Achievement Motivation

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

J.C. Brunstein (✉)
Division of Psychology and Sports Science, Justus-Liebig-University, Giessen, Germany
e-mail: Joachim.C.Brunstein@psychol.uni-giessen.de

H. Heckhausen (deceased)
Max Planck Institute for Psychological Research, Munich, Germany

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)
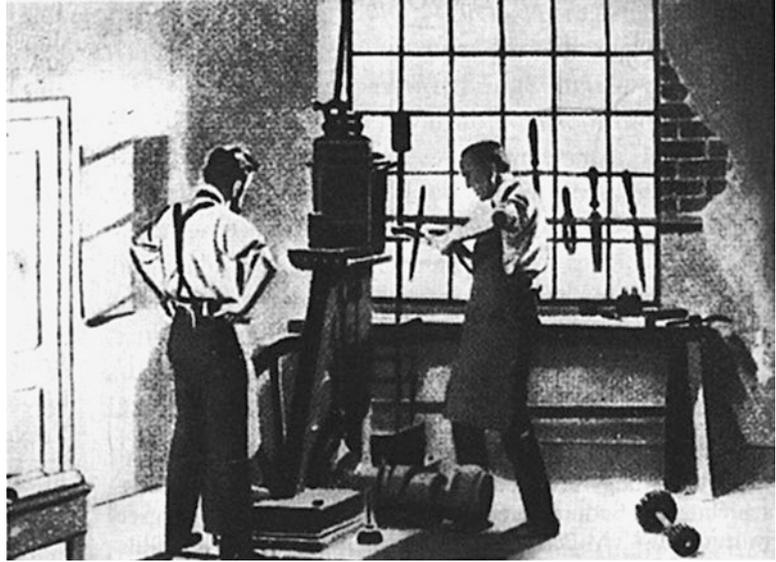
Study

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 administer-

ing 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 con-
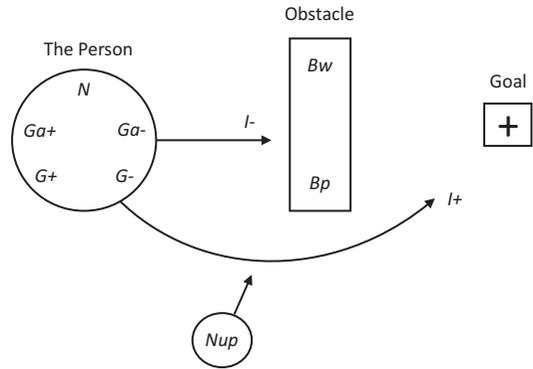

Fig. 6.2 Schematic representation of a goal-directed action sequence used to differentiate content categories in TAT stories. *N*, need to attain a goal; *Ga+*, anticipation of success; *Ga–*, anticipation of failure; *G+*, positive affective state; *G–*, negative affective state; *I–*, instrumental 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)

dition 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).

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
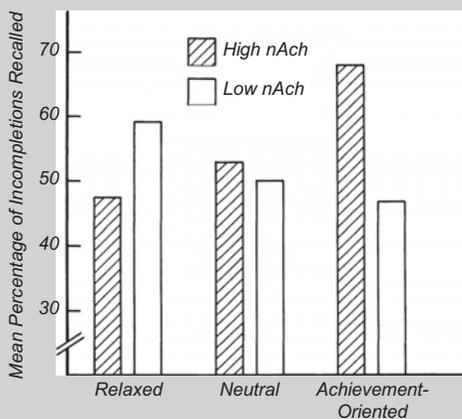

Fig. 6.3 Mean percentage recall of uncompleted tasks by respondents high and low in achievement motivation (nAchievement) under three arousal conditions (Based on McClelland et al., 1953, p. 266)

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

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)
*$p < 0.01$, **$p < 0.001$

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.

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).
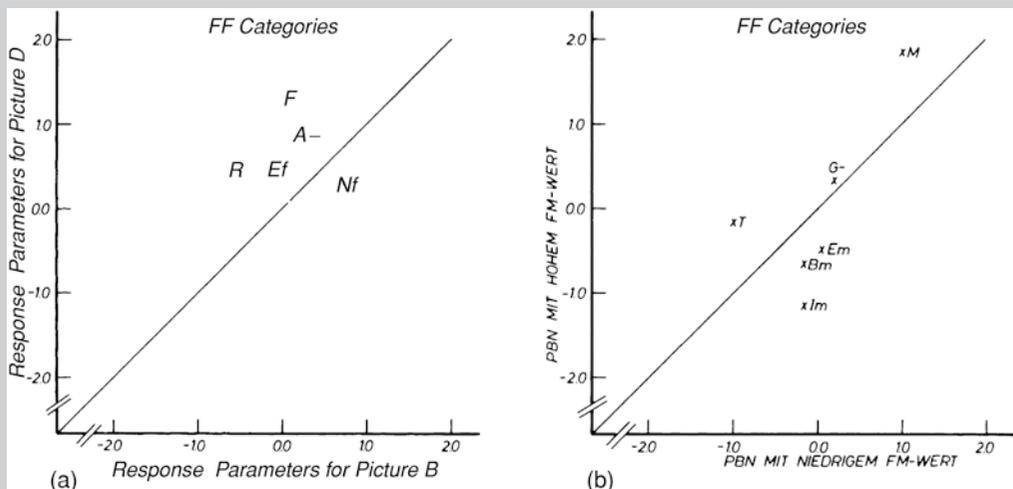

