



# Situational Determinants of Behavior

# 4

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

variables, on the situational stimuli that trigger and direct behavior. In this chapter, we look at the major theoretical developments that have emerged from situation-centered explanations of behavior.

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

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

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

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

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

Following an examination of conflict theory, we will consider the approaches taken to the situationally motivated determinants of behavior in the psychology of activation and in cognitive psychology. Activation theories are, for the most part, physiologically oriented and build on the concepts of drive theory, whereas cognitive theories focus on cognitive interpretations of situations and their effects on behavior, emphasizing the importance of intervening cognitive processes in motivation. Foremost among theoretical approaches incorporating a cognitive interpretation of situational factors is the theory of cognitive dissonance, which generated particularly intensive research activity. Originally a theory of motivation based on the assumptions of drive theory, it enjoyed increasing currency as a theory of attitudinal change in social psychology. Eventually, its function was reduced to one of mental hygiene, with processes of dissonance

reduction serving solely to produce a conflict-free self. In essence, however, it is a motivational theory that describes processes of self-regulation occurring in response to internal conflicts. Thus, dissonance theory lies at the interface of motivation and volition (Beckmann, 1984).

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#### **4.1 The Explanatory Role of the Situation in Motivational Psychology**

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

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

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

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

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## 4.2 Need and Drive

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

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

### 4.2.1 Approaches to the Measurement of Internal Stimuli

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

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

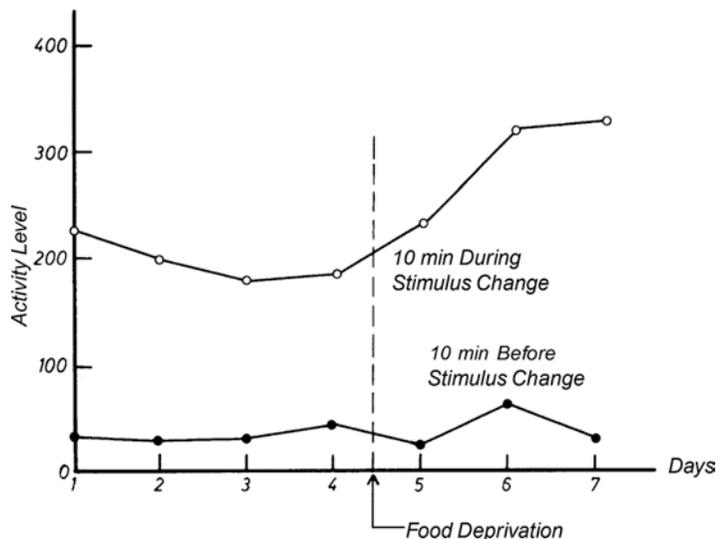
Another line of research, initiated primarily by Curt Richter, focused on the general activity level of experimental animals. Richter's (1927) findings suggest that activity level represents an index of periodic variation in drive that seems to accompany cyclic variation in need as a means of

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

Here again, matters seem to be far more complicated than first assumed. For example, whether a food-deprived rat displays an above- or below-average level of general activity has far more to do with external stimulus conditions than was originally thought. Various attempts were made to operationalize the internal stimulus, the drive. Campbell and Sheffield (1953) kept rats in stabilimeter cages for 7 days. These cages registered the animal's every activity. The laboratory was dark and soundproof; a ventilat-

ing fan produced a constant masking noise. Food was provided in the first 4 days, followed by 3 days of deprivation. Once a day, the experimenter entered the room for 10 min, turning the light on and the fan off. Activity levels were measured in the 10 min prior to and during this change in stimulus. Figure 4.1 shows the mean activity levels in these two 10-min periods over the 7 days of the experiment. The level of activity prior to the stimulus change remains at the same low level, even with increasing hunger in the last 3 days. During the period of stimulus change, however, the level of activity increases steadily as a function of increasing hunger, supporting Morgan's assumption of an increased general motivational state. These findings, however, challenge Richter's theory that activity increases automatically with an increase in the need state. What increases is evidently the readiness to respond to external stimuli. In another experiment, Sheffield and Campbell (1954) showed that the increase in activity during the deprivation period was particularly pronounced if the change in stimulus was temporally linked to feeding on previous days. It would seem that the animals have learned stimulus cues that precede feeding, suggesting that the periodic variations in drive observed by Richter were the result of food-signaling stimuli that were not controlled in his experiment.

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



Measurements of general activity are difficult to interpret because there is no way of knowing which specific drives they reflect. Similarly, general activity does not result in drive-specific,

goal-directed behavior. Progress was made with the construction of a new experimental apparatus for measuring drive-specific, goal-oriented activity: the Columbia Obstruction Box.

**Study**

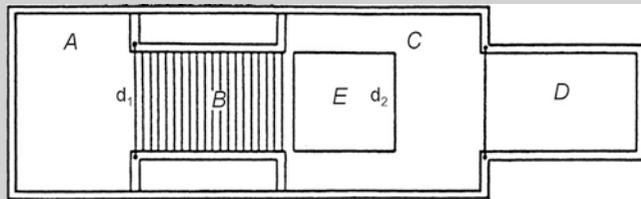
*The Columbia Obstruction Box*

Figure 4.2 shows the layout of the Columbia Obstruction Box. The animal is placed in the entrance compartment (A). To reach an incentive object to satisfy a drive, it has to cross an electrically charged grid (B) accessed by means of an experimenter-operated door ( $d_1$ ). Having crossed the grid, the animal reaches the first section of the incentive compartment (C). Stepping on the release plate (E) opens the door ( $d_2$ ) to the incentive compartment proper (D), which contains a drive-specific incentive object (food, water, or a sex partner).

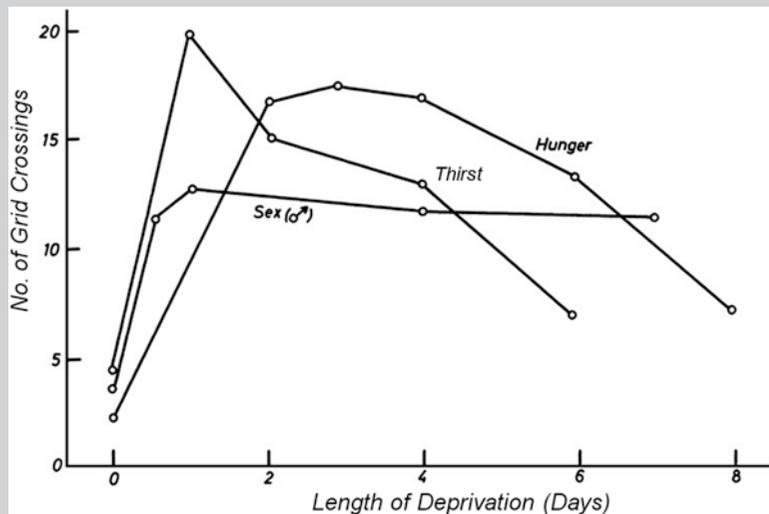
The animals were first given a series of pretrials to acquaint them with the apparatus. The incentive object was present at all times. It was only in the last of the pretrials that the grid was charged. In the main experiment, deprivation of a specific need was varied, and the number of times an animal overcame its aversion to the charged grid to reach the incentive object in each 20-min observation period was recorded. The aim was to measure the strength or urgency of individual drives, not only as a function of length of deprivation but also in terms of differences between the various drives.

As shown in Fig. 4.3, thirst seems to have greater drive strength than hunger; and hunger,

**Fig. 4.2** The Columbia Obstruction Box designed to measure drive-specific levels of activity (Based on Jenkins, Warner, & Warden, 1926, p. 366)



**Fig. 4.3** Frequency with which rats crossed the electrically charged grid of the Columbia Obstruction Box to make contact with a need-specific incentive object by length of deprivation (Based on Warden, Jenkins, & Warner, 1936)



(continued)

in turn, seems to have greater drive strength than sexuality in males. The number of times the grid was crossed, however, is a questionable measure of drive strength. For one thing, uncontrolled factors in the pretrial phase may have led to different learning outcomes. Likewise, very different results might be obtained if the length of the observational period were changed. It would be difficult to determine which time period

would produce the most valid measure of a specific drive strength. Most of all, the attractiveness of the incentive object was not varied systematically. We now know that this can be a motivating factor capable of activating behavior independent of need state. Furthermore, each contact with the incentive object – no matter how fleeting – results in consummatory activities that cannot always be controlled.

### 4.3 Drive Theory

In the 1920s and 1930s, extensive research relating to the concept of drive produced a broad range of findings and insights. Need states were manipulated; internal and external stimuli, physiological and behavioral indicators of need-dependent drive strengths, and instrumental and consummatory reactions were observed, operationalized, measured, and interrelated. This work represented a considerable advance on the speculative concept of instinct. However, there was still no clear and cohesive conception of drive beyond the general notion that the motivational state driving behavior increases as a function of need state.

Researchers reconsidered the questions that had already been addressed by instinct theorists. Are there as many drives as there are physiological needs? Or is there just one drive – a generalized incentive function for all behaviors that is not specific to a particular need? Assuming that there are various drives, does a need-specific drive have a selective function (in terms of stimulus and response) as well as an incentive function, i.e., a directive component as well as an energizing one?

These were the questions addressed by Hull's (1943) drive theory. In his complex theory, Hull made a clear distinction between drive and habits. Drive has a purely dynamic function and describes a general state of activation. Habits, in

contrast, are learned, associative stimulus–response bonds that give behavior direction.

- Hull assumed a single, generalized incentive function, which had no selective function in determining behavior. Thus, the question of motivation was confined to a single drive or rather to a question of incentive. For Hull, motivation concerned only the energizing of behavior, whereas the selection and goal orientation of behavior were functions of associative learning.

The clear distinction between issues of learning and motivation in the explanation of behavior, however, does not mean that the two components were viewed as mutually exclusive. In fact, one basic tenet of Hull's drive theory is that the motivational component affects the learning component but that the learning component has no influence on the motivational component. The motivational component, drive (*D*), is – in a manner of speaking – an indigenous source of behavior.

How does drive influence learning? In the late 1930s, Hull began to ask whether stimulus–response contiguity suffices as the sole explanation for learning, i.e., for the formation of new *S–R* bonds. For him, it was not classical conditioning that had been invoked to explain Thorndike's trial-and-error learning, which was the primary learning principle; it was instrumental conditioning. Stimuli become linked to responses whenever these responses lead to need satisfac-

tion. The subsequent reduction in the existing need or drive serves to reinforce the new  $S-R$  bond. Thus,  $S-R$  learning follows the principle of reinforcement. This approach to the mechanisms of reinforcement is known as drive reduction theory (Chap. 2).

According to this approach, the strength of the emerging stimulus-response bond ( $SHR$ ) is solely dependent on the frequency of reinforcement. The frequency or strength of learned responses is only dependent on the existing drive strength.

