal. These timing constraints in goal attainability can be anticipated by the individual and elicit phases of urgent goal striving

immediately before reaching the developmental deadline. This allows individuals to prepare for developmental deadlines with urgent and intensified goal engagement immediately before they are reached. In such instances, individuals sometimes make use of preconceived backup plans that can involve alternative methods of goal striving (Napolitano & Freund, 2016), as illustrated by the steep increase in the goal engagement curve in Fig. 17.6. As soon as the developmental deadline has been passed, however, individuals need to disengage from the now futile goal and invest their energy in other, more fruitful projects.

Developmental deadlines make extraordinary demands of an individual's regulatory capacities; they require a switch from urgent, intensive goal engagement in the immediate run-up to the deadline to goal disengagement and protection of self-esteem as soon as the deadline has been passed. Developmental transitions involving developmental deadlines are thus particularly suitable for testing the potentials and limits of individual developmental regulation.

Summary

To be successful and efficient, goal striving must be synchronous with the age-graded opportunity structures to attain developmental goals across the life course. The rising and falling curves of opportunity for developmental goals such as finding a first job or starting a family have phases of maximum opportunity, during which relevant control striving is most effective. Because these age-graded opportunity curves are represented in age-normative conceptions, they can be anticipated and taken into account in adolescents' and adults' developmental regulation. As adults get older, there is a general shift away from pursuing developmental gains and toward avoiding developmental losses.

Developmental regulation is particularly intensive in the run-up to and immediately after a developmental deadline. As soon as the deadline has been passed, individuals have to switch from a phase of urgent goal engagement to goal disengagement and protection of self-esteem. Three optimization heuristics can be used to regulate the selection of goals for engagement versus disengagement: age-graded goal selection, consideration of short- and long-term consequences, and maintenance of diversity.

17.3.2 Action Phases in the Pursuit of Developmental Goals: Goal Selection, Goal Engagement, and Goal Disengagement

How can the action cycle of goal engagement and goal disengagement be conceptualized against the background of increasing and decreasing opportunities to attain important goals across the life course? A key proposition of the action-phase model of developmental regulation (Heckhausen, 1999; Heckhausen & Farruggia, 2003) is that the transitions to goal engagement and from goal engagement to goal disengagement are not gradual and progressive, but sudden and discrete, and affect multiple aspects of motivated behavior. The underlying assumption is that the individual can be either in a "go" mode or in a "stop and retreat" mode. The phases of the action cycle and the associated control strategies are presented in Fig. 17.3. The following excursus examines these control strategies in more detail.

The sequence of action phases The action-phase model of developmental regulation (Heckhausen, 1999) expands and modifies the Rubicon model of action phases proposed by Heinz Heckhausen (Heckhausen, 1991; Heckhausen & Gollwitzer, 1987). Specifically, the Rubicon model has been expanded to include the concept of the developmental deadline, the point at which opportunities to achieve a certain goal decline below a critical level. This developmental deadline is hypothesized to be preceded by an *urgency phase* and followed by a phase of goal disengagement. To track the timeline of the model shown in Fig. 17.3 from left to right, an action cycle starts with the predecisional phase before the Rubicon is crossed (see also Chap. 12, Sect. 12.2). During this predecisional phase, the individual evaluates developmental alternatives (e.g.,

different career paths) in terms of their advantages and disadvantages, controllability and feasibility, and costs and utility for other goals (including long-term goals). During this deliberative phase (Chap. 12), information processing should be open-minded and impartial. As soon as the Rubicon has been crossed and a decision made, however, there is a discrete shift to a mindset suitable for maximizing primary control striving toward the chosen goal. Strategies of selective primary and selective secondary control are applied to this end. As the individual approaches the developmental deadline for a chosen goal, primary control striving enters an *urgency phase*, and the application of goal-engagement control strategies is intensified. If internal behavioral resources are insufficient, recourse may be taken to compensatory primary control strategies. As soon as the developmental deadline has been passed, however, goal engagement becomes dysfunctional. The transition from favorable to radically reduced opportunities for goal attainment necessitates a discrete shift from goal engagement to goal disengagement. This change of gear can be illustrated using the analogy of a lion pursuing an antelope. The lion begins the chase at top speed. As soon as it realizes that it is being outrun, however, and that the distance to the antelope is increasing, the lion will stop and turn away abruptly, rather than slowing down gradually.

Excursus

Control Processes Involved in Goal Engagement and Goal Disengagement

The Motivational Theory of Lifespan Development (see also "lifespan theory of control") distinguishes two kinds of control striving: primary and secondary control striving. Primary control striving is directed at the external world and serves to produce direct effects of behavior in the environment. Examples include building a Lego house, studying for an exam, applying for a job, or trying to sell someone a house. Secondary control striving, in contrast, is directed at the internal world and serves to influence one's motivational resources, either by increasing volitional commitment to a chosen goal or by shielding self-esteem and other motivational resources against potential threats. Examples of secondary control strategies directed at volition include imagining the benefits of goal attainment, avoiding tempting distractions, or convincing oneself that the prospects of success on an ongoing project are good. Primary and secondary control strivings work hand in hand throughout the goal-engagement phase to ensure that both behavioral and motivational resources are mobilized.

Goal engagement involves three kinds of control strategies:

1. Selective primary control strategies involve the investment of behavioral resources (time, effort, skills) in goal pursuit (e.g., "I'm going to work hard to succeed in my career.").
2. Selective secondary control strategies use volitional self-regulation to enhance motivational commitment to selected goals (e.g., "I often imagine how happy I'll be when I've found a good job.").
3. Compensatory primary control strategies include seeking other people's help or advice when one's own primary control resources are insufficient and external assistance is required (e.g., "If I run into problems with my career plans, I'll ask others for advice.") or taking detours or unusual approaches (e.g., "I'd accept a less attractive job if it meant I'd get the position I want in the long run.").

Goal Disengagement and Protection of Motivational Resources

If circumstances make goal attainment prohibitively difficult or impossible, goal disengagement is an adaptive response that prevents behavioral and motivational resources that could be more productively

(continued)

applied to other goals from going to waste. According to the Motivational Theory of Lice Coursefe span Development, goal disengagement relies on strategies of compensatory secondary control that serve either of two key functions:

1. Goal disengagement: Disengagement from unattainable (or prohibitively difficult) goals allows resources to be invested in other, more feasible goals. Goal disengagement may involve devaluation of the original goal (e.g., "If I don't succeed in my job, I'll know that it wasn't the right thing for me anyway.").
2. Protection of motivational resources: Strategies serving to protect motivational resources help shield individual self-esteem and action-related optimism against the negative effects of experiences of failure or loss. Self-protective strategies include attribution to external rather than internal factors (e.g., "If there are problems at school, I tell myself it's not all my fault.") and strategic social comparison (e.g., "If I don't succeed in my job, I'll keep in mind that other people are even worse off.").

Active goal disengagement (see also Wrosch, Scheier, Miller, Schulz, & Carver, 2003) facilitates a rapid and radical shift from goal engagement to goal distancing. Strategies of active goal disengagement are thus an important component of compensatory secondary control, preventing behavioral and motivational resources from being invested in vain. Moreover, self-protective secondary control strategies help the individual deflect the long-term negative effects that missing a developmental deadline may have on motivational resources (e.g., self-esteem, hope for success in the future). Individuals who succeed in attaining a goal before the deadline expires can either build on their success in that domain (e.g., work toward their next promotion, have another baby) or apply their control strategies to a domain that may have been neglected while pursuing the more urgent goal. One example is the shift from a focus on career goals to family goals as soon as a major age-dependent move up the career ladder has been made (e.g., tenure in an academic career). Wiese (2000; see also Wiese & Freund, 2000) reported that this kind of "career first, then family" pattern of goal engagement is endorsed by a substantial subgroup of respondents in early adulthood (ca. 25%).

Empirical Studies on Goal Engagement and Disengagement Before and After Developmental Deadlines

Our ongoing research program explores the regulatory strategies that people of different ages and in different sociocultural contexts adopt when confronted with developmental challenges during important life-course transitions. The general research paradigm is to use marked life-course changes in opportunities to attain particular life goals (e.g., having children, climbing the career ladder) as testing grounds for individuals' regulatory capacity. Specifically, we explore how individuals with different (cultural, sociostructural, individual personality) backgrounds respond to such changes

Study

Childbearing as a Developmental Goal

Both studies compared childless women before (age, 30–35 years) and after (age, 40–45 years and 50–55 years) the developmental deadline for childbearing, which most people consider to fall around the age of 40 (Heckhausen et al., 2001). To this end, the Optimization in Primary and Secondary Control (OPS) scales (Heckhausen, Schulz, & Wrosch, 1998) were adapted to the life goal of childbearing.

Sample items from the control strategy questionnaire were as follows:

- Selective primary control: "I will do whatever I can to have children of my own."
- Selective secondary control: "I will not let anything distract me from my goal of

having children."
- Compensatory primary control: "If I have problems conceiving, I will seek assistance (e.g., from a doctor)."
- Goal disengagement component of compensatory secondary control: "If I can't have children, I'll have to forget the whole idea."
- Self-protective component of compensatory secondary control: "It's not my fault if I don't have children."

Findings show that the childless women in the urgency condition (women in their early 30s) felt strongly committed to the developmental goal of childbearing. They reported using all three control strategies of goal engagement – selective primary control, selective secondary control, and compensatory primary control – more frequently than the older women (see the excursus on "Control Processes Involved in Goal Engagement and Goal Disengagement"). Conversely, the 40- and 50-year-old women reported using compensatory secondary control strategies more frequently than the pre-deadline women. Thus, both premenopausal women approaching the developmental deadline and women in the age group of rapidly decreasing fertility showed a pattern of goal engagement or disengagement that was congruent with their age-graded opportunities for childbearing.

We then examined how phase congruence (i.e., congruence of goal engagement and opportunities for goal attainment) relates to psychological well-being measured in terms of the absence of depressive symptoms to determine whether congruence is associated with more adaptive developmental outcomes. The findings presented in Fig. 17.7 indicate that strong selective primary control striving in pre-deadline women was associated with particularly low scores on the depression scale. The reverse holds for post-deadline women (in their 40s and 50s). The more committed these post-deadline women felt to childbearing, the more depressive symptoms they reported. Mental health thus reflects the congruence between control opportunities and control striving; greater congruence is associated with fewer reported depressive symptoms and low congruence with elevated levels of depressive symptomatology.

In another study on developmental deadlines for childbearing, we investigated whether goal engagement or disengagement leads to change at the information-processing level and thus has implicit or subintentional effects beyond conscious control strategies. An incidental memory test was used to assess implicit bias in information processing in terms of recall of goal-relevant and goal-irrelevant information. Respondents were again childless women before and after the developmental deadline. They were first asked to name five developmental goals for the next 5–10 years (Developmental Goals Questionnaire based on Heckhausen, 1997) and then to rate their agreement with sentences about children and babies and sentences about other topics. After the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) had been administered, participants were finally instructed to recall as many as possible of the sentences presented in the rating task. Participants had not been expecting this memory test. The results replicated the findings of the first study on childbearing, to the extent that the developmental goals nominated reflected the age-graded opportunity structures for childbearing. Pre-deadline women reported more developmental goals relating to children than did post-deadline women. Moreover, for the post-deadline women, negative affect was found to be strongly associated with remembering relatively many sentences relating to the positive aspects of life with children, the personal responsibility for not having children, and the implications of childlessness

(continued)

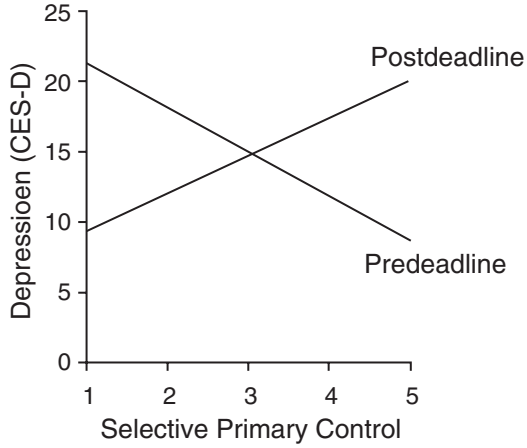

Fig. 17.7 Selective primary control as a predictor of depressive symptoms in childless women before and after the developmental deadline (Based on Heckhausen et al., 2001)

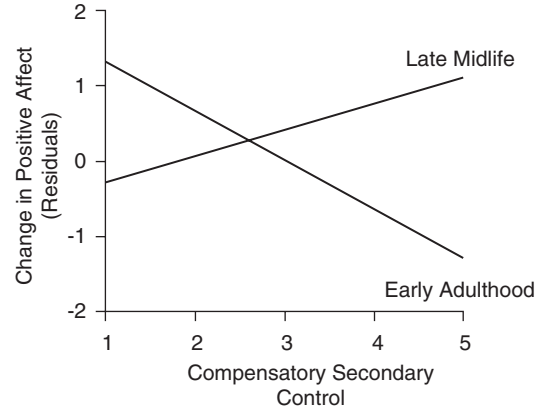

Fig. 17.8 Compensatory secondary control as a predictor of change in positive affect over 18 months in recently separated individuals in early adulthood and late midlife (Based on Wrosch & Heckhausen, 1999)

for other goals (becoming a grandparent) in the incidental memory test.

This study thus provided evidence at both the explicit intentional level (developmental goals nominated) and the implicit subintentional level (selective memory) to confirm that goal engagement and goal disengagement follow age-graded opportunity structures. Moreover, the findings showed that incongruence of implicit goal orientations and opportunities for goal attainment is associated with negative affect.

in opportunities with congruent or incongruent goal engagement or goal disengagement.

The two studies described as follows investigated the transition from favorable to fading opportunities for the developmental goal of childbearing. Both of the studies were cross-sectional; changes in the opportunity structure itself (in this case, age-graded female fertility) are too gradual for a longitudinal approach to be feasible.

Another study on developmental regulation before and after a developmental deadline investigated intimate relationship goals (Wrosch & Heckhausen, 1999). Partnership formation is, in principle, possible at any time in adulthood, so it might seem surprising that there should be a deadline for this developmental goal. The probability of finding a new partner after a separation is known to decrease rapidly over adulthood, however, from around 80% in early adulthood to 20% in late middle adulthood (Braun & Proebsting, 1986; Teachman & Heckert, 1985). Individuals have to come to terms with this sharp decline in opportunities to find a partner, presumably by distancing themselves from the goal at some point between early and late middle adulthood. In his dissertation study, Carsten Wrosch examined men and women aged 20–35 years and 50–60 years who had recently separated from a long-term partner or entered a new relationship. It was assumed that the goal of finding a partner would be urgent in early adulthood, especially after a separation, but that adults in their 50s would find it difficult to form a new relationship and that goal disengagement would be the more advisable course of action for this group. In line with the action-phase model, the young respondents reported more goals relating to intimate relationships and more frequent use of the associated goal-engagement strategies

(selective primary and selective secondary control, compensatory primary control), whereas participants between 50 and 60 years of age nominated relatively few partnership goals and reported more frequent use of compensatory secondary control strategies of goal disengagement and self-protection.

Again, an incidental memory task was used to examine a potential information-processing bias. It emerged that the young adults were better able to recall adjectives describing the positive aspects of intimate relationships (e.g., happy, supportive), whereas the 50- to 60-year-olds remembered adjectives associated with the more negative aspects (e.g., unfaithful, stressful). The respondents in the relationship study were contacted again 18 months after the first wave of data collection and asked to report on their psychological well-being. As shown in Fig. 17.8, strong endorsement of compensatory secondary control strategies (e.g., "I can live a fulfilled life without a partner," "It's not my fault that I don't have a partner") tended to have detrimental effects on the psychological well-being of young, recently separated participants. They experienced a decline in positive affect over time. In the older respondents, by contrast, strong endorsement of compensatory secondary control strategies was associated with enhanced positive affect over time. In other words, abandoning the goal of forming a new relationship after separation is problematic in early adulthood but adaptive in late midlife. Research has not yet examined the nature of the transition from goal commitment to goal disengagement in this particular context. Based on the action-phase model of developmental regulation, we assume that goal engagement does not decrease gradually as the chances of finding a partner fade. Rather, we hypothesize that individuals faced with steadily worsening prospects of finding a mate set themselves a developmental deadline, investing heavily in the goal of finding a partner in the run-up to that deadline and abandoning it once and for all when the deadline has passed (e.g., devaluing or ignoring the positive aspects of a relationship). It remains for future research to determine whether there really is such a radical shift in priorities at a self-generated developmental deadline.

17.3.3 Adjustment of Developmental Goals at Developmental Transitions

At certain points in life, new opportunities might arise, while others disappear during a relatively short amount of time. Important examples include the first day at school, starting a family, or retirement. In particular, the various developmental pathways and grave consequences for the life course that are associated with the transition to adulthood have been investigated in several studies (e.g., Freund, Weiss, & Wiese, 2013; Heckhausen & Shane, 2015; Heinz, 2009; Salmela-Aro, Kiuru, Nurmi, & Eerola, 2014; Schoon & Lyons-Amos, 2017; Tomasik & Salmela-Aro, 2012). Therefore, this section will take a closer look at the relationship between societal structures and individual agency in the developmental regulation of this transition. The transition to adulthood determines to a large extent whether or not individuals will be able to improve their social standing as it involves crucial determinants for the life course such as the level of educational attainment. Different societies allow for different degrees of leeway as we will see using the examples of Germany, the United Kingdom, and the United States.

The education system of Germany manages the transition from school to vocational training through the dual system (on-the-job training combined with general and vocational education at a vocational school). The major challenge of this transition is to find a qualified apprenticeship position, preferably before leaving school. This is a challenging and critical step because the number and quality of qualified apprenticeship positions that allow for professional advancement by no means match the demand. During their final year at school (typically tenth grade), students not wanting to continue their general education have to find an apprenticeship (Heinz, Krüger, Rettke, Wachtveitl & Witzel, 1985; Heyn, Schnabel & Röder, 1997) that opens up

relatively positive long-term career prospects (Heckhausen & Tomasik, 2002; Tomasik, 2003) given their individual capacities. Navigating between the Scylla and Charybdis of over- and under-aspiration under urgency conditions is thus a considerable challenge to developmental regulatory capacities of 16-year-old school leavers.

We investigated students in their final year at four high schools located in lower and lower middle-class residential areas in the eastern and western part of Berlin, Germany. Data on students' goals, control strategies, and vocational aspirations were collected twice in the ninth grade and five times at 2-month intervals in the tenth grade. Findings showed that the adolescents adjusted their vocational aspirations, measured in terms of social prestige, to their grades (i.e., their educational resources on the labor market). The adolescents even adjusted their ideas of a "dream job" to the apprenticeships they could realistically hope to be offered (Heckhausen & Tomasik, 2002), such that the vision of a dream job did not prevent them from investing in the search for an appropriate position. A closer examination of aspiration adjustments during the urgency phase of the tenth and final school grade revealed that a pattern that starts with high aspirations, gradually adjusts downward as unsuccessful attempts accumulate and then gradually raises again, is most adaptive (Tomasik, Hardy, Haase, & Heckhausen, 2009). In this process, cognitions of worry about failing to attain an apprenticeship seem to function as adaptive motivational incentives for those who have them, leaving those without such worries behind (Nagy, Köller & Heckhausen, 2005).

Moreover, combinations of strong primary control striving and volitional strategies for enhancing goal commitment (i.e., selective secondary control) proved to be particularly effective under conditions of urgency, especially for girls (Haase, Heckhausen, & Köller, 2008). Intensive primary control striving was a prerequisite for successfully finding an apprenticeship, especially for students who had not yet found one during the last 3 months of tenth grade. Primary control striving was particularly beneficial if primary and secondary control strivings were combined under conditions of extreme urgency, especially for girls. In this case the investment of behavioral resources (primary control striving) was assisted by meta-volitional strategies of commitment to the goal of finding an apprenticeship (e.g., not being distracted or discouraged; believing in eventual success), which in turn caused a higher resilience to failure and perhaps also a more compelling performance during job interviews with potential employers. Interestingly, this combined effect of selective primary and secondary control striving was particularly pronounced at the end of tenth grade under conditions of great urgency.

In the United States, the transition to employment or college after graduating from high school is much less regulated, which is why many young people end up "floundering" (Hamilton, 1990) and are at risk for downward social mobility (for details on international variation in the school-to-work transition, see Heckhausen, 2002b; Heinz, 1999; Paul, 2001). In this situation many young people tend to have vague long-term expectations of radical upward social mobility that depends primarily on personal effort, showing a meritocratic world view (Shane & Heckhausen, 2016a). Therefore, they often set extremely ambitious and frequently unrealistic goals (Villarreal, Heckhausen, Lessard, Greenberger, & Chen, 2015). Interestingly, such goals help them with persevering over time and even increase their chances of actually realizing these goals (Heckhausen & Chang, 2009). On the other hand, many young people at the transition to job and college are forced to downwardly adjust their personal expectations about how effective their own efforts will turn out to be in the context of various external conditions (e.g., job market, social background, and corresponding resources and relationships). At the same time, these young people tend to maintain the general societal ideology of the meritocratic American Dream (Shane & Heckhausen, 2016b).

The transition to adulthood in the United Kingdom appears to diverge into six distinct pathways (Schoon & Lyons-Amos, 2017; Schoon & NgKnight, in press). These pathways differ from one another based on educational and pro-

fessional trajectories and might be influenced by individual effort. In most, if not all, modern societies, there appears to be a subgroup of marginalized individuals whose chance of upward social mobility is very low, regardless of personal effort (Heinz, 2009; Schoon, 2014).

17.3.4 Goal Engagement and Disengagement in the Context of Health Problems

Other studies have investigated goal engagement and disengagement and the associated control processes in the context of health problems in middle adulthood and old age (Wrosch, Heckhausen, & Lachman, 2000; Wrosch, Schulz, & Heckhausen, 2002). Health impairments are normative developmental challenges in older age that put the capacity for developmental regulation to the test.

Deteriorating health as a result of chronic illness and progressive sensory (e.g., loss of vision associated with macular degeneration) or motor (e.g., arthritis) impairment leads to a reduction in control potential and necessitates appropriate control striving strategies. When health problems in old age are reversible and controllable, primary control striving is suitable for overcoming their effects and can even help improve health and extend longevity (Hall, Chipperfield, Heckhausen, & Perry, 2010). In contrast, disengaging from primary control striving under conditions of relatively high control is associated with the development of depressive symptoms, which in turn weaken primary control striving and resiliency to stress over time (Wrosch & Schulz, 2008; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007a; Wrosch et al., 2000, 2002, 2004).

When health outcomes are less controllable, compensatory strategies of secondary control, such as disengaging from unrealistic standards of physical functioning and acknowledging the positive side effects of illness, seem to be most conducive to physical and psychological well-being (Affleck, Tennen, Croog & Levine, 1987; Boerner, 2004; Evers et al., 2001; Rothermund & Brandtstädter, 2003a, 2003b; Thompson, 1987). Chipperfield, Perry, and Menec (1999) found that primary control striving (e.g., active persistence, effort) in the "young old" (younger than 80 years) and compensatory secondary control striving (e.g., lowering one's expectations, accepting limitations) in the "old old" (older than 80 years) was associated with higher subjective health ratings. A study on life regrets produced analogous findings. It is more conducive to the psychological well-being of older, but not younger, adults to abandon the goal of making up for past actions and instead to see those actions as having been beyond their control (Wrosch & Heckhausen, 2002).

Heckhausen and colleagues conceptualized in their *lines of defense model* (Heckhausen, Wrosch, & Schulz, 2013) how individuals cope with the increasing health-related problems and functional limitations that occur in particular as symptoms of chronic and progressive diseases in old age (e.g., Parkinson's disease, osteoarthrosis). The model claims that organized goal adjustment is required to optimally adapt to the increasing limitations in health and functionality. Specifically, individuals focus on functional levels and goals that are still achievable and disengage only if they become unrealistic in order to set newly adjusted functional goals. By doing so, people with chronic diseases can gradually back down to realistic lines of defense, rather than continue to pursue rigid and unrealistic functional levels or give up entirely. The reverse is also possible, when individuals regain formerly lost functions in the course of rehabilitation and step-by-step return to their full functional abilities. A study on the rehabilitation of patients who had undergone radical prostate surgery was the first to apply the lines of defense model. During the 7 months of the observation, patients as predicted adjusted their goals of self-reliance and less dependency on using technical aids while managing the problems with incontinence in their daily lives. Patients' goals became more ambitious as they regained better functionality over time (Knoll, Wiedemann, Schrader, Schultze, & Heckhausen, 2014). The subjective well-being

of patients and their spousal caregivers was higher if both agreed on the lines of defense, i.e., the attempt to independently manage incontinence (Knoll et al., 2015).

Summary

Cross-sectional and longitudinal studies on developmental regulation before and after a developmental deadline have provided evidence in support of two key assumptions of the action-phase model of developmental regulation:

1. A discrete shift from goal engagement to goal disengagement once the developmental deadline has been passed
2. A phase of urgent goal engagement in the immediate run-up to the developmental deadline

Cross-sectional studies on childbearing and intimate relationships have shown that adults surveyed shortly before a developmental deadline are strongly committed to the goal at hand and use corresponding control strategies. Once the developmental deadline has been passed, however, most respondents distance themselves from the goal and use compensatory secondary control strategies to protect the self against the negative consequences of failure experiences. Evidence for congruence between goal engagement/disengagement and opportunities for goal attainment has been found using both explicit measures (goals nominated, control strategies) and implicit indicators of selective information processing. The greater the congruence between goal engagement/disengagement and opportunities for goal attainment, the higher the levels of subjective well-being and mental health recorded (lower levels of depressive symptomatology).

A longitudinal study on the transition from school to vocational training showed that adolescents' capacity for developmental regulation at this precarious transition to adulthood is impressive, with vocational ideals increasingly being adjusted to more realistic aspirations. A combination of selective primary and selective secondary control strategies proved particularly adaptive at this difficult developmental transition. The study also underlined the importance of the urgency phase in the action cycle and showed that orchestrated application of primary and secondary control strategies is particularly effective during times of urgent goal pursuit.

The action-phase model of developmental regulation has also been specified as a *lines of defense model* and applied to investigate the control striving of patients with acute and chronic illnesses. In line with the findings of studies on developmental goals, the investigations conducted to date have observed positive developmental outcomes when health-related goal engagement and disengagement are congruent with the available control potential, and negative implications for well-being when goal striving vs. goal distancing and control potential are incongruent.

17.3.5 Pursuing Multiple Developmental Goals

The various facets of life require that people function adequately in more than just one domain. Therefore, people usually need to pursue multiple goals at the same time, which is particularly true for long-term developmental goals. Individuals might, for example, simultaneously pursue goals in the domains of family and work and must therefore find ways to coordinate their time and the resources they invest. Based on the general goal system theory (Kruglanski, Chernikova, Babush, Dugas, & Schumpe, 2015; Kruglanski et al., 2002), it should be most adaptive for individuals if their goals do not conflict, but complement one another (see also Chap. 11, Sect. 11.3).

Alexandra Freund's research group has conducted several studies on the pursuit of multiple goals in adulthood. Riediger and Freund (2006), for example, examined the focus on goal investment for important and coherent goals that benefitted one another in a sample of adults between the ages of 20 and 70. A focused selection of goals turned out to be more beneficial to goal

engagement than simply reducing the number of simultaneously pursued goals. The reason for this finding might be that the goals included in a focused goal selection can complement one another. Moreover, the findings suggest that focusing goals becomes increasingly common among middle-aged adults (see also Riediger & Freund, 2004: Riediger et al., 2005). A study by Freund, Knecht, and Wiese (2014) in which middle-aged women and men were asked about their goal investment in various areas of life and about their proneness to psychosomatic diseases yielded convergent results. Women who experienced conflicts between different areas of life suffered from more psychosomatic symptoms than women without such conflicts. Male participants, on the other hand, did not show this pattern. Other research groups have reported similar findings that indicate that engagement in multiple areas of life can have positive implications on domain-specific goal realization and subjective well-being (Shane & Heckhausen, 2016b; Wiese & Salmela-Aro, 2008).

17.4 Individual Differences in the Capacity for Developmental Regulation

Because research on individual differences in the capacity for developmental regulation is still in its infancy, the main objective of this section is to identify directions for future research. Based on the assumptions of the action-phase model of developmental regulation, individual differences in the following dimensions can be expected to determine the adaptability of developmental regulation across the lifespan (see also Heckhausen & Wrosch, 2016):

1. Knowledge of one's control potential and the opportunities to attain developmental goals within the developmental ecology afforded by the existing biological and societal conditions plays a key role in optimized goal selection, as does the ability to obtain this information. The individual macro- and meta-cognitive capacity to analyze relevant opportunities for and limitations to development should become increasingly important as the immediate social environment (e.g., childhood home) fails to provide relevant knowledge and experiences. One example for this are first-generation college students (i.e., students whose parents did not attend university). Conducive parental influence is particularly strong in students whose parents experienced college life themselves (see, e.g., Sy, Fong, Carter, & Boehme, 2011). For students without a similar family background, on the other hand, the relationship with their parents has little impact on their beliefs regarding how to be successful in college but a stronger impact on actual success (Kay, Shane, & Heckhausen, 2016).
2. The individual willingness and ability to adjust processes of developmental regulation to the opportunities and constraints of the developmental ecology determine whether individuals are able to establish congruence between the biological and societal opportunity structures and their own developmental goals. The construct of motivational competence proposed by Rheinberg (2004; Rheinberg and Engeser, 2011; see also Sect. 15.7) is probably decisive in the fine-tuning of environment-action fit. Moreover, the willingness to achieve congruence is probably closely related to the three aspects (three and four) that follow.
3. Strong primary control striving, characterized by persistence and resilience, is the fundamental motivational resource for developmental regulation. A certain degree of a generally optimistic worldview might benefit individuals in pursuing their goals, particularly if they are met with challenges (Heckhausen &Wrosch, 2016; Rasmussen, Wrosch, Scheier, & Carver, 2006). Persistence and resilience may prove excessive, however, if they are not in line with the actual potential for control.

   Initial findings on the age-graded adaptability of primary control striving in the context of childbearing (Heckhausen et al., 2001) indicate that individuals who continue to strive for a particular life goal when it is no longer attainable tend to develop depressive symptoms. However, studies on coping with

reversible health problems (Wrosch et al., 2000, 2002, 2004) have shown that it is maladaptive to relinquish primary control striving when control potential is still available. Findings presented by Halisch and Geppert (2000) for a sample of 65- to 85-year-olds show that the persistent pursuit of personal goals only has positive effects on life satisfaction if those goals are judged to be attainable. Intensive investment in goals with low feasibility ratings has pronounced negative implications for life satisfaction. Goal striving must therefore be calibrated to the control potential available in a given situation.

4. The willingness and ability to deactivate and disengage from a goal influences both objective and subjective developmental outcomes. Objectively speaking, individuals who cling to unattainable goals are unable to invest the resources tied up in pursuit of those goals in more feasible projects and thus relinquish control potential. First findings even indicate that deficient disengagement from unattainable goals influences secretion of the stress hormone cortisol over the course of the day and is likely to make these individuals more susceptible to illness (Wrosch, Miller, Scheier, & de Pontet, 2007b).

   The subjective costs of deficient goal disengagement are also considerable, as shown in a series of studies by Wrosch et al. (2003). The ability to disengage from unattainable goals has been found to have positive effects on subjective well-being (e.g., perceived stress, depressive symptoms) in young and middle adulthood, especially among individuals who have been exposed to high stress (e.g., having one's child undergo treatment for cancer).
5. Because experiences of failure and loss of control are inevitable across the human life course, strategies of compensatory secondary control that serve to protect motivational resources (e.g., self-esteem, avoidance of self-blame, confidence in the success of future endeavors) are indispensable.

   Very little is yet known about interindividual differences in people's preferences for and skill in applying these different strategies (e.g., self-serving patterns of attribution and social comparison, devaluation of unattained goals). Research into cross-cultural differences in the acceptance of strategies serving to protect motivational resources is also warranted.
6. Another major dimension of the capacity for developmental regulation that varies interindividually is the willingness and ability to reengage in a new goal when an existing goal seems unattainable.

   Wrosch et al. (2003) found that goal reengagement varies interindividually and independently of the willingness to disengage from a goal and is associated with enhanced psychological well-being (e.g., perceived stress, meaning in life, depressive symptoms). Interindividual differences in the willingness to both disengage from old goals and reengage in new ones show age-differential effects. In young adulthood, those who find it difficult to abandon unattainable goals benefit most from the willingness to pursue new goals. In later adulthood, in contrast, those who are easily able to relinquish unattainable goals have most to gain from high willingness for goal reengagement. The crucial point is evidently that deficient goal disengagement should not stop people from engaging in new and worthwhile goals in early adulthood, when a multitude of opportunities are available to them. In advanced age, in contrast, it is important to be engaged in goal striving at all, even if the goals are unattainable.
7. Finally, the orchestration of primary and secondary control strategies at transitions between action phases – specifically, from goal deliberation to goal engagement (crossing the decisonal Rubicon), from goal engagement to the urgency phase before a developmental deadline, and from urgent goal engagement to goal disengagement (crossing the developmental deadline) – is another key determinant of the capacity for developmental regulation.

In this context, the conceptualization of processes of action control and self-regulation

proposed by Kuhl in his model of action vs. state orientation and its elaboration in the PSI model (Kuhl, 2000, 2001; see also Chap. 13) provides a promising framework that can guide future research. People with a stronger action orientation should express this orientation particularly during the phase of goal striving. Their general ability to switch between motivational and volitional phases should also be superior (Heckhausen & Wrosch, 2016).

Summary

The exploration of interindividual differences in the capacity for developmental regulation is still in its infancy and promises to be a fruitful new field of research. Dimensions warranting study include individuals' knowledge about age-graded change in the opportunities for goal attainment over the life course and the corresponding fit between personal goals and the developmental ecology, the strength and resilience of primary control striving, the willingness and ability to disengage from goals for which controllability is low, access to compensatory secondary control strategies serving to protect motivational resources, the willingness and ability to reengage in new and attainable goals when previous goals become unattainable or prohibitively costly, and finally the orchestration of primary and secondary control strategies at the transition between action phases.

17.5 Motivated Development: Dynamic Interaction Between Development and Motivation Across the Lifespan

The dynamic interactions between individuals and their environment have attracted increasing attention in personality psychology and lifespan developmental psychology in recent years (Asendorpf, 2004; Caspi, 1998; Lang & Heckhausen, 2006; Lerner, 2002; Roberts & Caspi, 2003; Sameroff, 1983; Scarr & McCartney, 1983). From the perspective of developmental and motivational psychology, it is possible to distinguish three prototypical forms of person/environment transactions that contribute to fit being established over time between the individual and his or her environment, *selective*, *evocative*, and *manipulative* transactions (see also Asendorpf, 2004; Buss, 1987):

- Through their *selection* of environments and situations (e.g., choice of career, choice of partner), individuals can influence the fit of competencies and motivational preferences with the environment and thus play an active role in testing, developing, and optimizing that fit.
- The *evocation* of environments or situations is usually an unintentional result of individuals with certain personality characteristics (e.g., strong approach or avoidance affiliation motivation) repeatedly eliciting similar outcomes or responses (e.g., friendliness, rejection) in the social environment.
- *Manipulation* occurs when an individual shapes the environment directly and intentionally.

In their longitudinal studies with adolescents and young adults, Eccles and colleagues discovered mutual influences between the individual and the self-selected environment (e.g., in the choice of subjects at school; Eccles, 2005; Eccles, Barber, & Jozefowicz, 1999). These authors found that, influenced by the gender role norms prevailing in their peer group, girls may show a dislike for mathematics and physics and consequently make less effort in these subjects, causing their performance outcomes to fall below those of others over time, which in turn leads to reduced confidence in their ability in these subjects (Eccles, 2005; Eccles et al., 1999). These studies thus show that dynamic interactions between the person and the environment do not always lead to optimized developmental outcomes. When conditions are unfavorable (e.g., adverse gender role norms, educational disadvantaging of the family, developmental delay), the developmental dynamics between person and environment can have either

negative or positive implications for development. The decisive point here is whether the influences of biological development and socialization agents in the immediate environment (parents, teachers) suffice to bring development back on track. The further the dysfunctional canalization of the developmental trajectory has progressed, and the weaker the normative regulatory effects of biological and societal structures in the developmental ecology, the more difficult this will be.

Selection and *manipulation* of the environment play a major role in individual developmental regulation, as outlined in this chapter. In a field of action mapped out by biological and societal structures, selection is by far the most frequent form of transaction between the individual and the life-course ecology. For example, developmental paths are selected at the transition from school to vocational training (Haase et al., 2008; Heckhausen & Tomasik, 2002). Real manipulation of the environment occurs primarily in the context of social relationships with romantic partners, children, parents, friends, colleagues, and neighbors. Not only do individuals decide who to spend more or less time with and who to include in their social networks (Lang, 2001, 2004), but they also play an active role in shaping the quality of their relationships and daily interactions with social partners (Lang & Heckhausen, 2002, 2006; Lang, Reschke, & Neyer, 2006; Rook, Sorkin, & Zettel, 2004). These social relations come to constitute the everyday social environment and thus have a ubiquitous influence on the individual's future development through model learning (for better or worse), conformity, contrast, and contradiction.

The emergence of subgroups with shared value beliefs and normative ideas about the nature of a successful life course, key aspects of which may differ from the conceptions of society as a whole, is an important aspect in the selection and shaping of social networks. If these subgroups become strong enough, they can create their own social developmental ecologies. The student movement of the late 1960s and early 1970s is one example of this phenomenon. Although these ideological subgroups do not, by any means, create real countersocieties, they can shape the life courses of their members and the perspectives of society in general to such an extent that they instigate social change and ultimately lead to long-term transformation of societal institutions (e.g., marriage and divorce legislation). At political and social turning points, the dynamic transactional efforts of individuals, coupled with the leverage of the collective, can develop enormous – although rare – power that changes the societal conditions of lifespan development lastingly and irreversibly, far beyond the individual's immediate social ecology.