Fig. 6.4 Response parameters for the "fear of failure" (FF) content categories for (**a**) two TAT pictures (Pictures B and D from Heckhausen, 1963) and (**b**) two groups of respondents with high vs. low FF scores. The deviation of the response parameters from the regression line does not challenge 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) inter-pretations 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 vari-ables 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 – origi-nally 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 men-tioned above. In most cases, the statements to be rated relate to both incentives and expectancies. People who state that they "like working on dif-ficult tasks" indicate not only that they find diffi-cult tasks attractive but also that they are confident of being able to master them.

A more accurate examination of the mecha-nisms of achievement motives would require the disentangling of incentive-related and expectancy-related components. Global mea-sures 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 acquisi-

tion 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
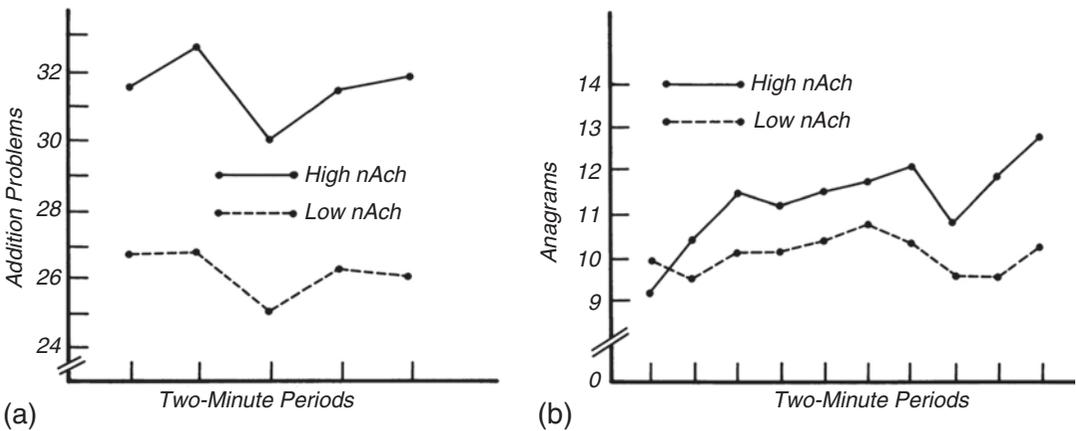

Fig. 6.5 Mean performance of individuals high and low in the achievement motive (nAchievement) on (**a**) simple addition problems and (**b**) scrambled-word tasks (anagrams) over 2-min periods (Based on Lowell, 1952, pp. 36, 38)

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 applica-

tion 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 demo-graphic 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
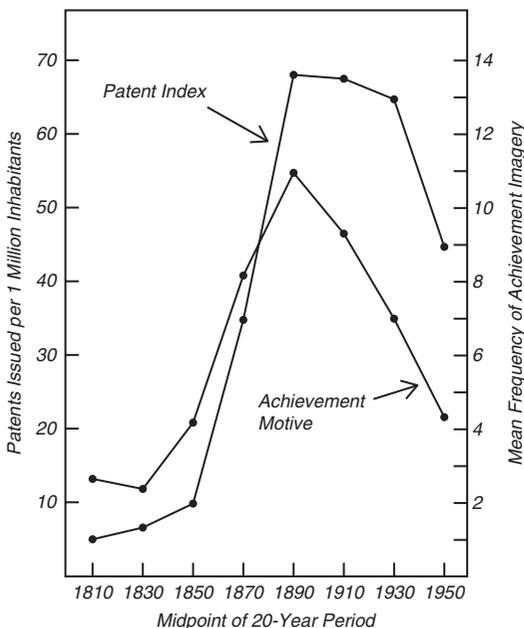
Fig. 6.6 National nAchievement index (frequency of achievement-related themes in readers) and number of patents issued per one million inhabitants of the USA between 1810 and 1950 (Based on deCharms & Moeller, 1962, p. 139)

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.