### Study

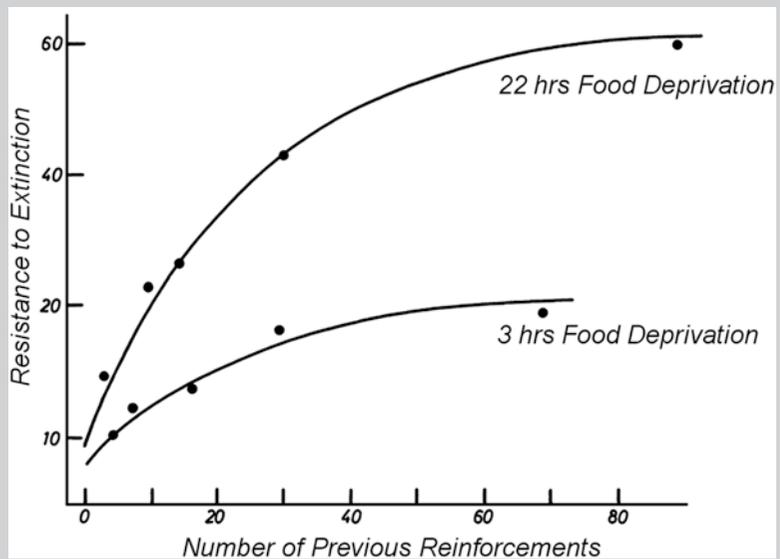
#### *Experimental Studies on the Drive Reduction Theory of Reinforcement*

In the studies by Williams (1938) and Perin (1942), rats that had been deprived of food for 23 h learned an instrumental response (lever pressing) that produced food. The frequency of reinforcement of this instrumental response (by provision of the food reward) was varied across four experimental groups during the learning phase. In the subsequent test phase, the animals were again deprived of food (for 22 h in Williams's study and 3 h in Perin's study). Lever pressing was no longer rein-

forced, i.e., the learned response was extinguished. The dependent variable was resistance to extinction, i.e., the number of lever presses prior to a 5-min period of nonresponse. This is a measure of habit strength ( $sH_R$ ). The results are presented in Fig. 4.4.

The graph shows that the resistance to extinction of the acquired  $S-R$  bond increases as a function of the number of previous reinforcements. In other words, an animal whose goal responses have more frequently resulted in a reduction of need state in the past will show greater persistence in responding when reinforcement is withheld.

**Fig. 4.4** Impact of the number of reinforcements and the length of deprivation on resistance to extinction (Based on Perin, 1942, p. 101)



Hull derived his drive reduction theory of reinforcement (and other concepts of his drive theory) from the two experiments presented in the study box: one by Williams (1938) and the other by Perin (1942).

The findings of the two studies appear to clearly support the notion of reinforcement being based on drive reduction. Furthermore, the two curves in Fig. 4.4 indicate that resistance to extinction increases as a function of hours of deprivation,

independent of the number of reinforcements. The higher the frequency of reinforcement, the greater the difference between the two different deprivation conditions, i.e., the two drive strengths, in terms of a resistance to extinction. In other words, where their influence on behavior is concerned, the relationship between frequency of reinforcement and drive strength is multiplicative. Neither habit strength ( ${}_sH_R$ ), based on the frequency of reinforcement, nor drive strength ( $D$ ), based on hours of deprivation, is the only determinants of behavior (in this case, the extinction of a learned response). Rather, the two must combine to produce the behavior. Thus, behavior is shaped by the product of ( ${}_sH_R$ ) and ( $D$ ), the so-called reaction potential,  ${}_sE_R$  (Chap. 2, Sect. 2.6.1).

Performance is not solely a function of learning. A motivational component is also required. Hull makes an explicit distinction between learning and performance to the extent that, once a habit has been formed, performance of a response is determined only by the product of  ${}_sH_R$  and  $D$ . Although not stated explicitly, however, the same also applies to the preceding acquisition process. For Hull, both learning and performance are behavioral principles. To build up habit strength, the organism has to repeatedly engage in behavior that results directly in the reduction of a specific drive. Regarding the acquisition phase, the distinction between learning components ( ${}_sH_R$ ) and motivational components ( $D$ ) is problematic. If reinforcement is a necessary prerequisite for learning, then the learning component (habit formation) must necessarily also incorporate a motivational component.

Hull (1943) expanded his drive theory in a number of directions, essentially formulating six postulates. All of these helped to clarify the drive construct. They stimulated research and led to revisions and new conceptualizations. The six postulates relate to:

1. The antecedent conditions of drive
2. Drive stimuli
3. Independence of drive and habit
4. The energizing effect of drive
5. The reinforcing effect of drive reduction
6. The general nature of drive

### 4.3.1 Antecedent Conditions of Drive

Drive strength is a direct function of the organism's existing need state and is presumably mediated by need-specific receptors within the organism. Empirical studies have focused primarily on the need for food and the resulting drive states. Duration of food deprivation is varied as an antecedent condition of drive, thus serving as operational criterion for drive strength.

The value of deprivation as a criterion for drive strength, however, proved to be limited. In rats, for example, a relationship between length of deprivation and indicators of hunger – e.g., amount of food consumed – was observed only after a period of deprivation exceeding 4 h (Bolles, 1967, 1975). Because laboratory rats eat about four times during the day and eight times during the night, a given period of deprivation during the night will deprive the animal more than that same period during the day. The 4-h threshold was confirmed by Le Magnen and Tallon (1966) among others, who showed that food intake does not increase as a function of the period of abstinence between two regular feedings, but that it does increase as a function of the time interval following an omitted feeding.

Research (see Bolles, 1967) has shown that reduction in body weight is a better indicator of the strength of a hunger drive than is the period of deprivation. In line with Hull's drive theory, experiments with rats confirmed that the strength of both instrumental and consummatory behavior (in terms of latency, intensity, persistence, and resistance to extinction) increases proportionately to weight loss. It should be pointed out, however, that the quantitative relationship between the induced need states and drive strength (i.e., their behavioral parameters) does not represent an equal-interval scale, but only a rank-order scale. Needs other than food and liquid intake, such as sexuality or exploration, are not "needs" as defined by drive theory, because their deprivation has little effect on behavior. In these cases, the conditions determining behavior are very complex, and the external situation plays a decisive role in providing incentive

conditions. For example, certain hormonal states are necessary but not sufficient conditions for copulatory behavior.

### 4.3.2 Drive Stimuli

Drive states are assumed to be accompanied by specific drive stimuli ( $S_D$ ). These are attributed to the structural (associative) and not to the motivational components of behavior. Drive stimuli form stimulus–response bonds of their own and can thus direct behavior. Unlike generalized, unspecific drive strength, however, they cannot motivate behavior of their own accord. Attempts were made to demonstrate the directive functions of drive stimuli in drive-discrimination studies. In one such study, rats learned certain instrumental responses under food-deprived conditions, and others under water-deprived conditions, but otherwise they were subjected to identical external conditions. How easy would it be for them to respond in a manner appropriate to the existent need state? To identify the appropriate response, they needed to “know” whether they were hungry or thirsty. In other words, specific drive stimuli needed to have formed associations with the instrumental responses.

The data obtained (Bolles, 1967, pp. 254–264) provide little evidence for the significance of drive stimuli. There are other, more convincing explanations for the finding that rats learn the instrumental response appropriate to the momentary need state more quickly – specifically, the incentive mechanism of fractional goal response ( $r_G$ ), as illustrated by the following two studies. Hull (1933) had rats run through a maze. If they chose one path, they found water in the goal box; if they chose another path, leading to the same goal box, they found food. The animals were alternately food or water deprived when placed in the maze. It was a long time before they were able to discriminate between the two paths, and even then the distinction was weak and not very reliable. Leeper (1935), in contrast, observed rapid discrimination learning when water and food were placed in different goal boxes. If drive stimuli were the crucial factor, this difference in

learning outcomes would not have been observed. Something other than drive stimuli evidently controlled the behavior of the rats in Leeper’s research design. The consummatory responses of eating and drinking ( $R_G$ ) are linked to stimuli present in the environment in which they take place. These environmental stimuli become associated with those previously encountered at the crucial fork in the maze. This triggers anticipatory fractional goal responses ( $r_G$ ) of eating or drinking that steer the animal more strongly in one direction or the other, depending on the momentary need state.

- The hypothetical incentive mechanism of *anticipatory fractional goal response* ( $r_G$ ) is the most serious challenge to drive theory, because it is also better able to explain other aspects of incentive motivation (Chap. 5). It is an especially marked improvement on explanations of behavior based solely on association, which relied heavily on the effectiveness of drive stimuli (e.g., Estes, 1958).

### 4.3.3 Independence of Drive and Habit

Neither the learning component (habit) nor the motivational component (drive) determines behavior independently; what takes effect is their multiplicative product. Two main approaches have been taken to this issue. The first compares learning curves obtained under different drive conditions but comparable frequencies of reinforcement. Given the multiplicative effect, variations in drive strength should result in the learning curves plateauing out at different levels (cf. the data presented by Williams and Perin in Fig. 4.4); in each case, however, these plateaus should be reached in equal steps. In the second approach, learning takes place under one drive state, and testing under another. The question is then whether behavior is commensurate with the change in the drive conditions or whether transfer effects from the previous drive condition can be observed?

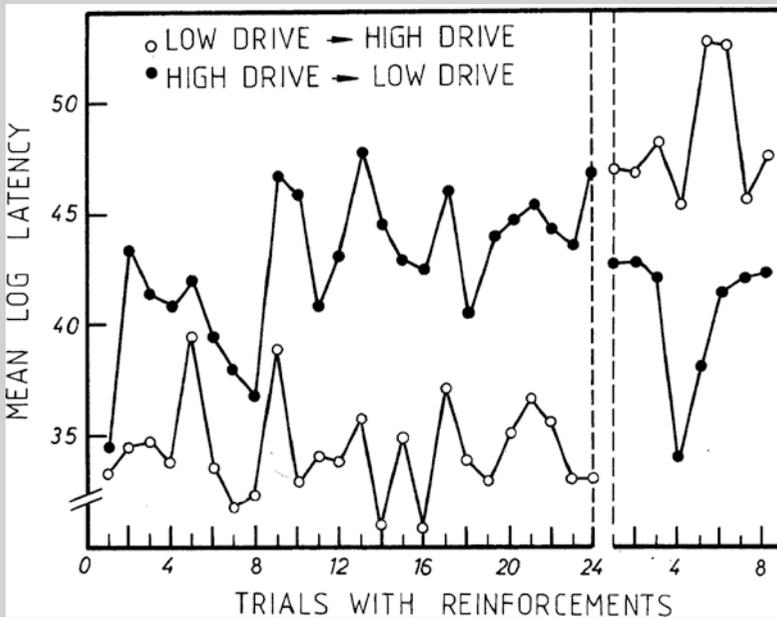
A study by Deese and Carpenter (1951) is an example of the second approach.