Summary

Individuals' motivated influencing of their own development goes far beyond a mere person/situation interaction. Individuals must navigate their way through the opportunity structures dictated by biological and societal influences and commit to action paths that open up certain opportunities and put others out of reach. In so doing, individuals not only shape their own future but also have an active influence on the developmental ecology and thus on their future scope for action. Although the biological (e.g., genetic makeup, biological maturity, or age) and societal (e.g., social mobility within a society, individual social background) circumstances determine and limit their developmental potential, individuals not only have the freedom to make the best of the given conditions, but they can also seek to actively shape the conditions of their development by means of selection, evocation, and manipulation. These transactions are not always conscious, or indeed to the advantage of the individual, whose choices (e.g., of a career or a partner) shape the social environment, for better or worse. Nevertheless, individuals can and do become agents in shaping the social ecologies for their own development and thus exert powerful influences on their developmental potential and future life course.

Review Questions

1. *Which influences determine the opportunities and constraints that the lifespan offers as a field of action for developmental regulation?*

   Biological processes of maturation and aging (inverse U-shaped trajectory), the age-graded societal scaffolding of the life course by means of institutions and prescribed age transitions (school entry, retirement), the canalization of occupational and family careers, and socially learned, normative conceptions about age-appropriate behavior and changes in (occupational, family) status

2. *What are the two components of the two-process model of intentional self-development (AAI)?*

   Assimilation, persistent striving; accommodation, flexible goal adjustment

3. *What are the tenets of the Motivational Theory of Life-Span Development?*

   Primacy of primary control striving; secondary control striving for motivational self-regulation; optimization of goal selection; congruence with control opportunities, consideration of the consequences for other goals, and avoidance of a selection that is too narrow; goal selection, goal engagement, and goal disengagement as discrete behavioral phases with functionally adjusted mindsets; and motivational self-regulation before and after meeting a developmental deadline

4. *What are the three components of the model of selection, optimization, and compensation (SOC model)?*

   (Elective and loss-oriented) selection of functional areas; optimization, investment of resources in these preferred functional areas; compensation, attempts to compensate for developmental losses in preferred functional areas

5. *What role do developmental goals play in individual developmental regulation?*

   Developmental goals organize developmental regulation, endowing behavior with direction, coherence, and meaning on the medium and long term. Incongruence between implicit motives and developmental goals is maladaptive.

6. *Are individuals completely free in the choice of the developmental goals they pursue?*

   No. If the developmental goals selected are not in line with the opportunities to attain them at a given age or in a social group, goal attainment will be impossible or, at the very least, extremely difficult. Adaptive choices are characterized by congruence between developmental goals and the opportunities for their attainment.

7. *What are the major conceptual differences between the AAI model proposed by Brandtstädter and colleagues and the Motivational Theory of Lifespan Development (see also "lifespan theory of control") developed by Heckhausen and Schulz?*

   The AAI model sees developmental regulation as self-regulation, whereas the lifespan theory of control conceptualizes developmental regulation as optimization of control (primary control) across the lifespan. For Brandtstädter and colleagues, the criterion for successful development is a consistent self; for Heckhausen and Schulz, it is the maximization of control potential across the life course and across life domains.

8. *What are the major conceptual differences between the MTD model and the SOC model?*

   The MTD model assumes the primacy of primary control striving, whereas the SOC model estimates the functionality of

(continued)

an individual's developmental regulation based on subjective well-being. The MTD model conceptualizes goal selection (optimization) as superordinate and controlled by specific heuristics that are aligned with a long-term primary control. In the SOC model, all three strategies – selection, optimization, and compensation – are conceptualized as operating at the same level. The MTD model conceptualizes motivational meta-processes of secondary control, which is not the case for the SOC model.

9. *Which phases are distinguished in the action-phase model of developmental regulation?*

   Predecisional phase and goal selection using optimization heuristics → the Rubicon of decision → non-urgent goal engagement, changing to urgent goal engagement as a developmental deadline approaches, with strategies of selective primary and secondary control as well as compensatory primary control → goal disengagement and self-protection in cases of failure, with strategies of compensatory secondary control. One of the main assumptions of the action-control model is that, to ensure the efficient use of resources, the transitions from the predecisional to the postdecisional phase of goal engagement and from the goal-engagement phase to goal disengagement are not gradual or continuous but discrete, rapid, and comprehensive.

10. *What is a developmental deadline?*

    Developmental deadlines are points or stages in life at which the prospects of achieving an important developmental goal decrease sharply, such that continued goal pursuit is either futile or requires heavy investment of resources that are then no longer available for other important domains of primary control. One example of a developmental deadline is the "biological clock" for childbearing in middle adulthood.

11. *What are the central assumptions of the lines of defense model?*

    According to the lines of defense model, optimal adjustment to increasing health-related and functional limitations is achieved by means of a sequentially organized goal adjustment. This means that individuals focus on functional levels and goals that are still achievable and only disengage if they become unrealistic in order to set newly adjusted goals. Such sequential and discrete goal adjustment should be particularly adaptive in people with chronic or progressive diseases. The reverse process is also possible if individuals regain lost functional levels as a result of rehabilitation following an accident or surgery.

12. *What are the effects of incongruence between goal engagement/disengagement and opportunities for goal attainment across the lifespan?*

    Incongruence of developmental goals and opportunities for their attainment leads to deterioration in psychological well-being and can result in depressive mood and inhibit primary control striving. This pattern of relationships has been found in different domains of life (e.g., family, education) and has also been observed to apply to behavior in the context of health impairments.

13. *What is the best way for people to engage in several areas of life?*

    We usually have to engage simultaneously in multiple areas of life. Therefore, it is important that the goals we pursue in different domains are compatible at least with regard to their content and the behavior required for their realization. A coherent set of personal life and developmental

goals is an important prerequisite for a fulfilling life, which applies in particular to old age.

14. *To what extent can individual developmental regulation be seen as a dynamic interaction between development and motivation?*

    It is as a result of the individual's active influence on his or her own development through goal pursuit that the opportunities and constraints of the situation really come to bear. Not only are individuals producers of their future, they actively influence their own future developmental ecology by means of selection, evocation, and manipulation, thus setting the stage for their future developmental regulation.

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Motivation at School and University

18

Joachim Stiensmeier-Pelster
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18.1 Introduction: Motivation as Explanation for Differences in Performance

People differ with regard to how fast and well they work on tasks. The same holds true for learning. If people are required to learn something new or develop a new competence, it takes them a different amount of time, and the quality of their final outcomes will hardly be the same. Students and instructors at schools and colleges know this from their own experiences. They all know that different students will write less or more on exams and that the quality of their performances will differ. Various factors are responsible for these differences as a recent analysis by Hattie (2014) showed. Different intellectual capabilities are of course one of these factors. The previous achievement level of students has a substantial influence on how well they will learn new things (effect size according to Cohen, 1988: $d = 0.65$, which indicates a moderate or large effect). Differences in achievement are furthermore caused by differences at home (degree of stimulation at home: $d = 0.57$; socioeconomic status: $d = 0.57$), differences in teacher quality ($d = 0.44$) or differences with regard to school quality or facilities ($d = 0.43$ for school size). In addition to all of these factors, differences in students' motivational conditions also determine academic performance. Hattie (2014) showed, for example, that various motivational variables have a moderate influence on performance: motivation ($d = 0.48$), concentration, effort and engagement ($d = 0.48$), self-concept ($d = 0.47$), or absence of fear ($d = 0.40$).

Apart from Hattie's analysis, several impressive laboratory and field studies have shown that motivation has a strong impact on learning behavior, outcome, and performance. Several such analyses were based on the expectancy value theory by Eccles and Wigfield (2002) that has received much empirical attention since the 1980s. Students' mathematical competence in PISA (Baumert, Stanat, & Demmrich, 2001), for example, can be predicted significantly with the mathematical self-concept, mathematical and general self-efficacy, and interest in mathematics (Kriegbaum & Spinath, 2016). Laboratory studies have found that motivational orientation (Dweck & Leggett, 1988), another construct that has been widely discussed in recent years, influences learning behavior and performance. Concretely, an achievement goal orientation makes it more difficult to learn something new if a person simultaneously has a low academic self-concept (Schöne,

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Dickhäuser, Spinath, & Stiensmeier-Pelster, 2012). However, an achievement goal orientation paired with a high academic self-concept as well as a learning goal orientation (independent of the self-concept) benefitted learning (Spinath & Stiensmeier-Pelster, 2003; Stiensmeier-Pelster, Balke, & Schlangen, 1996).

However, motivational variables do not only influence learning behavior, outcome, and performance with regard to the performance requirements usually found in schools or universities. Substantial evidence suggests that motivational variables also affect how individuals perform on intelligence tests and even how intelligence develops. For example, Eckert, Schilling, and Stiensmeier-Pelster (2006) showed that students with a low academic self-concept performed much worse on a common intelligence test than students with a high academic self-concept if any problems occurred while they were working on the test. If, however, the test could be taken without any such problems, no systematic differences were found (see box below). Moreover, Bergold and Steinmayr (2016) found that children's intelligence developed more poorly in primary school if their avoidance motive (fear of failure, cf. Atkinson, 1957) was strong (see box below).

Two Studies

Motivation Influences Performance on Intelligence Tests and Intelligence Development

Eckert et al. (2006) investigated the influence of academic self-concept on the performance in an intelligence test. Students were asked to participate in an evaluation of their mathematical intelligence based on the subtest number sequences from the Intelligence Structure Test 2000 (IST2000; Amthauer, Brocke, Liepmann & Beauducel, 2001). The participants were divided into two groups. One group worked on the original IST2000 exercises. Because the first number of exercises is fairly easy and students can usually solve them quickly without problems, the authors assumed that participants would initially develop the hope to perform well on the test. In the terms of the achievement motivation theory of Atkinson (1957), they were expected to develop hope of success. At first glance students in the second condition (fear of failure) received the same set of exercises. However, exercises 3 and 4 were changed in a way that made them impossible, which the participants did not know. Students in this condition developed what Atkinson called fear of failure because the third and fourth exercise elicited the expectation that they might perform poorly on the test. All students had answered a questionnaire on their academic self-concept prior to the intelligence test. Based on these results, they were grouped in a "high" self-concept and a "low" self-concept group. The results showed that the academic self-concept strongly influenced performance in subsequent exercises if the third and fourth exercise were manipulated to induce fear of failure (cf. Fig. 18.1). Individuals with a low academic self-concept solved fewer subsequent exercises than those with a high self-concept. This difference did not occur in the condition that used the original exercises of the IST2000. Apparently, the performance on this intelligence test was influenced by motivational variables, namely academic self-concept and fear of failure.

Motivation does not only affect the performance on an intelligence test, but even impacts how intelligence develops over time. This was, for example, shown in a study by Bergold and Steinmayr (2016) who looked at the development of achievement motivation and intelligence in primary school children. Achievement motivation (hope of success vs. fear of failure; measured with a questionnaire that was read to the children) and intelligence (measured with the CFT1 by Cattell) were measured twice: once at the end of the first school year and again 9 months later at the beginning of the second school year. The results showed

that the average intelligence development over 9 months matched the expected course. The children gained about six IQ points at average. This positive development, however, was not found in all children. Those with a strong fear of failure at the beginning of the study gained fewer IQ points until its end. The authors concluded that high fear of failure can impair intelligence development. Further analyses revealed that this pattern was particularly prominent in students whose general intelligence was below average. This means that first year students with low intelligence seem to be more strongly affected by fear of failure than those whose intelligence is higher. Hope of success, on the other hand, did not have an impact in intelligence development.

18.2 Expectancy Value Theory of Achievement Behavior by Eccles and Wigfield

As mentioned earlier, the expectancy value theory developed by Eccles and Wigfield (model of achievement-related choices: Eccles, 1984; Wigfield & Eccles, 2000; Wigfield, Tonks, & Klauda, 2016) has been one of the most popular and most-discussed explanations of achievement-related behavior for more than three decades (see also Chap. 6, Sect. 6.4.4, and Chap. 16, Sect. 16.6.2). One of its primary advantages is that it provides a framework for the integration of motivational variables that are relevant from a pedagogical and psychological perspective. Figure 18.2 gives an overview of the model based on the description by Wigfield et al. (2016). We will first briefly address the variables included in the model and assumed causal relationships between them before subsequently discussing them alongside a few other important pedagogical and psychological variables. Then, we will take a look at the role of self-regulated learning at school and university. Although this paradigm is highly relevant to several aspects of Eccles and Wigfield's model, they did not address it explicitly. Therefore, we will here use the cyclical phase model of self-regulated learning by Zimmerman (2000) which is another famous theory that has resulted in many studies on processes of self-regulation (cf. Sect. 5).

The two constructs expectancy (of success) and value (of tasks) are the proximal determinants of achievement-related behavior in the model of achievement-related choices by Eccles and Wigfield. They have dominated research on achievement motivation from the beginning (Atkinson, 1957; Lewin, 1938) and over the course of several decades (cf. Chaps. 5 and 6 in this volume). Expectancy and value determine several factors: which tasks we choose (task selection), our persistence when confronted with difficulties or failure, how much effort we put into a task (intensity), and the latency period, i.e., the time that passes until we start working on a task. Via these behavioral parameters, expectancy and value influence performance and learning. Expectancy and value are task-specific, which means that they depend on what task we con-

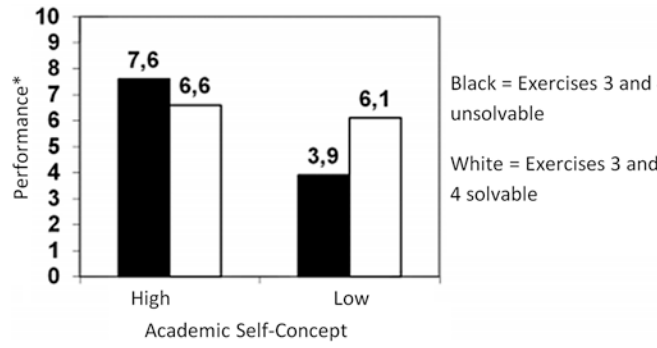

Fig. 18.1 * Performance = solved number sequence exercises on the IST-2000 while experience fear of failure (exercises 3 and 4 unsolvable) or hope for success (exercises 3 and 4 solvable) in dependence of the academic self-concept

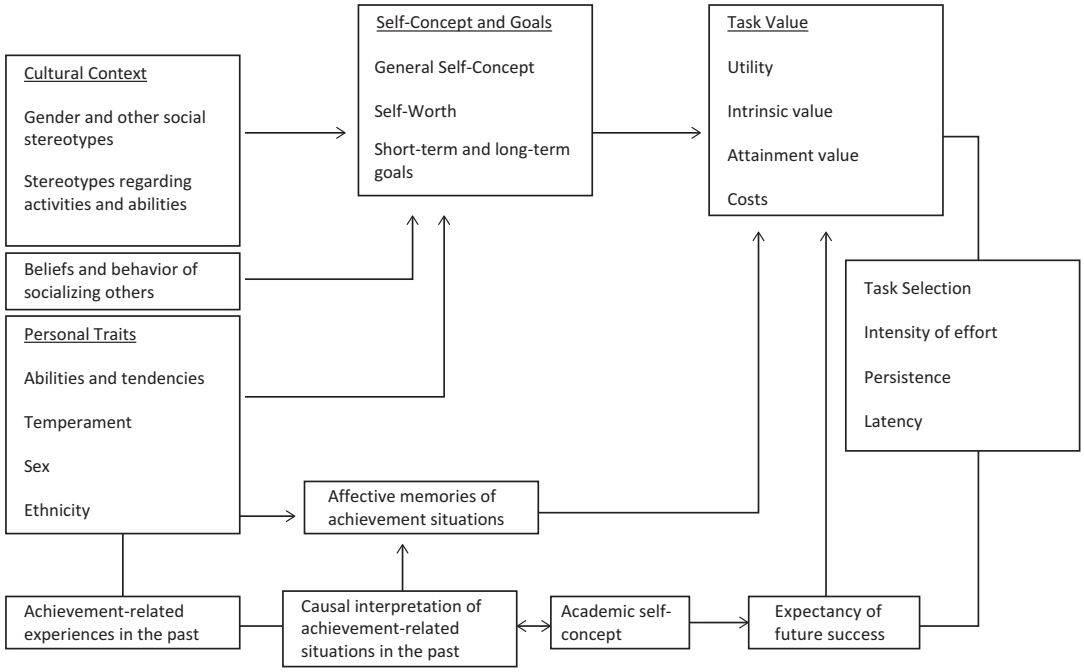

Fig. 18.2 The expectancy value theory of achievement behavior by Eccles and Wigfield

cretely focus on at the moment. We will discuss this issue in more detail further below. The value of a task depends on four different facets: utility, intrinsic value, attainment value, and costs. Expectancy refers to the subjective expectation of success, i.e., how likely we think it is that we will successfully complete a task.

On the one hand, expectancy and value depend on the assumptions people have with regard to their self-image (general self-concept, academic self-concept, self-worth). General self-concept and self-worth are more likely to affect the value of a task while the academic self-concept seems to influence our expectancy. In addition, the value of a task is determined by our short-term and long-term goals as well as our affective memories regarding achievement-related behavior in the past. Affective memories do not only actively shape the value of a task, but also influence it indirectly through our self-image and pursued goals.

These assumptions and affective memories are formed based on our past experiences with and interpretations of achievement-related events. In particular, they depend on how we explain the reasons for behavioral outcomes (for the role of causal attributions in achievement behavior, cf. Chap. 15 in this volume). In addition, they are influenced by our individual cultural environment which affect the beliefs and actions of important people in our socialization (e.g., parents, teachers, classmates). Expectations and standards they use to evaluate our behavior are particularly impactful. It is also crucial how the influential people in our socialization react to the outcomes of our behavior, i.e., whether they praise or blame our good and poor performances, respectively (cf. section on parental conditional regard in 5). Cultural factors include gender role expectations or stereotypes about gender-congruent abilities (e.g., "Girls are bad at math."; cf. Tiedemann, 2000) as well as socioeconomic influences (e.g., influence on aspirations). Remarkably, the model by Eccles and Wigfield can determine the impact of various social and cultural factors on achievement-related behavior and its outcomes.

Following this short overview, we will now take a closer look at the determinants of achievement-related behavior and their causal relationships. For this purpose, we will elaborate variables described by Eccles and Wigfield as well as others which these authors have so far neglected, e.g., the role of self-worth, goal orientation, or

parental conditional regard. We will start with the proximal determinants of achievement-related behavior (expectancy and value) and then move on to comparatively distal determinants (students' believes and the behavior of others affecting their socialization).

18.3 Achievement-Related Behavior as a Result of Expectancy and Value

The conceptualization of the expectancy variable can be more or less specific depending on the specificity of the behavior that is to be predicted. For example, if we would like to predict whether a new student is more likely to choose a scientific major over a foreign language, the expectancy variable of interest is not task-specific but domain-specific. If, on the other hand, we are interested in whether or not the student will attend an additional tutorial alongside a lecture, the expectancy variable becomes very specific, namely related to this particular lecture. Expectancy is always conceptualized as the subjective expectation of success. Thus, it always refers to future events or behavior. At this point, expectancy in the model by Eccles and Wigfield is fairly similar to efficacy expectations described by Bandura (Bandura, 1995; Bandura, Adams, & Beyer, 1977) because the individuals whose behavior we want to predict are always asking themselves if they will be able to successfully complete future tasks or not. To answer this question, they have to assess their individual abilities that will help them succeed in these particular tasks. Nevertheless, efficacy expectations and academic self-concept are not the same! In contrast to expectancy according to Eccles and Wigfield or Bandura's efficacy expectations, the academic self-concept is not primarily concerned with future behavior. Much rather, it refers to the "status quo." Still, the academic self-concept affects our expectations of success as the latter will be higher if our academic self-concept is higher (cf. the discussion of determinants of expectations of success in Sect. 4).

Definition

Constructs Related to Self-Concept

Definitions of self-concept, self-worth, academic self-concept, efficacy expectations, and outcome expectancy: *Self-concept* is a nonevaluative, cognitive description of the traits, abilities, preferences, etc. that people ascribe to themselves. In other words, it refers to how individuals define themselves or as Coopersmith (1967, p. 20) wrote: "As defined here, 'the self' is an abstraction that an individual develops about the attributes, capacities, objects, and activities which he possesses and pursues. This abstraction is represented by the symbol 'me', which is a person's idea of himself to himself." Thus, the self-concept is a theory people develop about themselves or in the words of Epstein (1973, p. 407): "The self-concept is a self-theory. It is a theory that the individual has unwittingly constructed about himself…."

While the self-concept is a description of our self, *self-worth* refers to the affective-evaluative component of the self. Following Brown and Marshall (2006), Schöne and Stiensmeier-Pelster (2016, p. 10) thus define self-worth as the "… emotional self-appreciation and self-evaluation of the entire person …, i.e., to like ourselves and feel good, right and precious."

The *academic self-concept* is the part of the self-concept that covers the abilities that people ascribe themselves. Stiensmeier-Pelster and Schöne (2008, p. 63) therefore define it as "… the entirety of the cognitive representations of our own abilities … This includes ideas about their extent, structure and stability. Potential affective-evaluative appraisals of our own abilities, on the other hand, are part of our self-worth."

Initially, Bandura et al. (1977, p. 126) presented a definition of *efficacy expectations* that limits them to concrete behavior: "An efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes".

(continued)

Bandura (1995, p. 2) later defined efficacy expectations in much more general terms: "Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations". Bandura defined *outcome expectancies* as follows: "An outcome expectancy is defined as the estimate that a given behavior will lead to certain outcomes" (Bandura et al., 1977, p. 126).

The *value variable* covers four facets: attainment value or importance, intrinsic value, utility value or usefulness of task, and cost.

"Attainment value" refers to the "inherent importance of a task." The specifics of this importance, however, were not elaborated by Eccles and Wigfield. The "inherent importance of a task" might result directly from its relationship with an individual's self-concept and self-worth. With regard to the latter, there is a close connection between attainment value and self-worth contingence, i.e., how self-worth depends on meeting standards defined by ourselves or by others. A task seems to be particularly important if it represents a domain in which self-worth is contingent. This means that a task becomes more important, the stronger our self-worth is determined by whether we succeed or fail in completing them. Our self-worth is protected or increases if we successfully finish these tasks. Failure, on the other hand, impairs our self-worth.

Furthermore, the "attainment value" should be higher for tasks which are representative of our self-concept. This is the case if our self-concept is shaped by working on the tasks in question. A student, for example, who defines herself as a "physicist" or at least claims to be "interested in physics" would thus prefer tasks with a connection to physics because they match her self-definition, i.e., the image she has of herself. The self-concept is only affected by completing the task if we do so successfully because it is the only way to realize the desired attainment value. The position that "attainment value" is only realized by successful task completion is derived from findings by Braun and Wicklund (1989). Their studies on the phenomenon of symbolic self-completion found that individuals with a strong commitment to a particular identity (e.g., "being a physicist") tend to adopt symbols that strengthen said identity in various ways if they experience failure while building their identity. This is because failure precluded the realization of "attainment value." Their self-concept was not boosted, but rather damaged. However, in order to maintain a certain self-concept, the adoption of symbols that strengthen the concept became a "substitute."

The "intrinsic value" of a task refers to the enjoyment we anticipate when working on the task. Intrinsic value is directly influenced by our affective memory. We expect to gain particular enjoyment from a task that has proven to be enjoyable in the past. The definition of intrinsic value as the enjoyment felt while working on a task makes it similar to intrinsic motivation defined as the type of motivation that is inherent to a given task (cf. Chap. 14 in this volume). There are other possible incentives in addition to enjoying a task. Working on a task could, for example, also satisfy our interests, which in turn increases its "intrinsic value" (cf. Schiefele, 2009). Intrinsic value, however, is not always exclusively defined by task-inherent incentives. In an analogous manner to the achievement motivation theory by Atkinson (1957; cf. Chap. 6 in this volume), pride following completing a task can be an important incentive. The more pride an individual anticipates when finishing a task, the higher its intrinsic value becomes. Weiner's (1985) attributional theory of achievement motivation also defines pride in success that is attributed to internal causes as an important behavioral incentive. How we experience an intrinsic value defined by pride is also directly affected by our affective memory: After all, we have to be able to remember past events when we felt proud in order to anticipate pride in the future.

The "utility value" or "usefulness of a task" is determined by how well it matches the future goals pursued by an individual. If a future employer (e.g., a school), for example, expects prospective teachers to have advanced knowledge about the psychology of learning, so they can work effectively with a heterogeneous group of students, the utility value of successfully taking a psychology

class at college would be high. Thus, the "utility value" is more closely related to extrinsic motivation because the value of a task depends on the attractiveness of its outcomes (in our example, being successful in a psychology class). It also corresponds to outcome-consequences as defined in the extended cognitive model of motivation by Heckhausen (1977; cf. Chap. 14 in this volume). In this model the outcome is the successful participation in a psychology class. Its utility value depends on the attractiveness of the consequences as well as on the outcomeconsequences expectations (instrumentality). It is therefore not only important if the consequences are perceived as attractive (e.g., getting a good teaching job), but rather as how closely related we perceive the result (proof of successful participation in a psychology class) and its consequences, i.e., its instrumentality. Utility value is thus defined by the attractiveness of outcome-consequences and the instrumentality of the result for these consequences (cf. Vroom 1964).

Wigfield and Eccles broke down the fourth facet of value, "costs," into three subordinate facets. All three have in common that working on a particular task requires the investment of different types of resources. Costs result, for example, from the fact that working on a particular task restricts our potential engagement in alternative tasks. These particular costs increase the more attractive the alternative is or the higher the restrictions (i.e., are we not able to work on the alternative at all or do we only have to postpone it). Time as a resource is a particularly important component for this kind of costs because investing time in one task limits our available time for another. The second cost factor refers to the amount of effort required for completing a task. The definition of effort is very broad; it covers both mental and physical resources. The third and final cost factor is the emotional costs of working on a task. The experience of shame when failing is an important part of these costs alongside emotions such as frustration, disappointment, or fear. Hobfoll (1989) assumed that our available psychological or emotional resources are limited, which in turn limits the investment we can make to cover such emotional costs. The more we deplete these resources, the more likely we are to experience stress or fear of losing these resources temporarily or even permanently.

Excursus

Interrelations Between Theories

As we already discussed for pride as a determinant of intrinsic value, shame is also related to the same two theories: the achievement motivation theory by Atkinson (1957) which conceives anticipated shame as a negative incentive (incentive of failure; cf. Chap. 6 in this volume) and the attributional theory of achievement motivation by Weiner (1985) that also conceptualizes shame (experienced after failure attributed to internal-uncontrollable causes) as a negative incentive. Several recent theoretical positions and empirical findings on self-worth are also relevant to understanding the role of shame as a cost factor. Shame (which represents low self-worth) is particularly prevalent if failure is experienced in tasks perceived as especially important to self-worth, i.e., tasks on which self-worth is contingent. In contrast, success can result in high self-worth if it occurs in tasks self-worth is staked on (see above in the paragraph on attainment value). These anticipated emotional costs of potential failure which are related to self-worth are particularly prone to result in dysfunctional behavior such as self-handicapping (for an overview, see Schwinger, Wirthwein, Lemmer, & Steinmayr, 2014).

Shame as an emotional cost is an example for anticipated costs, i.e., costs that occur in the case of failure. Thus, these costs do not affect the process of carrying out a task. Rather, they come afterward. However, we can also experience negative emotions while working on a task. In addition to disappointment and frustration, feelings of fear and anxiety (e.g., before an exam) are particularly relevant. Moreover, anxiety and its accompanying negative physiological arousal (sweating, nausea, etc.) contradict

the intrinsic value of a task: We cannot enjoy a task and be afraid of it at the same time! Costs are thus not independent of one another; they are interacting.

Definition

Facets of Self-Worth

Although self-worth is frequently understood as a monolithic construct that is only defined by its level, several authors (e.g., Crocker, 2006; Deci & Ryan, 1995; Kernis, 2003) have argued that self-worth is in fact a multifaceted construct. In addition to level, the stability and contingence of self-worth are important considerations. Self-worth stability refers to how robust or fragile our self-worth is and whether it is stable over time or fluctuating. Self-worth contingence is the degree to which self-worth depends on the achievement of standards set by ourselves or others, e.g., success and failure at school or in the workplace. Optimal self-worth should thus depend not only on how high it is but also on whether it is robust and stable over time as well as independent of fulfilling certain standards (Kernis, 2003; for an overview, see Schöne & Stiensmeier-Pelster, 2016).

18.4 Determinants of Expectancy and Value

18.4.1 Determinants of Success Expectancy

Initially, subjective success expectancy depends on two factors: the individual's assessment of the objective task difficulty as an external factor and the strength of their academic self-concept as an internal factor. Concretely, we compare our own abilities to the objective difficulty and requirements of a given task. This comparison results in the subjective task difficulty, i.e., "the difficulty of a particular task for the individual": the lower the task requirements and the higher our own abilities to complete it, the easier the task seems subjectively. The estimation of the expectancy of success also requires a third variable: the amount of effort an individual is willing to spend on a task. If the completion of a task is deemed possible with reasonable effort and if completion requires effort at all, our success expectancy increases the more effort we intend to put into its completion. In general, success expectancy is therefore higher if the objective task difficulty is low and/or the academic self-concept or the intended effort is high (Kukla, 1972; Meyer, 1976). Meyer and Hallermann (1977) showed that the influence of the academic self-concept on success expectancy tends to decrease as tasks become progressively less difficult. Success expectancy is thus more strongly determined by the academic self-concept in the case of objectively difficult tasks compared to objectively easy ones. Meyer argued (Meyer, 1984, p. 43) that this relationship might in part be caused by the assumption that lacking abilities can be compensated for with extra effort.

These interactions illustrate that human behavior is determined by an extremely dynamic interplay between person factors (here the academic self-concept), environmental factors (here task difficulty) and individual behavior (here effort). Additionally, our discussion implies a particular behavior in teachers which benefits their students' performance, e.g., with regard to praise (see Box "What Teachers Need to Keep in Mind When Praising Their Students").

Excursus

What Teachers Need to Keep in Mind When Praising Their Students

When teachers praise their students, they should do so in a way that informs them about their competence and implies that they will be able to perform similarly well in the future. By doing so, teachers can support their students in developing positive perceived self-efficacy. This recommenda-

tion is based on the work by Brophy (1981), Henderlong and Lepper (2002) as well as recent studies on goal orientation (Lee & Bong, 2016) and on the self-determination theory (Ryan & Deci, 2000). Teachers' praise should also make explicit what exactly it is students achieved or which new skills they gained. Lastly, praise should focus on the contribution effort has on success by attributing success to the abilities and the diligence of a student. In general, teachers need to ensure that their praise is based on an individual reference norm. Using individual reference norms allows students to understand the connection between achievement and effort and thus stresses the value of the latter. It also communicates that students can attribute their performances to their effort, which is a controllable cause and thus beneficial to their motivation and the development of a learning goal orientation. In general, praise based on individual reference norms usually includes information about improving performance and/or growing abilities, which promotes the development of an incremental theory of intelligence (cf. Dweck, 1986) in students.

Praise should also benefit students' autonomy. To achieve this, teachers should commend on their students' initiative instead of whether or not they meet standards set by others or quietly work on tasks given to them. In this context, it can also be important to use praise in a sensitive way that acknowledges the given context. If students already act based on their intrinsic motivation (e.g., dealing with a new topic out of interest), an additional extrinsic incentive (e.g., in the form of praise) can actually supersede the primary intrinsic motivation and thus reduce a behavior which originally took place voluntarily as soon as the external incentive disappears. Even though the exact circumstances under which this so-called corruption effect occurs remain controversial, teachers should avoid unnecessary praise. Additionally, it is important to keep in mind that praise always means that one person is (positively) evaluated by another. Many students might experience this situation as controlling or even threatening. Whether or not students perceive praise as controlling depends significantly on whether praise refers to them as individuals or to their behavior. The former case is more commonly perceived as controlling. Increased self-worth contingence is another possible unfavorable outcome of this form of praise (cf. section on parental conditional regard in 5). Praise should thus always refer to a particular behavior. Moreover, beneficial praise is characterized by appropriate (i.e., high, but realistic) expectations and criteria for judging performance. In contrast, impossible expectations, which result in seldom praise or frequent disappointment and frustration in students, tend to have detrimental effects. The same is true for expectations that are too low or if teachers praise students too frequently or for completing tasks that are too simple. In such cases, students might also feel frustrated because they do not feel as if their teachers take them seriously or because they think that their ability is perceived as weak (Meyer, Mittag, & Engler, 1986).

The fact that our intended effort is part of how success expectancy is calculated implies a direct link between the expectation of success and the value component "costs." This means concretely that if our success expectancies grow as we intend to put more effort into a task, the anticipated costs should also grow as our success expectancies increase. This second relationship might seem counterintuitive at first. For now, however, we will not elaborate on this issue; instead, we will return to have a closer look at it below in the discussion of the determinants of the value components.

Another determinant of success expectancies is past experiences in achievement-related situations. What matters in particular are our perceptions and interpretations of their outcomes. Any result needs first to be compared to a certain standard in order to be able to judge it as a success (or good performance) or a failure (or poor performance) at all. Such comparisons can use objective/criterial, social, or individual reference norms (cf. Chap. 6 in this volume). A performance can thus be perceived as success or failure in three different ways: (a) because a previously established criterion was met/exceeded or missed (objective reference norm), (b) because it is better or poorer than the performance of relevant others (social reference norm), or (c) because it is above or below past performances of the same individual (individual reference norm).

Success expectancies are then directly and indirectly (via the academic self-concept) affected by whether outcomes are perceived as successes or failures. Following success, they increase for future tasks; and they shrink after failure. As was discussed in Chap. 15, the changes in our expectancies of future success are more pronounced if we attribute success and failure to stable causes, i.e., causes of which we think that they will continue to determine future outcomes. Stable causes of failure include excessive task difficulty or lack of abilities to complete a task. Attributing failure to stable causes thus means that we initially underestimated the difficulty of a given task and/or overestimated our capability to solve it. Regardless of which of these two interpretations turns out to be true, a new assessment of the (potentially higher) requirements of the task and our (potentially lower) abilities seems warranted. In turn, this assessment results in a lower expectancy of success in the future. The extent of this decrease depends on as how global we perceive the causes. The more global they are to us, the more strongly we will generalize our higher or lower success expectancies to different types of tasks.

If success and failure persist and are continuously attributed to internal-stable-global causes, they affect our academic self-concept and thus indirectly our expectancy of future success. One effect that has received particular academic attention was originally described by Rheinberg (Rheinberg & Enstrup, 1977) as "Bezugsgruppeneffekt" (comparison group effect) and later named the "big-fish-little-pond" effect by Marsh (1987). This effect predicts that the strength of a student's academic self-concept depends on the performances of their peers (in the same class or school). For the effect to kick in students need to use a social reference norm to evaluate their own performances. In this case, it becomes more likely that an individual student will perceive their own performance as insufficient (subjective failure) in a class of high-performers compared to a class in which most students tend to perform more poorly. The current debate about the inclusion of students with disabilities in regular classes needs to keep this effect of the comparison group in mind as the boxed text below on the "Side Effects of Inclusive education" discusses in more detail.

The relationship between attribution, academic self-concept and success expectancies is not one-directional. If this were the case, it would mean that attributions affect the academic self-concept which in turn shapes our expectancies of future success, but not the other way around. In fact, however, the relationship frequently goes both ways. The academic self-concept, for example, is not only influenced by causal attributions but also shapes them at the same time. A student whose academic self-concept is low might thus attribute a good grade to luck instead of their abilities (Stiensmeier-Pelster, 1988; Stiensmeier-Pelster, Schürmann, Eckert, & Pelster, 1994; see also Chap. 15 in this volume). Moreover, our expectancies of success prior to working on a task also affect our causal attributions once we complete it. For example, if we fail on a task in which we expected to succeed, we are more prone to attribute our failure to bad luck than if we anticipated failure anyway (Stiensmeier-Pelster, Martini, & Reisenzein, 1993). The surprise about an unexpected outcome also initiates our search for causes (Stiensmeier-Pelster et al. 1993; cf. Chap. 15 in this volume).

Excursus

Side Effects of Inclusive Education

The UN Convention on the Rights of Persons with Disabilities states that all young people with disabilities must be granted access to inclusive education (United Nations, 2006). There are many arguments in favor of inclusive classes. These include the creation of more engaging learning environments (e.g., higher requirements defined by teachers) or composition effects that result in bigger gains in weaker students because higher-performing students are used as a resources and positive learning model. The majority of empirical studies on inclusive schooling have so far reported that students with special needs perform better in German and mathematics compared to their counterparts in exclusive schools (cf. Kocaj, Kuhl, Kroth, Pant, & Stanat, 2014). However, the available cross-sectional results are partially relativized by studies on a longitudinal comparison between inclusive and exclusive settings (Stranghöner, Hollmann, Otterpohl, Wild, Lütje-Klose & Schwinger, 2017). One possible explanation for these findings could be the inadvertent negative side effects of inclusion. Rheinberg and Enstrup (1977) compared students at special needs schools and students at a Hauptschule (the lowest-tier secondary school in the German education system) of equivalent intelligence. Students at the Hauptschule between grades 4 and 7 had a lower academic self-concept and higher anxiety before exams than similarly intelligent students at the special needs school. These results were in line with expected effects of the respective comparison groups. As was shown above, stronger test anxiety or fear of failure and a low academic self-concept negatively affect learning behavior and performance (cf. Eckert et al., 2006).