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
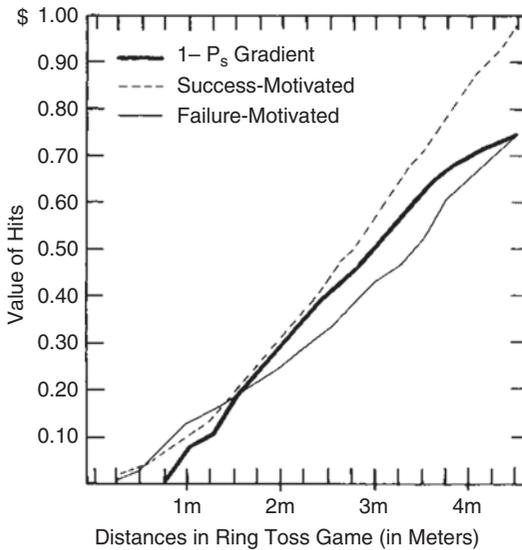
Fig. 6.7 Mean monetary value assigned by success- and failure-motivated individuals to hits from various distances in a ring toss game, as compared with the incentive function calculated on the basis of the estimated probabilities of success alone (Based on Litwin, 1966, p. 112)

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 ques-

tionnaire 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
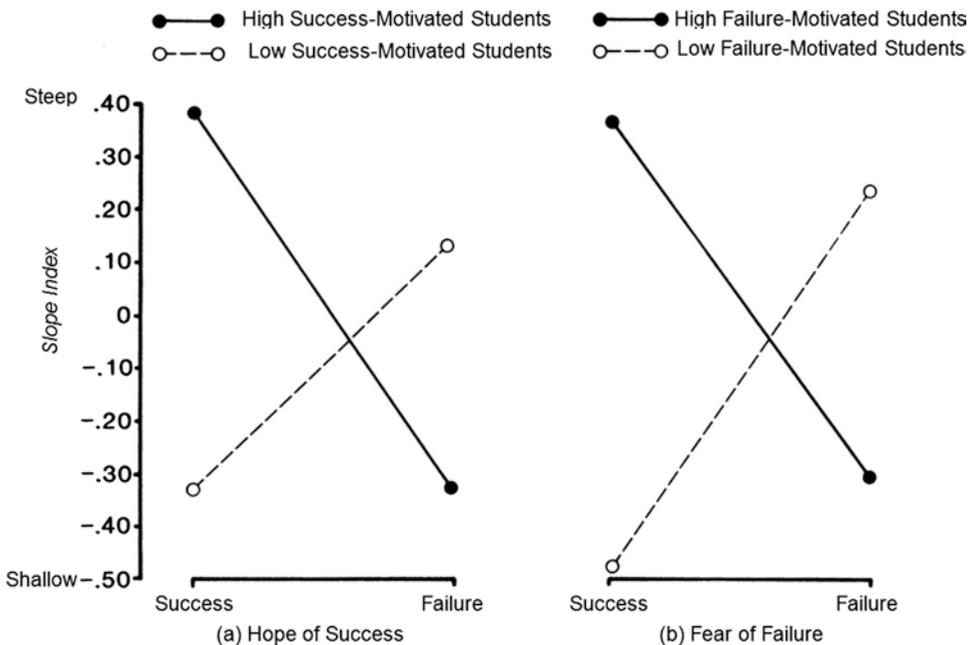

Fig. 6.8   Slope indexes of valence gradients for success and failure in (**a**) individuals high vs. low in success motivation (positive affect, praise, and expectancy of success) and (**b**) individuals high vs. low in failure motivation (total FF score) (Based on Halisch & Heckhausen, 1988, p. 60)

"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).

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
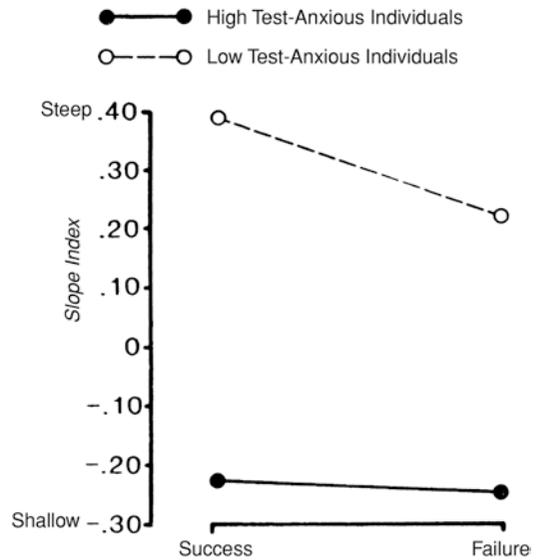

Fig. 6.9 Slope indexes of normative valence gradients for high vs. low test-anxious individuals (Based on Halisch & Heckhausen, 1988, p. 61)