### Study

#### *Asymmetrical Transfer With Reversed Drive*

Deese and Carpenter (1951) ran food-deprived rats under either low or high drive conditions through a runway leading to a goal box that contained food. The authors measured latency of leaving the start box after the gate was opened. Both groups had

reached their respective plateaus of response latency after 24 reinforcements. The drive conditions were then reversed, with the group that was previously run under a low drive condition being run under a high one and vice versa. The findings shown in Fig. 4.5 attest to a peculiarly asymmetrical transfer effect.



**Fig. 4.5** Latencies (reciprocal) of a running response to food under low and high hunger drive conditions and (in the right-hand panel) under reversed drive conditions (Based on Deese & Carpenter, 1951, p. 237)

Bolles (1967, pp. 227–242) provides an overview of key findings. In general, it was possible to confirm the independence of habit and drive in the case of food-seeking behavior, as measured in terms of intensity differences. The latter restriction raises the question of whether slow and fast running speed are merely differences in the intensity of one and the same response, or two qualitatively different responses, learned under low or high drive strength.

Furthermore, whether drive and habit are independent of each other is really a question of definition. After all, there are secondary, acquired drives (motives), such as fear, that are activated in the presence of particular stimulus cues. Hull places these in a separate category because, for

him, drive (D) encompasses only nonlearned drive states. By contrast, Hull's collaborators and students, such as Spence (1956), Miller (1956), and Brown (1961), categorize everything with motivating characteristics as D, thereby abandoning the postulate of independence of drive and stimulus–response bonds. These extensions of drive theory will be discussed next.

#### 4.3.4 Energizing Effects of Drive

It is a basic hypothetical postulate of drive theory that the motivational component serves exclusively to initiate behavior, but does not give it direction. Here again, however, research find-

ings are inconsistent. The clearest support for the energizing characteristics of drive strength is provided by studies involving learning under drive conditions that are subject to rapid change through instrumental or consummatory responses (Fig. 4.4). On the whole, this applies only to “tissue needs” and not to the “sex drive” (whose drive character was questioned earlier). Parenthetically, if energizing is equated with response frequency, then there are also alternative explanations for these findings, e.g., in terms of purely associative principles or incentive effects. The study by Campbell and Sheffield (1953) presented above is an example of this (Fig. 4.1).

### 4.3.5 Reinforcement Effects of Drive Reduction

The acquisition of a new stimulus–response bond assumes the existence of a drive state that will be reduced by the response. None of the postulates of drive theory have prompted as much research and testing as this one.

The postulate raises questions about the precise nature of drive reduction. Does it consist in the consummatory activity itself, the effects of the stimulus (e.g., stomach activity after food intake), or the subsequent need reduction within the organism? Is drive reduction not simply a motivational process governing the execution of behavior that has also been acquired in other ways not involving drive reduction? In that case, drive reduction would be a behavioral principle – a matter of motivation – and not a learning principle (see Chap. 5 on latent learning).

To test whether consummatory responses are the critical event facilitating learning, experimenters sought to eliminate parts of the consummatory response sequence. Specifically, they bypassed the oral component by means of a fistula that introduced food directly to the stomach or the gastric component by means of an esophageal fistula that drained the food before it could enter the stomach (sham feeding). Because limited learning was observed under both conditions, drive reduction must, at least in part, be linked to consummatory activities. Given these findings, the hypothetical drive construct could

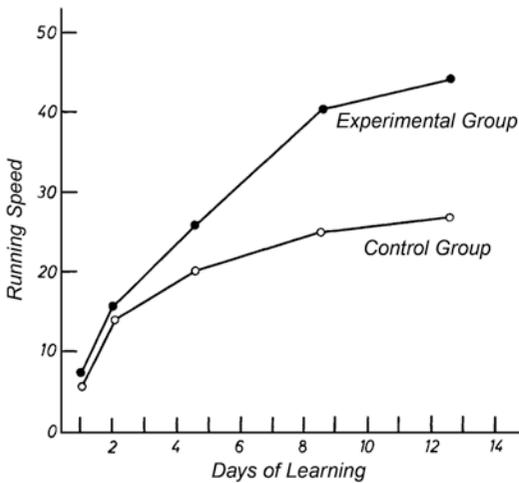
only be maintained – e.g., by N. E. Miller (1961), who ran numerous experiments with normal and sham feeding – by abandoning Hull’s notion that drive reduction is synonymous with a reduction of an organismic need state.

Sheffield went a step further. He showed that neither need reduction nor drive reduction are necessary prerequisites for learning. Sheffield and Roby (1950) demonstrated that thirsty rats will learn an instrumental response in order to obtain a saccharin solution rather than the same amount of water. Because saccharin has no nutritional value, it cannot have resulted in higher need satisfaction. Young (1949, 1961) identified numerous taste preferences that prompt learning without providing for the organism’s metabolic requirements. Young attributed these findings to differences in the affect-inducing incentive values of the foodstuffs in question.

The findings of a study by Sheffield et al. (1951) present an even greater challenge to drive reduction theory. The study involved learning under stimulation of the sex drive. Male rats who had never copulated prior to the experiment learned an instrumental response to gain access to a female in heat, despite the fact that the copulatory process was interrupted prior to ejaculation. It seems reasonable to assume that not only was there no reduction in drive strength in this case, but that – in contrast – drive was increased. There must, then, be certain cases in which learning is the result of drive induction rather than drive reduction. Figure 4.6 shows the results for the rats in the experimental group in comparison to a control group that found a male animal in the goal box.

- Curiosity and exploratory behavior constitute an entire class of learning phenomena that cannot be explained in terms of a reduction in organismic need states.

A final group of studies was based on the remarkable discoveries of Olds and Milner (1954) who electrically stimulated certain lateral regions of the hypothalamus, the so-called pleasure centers. Rats learned to press a lever or to make another instrumental response when that response was followed by mild stimulation of



**Fig. 4.6** Learning gains under the drive condition of copulation without ejaculation in rats. The control group found a male animal in the goal box (Based on Sheffield, Wulff, & Backer, 1951, p. 5)

these brain regions. Olds (1958) observed up to 7000 responses per hour under this condition, an activity level leading to physical exhaustion. When electrodes were implanted in another region, i.e., one involved in food regulation, the reinforcement effect of electrical stimulation ceased as soon as the animal became satiated. When sexual stimulation was achieved through injection of androgen, the reinforcement effect of stimulating the “hunger region” was reduced. Evidently, there are interactions between organismic need states and other drives.

Can these findings be reconciled with drive reduction theory? An inveterate drive theorist might argue that the electrical stimulation of the brain interferes with the complex regulatory mechanism governing need and drive states. Yet it might also be the case that need and drive states are not involved at all and that the emotional arousal or pleasurable states elicited by a certain behavior in fact reinforce that behavior. Especially the neurotransmitter dopamine seems to play an important role here (see Ikemoto & Panksepp, 1999). In either case, research using brain stimulation raises serious questions about Hull’s postulate. In view of these accumulated findings, it would seem advisable – if Hull’s theory is not to be abandoned – to divorce drive reduction from

antecedent need states and to designate as drives everything that reinforces as a function of its reduction.

#### 4.3.6 The General Nature of Drive

- If habit and drive are mutually independent, the habit-activating function of drive must also be independent of different drive sources. Drive is then the summation of all specific drive states, such as hunger and thirst. A response that was learned under hunger conditions must be emitted in an identical stimulus situation, even if the organism is only thirsty.
- Some empirical data confirm this assumption; others do not. Hunger and thirst seem to be inappropriate substitutes for each other because the organismic regulatory mechanisms of the two need states are not mutually independent.
- The empirical data discussed above indicate that the postulate of a general, nonspecific drive is the exception rather than the rule (cf. Bolles, 1965, p. 265 ff.). Meanwhile, findings from recent neuropsychological research, however, suggest that this old postulate might be worth some reconsideration (cf. Kuhl, 2001, p. 903).

The assumption of a generalized drive also formed the basis for a broad field of research relating to human motivation (Taylor & Spence, 1952). Taylor (1953) developed a questionnaire to measure enduring individual differences in generalized, nonspecific anxiety (MAS, “Manifest Anxiety Scale”). Anxiety is viewed not as a function of the situation, but as a motive disposition, an “acquired drive.” People with high MAS scores are assumed to have a high generalized drive level, making them more likely to respond.

This has various implications for the acquisition of easy and difficult tasks. The reasoning here is as follows: Tasks are easy if their correct solution involves responses that already possess a measure of habit strength and if there is little competition with the habit strength of inappropriate responses. Given the multiplicative relationship between  $sH_R$

and *D*, high-anxiety individuals can be expected to learn easier tasks better and more quickly than low-anxiety individuals, because their higher drive strength raises the dominance of the reaction potential for the correct responses over the incorrect ones even further above the response threshold. The opposite can be expected for difficult tasks. Here, the correct responses have lower habit strength than the incorrect ones. The high drive strength of high-anxiety individuals serves to exacerbate the unfavorable relationship between competing responses, to the detriment of the correct ones. Moreover, other irrelevant habits are likely to be raised above their response thresholds. Paired-associate tasks were used to test this theory of the interaction between generalized drive strength and task difficulty. Low-difficulty tasks (high associative value between the pairs) were contrasted with high-difficulty tasks (low associative value; other responses are more salient, leading to interference with the prescribed response).

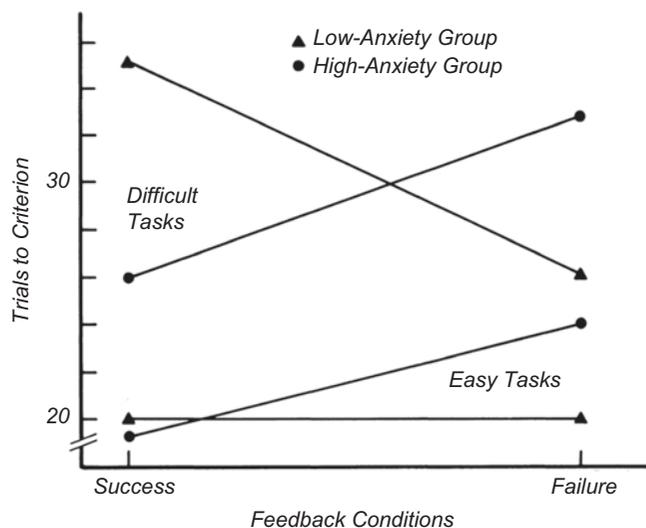
Spence, Farber, and McFann (1956) were able to confirm the hypotheses derived from this model. However, Weiner (1966) and Weiner and Schneider (1971) proposed an alternative explanation based on the frequently reported finding that, in high-anxiety individuals, success leads to improved performance and failure to deterioration, while the reverse holds for low-anxiety individuals. Because easier tasks are more likely to lead to success and

difficult ones to failure, Weiner (1966) reasoned that the differential effects found by Spence et al. (1956) could be attributed to cognitive intervening processes of experiencing success or failure, rather than to response competition (as postulated by drive theory).