These inadvertent side effects, however, do not always occur. In fact, skillful teachers are able to attenuate the effects of comparison groups and their negative impact on the academic self-concept of students in inclusive institutions. For this purpose, they can make use of the specific effects of different reference norms. If teachers stress the importance of individual reference norms over social ones, students become less likely to compare themselves with their classmates, which in turn lessens the effects of comparison groups (Rheinberg & Krug, 2005; Rheinberg, Schmalt, & Wasser, 1978). Moreover, individual reference norms have the advantage that students in inclusive schooling experience success more often because teachers focus on their individual improvement even if their performance is below the average of the class.

Under certain circumstances, however, the use of social reference norms is hard to avoid. In such cases teachers can take advantage of another phenomenon that can occur in intergroup comparisons: basking in reflected glory (BIRG; also knows as assimilation effect, labeling or identification effect). This effect refers to students' subjective perception of increased status in certain domains (such as the academic self-concept) that results from their identification with a group that is perceived as respected and esteemed from the outside. If the BIRG effect is activated, the inclusion of weaker students into a comparatively high-performing group can result in a higher academic self-concept. Although at first glance the name of the effect seems to imply that weaker students might take credit for the better performances of their classmates, they in fact identify with the group because of their impression that they are making their individual contribution to the group's success.

18.4.2 Determinants of Task Value

The various facets of the value of any given task are determined by our short-term and long-term goals, our beliefs with regard to our general self-concept and self-worth, and their affective memories (cf. Fig. 18.2).

With regard to the goals people pursue, motivational goal orientations are of particular relevance (see also Chap. 16, Sect. 16.7.3). These were first described by Dweck (1986; see also Dweck & Leggett, 1988) and later further developed by other authors such as Elliot and colleagues (Elliot & McGregor, 2001). Early studies on motivational goal orientations were based on the assumption that people can in principle pursue two different types of goals when working on a task: learning goals and performance goals (see Definition).

Goal Orientations
Goal orientations are habitual preferences for a specific kind of goal in learning and achievement contexts (Spinath, 2009). Learning goals are defined by the wish to gain competence or skills by working on a particular task. First and foremost, individuals pursuing learning goals are intent on learning something new by taking on new challenges and mastering them. Learning and mastering are deeply connected because the learning process is associated with working on challenging tasks that the individual has not yet mastered. People who pursue performance goals, on the other hand, are concerned with making their competence evident to others and with receiving positive feedback. Working on a task is thus primarily an opportunity to demonstrate their competence and receive some form of validation. This means that these individuals are intent on showcasing the competences they have and hide those they lack.

Several authors (e.g., Elliot, 1999; Midgley et al., 2000; Spinath, Stiensmeier-Pelster, Schöne & Spinath, 2002; Spinath, Stiensmeier-Pelster, Schöne, & Dickhäuser 2012) criticized the original definition by Dweck and Leggett (1988) due to a central disparity with regard to how the two types of goals were defined. Whereas the definition of learning goals only incorporated an approach component (learn something new and develop skills), the definition of performance goals included both an approach component (validate and demonstrate one's competence) and an avoidance component (hide incompetence). Later, Elliot and McGregor (2001) added an analogous distinction between an approach and avoidance form of learning goals. The resulting two (learning goals vs. performance goals) times two (approach goals vs. avoidance goals) matrix of motivational goal orientations, however, proved to be fairly problematic (cf. Lee & Bong, 2016) because avoidance learning goals lacked a clear theoretical and empirical distinction from performance goals. Furthermore, from a theoretical perspective, it appears counterintuitive to assume that a person's behavior is focused on challenges and competence honing, and simultaneously covers a motive of avoidance. Empirical studies also fail to distinguish between avoidance learning goals and performance goals: avoidance learning goals are positively correlated with both approach performance goals and avoidance performance goals (cf. Lee & Bong, 2016, for a detailed discussion).

Impact of Goal Orientation on the Facets of Value

The goals people pursue affect the various facets of a task's value and their affective evaluation of past performances. People who pursue *learning goals* benefit from tasks that are challenging or offer opportunities to learn new things or develop new skills. Such tasks also have a high intrinsic value because mastering a challenging task is perceived as rewarding. Negative aspects, e.g., the potential failure in a task, are barely relevant because anticipated failure is not interpreted as negative feedback on the individual's competence, but rather as information about where and how they can further develop their competence. This is why individuals hardly anticipate costs such as negative emotions (e.g., shame) because

feeling shame requires the attribution of failure to stable and uncontrollable personality traits such as lacking ability. People pursuing learning goals, however, do not usually make such attributions after experiencing failure. Even if they attribute their failure to a lack of abilities, the belief that abilities are variable, controllable, and malleable, which is associated with learning goals, protects them from feeling shame.

People who pursue *performance goals* face a very different situation. To them, useful tasks allow them to validate their abilities, demonstrate their skills, and/or compete with others. Such tasks can also have an intrinsic value because the potential of success already elicits positive emotions (e.g., happiness about future success or pride in one's strong performance) while working on a task. Pursuing performance goals, however, can always also result in failure. As was mentioned above, the subjective ratio of opportunities and risk depends on the individual's academic self-concept. If the academic self-concept is low, the individual primarily perceives the risk of failure. In this case, tasks which allow for hiding the individual's lack of abilities are perceived as particularly useful. However, such tasks cannot provide intrinsic value because they are not associated with positive emotions, but instead with the fear of failing and thus revealing one's low abilities. Moreover, potential failure is attributed to a stable and uncontrollable lack of abilities; thus, the individual focuses on potential feelings of shame that would result from failure. This fear, which the individual feels while working on the task, as well as the anticipated feeling of shame represent the costs that can make the task value negative. The individual would furthermore store the emotions associated with the task in their affective memory. If new tasks arise in the future, the individual would remember their stored affect, which in turn has a negative impact on the task value.

In addition to these consequences for the value component, several other effects of goal orientations have been documented. A performance goal orientation can, for example, result in learners applying strategies of self-handicapping in order to hide their potential lack of abilities (Urdan, 2004; for the assessment of self-handicapping, see Schwinger & Stiensmeier-Pelster, 2012; cf. Sect. 7). A performance goal orientation can also result in the avoidance of novel tasks (Turner et al., 2002). The concentration on familiar tasks that have already been mastered in the past and the avoidance of new types of tasks are not conducive to learning. Further strategies that preclude learning are the unwillingness to seek out help (Karabenick, 2004) or cheating (Bong, 2008), both of which are also associated with a performance goal orientation.

Determinants of Goal Orientation

A central determinant of an individual's goal orientation is their *naïve theory on the malleability of competences and abilities*. Learners who believe that their competences cannot be changed, have an "entity theory of intelligence" (Dweck, 1986) and are more likely to develop a performance goal orientation. In contrast, learners who believe that their competences can change and be developed over time ("incremental theory of intelligence," Dweck, 1986) tend to pursue learning goals. Peoples beliefs about the malleability of abilities and competences are an integral part of their academic self-concept (see Definition in Sect. 3). Unfortunately, the vast majority of questionnaires evaluating the academic selfconcept only include questions about the extent of participants' abilities even though Dweck has pointed out 30 years ago that beliefs about the malleability of intelligence and aptitudes can provide important insights into the development of performance and learning motivation. To the knowledge of the authors, the Scales for the Assessment of the Academic Self-Concept (SESSKO; Schöne et al., 2012) are the only instrument currently on the market which measures the changeability of competences. Differences in students' beliefs about the malleability vs. stability of intelligence seem to depend on the *reference norm orientation* of their teachers and other important individuals who affect their socialization (e.g., parent; cf. Sect. 5).

The *academic self-concept* is another important determinant of goal orientation. In individuals with a performance goal orientation, their academic self-concept determines whether they are more prone to approach or avoidance. The

purpose of approach performance goals is the demonstration of competences. This wish necessitates that the individuals believe that they actually possess the abilities they want to demonstrate. Therefore, approach performance goals require a high academic self-concept. On the other hand, the endeavor to hide low abilities is a characteristic of avoidance performance goals. They are built on a low academic self-concept, i.e., the individual's belief that their competences are low and that they are therefore unable to compete with others.

Students' goal orientations seem to be subject to historical change. Spinath, Kriegbaum, Stiensmeier-Pelster, Schöne, and Dickhäuser (2016) were able to show that the prevalence of learning goal orientation decreased in German students between 2002 and 2012 while avoidance performance goals became more common during the same time. Both effects were substantial, and their size comparable to the so-called Flynn effect found in different studies on intelligence (Trahan, Stuebing, Fletcher, & Hiscock, 2014). Even though the authors do not discuss this possibility, one potential explanation for this shift could be the increase in high stakes testing on the federal (PISA, TIMMS) and state level (VERA). These tests might distract students from focusing on their own learning progress and instead move their attention toward competing with other students. This could result in a decrease in learning goals and a simultaneous increase in performance goals. Insofar as these tests play an important role for the transition from primary to secondary education (elementary to middle school) and graduation (e.g., at the end of middle school), the risks associated with poor performances are significant. Consequently, students seem to be more concerned with hiding the abilities, and become more prone to pursuing avoidance performance goals. These trends exemplify a typical negative consequence of "high stakes testing" that has been strongly criticized in recent years (Nichols & Berliner, 2008; Ryan & Deci, 2016). The changing goal orientation in high school students might also be a consequence of the increasing importance of their GPA for entering college. If the competition with other applicants is their biggest concern, students might focus on outcomes rather than the process of learning itself. Thus, performance goal orientation becomes more prevalent and replaces learning goal orientation.

18.5 Influence of Environmental Factors on Goals and Self-Concept

The model by Eccles and Wigfield (Eccles, 2005; Wigfield & Eccles, 2000) does not only allow predictions about which personal characteristics (e.g., goal orientations, academic self-concept, self-worth) influence expectancy of future success and the value of a task. It also provides information about how differences in these characteristics are shaped by others who affect our socialization and our cultural context (e.g., gender and other social stereotypes).

The beliefs and behaviors of others who influence a student's socialization (such as parents, teachers, or peers) can have a large impact on the beliefs, convictions, and behaviors the student develops. The model by Eccles and Wigfield assumes that a student's subjective perception of these variables is more important than the objective assessment of these beliefs and behaviors or how significant others perceive them themselves. This is a crucial distinction because the same variable can be perceived very differently by students and the people who affect their socialization (De Los Reyes & Kazdin, 2005). When students face problems in learning or performance, it is therefore crucial to include not only themselves, but also their parents into the search for the causes to develop a comprehensive picture and discover potential discrepancies. Several studies have taken a look at the influence of socializing others in the contexts of learning and performance (for a summary, see Wigfield et al., 2016). Here, we will discuss an example of the role of reference norm orientations and conditional regard as well as gender stereotypes in the so-called MINT subjects.

The Influence of Reference Norm Orientations

There are stable differences across individuals with regard to the reference norm they prefer for

evaluating performances if they are given the choice between various reference norms. This tendency is known as *reference norm orientation* (Rheinberg, 2001). In general, psychologists differentiate between individuals with an individual reference norm orientation and individuals with a social reference norm orientation. Teachers who have a pronounced preference for the social reference norm communicate to their students that their performance and competences are relatively stable. Teachers with a strong individual reference norm orientation, on the other hand, convey the message that performance and competences are variable. This is because a strong focus on the usually relatively stable differences between students in the former group overshadows the development of competences that individual students might experience; in contrast, the relatively stable inter-student differences become less relevant if teachers focus on individual gains (cf. Rheinberg, 2008). Teachers with a social reference norm orientation moreover tend to attribute their students' performance to causes that are stable over time and assume that their students will continue to perform at a relatively predictable level. In contrast, teachers with an individual reference norm orientation are more likely to attribute performances to variable causes and perceive their students' behavior as less predictable over time.

Teachers' reference norm orientation has a strong impact on students' learning and behavior as well as on their performances (cf. Rheinberg, 1980; Rheinberg & Engeser, 2010; Rheinberg & Krug, 2005). First of all, differences in teachers' social vs. individual reference norm orientation should contribute to students' development of entity vs. incremental *theories of intelligence*, respectively (cf. Sect. 4.2). Secondly, the reference norm orientation influences students' *causal attributions*. Teachers with a social reference norm orientation need to provide the same or at least comparable exercises to their students in order to make an adequate social comparison. If students differ in how well they complete these exercises, teachers with a social reference norm orientation should be more inclined to attribute these differences to stable and unmalleable variations across students. As a consequence, students are more likely to be ranked relatively consistently over time (e.g., one student remains at the bottom of the class in mathematics throughout the year). Students become thus more prone to develop an internal-stable attribution style (e.g., the student at the bottom of the class assumes that he is bad at mathematics).

Thirdly, teachers' reference norm orientation should influence students' *goal orientation*. It seems likely that students in classes taught by teachers with a social reference norm orientation are more likely to develop a performance goal orientation because they see themselves as constantly forced to compare themselves with their classmates in order to assess whether or not their teacher will give them a good grade. Teachers with an individual reference norm orientation use context-sensitively diverse reference norm in their classes and provide more individual feedback to their students. They also give their students different exercises at different levels of difficulty. Informal evaluation of students' performance focuses primarily on its development over time. Changes are attributed to varying degrees of effort or strong and low situational interest. This behavior should cause students to develop an internal-variable attribution style. Students of teachers with an individual reference norm orientation should thus be more likely to pursue learning goals because their present performances are evaluated based on a comparison with past ones. In order to estimate whether or not they will receive a good grade, they need to focus on the development of their competences over time.

Some of the components of this mechanism have been confirmed by empirical studies. A study by Hong, Chiu, Dweck, Lin, and Wan (1999), for example, found evidence for the assumed relationship between implicit theories of intelligence and causal attributions. Ommundsen (2001) reported a similar relationship between the implicit class goal structure students perceived and their implicit theories of intelligence. However, there have not yet been enough studies on the effects of teachers' reference norm orientation on their students' motivational orientation.

In addition to the aforementioned indirect effects, teachers' reference norm orientation also

has direct effects on students' goal orientation. Teachers might, for example, convey the message that students' social status matters in the classroom. In order to achieve higher status, students might then compete with one another by demonstrating their strengths and hiding their weaknesses to perform well in this competition. This benefits the development of a performance goal orientation. Teachers with an individual reference norm orientation stress the importance of individual learning progress. Competition with others becomes less important than honing one's own competences. Success and failure are perceived as feedback rather than evaluation. Teachers' reference norm orientation thus influences the goal structure that dominates the classroom. In general, the so-called classroom goal structure is to a large extent determined by the goal orientation teachers create. The structure determines in turn how students perceive the learning context in the classroom and which goals they choose to pursue (for a summary, see Meece, Anderman, & Anderman, 2006). If teachers succeed in encouraging their students to focus on their own abilities (individual reference norm) instead of comparisons with others (social reference norm), they can establish a classroom goal structure with a learning goal orientation. If teachers, however, communicate to their students that it is important to demonstrate their competences and hide their weaknesses, they are more likely to create a goal structure defined by performance goals. Competitions that focus on determining a winner and encouraging students not to lag behind are particularly conducive to the creation of the latter structure. The same goes for praising achievements that are seen as positive in the social comparison and reprimanding performances that are seen as negative (cf. Box "What Teachers Need to Keep in Mind When Praising Their Students"). Praise that refers to individual progress, i.e., praise that is based on an individual reference norm, benefits the creation of a goal structure with a learning goal orientation. Whether the established classroom goal structure has an approach orientation or an avoidance orientation depends on whether teachers primarily address learning progress and gains or rather regressions in learning and failure (for a summary, see Eccles & Roeser, 2011).

The Influence of Parental Conditional Regard

Teachers are not the only ones whose praise and blame affect students' goal orientations. Students' self-concept (primarily their self-worth) is to a large extent also influenced by how other important people in their socialization (e.g., parents or grandparents) react to their performances, i.e., how strongly they praise good grades or blame bad ones. Several recent studies have therefore looked at the construct of parental conditional regard (Assor, Roth, & Deci, 2004).

Definition

Parental Conditional Regard

Conditional regard refers to a particular socialization strategy for the development or modification of children's attitudes and behavior. Concretely, parents adjust the extent of their affection and appraisal depending on their children's concrete behavior or performances. Positive regard is characterized by increased affection and appraisal when children behave or perform in a desirable way; whereas negative regard means decreased affection and appraisal when children exhibit unwanted behavior or performances (Assor et al., 2004).

The strategy of conditional regard is fairly common among parents and counselors often recommend it. Among psychologists it remains a contested question whether or not the socialization strategy benefits children's development. Proponents of the approach usually make the behaviorist argument that parental conditional regard can be an effective strategy for shaping children's behavior (e.g., Aronfreed, 1968; Domjan, 2014; Gewirtz & Pelaez-Nogueras, 1991). Critics emphasize the emotional costs of the approach (e.g., Assor et al., 2004; Rogers, 1951; Ryan & Deci, 2000). Several studies have found various negative correlates, e.g., deficits in self-regulation, excessive performance goal

orientation, and inhibited exploration, i.e., lack of intrinsic motivation (Assor et al., 2004; Roth, Assor, Niemiec, Ryan, & Deci, 2009). Parents and teachers furthermore convey the message that children only deserve regard under certain circumstances. As a consequence, children develop the idea that their self-worth depends on whether or not they meet certain criteria (Deci & Ryan, 1995; Otterpohl, Keil, Assor & Stiensmeier-Pelster, 2017). On the one hand, conditional regard, can have a positive impact on certain facets of task value (e.g., increased personal significance). On the other hand, it can negatively affect other, potentially more important facets of task value (e.g., decreased intrinsic value of a task). It is important to note, that the before mentioned impact of conditional regard on task value is mediated by an increased self-worth contingence.

Parental conditional regard is conceptually related to operant conditioning in which behavior is shaped with the help of reinforcement and punishment. When parents reinforce or punish their children by giving them more or less affection, they are using conditional regard. This means that conditional regard is always a form of reinforcement or punishment. However, not every form of reinforcement or punishment is also conditional regard. Conditional regard requires that regard following a particular behavior is directly aimed at the individual ("I appreciate you more because you got a good grade on the test about irregular verbs."), resulting in a contingent connection between behavior and person. Reinforcement and punishment can also be exclusively related to behavior without implying any message about the value of a person ("process vs. person feedback," Kamins & Dweck, 1999, p. 835). Teachers and parents can also provide feedback on children's academic performance without giving the impression that regard depends on performance ("The fact that you got a good grade shows that you understand irregular verbs well"; cf. Assor, Kanat-Maymon, & Roth, 2014).

The Influence of Gender Stereotypes

Learners' sex has a great influence on their learning and achievement motivation at school and college (for a summary, see Watt, 2016). Frenzel, Goetz, Pekrun, and Watt (2010), for example, showed that male students tend to be much more confident in their abilities than their female classmates. A study by Tiedemann (2000) found that this difference in the academic self-concept already develops at an early age. Female third- and fourth-graders rated their competence in mathematics significantly lower than male students. They also indicated to take more time to finish their homework than boys. Additionally, boys and girls differ in how they attribute achievements. Female students are less prone to attribute success to (high) abilities and more prone to attribute failure to lacking abilities. Remarkably, the differences in self-evaluation were unrelated to students' actual past and present grades in mathematics. Therefore, there must be reasons other than actual performance that precipitate these unfavorable self-assessments in girls. Gender stereotypes seem to be one of these reasons in line with the model by Eccles and Wigfield. Tiedemann (2000) showed that parents (both mothers and fathers) and teachers assume boys to be significantly more competent in mathematics than girls. These assumptions about differing competences are communicated to girls through various channels such as assumptions about the potential causes of their performances. For example, teachers tend to convey to their male students that success is caused by their abilities whereas failure is due to a lack of effort; in contrast, girls are usually told that their successes are a result of their effort and their failures due to a lack of abilities (Tiedemann & Faber, 1995). Praise and blame, emotional reactions and task assignment are other channels that can communicate equivalent messages (for a summary, see Meyer, 1984). If teachers perceive the abilities of a particular female student as low, they tend to praise her particularly greatly for success. At the same time, they are surprised at her success and assign her easier exercises if such a differentiation is possible. How important socializing others assesses students' competences does not only influence their own assessment but also their learning behavior and actual performance (Tiedemann, 2000). Regardless of their real competence (operationalized by past grades),

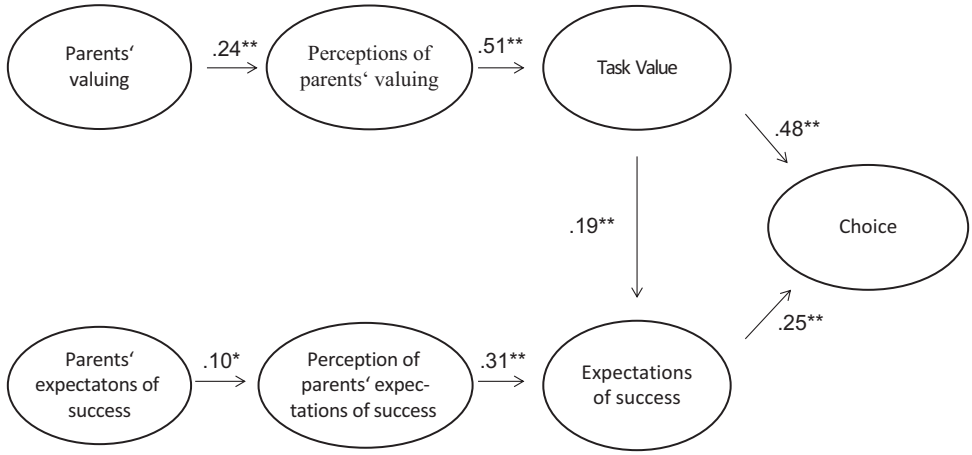

Fig. 18.3 Path model for predicting choice of computer course. Above the paths are the standardized path coefficients. ** $p < .01$; * $p < .05$

students perform better in mathematics if their teachers perceive them as more competent.

Gender stereotypes held by important socializers also affect which subjects students choose at school. If given the choice, male students are much more likely than female students to pick MINT subjects (Dickhäuser, 2001). As Dickhäuser and Stiensmeier-Pelster (2003) documented for computer classes, these different preferences can be explained with students' expectancies and values (cf. Fig. 18.3). As Eccles and Wigfield predicted, expectancies and values are in turn influenced by the attitudes of parents. Students were more confident that they could perform well on computer courses (expectancy of future success) if they assumed that their parents perceived them as competent enough to do so. They also judged the course to be of higher value if they thought that their parents also perceived it as valuable. Students' assumptions about their parents attitudes also corresponded to parents' self-reported attitudes (cf. Fig. 18.3).

18.6 Zimmerman's Cyclical Phase Model of Self-Regulated Learning

The expectancy value theory allows for the prediction of behavioral intentions that explain differences in task selection and persistence during goal striving. The model primarily focuses on the factors that influence the creation of intentions; its central question is how interpersonal differences across students (e.g., in their academic self-concept, goal orientations) affect differences in achievement motivation (differential perspective). In other words, the model tries to predict the strength of achievement motivation in different students. Let us now consider the example of a particular student who has already formed the intention to engage more closely with a particular topic. This means that his achievement motivation for the upcoming learning process is high. But what exactly does this process look like? Does it pass through distinct phases? And how can the student actively influence the process? The expectancy value model cannot provide satisfying answers to questions on such psychological mechanisms (process-oriented perspective). Theoretical models on self-regulated learning, however, offer important insights. These models allow for the differentiation of goal selection and realization while simultaneously integrating these processes in an overarching framework (see also Chap. 12, Sect. 12.2). Several established approaches describe the process of self-regulated learning, e.g., the model by Boekaerts (1996; Boekaerts & Niemivirta 2000) and the model by Zimmerman (2000). Here, we will take a closer look at the latter.

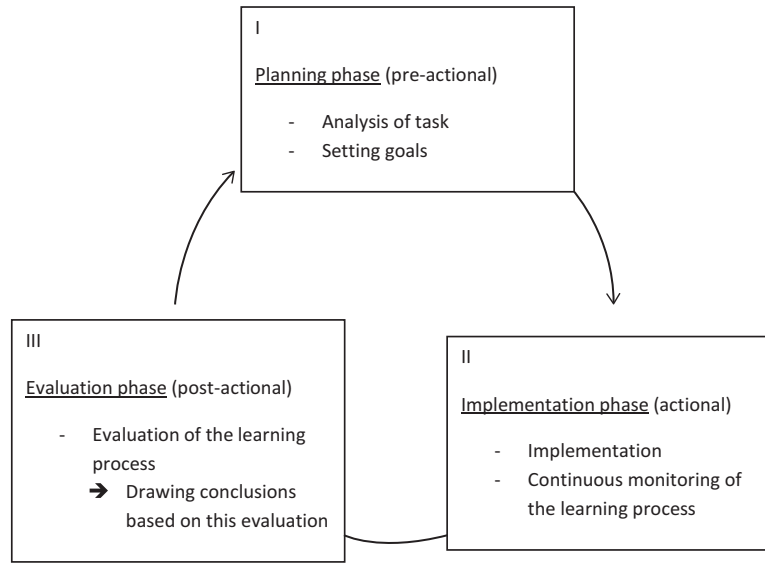

Fig. 18.4 Zimmerman's cyclical phase model of self-regulated learning

Definition
Self-Regulated Learning
Weinert (1982) defines self-regulated learning as the process during which learners "… can substantially influence the central decisions of whether, what, when, how and for what purpose they learn."

Zimmerman (2000) describes self-regulated learning as a social cognitive process that is characterized by the interplay between personal, behavioral, and environmental factors. Self-regulation refers to the learners' active and continuous adjustment of these three groups of factors. Learners also make use of adequate strategies for the optimization of the learning process. Thus, learning becomes a cyclical process in which the outcome of past learning activities affects the goals set for future learning. (cf. Fig. 18.4).

This cyclical process can be divided into three phases: a planning phase (pre-actional phase), an implementation phase (actional phase), and an evaluation phase (post-actional phase). During the planning phase, self-regulated students analyze an upcoming task and (if no goals are given) set goals and potentially subgoals. The student then realized these learning goals during the implementation phase. Self-regulated learners continuously monitor their own learning during implementation. The evaluation phase allows for the assessment and appraisal of the completed learning process. The student compares the outcome with the initial goals and derives conclusions for future learning processes. Should the student be dissatisfied with the results, they might, for example, decide to change to a different learning strategy or set less demanding goals in the future. Each of the three phases involves various cognitive, motivational-volitional, and metacognitive components:

1. Cognitive components: These include conceptual (e.g., knowing several learning strategies) and strategic knowledge (e.g., about the effectiveness of various strategies under given circumstances) and the ability to apply this knowledge. A student might, for example, summarize the main ideas after reading each paragraph of a text.
2. Motivational-volitional components: These include behavior that is aimed at initiating and maintaining learning activities. Before reading a text, the student might, for example, imagine as a reward that they will play soccer

with friends afterward. While reading the text, they then have to keep their motivation and shield their intention to learn from competing influences and goals. This is achieved with volitional strategies that are used to adequately deal with internal and external distractions. The student could, for example, turn off their cell phone to avoid being distracted or react to discouraging thoughts by taking a deep breath and counting to ten in order to concentrate on their task again afterward.

3. Metacognitive components: These include self-monitoring, planning, and the adaptive adjustment of learning behavior with regard to the pursued goals. In order to monitor and evaluate their learning process, the student could each day estimate how long they will take before starting their homework. Later, they can assess whether they completely finished their homework, how long it took, and how long they were doing different things during that time.

Excursus

How Teachers Can Facilitate Self-Regulated Learning

Several strategies for the promotion of self-regulated learning can be derived from Zimmerman's model. Teachers can support their students in setting goals that benefit their motivation during the *planning phase* by applying the SMART principle. According to this principle, a goal is conducive to motivation if it is *specific* enough and clearly states the conditions under which it is accomplished; if it is *meaningful* to the students; if it is *achievable* and neither too easy nor too difficult (*realistic*); and if it is clear until when students are expected to realize it (*timely*). Some students have a hard time when trying to set goals and commit to them. If students struggle with self-regulation, behavioral contracts can be helpful during the planning phase. Based on the SMART principle, a student formulates a contract about a concrete behavior their teacher and parents. This contract includes clear criteria for the objective assessment of whether or not a goal has been achieved; as well as rewards, students receive once they realize the goal. Anticipated difficulties and potential solutions can also be included. Students, parents, and teachers all sign the contract to signalize that all parties intend to do their part to fulfill the contract. The student should be treated as an active and full-fledged signatory; this can increase their willingness to take responsibility for their part of the contract. Figure 18.5 gives an example for a behavioral contract that uses a simple token system. Teachers should not use response cost systems that also involve the withdrawal of an already received reinforcement at school unless they are cooperating with a psychological professional. The improper use of response cost systems can have a severe negative impact on the relationship between teachers and students.

Teachers can introduce specific self-instruction strategies to ensure that their students' *implementation phase* is structured and focused. Special cards that use certain symbols (such as a stop sign) can help children solve an exercise step by step while thinking aloud ("What should I do? What is the plan?"). As they grow more experienced, students can move to whispering and internal self-instructions as well as learn to apply the strategies they have acquired to new situations. Students can also train how to deal with external and internal distractions (e.g., loud classmates, thoughts that distract from learning) about which we will say more in the upcoming paragraphs.During the *evaluation phase,* teachers can influence how the learning outcome is evaluated and interpreted. A learning diary is a useful instrument that can be used over the course of several weeks to evaluate a student's learning behavior (e.g., with regard to homework)

Behavior	Reward
Goal: ***I will be back in the classroom on time after recess*** This means: ***I am sitting at my desk when the bell rings for the second time*** I put stickers on the sticker card.	Each time ***when I am back in the classroom on time after recess*** I receive a sticker from ***Mrs. Smith***. If I am ***late once***, ***Mrs. Smith will no longer reprimand me***. But I also do not get a sticker. I can exchange the stickers at the end of the contract with ***Mrs. Miller***: 15 stickers = ***a pack of trading cards*** 18 stickers = ***going to see a movie with Mrs. Miller*** 20 stickers = ***going to a theme park once***

Contract between ***Lucas*** (student), ***Mrs. Smith*** (teacher) and ***Mrs. Miller*** (parent)

The validity of the contract is from ***October 23*** to ***November 3*** (two weeks)

I can do the following thing to achieve my goal:

Leave immediately once the bell ring for the first time.

Possible difficulties I might face:

Jim wants to talk about football for a little longer.

If I face these difficulties, I can do the following:

I tell Jim that we can continue talking during the next recess period.

I suggest that we can meet up after school.

Signatures:

Student: ***Lucas***

Teacher: ***Mrs. Smith***

Parent: ***Mrs. Miller***

Sticker Card
I was back in the classroom on time after recess. ☺

	Monday	Tuesday	Wednesday	Thursday	Friday
Date	October 23	October 24	October 25	October 26	October 27
1st recess	Put sticker here	Put sticker here	Put sticker here	Put sticker here	Put sticker here
2nd recess	Put sticker here	Put sticker here	Put sticker here	Put sticker here	Put sticker here
	Monday	Tuesday	Wednesday	Thursday	Friday
Date	October 30	October 31	November 1	November 2	November 3
1st recess	Put sticker here	Put sticker here	Put sticker here	Put sticker here	Put sticker here
2nd recess	Put sticker here	Put sticker here	Put sticker here	Put sticker here	Put sticker here

Fig. 18.5 Example of a behavioral contract

(continued)

on the basis of the same set of questions each day. The long-term use of learning diaries helps students with the systematic analysis and realistic assessment of their learning process without having to rely on potentially distorted memories. Just like self-instruction, learning diaries let students internalize strategies that eventually make the diaries unnecessary. Thus, they are an instrument for the temporary use in the classroom. Teachers can also use certain behavior to influence how their students evaluate and interpret learning processes. As was mentioned earlier, the evaluation of learning outcomes is to a large extent determined by reference norms while their interpretation depends on attributional processes. How students analyze mistakes in particular can differ greatly depending on attributional patterns they usually use to explain success and failure. Teachers have a strong impact on this process, which in turn influences which conclusions students draw for future learning processes.

18.7 From the Regulation of Learning to the Regulation of Self-Worth: Quitting the Learning Process

Students frequently create an artificial handicap prior to being evaluated in order to later use it as an excuse for potential failure (cf. case study on Anne). This is a phenomenon known as "self-handicapping" (Berglas & Jones, 1978) and can result in different behavior that is either actively implemented (e.g., substance abuse, reduced effort) or purported (e.g., mentioning exam nerves, lack of sleep or alleged illness). At its core, self-handicapping is a strategy to control anticipated attributions. Its purpose is to avoid the attribution of failure to internal-stable-global-uncontrollable causes that would negatively affect self-worth and instead direct such attributions toward external or internal-variable-controllable causes that help preserve self-worth.

Case Study: Self-handicapping
Anne has been a college student in a teaching degree for three semesters. Tomorrow she will take an important biology exam. It is an important subject to her, but unfortunately, she has had great trouble with understanding the complex materials. Anne is afraid that she might not be intelligent enough to pass the exam. She is picturing repeatedly how she flunks and looks stupid in front of her classmates. As she is ruminating, a friend calls her to invite her to a party tonight. Actually Anne had planned to go to bed early to get enough sleep before the exam as she was secretly hoping to pass it after all. However, she realizes that there might be some advantages of going to the party instead: If her worst fears become reality and she actually flunks the exam, she could at least tell herself that she failed because she was too tired. Anne decides to join the party and stay until late.

Several studies have shown the negative impact of self-handicapping on academic performances in school and college. A meta-analysis (Schwinger et al., 2014) found a moderately negative correlation ($r = -0.23$) between self-handicapping and academic performance. This relationship was stronger in younger students than in older students or students at university. Still, students use self-handicapping before exams because most people perceive the attribute "not intelligent enough" as harmful to their self-worth. This strategy to control attributions thus seems to allow for the protection of self-worth in the short run (Martin, Marsh, & Debus, 2001).

In this context Boekaerts (Boekaerts & Niemivirta, 2000) assumes that learners pursue two different types of goals while learning. On the one hand, they hope to grow as individuals by

honing their competences. On the other hand, they wish to avoid negative influences on their self-worth and well-being. Boekaerts suggests that people might possess an internal processor that gathers information (e.g., on the type of task or evaluation of one's own abilities) for the assessment of whether or not a situation might be threatening to our self-worth. Depending on the outcome of this assessment, two different modes can be initiated for the learning process. A threatening situation activates the so-called coping mode. The individual quits the self-regulation process and instead switches to the regulation of self-worth, e.g., by engaging in self-handicapping. If a situation is offering an opportunity to learn something new, on the other hand, it is not perceived as threatening to our self-worth, and we activate the mastery mode. Based on this line of thought, Schwinger (2008) developed a model of the determinants, development, and consequences of self-worth regulation during the learning process. The model is based on the assumption that regulating self-worth holds a hierarchically higher position than regulating learning processes. Only if our self-worth is in balance, we are able to pursue our learning goals. This means that the self-regulation of learning (e.g., regulation of motivation; time management) and the regulation of self-worth cannot take place simultaneously. Even if self-worth regulation might cause our performance to decrease, it is still perceived as highly adaptive because a meaningful learning experience requires a balanced self-worth.

The phase of self-monitoring is of particular relevance with respect to self-handicapping. If we recognize based on the evaluation of a learning process that we were unable to achieve the goals we have set, we start searching for potential causes. Our attributions influence our affective responses (cf. Chap. 15 in this volume). A student who attributes his failure to internal-variable-controllable causes (e.g., lack of effort), for example, will probably be mad at himself. In contrast, a student who uses an internal-stable-uncontrollable attribution (e.g., lack of abilities) is more prone to feel shame. According to Schwinger (2008), the affective responses based on our attributions form the foundation for the assessment if a situation is threatening to our self-worth. The model stresses that this part of the process is also influenced by personal dispositions. If an individual, for example, perceives the learning outcome in question as particularly relevant (i.e., the self-worth contingency for this domain is high), an dysfunctional attribution and its associated affective response are more likely to make the situation appear as threatening. Under these circumstances the individual will switch to the coping mode and engage in self-worth regulation, for example, by self-handicapping. These assumptions have been confirmed by various questionnaire and experimental studies (for a summary, see Schwinger, 2008).

18.8 Strategies of Self-Regulation: Emotional and Motivational Regulation

If our self-worth is not threatened and our mastery mode thus activated, students can make use of various strategies that help them with the regulation of the learning process in order to reach their intended goals. In general, we can distinguish between strategies of emotional regulation and strategies of motivational regulation.

Definition

Emotional Self-Regulation

Emotion regulation consists of "processes involved in initiating, maintaining, and modulating the occurance, intensity, and expression of emotions, expecially their intensive and temporal features, to accomplish once's goals" (Thompson, 1994, p. 27 f.).

How is this ability connected to self-regulated learning? Let us assume one more time that a student's evaluation of his learning process

yields a dissatisfactory result. This time, however, he uses a different attribution and ascribes his failure to the unfairness of the assignment. Even though this attribution should not threaten his self-worth, it should nevertheless result in negative affect (e.g., anger toward his teacher). Such emotions can still have detrimental effects on the upcoming learning process even if they are not relevant to our self-worth. One potential explanation for this finding is that (especially negative) emotions interfere with children's memory for educational information (Davis & Levine, 2013). Emotions direct our attention toward information that helps us understand changes in our goal striving and react to them (Thompson & Meyer, 2007). However, because attention is a limited resource, this focus may limit its availability for processing different (emotionally neutral) information in our surroundings. Learning materials usually include a high amount of information that might be highly relevant for exams; and learners are expected to study these materials even though they tend to be emotionally neutral. If a student is angry and unable to regulate this emotion appropriately, he might have a hard time directing his attention away from his anger and toward emotionally neutral learning materials. If he does not pay adequate attention to the learning material, he in turn encodes it less thoroughly, and it will be harder for him to recall it later.

Several strategies can be used for emotional regulation. These strategies can be grouped based on whether they tend to be beneficial (adaptive) or detrimental (maladaptive) for the user's mental health if applied over an extended period of time (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Schäfer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017).

In addition to the attenuation of negative emotions, self-regulation can also boost positive ones. Individuals who feel bored while studying can, for example, try to increase their enjoyment of learning. At this point strategies of emotion regulation can overlap with strategies of motivational regulation.