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-
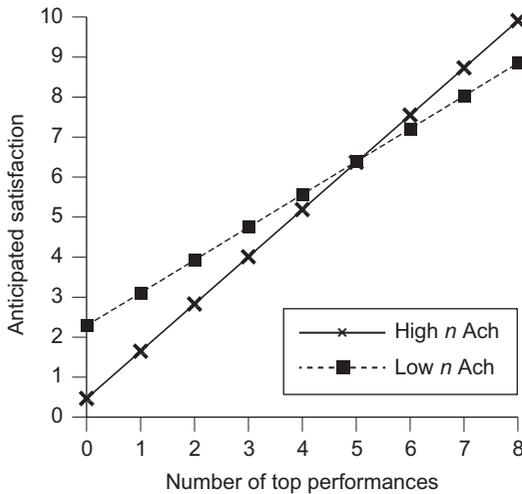
Fig. 6.10 Valence of performance as a function of the performance level (number of personal best performances) and the strength of the achievement motive (hope for success by Heckhausen). Shown are the gradients for hypothetical individuals who are one standard deviation above or below the average of 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 multi-level 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 ($Ve = Me \times Ie$). 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 sub-
jective 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 specifi-
cally, success-motivated) individuals prefer tasks
of above-average difficulty. Much indicates that
task preference indeed deviates from the sym-
metrical 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 accu-
rately 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 per-
  formed 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) investi-
gated 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 fre-
quency of successes and failures in previ-
ous trials; the subjective probability of
being able to score a "goal" at a given dif-
ficulty level was obtained from partici-
pants. 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 suc-
cess were considerably higher than objec-
tive probabilities of success (Fig. 6.11).
Participants' subjective judgments only
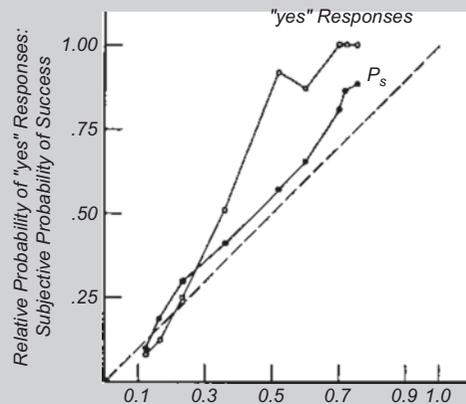approached objective task difficulty when
tasks were extremely difficult.

Fig. 6.11 Subjective probability of success (Ps)
and relative proportion of predicted goals ("yes"
responses) as a function of the objective probabil-
ity 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)
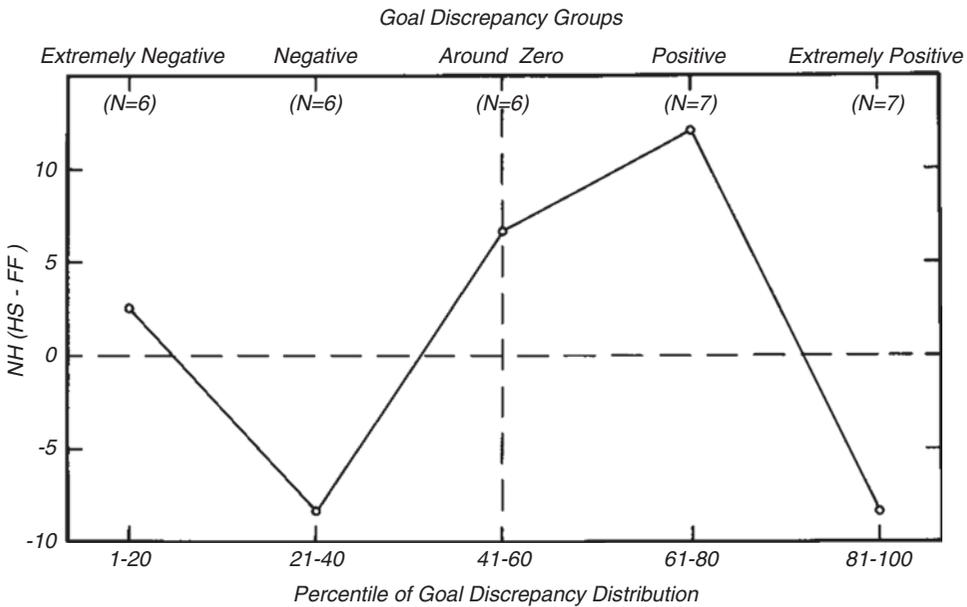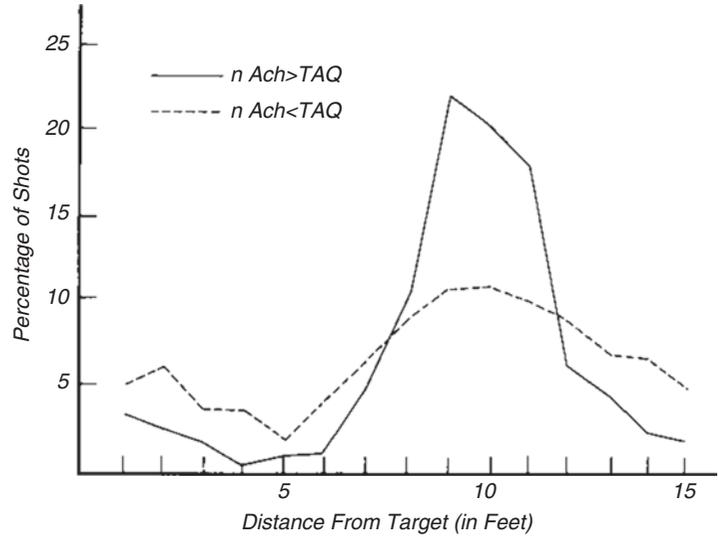