To adjudicate between the two explanatory models, Weiner experimentally separated easy tasks from success and difficult tasks from failure. Participants given the task of learning (objectively) easy paired associates were told that their performance was below average, while participants learning difficult syllable pairs were told that their performance was above average. Under these conditions it was indeed possible to show that differential performance was not dependent on the general anxiety level (i.e., “drive strength” as a personality-specific, situation-independent characteristic), but that it was a function of the momentary experience of success or failure. High-anxiety individuals learned a list of difficult trigram pairs (e.g., HOV-MIY) more quickly than low-anxiety subjects when given positive feedback. At the same time, low-anxiety participants learned a list of easy pairs more rapidly than their high-anxiety counterparts when given negative feedback.

A replication study by Weiner and Schneider (1971) produced similar findings for all combinations of participants’ anxiety levels, task difficulty, and type of feedback (Fig. 4.7).

**Fig. 4.7** Number of trials needed to learn an easy and a difficult list of 13 trigram pairs as a function of success and failure feedback for groups classified as confident of success or anxious about failure (Based on Weiner & Schneider, 1971, p. 260)



The interaction between anxiety and feedback of success or failure was more pronounced for difficult tasks than for easy ones (see Chap. 8 on success and failure motives).

### Summary

Although empirical findings have undermined hypotheses derived from Hull's drive theory in specific respects, advances in neuropsychological research have produced findings that partly rehabilitate the generalized model. This applies, for example, to the assumption that a generalized drive state serves to energize behavior across situations (Smith, 1971).

Furthermore, Hull's differentiation between energizing (drive) and directive functions (habits) can be tied to specific anatomic structures. For example, LeDoux (1996) has demonstrated that – in the case of fear, in particular – the amygdala, the almond-shaped structure in the center of the brain, causes a generalized activation that first takes effect on brainstem activation systems and subsequently triggers cortical activation. The direction of an activity, in contrast, is mediated by another brain structure, the hippocampus. Models of the situation and of appropriate responses are stored in the hippocampus.

To conclude, this final postulate of drive theory also stimulated research and resulted in insights that advocated the revision, if not the complete abandonment of Hull's drive theory.

### 4.3.7 Extensions of Drive Theory

When Woodworth (1918) introduced the drive concept and contrasted it with the behavior mechanisms initiated by drive, he pointed out that these mechanisms can themselves acquire an incentive function, meaning that they can become divorced from the energizing function of primary drives. Tolman (1926, 1932) also addressed the question of how secondary drives could evolve and achieve independence from primary drives. Allport (1937) introduced the principle of functional autonomy. Although this principle does not

deny the historical roots of motives in primary drives, it suggests that they soon become independent of these roots.

#### 4.3.7.1 Acquired Drives

Co-workers of Hull, particularly Mowrer and N. E. Miller, attempted to expand and develop drive theory to cover more complex motivational phenomena, such as frustration, conflict, and nonprimary motivational conditions, particularly in humans. This led them to postulate "acquired drives."

**Frustration.** In this context, frustration implies the blocking of responses that lead to drive satisfaction or the blocking of consummatory responses once the goal has been attained. In both cases, animals are observed to respond more vigorously, more frequently, or with greater variation. This frustration effect seems to arise from an increase in the drive whose satisfaction has been thwarted. Dollard, Doob, Miller, Mowrer, and Sears (1939) assumed that frequent frustration leads to an acquired drive that contributes to general drive strength and, in its specific form, becomes tied to aggressive responses. They argued that aggressive behavior is always rooted in frustration and that every frustration leads to aggression. In other words, they saw frustration as a necessary and sufficient condition for aggression. Empirical findings, however, have since refuted these very broad assumptions (cf. Bandura, 1971; Feshbach & Singer, 1971; Zuckerman, 1978).

The validity of inferring an increase in drive from an increase in frustration is doubtful for several reasons. An animal that does not find the expected food at a goal cannot complete the behavior sequence with consummatory responses. Instead, instrumental goal responses or other behaviors might be intensified, e.g., because past experience has shown that a more vigorous response can lead to success. In other words, an increase in the intensity or variability of behavior might be explained in terms of cognitive factors rather than drive factors. Such an explanation is supported by the results of Holder, Marx, Holder, and Collier (1957), who found

that rats can learn to respond more weakly rather than more vigorously following the thwarting of reinforcement.

Fear as an acquired drive. Although it was not possible to demonstrate acquired drives based on appetitive needs, it did seem possible to do so for aversive drives. Avoidance learning, where fear seems to be the crucial factor, is a case in point.

#### Definition

Fear can be seen as a conditioned response to pain, and pain as a primary (and aversive) drive state, the reduction of which reinforces instrumental escape and avoidance behavior.

Research has shown that fear and avoidance behavior can also be learned and maintained by means of conditioned fear states, without the pain originally experienced having to be reintroduced. This indicates that fear is an easily acquired drive that soon attains independence and can become attached to a variety of eliciting conditions.

Mowrer (1939) was the first to reason along these lines, referring to the second psychoanalytic theory of fear that Freud had formulated in 1926. This theory held that fear, if it is justifiable fear, represents an effective signal, a warning about real, impending dangers and motivating defense responses. Observations of animals in experimental situations had shown that responses that are learned in order to avoid an electric shock are extremely resistant to extinction. In other words, if an animal is placed in a previously aversive situation, it will continue to display escape behavior, even when the painful stimulus is not present. This would seem to be a typical case of classical conditioning. In actual fact, further reinforcement would have been needed for classical conditioning to occur. Hence, the high resistance to extinction cannot be explained in terms of classical conditioning. Mowrer assumed that fear is elicited by the stimulus cues arising from the originally aversive situation. Although fear was originally a conditioned form of the pain response, it now became

an aversive tension state, an independent drive to be reduced by escape behavior.

- Thus, the escape response continues to be reinforced by the reduction of fear, even in the absence of pain.

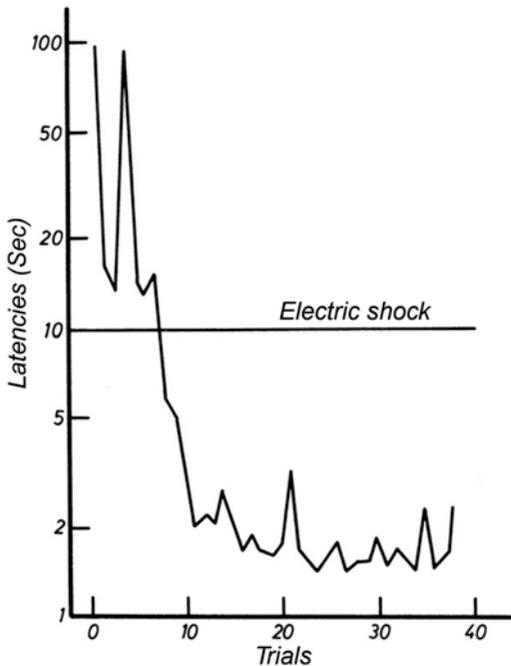
The apparatus that N. E. Miller (1941, 1948) used in his fear experiments was later also adopted in research on the theory of learned helplessness (Seligman & Maier, 1967). Miller's experiment is described in Sect. 2.6.1 of Chap. 2 in the context of "classical learning experiments."

Based on the results of his experiments, Miller concluded that fear is an (unconditioned) response of the autonomic nervous system to painful stimuli and that it can therefore be conditioned to other stimuli. Fear is itself also a stimulus, however, because it can form associations with responses. As a stimulus it is also a drive, because every response that removes the organism from the fear-eliciting environment (e.g., flight) results in drive reduction and is thus reinforced.

In contrast to Hull, who hypothesized drives to evolve from primary needs only, Miller and Dollard (1941, p. 66) postulated that any stimulus can become a drive.

Mowrer (1947) introduced limitations to the general validity of the postulate of reinforcement through drive reduction. Initially, he advocated a two-factor theory, which held that all learning is based on either classical or instrumental conditioning. (He abandoned this position in 1960 in favor of an expectancy theory of motivation; see Chaps. 2 and 5.) According to Mowrer's two-factor theory, drive reduction is not a general prerequisite for every reinforcing event, but only for instrumentally conditioned responses that are mediated exclusively by the voluntary activity of the skeletal muscles. Classical conditioning (which is restricted to involuntary mechanisms) requires temporal contiguity alone.

- Both classical and instrumental conditioning play a role in avoidance learning. First, fear becomes classically conditioned to stimulus cues; then the reduction of fear reinforces the instrumental avoidance response.



**Fig. 4.8** An individual acquisition curve (latency time) for an avoidance response to an electric shock delivered after 10 s (Based on Solomon & Wynne, 1953, p. 6)

Further questions were raised by the experimental findings of Solomon and Wynne (1953), who found that, after several repetitions, an acquired avoidance response was shown more rapidly than a fear response could in fact occur. In their experiment, dogs administered strong electric shocks 10 s after a conditioned stimulus soon learned the avoidance response of jumping over a hurdle. Figure 4.8 shows typical response latencies. It took only seven trials for the dog to start jumping the hurdle before the onset of the shock. After three more trials, latencies were reduced to between 1 and 2 s, which is too short a time for the occurrence of an intervening fear response. As an autonomic nervous system response, fear generally requires 2–4 s to become manifest (cf. Spence & Runquist, 1958). On the occasions that longer latencies were observed, meaning that a fear response may have occurred, the succeeding latencies were often markedly shorter. It would seem that the animal tries to

avoid not only pain, but also the fear of pain. Interestingly, under these experimental conditions, resistance to extinction was almost unlimited, with some animals requiring no less than 650 trials for the learned response to be extinguished. These findings seriously challenge the notion that fear reduction results in drive reduction and thus continues to reinforce the acquired avoidance response. The authors explain the high resistance to extinction in terms of a “conservation of fear.” Once it abates, response latency increases; fear is then experienced once more and serves to reinforce the avoidance response. Yet even this explanation cannot account for the extreme resistance to extinction.

Schoenfeld (1950) proposed an interpretation of avoidance learning that makes no reference at all to acquired drives. His explanation is simply that there are positive or negative stimuli that have the capacity to reinforce. If these are associated with neutral stimuli, the latter will gradually acquire reinforcing characteristics. Hence, stimuli that were originally neutral acquire negative characteristics, and the organism learns to respond in a manner that will eliminate them.

### Summary

Empirical findings have cast doubt on the explanatory value of drive theory, with respect to both its individual postulates and the hypothesis of fear as an acquired drive. Admittedly, drive theory generated a wealth of experimental research findings, but interpretations of these data increasingly drew on factors that related to external, situational determinants rather than to internal, organismic determinants like drive states. In other words, the focus shifted from the internal to the external environment. Stimulus cues, incentive values, and motivating expectations seemed able to provide more plausible theoretical explanations for the activation, direction, and persistence of goal-directed behavior.

Nevertheless, drive theory can be seen as a major step toward the development of the theoretical approaches being used today. For example,

social psychologists still draw on the basic assumptions of drive to explain the phenomena of social inhibition and facilitation. Since the 1980s, social psychology has also seen the emergence of neo-associationism, an approach that seeks to overcome the known shortcomings of classical associationism by incorporating cognitive variables.