Definition

Motivational Self-Regulation

Motivational self-regulation can be defined as the more or less conscious control over one's own motivation which mostly serves to increase effort and persistence (Wolters, 2003).

Study

Emotion Regulation and Memory for Educational Information

Davis and Levine (2013) studied the assumption that (particularly negative) emotions interfere with children's memory of academic information in an experiment with participants between ages 6 and 13. Children first watched a sad movie that induced negative emotions. Subsequently, they were instructed to regulate their emotions either using an adaptive emotion regulation strategy (cognitive reappraisal, high effectiveness of strategy) or a maladaptive strategy (rumination, low effectiveness of strategy). Next, the participants were shown an educational video about a girl visiting a bread factory. Children were asked several questions following the educational video (e.g., "How many loaves of bread can be backed in an oven at the same time?"). Children in the first condition remembered more details from the video than children in the second condition or those in a control condition who had not received any instructions regarding emotion regulation. However, this effect was only found in children whose parents had indicated that their general (habitual) abilities to regulate emotions were relatively poor. Children with generally good emotion regulation strategies did not differ across conditions (Fig. 18.6).

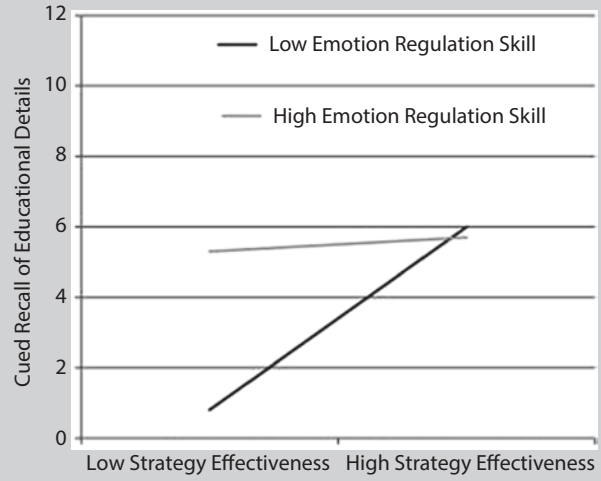

Fig. 18.6 Emotion regulation and memory for educational information (according to Davis & Levine, 2013)

Learners use various strategies to regulate their motivation (cf. Wolters, 2003): For example, learners can increase their interest in a given task by changing certain aspects of the task (e.g., using colored pencils to copy a text) or increasing its personal relevance (e.g., thinking about how the task might be related to their own interests and preferences). Another example for motivational regulation is the strategy of self-instruction that was already mentioned in the boxed text "How Teachers Can Facilitate Self-Regulated Learning." Learners can, for example, tell themselves that they have to put effort into a task, so they do not look bad in front of their classmates. Yet another strategy is based on the principles of operant conditioning and involves the use of self-reward (e.g., going to the movies after studying). Setting subgoals is a related strategy. In this case, learners divide superordinate goals into smaller subgoals which can be completed quicker and with less effort and thus raise their motivation. The strategy of environmental control, on the other hand, is aimed at changing one's surroundings (e.g., turning off one's cell phone or inbox during studying to avoid distraction). Studies have found that these strategies differ with regard to how big their benefits are.

Two Studies

Effectiveness of Various Strategies of Motivational Regulation

Schwinger, Steinmayr, and Spinath (2012) identified several profiles of motivational regulation strategies in young adults (high school and college students). The authors found that students who in general used a lot of motivational regulation were also characterized by higher effort and better performances. A comparison between various profiles of motivational regulation strategies showed that a profile consisting of mastery self-talk or performance-approach self-talk was particularly effective. The direct comparison of various strategies in another study (Schwinger & Otterpohl, 2017) also found that strategies of self-instruction were particularly effective as was the strategy of proximal goal-setting. In contrast, performance-avoidance self-talk did not result in significant benefits. Central personality traits (e.g., conscientiousness, goal orientation, dispositional interest) did not account for differences in

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the effectiveness of these motivational regulation strategies. Moreover, the same results were found for female and male participants. The findings suggest that the mentioned strategies can be functional for a large number of students.

Summary

In this chapter we saw that motivational variables have a large impact on students' learning behavior and performances. This influence is not limited to the questions which tasks students select, how much effort they put in their completion, and how fast they begin to work on them. Motivational variables also affect the learning process itself. We can, for example, see this in the regulation of our efforts or the regulation of strategies used when working on tasks as well as in cases in which students (prematurely) quit the learning process. The two most important proximal determinants of learning behavior are expectancy (of future success) and value (of a task). They are in turn influenced by students' believes about their self-concept, self-worth, and their goals alongside their past experiences with achievement-related situations as well as their associated causal attributions and affective reactions. Therefore, the general and academic self-concept, self-worth, motivational goal orientation, and the other aforementioned variables should receive particular attention in academic contexts. Students' learning behavior and performance is negatively affected by the belief that they lack the necessary abilities to succeed, the obstinate concentration on standards set by others or themselves, and the preference for a (avoidance) performance goal orientation. The variables discussed in this chapter are affected by our socialization. Parents and teachers are important actors in a child's socialization. They influence the variables affecting expectancy and value (i.e., academic self-concept, self-worth, motivational orientation) with behavior such as praise and blame, conditional regard, and reference norm orientation. Cultural norms and predominant stereotypes have a large impact on the behavior of socializing others. These are the distal determinants of learning behavior and performance. Because we consider the behavior of teachers at school and college to be particularly relevant, we included suggestions for practical applications at several points in this chapter. Following these recommendations can help teachers to regulate their behavior (in the classroom) in a way that positively affects the learning behavior and performance of their students.

Review Questions

1. *What are the facets of task value in the expectancy value theory by Eccles and Wigfield?*

   The value of a task includes four different facets: (Aldao et al., 2010) utility value, (Amthauer, Brocke, Liepmann, & Beauducel, 2001) intrinsic value, (Aronfreed, 1968) attainment value, and (Assor et al., 2014) costs. "Utility value" refers to how well a current task matches an individual's future plans. It is defined by the attractiveness and the instrumentality of the goal's results. The "intrinsic value" of a task refers to the incentives found in the task itself. These can include positive emotions (e.g., enjoyment or pride that the individual expects to experience while working on the task) as well as interest in the task. "Attainment value" means the importance of the task itself and results from the individual's self-concept and self-worth. For example, the "attainment value" of a task is high if the task supports the individual's self-concept or if their self-worth depends on the successful completion of the task. The "costs" of a task

are the various resources an individual has to invest when trying to complete it. This includes time and effort as well as emotional costs.

2. *How do causal attributions affect the academic self-concept and expectancies of future success?*

   One important determinant of expectancies of future success is past experiences in achievement situations. It is of particular relevance how the outcomes of such situations were perceived and interpreted by the individual. First, results need to be compared to a standard, a so-called reference norm, to allow for the evaluation of success (or good performance) and failure (or bad performance). Expectancy of future success is directly and indirectly (via the academic self-concept) influenced by this evaluation of success or failure. They increase after success and decrease after failure.

   The effect on success expectancies is stronger the more the individual attributes past success and failure to stable causes such as (excessive) task difficulty or (insufficient) abilities. Attributing one's failures to stable causes means that the individual initially underestimated the difficulty of a task or overestimated their abilities. The reassessment of task difficulty or of one's own abilities results in a decrease of (future) success expectancies.

   How broadly the individual generalizes their expectancies of future success depends on as how global they perceive these causes. The more global the causes and their outcomes seem, the more broadly the individual generalizes their increased or decreased expectancies of future success to different tasks.

3. *What is the central difference between self-concept and self-worth?*

   The self-concept is a nonevaluative, purely cognitive description of the self, i.e., the attributes that define an individual. In contrast, self-worth is an affective-evaluative component of the self which includes self-esteem and self-evaluation.

4. *What are the determinants of "attainment value"?*

   "Attainment value," i.e., the importance of a task itself, is to a large extent determined by the connection of a task to an individual's self-concept and self-worth.

   Self-worth is primarily affected by self-worth contingency, i.e., the dependence of self-worth on standards set by individuals themselves and others. A task is particularly important to an individual if it represents a domain with high self-worth contingency, i.e., if the level of their self-worth depends on whether they succeed or fail. Only successful task completion supports an individual's self-worth.

   A task becomes more important with regard to an individual's self-concept if it is representative of the self-concept, i.e., if the individual's self-concept is shaped based on the particular task. Just like self-worth, the self-concept is only supported by task completion if a task is completed successfully.

5. *What are the facets of the value variable "costs," and what do they have in common?*

   Wigfield and Eccles divide "costs" into three sub-facets. The first cost factor is the time required to complete a task, which thus becomes unavailable for different tasks. The second factor is the effort required to complete the task, which includes mental and physical resources. The third and final factors are the emotional costs arising while working on a task. These include feelings such as frustration, disappointment, and anxiety as well as shame.

   All three factors refer to limited resources. The more these resources are

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depleted during task completion, the more prone individuals are to experiencing stress or the fear of losing these resources temporarily or permanently.

6. *Under which circumstances do learners anticipate to experience shame due to working on a task? How does anticipated shame affect self-regulated learning?*

In his attributional theory of achievement motivation, Weiner (1985) conceptualizes shame as a negative incentive individuals primarily experience following failure attributed to internal-uncontrollable causes. Individuals can anticipate shame when working on a task if they assume that their performance is primarily determined by internal-uncontrollable factors (e.g., lack of abilities or talent). Additionally, recent studies have shown that shame is more common after failure if the task in question is particularly relevant to an individual due to high self-worth contingency.

If a learner feels shame after failing on a task and therefore anticipates feeling ashamed once more before working on the same task again, this outcome would result in negative consequences according to the principles of self-regulated learning. Thus, the learner might set easier goals during the pre-actional planning phase to decrease the probability of experiencing failure and associated shame. Self-handicapping (cf. Question 16) is another potential strategy. If the individual fails, they can attribute this failure to the handicap and thereby avoid the feeling of shame and decreased self-worth.

7. *How should teachers and parents praise in order to benefit intrinsic motivation?*

Praise can strengthen intrinsic motivation if it is conducive to students' autonomy by referring to their initiative instead of whether or not they meet standards set by others or quietly work on the tasks given to them. It is also important that praise is based on an individual rather than social reference norm. This way, teachers direct attention to an individual student's learning progress while decreasing the relevance of competing with others. Unnecessary praise should be avoided as it can result in the so-called corruption effect which occurs in situations in which students already work on a task due to their intrinsic motivation (e.g., working on materials out of personal interest) and then receive an additional extrinsic incentive (e.g., in the form of praise). This extrinsic incentive can replace the original intrinsic motivation. If the external reward disappears, the (originally intrinsically motivated) behavior does no longer occur or is at least reduced. Praise should also stress the abilities students already possess or have developed. This creates a feeling of competence, which in turn supports intrinsic motivation.

8. *What are the three determinants of success expectancy?*

Expectancy of future success while working on a task is determined by several factors, including the evaluation of the objective task difficulty as an external factor; the strength of the academic self-concept as a person factor; and the amount of effort an individual is ready to put into a task. The expectancy is higher the easier a task seems, the stronger the academic self-concept is, or the more effort an individual is willing to invest. Another determinant of success expectancies is past experiences with achievement situations and the causal interpretations of their outcomes. It is particularly important whether success and failure are perceived as stable and global (cf. Question 2).

9. *What are potential negative side effects of inclusive education on the academic self-concept, and how can teachers alleviate them?*

One potential side effect of inclusive education on the academic self-concept of children in inclusive institutions can be caused by the effect of their comparison group. According to this effect, a student's academic self-concept depends on the average performance of their comparison group (e.g., class at school) if different students are compared. The effect only occurs if students make use of a social reference norm when evaluating their performances because lower-performing students in high-performing classes are more likely to perceive their performance as below average under these circumstances. These students might then develop a low academic self-concept, which can in turn negatively affect their learning behavior and performance.

However, teachers can alleviate these negative side effects of inclusion. One possible way to achieve this is the use of individual reference norms for the evaluation of students' performances (e.g., when giving feedback on homework). When social reference norms become less relevant, it is less likely that students compare themselves to their classmates, which lessens the effect of their comparison group.

Another possibility is taking advantage of the "basking in reflected glory" effect (BIRG effect). This effect refers to students' subjective perception of increased status in certain domains (such as the academic self-concept) that results from their identification with a group that is perceived as respected and esteemed from the outside. If teachers use the BIRG effect to their advantage, the inclusion of lower-performing students in high-performing comparison groups can result in a stronger academic self-concept.

10. *What are motivational goal orientations? Name three of them.*

Motivational goal orientations are habitual preferences for a particular type pf learning and performance contexts. We distinguish between learning goals, approach performance goals, and avoidance performance goals. Learning goals are characterized by the intention to gain new competences or skills. Individuals who pursue an approach performance goal prefer to validate and demonstrate their competences. Individuals who pursue an avoidance performance goal, on the other hand, try to hide their incompetence.

11. *How does teachers' reference norm orientation affect students' motivational goal orientation?*

Teachers' reference norm orientation can have a direct or indirect impact on their students' goal orientation. With regard to their indirect impact, students with teachers who prefer a social reference norm are more likely to pursue performance goals because they are forced to compare themselves to their classmates in order to estimate whether or not their teacher will give them a good grade. Teachers with an individual reference norm orientation are more likely to provide personalized feedback that focuses on students' individual development over time. Thereby, teachers support the development of an incremental theory of intelligence in their students, which in turn results in a learning goal orientation. Moreover, teachers with an individual reference norm orientation are more prone to attribute their students' performances to variable-controllable causes (e.g., effort) while teachers with a social reference norm orientation tend to prefer stable-uncontrollable attributions (e.g.,

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abilities). This also influences students' implicit theories about the stability of intelligence and abilities as well as their goal orientations.

In addition to these indirect influences, teachers' reference norm orientation also directly affects their students' goal orientation. Teachers with a social reference norm orientation can convey the message that students' social status matters in the classroom. In order to achieve high status, students might then compete with their classmates and try to demonstrate their abilities while hiding their weaknesses to perform well in this competition. This promotes a performance goal orientation. In contrast, teachers with an individual reference norm orientation communicate the importance of personal progress in learning. Competition with others becomes less important than honing one's own skills and competences. This promotes a learning goal orientation.

12. *What is parental conditional regard? To what extent can it be understood as reinforcement and punishment as defined by operant conditioning?*

Conditional regard refers to a particular socialization strategy for the development or modification of children's attitudes and behavior. Concretely, parents adjust the extent of their affection and appraisal depending on their children's concrete behavior or performances. Parental conditional regard is therefore related to operant conditioning as parent's positive regard can be understood as a special form of positive reinforcement and negative regard as punishment.

13. *What is the relationship between parental conditional regard and (a) level of self-worth and (b) self-worth contingency?*

The socialization strategy of parental conditional regard conveys the message that children only deserve regard under certain circumstances. As a consequence, children develop the idea that their self-worth depends on whether or not they meet certain criteria. Thus, the individual's self-worth depends to a large extent on fulfilling external criteria.

14. *What is self-regulated learning?*

Weinert (1982) defines self-regulated learning as the process during which learners "… can substantially influence the central decisions of whether, what, when, how and for what purpose they learn."

15. *How can teachers facilitate self-regulated learning?*

Self-regulated learning can be promoted in various ways. Teachers can support their students in setting goals that benefit their motivation during the planning phase by applying the SMART principle. According to this principle, a goal is conducive to motivation if it is *specific* enough and clearly states the conditions under which it is completed; if it is *meaningful* to the students; if it is *achievable* and neither too easy nor too difficult (*realistic*); and if it is clear until when students are expected to realize it (*timely*). Students who have a hard time trying to set goals and commit to them can also benefit from so-called behavioral contracts during the planning phase. This contract includes clear criteria for the objective assessment of whether or not a goal has been achieved as well as rewards students receive once they realize the goal. The student should be treated as an active and full-fledged signatory.

Teachers can introduce specific self-instruction strategies to ensure that their students' implementation phase is structured and focused, such as special cards with certain symbols. As they grow more experienced, students learn how to use

such strategies by themselves and apply them to new situations. Students can also train how to deal with external and internal distractions.

During the evaluation phase teachers can influence how the learning outcome is evaluated and interpreted by using the so-called learning diaries. By using such diaries featuring questions about their learning behavior daily over the course of several weeks, students learn how to systematically analyze and realistically assess their learning process without having to rely on potentially distorted memories.

16. *What is self-handicapping? When do students quit the learning process to engage in self-worth regulation instead?*

Self-handicapping is a strategy to control anticipated attribution. Its purpose is to avoid the attribution of failure to internal-stable-global-uncontrollable causes that would negatively affect self-worth and instead direct such attributions toward external or internal-variable-controllable causes that help preserve self-worth. Self-handicapping can result in different behavior that is either actively implemented (e.g., substance abuse, reduced effort) or purported (e.g., mentioning exam nerves, lack of sleep, or alleged illness).

According to Boekaerts (Boekaerts & Niemivirta, 2000), learners pursue two different types of goals while learning. On the one hand, they hope to grow as individuals by honing their competences. On the other hand, they wish to avoid negative influences on their self-worth and well-being. If a learning process is perceived as threatening to our self-worth, the so-called coping mode is activated. In this mode the individual quit the learning process and instead switches to the regulation of self-worth, e.g., by engaging in self-handicapping to protect their self-worth. The regulation of self-worth seems to hold a hierarchically higher position than the regulation of learning. Only if our self-worth is in balance, we are able to pursue our learning goals.

17. *While working on an exercise, a learner realizes that the value of the task is gradually decreasing. The task feels increasingly less interesting, less useful, and somehow even less important. Which strategies can the learner use to increase the value of the task?*

If a task becomes less interesting, useful, or important, its value can be increased by using different strategies of motivational regulation. For example, learners can increase their interest in a given task by changing certain aspects of the task (e.g., using colored pencils to copy a text) or increasing its personal relevance (e.g., thinking about how the task might be related to their own interests and preferences). Alternatively, they can make use of strategies of self-instruction, for example, by telling themselves that they have to put effort into a task, so they do not look bad in front of their classmates. Yet another strategy is based on the principles of operant conditioning and involves the use of self-reward (e.g., going to the movies after studying). Setting proximal subgoals is a related strategy for which learners divide superordinate goals into smaller subgoals which can be completed quicker and with less effort and thus raise their motivation. Lastly, the strategy of environmental control is aimed at changing one's surroundings to control internal and external distractions.

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Motivation and Volition in the Workplace

19

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19.1 Motivating Employees: A Key Variable in Organizational Psychology

Employee motivation is an important variable in the workplace. It affects performance, determines job satisfaction and commitment, and ultimately determines the success of individual employees, teams, and entire organizations. Motivation is also a strategic key variable for the competition between organizations (Steers, Mowday, & Shapiro, 2004; cf. Nink, 2014). Managing employee motivation is in fact one of the greatest challenges organizations face. Therefore, almost all organizations – by no means only larger ones – make use of all kinds of effective motivational tools. These tools include the application of goals as coordination and leadership instruments, the regular assessment of employees' commitment and satisfaction, and the employment of legions of internal and external advisers who are there to help employees overcome motivational barriers when change occurs in the workplace.

However, motivation is also a fundamental component in the construction of valid and useful theories that can be applied to the entire scope of work-related research (Steers et al., 2004). Virtually every textbook on organizational psychology, human resources, and management includes one or even several chapters on "employee motivation." At the same time, readers will find that most concepts and models discussed in textbooks about applied fields have been around since the 1960s and 1970s. Since Steers et al. (2004) bemoaned this situation, little has changed even though research on motivation in particular has undergone many new developments that are increasingly replicated in applied research and in practice. Examples include research on volition (Gollwitzer & Moskowitz, 1996; Haggard, 2008; Kuhl & Fuhrmann, 1998), the depletion of willpower (Baumeister, Muraven, & Tice, 2000; Hagger, Wood, Stiff, & Chatzisarantis, 2010), or the implicit and explicit motive systems and their resulting motive discrepancies (see Chap. 9). Other prolific developments that are clearly relevant to practice involve expanding the understanding of work motivation by exploring how individual perspectives change with time and age (see Sect. 19.4.1), gamification (see Sect. 19.4.2), or the exploration of "new" motives such as money (see Sect. 19.4.3). Finally, some scholars have recently suggested new frameworks that have been put forth in an attempt to comprehensively explain the determinants of employee motivation (see Sect. 19.3).

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The following chapter aims to introduce these new developments. For this purpose, we will concentrate on approaches that focus on the roles of motivation and volition in the workplace, rather than on approaches that merely mention them. Moreover, we will report findings from recent applied research on various constructs that have been discussed in more detail in other chapters of this volume such as goals (see Chap. 11) or intrinsic motivation (see Sect. 14.2) and flow (see Sect. 14.5). Still, we need to start our discussion by presenting the classic theories of employee motivation.

19.2 Classic Theories of Employee Motivation

A comprehensive overview of classic theories of employee motivation would require an entire monography (cf. Miner, 2015; Pinder, 2008) or its own textbook (cf. Kanfer, Chen, & Pritchard, 2012). This chapter will therefore exclude topics and approaches that include notions of motivation or work environments but do not focus on these issues and instead merely assume their relevance or use them as additional dependent or independent variables. Some of these research areas are research on leadership (Blessin & Wick, 2013; Miner, 2015; Northouse, 2015; Weibler, 2016) and approaches that address how to arrange the workplace (Hackman & Oldham, 1980; Humphrey, Nahrgang, & Morgeson, 2007), control theory (cf. Carver & Scheier, 1982, 2012), the theory of behavioral regulation (cf. Ach, 1935; Dörner & Schaub, 1994; Frese & Zapf, 1990), theories on justice (Adams, 1965) or procedural fairness (Tyler & Lind, 2002), or literature on stress and burnout (Bakker, Demerouti, & Euwema, 2005; Maslach, Schaufeli, & Leiter, 2001). Some other approaches that explicitly address motivation have been excluded because they are covered elsewhere in this volume or have received little attention in recent applied research. These topics include the hierarchy of needs (Maslow, 1943), attribution theories (cf. Kelley & Michela, 1980; Weiner, 1985), or the Rubicon model of action phases (Gollwitzer, 1990; see Chap. 12).

19.2.1 Herzberg's Two-Factor Theory

In spite of its contested validity and controversial empirical findings, no textbook on motivation in the workplace can omit Frederick Herzberg's (1966) two-factor theory. Herzberg and his colleagues rejected the traditional perspective that employees' dissatisfaction and satisfaction constitute the extremes of the same continuum. Instead, they proposed that the two dimensions are in principle independent of each other. Thus, employees can be satisfied with certain aspects ("factors"[1]) of their work while being dissatisfied with others. Herzberg called factors that, if met, make employees motivated and satisfied *motivators*. Examples include the work itself (it should be engaging and challenging), performance, acknowledgment, responsibility, and opportunities for growth and promotion. Even if these factors are not fulfilled, employees are not automatically dissatisfied. Dissatisfaction is instead caused by the absence of so-called hygiene factors such as internal company policy, supervisors' leadership style, physical work conditions, job security, and income. If hygiene factors are met but motivators are not, employees are neither satisfied nor dissatisfied. Not being dissatisfied therefore does not equal being satisfied, although both constitute positive psychological states (Sachau, 2007).

Herzberg's (Herzberg, Mausner, & Snyderman, 1959) understanding of "hygiene" mirrored the medical understanding of the term according to which good hygiene prevents illness but does not automatically make a person healthy. For the workplace, this means that not only is management required to create an appropriate framework that is defined by hygiene factors alone, but managers also need to consider motivators in order to keep their subordinates motivated (Herzberg, 1976). Herzberg (1976) put his

[1]The name "two-factor theory" might confuse some readers because it seems to suggest that there are only two factors. Motivators and hygiene factors are used in their respective plural forms to indicate that there are in fact more than just two factors in each case. The name of the theory therefore indicates "two independent groups of factors."

theory to practical use in order to popularize the notion of job enrichment. He placed a particular focus on certain motivators, stressing that organizations should guarantee that their employees have compelling work, appropriate responsibilities, and opportunities to grow and develop. Herzberg expected that such measures would increase employees' interest, sense of responsibility, and performance.

Inspired by Flanagan's (1954) critical incident technique, initial research by Herzberg and his colleagues (Herzberg et al., 1959) used semi-structured interviews to ask employees about situations in which they had felt particularly satisfied or dissatisfied. Content analyses of these responses led to a complex set of data that the authors interpreted as a confirmation of their two-factor theory. However, this interpretation has been met with considerable criticism (for an overview, see Miner, 2015). The biggest concern has been that almost all factors appeared in all narratives no matter whether the narratives expressed contentment or discontentment. Thus, they were motivators and hygiene factors at the same time. This is particularly true for the factor "income," which was mentioned with almost equal frequency in both types of stories (cf. Pinder, 2008).

Overview

Further Criticisms of the Two-Factor Theory (cf. Bockman, 1971; Miner, 2015; Pinder, 2008; Sachau, 2007)

- The original results are methodological artifacts: Stories based on semi-structured interviews generally tend to attribute negative outcomes to external factors (as depicted by hygiene factors).
- The theory cannot be tested: There are too many different versions of the core hypotheses. One variation states that all motivators together contribute more to satisfaction than to dissatisfaction, while another variation claims that all motivators together contribute more to satisfaction than all hygiene factors together. Such contradictions seem to immunize the theory against empirical examination.
- General findings on employee satisfaction do not match the prognoses: When asked, most employees indicate that they are rather satisfied and less dissatisfied. According to the two-factor theory, this should indicate that both motivators and hygiene factors are fulfilled. It seems unlikely that this is the rule.

Overall, criticism has caused researchers' initial enthusiasm in the 1970s to wane over the years and the two-factor theory to lose its relevance (cf. Judge & Church, 2000). More recently, however, some positive psychology proponents have started to express new interest in Herzberg's humanistic approach (Sachau, 2007).

Still, the two-factor theory remains very popular in practice (Latham, 2012; Miner, 2015), perhaps because it is simple and plausible. It is not difficult to imagine employees who are satisfied with certain aspects of their jobs and dissatisfied with others. Moreover, the idea that motivation can be boosted without monetary incentives or the implementation of (expensive) work conditions sounds very attractive if organizations intend to cut costs (cf. Miner, 2015). In general, Herzberg and his colleagues contributed the practice of questioning the importance of money as a motivational instrument and advanced the idea of job enrichment. Both of these aspects are compatible with current concepts in motivational psychology (cf. Sachau, 2007).

19.2.2 Vroom's VIE Theory

A critical discussion of the VIE theory (Vroom, 1964) and its precursors is presented in Chap. 5 (cf. Sect. 5.10.1 "Instrumentality Model"). Therefore, we will limit our discussion here to additional information about applied research and the practical implications of the theory in the workplace.

In the job context, the VIE theory roughly states that employees draw their "motivational energy" for their work from a combination of various cognitions: the *expectation* (E) that the action in question can be performed and realized successfully if enough effort is put into it; the *instrumentality* (I) or utility of this action for outcomes that individuals consider meaningful such as income, promotion, or health; and finally, the *valence* (V) of the outcomes, i.e., how important acting individuals consider the consequences of their actions. Determining the valence is an idiosyncratic process. The VIE theory determines the energy invested in the relevant action by the acting person by multiplying the three cognitions V, I, and E (details about the multiplication can be found in Chap. 5). Van Eerde and Thierry (1996) stressed the metaphorical understanding of "energy" in the context of the theory. It can be translated into effort, strong intentions, productivity, engagement, or participation in work-related activities. These various interpretations explain why applied research has operationalized the VIE theory in very heterogeneous ways.

What about the validity of the VIE theory? Miner's (2015) interviews with established researchers attested high validity to the theory. By contrast, a meta-analysis based on 77 applied studies on the VIE theory reported by Eerde and Thierry (1996) found that the multiplicative model does not allow for better predictions than its individual components. The authors interpreted this finding as indicating a serious lack of validity and recommended that the individual components of the VIE theory be used instead of their multiplicative combination. Overall, academic interest in the VIE theory has probably decreased since the beginning of the twenty-first century because of its contested validity and several other conceptual and methodological problems (Miner, 2015; cf. also van Eerde & Thierry, 1996). The practical usefulness of the theory has also been questioned (Miner, 2015) on the basis of two major criticisms:

1. The calculation of decisions is idiosyncratic. Therefore, using the motivational energy resulting from the multiplication of the three components allows for the most accurate predictions when several alternative decisions are compared for the same individual. However, intersubjective comparisons are virtually impossible because the individual valence of different behavioral outcomes varies across subjects, while even the outcomes that different people consider relevant are not the same in the first place. For example, some employees might assign high valence to health after experiencing severe illness in their families, whereas others might not recognize health as a potential behavioral outcome at all.
2. This kind of calculation is usually not applied in practice. Except for highly formalized collective decisions (e.g., in economic and political committees), most people will usually not determine expectations, instrumentalities, and valences before they make important decisions in order to multiply them with one another (cf. Locke & Latham, 2004). Real-life decisions are often made impulsively, which means that our emotions are of particular relevance (Dijksterhuis, 2004; Slovic, Finucane, Peters, & MacGregor, 2007). Although our emotions might be influenced to some extent by the components included in the VIE theory – making its individual components meaningful for such decision-making processes – they are most likely not determined by the product of the multiplicative process specified in the VIE theory.

Nevertheless, the VIE theory has provided the theoretical foundation for a motivational leadership model that remains influential in current applied research: the *path-goal theory of leadership* (Georgopoulos, Mahoney, & Jones, 1957; House, 1996; House & Mitchell, 1974), which states that managers should support employees in identifying and successfully implementing the best possible ways of realizing their own goals and the goals of the organization. Managers can achieve this by assessing employees' expectations, instrumentalities, and valences and can subsequently influence them in a way that causes them to form the desired intentions (see <Overview> "Measures"). This idea is based on the fundamental

assumption that the three components of the VIE theory are cognitions and can therefore be influenced just like other cognitions (Pinder, 2008). Even though it is not always clear whether cognitions lead to corresponding behavior (acting individuals might objectively lack the required abilities, or external factors might prevent further actions), it can be assumed that expectations, instrumentalities, and valences at least suggest certain intentions and thus might become immediately relevant to behavior (Pinder, 2008).

Scholars have described various means by which managers can affect employees' expectations, instrumentalities, and valences (House & Mitchell, 1974; Isaac, Zerbe, & Pitt, 2001; Pinder, 2008). However, these recommendations are usually based on plausibility and anecdotal evidence as opposed to critical research. A few examples should therefore be enough to provide a general idea of approaches that appear in the relevant literature.

Overview

Approaches to increase employees' *expectations*:

- Clearly explain tasks.
- Communicate clear goals and expectations.
- Develop feedback systems.
- Strengthen employees' self-confidence.
- Offer training/coaching/learning on the job.

Approaches to increase employees' *instrumentalities*:

- Establish clearly visible connections between success and positive behavioral outcomes (e.g., by means of transparent and fair reward systems).
- Show realistic career paths.
- Demonstrate reliability and fairness. Implement measures to build trust.

Approaches to increase employees' *valences*:

- Show new career opportunities (e.g., "If you hold a counseling position with us for three years, it will boost your chances of getting a job as a professor at a vocational college later").
- Implement a "cafeteria plan" that allows employees to choose individually suitable incentives (e.g., a financial bonus, more free time, or a higher pension).
- Improve the match between the organization's and employees' individual goals, e.g., by means of employee-focused conversation techniques during talks (cf. the example "3C-check" in Sect. 19.3) in combination with a bottom-up regulation for the formation of superordinate company goals.

These examples show that the components differentiated in Vroom's (1964) VIE theory have been applied to a systematic search for effective ways to influence employees. Due to the high number of heterogeneous measures, however, it seems unlikely that the path-goal theory will become empirically testable in its entirety. It is remarkable, however, that the path-goal approach does not use the multiplication of the underlying variables even though it is directly derived from the VIE theory.

19.2.3 Locke and Latham's Goal-Setting Theory

Locke's (1968) early work discussed the relevance of particular goal attributes for work performance. He assumed that difficult and specific goals result in better performance than easy, diffuse, or unattainable goals (Locke, Shaw, Saari, & Latham, 1981).

Excursus

Early Psychology of Will as a Precursor of Goal-Setting Theory

The recommendation to form specific and difficult goals will hardly come as a surprise to laypeople (but see Excursus "Motivational Effect of Difficult Goals: A Contradiction Between VIE Theory and Goal-Setting-Theory?"). Early proponents of the psychology of will had already made this proposition. Ach (1935), for example, stressed the importance of goal specificity when he proposed his law of special determination, claiming that the more specific the content of a determination, the more quickly and more reliably it is realized. Hillgruber (1912), on the other hand, documented the importance of goal difficulty for boosting performance and developed his so-called difficulty law of motivation on the basis of this observation.

Excursus

Motivational Effect of Difficult Goals: A Contradiction Between VIE Theory and Goal-Setting Theory?

The call for difficult goals seems to contradict a central argument of the VIE theory (see Sect. 19.2.2), which claims that high expectations of success should have a positive impact on motivational energy. Because success should feel less certain when goals are difficult rather than easy, the VIE theory would assume that motivation should in fact be *lower*. Locke and Latham (2002) solved this ostensible contradiction: If two goals with the same difficulty are compared, a high expectation of success is advantageous; if goal difficulty differs, however, lower expectations of success (in the case of difficult goals) are associated with better performances. Locke (1968) noted, however, that this performance boost occurs only when a goal is accepted. Because extremely difficult goals should be met with comparatively low levels of acceptance in real life, Locke's theory might hold up to only a certain level of difficulty (cf. Miner, 2015).

Early iterations (e.g., Locke & Latham, 1979) of goal-setting theory introduced it primarily as a behavioral technique instead of a comprehensive theory (cf. Schmidt & Kleinbeck, 1999). For instance, Locke and Latham (1979) did not discuss the origins of goals or the mechanisms by which they influence behavior (Kanfer, 1990; Kleinbeck & Schmidt, 1996), and they did not assess motivation as an independent construct. Proponents of goal-setting theory, however, addressed these issues later (cf. Locke & Latham, 1990) and "imported" different motivational approaches (Schmidt & Kleinbeck, 1999, p. 294) to identify moderators and mediators of the goal-setting process.

Figure 19.1 shows the results of continuous research aimed at developing a complete theory of goal-setting antecedents, processes, and outcomes (Locke and Latham, 2004). Currently, goal-setting theory represents a complex and comprehensive theory of the goal-setting aspect of work motivation. A detailed discussion of all variables included in Fig. 19.1 alongside the relevant underlying processes can be found in Locke and Latham (2004, 2013). Some mediators and moderators will briefly be discussed here. According to goal-setting theory, the mediators (psychological mechanisms) of goal realization are the willingness to expend effort, persistence, the focus of attention, perceived self-efficacy, and the utilization of suitable task strategies (Latham & Locke, 1991; Locke & Latham, 1990). Moderators (i.e., variables that influence the strength and/or direction of an effect between two other variables) of the effect of difficult and specific goals, on the other hand, are commitment, aptitude, feedback, situational restrictions, and task complexity. Insufficient aptitude and situational restrictions can represent objective obstacles and thus reduce the effect of a goal. It is interesting that the assumptions of goal-

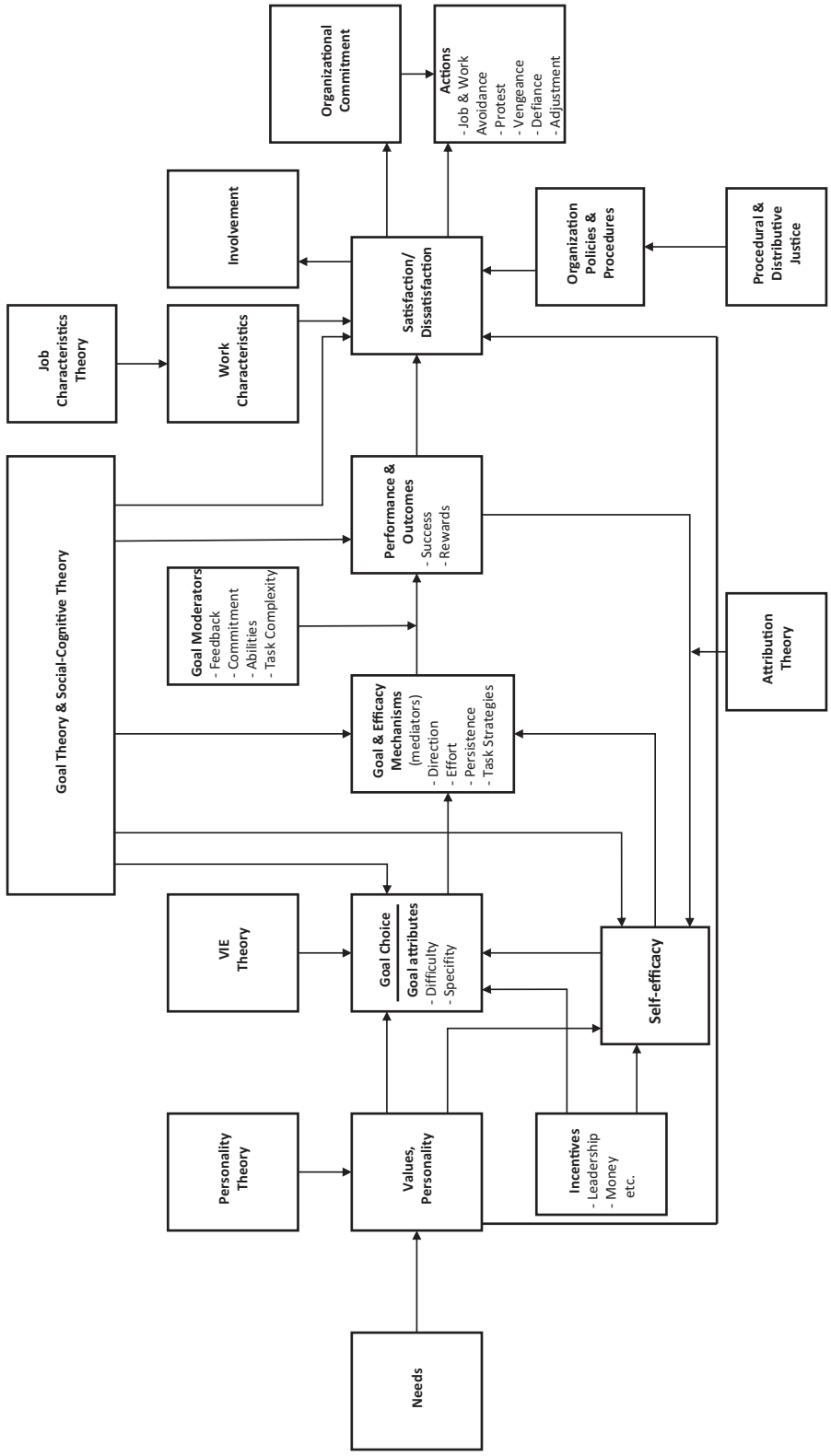

Fig. 19.1 Goal-setting theory: Key variables and processes (Adapted from Locke and Latham (2004))

setting theory do not seem to apply to complex and novel tasks. Earley, Connelly, and Ekegren (1989) were able to show that vague "do your best" goals result in better outcomes than specific goals in such situations. Wood and Locke (1990) countered that complex and novel tasks are characterized by a lack of routines that are available for coming up with solutions, and this in turn creates an advantage of learning goals over performance goals. In line with the theory, however, these learning goals should be specific and difficult (cf. Latham & Locke, 2007) before they can be supplemented by equivalent performance goals. The left side of Fig. 19.1 also shows *needs* as a factor that influences the goal-setting process. Locke and Latham (2004) explicitly stated that their earlier work failed to acknowledge the role of "unconscious" processes and suggested the inclusion of projective measures. This is a particularly remarkable suggestion considering that the same authors had claimed only a few years earlier (Locke & Latham, 2002) that even though the "unconscious" might exist, it should not have a strong impact on goal setting. Newer contributions by proponents of goal-setting theory have also begun to include volition (cf. Locke & Latham, 2004). The authors primarily consider this construct in the form of a general assumption about free will during the processes of setting and pursuing goals; however, it is not the type of functional-analytic consideration that is found elsewhere (cf. Kehr, 2004c; Kuhl, 2000).