Fig. 6.13 Goal discrepancies for labyrinth tasks as a function of net hope (hope for success - fear of failure) in Heckhausen's TAT measure (Based on Heckhausen, 1963, p. 95)

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)
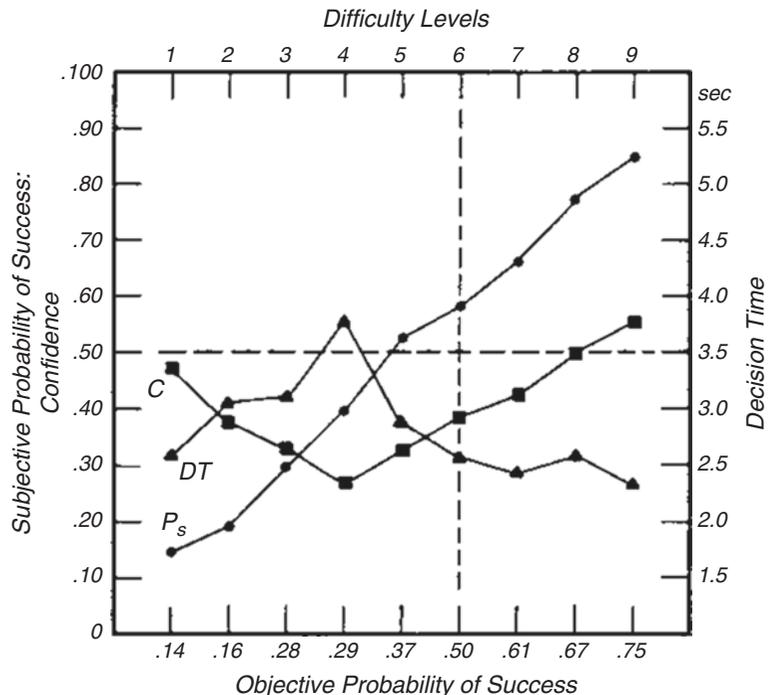
- Personal standards defining the difficulty level at which a certain success incentive is reached (Kuhl, 1978b)
- Inertial tendencies resulting from previous attempts to complete a task, which afford a kind of additional motivation for future tasks (Atkinson & Cartwright, 1964; Weiner, 1965a, 1970)
- 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 aspi-

ration 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
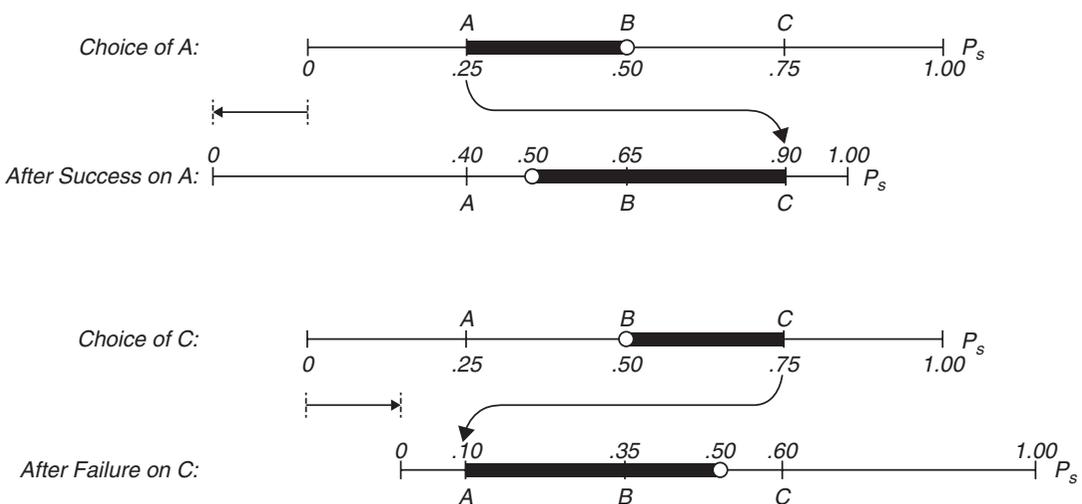