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#### 4.4 Neo-associationism

Learning theorists increasingly disputed the basic associationist approach and expanded it to include cognitive variables. As shown in studies by Rescorla and co-workers (Rescorla, 1968; Rescorla & Wagner, 1972), even rats are not indiscriminately bound to the law of association; they establish “reasonable” rules. For example, rats do not respond to a contingent sound stimulus if they have already learned that a contingent light stimulus signals the onset of an unconditioned stimulus (e.g., an electric shock). Even if the light stimulus is paired with the sound stimulus in terms of space or time, the sound stimulus will have no effect in its own right – though the principles of associationism would predict otherwise. If light and sound stimuli are presented together from the outset, however, both stimuli will have independent effects (as concomitantly conditioned signals of impending pain, both stimuli are discriminative and thus “salient”).

In social psychology, the tradition of the associationist approach is unbroken. Berkowitz (1974) assumed that any stimulus that is repeatedly linked (associated) with certain behaviors becomes capable of eliciting that behavior of its own accord, whether the stimulus is an object or a person. In contrast to the proponents of classical associationism, however, Berkowitz (1974) assumes that these associations are tied to certain mediating conditions and refers to “mediated associations.” Berkowitz’s weapon effect has become particularly well known. Because weapons are associated with aggression, they become

aggressive stimulus cues that can trigger aggression by their very presence. In one experiment (Berkowitz & LePage, 1967), participants were first antagonized by a confederate of the experimenter. They were then given the chance to “get their own back” on the confederate by giving him electric shocks. A gun was visible in the room in one condition, but not in the other. In line with expectations, the participants delivered more shocks to the confederate when they had been antagonized in the presence of a gun than when no gun was present in the room.

Numerous recent experimental studies on nonconscious information processing have shown that different motivations are activated automatically by the perception of certain stimuli (see the following excursus). In these experiments, stimuli such as photographs of people’s faces are presented on a computer screen for such a short time (a few milliseconds) that they cannot be consciously perceived or identified. Nevertheless, objective measures of physical responses and behaviors taken in the laboratory have demonstrated that people do in fact process these stimuli (Bargh, Chen, & Burrows, 1996).

Simple, learned stimulus–response bonds cannot provide an adequate explanation for the phenomena described in the excursus. In his cognitive neo-associationist model of impulsive (emotional) aggression, Berkowitz (1990) assumes a developmental mechanism that integrates Leventhal’s (1984) theory of emotions and Bower’s (1981) network theory of memory within an associationist framework. According to this model, frustration and aggressive stimulus cues do not necessarily trigger aggressive behavior. Rather, the intervening conditions determine whether or not aggressive behavior is exhibited. First, there must be a negative evaluation of an event. This negative appraisal triggers a general feeling of displeasure, which in turn activates corresponding thoughts, memories, expressive-motor and physiological responses, and feelings of anger that are linked together associatively in the network of memory. Activation of this

network-like system is most likely to spread from an “affect node.”

- Neo-associationism assumes that – in humans, at least – cognitive and affective processes intervene in the primary association mechanism (Hull’s habits) and thus serve to determine the overall response (Berkowitz, 1994). The affective responses elicited within the organism seem to play a key role here.

This aspect has also been considered in research on the activation of stereotypical patterns of behavior, where the role of organismic responses – particularly nonconscious processes of affective evaluation – has been examined. Findings from different paradigms indicate that the affective properties of the stimuli to which individuals are exposed are activated extremely quickly, without their conscious awareness. This activation of affective connotations can influence their subsequent judgments and behavior (Bargh 1994, 1997; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Greenwald & Banaji, 1995; Murphy & Zajonc, 1993).

Affective priming effects are not only apparent in people’s evaluations, they have also been observed, e.g., in the pronunciation of target stimuli (Bargh, Chaiken, Raymond, & Hymes, 1996). Consequently, Bargh maintains that there is strong evidence for an unconditional, general process by which all environmental stimuli are evaluated automatically: “It appears that nearly everything is preconsciously classified as good or bad” (Bargh, 1994, p. 19).

- Neo-associationism assumes that the association between stimulus and response is mediated by basal organismic processes of evaluation. Thus, affect or emotions are again attributed a key role as intervening variables in the development of motivation and the activation of behavior. The introduction of these organismic processes of evaluation to the equation marked the end of strict associationism (cf. Bargh & Ferguson, 2000; Berkowitz, 1994; Eron, 1994).

## 4.5 Conflict Theory

Conflict theory represented a significant step along the path to modern conceptualizations of motivation.

### 4.5.1 Lewin’s Conflict Theory

The experimental analysis of conflict behavior was an important facet of drive-related research. Lewin was the first to present fundamental ideas on conflict theory, back in the 1930s.

#### Definition

According to Lewin, “a conflict is to be characterized psychologically as a situation in which oppositely directed, simultaneously acting forces of approximately equal strength work upon the individual” (Lewin, 1935, p. 122).

Lewin identified three basic categories of conflict situations; Hovland and Sears (1938) later added a fourth. The defining characteristics of the four categories are the situational forces that impinge on the individual, resulting in approach or avoidance behavior as follows:

1. Approach–approach conflict: The individual has to choose between two incompatible situations or goals, both of which have positive valences of approximately equal strength. This is emblemized in Aristotle’s allegory of Buridan’s ass starving to death between two stacks of hay.<sup>1</sup>
2. Avoidance–avoidance conflict: Here, the choice is between “evils” of approximately equal strength; e.g., a student has to do his homework or face being set extra work as punishment.

<sup>1</sup>In an allegory, Jonathan Buridan is said to have envisioned the impossibility of a logical decision between two solutions of the same value through a donkey starving to death between two stacks of hay.

3. Approach–avoidance conflict: One and the same goal is both attractive and repulsive. For example, someone might want to commit to a loved one by marrying them but at the same time fear the loss of independence that this commitment incurs.
4. Double-approach–avoidance conflict (double-ambivalence conflict): An example would be a choice between two jobs, both of which have positive and negative aspects.

Figure 4.9 summarizes these four types of conflict situations using the symbols developed

#### Excursus

##### *Effect of Stereotypes: The Model of Nonconscious Behavioral Confirmation*

Since the 1980s, social psychologists involved in social cognition research have paid particular attention to the more subtle effects of stereotypes (Kunda, 1999). One widespread stereotype in the United States is that African-Americans are especially aggressive. Priming studies have shown that this stereotype can be activated unconsciously and influence people's judgments of others without their conscious awareness (cf. Devine, 1989).

The model of nonconscious behavioral confirmation proposed by Chen and Bargh (1997) assumes three subprocesses:

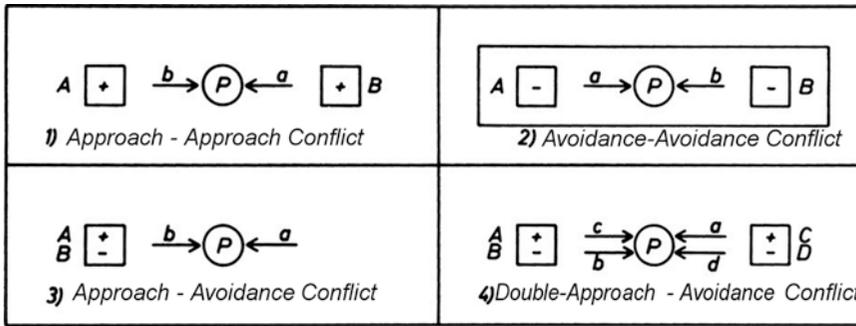
1. Automatic activation of a stereotype
2. Direct and automatic link between perception and behavior
3. Automatic behavioral confirmation

It is assumed that the frequent activation of a stereotype suffices to increase the probability of its unconscious and unintentional activation, i.e., the development of automaticity. The activation of a stereotype (or behavioral schema) is thought to trigger the associated response behavior directly, in the manner of James' (1890) ideomotoric principle. The

behavior exhibited is then confirmed by the social responses of those involved in the interaction, whose behavior is consistent with the stereotype. These assumptions were tested in an experiment by Chen and Bargh (1997). Two Caucasian participants worked independently on a computer task. One of them was subliminally (below the threshold of conscious perception) exposed to photos of Caucasian or African-American faces. In the second part of the experiment, the two participants interacted (they worked on a verbal task together). Finally, participants were asked to evaluate each other. The authors expected subliminal priming with photos of African-American faces to activate a negative stereotype, which was in turn expected to result in more negative evaluations of the experimental partner. Appraisals of the experimental partner were indeed more negative when participants were primed with photographs of African-American faces than when Caucasian faces were used. Correlations between 0.30 and 0.40 were found, indicating that around 10% of the variance in behavior was explained. These findings confirm the model proposed by Chen and Bargh but, at the same time, show that other variables must be involved in explaining the large residual variance in behavior.

by Lewin for his field theory; e.g., the arrows represent directional vectors in the field, originating either from the situation or from within the person. Note that the schema for the avoidance–avoidance conflict is surrounded by a box,

representing a psychological forced-choice situation. In other words, the individual considers himself or herself to be inextricably caught between two evils and unable to escape the field of conflict.



**Fig. 4.9** The four types of conflict situations [*P*, Person; *A* to *D* positive (+) or negative (-), incentive characteristics of the available objects or goals of behavior; *a* to *d*

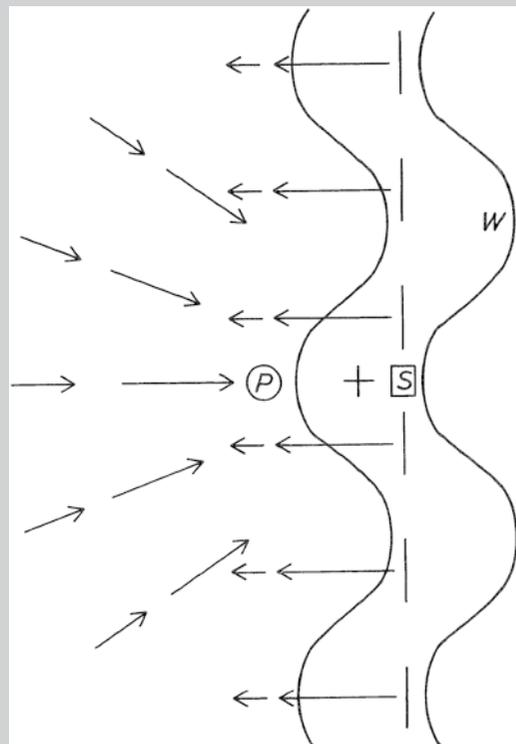
positive or negative, incentive characteristics of the forces originating from these objects or goals that impinge on the person]

**Example**

Lewin’s field-theoretical approach can best be illustrated by the example of a specific conflict situation, such as that represented by the force fields in Fig. 4.10. A 3-year-old boy at the beach is trying to retrieve a toy swan that has been swept away by the waves. On the one hand, he is pulled toward his beloved toy.