Goal-setting theory has resulted in a great deal of empirical research (cf. Locke & Latham, 1990). Latham, Stajkovic, and Locke (2010) explained that over 1,000 studies have demonstrated the positive effect of specific and difficult goals on performance, including many field and intervention studies. A similar conclusion has been reached by diverse meta-analyses on goal-setting theory (cf. Miner, 2015). However, Kanfer et al. (2012) noted that there has been much more research on goal difficulty than on goal specificity. The latter has often been included only in fairly rough designs, namely, the comparison between a specific goal and a "do your best" goal. Because the lack of motivational energy for such vague goals is fairly obvious, such designs do not provide a particularly convincing test of the theory. Instead, research and practice would benefit from continuous or at least more nuanced modeling of goal specificity.

The most important conclusion of goal-setting theory for everyday life is of course that we should set difficult and specific goals for ourselves and others. Locke and Latham 2004; (cf. Miner, 2015) went one step further and described distinct steps that should be considered when applying goal-setting theory:

1. Develop and specify a working model of the task at hand.
2. Specify how performance is measured.
3. Specify the standard that should be met. It should be possible to measure this standard objectively or through behavioral observation. Choose a standard that is difficult yet achievable.
4. Specify the time frame.
5. Clarify which goals should be prioritized if several goals are given.
6. Assess the difficulty and importance of each goal. The measure of performance equals the sum of products of difficulty, importance, and degree of goal realization across all goals.
7. Determine which goals require cooperation, how much coordination is required, and how cooperation can be achieved. Use group goals.

Miner (2015) reported that some field studies have provided evidence for the importance of such measures, whereas others have failed to do so. This is why he concluded: "Overall, goal-setting procedures appear to have considerable motivational potential with the right people under the right circumstances" (p. 173).

More recently, some researchers have also looked at the "dark side" of goal setting. A laboratory study by Schweitzer, Ordóñez, and Douma (2004) demonstrated that participants with specific and difficult goals were more likely than those with "do your best" goals to resort to unethical behavior and to break rules. This effect was stronger the closer they were to reaching their goals. It is possible that some recent scandals might have been catalyzed by these processes, such as the emissions scandal in the automobile industry that the media has blamed on exaggerated and unattainable managerial goals.

Overview

Content and Process Theories of Employee Motivation?

Some older textbooks have distinguished between content theories and process theories of employee motivation (cf. von Rosenstiel, Kehr & Maier, 2000). According to this distinction, Maslow's (1943) hierarchy of needs or Herzberg's (1966) two-factor theory would be considered content theories, whereas Vroom's (1964) VIE theory or Locke and Latham's (1979) goal-setting theory would be considered process theories. This distinction is based on the idea that content theories divide needs (Maslow) or motivators (Herzberg) into categories according to their thematic content, while process theories address the *process* of motivation, for example, in the form of a multiplicative decision-making process (Vroom). However, we decided not to apply this distinction. Authors of so-called content theories have by no means ignored processes: Maslow, for example, clearly stated that higher level needs are not activated before lower level needs are satisfied. The assumption of such a process is probably much more central to Maslow's concept than the simplistic placement of different needs into different classes. Vroom, on the other hand, did not by any means focus exclusively on the processes of motivation; instead, the classification of different aspects of decision-making into valences, instrumentalities, and expectations was clearly based on thematic content (see Chap. 5).

The discussion of motivation should not be restricted by a thematic or a process-related perspective. The two aspects need to be combined to create a comprehensive theory of employee motivation. Thus, the differentiation between content and process theories seems obsolete.

19.2.4 Self-Determination Theory by Deci and Ryan

Self-determination theory (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) is without a doubt a modern classic because it is based on decades of theoretical and empirical work on *intrinsic* and *extrinsic motivation*. Earlier (see Sect. 14.2), we already established that self-determination theory was developed from preceding approaches to intrinsic motivation and the corruption effect. An important feature of the theory is the distinction between *autonomous* and *controlled* motivation (Gagné & Deci, 2005). Autonomous motivation is experienced as self-determined, while controlled motivation feels as though it has been determined by external factors. In addition, the distinction between intrinsic and extrinsic motivation is still relevant today.

Moreover, the model is based on the assumptions that people have three basic universal needs (*autonomy*, *competence*, and *relatedness*; cf. Gagné & Deci, 2005; Schüler, Brandstätter, & Sheldon, 2013) and that intrinsic motivation results (exclusively!) from the satisfaction of these needs. According to self-determination theory, intrinsic motivation is therefore always autonomous (Gagné & Deci, 2005). A more detailed description of the three basic needs as well as a critical discussion of the underlying assumptions of the model can be found in Sect. 14.2.

In the context of the *organismic integration theory* (*OIT*), self-determination theory addresses the question of how external behavioral goals that are determined by our social surroundings can be integrated into the self through the process of *internalization* (Ryan & Deci, 2000). Progressive internalization results in four types of extrinsic behavioral regulation that gradually represent more self-determined developmental stages and have different degrees of positive effects on psychological well-being (Vallerand, 1997).

Externally regulated behavior does not correspond to personal intentions and is instead externally controlled (e.g., a sewer sews as long as the

head worker is nearby and will punish anyone who is slacking off). By contrast, *introjected regulation* does not require immediate external control. It is instead based on internalized social pressure (e.g., an executive consultant works overtime because he would feel guilty otherwise). *Identified regulation* means that an action was originally initiated from the outside but has in the meantime been integrated into an individual's value and goal systems (e.g., a nurse helps patients because he thinks that it is important to help others). Finally, *integrated regulation* is the strongest self-determined form of extrinsic motivation in which complete correspondence with personal values and goals and a high level of the relevance of the behavior for an individual's identity is established (e.g., not only does a scientist read papers because she thinks that it is important and it matches her value system, but also because she perceives her job as a "vocation"). Gagné and Deci (2005) stated that integrated and identified regulation represent additional dimensions of autonomous motivation alongside intrinsic motivation.

Proponents of self-determination theory have claimed that it can explain the role of motivation in the workplace (cf. Gagné & Deci, 2005). Pinder (2008) observed, however, that research inspired by the theory has primarily been conducted in the laboratory or in academic contexts, with a few exceptions in the fields of public health and athletics. Two main research strategies have been developed in the context of self-determination theory. The first determines the extent of satisfaction of the assumed basic needs and then tests whether positive effects on performance and satisfaction can be observed (cf. Gagné, 2003; Kashdan, Julian, Merritt, & Uswatte, 2006; Schüler et al., 2013). The second strategy asks for the exact reasons behind why we pursue a particular activity. The Motivation at Work Scale (MAWS; Gagné et al., 2010) was developed for this latter purpose: The item "because I like my work" measures intrinsic motivation; the item "because the work matches my values" measures identified regulation; the item "because my reputation is based on it" measures introjected regulation; and the item "because I earn money" measures external regulation (Gagné et al., 2010). The MAWS no longer assesses integrated regulation because it is virtually indistinguishable from intrinsic motivation in empirical studies (Gagné et al., 2015).

Study

Validation of the Motivation at Work Scale

Gagné et al. (2010) conducted a comprehensive validation study of the Motivation at Work Scale (MAWS) with four samples of pilots, executive employees, correctional staff, and workers. Depending on the sample, several antecedents (e.g., perceived organizational support) and various criteria (e.g., work-related well-being, affective and normative organizational commitment, stress and physical health) were measured in addition to the MAWS. Apart from one exception, the findings showed significant and meaningful intercorrelations between all of the motivational measures that decreased between less related measures (the lowest correlation was found between intrinsic motivation and external regulation). Moreover, the authors found that predictors and criteria were for the most part associated in ways that supported their hypotheses. Unfortunately, it was not reported how much incremental variance was explained by the different types of motivation. It is therefore possible that some of the significant correlations were in fact artifacts. The two autonomous types of motivation (intrinsic motivation and identified regulation) were more strongly associated with all criteria than the two controlled types of motivation.

A recent study by Güntert (2015) raised the suspicion that all of the variance in studies on self-determination theory can be explained by autonomous motivation alone. Güntert conducted an online study with employees of a Swiss

insurance company. He intended to test the extent to which the types of motivation measured with the MAWS play a mediating role between various organizational antecedents that are commonly measured with employee surveys (motivational potential of the job, leadership conducive to autonomy, knowledge about organizational strategies) and several criteria (job satisfaction, intention to quit, organizational citizenship behavior). Güntert found some of the expected mediating relationships. However, this was the case only for the two types of autonomous motivation (intrinsic motivation and identified regulation) but not for the two controlled types of motivation. On the basis of these results, Güntert raised the question of whether controlled and externally determined regulation plays any role in modern organizations at all or whether such an influence is an exception rather than the rule.

In general, studies on self-determination theory have clearly shown that autonomous motivation is beneficial, whereas controlled motivation is harmful (cf. Deci & Ryan, 2008). By itself, however, this observation appears rather trivial: Small children are already familiar with it when their parents tell them that they are not allowed to play outside until they finish their homework. After reviewing criticisms of the self-regulation theory, Latham (2012) therefore concluded that the theory does not yet meet the requirements for being considered a complete and comprehensive theory of work motivation.

According to Gagné et al. (2010), all organizational actions that promote the satisfaction of the three basic needs – autonomy, competence, and relatedness – are suitable for the practical application of self-determination theory. For this purpose, the authors listed several relevant areas; however, they did not specify the underlying psychological mechanisms. These areas include the design of external frameworks (time pressure, control mechanisms, performance-based incentives), leadership focusing on control or autonomy, as well as ways to design work tasks and working conditions. A closer examination of these options has the potential to open up a wide field for application and provide many new tasks for researchers.

19.3 The 3C-model of Work Motivation

Almost all motivational constructs that have been discussed in this volume so far are suitable for offering a better understanding of motivation in the workplace. This is true for goals and goal conflicts, implicit (and explicit) motives, volition, intrinsic and extrinsic motivation, as well as flow, to name just a few. However, perhaps even more than in basic research, the application of motivational constructs requires researchers to recognize connections and use this knowledge to solve practical problems of motivation by applying effective interventions. But what are the connections between the aforementioned constructs? Are they connected in a systematic way? Is it possible to draw lines between their different underlying theories or even combine them?

19.3.1 A Brief Introduction to the 3C-model

The 3C-model[2] of work motivation (Kehr, 2004b, 2014) was developed with the intention to create an integrative framework for the systemization of the relationships between various motivational constructs and the already existing approaches of motivational psychology.

Figure 19.2 presents a graphical illustration of the 3C-model. "3C" refers to the three components of motivation that are shown as partially overlapping circles. On a distal level (for the distinction between distal and proximal motivational levels, see <Excursus> as well as Kanfer & Heggestad, 1997), these components are implicit motives, explicit motives, and subjective abilities (see Chap. 9 for a distinction between implicit and explicit motives). The division into three components is based on McClelland's distinction

[2]The 3C-model was initially published as the "compensation model of work motivation and volition" (Kehr, 2004b). The original title referred to one of the central assumptions of the model, namely, that volition can cover for insufficient motivation. Because of the potential confusion with "worker compensation," however, the name was changed to the "3C-model."

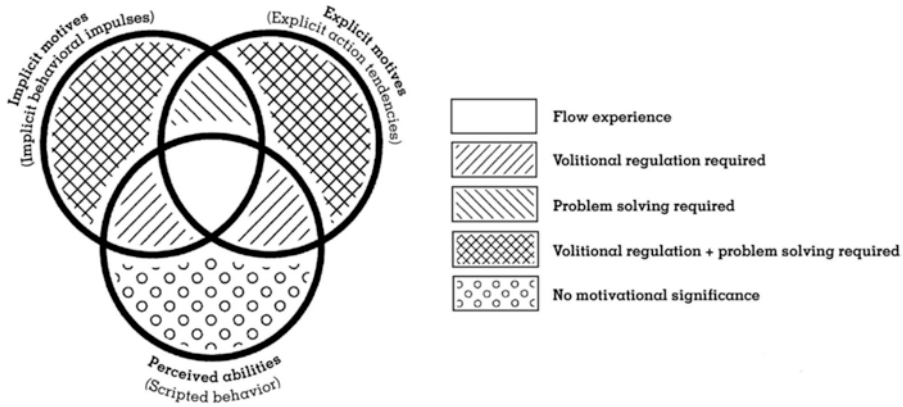

Fig. 19.2 The 3C-model of work motivation (Adapted from Kehr (2004b))

of *motives*, *values*, and *skills* (McClelland, 1985; cf. McClelland, Koestner, & Weinberger, 1989).

Excursus

Distal and Proximal Motivation

Kanfer (1990) distinguished between a distal and a proximal motivational level in accordance with how closely a motivational construct is located to actual behavior. For example, the unspecific implicit achievement motive is comparatively distal, whereas emotions experienced during an activity is comparatively proximal because it is more closely linked to behavior. The 3C-model of work motivation incorporates both distal (e.g., implicit and explicit motives) and proximal constructs (e.g., affective and cognitive preferences). Moreover, the model specifies how and when distal motivational predictors become proximal ones. The following provides an example: The strong affiliation motive of a clerical assistant allows for predictions with regard to how often and how long he will engage in conversations with colleagues that are not related to work (distal). If a call from a friendly colleague triggers the implicit affiliation motive, the motive engenders the spontaneous affective preference for answering the phone. This preference can be used as a proximal indicator of how long and intimate the conversation will be.

Insufficient correspondence between implicit and explicit motives on the distal level results in a *latent* intrapsychic behavioral conflict. The conflict *manifests* itself as soon as the affective and cognitive preferences triggered by these motives become incompatible.

The *implicit motives* addressed by the research on and application of the 3C-model have typically been the "big three" (McClelland, 1995) motives of achievement, affiliation, and power. These motives were already discussed in Chaps. 6, 7, and 8. Nevertheless, it is possible to include further implicit motives, for example, the ones derived from Murray's (1938) original classification. *Explicit motives* are based on verbal self-assessments and are frequently associated with concrete goals. This connection can be exemplified by an executive consultant who sees herself as achievement-motivated (her explicit motive) and sets the performance-related goals to pursue a PhD in addition to fulfilling her time-consuming work responsibilities. In this scenario, *subjective abilities* represent the consultant's self-assessment of being competent enough to successfully finish her PhD.

The overlapping areas of the three circles show that a person's explicit motives and goals can be consistent with the person's implicit motives and

subjective abilities. However, this is not necessarily always the case. The executive consultant might, for example, discover that she actually does not enjoy research (if there is not enough support from implicit motives, e.g., if her implicit achievement motive is in fact not very strong, but her implicit power motive is) and that the workload might be too large after all (e.g., because she overestimated her intellectual abilities).

The three components affective preferences, cognitive preferences, and scripted routines represent the proximal level. In the workplace, *affective preferences* can, for example, take the form of employees' enthusiasm to engage in organizational transitions, or, on the contrary, their fear of getting involved in these transitions. *Cognitive preferences* would then be employees' goals and intentions to support the transition. Finally, *behavioral routines* ensure the smooth execution of familiar actions, e.g., drawing flow charts of the transition.

Volition and *problem-solving* are the functional mechanisms of the 3C-model. Volition is required to compensate for insufficient motivation, while problem-solving compensates for a lack of behavioral routines due to insufficient abilities.

Excursus

The Difference Between Volition and Problem-Solving

In the workplace, motivation-related and skill-related problems need to be distinguished, because they require different compensating mechanisms: voliton for internal behavioral barriers and problem-solving for external ones.

For example, a company employee perceives software that is prone to errors as an external behavioral barrier. This barrier is related to the employee's skills and not her motivation because she is unable to solve the problem by herself even if she is motivated. Instead, she is in need of problem-solving strategies such as using different software or consulting an expert. An example of a motivational barrier would be if an employee with a strong affiliation motive is unwilling to end a conservation with a friendly yet clearly insolvent customer. Overcoming this barrier would require volitional strategies such as imagining the amount of money the employee could earn from a different customer in the same amount of time.

Empirical studies (Kehr, 2004c, Study 4) have provided support for the distinction between volitional and problem-solving strategies: Employees of an automobile company were given scenarios that described either an internal (motivational) or external (ability-related) behavioral barrier. Given a broad selection of possible strategies to choose from, their choices showed the expected pattern: They preferred volitional strategies when presented with internal barriers, whereas they preferred problem-solving strategies when presented with external barriers.

In addition, a distinction can be made between two types of volitional regulation (Kehr, 2014). Type 1 volition is required for tasks that match our cognitive preferences but not our affective preferences, for example, if we are asked to work on unpleasant tasks during change processes. Type 2 volition, on the other hand, is required when affective preferences are activated (via the activation of implicit motives) although the task at hand might clash with our cognitive preferences. We experience such situations as temptations (if hope motives are activated) or fear (if fear motives are activated). A manager might, for example, be tempted to sabotage a change process she perceives to be controlled by others, or she might be afraid that the process could undermine her own chance of getting a promotion.

Intrinsic motivation results whenever implicit and explicit motives correspond on the distal level (*latent* intrinsic motivation) and cognitive and affective behavioral preferences correspond on the proximal level (*manifest* intrinsic

motivation). The correspondences are captured by the overlapping areas in Fig. 19.2. According to the 3C-model, intrinsic motivation is thus independent of whether or not an individual possesses the necessary subjective abilities to finish a task: A craftsman might enjoy using a new work bench even if he initially does not yet know how to use it optimally. In an analogous manner, people are often highly motivated at the beginning of a new project even if they do not yet have enough personal and external resources for its completion. Optimal motivation is found in the area in which all three components overlap, i.e., when the acting individual is intrinsically motivated and subjectively able to solve a task. On the phenomenal level, this state is often experienced as flow (see Sect. 14.5).

Study

Empirical Research on the 3C-model

Two central assumptions of the 3C-model are the dysfunctional consequences of motivational discrepancies and their connection with volition as well as the occurrence of flow when all three motivational components are fulfilled. Several laboratory and field studies have tested these two assumptions (for an overview, see Kehr, 2014). For example, a laboratory study on motivational discrepancies by Trapp and Kehr (2016) showed that employees tended to ask for higher raises during negotiations if their implicit power motive had been activated beforehand. However, this was true only if no explicit affiliation motive ("Be advised that you will be able to get to know your negotiation partner personally after negotiations") had been activated at the same time. The explicit affiliation motive was thus able to neutralize the influence of the implicit power motive. In an earlier longitudinal survey of managers, Kehr (2004a) had already shown that conflicts between implicit and explicit motives result in decreased self-assessed volitional competence and an impairment of subjective well-being. Gröpel and Kehr (2014) extended this line of thought in a laboratory study. They found that power- and achievement-related behavior that is not supported by corresponding implicit motives depletes volitional resources that thereby become unavailable for subsequent self-control tasks. These findings confirm the assumptions of the 3C-model about Type 1 volition.

Another survey study of managers with two measurement periods (Kehr, 2005) looked at Type 2 volition and found that implicit fear motives are associated with an increased tendency to engage in unwanted intrusive thoughts that in turn lead to a decrease in self-assessed volitional competence and an impairment of subjective well-being.

The 3C-model claims that we experience flow if all three motivational components are satisfied. Optimal challenges by themselves are therefore not sufficient for flow experiences; our motives have to be congruent. Schattke, Brandstätter, Taylor, and Kehr (2014) found evidence supporting this assumption in a quasi-experimental study of indoor climbers whose experience of flow depended not only on the subjective assessment of their climbing skills but also on whether or not they met the condition of motive congruence for their achievement motive (as expected for climbers). Schiepe-Tiska, Schattke, and Kehr (2016), on the other hand, examined flow as a phenomenal state on the proximal level of motivation during work on an open innovation platform. As expected, the depth of the flow experience depended on the three-way interaction of task-related affective preferences, cognitive preferences, and subjective abilities. The experience of flow was strongest when all three predictors were high and weakest when all three predictors were low.

19.3.2 Compatibility with Conceptualizations of Basic Research on Motivation

The basic assumptions of the 3C-model that we briefly introduced in this chapter are highly compatible with many other theories on motivation and volition that are discussed in this volume. First, the 3C-model is based on the distinction between *implicit and explicit motives* (see Chap. 9). Research on behavioral goals (see Chap. 11) also corresponds to the assumptions of the 3C-model even though the former is much more in depth because the 3C-model does not address certain attributes of goals or the formation of goals and intentions. Still, we do not agree with Kleinbeck who claims that "actions without goals are unthinkable" (Kleinbeck, 2010, p. 285). Goals *can* initiate and regulate behavior, but we can also act without goals (see the concept of autotelic activities by Csikszentmihalyi, 2000). Goals by themselves, on the other hand, do not guarantee corresponding actions even if we set them ourselves (Brunstein, Schultheiss, & Grässman, 1998; Rawolle, Kehr, & Glaser, 2007).

To what extent is the conceptualization of intrinsic motivation that is found in the 3C-model compatible with alternative concepts (for an overview, see Sect. 14.2 in this volume)? In Fig. 19.2, intrinsic motivation is represented by the overlapping areas of the two motive circles: when affective and cognitive preferences for a certain behavior match. However, it is possible for our affective preferences to be activated even when we do not have any simultaneous cognitive preferences. As long as there are no distracting cognitive preferences, it seems plausible to think of such affect- or impulse-driven behavior as intrinsically motivated. Wundt (1896) called this a *drive-initiated behavior* ("Triebhandlung"). This notion indicates the necessary and sufficient conditions for intrinsic motivation (cf. Kehr, 2004b): Affective preferences that support the behavior at hand constitute the necessary condition for the emergence of intrinsic motivation. The sufficient condition for intrinsic motivation is fulfilled when, in addition to the presence of affective preferences, no conflicting cognitive preferences are present. This perspective matches the concept of intrinsic behavioral incentives (as opposed to extrinsic outcome expectations) favored by Rheinberg (see Chap. 14).

The assumptions about *flow* contradict earlier models that were based solely on the correspondence between abilities and requirements (Csikszentmihalyi, 1991, 2000). However, they are compatible with the "flow hypothesis of motivational competence," which was theoretically developed and empirically supported by Rheinberg (see Sect. 14.7) and postulates that we experience flow only when our current behavior simultaneously matches our implicit motives and our current goals.

Kuhl (see Chap. 13) distinguishes two volitional modes, self-control and self-regulation. As long as it is a conscious process, *volition* in the 3C-model corresponds to Kuhl's notion of self-control, a conscious volitional mode that kicks in when there is a discrepancy between conscious goals and implicit motives. What Kuhl calls self-regulation corresponds to the unconscious mechanisms of volitional behavioral regulation (see the distinction between automatic and conscious volitional behavioral regulation in Kehr, 2004c). These mechanisms, however, are not further specified in the 3C-model. Flow in the 3C-model corresponds to the notion of self-organization (Kuhl, 1996), which is a non-volitional form of behavioral regulation that relies not only on motivational support but also on script-based routines. Kuhl's PSI theory (see Sect. 13.5) is of course also much more detailed than the 3C-model, which has primarily been tailored to applied research. Nonetheless, hypotheses derived from the 3C-model do not contradict hypotheses derived from PSI theory.

However, how volition is understood in the *Rubicon model* of behavioral phases (Heckhausen & Gollwitzer, 1987; see Chap. 12) differs from the understanding set forth in the 3C-model (cf. Kehr, 1999; Sokolowski, 1997). In the Rubicon model, certain behavioral phases, namely, the pre-actional planning phase and the actional phase, are perceived as volitional. The 3C-model, on the other hand, defines volition in functional terms.

Accordingly, volition is thought to be required for overcoming internal behavioral barriers regardless of which behavioral phase they occur in.

19.3.3 Compatibility with Classic Theories of Motivation

What are the similarities and differences between the 3C-model and classic theories of motivation? What further questions should be addressed by future research?

An initial comparison between the two-factor theory (Herzberg, 1976; see Sect. 19.2.1) and the 3C-model might suggest that the distinction between motivators and hygiene factors indicates that the former are associated with affective preferences, while the latter correspond to cognitive preferences. This could be the case because implicit motives might be aroused by motivators, whereas explicit motives might be activated by hygiene factors. Suitable empirical studies would need to be conducted to test this hypothesis. In principle, the two approaches do not seem to contradict each other. Further empirical investigations might even be able to explain some of the inconsistencies that have traditionally been used as counterarguments against the two-factor theory because, on the one hand, the 3C-model, unlike the two-factor theory, represents a differential approach to human motivation. We could, for example, hypothesize that feedback, which is one of the motivators described by Herzberg (1976), would have an especially strong impact on achievement-motivated individuals. The chance to get promoted might have a particularly strong motivating influence on power-motivated people. Recognition might affect power- and affiliation-motivated individuals in a similar way depending on the exact form of recognition (e.g., in front of others vs. in a cordial and private environment). On the other hand, the 3C-model specifies an overlapping area between implicit and explicit motives. Some of the factors that Herzberg (1976) grouped as motivators and hygiene factors might be misplaced because his dichotomous approach did not allow for other options that might fall "in between."

Kehr (2004b, 2004c) already compared the 3C-model with Vroom's (1964) VIE theory and goal-setting theory (Locke & Latham, 1990). The valences, instrumentalities, and expectations of the VIE theory are limited to two components only: explicit motives (which McClelland, 1985, called "values") and subjective abilities. Because it also includes implicit motives, the 3C-model expands on the predictions of the VIE theory. Early conceptualizations of goal-setting theory (Locke & Latham, 1990) did not consider implicit motives, which were included later (e.g., Locke & Latham, 2004; cf. Fig. 19.1). So far, however, the theory does not explicitly specify how implicit motives are related to goals and how this connection affects goal striving. Basic research on implicit and explicit motives (see Chap. 9) that is based on the 3C-model is more specific in this regard. Moreover, neither the VIE theory nor goal-setting theory addresses internal behavioral barriers or the necessity for volitional self-control. Even though Locke and Kristof (1996) also used the term "volition," their understanding was reminiscent of Rand and Branden's (1964) fairly unspecific view of (free) deliberate behavioral causes, rather than the functional-analytic understanding of volition found in the 3C-model.

Self-determination theory and the 3C-model have a lot in common. Both approaches feature a phenomenal understanding of intrinsic motivation as the enjoyment of behavior (see Gagné & Deci, 2005; Gagné et al., 2010). Furthermore, both approaches are based on the comparable assumption that certain implicit motives have to be fulfilled (3C-model) or that certain basic needs have to be met (self-determination theory) for intrinsic motivation to emerge. In contrast to self-determination theory, however, the 3C-model does not suggest that there are specific universal needs that are innate in all humans or that intrinsic motivation is possible only when these needs are met (see Sect. 19.2.4). This is in fact a fairly common criticism among researchers who are not proponents of self-determination theory (see Latham, 2012; see also Sect. 14.2).

Excursus

Three Big Motives vs. Three Basic Needs

McClelland (1995) distinguished three major motives: achievement, affiliation, and power. Self-determination theory is based on the distinction between three basic needs known as competence, relatedness, and autonomy. Schüler et al. (2013) pointed out substantial conceptual similarities between these two taxonomies. The similarities between the achievement motive and the need for competence are particularly strong (both are related to a positive assessment of achievement). The affiliation motive bears a resemblance to the need for relatedness as well (both are related to the positive experience of social relationships). Finally, the power motive and the need for autonomy also appear to have something in common as they are both related to the idea of control. This last connection, however, is comparatively ambiguous because the power motive is related to control over others, while the need for autonomy is linked to control over the self (Schüler et al., 2013).

Figure 19.3 presents a graphical illustration of another interesting similarity between the 3C-model and self-determination theory. It shows that the terms used for the various degrees of extrinsic motivation were carefully chosen: "External," "introjected," and "identified" must all be understood in terms of their *relation to an individual's explicit motive system*. On the other hand, "integrated" is behavior in as much as it is *integrated into the implicit motive system*.

Example

Gradual Progressive Internalization

Imagine a fourth grader who does not like math but is pressured by his mother to do his homework (external regulation). He gradually develops an understanding of how math might be meaningful and useful in other areas of life (introjected regulation). By the time he graduates from high school, he might see math as equally or even more important than other subjects (identified regulation). Because of his good

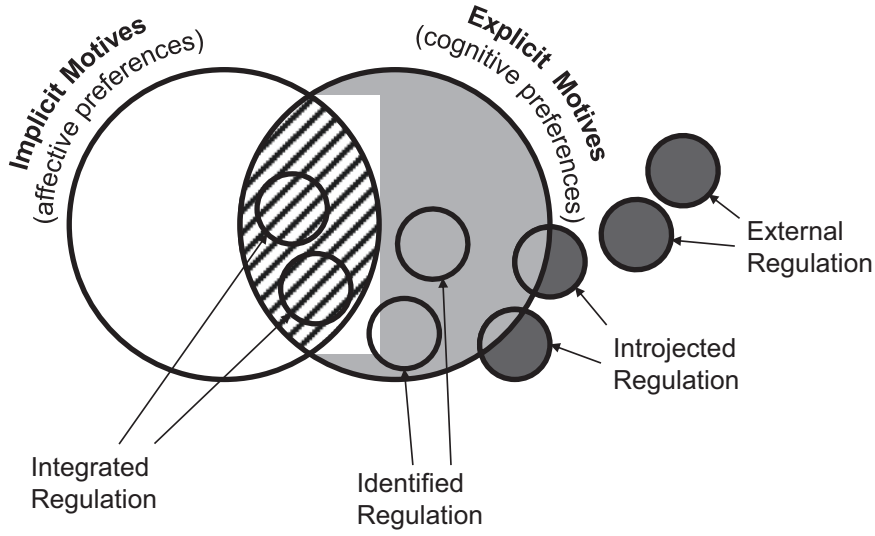

Fig. 19.3 Gradual internalization (adapted from Kehr (2004c))

grades, he decides to study math in college. He views difficult exercises as particularly challenging and begins to experience satisfaction when he solves them (integrated regulation). Three decades later, he receives the Fields Medal.

Why did this math professor in the making not realize that he enjoyed arithmetic problems and that they activated his achievement motive when he was in elementary school? Explicit goals channel implicit motives (Lang, Zettler, Ewen, & Hülsheger, 2012; Winter, John, Stewart, Klohnen, & Duncan, 1998). In our example, this channeling process occurred at a later point in time in school and at university. Prior to this, he simply had not yet learned that arithmetic problems could satisfy his achievement motive.

As a phenomenon, integrated regulation is no longer distinguishable from intrinsic motivation. Figuratively, they are both related to the lens in Fig. 19.3, i.e., they are supported by affective preferences. Because they lack a clear phenomenal distinction, the two types of motivation are also empirically indistinguishable, as the proponents of self-determination theory have already recognized (Gagné et al., 2015). Unfortunately, integrated regulation is therefore no longer measured separately (Gagné et al., 2015) even though earlier studies on self-determination theory had suggested that the relative amounts of variance explained by intrinsic and identified motivation should be separated by testing the incremental variance (cf. Burton, Lydon, D'Alessandro, & Koestner, 2006).

Figure 19.3 also highlights why autonomous types of motivation yield better results than their controlled counterparts: The three autonomous types of motivation are supported by affective and/or cognitive preferences; the controlled types of motivation are not.

Excursus

Practical Application of the 3C-model

In practical applications, such as self-management (Kehr, 2008; Kehr & von Rosenstiel, 2006), coaching (Strasser & Kehr, 2012), leadership training (Kehr, 2011), and change management (Kehr & Rawolle, 2009), the three components are referred to as *head, heart, and hand.* This intuitive metaphor is based on work by Swiss educator Johann Heinrich Pestalozzi and essentially communicates the same message as the scientific terminology.

The 3C-model can be used for systematic diagnosis and intervention when there is insufficient motivation in the workplace. Specifically, it is useful to base diagnoses on the assessment of the structural motivational components on the proximal level with the so-called 3C-check, through which the components are related to concrete activities. Possible questions that can be asked include (cf. Fig. 19.4a):

- Head (cognitive preferences): "Do I really think that [this activity] is important?"
- Heart (affective preferences): "Do I really enjoy [this activity]?"
- Hand (subjective abilities): "Am I able to perform [this activity] well?"

The answers to these questions indicate which supporting measures need to be implemented. Let us assume that a manager conducts a 3C-check with one of her employees about how to conduct interviews with customers. If the 3C-check indicates that this activity is supported by the head and heart components (i.e., by cognitive and affective preferences) but not by the hand component (which equals area A in Fig. 19.4b), a deeper conversation should help clarify whether it is only subjective abilities that are lacking or objective ones as well. If the employee lacks objective abilities (e.g., the employee is not sufficiently familiar with the employed interview guidelines), solutions such

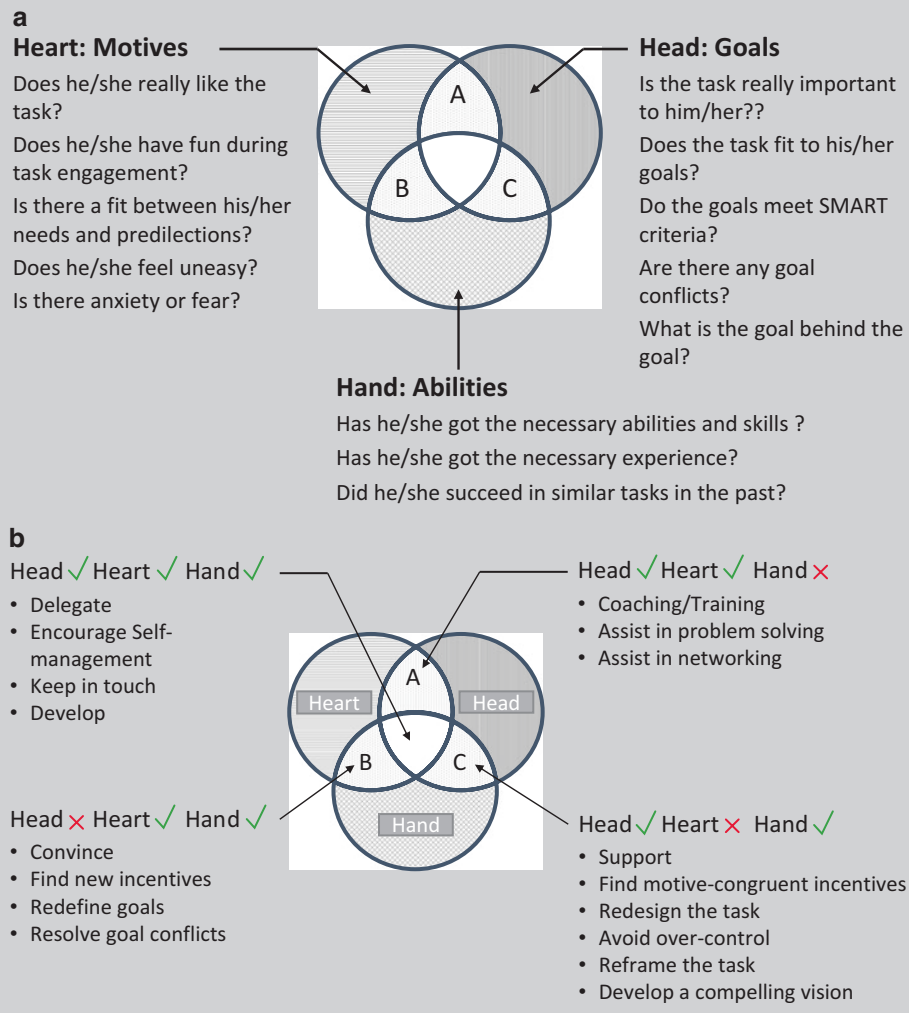

Fig. 19.4 (**a**) Application of the 3C-model: motivation diagnosis. (**b**) Application of the 3C-model: intervention

as coaching, training, or advice from colleagues should be considered. In some cases, other colleagues can cover some parts of the required task. If, however, the problem is related to low subjective abilities, the manager should attempt to use positive feedback to encourage her employee.