Fig. 6.15 Atypical shifts in the aspiration levels of failure-motivated individuals who have succeeded on a difficult task (shift from A to C) or failed on an easy one (shift from C to A), as derived from the risk-taking model

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			Shift in level of aspiration	
	Easy	Intermediate	Difficult		
	($Ps = 0.75$)	($Ps = 0.50$)	($Ps = 0.25$)	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 informa-

tion) 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:

$$Ts = Ms \times Ps \times Is + T_{\mathrm{Gi}},$$

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 ($T_{-\mathrm{Gi}}$) 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*):

$$Tr = \left(Ms \times Ps \times Is + T_{\mathrm{Gi}} \right) + \left(Mf \times Pf \times If + T_{-\mathrm{Gi}} \right)$$

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 & Youssef, 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
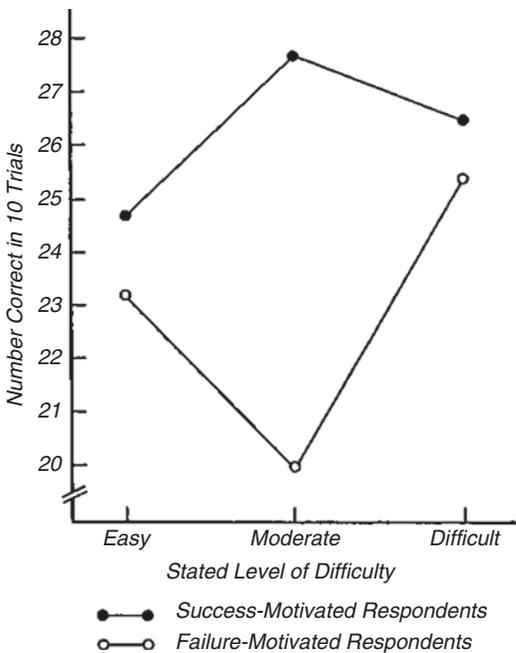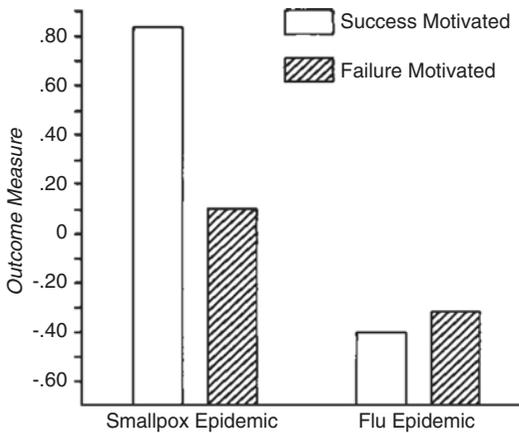
Fig. 6.17 Effect of the level of personal involvement on success- and failure-motivated individuals' performance on a complex problem (Based on Hesse, Spies, & Lüer, 1983, p. 416)

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 "over-motivation." 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)
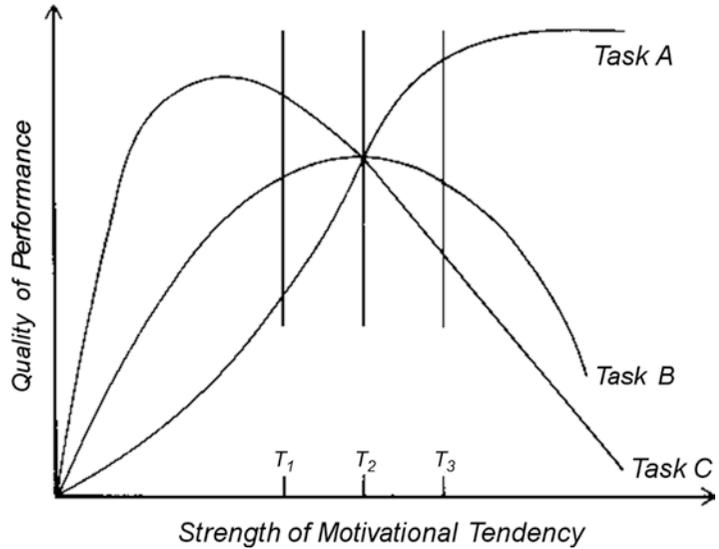
a task is very complex (C), motivational strength reaches its optimal level even sooner. Hence, a given motivational strength can have very different effects on performance outcomes depending on the type of task at hand (in other words, more motivation does not automatically mean better performance).