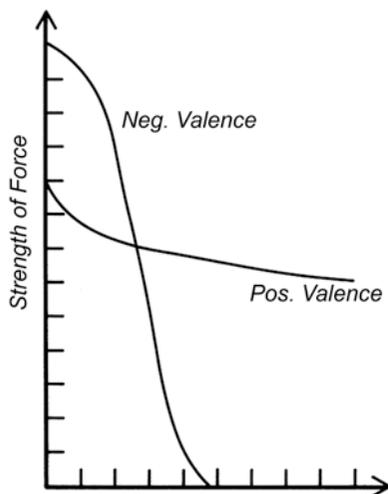
Once he gets too close to the forbidding waves, however, he will be pushed back in the opposite direction. Evidently, there is a subjective barrier running parallel to the shoreline. Once that barrier is crossed, the force pushing the boy away from the waves soon becomes greater than the force pulling him toward the toy swan.

**Fig. 4.10** The force field occurring in a conflict situation where a goal has both positive and negative valence (*P* person, *S* swan, *W* waves) (Based on Lewin, 1935, p. 92)



This example led Lewin (1946) to intuitively postulate that, in an approach–avoidance conflict, the strength of the repelling forces increases more rapidly with increasing proximity to the goal object than does that of the attracting forces. From this it can be deduced that there must be a point some distance from the goal at which equilibrium occurs. This point represents the intercept of the approach and avoidance gradients. Prior to this point, the attracting forces are stronger than the repelling ones, thus pulling the child toward the swan. But once the point of equilibrium is passed, the repelling forces become stronger, pushing the child back again. This results in oscillating behavior. Figure 4.11 illustrates the fluctuating relationships of the forces in this type of conflict situation as a function of a person’s geographical distance to an attractive or feared situation.

According to Lewin, the strength of a behavioral tendency (force) is concomitantly dependent on two quantities: the strength of the valence of the goal (object) and the distance from the goal. Psychologically speaking, distance can be measured in terms other than geographical units, e.g., in time or in the number of necessary intervening activities, their difficulty, or the amount of effort they require.



**Fig. 4.11** Schematic representation of the change in the strength of a force with the distance to a positive and a negative valence (Based on Lewin, 1946, p. 812)

## 4.5.2 Miller’s Model of Conflict

Miller (1944) combined Lewin’s notion that fluctuations in valence are a function of the distance from the goal with Hull’s (1932, 1934) hypothesis of goal gradients. Hull postulated this hypothesis to explain the observations that hungry animals run faster as they approach their goal and that the correction of errors in maze running begins near the goal and continues in reverse sequence back to the start box.

The goal gradient hypothesis states that stimulus–response bonds are first produced, i.e., habit strength built up, in the immediate proximity of the goal, because it is here that reinforcement is immediate, whereas it is delayed at points further away from the goal. In the acquisition of a new behavior sequence, the development of habit strength thus starts at the end of the response sequence and rolls slowly back to the beginning of that sequence.

Miller (1951, 1956) formulated six basic assumptions relating to conflict phenomena (see Fig. 4.12):

### Basic Assumptions of the Conflict Model (After Miller 1951, 1956)

1. The tendency to approach a goal becomes stronger, the nearer a person is to it (gradient of approach).
2. The tendency to avoid a feared stimulus becomes stronger, the nearer a person is to it (gradient of avoidance).
3. The gradient of avoidance is steeper than the gradient of approach.
4. When two incompatible responses are in conflict, the stronger one will prevail.
5. The height of the approach and avoidance gradients is dependent on the strength of the underlying drive.
6. The strength of the response tendency being reinforced increases as a function of the number of reinforcements until learning plateaus out at a maximum level. (This assumption was added in 1959.)

**Fig. 4.12** Gradients of approach and avoidance when approaching a goal with both a positive and negative valence

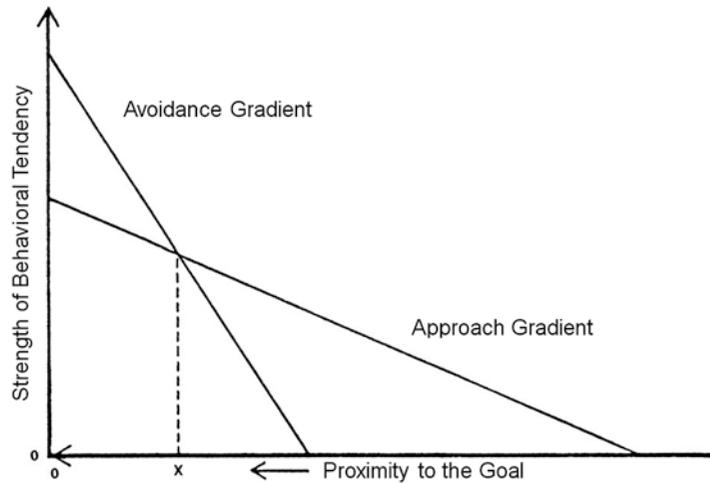


Figure 4.12 illustrates the first four assumptions. As point “x” is crossed on the way to the goal, the avoidance tendency becomes stronger than the approach tendency. At this point, behavior will oscillate between approach and avoidance.

According to the fifth assumption, a change in the relative strengths of the drives underlying the approach and avoidance tendencies can result in a change of the relative strengths of these tendencies and produce a shift in the point of intersection. For example, increasing the period of food deprivation will increase the pull on an animal to approach a food goal. As a result, the entire approach gradient is raised, placing the intercept of the two gradients closer to the goal.

But what is the reasoning behind the assumption that the avoidance gradient is steeper than the approach gradient? For Miller, the difference lies in the sources of the two tendencies. In the case of hunger, the approach tendency is maintained by a drive stimulus arising from within the organism itself. The drive stimulus remains unchanged, regardless of the organism’s distance from the goal where food is available. The avoidance tendency, in contrast, arises from fear, an acquired drive resulting from aversive stimulation (e.g., pain) experienced in the region of the goal. Because fear is not elicited by internal drive stimuli, but by external cues, it becomes closely linked with the original, pain-inducing situation.

### Study

#### *Experimental Evidence for Miller’s Assumptions*

Brown (1948) experimentally confirmed assumptions 1, 2, 3, and 5. Two of his four groups of rats repeatedly found food at the end of a runway; one of these groups had been deprived of food for 48 h, the other for just 1 h. The two remaining groups, which were not deprived of food, received electric shocks at the end of the weak shocks in one group and strong shocks in the other. Following a learning phase, Brown measured the strength with

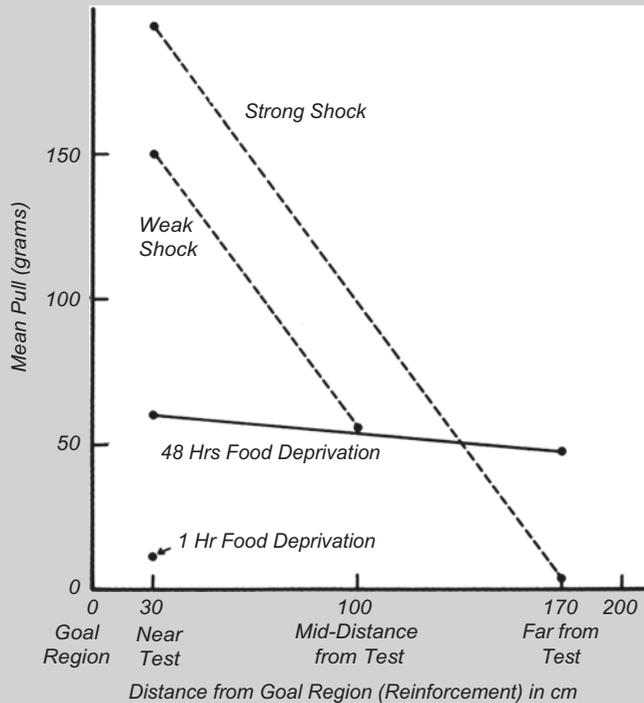
which individual animals pulled toward or away from the goal when placed in the runway. To this end, the animal was placed in a harness permitting the experimenter to stop it at various points on the runway and to measure the amount of pull exerted. Figure 4.13 shows the results.

In a later study, Miller (1959) combined his assumptions 4 (the stronger response prevails) and 5 (the height of the gradient is a function of drive strength) and confirmed them experimentally. The rats were now given both food and electric shocks at the goal, producing a

conflict situation. Hours of food deprivation and shock severity were now varied in combination for different groups of rats, thereby producing different levels of drive strengths and permitting the height of the approach and the avoidance gradients to be manipulated independently of each other. The gradients were now expected to intercept at various distances from the goal. Accordingly, the

dependent measure was the minimum distance from the goal reached by the animal in the conflict situation. The data confirmed Miller's assumptions. When shock intensity was constant, distance from the goal decreased with hours of food deprivation. Conversely, when hours of food deprivation were kept constant, distance from the goal increased with the intensity of the shock.

**Fig. 4.13** Strength of approach and avoidance tendencies at various distances to the goal in four groups of rats: 1 h vs. 48 h food deprivation, strong vs. weak electric shock (Based on Brown, 1948, pp. 457, 459)



This idea also helps to explain the sixth and final assumption. The number of reinforced responses (i.e., habit strength) determines the steepness of the gradient of the respective tendency because habit strength, the associative component of the reaction potential, is dependent on the distance from the goal (at least until learning has reached a plateau on the way to the goal). The avoidance gradient is steeper precisely because, in this case, both components of the reaction potential – drive (i.e., fear) and habit strength – are linked to goal-related stimuli. In the case of the approach tendency, this applies only to

the associative component, habit strength. If habit strength were considerably stronger for the approach than for the avoidance tendency, there might be an exceptional case of a steeper approach gradient.

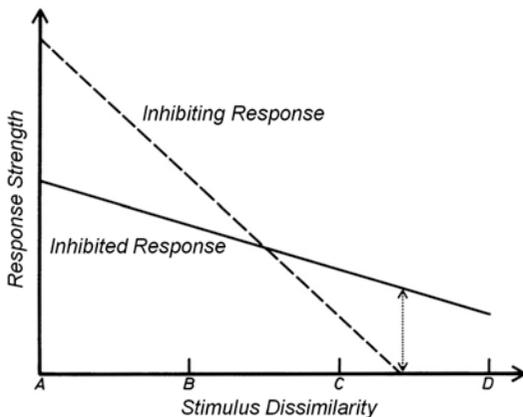
#### 4.5.3 Applications of the Conflict Model

A variety of intriguing applications were derived from Miller's model. The distance from the goal does not necessarily have to be spatial; it may be

measured in terms of temporal proximity or similarity to the original goal. A process of decreasing similarity to a conflict-inducing goal often plays a role in the development and treatment of neuroses. For example, an object of aggressive or sexual desire may also elicit fear of negative consequences. In Freud's terms, this can lead to displacement. The original object is replaced perceptually by a more or less similar object that elicits less fear or anxiety. Clark (1952) and Clark and Sensibar (1955) were able to experimentally demonstrate this process for sexuality. They induced displacements of imaged projections as a function of sexual motivation.