It is also possible that the 3C-check will indicate that the problem is caused by insufficient support from the head component (cognitive preferences): An employee might not be convinced that the suggested interview guidelines are appropriate, or an employee might prefer alternative approaches. Under these circumstances, the manager needs to create the necessary cognitive support (see Fig. 19.4b, area B). Possible measures include persuasion, offering particular extrinsic incentives, or re-prioritizing goals in order to solve the identified goal-related conflicts.

Which measures are useful, however, if the 3C-check shows that the head and hand com-

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ponents are fulfilled while the heart component (affective preferences) is not? This means that the employee sees his tasks as important, *and* he and his manager are both convinced that he possesses the required abilities to complete them (see Fig. 19.4b, area C). Neither the manager nor the employee would be able to identify the need to intervene without the 3C-check: The manager may think: "The employee is convinced that his task is useful and he is capable of completing it, so why would there be a problem?" Older concepts of leadership such as Hersey and Blanchard's (1969) situational leadership, for which affective preferences were not systematically assessed, would not suggest any reason to intervene in this situation either.

A lack of affective preferences (i.e., listlessness, "belly aches," and particularly fears), however, often accounts for why even intentions with a strong cognitive foundation remain unrealized. A lack of affective preferences is a motivational barrier that can be overcome only with volitional strategies. Yet, volitional resources are limited and depleted quickly (see Kehr, 2004a; Gröpel & Kehr, 2014).

Let us return to our employee. It is imaginable that he does not want to conduct the interviews the way he is supposed to, that he gets nervous when thinking about visiting and talking to strangers, or that he is afraid that his customers will turn him down. There is no panacea for these situations. However, managers are advised not to ignore such problems but instead to try to find solutions along with their employees. It might be possible to set new incentives that are congruent with the employee's motives or to rephrase the task so it can activate the employee's implicit motives and activate beneficial affective preferences. This is what Kehr and von Rosenstiel (2006) named *metamotivation*. For example, if the employee has a strong affiliation motive, he might be assigned to work with only hassle-free and friendly customers. It might also be possible to hold talks with customers as a team. Another approach could be the joint development of a personal vision (see Sect. 19.4.4) that matches an employee's implicit motives.

If these approaches are successful, they will arouse implicit motives, and the employee can thus effectively *avoid* motivational barriers. If they fail, managers can use their experience to help employees find volitional strategies to *overcome* these barriers. Kehr and von Rosenstiel (2006) called this *metavolition*. Recommended approaches include the reduction of excessive self-control (e.g., negative fantasies, suppression of temptations, exaggerated planning) and the replacement of over-control with reframing (positive fantasies) or changes to aversive working conditions, for example by moving the interviews to a neutral location.

19.4 New Fields of Research on Motivation in the Workplace

19.4.1 Motivation of Older Employees

The average age of employees in developed countries is steadily rising. It is therefore hardly surprising that aging has become an increasingly relevant variable in research on motivation. Studies have shown that older employees are by no means less motivated than their younger colleagues. They tend to have a stronger desire for intrinsically motivating work and higher motivational competence (see Excursus).

Excursus

Motivating an Ageing Workforce

The physical, cognitive, affective, and motivational factors of work change as employees grow older. Whereas changes in physical and cognitive resilience in older

employees have recently received a great deal of academic attention as a reaction to demographic change (OECD, 2006, 2015), the same is not true for affective and motivational aspects. In part, this lack of interest might have been caused by the implicit assumptions that motivation and affective commitment commonly decrease as employees approach retirement and that the marginal utility of motivational interventions declines with age. Nevertheless, it is particularly relevant for companies to consider the specific needs and goals of their older employees. One reason is that physical and cognitive deficits can be counterbalanced by motivation and volition. In addition, motivated employees can be expected to work productively for a longer time than their unmotivated colleagues, and this can help companies attenuate the effects of a shrinking workforce.

A recent meta-analysis on work-related explicit motives (Kooij, Lange, Jansen, Kanfer, & Dikkers, 2011) showed that older employees differ from younger ones in the following ways:

- Intrinsic work-related incentives (e.g., teamwork, autonomy) are more important to older employees than extrinsic incentives (e.g., prestige, social status, bonus payments). Older employees' motivation and work satisfaction tend to be high if they identify with their work and have a consistent self-image.
- Social motives are just as important to older employees as they are to younger ones. The subjective importance of social relationships at work, however, tends to decrease with age (Kanfer & Ackerman, 2004), suggesting that older employees' social motives are satisfied during their free time rather than in the workplace.
- Growth motives (e.g., mastery, challenges, or development) are less important to older employees. However, the importance of the generativity motive (passing on experience) grows with age.

Contrary to common preconceptions (cf. Posthuma & Campion, 2009) and earlier findings (Rhodes, 1983), recent descriptive studies have shown that older employees tend to be more motivated and satisfied than younger ones (cf. EY, 2015; Ng & Feldman, 2010). Researchers have suggested that these findings can be explained by selection processes (disgruntled employees drop out earlier), growing affective and organizational commitment, and having many opportunities to choose motive-related work throughout one's career (cf. von Rosenstiel et al., 2000). As employees grow older, it becomes more likely that their implicit motives and explicit values will be integrated (Labouvie-Vief, 2003; Thrash, Elliot, & Schultheiss, 2007). Moreover, experience and practice help to increase volitional competence (Muraven & Baumeister, 2000).

19.4.2 Gamification

Another topic that has recently received considerable attention in motivational research is gamification, which captures the idea of incorporating elements of play into work (Sailer, Hense, Mandl, & Klevers, 2013; Werbach & Hunter, 2012). In practice, however, gamification usually means that computer- or software-based elements are incorporated into current activities in order to boost motivation and performance (Deterding, Dixon, Khaled, & Nacke, 2011). For example, apps can be used to create a virtual environment with the goal of reaching a high score or level. The required points are earned through concrete real-life behavior such as completing subgoals or project-related milestones (see <Example>). Thus, work-related tasks can be structured in a playful way and divided into subordinate goals (Kapp, 2012). Virtual rewards for acquiring

specific skills or mastering particularly demanding tasks can also be implemented (Cardador, Northcraft, & Whicker, 2016).

Several approaches have been presented to explain why gamification should increase motivation. According to Cardador et al. (2016), there are two main processes – an information-based process and an affective one – that lead to the motivational effect of playful elements at work. Due to the information-based process, the introduction of virtual indicators of progress and reward increases the availability of performance-relevant information. It is thus, for example, easier to ascertain which steps are required to achieve a desired goal. This knowledge should boost motivation, an idea that is in accordance with the assumptions about the motivational effect of specific goals found in goal-setting theory (see Sect. 19.2). Subsequently, the affective process creates positive emotions in players because gamification makes their progress clearly visible at all times. These positive emotions are related to the feeling that players will be able to complete their tasks, approach the realization of their own goals and the goals of others, and gradually become more competent. All of this together satisfies players' basic needs and generates affective preferences for the tasks at hand.

Sailer et al. (2013) investigated the effect of gamification from a differential point of view. They proposed that gamification addresses employees' needs for achievement, power, and affiliation:

- Indicators of progress, increasing levels, and performance curves allow players to always have a clear and immediate understanding of parameters that are related to achievement such as progress toward goal realization and current discrepancy with the target state. This should continuously activate the achievement motive.
- The clear depiction of each player's status and progress should make social comparisons easier and reveal players' individual reputations. Knowledge about other players' progress enables them to control information and provokes competitive emotional reactions, both of which activate the power motive.
- Finally, the introduction of virtual incentives for teams and the establishment of new virtual groups, mutual support, and cooperative virtual rewards could activate the affiliation motive.

The assumed motivational processes and differential assumptions will require further empirical tests.

Example

Process of the Motivational Effect of Gamification at Work

An internal company wiki (database with intranet) with articles and quizzes is installed in order to boost further training, increase the transfer of knowledge, and connect different departments more strongly. An app for mobile devices and desktop computers is used to ensure the internalization of distributed information. Employees who use the app to read an article and correctly answer a subsequent question are awarded points. Eventually, employees level up once they reach a certain score and gain access to additional articles. Answering particularly difficult questions is rewarded by virtual trophies and other extraordinary accolades. At all times, all "players" can follow their own progress as well as the progress of their teammates and the members of other teams throughout the organization. This means that not only do employees receive immediate feedback about their own progress, but they can also compare their own performance with the performances of others. Achievement- and power-motivated employees should therefore be particularly motivated to make use of the wiki. "Unlocking" new content through one's own efforts should in turn result in positive reactions and strengthen perceived self-efficacy.

Many studies have provided evidence for the facilitation of flow through video games, mobile apps, internet-based multiplayer games, and general interactions between humans and computers (Chen, 2006; Hsu & Lu, 2004; Lu, Zhou, & Wang, 2009; Schattke, Seeliger, Schiepe-Tiska, & Kehr, 2012; Webster, Trevino, & Ryan, 1993). Because flow has a positive impact on subjective well-being, job satisfaction, and performance (cf. Sect. 14.5), researchers conducting applied research can be expected to investigate the connection between gamification and flow more often in the near future (see <Excursus>).

Excursus

Gamification

Gamification can enhance activities to increase the frequency of flow. A field study by Hamari, Koivisto, and Sarsa (2014) confirmed this assumption in the athletic context. Morever, a work-related field study by Hamari (2015) showed that the introduction of virtual badges resulted in increased efforts. This result was explained by the ability of virtual badges to fulfill several conditions for flow such as immediate feedback and optimal challenges. Finally, flow-creating elements in educational games (adaptively increasing challenges in particular) were shown to result in effective and lasting learning (Hamari et al., 2016; cf. Kapp, 2012).

Augmented reality (AR) is a domain that is related to gamification. AR refers to the connection between real and virtual worlds through devices such as smartphones or virtual reality glasses with the goals of enhancing perception and the execution of tasks (Azuma, 1997; Bimber & Raskar, 2005). Of particular motivational relevance are the activation of motives through playful elements and control of attention and emotions through the systematic modification of the reality of work. AR creates countless opportunities for the cooperation of psychologists, ergonomists, and designers (cf. Schmalstieg & Hollerer, 2016; van Krevelen & Poelman, 2010). Rapid development in these areas suggests that gamification and AR will constitute important fields for future applied research on motivation. At the same time, both basic and applied research should benefit from the technical opportunities created by gamification and AR.

19.4.3 The Money Motive

The idea of investigating money as an independent motive was probably inspired by practical considerations. Many people seem to pursue money to an extent that seems to push aside other needs such as pursuing a task that provides autonomy and makes a contribution to society. However, the question of whether this desire is really created by a "money motive" or is rather the expression of other explicit motives is quite controversial (see <Excursus>).

Excursus

Need for Money?

Several studies have suggested that monetary incentives increase the productivity of employees and students (Jenkins, Mitra, Gupta, Shaw, & Jenkins, 1998). This is usually true for the quantity of work rather than its quality, which, by contrast, is primarily determined by intrinsic motivation (Cerasoli, Nicklin, & Ford, 2014). Just because money can motivate people to work, however, does not mean that an (implicit) money motive really exists. Evidence for the existence of such a motive would first require the development of suitable operant instruments. Next, empirical analyses would need to show that the money motive activated by monetary incentives and measured with appropriate instruments in fact engenders corresponding affective preferences and subsequently influences operant behavior. There is currently no such evidence. Research on the motivation to earn money has so far been limited to

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explicit self-reports measured with questionnaires (e.g., Srivastava, Locke, & Bartol, 2001). Such research has shown that the motivation derives from various practical considerations (cost of living, support for one's family) and explicit motives such as the need for social comparison, the need for influence and prestige, and the desire to overcome self-doubt (Srivastava et al., 2001). Thus, whether there truly is a money motive remains to be seen.

19.4.4 Motivation and Leadership

Unfortunately, studies on motivation and leadership have so far been relatively isolated from each other (for an exception, see the employee-based goal negotiation by Schmidt & Kleinbeck, 2006), although leadership researchers could benefit from the insights of motivational psychology. In fact, House and Shamir (1993) already assumed that the effectiveness of leadership might be based on the selective activation of employees' implicit affiliation, power, and achievement motives. Amann (2014; Kehr, Amann, & Giessner, 2016) tested this idea and found in a laboratory study that employees' implicit motives had an impact on which leadership style they preferred. If the leadership style matched employees' implicit motives, their performance became significantly better.

Another convergence of research on motivation and leadership can be found in studies on visions. Although research on the construct "visions" has been conducted for decades (Nanus, 1992), it has only recently been implemented in motivational psychology. Rawolle, Schultheiss, Strasser, and Kehr (2016) defined "visions" as mental images of desired and achievable future states that are relevant to an individual's identity. Their pictorial quality in particular is what distinguishes visions from long-term goals that do not need to be concrete images but can in fact be abstract. The results of a laboratory study by Rawolle et al. (2016) suggested that visions affect motivation because the act of painting a mental image activates implicit motives in a way that is analogous to looking at an actual image on a projective test. Hajas (2013) provided indirect support for this assumption in field studies in which he was able to show that the subjective motivational effect of organizational visions depended on how easily they could be visualized. An overview of applied studies on visions can be found in (Strasser, Rawolle, and Kehr 2011).

19.5 What Lies Ahead

Research on motivation in the workplace is at a crossroads. Many of its classic concepts remain very popular among practitioners but tend to be gradually losing their academic relevance – with the notable exceptions of goal-setting theory (Locke & Latham, 2004) and self-determination theory (Deci & Ryan, 2000) as "modern classics." More recent impulses for research on work motivation are frequently not inspired by practice – apart from the important influences of gamification and augmented reality – but rather from basic research on motivation. The investigation of implicit motives and volitional processes has been particularly fruitful here. New insights derived from such research are already being combined with integrative approaches of work motivation (cf. Barrick, Mount, & Li, 2013; Humphrey et al., 2007; Kehr, 2004b; Locke & Latham, 2013), discussed in textbooks with a practical focus (e.g., Weibler, 2016), and used as a basis for training (e.g., Kehr, 2011; Kehr & von Rosenstiel, 2006). The future will show if they will also have a practical impact.

Review Questions

1. What *is the importance of motivation for companies and their employees?*

   Employee motivation is an important variable in the workplace. It affects performance, determines job satisfaction and commitment, and ultimately determines the success of individual employees, teams, and entire organizations. Motivation is also a strategic key variable for the competition between organizations.

2. *What are the classic theories of employee motivation?*

   Theories discussed in this chapter:

   - Herzberg's two-factor theory
   - McClelland's need theory
   - Vroom's VIE theory
   - House and Mitchell's path-goal theory
   - Locke and Latham's goal-setting theory
   - Deci and Ryan's self-determination theory

   Other theories mentioned in the book, for example:

   - Maslow's hierarchy of needs and its further developments (e.g., Alderfer's ERG theory)
   - Atkinson's model of risk-taking behavior
   - Adams' equity theory

3. *Which two groups of factors does Herzberg specify in his two-factors theory? How are they related?*

   The two factors are motivators and hygiene factors. Fulfilled motivators (e.g., job satisfaction, acknowledgment, career opportunities) are satisfying and motivating. If these motivators are not fulfilled, employees are not satisfied but are also not automatically dissatisfied. Dissatisfaction is a result of unfulfilled hygiene factors (e.g., job security, physical work conditions, or income). If hygiene factors are fulfilled, the employee is not dissatisfied but also not automatically satisfied. Satisfaction and dissatisfaction are therefore independent of each other.

4. *What is, according to Herzberg, the motivational state of an employee who is neither dissatisfied nor satisfied? Which incentives would make the employee satisfied?*

   According to Herzberg, the employee is not demotivated but also not motivated. Thus, incentives should be given which can serve as motivators. These include opportunities for growth and promotion, appreciation and acknowledgment, responsibility, and challenging but manageable tasks.

5. *Which variables determine "motivational energy" in the VIE theory?*

   "Motivational energy" is determined by

   - The expectation (E) that the action in question can be realized successfully
   - The instrumentality (I) of this action for outcomes that individuals consider meaningful
   - The valence (V) of the anticipated action's consequences

   In the conceptualization of the VIE theory, these variables are independent of each other and need to be multiplied in order to predict motivation and behavior.

6. *Why is the practical usefulness of the VIE theory limited?*

   The practical usefulness of the VIE theory is rather limited because

   - The calculation of decisions is idiosyncratic. For individual employees, it is neither possible to predict how instrumentality, expectation, and valence will be weighted nor possible to predict what the outcome of their

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multiplication on the resulting motivation will be.
- The strictly rational calculation of motivation in decision making is not possible because other factors (e.g., emotions) are more influential than the three factors. Therefore, impulsive decisions often occur in practice which can neither be predicted nor explained by the multiplicative model of the VIE theory.
- The practical deductions and recommendations from the VIE theory are largely not based on empirical studies. Therefore, their effectiveness cannot be guaranteed.

7. *What are the claims of the path-goal theory?*

   The path-goal theory states that managers should support employees in identifying and successfully implementing the best possible ways of realizing their own goals. For this purpose, they should assess the employee's valences, instrumentalities, and expectations, and subsequently influence them in a way that causes them to form the desired intentions.

8. *Which mediators and moderators does the goal setting theory postulate? How do they work?*

   The most important mediators of goal realization are the willingness to expend effort, focus of attention, persistence, perceived self-efficacy, and the utilization of suitable task strategies. The first three mediators represent the classical components of motivation. Their presence has positive results on goal achievement. According to goal-setting theory, perceived self-efficacy directly influences these motivational factors as well as the goal setting itself. Accordingly, it has a central role in goal setting and goal achievement. However, its influence is not linear in terms of a simple "more is better." Lastly, task strategies can be characterized as resources and problem-solving instruments, which have a positive influence on goal achievement once goal difficulty and motivation are set.

   The most important moderators identified are commitment, abilities, feedback, situational restrictions, and task complexity. Their existence has a positive influence on goal setting. However, regarding the influence of task complexity, further moderators are discussed which suggest a nonlinear influence on goal achievement.

9. *Which three basic needs are at the core of the self-determination theory?*

   The three basic needs of self-determination theory are autonomy, competence, and relatedness.

10. *What is "internalization" according to the self-determination theory?*

    Internalization is the process of integrating originally external action goals. In the context of the organismic integration theory, four types of extrinsic behavioral regulation are distinguished: external regulation, introjected regulation, identified regulation, and integrated regulation. According to self-determination theory, the last two are dimensions of autonomous motivation.

11. *Why does the self-determination theory not yet meet the requirements for a comprehensive theory of work motivation?*

    Self-determination theory does not yet meet the requirements for a comprehensive theory of work motivation because (until now) it has only demonstrated the influence of autonomous motivation on work motivation; the differential effect of the various kinds of autonomous and controlled motivations has not yet been demonstrated. Furthermore, the theory has

mainly been validated in laboratory and academic contexts. A thorough validation in the work context is still missing.

12. *What are the methodological weaknesses of the self-determination theory?*
    - Using the common tools to investigate different theory-based types of motivation, differences between integrated and intrinsic motivation cannot empirically be made, although a clear theoretical difference exists.
    - The contribution of controlled motivation types in various work-related variables is very low. This puts into question the postulated role of controlled motivation in work contexts.
    - Specificity of the investigations: The theory has mostly been tested in laboratories or in school contexts and is accordingly best validated for academic institutions and their characteristics.

13. *What are the structural components and functional mechanisms of the 3K model? How are they related?*

    The 3C-model postulates three structural motivational components that can be conceptualized on distal and proximal levels. On the distal level, the components are implicit and explicit motives and subjective abilities; on the proximal level, they are affective and cognitive preferences and scripted behavior. The three components are represented as three partially overlapping circles to indicate that the components can be consistent with each other but do not have to be. The functional mechanisms are volition and problem-solving. They are required to compensate for insufficient motivation (volition) and insufficient abilities (problem-solving).

14. *What is the difference between latent and manifest intrinsic motivation in the 3K model?*

    Latent intrinsic motivation occurs when implicit and explicit motives correspond on the distal level. Manifest intrinsic motivation occurs when cognitive and affective behavioral preferences correspond on the proximal level.

15. *What is the difference between distal and proximal motivational constructs?*

    Distal and proximal motivational constructs are distinguished with regard to their behavioral proximity to the motivational construct, where the proximal motivational construct is closer to the actual behavior than the distal one. An example for a distal motivational construct is the implicit power motive. The corresponding proximal indicator would be, e.g., positive emotions when engaging in power-related activities.

16. *A colleague has been underperforming for a while. She has been lethargic, despondent, and inefficient. You assume that a "motivational problem" is the reason for the changes. How can you use the 3K model to test your assumption and potentially help your colleague?*

    In practice, a systematic diagnosis with the so-called 3C-check is recommended. The three structural components of motivation (head, heart, and hand) are checked with regard to concrete activities.

    Key questions:
    - Does the employee enjoy the activity? (heart, implicit motives, affective preferences)
    - Does the employee think that the activity assigned to her is important? (head, explicit motives, cognitive preferences)

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- Does the employee believe she has the required skills to perform the activity well? (hand, scripted behavior, subjective abilities)

17. *Based on the 3K model, how would you motivate an employee who thinks his work is important and possess the required skills to complete it, but feels afraid and weary when thinking about work?*

    On a proximal level, the employee is lacking the necessary affective preferences to perform the activity with motivation. Affective preferences can be achieved, for instance, through motive-congruent incentives or a motive-congruent redesign of the task. Other possibilities are reframing the activity or forming a compelling, motive-stimulating vision of the activity.

18. *How do older and younger employees differ with regard to aspects of their motivation?*
    - Older employees place more value on intrinsic work-related incentives.
    - Younger employees place more importance on social relationships at work.
    - Older employees' motives shift to passing on of experience (generativity).
    - Older employees generally have higher volitional and motivational competencies.

19. *What are the explanations for the motivational effect of gamification in the workplace?*

    There are various approaches to explain the motivational effects of gamification in a work context. According to Cardador et al. (2016), affective and information-based processes play a role: playing creates positive emotions in players through their ability to complete tasks and to approach their own goals or the goals of others (affective process). Additionally, there is an increase of the availability of performance-related information (information-based process). According to Sailer et al. (2016), gamification addresses the three big motives: achievement, through the indicators of performance-relevant parameters and progress; power, through the winner's reputation and the display of progress; and affiliation, through the establishment of teams and new groups.

    An empirical test of these approaches has not yet been conducted.

20. *Why can visions motivate more strongly than "conventional" goals?*

    Visions distinguish themselves in comparison to goals through a higher pictorial quality. Because mental images activate implicit motives, visions are able to generate affective preferences over concrete images. This facilitates the decision of whether the vision will be pursued wholeheartedly (i.e., with the support of own implicit motives). Nonpictorial goals render access to the implicit motive system more difficult.

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Motivation and Volition in Sports

20

Jürgen Beckmann and Tom Kossak

20.1 Introduction

Motivation is crucial in sports, from professional to recreational forms and including physical education as well as exercising for health reasons. This makes motivation a key aspect of sport psychology. The field of sport psychology involves "research on basic psychological knowledge, on the psychological processes in sports and on the effects of these processes on the sport. This knowledge is used to derive scientifically grounded training and practice for optimising behaviour in the specific sport" (Beckmann & Elbe, 2015, p. 5). There are specific conditions that distinguish sports, especially elite sports, from other areas of life. For example, athletes typically experience high physical load which is combined with large amounts of psychological stress during competitions. Sport psychology research investigates the causes and effects of the stress experience. However, since sport psychology is first and foremost an applied discipline, research ultimately focuses on the development of interventions to support and optimise behaviour in professional sports, physical education and exercise. Because poor performance is frequently caused by a lack of motivation, a central objective of sport psychology is to explain what causes a lack of motivation and help to improve motivation in athletic contexts. For about 30 years, sport psychologists, just like researchers in other fields, have been aware of the fact that motivation alone is not enough to explain human behaviour. Fitness training and strength and conditioning are not always fun, although professional athletes often push themselves to the brink of exhaustion and have to sacrifice other parts of their lives. Why and how can runners, for example, complete a marathon although their motivation is gone when they hit "the wall" after 21 miles (35 km)? The question of how individuals keep going even if it is exhausting and tiresome with little obvious progress in the short term is a central one for health-related physical activity. Extreme sports are becoming increasingly daring. Why do individuals put their health and even life at stake in such sports? All of these topics are of interest in sport psychology. The topic of motivation relates, for example, to an understanding of the motivation of individuals in health-related fitness or extreme sports, to answer the question of how individuals set their goals to achieve high performances. Volition deals with topics like how athletes manage to concentrate on their activities in spite of fear, stress and exhaustion. This chapter

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focuses primarily on competitive and professional sports. Health-related physical activity will only be addressed briefly.

20.2 Theoretical Background of Motivation

20.2.1 The Central Approach of Motivational Psychology

Since McClelland (1953) modern motivational psychology has focused on incentives. The affect-laden incentives of a positive target state energise and direct behaviour. Incentives attract or "pull" a person towards them in contrast to needs and drives which are assumed to "push" the person (see Chap. 4). In sports such incentives can be perceived in proving competence, e.g. when running a world record or when beating all others and becoming Olympic or world champion. In modern sports financial incentives also play a substantial role, and this anticipation of affective change can constitute the core of this incentive. Athletes anticipate the affect resulting from achieving their goal, e.g. winning a medal, and also strive to restore the affect they associate with a certain outcome based on their earlier experience. This explanation for the emergence of incentives based on anticipated affective changes has been confirmed by more recent neurophysiological and biopsychological approaches (see Beckmann & Trudewind, 1997; Schultz, 2000).

Incentives are a component of motivation associated with the anticipation of obtaining a desired goal state (i.e. the value component in expectancy-value models; see Chap. 5). The majority of motivational research is based on the expectancy-value model (see Chap. 5 in this volume). According to this model, the motivational state is determined by the incentive of the target state (value) multiplied with the probability (anticipation) of its realisation. In his expanded model of motivation, Heinz Heckhausen (1977) describes different relevant forms of expectancies and values. Concretely, there are incentives that are inherent to the activity (intrinsic incentives) and others that depend on the consequences of the activity (extrinsic incentives). The most important forms of expectation include the expectancy of the results of the behaviour, i.e. to achieve certain results with our own behaviour, such as becoming world champion, and the expectancy of the consequences following the result, i.e. that achieving a certain result will lead to the desired consequences, such as becoming famous, scoring well-paying advertisement contracts and so on.

However, these are only the situational aspects of motivation: the potential incentives indicated by a particular situation and how likely it seems that these incentives can be attained. Whether such situational aspects appeal to an individual, however, also depends on personality factors. Not everyone will be interested by the prospect of skiing down a steep slope, and, similarly, not everyone considers demonstrating their skills in front of 70,000 spectators in a football stadium a positive incentive.

Modern motivational psychology thus subscribes to an interactionist approach: the situational aspects of incentives are thought to interact with personality traits. These determinants of motivation found inside the person are called motives and are relatively stable evaluative dispositions for classes of situations that share certain characteristics. Thus, it depends on motives how a person evaluates athletic contexts. Each social motive, i.e. evaluation disposition developed through socialisation, has a positive approach component and a negative avoidance component. For the achievement motive, these components are hope for success and fear of failure, respectively. Motivation is ultimately the result of the product of incentive, expectation and the motive related to the overall theme (here achievement). The resulting motivational tendency which ultimately determines the action taken is the result of the sum of the approach and avoidance tendencies generated by the two components of the motive.

As the above case study shows, everybody working in an athletic context, such as teachers or coaches, needs to consider the various aspects of

Example

Motivational Deficit

In the early morning, a ski instructor prepares a challenging slalom course for a group of advanced students. The instructor expects that the course will motivate his students. However, unexpectedly, none of his students wants to ski the course. Because all of the students study sports at university and have a high achievement motive (with a much higher hope for success than fear of failure), the teacher assumes that the course should represent a rewarding challenge to them and thus be perceived as an incentive. Consequently, he is surprised to find that his students are not particularly enthusiastic about the course, and some even refuse to ski at all. Later, when talking with the students, he learns that because of the icy conditions, the student's expectation of safely navigating the course is zero. The whole product consisting of motive, incentive and expectation therefore equals zero as well.

motivation, namely, motive, incentive and expectation, equally if they wish to obtain high motivation. The case study highlights an important feature of the motivation formula that is highly relevant to its application: motive, incentive and expectation are multiplied! Thus, the resulting motivation equals zero if only one of the individual factors is zero. In what follows we will have a look at different motives that can play a role in this calculation. First, however, we need to consider fundamental differences between motives.

Summary

The "expectation-times-value" model, whether it might be used in research or in applied contexts, is extremely helpful in order to understand and influence the motivation of athletes. Situational incentives which are influenced by an individual's motive structure and the individual expectations to master the situation are fundamental for the prediction of motivation in sports. All three aspects need to be considered.

20.2.2 Implicit and Explicit Motives

At the most basic level, motives can be divided into conscious (explicit) and subconscious (implicit) motives (see Chap. 9 in this volume). According to McClelland et al. (1989), implicit motives are inaccessible to conscious introspection and can thus only be measured indirectly. They are based on affect-laden preferences for certain types of incentives and are acquired during early childhood. Because they lack a verbal representation, they cannot be assessed with questionnaires. On the other hand, explicit motives are self-ascribed motives that reflect individuals' self-image, conscious values and goals as well as perceptions of motives. Thus, explicit motives can be measured with questionnaires. While implicit motives are associated with spontaneous and recurring long-term behavioural tendencies, explicit motives tend to predict short-term conscious choices or the conscious setting of goals, e.g. the choice of achievement-related tasks (Brunstein & Hoyer, 2002). Many studies have found no correlation between measures of implicit and explicit motives (e.g. Köllner & Schultheiss, 2014; Spangler, 1992; Thrash & Elliot, 2002).

Measures of explicit motives have so far been dominating sport psychological research and its application (Allmer, 1973; Elbe, 2003; Elbe, Wenhold, & Müller, 2005; Frintrup & Schuler, 2007). However, Gabler (1972) transferred a measure of an implicit motive, Heckhausen's thematic apperception test (TAT) for the achievement motive, to the athletic context a number of years ago, showing that high-achieving swimmers have higher scores of implicit motives than swimmers at a lower achievement level. The achievement motive measured with the sports-specific TAT was positively correlated with the swimmer's performances and amount of exercise, but it did not correlate with

their (explicit) self-reports. Gabler's approach, however, did not result in much consecutive research; this is probably due to how much more time-consuming the TAT is compared to the use of questionnaires.

Recently, research has more clearly addressed the differentiation between implicit and explicit motive measures in sports psychology (Schüler & Wegner, 2015). Findings reported by Wegner and Teubel (2014) suggest that implicit and explicit motives predict different classes of behaviour in the athletic context. In their study sports students' explicit achievement motive was predicted relatively well when distance to a goal in handball and football or to the hoop in basketball was chosen in a performance test. Predictions for the choices were not as good with the implicit motive. However, the implicit motive was a good predictor for performances in competitive contexts in several matches played in these three types of sport, which in turn was not significantly associated with the explicit motive. Wegner et al. (2014) reported similar differences in the prediction of behaviour for the affiliation motive. The implicit affiliation motive was more closely associated with nonverbal social interactions in real competitions, whereas the explicit affiliation motive was associated with verbal exchanges within the same team. Two studies by Gröpel et al. (2015) showed significant differences in the achievement profiles of professional and recreational athletes with both the implicit and explicit achievement motive being stronger in the former group. Additionally research has shown that congruence between implicit and situational conditions in an athletic context can result in higher well-being and a more frequent experience of "flow" (Schüler & Brandstätter, 2013). Schüler and Wegner (2015) also showed that a match between set goals and implicit motives (motive congruence) is positively associated with well-being as well as motivation for upcoming athletic activity. Interestingly, this also holds true for goals set by others, e.g. the goals set by coaches as long as they are congruent with an individual's goals. According to a study by Sorrentino and Sheppard (1978), such congruence can even lead to better performance. In their study swimmers with a strong affiliation motive performed better if they swam as part of a team (for team success) than when they swam for their own success in a competition. These findings are of high applied relevance for both competitive sports as well as health-related exercise.

Kuhl (2001) stated that positive and negative affect are crucial determinants for the access to one's own personal implicit motives. Thus, negative affect hinders access to the implicit self, personal preferences and implicit goals (cf. Brunstein, Schultheiss, & Grässmann, 1998). The choice of personal athletic goals is therefore strongly dependent on the ability to regulate negative affect. Professional athletes who are under consistent pressure benefit in particular from being able to regulate their negative affect. This ability allows them to constantly pursue self-selected goals and identify which goals are congruent with their motive and which goals are not. Additionally, it seems to be extremely important for health-related exercise to be able to access one's self-system even under stress and pressure (Baumann, Kaschel, & Kuhl, 2005). Positive affect, on the other hand, facilitates access to behaviour. Without positive affect, according to Kuhl, initiative is blocked, and intentions are not translated into behaviour.

20.2.3 Activation

Arousal and activation are extremely important topics in sports. Activation, understood as being ready for competition, is an important prerequisite for successful athletic behaviour. In part, this energisation is generated through the affective cores of incentives. A purely cognitive representation of goals is not sufficient to elicit behaviour. Activation and motivation are sometimes equated in sports (Roberts, 1992). Frequently, an athletes' failures are attributed either to a lack of motivation or to "overmotivation". When "overmotivation" is stated as a cause of failure, it is usually meant that the activation was too high. The 1908 so-called Yerkes-Dodson law on the relationship between arousal and performance is a common

point of reference here. According to this rule, a moderate level of activation is the optimal condition for good athletic performance. Even though the Yerkes-Dodson rule is too simplistic to apply to the relationships in question and must therefore be dismissed as a general rule (Beckmann & Rolstad, 1997), it is still often used by coaches and athletes as a basic guideline for the optimal activation for competitions.

The first shortcoming of the Yerkes-Dodson rule is its one-dimensional conceptualisation of activation which equates activation with arousal. Later approaches differentiate the concept of activation and distinguish it from arousal (Schönpflug, 1993). In the Yerkes-Dodson conceptualisation, activation is seen as a general arousal of the central nervous system. Increases in such arousal are assumed to be helpful if athletes, for example, need to exert strong physical force. But the situation is more complex and two aspects must be distinguished: intensity and selection. Intensity refers to how much energy is mobilised, while selection answers the question of where this energy is directed. Originally, researchers thought that the ascending reticular activation system was unspecific; now, however, a stronger degree of selectivity is assumed (e.g. control of selective attention; cf. Birbaumer & Schmidt, 1990). According to Schönpflug (1993, p. 135), energy is distributed from central to peripheral locations (top-down activation). Moreover, energy is a limited resource and can therefore only be distributed to a limited number of functions (cf. Heemstra, 1988).

A certain level of general activation (arousal) is required for more specific activation processes. Thus, activation emanating from the brain stem (ARAS) provides the foundation for more specific processes (cf. Gray, 1991). On the one hand, such activation facilitates the excitability of receptors and thereby the processing of stimuli; on the other hand, it allows for the general ability to centrally initiate behaviour. Tucker and Williamson (1984) therefore postulated the existence of two neural control systems of which one, the activation system, regulates an organism's willingness to take action. The other control system, the regulation of arousal, supports alertness and the ability to react to stimuli. Thus, both systems dynamically manage an organism's reactions to its surroundings.

According to Schönpflug (1993), there is a limited amount of energy (activation) which needs to be assigned to the function required for performing well on a task demanding high concentration: "Strong concentration seems to require two things: a high mobilisation of energy and a preference to use this energy for a preferred activity" (p. 136). Therefore, higher degrees of activation can be concentrated on specific functions without necessarily resulting in negative side effects such as anxiety.

20.2.3.1 Relationship Between Activation and Performance

Yerkes and Dodson (1908) originally postulated an inversely U-shaped relationship between the performance shown in a difficult discrimination task and the intensity of electric shocks as punishment (cf. Bäumler, 1992). According to the generalised Yerkes-Dodson hypothesis, the optimal condition for good performance is a moderate level of arousal. In spite of much theoretical criticism and contradicting findings, this hypothesis appears to be very resistant to being abandoned in academic and applied sport psychology.

The Yerkes-Dodson rule suffers from two fundamental problems. The first problem is the aforementioned assumption that arousal is a one-dimensional concept. Additionally, the rule does not sufficiently differentiate between tasks with different performance characteristics apart from difficulty. Neiss (1988, p. 355) therefore states that findings on the Yerkes-Dodson rule merely reflect the mundane observation that motivated people perform better than apathetic and highly anxious ones. Moreover, in the case of anxious individuals, many results also suggest that performance does not only depend on physiological components (arousal) but also on cognitive appraisal (apprehension).

On the basis of such criticism, Hanin (1997) developed the model of "optimal zones of individual functioning". This model states that each

athlete has an individual optimal activation level. Several studies have supported the existence of such optimal zones: before competitions successful athletes tend to report activation levels that are much closer to their individual optimal zones than less successful athletes (Raglin & Hanin, 2000). Sport psychologists should therefore try to develop interventions for individual optimal levels of activation together with athletes.

According to Beckmann and Rolstad (1997), processes of cognitive appraisal are critical mediators on the relationship between activation and performance. They list several findings that stress the important role of cognitive appraisals and how they are crucial to determine whether activation processes impede or promote performance. If a situation is interpreted as a challenge, i.e. a difficult goal that can be achieved, there does not seem to be an upper limit for beneficial activation. Being "too motivated" and thus performing worse appears to be impossible under such circumstances. If, however, a situation is perceived as a threat, i.e. uncontrollable or impossible to achieve, cognitive and physiological processes that impede performance can occur. Perception of threat involves anxiety which is a central emotional component in the explanation why athletes fail to perform up to their potential in important competitions (known as "choking under pressure"; Mesagno & Beckmann, 2017).