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 multi-thematic 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)

Motive constellation	Condition		
	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 over-motivation 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 over-learned 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.

Fig. 6.19 Quadripolar model of achievement motivation (Based on Covington & Roberts, 1994, p. 160)

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.
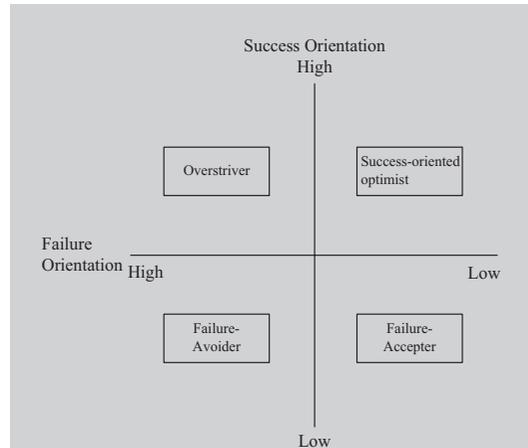Type 4: Failure-accepting individuals do not feel attracted to success, nor are they concerned about possible failure.

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 ($\times$) of ability and efficiency, where efficiency 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
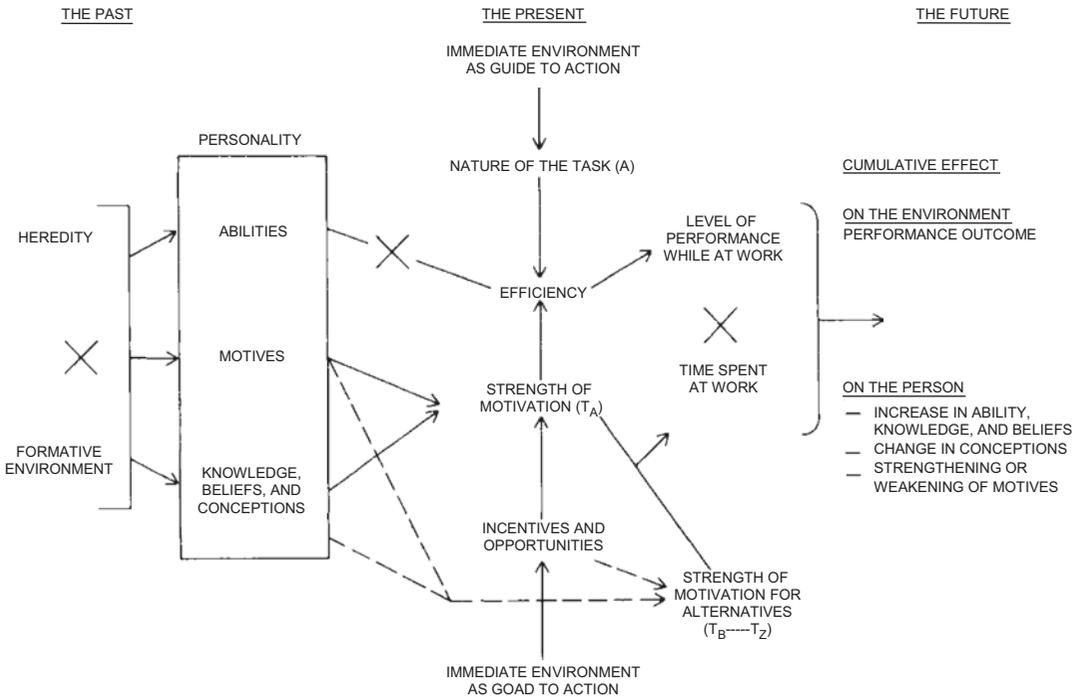
Fig. 6.20 The dual role of motivation as a determinant of cumulative achievement. Besides individual ability on a specific task (*A*), strength of motivation (*TA*) influences performance gains in two ways. First, together with the specific demands of the task, it determines the efficiency of task performance. 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 over-motivated 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
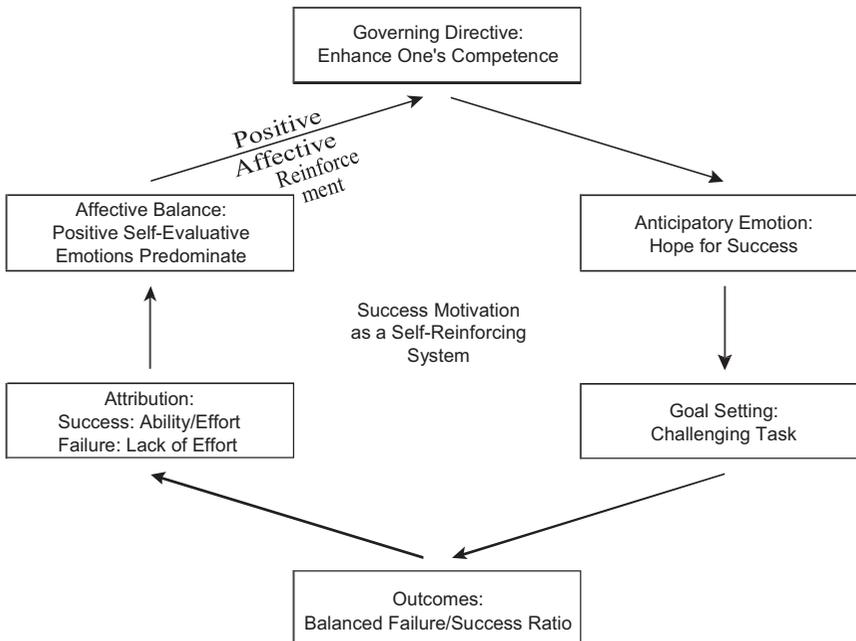