Displacement corresponds to a generalization of the response to the original object. The more the avoidance tendency outweighs the approach tendency, the less similar the displacement object will be to the original object.

Miller (1948) applied his conflict model to this situation. The gradients of approach and avoidance now signify response strength as a function of degree of similarity to the conflict-inducing stimulus, rather than as a function of spatial or temporal distance. Figure 4.14 shows the application of this model to the displacement mechanism. It indicates that displacement is most likely to occur at the degree of similarity associated with the highest net strength of the inhibited response. In Fig. 4.14, it would be a degree of similarity falling between C and D.



**Fig. 4.14** Displacement of an inhibited response at the highest net strength of the inhibited response (dotted arrow) (Based on Miller, 1944, p. 434)

Murray and Berkun (1955) substantiated these ideas experimentally. After rats had learned to find food at the end of a black runway, they were given electric shocks while eating, resulting in avoidance of the goal box. Two additional runways were then set up parallel to the first. Openings connected the adjacent runways at varying distances from the goal box. The two new runways differed in color from the original one. The one immediately next to the original (black) runway was gray, the other white. This coloring represented a gradient of decreasing similarity from the original, conflict-inducing runway. When an animal was placed in the black runway, it would keep its distance from the goal; this avoidance decreased progressively as the animal escaped first to the gray and then to the white runway. Here, conflict is a function of two mutually exclusive dimensions: spatial distance from the conflict-inducing goal and degree of similarity of the runways.

Both dimensions can be utilized as orthogonal axes in a three-dimensional model of conflict in which the gradients no longer represent lines, but planes. Their intercepts become lines of intersection between the two-dimensional axes. In concrete terms, this means that an animal will reduce its distance to the goal if it is willing to accept greater dissimilarity from the original goal (and vice versa). Murray and Berkun were able to demonstrate this empirically. They also found that displacement can have a “therapeutic” effect – the avoidance gradient decreases over time and the animals increasingly approach both the more similar (gray) and the original (black) goal stimulus.

- The implication of these findings for psychotherapeutic applications is that the avoidance gradient must be lowered. This can be accomplished by measures altering the degree of similarity to the original cause of conflict. The patient then seems to be able to confront the conflict-inducing situation again. Simply telling a patient to confront the actual source of the conflict at the beginning of a course of therapy would shift the intercept of the two gradients closer to that source, but also raise it, which would increase the level of both conflicting tendencies, resulting in greater internal tension.

Conflicting tendencies in parachutists. Threatening but inevitable events that are set to occur at a fixed future date and thus loom ever nearer are prototypical for the conflict model. Examples of such situations are examinations, elective surgery, or childbirth. On the one hand, we dread these situations; on the other hand, we would like to have them over and done with. Fisch (1970) studied conflicting tendencies in the run-up to an exam as a function of temporal proximity and the degree of similarity between the situations portrayed in pictures and the upcoming event.

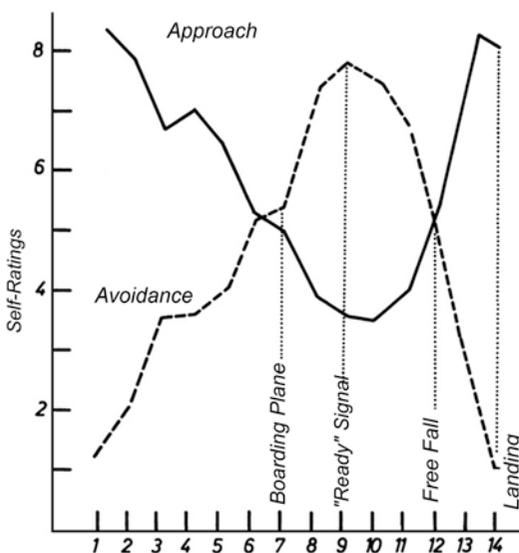
Epstein (1962) carried out a similar study with people about to do their first parachute jump. Participants were asked to rate their approach tendencies and then their avoidance tendencies at 14 points in the run-up to the jump.

Figure 4.15 presents the retrospective (mean) self-ratings of 28 novice jumpers at 14 sequential points in time: (1) last week, (2) last night, (3) this morning, (4) upon reaching the airfield, (5) during the training session before the jump, (6) getting strapped into the parachute, (7) boarding the plane, (8) during ascent, (9) at the ready signal, (10) stepping outside (onto the plane's undercarriage), (11) waiting to be tapped, (12) in free

fall, (13) after the chute opened, and (14) immediately after landing.

Of course, self-reports (especially retrospective ones) are questionable measures of approach and avoidance tendencies. It is quite likely that the parachutists were not able to discriminate between the two tendencies, but in fact experienced mixed feelings of confidence and apprehension. This is also reflected in the fact that the curves represent mirror images of each other. Nevertheless, it is worth noting that the avoidance tendency (apprehension) increases steadily but then begins to decrease shortly before the critical event of jumping (as if the parachutists gained confidence through the realization that they could no longer turn back).

In subsequent studies, Fenz (1975) measured autonomic indexes of activation during an entire parachute jump. He found that heart rate, respiration, and galvanic skin response increased steadily until the chute opened. This only applied to beginners, however. Experienced parachutists reached maximum levels at earlier stages in the jump sequence: boarding the plane (heart rate), at the ready signal (respiration), and in free fall (galvanic skin response). In their case, however, the levels of all three indexes remained below the 50% mark of total variation observed among novices. These differences are not solely a function of experience, i.e., the number of previous jumps. Distinguishing between good and bad jumpers reveals that the latter show a sequence of activation similar to beginners, even after many jumps. It would seem that their performance does not equip them to cope as well with the stress of the threatening situation. The relationship between anxiety and performance may (at least in part) be a vicious circle: because they remain anxious, they perform less well, and their poor performance in turn prolongs their anxiety.

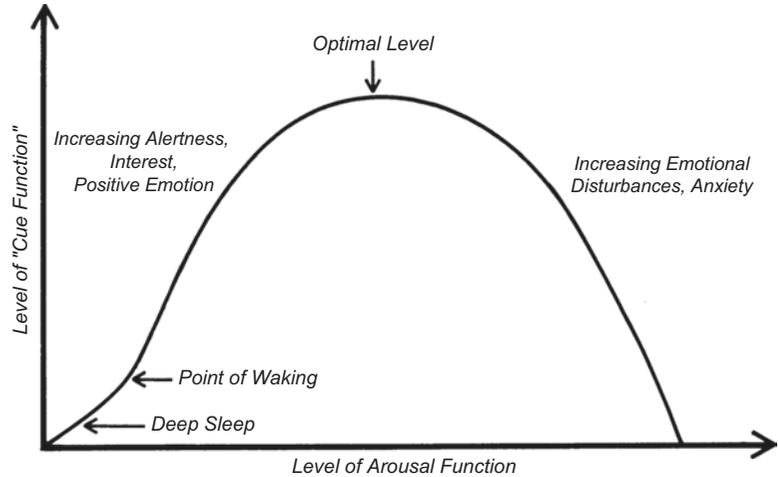


**Fig. 4.15** Self-ratings of approach and avoidance tendencies as a function of the sequence of events in the run-up to and during the first parachute jump (Based on Epstein, 1962, p. 179)

## 4.6 Activation Theories

Early in the twentieth century, attention had already been drawn (e.g., Duffy, 1934) to various autonomic activation phenomena and their measurement, particularly in connection with the description

**Fig. 4.16** Inverted U-function in the relationship between efficacy of behavior (cue function) and level of arousal (Based on Hebb, 1955, p. 250)



and interpretation of emotions. In the 1950s, it was postulated that the hypothetical construct of a general arousal level, based on the neurological ARAS function (Chap. 2), corresponded to the strength of a generalized drive and had the potential to replace Hull's D. The main proponents of this position were Hebb (1955) and Malmö (1959), as well as Bindra (1959) and Duffy (1957). Because arousal level can be measured in terms of numerous autonomic indexes, such as galvanic skin response, muscle tone, or electroencephalogram, it was thought to be a more direct indicator of drive strength than those previously used by drive theorists, who relied on deprivation procedures or measures of general activation. Lacey (1969) questioned the validity of general arousal, because the various measures are not highly correlated and produce profiles that reflect large individual differences (see Walschburger, 1994).

#### 4.6.1 The Construct of Arousal

Yerkes and Dodson (1908) had already found that intermediate levels of arousal (produced by an electric shock) were most conducive to maze learning in animals. The optimal arousal level for easy tasks was higher than that for difficult tasks.

Hebb (1955) interpreted this inverted U-function as an interaction between the arousal function and the cue function. On the one hand, the flow of information picked up by the senses is processed in terms of specific cues; on the other

hand, it makes a nonspecific contribution to the generalized arousal level. The cue function requires a certain level of activation of the brain regions involved to reach its optimal level. Figure 4.16 illustrates Hebb's conceptualization.

A number of questions remain open here. Can arousal level be equated with drive strength? Is there a difference between peripheral and central arousal (in the brain)? Might there even be a differential arousal in the brain? Modern research has provided numerous insights here (e.g., Haider, 1969). As we will see below, both differential arousal and generalized arousal seem to occur. First, however, we address the question of whether arousal can be equated with drive strength.

There are at least two points in which the equation of arousal level with drive strength (D) is difficult, if not impossible, to reconcile with the postulates of classical drive theory:

- First, the curvilinear relationship between arousal and performance does not tally with the postulate of a monotonic function between drive strength and measures of behavior (with the exception of Hull's exhaustion factor that results from prolonged food deprivation).
- Modern research, however, has called this curvilinear relationship between arousal and performance into question (Neiss, 1988; for a summary, see Beckmann & Rolstad, 1997). Dienstbier (1989) advocates a linear function, e.g., whereas Fazy and Hardy (1988) present a complex three-dimensional model in which

both a linear and a curvilinear relationship is possible as a function of the three dimensions.

- The second problem of equating arousal level with drive strength is that arousal level is known to be strongly affected by external stimulation, while the same is not assumed to apply to the classical drive concept (with the exception of aversive drives such as pain).

Investigators have identified relationships with a number of parameters of external stimulation. It is not just stimulus intensity that plays a role, but stimulus variation in time and space. Moreover, not only the physiological or physical aspects of the stimulus are involved but, more importantly, their psychological parameters – e.g., their information content, complexity, and deviation from the expected and familiar.

Effects of sensory deprivation and sensory flooding. At first, research attention focused on dramatic examples of phenomena at the extremes of a hypothesized continuum of stimulation, i.e., sensory deprivation, on the one hand, and situations that induced excitement, alarm, and fear, on the other hand. Best known among the sensory deprivation experiments is that of Bexton, Heron, and Scott (1954).

### Study

#### *Effects of Sensory Deprivation*

Bexton et al. (1954) hired students at a high rate of pay and placed them in sound-proof rooms. Participants wore translucent goggles eliminating all pattern vision and gloves and cardboard handcuffs to minimize tactile stimulation. Hallucinations and severe decrements in the participants' intellectual ability were soon observed. After just a few days, the participants terminated the experiment, despite the high pay, because they were no longer able to endure the deprivation condition. When given an opportunity to listen to stock market reports or excerpts from a telephone directory – information in which they would normally not be remotely interested – they now welcomed the prospect and kept asking for the material to be repeated.