Summary

The Yerkes-Dodson rule assumes an inversely U-shaped relationship between an athlete's arousal and performance. Thus, it assumes that moderate levels of activation are associated with good performance. Empirical findings have shown that this relationship can be seen as a rough guideline or rule of the thumb at best. The actual relationship is much more complex. There seem to be substantial interindividual differences in how arousal is perceived and what degree of arousal leads to optimal performance. In addition, different requirements that are specific to different types of sports demand different levels of arousal. A more useful model in this context is Hanin's concept of individual zones of optimal functioning (IZOF).

20.2.4 Distinctive Features of Motivation in Sports: Incentives in Sports

After having discussed some fundamentals and general models pertaining to the role of motivation in sports, this section will address domain-specific motivation in sports. The question of motivation for sports refers to what makes people take up sport and exercise. For instance, we might want to find out what could motivate nonathletes in their mid-fifties to take up jogging. In contrast, motivation in sports deals with factors that motivate people while exercising or what stimulates a person to go for a run three times a week regardless of the weather.

Motivation for sports and in sports are both related to the particular incentives offered by sport activities prompting individuals to even experience some discomfort and potentially face risks instead of sitting on the couch and watching TV. In general, individuals should anticipate that athletic activity will lead to affective change as proposed by McClelland (1953). Both the affective consequence of the results of an athletic activity, e.g. finishing a marathon, and its consequences are important here. The latter factor might be doing something good for one's health, making new friends, gaining recognition and prestige and eventually perhaps even earning (a lot of) money, whereas the former could be related to a feeling of satisfaction or pride after having reached a relevant goal.

Experiencing athletic activities itself contains specific forms of incentives. The enjoyment of being active can encourage people to exercise after phases of physical inactivity. The kinaesthetic experience of movement is experienced as an incentive. Duncker (1940), for example, referred to the specific affective experiences when driving fast or skiing as "dynamic joys". According to Caillois (1958), certain forms of movement such as rotating the body, gliding, moving at high speed and speeding up during circular movement (e.g. pirouettes in ice skating) constitute special states that can function as incentives. He calls them "ilinx" (the Ancient Greek word for "swirl").

Feige (1976) describes five dimensions of motivation in sports. The first dimension refers to a drive-like foundation of the motivation to physical activity and represents the desire to move and be physically active. The second dimension is emotional affective bonding. Concretely, people exercise in order to feel certain emotions. The third dimension concerns the direction and stabilisation of the motivation to exercise due to individual and social needs. Sports offer many opportunities to satisfy the needs of independence and self-actualisation. Furthermore, individuals can experience self-affirmation, competence, gregariousness and mutual support when exercising. The fourth dimension according to Feige is the intellectual reinforcement of motivation. People can be motivated to exercise by rational thoughts such as the idea that exercising is good for one's health. Feige's final dimension that is placed at the highest structural level for explaining a person's motivation to exercise is making volitional decisions based on goals and values. This dimension refers to superordinate values that determine the extent and intensity of athletic behaviour over long periods of time.

Excursus

Gabler's (1993) Classes of Incentives of Exercising

- Pursuit of self-knowledge: One's performance provides information about oneself in comparison to others.
- Pursuit of rewards: Achievement can result in extrinsic rewards such as material gains or higher status.
- Pursuit of pleasure: Achievement can be pleasant. Anticipating the emotional and affective consequences of one's activity can be perceived as the actual source of motivation in this case.
- Rewarding oneself: This reflects the notion of achievement motivation as a system of self-reinforcement. Individuals reward themselves immediately following the completion of an activity if they achieve their goal.
- Pursuit of task realisation: Relates to striving to meet the requirements that are immanent to the task at hand.
- Pursuit of efficacy: This striving does not relate to the realisation of a particular goal itself but rather the experience of one's own efficacy in interactions with the environment.
- Pursuit of excellence: During the course of development, the pursuit to experience one's own excellence emerges from the pursuit of efficacy. This paves the way for the formation of the concept of achievement-related self-esteem.
- Pursuit of self-realisation: In accordance with Maslow (1954), self-actualisation is the highest level of pursuit which is related to finding out what a person's full potential is and the realisation of that potential.

In addition to incentives, personality has been an important consideration. It comes as no surprise that Gabler (1972) focused primarily on the achievement motive as a pivotal personality component in high achievement sports. However, outside of high achievement sports, several other motives appear to be of significance. Abele and Brehm (1990) suggest 15 motives that are relevant to athletic leisure activities. They can be assigned to ten areas; however, the differentiation between motive and motivation is unclear:

- Health and fitness
- Well-being (fun/well-being, relaxation/balancing stress)
- Physical appearance (athletic body, losing weight)
- Achievement (effort/strain, improving one's performance, comparison/competition; this corresponds to the achievement motive)

- Experiencing one's body
- Experiencing companionship
- Social contacts (foster friendships, meeting new people; this corresponds to the affiliation motive)
- Excitement and discovering something new through sports (similar to sensation seeking)
- Aesthetics of physical activity
- Self-presentation

According to Hueppe and Uhlig (1992), other authors suggest similar dimensions as relevant to athletic behaviour (e.g. Singer, Eberspächer, Bös, & Rehs, 1980). Surprisingly, the power motive is not included in this list.

Using motorcycling as an example, Rheinberg (1989) examined the motivational incentives of risky behaviour. The underlying rationale is that, apart from motivation based on behavioural outcomes, activities themselves can have strong incentives as the abovementioned "dynamic joys" and can thus be motivating and instigate behaviour. Ultimately, according to Rheinberg's empirical findings, the risky behaviour of riding a motorcycle can be characterised as an activity in which savouring of the incentives of dynamic driving (dynamic joys) is intensified through the perception of potential threat which is perceived to be controllable by one's own competence (Rheinberg, 1996). The combination of experienced competence, exciting perception of threat and uncommon states of movement can be found in other risky leisure activities as well (e.g. skiing, BASE jumping). This kind of matching of task demands and competence can create special experiences in other areas than sports as well. Csikszentmihalyi (1975) called this special quality flow experience (see Chap. 14 in this volume). Although flow can be experienced in all areas of life, it is reported with particular frequency in sports.

Example

In the 800 m race at the German championships an athlete who had been successful internationally for the last few years is leading the field after 400 m. Suddenly, however, she slows down and leaves the track. When journalists ask her why she dropped out of the race, she replies: "I was simply tired". Psychologically speaking, we can see a loss of motivation here. How could we explain it? In the past, the athlete had particularly enjoyed running (incentive intrinsic to the activity) when she was in second place and then could "switch on her turbo" to overtake the runner leading the field and win. Her "turbo" was paired with images of the "Road Runner", a bird of the Loony Tunes cartoons that with a "beep beep" can run at such a high speed that its legs start to look like rapidly turning wheels. This is the image the athlete saw whenever she switched on the "turbo". With the image of the turning wheels of the road runner and a "beep beep" to herself, she would start to fly along the track. Not long before the German championship, she had started to work with a new coach. He had strictly instructed her to be aware of her mental race plan each second of her race. Following these instructions left no room to act spontaneously. Consequently, she was no longer able to resort to individual resources of performance-enhancing self-regulation, so intrinsic motivation and self-regulation ability were literally left behind.

20.2.5 Intrinsic and Extrinsic Motivation

One central component of motivation in sports is the role of incentives that are inherent to an activity. If an activity is performed for its own sake, i.e. if "there is a thematic convergence between means (behaviour) and end (goal of behaviour)", behaviour is intrinsically motivated (Heckhausen, 1989, p. 459; see Chap. 14 in this volume). If, however, an activity is primarily performed because of its expected results, e.g. prize money, it is extrinsically motivated. Intrinsic incentives can be felt in various ways, ranging from performing athletic activities themselves

(e.g. kinaesthetic experiences) to achieving results through one's own behaviour. The latter is particularly true in cases of achievement-related behaviour. Thus, professional sports are intrinsically motivated if their primary goal is to achieve high performance. It is extrinsically motivated if the performance is nothing but a means to an end (e.g. money or prestige).

Gabler (1972) showed that there are no fundamental differences in the motive structures of professional and recreational athletes. Intrinsic and extrinsic motivation are of course intertwined in professional sports. Enjoying exercise is often linked to monetary incentives and the pursuit of prestige. In general, the coexistence of intrinsic and extrinsic motivation is not problematic. However, intrinsic motivation can be compromised by extrinsic incentives. In a study by Orlick and Mosher (1978), children who were rewarded for excellent performance in a balancing task subsequently practised less than the children who showed similarly good performance but were not rewarded (cf. corruption effect in Chap. 14 in this volume). However, some differentiation is necessary at this point. If athletic activities are performed in order to test one's own capability, consequences in terms of self-evaluation (e.g. pride) play a crucial role. Several studies show that intrinsic motivation is not reduced by extrinsic rewards if obtaining the extrinsic incentive is contingent on achievement (Weinberg & Jackson, 1979; Weinberg & Ragan, 1979). Deci and Ryan (1985) emphasise that the perception of self-determination is essential for intrinsic motivation. Sports can offer great opportunities for feelings of competence and self-determination, and according to Deci and Ryan, exercising creates many ways in which one's own abilities and competences can be compared with personal and intersubjective standards. This, in turn, can provide meaningful feedback for intrinsic motivation and consequently strengthen it. If this aspect of feedback, however, becomes less important and individuals feel externally controlled instead, their intrinsic motivation decreases. Several studies have confirmed this "theory of cognitive appraisal" in sports. Athletic programmes allow athletes to pursue individual preferences, have a choice between different alternatives and determine personal performance goals and group goals and rules themselves resulting in higher intrinsic motivation compared to programmes that do not meet these criteria (Gould, 1986; Thompson & Wankel, 1980). With regard to control, a study by Ryan (1980) is of particular interest. In this study with athletes from 12 colleges, football players on scholarships were found to be less intrinsically motivated than those without a scholarship. However, the study also yielded effects of type of sport and sex. Male wrestlers with scholarships and female athletes with scholarships in the sample had higher intrinsic motivation than their colleagues without scholarships. Ryan argues that the crucial criteria for whether intrinsic motivation persists or not does not relate to the receipt of a reward per se. Rewards should always be viewed in the context of whether they constitute feedback contingent on performance or as an attempt to control the behaviour of the actor. While male wrestlers and female athletes interpreted their respective scholarships as confirmations of their competence, football players focused on the aspect of external control.

Summary

Extrinsic and intrinsic motivation roughly refer to externally set incentives versus incentives that are immanent to an activity itself, respectively. In professional sports in particular, intrinsic and extrinsic incentives can coexist. Athletes' personal evaluations are important for the ascertainment of intrinsic motivation if external incentives are given at the same time. It seems to be particularly important for the retention of intrinsic motivation whether a reward is interpreted as feedback or rather as control.

The next section will address specific motives that seem important in the athletic context and have been studied in empirical research.

20.2.6 Motives in Sports

20.2.6.1 Achievement Motive/ Achievement-Motivated Behaviour in Sports

One important incentive of engaging in sports is to experience one's own competence, and this experience is gained by a constant quest for excellence. One of the key incentives in professional sports is to find out who performs best and how far achievement can be pushed, following the Olympic theme of "faster, higher, stronger". A career as a professional athlete requires a strong achievement motive (cf. Elbe, 2003; Gabler, 1972; Schneider, Bös, & Rieder, 1993). Thus, most studies on motives in sports focus on the achievement motive.

The achievement motive is defined as comparing one's performance with a certain standard (see Chap. 6 in this volume). Actors wish to do something well or better than before or better than others. The evaluation of behavioural outcomes is based on certain standards such as finishing a 100 m race in 14.3 s. This evaluation process results in outcome-related affect. The outcome-related affect is according to the incentive model of motivation the ultimately aspired objective of the activity. The evaluation depends on subjective aspiration levels. A runner who has never before finished a race in less than 15 s might be happy about finishing in 14.3 s (if the runner compares the race with an individual reference norm, i.e. previous performances) and be proud of his achievement. For somebody who only cares about winning the 100 m race (win orientation; social reference norm), however, 14.3 s might be a huge disappointment resulting in negative affect (shame) if others were faster. Simply anticipating positive affect resulting from achieving an aspired goal (satisfying the motive) can motivate new behaviour (McClelland, 1953). Achievement behaviour contains both "binding self-commitment to standards of excellence for the completion and products of behaviour and self-evaluation based on consequences following the behaviour" (Heckhausen, 1989, p. 231).

The achievement motive has two components: the approach component "hope for success" and the avoidance component "fear of failure." Coded categories for the success motive in the thematic apperception test or the picture story exercise (PSE was derived from the TAT by McClelland, Atkinson, Clark, & Lowell, 1953; Validity and reliability see Schultheiss, Liening, & Schad, 2008) include the need for achievement and success, instrumental behaviour for goal achievement, expecting success, praise for good performance and positive emotions. Fear of failure, on the other hand, is coded if stories contain the need for avoiding failure, instrumental behaviour for avoiding failure, certainty of failure or uncertainty of success, criticism and reprimand, negative emotions or failure. Based on the two components, hope for success and fear of failure, a total motivation score can be calculated by adding both values or determining net hope by subtracting fear motivation from hope motivation.

In competitive sports, the achievement motive has a superordinate significance for training and competitions. In a study conducted in 1981, it was found (in Gabler, 1995) that "higher confidence to succeed and lower fear of failure are important conditions for maintaining the motivation to practise over an extended period of time" (Gabler, p. 90). Dunleavy and Rees (1979) found the strength of the achievement motive to be directly dependent on an athlete's interest in competitive sports. Furthermore, according to Gabler (1995), the lower one's confidence to succeed and the higher one's fear of failure (i.e. low net hope), the more likely it is that practise will be reduced and individuals drop out of athletic careers. Vanek and Hosek (1977) found a positive relationship between the strength of the achievement motive and athletic performance (achievement level of athletes in the study). A study by Thomassen and Halvari (1996) reported a positive relationship between the success motive and both how much an athlete trained and how successfully an athlete performed. In contrast, a strong failure motive correlated negatively with athletic success. Elbe, Beckmann and Szymanski (2003) confirmed the results reported by

Thomassen and Halvari in a longitudinal study by finding that young athletes have less fear of failure than comparable pupils who did not engage in competitive sports.

Other studies using questionnaires to assess the achievement motive yield similar results. Using the sport orientation questionnaire, Gill and Deeter (1988) showed in particular that American competitive athletes have a higher competitive orientation than nonathletes. White and Duda (1994) confirmed in a study using the Task and Ego Orientation in Sport Questionnaire that competitive athletes have a higher competitive orientation than people engaging in sports without participating in competitions.

Hayashi and Weiss (1994) suggest that sociocultural factors might affect the degree of athletic achievement orientation. When comparing American and Japanese marathon runners, they found that Anglo-American female runners expressed higher competitiveness than Japanese male and female runners. Li et al. (1996) examined task and competitive orientation in sports in a sample of male college athletes and found that both task and competitive orientation were stronger in American than in Taiwanese and Thai students. Elbe (2003) found a higher achievement orientation in adolescent female athletes in the United States compared to female adolescent athletes in Germany.

Achievement-motivated individuals in sports are thought to be keen on proving their ability and competence in achievement-related athletic situations (Nicholls, 1984). According to Duda and Nicholls (1989), however, it is not quite that simple. Two different ways of setting goals are evidently important in sports. On the one hand, athletes are motivated by situations that are characterised by a social comparison or a competitive framework. The comparison with the performances of others allows for deciding whether an individual has succeeded or failed. On the other hand, athletes feel motivated by situations that focus on learning and mastering a task. In order to appraise success and failure, however, an individual standard is applied in such situations in contrast with competitive situations.

In part, White (1959) already theoretically described this difference earlier. White's theory of competence motivation has been highly influential in sports. White assumed that intrinsically motivated individuals strive to prove themselves as effective and competent in their social and physical environment and thus to master relevant situations. If their efforts result in positive achievements, respectively, the experience of competence and positive feeling of efficiency will result. In line with McClelland's approach, White states that competence motivation is strengthened through those emotional responses.

Based on White's approach, Roberts et al. (1981) compared children who engaged in sports with those who did not. The former group showed much higher scores of cognitive and physical competence than the latter. Moreover, children engaging in sports scored higher on "general self-esteem" and "future expectations of success". Feltz and Petlichkoff (1983) reported similar differences between students who continuously participated in a school sport programme and those who dropped out. Amongst gymnasts, however, Klint (1985) found a very different pattern: adolescent gymnasts who had ended their career perceived themselves as more physically and socially competent than gymnasts who were continuing their career. Klint and Weiss (1987) did a follow-up study to explain these contradicting findings. The second study found that adolescents who report high physical competence were most strongly motivated by opportunities to further develop their gymnastic abilities. Gymnasts with high social competence, however, were more strongly motivated by the social aspects of sports.

As mentioned earlier, an individual's future motivation is significantly influenced by the evaluation of the assumed causes of success and failure (see also Chap. 15 in this volume). The assumed causes of success and failure have a large impact on the affective responses. The process of ascribing causes to the result of a behaviour is known as attribution.

Möller (1994) recommends that athletes should strive to develop functional patterns of

attribution because such patterns can affect self-esteem, motivation and thereby athletic performance. Thus, athletes should attribute failure to external variable factors and success to internal stable factors. Studies in sports, however, have shown that this "self-serving bias", i.e. attributing success to one's abilities and attributing failure to external factors, e.g. bad luck, seems to be less pronounced in athletes than in the general population (Grove, Hanrahan, & Mc Inman, 1991; Mark, Mutrie, Brooks, & Harris, 1984). Therefore, Mark et al. (1984) postulate that there is a unique norm in athletic situations, which they refer to as "sport outcome responsibility norm". According to this norm, athletes assume full responsibility for their behaviour and internalise both their success and their failure. Moreover, Tenenbaum and Furst (1985) found that athletes in individual sports and athletes in team sports show different patterns of causal attribution. Compared to athletes in team sports, athletes in individual sports show more internal attributions. They take full responsibility for their performances and are less prone to believe that external factors have influenced their performance. These different attribution patterns also affect susceptibility to depressive episodes which are more common amongst athletes in individual sports than athletes in team sports (Nixdorf, Frank, & Beckmann, 2016).

Duda and Nicholls (1992) found task and ego orientation to correlate with different causal attributions for success. The ego-involved goal of superiority was associated with the belief that success requires high ability, whereas task orientation (the goal of gaining knowledge) was associated with beliefs that success requires interest, effort and collaboration with peers.

20.2.6.2 Affiliation Motive

Sepp Herberger, coach of the 1954 German national soccer team that won the World Championship that year, demanded of his players to "be eleven friends". Thereby, he intended to evoke team spirit believing that this would be a necessary condition for good performances in team sports. The idea of friendship even surpasses the notion of team spirit and refers to harmonic and close social relationships. Weiss and Petlichkoff (1989) report in their review on children's motivation in sports that joy, competence, fitness and affiliation are the most commonly stated reasons for exercising. Affiliation, the final item in this list, is defined by a person's need to feel a sense of involvement and "belonging", the opportunity to make friends and maintain friendships. These are the themes of the affiliation motive, which is the pursuit of initiating, maintaining and reestablishing warm and amicable relationships with others (Atkinson, Heyns, & Veroff, 1954). "The theme of the affiliation motive is the wish to turn strangers into acquaintances and acquaintances into friends as well as the experience that such efforts can also be rejected" (Heckhausen, 1989, p. 343).

The affiliation motive is often considered a core motive for sport participation (Ashford, Biddle, & Goudas, 1993). However, this seems to primarily apply to recreational sports and exercise for health reasons rather than competitive sports (Gröpel et al., 2015). In fact, strong affiliation motivation might interfere with striving to be the best. French (1956) asked participants in an experiment whether they preferred working on a task with a lazy friend or a competent person whom they disliked. The results showed that people with a strong achievement motive and a low affiliation motive chose the latter while people with the reverse motive pattern picked the friend. Similarly, a high affiliation orientation might not be beneficial to achievement-oriented sport performance. Therefore, a dominance of the affiliation motive should be more likely in recreational sports than in professional sports. In a study with 522 pupils, Janssen and Strang (1982) found their athletic activity and leisure behaviour to be mostly determined by the affiliation motive. Once the focus is more on winning than on amicable relationships, this may become problematic. Particularly in team sports, a conflict between affiliation-motivated athletes and those who focus on an achievement orientation can arise. Beckmann and Kellmann (2004) reported such a conflict even in training sessions of a first division female basketball team. In most athletes of the team, the affiliation motive was dominant.

The coach, however, had assumed that the achievement motive was dominant instead. Because he viewed practice as simulation of competition, he expected his athletes to put maximum effort into the practice sessions, fighting against each other like in the real competition. The achievement-oriented players on the team complied with these expectations. But their behaviour conflicted with the preference for a harmonious community of the affiliation-oriented players. Due to the motive conflict, several affiliation-motivated players avoided training sessions by calling in sick.

In line with this, an aspect of self-regulation might be to inhibit inadequate motivational tendencies. In fact, Sieber and Mempel (2015) found that, apart from energising behaviour by prompting, for instance, the achievement motive, inhibiting motivational tendencies that would be detrimental to athletic performance such as the tendency to have amicable relationships is an important ability for athletic success. According to these authors, it may even be considered a form of talent. In many cases, inhibiting affiliation-related behaviour in competitive situations results in achievement-related advantages.

20.2.6.3 Power Motive

Power-related behaviours can frequently be found in sports. Athletes might strive to "dominate their opponents" or "control the field". Coaches expect that athletes follow their instructions, and team captains take responsibility for the performance of their teams. Referees are also in a clear position of power. The power of sponsors, the media and associations could also be included in this list.

The power motive is the desire to have impact on other people, to affect their behaviour or emotions (Winter, 1973). Like other social motives, the power motive consists of a positive (hope for power) and a negative, fear component. Winter (1973) found that students with a strong and positive power motive hold more student offices, tend to be more active in organisations and participate more often in public events and discussions. He also found students with a strong power motive to participate in different types of competitive sports. Therefore, one might assume that strong power motives should be found in athletes in competitive sports.

There are only a few studies on the power motive in sports. Wegner et al. (2015) found the fear component of the implicit power motive to be associated with practice time in elite karateka and tennis players. In a study Tusak (2000) conducted in team sports, adult competitive athletes had a stronger explicit power motive than adolescent athletes. A further study involving athletes' power motive is described in the box below. It seems plausible that coaches and referees might have a particularly strong power motive. According to Brand (2002) there is no empirical evidence for this assumption. However, the studies conducted to investigate this issue did not use standard measures of the power motive. Moreover, they did not include measurements of the implicit power motive. It may also be possible, that the power motive plays an important but slightly different role in sports than has been suggested so far. Rheinberg (1996, p. 104) assumes that the power motive is crucial in extreme endurance sports as a feeling of "having control/power over oneself". Schultheiss and Rohde (2002) found an instigation of the power motive in competitive situations which supported implicit learning.

Summary

Understandably, the achievement motive has received more attention in sports than other motives. As expected, interest in competitive sports is associated with the strength of the achievement motive. Yet, the success motive is also a good predictor of the extent and intensity of practice. It is also related to athletic success even though success in sport depends on many factors. The affiliation motive is strongly related to recreational sports. In competitive sports, it can be more of a hindrance to be too keen to make friends or focus on amicable relationships. Although it is plausible to assume that certain functions in sports, e.g. regarding coaches, referees and officials, are associated with a strong power motive, there have only been few studies on the role of the power motive.

Excursus

Does the "V Profile" Motive Combination Have the Same Significance in Sports as in Business?

According to McClelland (1985), the classic triad of motives consists of the achievement motive, the affiliation motive and the power motive. Krug and Kuhl (2006) reported that 80 % of empirically analysed stories belong to these three motives. McClelland assumed that a certain combination of the three motives might be associated with successful leadership in business. This combination is V-shaped with moderate to high achievement motive, low affiliation motive and high-power motive. Many studies have confirmed the relationship between this V profile and economic success (e.g. Jacobs & McClelland, 1994; McClelland & Boyatzis, 1982; Wainer & Rubin, 1971). According to Krug and Kuhl, the ideal motive profile of competitive athletes also features a V shape. However, there are slight differences across different sports. The affiliation motive should be low in competitive athletes as it is for business leaders. Players on the same soccer team should thus not be "eleven friends". In technical sports the achievement motive should dominate (be very high) in combination with a moderate to high-power motive. In endurance sports both achievement and power motive should be moderate to high. Lastly, in interaction sports and martial arts, the power motive should dominate (be very high) with a moderate to high achievement motive. Gröpel et al. (2015) could confirm these assumptions only in part. They found professional and recreational ski free riders to set more achievement-related than affiliation-related goals (explicit motive). The achievement motive (both implicit and explicit) was significantly stronger in professional than in recreational sport. However, in either group the amount of power goals set was not higher than the amount of affiliation goals set. In interaction sports the assumptions could only be confirmed in part for professional and recreational athletes. As Krug and Kuhl had expected, the implicitly measured power motive was dominant in these interaction sports (e.g. martial arts) athletes. The V profile that Krug and Kuhl postulated was neither found for explicit nor implicit motives. Even though the (implicit) affiliation motive was significantly weaker than the (implicit) power motive, the (implicit) achievement motive was not significantly stronger than the affiliation motive. However, these differences cannot be found in explicit measurements of the motives. The (explicit) achievement motive was significantly stronger in professional athletes than in recreational athletes.

20.2.7 Aggression

Aggression is a term that frequently occurs in sports. Its everyday use, however, differs partly from its scientific meaning. For instance, if soccer coaches state that their players did not play aggressively enough during a lost game, they criticise their players' lack of investment. Motivational psychologists would therefore rather speak of a lack of effort or achievement orientation. However, high achievement orientation can indeed result in more frequent fouls because players act "in the heat of the battle" or strive to win "at all costs". If others are purposefully harmed, the psychological criterion for aggression is met.

Scientifically speaking, the term aggression spans forms of behaviour that are performed with the intention to directly or indirectly harm another person. For aggression in sports, however, there is an even more specific definition. Athletic behaviour is "only called aggressive if its goals do not conform to the norms that actors perceive as binding" (Gabler, 2002, p. 112) or, more gen-

erally, to the rules of the specific sport. Thus, behaviour in martial arts that aims at knocking out the opponent is not defined as aggression as long as it does not transgress the rules of the sport. Blows below the belt or biting off the opponent's ear, on the other hand, would be seen as aggression.

Because aggression is such a diverse phenomenon, some qualifications appear to be needed. One reasonable criterion for differentiation is whether the situational or personal factors trigger aggressive actions. Furthermore, the distinction should take into account the consequences for the acting individual. Dollard et al. (1939) proposed the frustration-aggression hypothesis which suggests aggression only occurs in reaction to frustration. Frustration thus always leads to aggression aiming at harming the person causing the frustration. The authors defined frustration as resulting from an interference with a goal response, i.e. an impediment to the realisation of behavioural goals. However, the hypothesis that aggression is always preceded by frustration has been met with criticism. It is possible to intentionally harm opponents without preceding frustration in many types of sports. Thus, it can be expedient to foul a key player on the opposing team in such a way that he cannot continue playing. This is an example of rational thinking as foundation for the aggression, which is also referred to as instrumental aggression. Aggression following frustration, on the other hand, can turn out to be detrimental to the actor's actual athletic goals if the fouling player ends up being sent off the pitch and being banned for the next match.

Berkowitz (1983) suggested adjustments to the frustration-aggression hypothesis. Thus, frustration may merely trigger an emotional reaction (e.g. fury, anger) that in turn can increase an individual's readiness to act aggressively. Aggression occurs if additional situational cues for aggressive behaviour that are related to the cause of the felt emotions are present. The result is anger-aggression that is determined primarily by feeling angry.

While aggression research with a primarily social psychological focus usually concentrates on situational determinants of aggression, Kornadt (1982) developed a motivational psychological process model of aggression (see Fig. 20.1) that adds the personality trait of the aggression motive with an approach and avoidance components to the situational factors addressed in the social psychological models. Gabler (2002) further elaborated on this model from a sports psychological perspective by including emotions that accompany behaviour, behavioural control and processes of self-evaluation.

Like other social motives, the aggression motive consists of two components: aggression tendency and aggression inhibition tendency. Aggressive behaviour occurs when, for example, an external frustrating factor is present and the aggression tendency becomes more strongly activated than the aggression inhibition tendency. Kornadt (1982) specifies the mediating factors until aggressive behaviour is initiated or inhibited in more detail in his process model. After a frustrating situation has caused anger, the aggression motive system with its both components is activated. If the aggression tendency is stronger than the aggression inhibition tendency, it can cause aggressive behaviour in two different ways: (1) a concrete aggression goal is generated involving the anticipation of positive incentives resulting from its attainment or (2) potential (acquired) behavioural patterns are activated followed by an evaluation of their respective expectancies of success. Attaining the aggression goal results in the deactivation of the aggression motivation. If aggression inhibition is activated, negative behavioural consequences involving anticipated negative incentives are considered. If the (avoidance) aggression inhibition tendency is stronger than the (approach) aggression tendency, no aggressive behaviour occurs.

Every now and then, sport is suggested as a potential antidote to aggression. The so-called catharsis hypothesis assumes that "letting off steam" through athletic activity should decrease frustration and thereby aggression. However, the catharsis hypothesis is amongst the most controversial concepts of research on aggression (Zumkley, 1978). An experiment by Stützle-

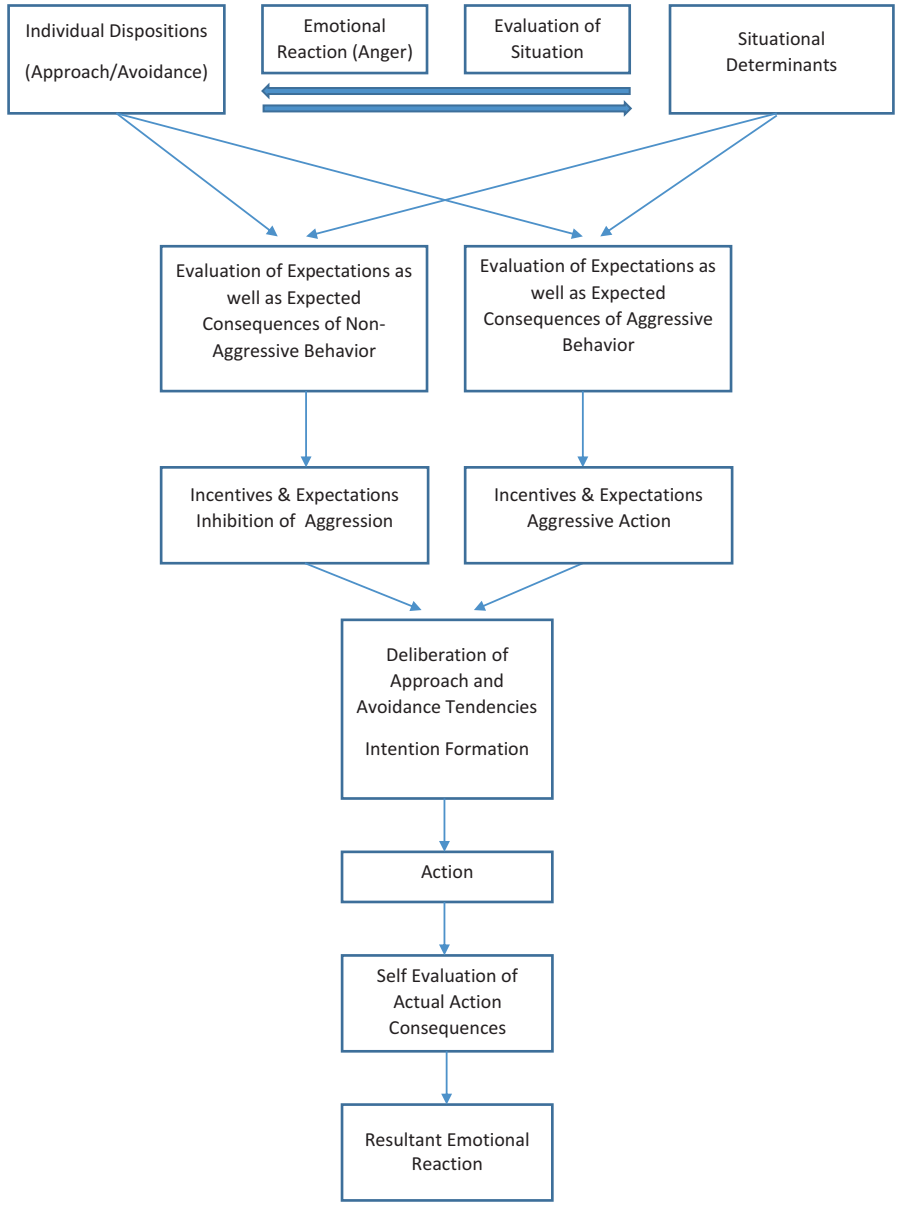

Fig. 20.1 Process model of aggression motivation (Modified from Kornadt, 1982, p. 85)

Hebel (1993) found that participating in exhausting ski gymnastics could not reduce earlier provoked aggression. In contrast, aggression was reduced if it was followed by an activity requiring a high degree of concentration. For the purpose of "letting-off-steam" athletic activity thus does not seem to work. On the other hand, however, distraction through exercise seems to have a positive effect. This was already discovered by Konecni (1975) and is in line with research on the persistence of anger emotions.

Peper (1981) presented a very elaborate study in which participants were frustrated in a ball game. An associate of the experimenter impeded goal achievement of the participants in the experiment. Expectedly, this aroused an aggression tendency in the participants. Following this aggression-inducing experience, the participants

engaged in intensive exercising. No "valve function" as suggested by the catharsis hypothesis in the form of reduced aggressiveness was found. The aggression tendency in the intense exercise group was not lower than in an experimental group that worked on tasks requiring dexterity rather than exercise. However, there was an experimental group in which aggression decreased. In this group participants could take revenge on the person who had frustrated them earlier (vicariously through verbal punishment by the experimenter). Bushman et al. (1999) provided interesting additional insights. They found that individuals with a positive attitude towards the idea of catharsis were more willing to perform a cathartic activity (punching a punching bag) after negative feedback. However, no catharsis resulted from the activity as these individuals became more aggressive towards an invisible opponent after punching the bag than participants in an anti-catharsis condition who had previously punched the punching bag only rarely. The increased aggressive behaviour in the pro-catharsis condition was independent of whether the invisible opponent was responsible for the negative feedback or not.

Some researchers have suggested that catharsis could even occur indirectly. They assume that spectators of sport events experience symbolic catharsis. Watching aggressive behaviour in sport events should decrease their own aggression motivation without acting aggressively themselves. There have only been few studies examining the influence of observing aggressive behaviour in sports on the aggressive tendencies of observers. But these studies seem to support the opposite. Arms et al. (1979) found that people who had watched a wrestling match or an ice hockey game expressed greater hostility and acted in less considerate ways than spectators of swimming contests. These findings directly contradict the symbolic catharsis hypothesis.

Krahé (2001) concludes that living out aggression as defined by the catharsis hypothesis is not only ineffective for reducing aggressive response tendencies, but also counterproductive. The cathartic expression of aggressive feelings seems to rather promote an increased probability to act aggressively later on.

20.2.7.1 Aggression in Fans and Hooligans

Aggressive sport fans, particularly hooligan soccer fans, have caused problems for many years. The aggressive behaviour of sport fans can be caused by lost matches or aggressive behaviour on the field (Russell, 1983). Wann (1993) points out that aggression can be influenced by how strongly an individual identifies with a certain team. According to Snyder et al. (1986), spectators whose identification with a team is low tend to distance themselves from the losing team in order to preserve self-esteem. Cialdini et al. (1976) named this reaction "CORFing" ("cutting off reflected failure"). Because "CORFing" is not an available strategy for fans who identify strongly with a team, however, they tend to "blast" (Branscombe & Wann, 1994). Thus, they act aggressively towards players and fans of the opposing team. This aggressive behaviour is a strategy applied to restore their lost sense of self-esteem.

In many instances, however, violent behaviour of fans has only little to do with the sport event itself (Gabler, 1998; Pilz, 1998). Even though soccer may serve as vehicle to violent behaviour for hooligans, it is not frustration about a bad or lost game that causes aggression in them. Major soccer events may simply provide the occasion for aggression and in particular violent clashes with supporters of other teams or of hooligan groups who associate themselves with the opponent team. Kerr (1994) suggests that a discrepancy between preferred and actual level of arousal motivates aggressive behaviour in hooligans. He characterises the behaviour as compensation based on the "reversal theory". In an environment that is perceived as boring, hooligans are looking for excitement by engaging in dangerous and delinquent behaviour. According to Kerr, there is no difference between the motivation of soccer hooligans and bungee jumpers.

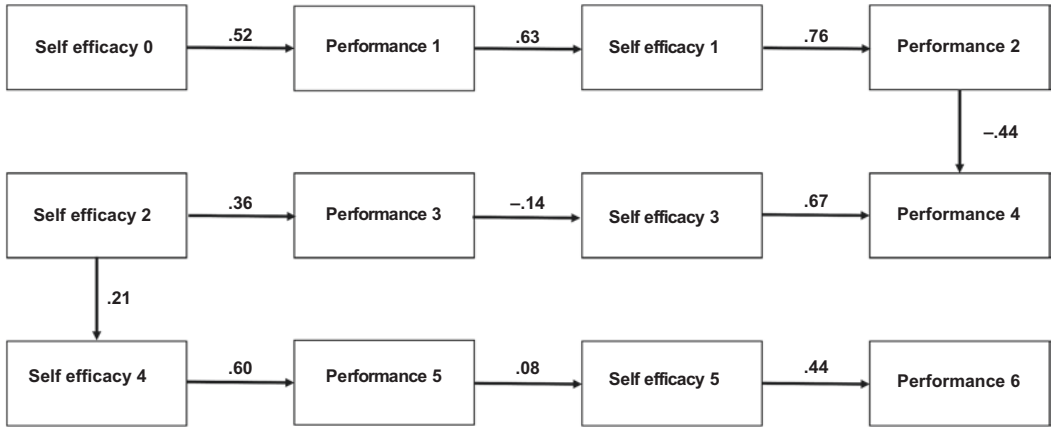

Fig. 20.2 Interaction between perceived self-efficacy and athletic aptitude from Lowther et al. (2002)

Summary

The definition of aggression in sports depends on the goals of aggressors and the specific rules (norms) of the sport in question. According to the frustration-aggression hypothesis, aggressive behaviour is caused by frustrating situations. However, other factors can also lead to aggression as, for example, quite deliberate considerations in instrumental aggression. Furthermore, personality factors mediate the process of whether aggressive behaviour actually occurs. That intense physical activity, especially boxing, could help to eliminate aggressive tendencies; the so-called catharsis hypothesis appears to be a myth that persists even though empirical research proves the opposite.