Fig. 6.21 Success motivation as a self-reinforcing system

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

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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.

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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.

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
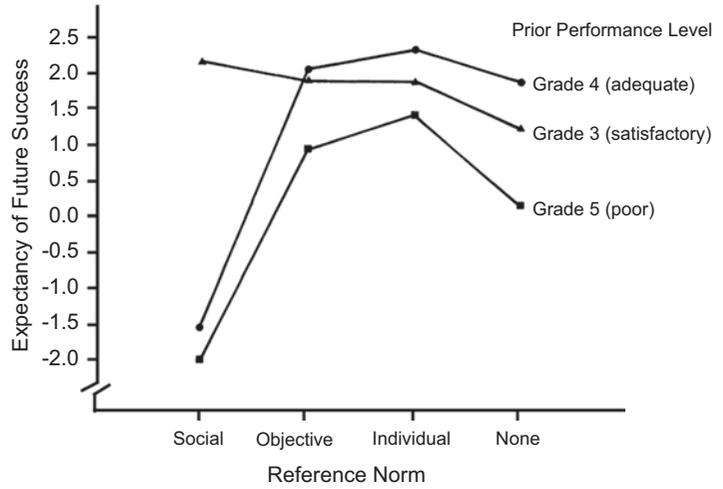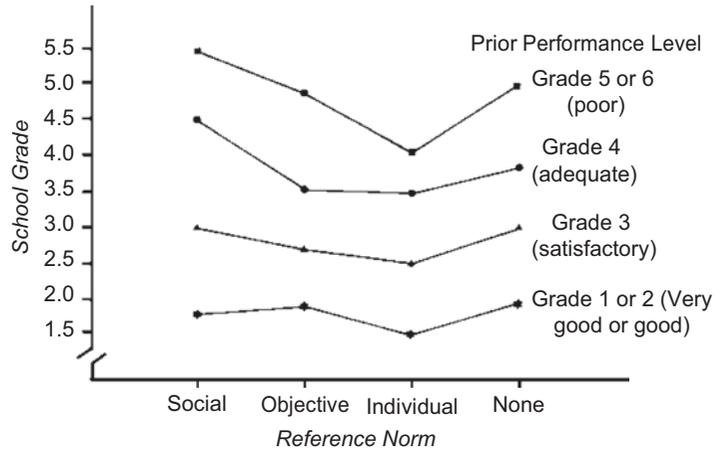anticipation of success
(Based on Krampen,
1987, p. 143)

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)
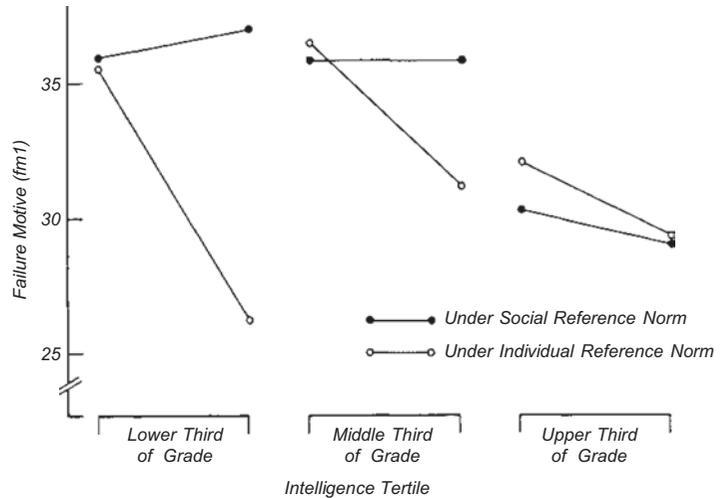
Family context and achievement motivation. Trudewind and Husarek (1979) presented some of the most compelling findings on the relationship between family background and the development of motive dispositions. The authors investigated how mothers' behavior in homework situations was associated with the 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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