20.2.8 Perceived Self-efficacy

So far we have talked about incentives and motives. The concept of expectation is the third component of the motivation formula. As mentioned earlier, Heckhausen (1977) distinguished several types of expectations (see also Chap. 1 in this volume). For sports the action-outcome expectancy and the outcome-consequence expectancy are of particular relevance. These expectancies are determined by previous experiences. Perceived self-efficacy can be understood as a generalised concept of expectation. While self-confidence and self-esteem constitute personality traits that are relatively stable over time, self-efficacy can be altered by short-term experiences (see Fig. 20.2 from Lowther, Lane, & Lane, 2002).

Bandura (1986) defined self-efficacy as people's beliefs regarding their capabilities of successfully accomplishing tasks. In contrast to self-esteem, self-efficacy is relatively specific to situations and domains. Thus, young athletes might believe to have higher capabilities in athletic achievement situations than in academic ones. Self-efficacies may vary between and even within athletes. Sport psychologists often work with athletes suffering from particularly low self-efficacy, which might even result in a downward spiral of failure: low self-efficacy causes athletes to expect poor performances, and if they then in fact fail, their self-confidence is reduced even further (see Fig. 20.2).

Bandura (1986) distinguished between two effects of self-efficacy:

1. Self-efficacy influences the thoughts, affective reactions and behaviours that follow.
2. Self-efficacy is positively associated with positive motive strength.

The second effect confirms the role of self-efficacy as the expectation component of the motivation formula. Research on self-efficacy in

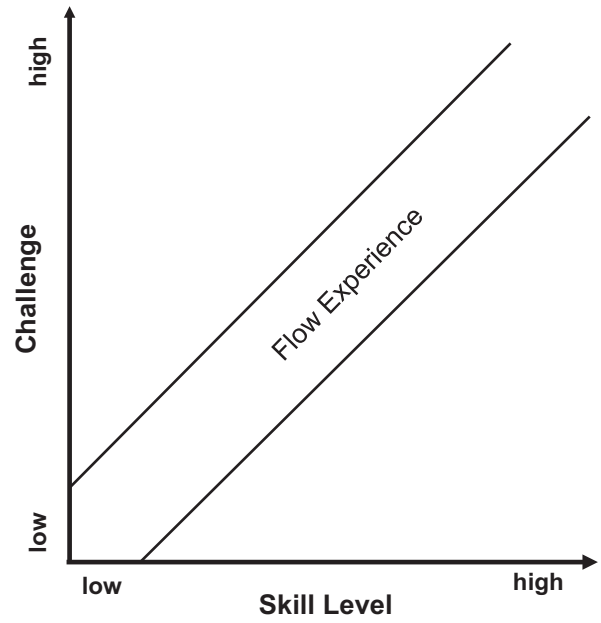

Fig. 20.3 Flow channel after Csikszentmihalyi (1988)

sport has shown that it constitutes a positive predictor for learning and performing motor skills as well as athletic performance in general (Treasure, Monson, & Lox, 1996).

20.2.9 Flow

The experience of flow that was described by Csikszentmihalyi (1975, 1990) is particularly relevant in sports. Sometimes it is also referred to as "being in the zone". When athletes experience flow, things seem to go automatically and without conscious control, while they are completely immersed in their behaviour. No thoughts or worries distract them even though they are fully concentrated. Thus, flow appears to be an optimal condition for outstanding performances (peak performances).

Csikszentmihalyi (1975) states that flow can occur when abilities meet task demands at a perfect match. Figure 20.3 depicts the so-called flow channel inside of which the chances of experiencing flow are highest (see Fig. 20.3).

Rheinberg (1996, p. 109f.) considers flow a motivational phenomenon "that is difficult to assess with a rationalistic-reflexive subject model". This calls for alternative assessment methods. Standard methods are used to assess feelings and thoughts only in retrospect. The experience sampling method claims to have a form of "online" access which is adequate to studying flow. The experience sampling method, also referred to as a daily diary method, asks participants to stop at certain times and make notes of their experience in real time.

According to Csikszentmihalyi, flow should represent an experience beyond boredom and fear. However, using the experience sampling method in a study with climbers, Aellig (2002) found that although lead climbers and followers in fact experienced flow in the form of excitement, alertness and concentration, such feelings were potentially linked to fear, stress and nervousness. Stops and Gröpel (2016) found that highly skilled and experienced ski free riders felt fear and inhibition during a ride. But these feelings did not interfere with their performance. A study by Schubert (1986) found evidence that apart from the conditions that Csikszentmihalyi described, additional factors might be even more important for experiencing flow, namely, self-dependence, increase in competence, challenge, experiencing efficiency and "just fun". These are the aforementioned central elements of intrinsic motivation according to Deci and Ryan (1985).

Schüler and Brandstätter (2013) showed that provided athletes perceive their athletic environment as satisfying their basic needs, flow experience increases if there is a congruence with their implicit motives. Schattke et al. (2015) found that flow increased with difficulty in experienced climbers (high performance). This result is in accordance with Csikszentmihalyi's (1975) flow channel that requires matching task difficulty and individual aptitude. Particularly noteworthy in this study, however, was the finding that this relationship was only found for athletes with a high congruence of implicit and explicit achievement motive but only if climbing was perceived as an achievement-related activity. Schüler (2010) explained this observation by stating that in the case of athletes with motive discrepancies, situations with strong achievement-related stimuli would trigger the internal conflict between the implicit and the explicit achievement motive and thus undermine the experience of flow. Therefore, it is possible to interpret the results of Schattke et al.'s (2015) study as an example of how motive congruence is prompted by thematically appropriate stimuli, which in turn results in experiencing flow.

Box

In accordance with the results presented in this section, Rheinberg (1996) claims that risky sports in particular meet the conditions for flow. "Unusual, yet enjoyable activities promoting flow experience create increased states of arousal which intensify the quality of the experience, leading to a basic and significant experience of own competence while trying everything to remain unscathed in the face of potential threat" (p. 114).

20.3 Volition in Sports

Volition can be considered the overarching concept covering all processes of self-regulation. Volition essentially refers to the regulation of an individual's mental states by the individual itself. Every time intended behaviour is facing internal or external obstacles, volitional processes are required to overcome the obstacles and maintain action control. Thus, Kuhl (1983) referred to volition as auxiliary processes supporting the execution of an action, for example, to complete a marathon although the motivation is gone after hitting "the wall" at mile 21 (Km 35). These self-regulation processes are based on people's meta-cognitive and meta-motivational knowledge about themselves. Volition supports fundamental processes such as attention, motivation and the regulation of emotions in the process of achieving desired goals if the original motivation does not suffice. There are fundamental individual differences with regard to the use and efficiency of volitional processes, sometimes referred to as "willpower" or "mental strength". In this section we will address individual differences mediating volition respectively self-regulation.

20.3.1 Theoretical Concepts

20.3.1.1 Volition and Behavioural Control

In the mid-1970s, Julius Kuhl discovered that motivation alone is not sufficient to explain behaviour. Several studies had only found a disappointingly weak connection between people's intentions and their actual behaviour (for an overview see Kuhl, 1983). Kuhl argued that there must be supporting processes in addition to motivational processes; without such support, intentions might not be translated into behaviour and maintained until a goal is reached. He referred to these processes as volition thereby resuming the strand of research on the will which was abandoned around the 1930s (Kuhl & Beckmann, 1985). Particularly in sports, such volitional processes play a crucial role (Beckmann, 1999).

20.3.1.2 A Model of Self-regulation: The Theory of Action Control

Kuhl's (1983, 2001, see Chap. 13) theory of action control is one of the fundamental modern theories of volition. The theory focuses on

processes of self-regulation that can be applied throughout the entire course of an action in order to transfer motivation into action and support the continuation of the action until goal achievement should resistance arise. Resistance to behaviour can take on various shapes, e.g. unclear decision structures or competing action tendencies that might tempt people to give up an important, yet strenuous activity in order to pursue temporarily more interesting and seemingly more pleasant alternatives.

Action control becomes necessary if conflicts between competing action tendencies occur. An athlete might, for example, be tempted to skip practice in favour of going out with friends even though he knows that he really needs the practice. Essentially, in Kuhl's terminology there are two possible forms of action control to solve the problem and manage to focus on doing what is considered most important: self-control and self-regulation. Self-control refers to the inhibition of competing behavioural tendencies and associated distracting thoughts. In contrast, self-regulation coordinates personal subsystems (motivational, affective, cognitive) to strengthen and promote the intended behavioural tendency. According to the theory of action control, volitional processes are influenced by personality differences with regard to action and state orientation. State-oriented people are characterised by chronically negative affect and a lack of positive affect. They tend to ruminate excessively about failure or decision alternatives. Especially, their chronically negative affect impedes their self-regulation. Mostly, therefore, they have to rely on the less sophisticated self-control strategies. In contrast, action-oriented people are characterised by highly efficient self-regulation.

Excursus

Self-control and Self-regulation

- Instead of giving in to the temptations of highly pleasurable activities, successful athletes will mostly force themselves to be conscientious and practise regularly with the necessary vigour. Kuhl and Beckmann (1994) define this as self-control. Everyday language calls such behaviour self-discipline or willpower. Self-control is well exemplified by an exhausted marathon runner who is about to drop out of the race. When he sees a television camera focusing on him, he mobilises his last resources and coerces himself to carry on.
- Self-regulation is the alternative to self-control. According to Kuhl and Beckmann (1994), consider self-regulation to be much more convenient and beneficial in the long run. Self-regulation attempts to influence the motivational basis of present behaviour in a way that reduces the temptations of behavioural change. To do this, an athlete might, for example, chose aspects of his/her training that are particularly enjoyable or challenging to him/her, or he/she imagines which goals that are important to him/her he/she may eventually realise if he/she practises long enough and hard enough.

In the long run, people benefit more from self-regulation than from self-control. The latter may eventually result in alienation from what athletes actually would like to do if it is the dominant volitional strategy (cf. Kuhl & Beckmann, 1994). They develop the feeling that they do not act in line with what they actually want but suppress their individual needs and interests because of feeling obliged to do so. Thus, they lose their sense of self-determination and competence that forms the foundation of intrinsic motivation (cf. Deci & Ryan, 1985). Several studies have shown that blocked access to (implicit) self-results in a loss of creative potential. Midfielders in soccer, for example, may not be able to demonstrate their potential as creative playmakers (Beckmann & Trux, 1991; Kazén, Kuhl, & Quirin, 2015; Kuhl & Beckmann, 1985).

As the above given examples have shown, volition is essential in sports, for example, for enduring long-term comprehensive practice schedules throughout an athletic career or for hanging on during exhausting competitions. Young athletes in industrialised societies have several competing options as to how to live their lives. Thus, hanging out with friends might be a tempting alternative to swimming length after length in the pool. Emerging athletic talents appear to possess the volitional ability to strengthen their intentions regularly in spite of occasionally negative training and practice experiences. Beckmann et al. (2006) conducted a longitudinal study on the volitional development of adolescent athletes going to a school with a sport focus, with one group of them living in a boarding school on campus and another group living with their parents compared to students attending regular schools. The results showed the volitional development in adolescent athletes to be more proficient than that of the regular students. This was particularly true for the athletes living in the boarding school compared to athletes living with their parents. Interestingly, the strongest leap in the volitional developmental occurred after students enrolled in the school with a sport focus. After school enrolment, students living in the boarding school were found to spend more time with their peers than those commuting home. This could be the reason for the advantages of the boarding school students over the commuting students. Boarding school students had more self-determined time with peers than the commuters. Additionally, the young athletes' advantages over regular students with regard to volitional abilities were already partly present before enrolment, suggesting a selection effect (Elbe, Szymanski, & Beckmann, 2005). Interestingly, it becomes more likely that young athletes end their careers (dropout) if supervisors (trainers, boarding school staff) do not acknowledge their already well-developed self-regulation and interfere with self-determined self-regulation (Elbe et al., 2003).

Summary

Kuhl (1983) defined volition as processes that support the execution of an action that faces obstacles. Particularly in sports these volitional abilities are of high importance because both training and competition demand of athletes to always give their best in order to perform at the highest possible level.

20.3.2 Action Vs. State Orientation and Athletic Performance

The theory of action control (see Chap. 12 in this volume) has stimulated a large number of sport-related studies (for a summary see Beckmann, 1999). Some of these studies examine the influence of stressful events (failures, attempted records, time pressure) on motor performance. Kuhl's (1983) construct of action vs. state orientation is of particular relevance in this context. Athletes with a personality disposition to state orientation are more likely to ruminate over failure (failure-related state orientation) or have more difficulties with making decisions (decision-related state orientation). Both can negatively affect subsequent athletic performance. If a soccer player is petrified after missing a goal, he might not be ready to help his team defend. If a goal keeper cannot decide whether to stay between the posts or run towards an approaching opponent, this indecision might give an advantage to the attacking team. Kuhl (1981) found that after inducing "learned helplessness" through a series of failure experiences, state-oriented participants' performance on a subsequent cognitive tasks was impeded. The performance of action-oriented participants was not affected by the failure experience. In an analogous manner, Strang et al. (1987) found in a study with student athletes that state-oriented participants made more mistakes on a complex motor tasks following failure training. The performance of action-oriented students, however, was not affected by preceding failure.

In addition to these findings, Haschke et al. (1994) found psychophysiological correlates to the helplessness effects in the brain. An increased encephalographic DC signal (a DC EEG refers to a signal value that is not changing), indicating impaired behavioural control, was found in state-oriented, but not action-oriented, soccer players after failure training.

Definition
Action orientation as a personality variable refers to the disposition to volitionally direct one's attention to factors supporting the execution of an action. The self-regulation does not have to be consciously represented. State-orientation as a personality variable associated with a tendency to redirect attention more frequently on situational factors and a tendency to ruminate. Both tendencies interfere with the intuitive execution of an action. The individual dispositions of action vs. state orientation have a particularly significant impact on action in stressful situations such as athletic competitions.

The higher capacity of action-oriented athletes to deal with pressure is particularly evident if they try to set a personal record on a task requiring fine motor skills and concentration. This was shown in a study by Heckhausen and Strang (1988). The instruction to aim for a personal record in a basketball task resulted in higher effort in both action-oriented and state-oriented players. The consequences for several performance characteristics, however, differed significantly between the two groups. State-oriented players ran faster when they were given the record instruction, but their scoring (number of basket they made) was not exceptionally well. Action-oriented players when given the record instruction performed substantially better in both categories (cf. Sahre, 1991). The reason for this difference might be that action-oriented players are able to regulate their available resources more efficiently and only invest just as much as needed for improved performance. State-oriented players, however, appear to be unable to regulate their efforts in a similarly efficient manner. Given personal record instructions, they deplete their resources quickly. Häger et al. (2015) found a relationship between an individual's disposition to action vs. state orientation and Higgins' (1997) regulatory focus theory. This theory distinguishes between goals with a promotion focus (i.e. a focus on hope and realisation) and goals with a prevention focus (i.e. focus on obligation and security). Amongst the basketball players in Häger et al.'s (2015) study, failure-related state orientation was found to be associated with a chronic prevention focus. Action-oriented players, on the other hand, more commonly focused on promotion (RFQ). According to the regulatory focus theory, a promotion focus is associated with the realisation of ambitions or ideas that are very important to the acting individual.

Our discussion so far seems to suggest that state orientation is always detrimental to athletic performance. Indeed, psychological research in general not only in the field of sports indicates less efficient self-regulation in stressful and demanding situations or the appropriate use of resources (strength and concentration) of state-oriented compared to action-oriented individuals. However, sport-related studies draw a much more complex picture. For example, in a study in track and field athletics, Beckmann (1987) found an advantage of state-orientation athletes in disciplines requiring short-time, maximal exertion of strength such as in shot put, javelin and 100 m races. The study included state-oriented Olympic gold medal winners and world champions in these disciplines. In endurance sports which demand careful management of one's resources over an extended amount of time, action-oriented athletes were found to be more successful. In martial arts which require athletes to remain unperturbed after failure (opponent placing hits), action-oriented athletes excel as they stay confident, better anticipate the opponent's movement and react quickly (Beckmann & Kazen, 1994).

The previous paragraph highlights that it is important to take into account the specific demands of different sport disciplines. Depending on the specific qualifications required by a certain sport discipline action orientation could be advantageous. In sport disciplines with other demands, state orientation could be beneficial. Even a differentiation of players according to action and state orientation regarding different positions within teams in game sports has proven to be beneficial. In certain positions the rumination tendency of state-oriented athletes can be to their advantage. Because they contemplate different moves and strategies, they have developed

the capacity to play in more variable ways than action-oriented players. There is in fact empirical evidence that key players in high-performance professional sports (German first and second league volleyball and basketball) tend to be state-oriented rather than action-oriented, whereas the strikers were mainly action-oriented (Beckmann & Trux, 1991). State-oriented players tend to restrict themselves to supportive roles in critical game phases, i.e. they avoid risks, shoot less and confine themselves to passes and dribbling. Action-oriented basketball players shoot more frequently and score more reliably in stressful situations than their state-oriented teammates (Sahre, 1991). This also confirms Kuhl's (2001) assumption that state orientation results in a comparatively rigid and context-insensitive acceptance of rules set by others (see also prevention focus in Häger et al., 2015).

Two studies by Roth (1991) on tactical decisions in sport games under time pressure and physical stress further confirmed these results. In general, Roth found that state-oriented players followed the instructions they were given on how to make decisions (e.g. stressing the quality of decisions over their speed or the other way around) more thoroughly than action-oriented players. However, action-oriented players were found to make more precise decisions under psychological (time pressure) and physical stress (which is comparable to game situations) than state-oriented players. Interestingly, this pattern was reversed under conditions of low psychological and physical stress.

Another aspect of the individual differences is especially interesting for coaches. Findings suggest that it should be easier to work with state-oriented players because they tend to follow instructions and tactics more willingly than action-oriented players (Beckmann & Trux, 1991). However, this is only true as long as their cognitive state, i.e. tendency to ruminate, does not intervene with such behaviour. Sahre (1991) showed that action-oriented in contrast to state-oriented players tend to keep their nerves and score more reliably in critical game situations, namely, close scores near the end of a game.

Coaches appear to be quite good at estimating their players' dispositions of state vs. action orientation as was shown by Haschke et al. (1994). Coaches' judgement corresponded well with the results of the action control scales. Coaches can actively incorporate assessment of their player's action control dispositions and the possible behavioural consequences for performance in a competition into their tactical considerations.

Empirical evidence also provides information about interventions that can improve action control. Experiences of failure do not result in a decrease of performance if the execution of the motor behaviour is accompanied by speaking aloud. A verbal structuring prevents a feeling of acting "planlessly" (cf. Strang et al., 1987).

State-oriented athletes seem to need instructions from their coaches that are as concrete and precise as possible. At the same time, such instructions might conflict with the flexible self-regulation potential of action-oriented athletes. The latter group, however, can benefit from high-pressure situations (high goals in competitive situations), while state-oriented players (without additional instructions) should avoid them (Heckhausen & Strang, 1988) and perform better when relaxed.

Hartung and Schulte (1994) have shown that state orientation is by no means a totally fixed trait. It can in fact be changed during the course of a behaviour therapy. However, as was shown above, state orientation can be beneficial in certain sports under certain conditions. A kind of (self-) selection during the early career of athletes seems to occur. Athletes with a disposition to state orientation remain successfully in disciplines that require short-term maximised effort or get into the position of a playmaker on sport teams. In disciplines that require the management of resources and "keeping one's cool", state-oriented athletes may drop out so that at a high achievement level, action-oriented athletes prevail. The same appears to apply to the top striker position on a team (Beckmann, 1987; Beckmann & Trux, 1991; Sahre, 1991).

Several studies have suggested such a process of self-selection as successful athletes gravitate towards disciplines or team positions that "match" their respective dispositions with regard to action control (Beckmann & Kazen, 1994; Beckmann & Trux, 1991). However, knowing

young athletes' dispositions could also be used in order to selectively introduce them to different disciplines or positions in which their personal dispositions might promise particular success.

Research has shown that it is also important to consider a combination of the various aspects of action and state orientation. In his 1987 study, Beckmann found that the successful state-oriented athletes in disciplines requiring short-term maximised effort had a combination of failure-related state orientation and performance-related action orientation. This combination essentially connects an energising effect of state orientation caused by its tendency to imagine the results of potential failure with the concentration aspect of action orientation. Overall, this could be considered an ideal condition for high athletic performance.

Summary

The construct of action vs. state orientation plays an important role in sports. Even though action-oriented people tend to perform better under pressure, there are findings showing that state-oriented athletes excel in certain disciplines. State orientation is particularly advantageous if short-term maximised effort is required. Action-oriented athletes tend to be more successful if scoring reliably is a concern and managing resources as in endurance disciplines is essential. When it comes to sport games like soccer, action-oriented players appear to be superior as strikers (traditionally the position of the centre-forward), whereas state-oriented players can be resourceful play-makers as long as they stay focused.

20.3.3 Regulation of Stress and Recovery

In order to maintain high athletic performance over time, it is crucial to avoid excessive training and burnout by aiming for a balance between stress and recovery (Kellmann & Beckmann, 2018). A lack of deactivation after activities – particularly failure – is not only a stressor, but can also result in continuous rumination that impedes or interferes with subsequent recovery. Recently, the importance of post-actional deactivation for recovery has been realised, and, hence, volitional processes as relevant volitional processes have been addressed in research on stress and recovery (Beckmann, 2002). Empirical results suggest that the disposition of action vs. state orientation and volitional skills influence both the perception of stress and recovery. The self-regulation of state-oriented people is generally less efficient than that of action-oriented people, particularly when under stress and dealing with failure. Consequently, their stress-recovery balance tends to be less favourable than that of action-oriented people. This means that their stress level remains relatively high for longer periods of time, while recovery levels tend to be comparatively low (Beckmann & Kellmann, 2004).

Summary

Research on action control has so far discovered numerous volitional determinants of athletic performance. These empirical findings have been used for the development of mental skills training stabilising performance (Beckmann & Elbe, 2015). However, the overall goal of this volitional research is not so much applying specific control processes but rather on supporting an adequate understanding of the cognitive-emotional state associated with "being in the zone" promoting peak performance (Csikszentmihalyi, 1975).

20.4 Comprehensive Models of Motivation and Volition

The next section will briefly address theoretical models that integrate motivation and volition. Generally, such models attempt to explain how intentions are formed and transferred into action, thereby overcoming a shortcoming of classic motivational psychological, the so-called "action gap" (Heckhausen, 1989).

One of these models is Ajzen's (1985) theory of planned behaviour. According to Ajzen, a person is likely to act in a particular way if he positively evaluates this behaviour (attitude) and if additionally he believes others to also positively evaluate this behaviour (subjective norm). Initially, attitudes and subjective norms determine the formation of intentions or, in other

words, whether a person intends to behave in a particular way or not. Whether or not a person manages to cross the "action gap", i.e. actually translate the intention into behaviour, depends on two components: the strength of the intention and perceived behavioural control. The latter component is volitional and refers to the perceived individual potential for actually initiating and executing the intended behaviour. Perceived behavioural control includes the evaluation of internal and external resources that can support overcoming obstacles towards the realisation of the intention. Numerous studies provide empirical evidence for the validity of the theory of planned behaviour in areas such as consumer behaviour but also in sport-related contexts, namely, attending sport events (Cunningham & Kwon, 2003; Lu, Lin, & Cheng, 2011). Moreover, several studies found the theory to successfully predict the actual extent of health-related exercising (e.g. meta-analysis by Hausenblas et al., 1997). For instance, Hausenblas and Symons Downs (2004) showed in a study with pregnant women that attitudes and subjective norms were good predictors for the intention to exercise as suggested by the theory of planned behaviour. They especially found that whether or not these intentions were realised depended primarily on perceived behavioural control.

Other sport-related studies have been inspired by Heinz Heckhausen's Rubicon model of action phases (Heckhausen, 1987, 1989; see Chap. 11 in this volume) that distinguishes between motivational and volitional phases. The first phase specified by this model is a pre-decisional motivation phase during which information about the incentives and expectations of various behavioural options are appraised in light of the given situation in an objective, undistorted way. The goal of this phase is to form an intention. Once a person has crossed the Rubicon by committing herself to that intention, the next step is a volitional phase during which the intended behaviour is implemented in a way that is as close to the intention as possible. The focus of the volitional phase is to process information relevant to the behaviour in question. This information might be distorted if this benefits the realisation of the original intention, i.e. helps to maintain action control (cf., Beckmann, 1984). The acting person's primary concern is not being realistic (reality orientation) but rather realisation. When the performance has obtained an outcome, a motivational, post-actional phase during which the results and their consequences are evaluated objectively (reality orientation). This concludes the action episode.

The post-actional phase is of particular importance in sports and for sport psychological interventions. This phase aims at evaluating and deactivating completed behaviour, which is required to switch to new behaviour. Inefficient deactivation can be a central obstacle to new behaviour. This can, for example, relate to the process of moving on after failure during an ongoing athletic activity. For example, a golfer may need more strokes on the first hole than expected but has to move on to the next hole and tee off with self-confidence. In decathlon it is essential for an athlete to stop thinking about an unexpected below standard performance on the previous discipline in order to focus on the upcoming discipline. Beckmann (1994) showed that this process can be particularly difficult for state-oriented individuals because they might get stuck in a self-evaluation loop after failure including internal, stable attributions.

The Rubicon model received particular attention in the context of participation in health-related exercising (Höner & Willimczik, 1998). The formation of implemental intentions (planning) as a type of volitional strategy has stimulated the development of new models in health and sport psychology (cf. overview by Fuchs, Göhner, & Seelig, 2007; Sniehotta & Schwarzer, 2003; Sudeck, 2006). The phase structure of the Rubicon model was confirmed by Höner et al. (2004) in a study on the implementation of exercising during recovery from a heart attack. A path analysis furnished a significant direct effect of strength of motivation on strength of intention as well as of the latter on strength of volition. But only the strength of volition showed a significant effect on actual participation in exercising.

Excursus

Berlin Stage Model (Fuchs, 2001)

The Berlin stage model by Fuchs (2001) combines elements of the trans-theoretical model by Prochaska and DiClemente (1982) as well as the Rubicon model of action phases (Heckhausen, 1989). The Berlin stage model distinguishes between eight distinct behavioural stages. Two of these stages have a pre-decision (motivational) orientation, whereas the other six focus on processes after decision-making (volitional). The model has been implemented successfully for increasing participation in health-related exercises (Fuchs, 2006).

20.5 Diagnosis

20.5.1 Measuring Motives

According to a recent review by Clancy et al. (2017), the six most highly cited motivation questionnaires in sport are the Sport Motivation Scale (SMS; Pelletier et al., 1995), the Intrinsic Motivation Inventory (IMI; McAuley Duncan & Tammen, 1989), the Situational Motivational Scale (SIMS; Guay, Vallerand, & Blanchard, 2000), the Perceptions of Success Questionnaire (POSQ; Roberts, Treasure, & Balague, 1998), the Behavioural Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008) and the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989).

Interestingly, these questionnaires do not represent the range of motives and motivation addressed in motivation theory. Solely two theoretical approaches, achievement goal theory with the two specific achievement goals of task and ego orientation (Nicholls, 1984) and Deci and Ryan's self-determination theory (Deci & Ryan, 1985), are covered by the questionnaires. Merely two measures address personality components, namely, task and ego orientation (Duda, 1989; Roberts, Treasure, & Balague, 1998). The other four questionnaires are closely related measures of intrinsic and extrinsic motivation.

Only four of these six questionnaires are domain-specific measures focusing on sport (Duda, 1989; Lonsdale, Hodge, & Rose, 2008; Pelletier et al., 1995; Roberts, Treasure, & Balague, 1998). The other two are general measures of intrinsic and extrinsic motivation.

Clancy et al. (2017) conclude that despite some variance in their psychometric properties, conceptualisation, structure and utility, the six questionnaires are psychometrically strong instruments. However, given the range of important motivational concepts in sports, the sample presented by Clancy et al. is insufficient. That the authors found these measures to be the most cited does not indicate that they are the most important measures especially for applied sport psychology. Furthermore, all of the measures are self-report questionnaires. Self-report measures primarily address the explicit motive but not the implicit motive. Because there are some differences between the implicit and the explicit motives a need for assessing the implicit motives in sport seems to be required. In what follows, we will therefore briefly address the necessity of sport-specific measures, a broader range of motive measures and also alternatives to self-report questionnaires in order to also capture implicit motives.

The domain-specific assessment of personality traits such as motives is a frequently debated topic. In the 1950s French (1958) already showed that specific incentive dimensions affect different motives. Spence and Helmreich (1983), for example, question whether the use of general instruments for the assessment of achievement motivation is appropriate in athletic situations at all. This means that athletes who are motivated by athletic achievement situations might not react equivalently in achievement situations that have nothing to do with sport such as academic tests. Therefore, it is a central question to what extent the general achievement motive influences an athlete's motivation or whether a sport-specific achievement motive has a larger impact. Using a projective instrument, namely, Heckhausen's (1963) TAT, Steiner (1976) found a relatively high but far from perfect correlation ($r = 0.60$) between the (implicit) general and sport-specific achievement motive of competitive athletes. The

study presented participants with the general TAT and a second one that only featured sport-related pictures. According to Steiner, these results seem to "suggest the existence of a rather superordinate construct that is independent of the current situation" (1976, p. 223). Elbe, Wenhold, & Müller (2005) also found evidence for this relationship between the general and sport-specific achievement motives. However, in contrast to Steiner (1976), the authors used two questionnaires: the Achievement Motive Scale (Gjesme & Nygard, 1970) and a sport-specific version of the same questionnaire (AMS-Sport). These findings suggest that also with measures of the explicit motive a similar relationship of the general and the domain-specific motive can be found. However, the results reported by Elbe, Wenhold, & Müller (2005) only show a significant relationship between actual athletic performance and the sport-specific assessment of the achievement motive but not for the general measures. The reason for this might be that domain-specific measures outperform general measures for predicting domain-specific performances. Moreover, athletes seem to be more accepting of sport-specific methods than general ones (Beckmann & Kellmann, 2004).

Similarly, sport psychologists recommend assessing sport-related phenomena with sport-specific instruments (Gill & Deeter, 1988) in order to get results that are relevant for athletic situations. The "Task and Ego Orientation in Sport Questionnaire" by Duda and Nicholls (1989) measures the extent to which respondents are activated by task-oriented and competitive situations. Gill and Deeter (1988) developed the Sport Orientation Questionnaire (SOQ) that measures respondents' attitudes towards competitions using three separate yet related scales. A general scale on this questionnaire measures the intensity of the desire to be successful in athletic situations (competitive orientation). The other two scales measure success orientation, i.e. the wish to win in situations of comparisons with others, and goal orientation, i.e. the wish to realise personal goals in sports.

As was mentioned in the section on implicit and explicit motives, Gabler (1972) developed a sport-specific version of the thematic apperception test (TAT) that allows for the measurement of the sport-specific implicit achievement motive. Initially, sport psychologists tended to neglect this approach as they relied on questionnaires which are much more economical in their use. Driven by the finding that implicit and explicit motives represent different motive systems that facilitate different kinds of predictions, however, a new interest in measuring implicit motives has recently emerged. The operant motive test (OMT) by Kuhl and Scheffer (1999) takes much less time than the classic TAT while surpassing the TAT with regard to psychometric criteria as Scheffer et al. (2003) showed. Therefore, recent studies measuring implicit motives in athletic contexts have used the OMT (Schüler & Wegner, 2015).

20.5.2 Measuring Volition

Several questionnaires measuring volition have also been adapted and validated for use in the field of sports. For instance, Beckmann and Wenhold (2009) developed a sport-specific questionnaire for measuring action and state orientation (HOSP), while Wenhold et al. (2009) developed a questionnaire on volitional components in sports (VCQ-Sport).

Summary

Even though the issue of domain-specific instruments remains controversial, the advantages of sport-specific measures have been shown in various studies. Particularly in the area of motivation research in sport, several sport-specific measures have been developed. After having been neglected for some time, new attention has recently been given to measuring implicit motives. Besides established instruments for assessing motives and motivation in sports, HOSP and VCQ-Sport have become accepted sport-specific instruments for the measurement of volitional components.

20.6 Practical Consequences: Boosting Motivation and Volition

At this point the question arises which practical consequences result from the sport psychological research on motivation and volition regarding how to motivate athletes. Answers to this question are of particular interest to coaches and PE teachers but also to people working in the area of health and exercise. In general, motivation is primarily an intrapersonal process. Strictly speaking, we cannot directly motivate others but only provide conditions which are suited best for a single athlete to inspire and maintain motivation and several studies confirm this idea.

Frequently, motivating athletes is associated with leadership behaviour. Several sport psychological studies have addressed this issue. For example, Saborowski et al. (2000) found the motivational climate during practice sessions amongst young athletes to be influenced by various factors. These factors, however, were not stable over time. In fact, leadership behaviour was an important source for motivation. Higher motivation was found with coaches who support participation of athletes, provide sport-specific explanations and give social support. Fuchs et al. (2000) found that instructors who "focused internally" were more likely to attract participants in health and leisure exercise groups than instructors who "focused dually". Instructors who focus internally address incentives for exercising which are located within the participants (e.g. enjoyment of exercising). Instructors who focus dually use both internal and external aspects (e.g. using attendance lists) in their attempt to motivate participants. Moreover, which kind of leadership behaviour sport participants prefer depends on various factors. Whether or not athletes perceive their instructor's behaviours as motivating includes instructor characteristics such as age of the instructor (Carron & Hausenblas, 1998), skill level (Würth, Saborowski, & Alfermann, 1999), sex (Chelladurai & Saleh, 1978) and cultural background (Chelladurai, Malloy, Imamura, & Yamaguchi, 1987; Hastie, 1993). Ames (1992) found that a motivational climate which involves acknowledging effort, improvement of performance and personal records is particularly successful for the development of effective motivational strategies in children. Similarly, Scanlan and Simons (1992) highlighted that positive emotions are particularly important for the motivation to start and keep exercising.

Moreover, sport-relevant aspects can be derived from insights into how motivation can be boosted in general. Hecker (1984), for example, stressed several such factors, namely, an ideal match of aptitude and task requirements, self-determination with regard to task choice and realistic performance standards. People with fear of failure in particular benefit if they are given more time to practise individually and are instructed to compare their performance to an individual rather than a social reference norm (cf. Rheinberg & Krug, 1999).

Applied sport psychology provides a number of specific interventions to boost motivation (for an overview see Beckmann & Elbe, 2015). According to Weinberg (1992), how goals are set in sports can have a huge impact on motivational outcomes. In fact, most disciplines have a tendency to systematically set difficult specific goals as described by Locke and Latham (2002). Evidence also suggests that a disposition to state orientation can be changed into action orientation with behaviour therapy (Hartung & Schulte, 1994). Altfeld et al. (2017) also found that mental training can increase players' action orientation in basketball. A century ago Lindworsky (1923) already compared willpower to a muscle that requires training. Sport seems to provide an excellent framework for such training. Young athletes frequently have to deal with failures and need to overcome them. Several studies have shown that this necessity can strengthen volitional capabilities (e.g. Beckmann et al., 2006).

20.7 Summary

Motivation and volition play a central role in sports. Achievement motivation is of course indispensable for competitive athletes. Whereas the affiliation motive is a central trait for the motivation of recreational athletes, it seems to be more of a disadvantage to competitive athletes. Therefore, volitional inhibition of the affiliation motive might lead to better performance in competitive situations. Several sport psychological studies have provided insights into the specific conditions for motivation and volition in athletic contexts. These include the development of sport-specific instruments for measuring motives, motivation and volitional factors. The differentiation between implicit and explicit motives has only recently received more attention after explicit measures had dominated research and its application for a long time. Congruence between the external conditions for motivation and the motive strengths of individuals is highly conducive to high motivation in training and competitions. Ideally, this applies to both implicit and explicit motive measures. Volition (self regulation) is a component that is required for enduring exhaustion in training sessions as well as the stressful conditions athletes face in competitions. Thus, sport psychological interventions focus on self-regulation to a great deal. Strategies of self-regulation can be acquired through practice. However, volition (or self-regulation ability) is apparently also boosted by the circumstances of (competitive) athletic contexts themselves, e.g. attending schools with a focus on sports.

Review Questions

1. *Question: Why can affiliation motivation be detrimental in competitive sport?*

   Answer: Competitive situations are usually about beating an opponent. This goal conflicts with a focus on harmonic cooperation at least in athletic contexts.

2. *Question: Is it possible to reduce aggression through sports as the catharsis hypothesis claims?*

   Answer: Most empirical evidence contradicts the catharsis hypothesis. Only if sport offers an opportunity to take revenge on the person who has frustrated the acting individual and thus caused the aggression, it is possible to reduce aggressive motivation.

3. *Question: What is the difference between self-control and self-regulation?*

   Answer: Self-control inhibits conflicting reactions, whereas self-regulation facilitates processes that support motivation.

4. *Question: Are state-oriented people always less successful athletes than action-oriented people?*

   Answer: State-oriented individuals can even be the more successful athletes in disciplines requiring short-term maximised effort (e.g. weightlifting, shot put). Additionally, they have been shown to develop more creative potential as key players on teams than action-oriented athletes. This holds true as long as negative affect is kept low.

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