The findings of Bexton et al. (1954) suggest that the organism requires a certain amount of external stimulation to maintain well-being and optimal functioning. As early as 1928, the results of experiments on “psychological satiation” carried out by Lewin’s student Anitra Karsten had pointed to similar conclusions. Karsten instructed students to repeat monotonous short tasks for as long as possible, e.g., drawing lines, drawing moon-shaped faces, and writing the same sentence over and over. After a while, participants tried to make the tasks more interesting by changing the order of execution. Finally, performance deteriorated into nonsensical subcomponents, accompanied by an increase in errors. Satiation and aversion to the task became increasingly difficult to overcome. When the participants were asked to perform a new task, performance immediately returned to its previous level.

The opposite of sensory deprivation is not sensory flooding in the everyday sense of the word, but stimulus input that creates “incongruities,” i.e., that can no longer be processed. Such conditions can produce severe emotional reactions, even panic and terror. Hebb (1946, 1949) demonstrated “paroxysms of terror” in chimpanzees who were shown a stuffed head or the lifeless body of an anesthetized fellow chimp or whose keeper suddenly wore his jacket inside out. Bühler, Hetzer, and Mabel (1928) observed similar severe fright reactions in infants when their mother or another familiar caretaker approached them speaking in a high falsetto voice. It is the sudden change in an otherwise similar and familiar object (Hebb calls it difference in sameness) that elicits severe panic arousal states.

Sensory deprivation and insurmountable incongruities in stimulus input represent the extremes of a broad continuum. Moderate incongruities seem to be experienced as pleasant and entertaining and to encourage exploratory behavior, curiosity, and manipulatory activities. It is these moderate incongruities within the familiar, the expected, and the already mastered that initiate and control behavior. The endless, apparently purposeless activities of the young child, especially at play, seem to be motivated by external stimulation of this kind (cf. Heckhausen, 1964; Klinger, 1971; see also Chap. 15). Approaches

based on activation theory now have greater currency than those derived from drive theory. Aside from Hebb (1955), the main proponents of the activation theory perspective are Fowler (1971), Walker (1973), and particularly Berlyne (1960, 1963a, b, 1971).

#### 4.6.2 Arousal Potential and Its Effects

Berlyne sought to describe the determinants of arousal level in terms of various properties of the stimulus, particularly its “collative variables.” This class of variables includes novelty and change, surprise, complexity, uncertainty, and conflict. The term “collative” refers to the fact that, in order to decide how novel, surprising, etc., a stimulus is, information from two or more sources has to be compared or collated. The collative variables are an important class of antecedent conditions for what Berlyne called arousal potential.

##### Definition

Arousal potential represents a hypothetical totality of all properties of a stimulus pattern. This totality is composed of collative variables, affective stimuli, intense external stimuli, and internal stimuli arising from need states.

Berlyne’s concept of arousal potential is covered in more detail in Chap. 2.

It is important to distinguish arousal potential from its effects – the arousal level, on the one hand, and positive or negative hedonic values resulting in approach or avoidance tendencies, on the other. Berlyne (1971, 1974) used the old Wundt curve – originally introduced by Wundt (1874) to describe the relationship between stimulus intensity and sensations of pleasantness and unpleasantness – to describe the effect of arousal potential. As shown in Fig. 4.17, once an “absolute threshold” has been crossed, positive hedonic value builds to a peak as arousal potential increases. Any subsequent increases in arousal potential lead to a decline in hedonic value and eventually to increasingly negative values.

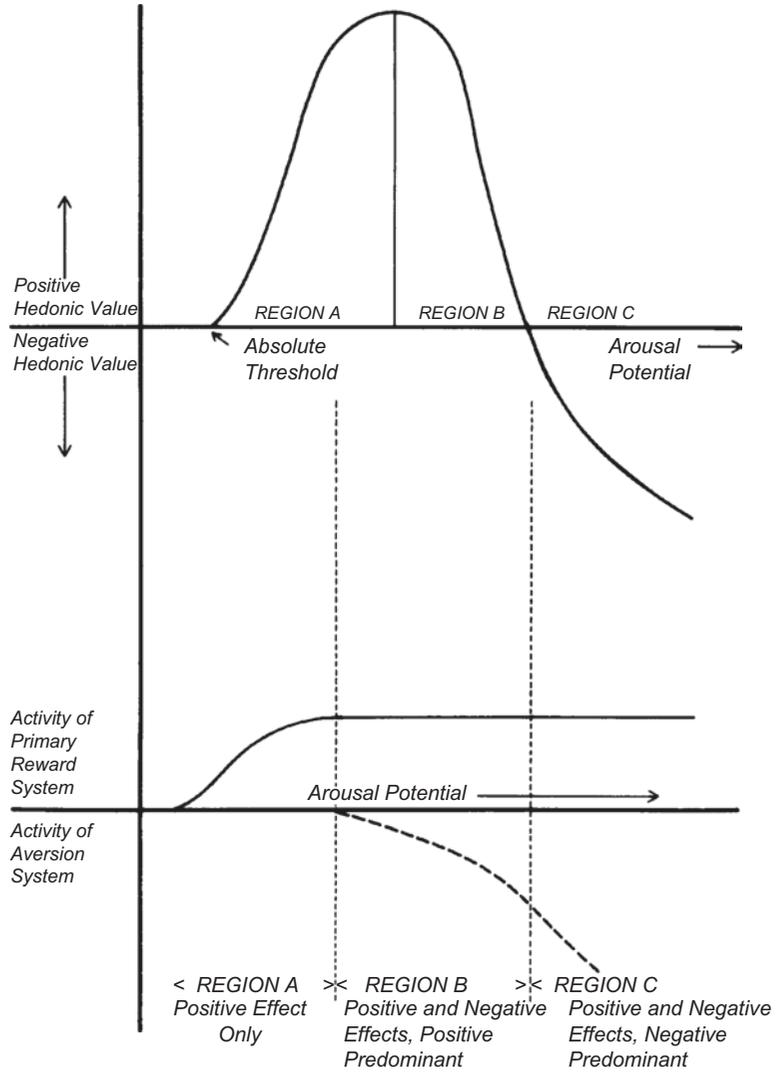
Berlyne’s model was inspired by Olds’ neurophysiological findings of positive and negative reinforcement centers in the brain (Olds & Olds, 1965). Berlyne suggested that the Wundt curve reflected the outcome of two opposing systems, a primary reward system and an aversion system. He interpreted it as a summation curve and split it into two partial curves corresponding to the two hypothesized systems (lower panel of Fig. 4.17). As shown in the figure, three successive regions of the arousal potential can then be identified, each having different effects on behavior. In region A, the arousal potential is low, producing only “positive effects,” i.e., pleasant, reinforcing stimulation, eliciting approach behavior. In the middle region (B), there is a mixture of positive and negative effects, the former being dominant. Finally, in the upper region (C), the effects of the arousal potential are predominantly negative.

- In contrast to Hebb (1955) or Fiske and Maddi (1961), Berlyne did not see arousal level as a monotonic, linear function of the arousal potential (or stimulus input), but rather as a U-shaped function. This implies that a low arousal potential can serve to increase the activation level, as well as a high one.

Berlyne (1960) further assumed that boredom and stimulus monotony are accompanied by an irritatingly high activation level. That brings us to the postulated reinforcement function of the activation level. Everything that serves to reduce the level of the activation is seen as reinforcing. In this respect, Berlyne’s approach is in line with Hull’s postulate of reinforcement through drive reduction. At the same time, however, it takes into account the U-shaped relationship between arousal potential and activation and holds that a low arousal potential will be raised, and a high potential lowered, toward an intermediate level that is experienced as pleasant and positively reinforcing (Berlyne, 1967). Both events result in a reduction in the activation level and, according to Berlyne, both elicit particular types of behavior:

- If the arousal potential is too high, it will prompt “specific exploration” in order to obtain further information from a specific

**Fig. 4.17** The Wundt curve (*above*), broken down into two hypothetical partial curves (*below*) representing the activity of the primary reward system and the aversion system as functions of arousal potential (Based on Berlyne, 1973, p. 19)



**Study**

*Complexity Preferences as a Function of Previous Stimulation*

Berlyne and Crozier (1971) asked participants to express their preference for a series of either highly complex or markedly simpler patterns. For one group, presentation of the stimulus patterns was always preceded by a 3.5-s period of near darkness. For the other group, presentation was preceded by exposure to highly complex, that is highly stimulating, patterns. Participants in the latter group sub-

sequently preferred patterns containing less information, while their counterparts in the former group, who had previously been exposed to near darkness, preferred the more complex, novel patterns. The stimulation of this group was evidently below the optimal activation level, resulting in a preference for stimulus input that enhanced activation (diverse exploration), while the optimal activation level of the other group had been exceeded, resulting in a preference for patterns that lowered activation (specific exploration).

source and thus relieve uncertainty. Berlyne calls this “perceptual curiosity.”

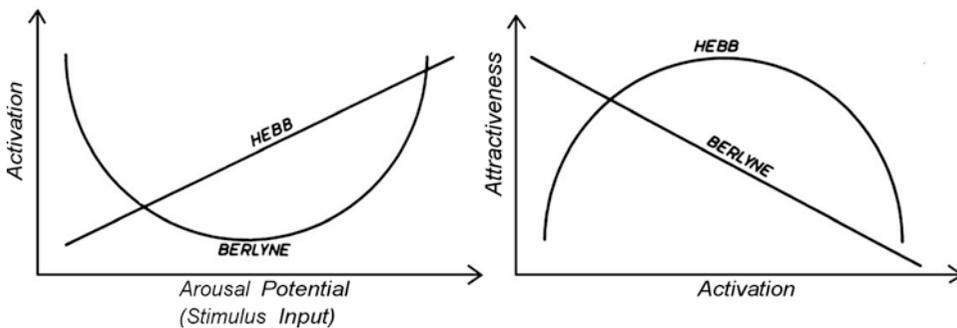
- If the arousal potential is too low, it will prompt “diverse exploration” in order to seek out stimulation, regardless of content or source (frequently motivated by boredom).

Berlyne (1971, 1974) compiled these and many other findings to develop a psychology of aesthetics. It states that observers can be pleasantly stimulated by a work of art because it can raise their activation in the direction of an optimal level. A work of art can also be experienced as unattractive, even repellant, however, if the observer finds it too novel or too complex. This negative reaction can be reversed if the observer becomes gradually familiar with the work of art, e.g., by hearing a piece of music again and again. If the work finally becomes so familiar that it no longer has any novelty or surprise value, it will lose its activating function, leaving the observer cold and uninterested.

In contrast to Berlyne, Hebb (1955), as well as Fiske and Maddi (1961), proposed that an intermediate activation level (which for them is the same as an intermediate arousal level) results in an optimum state. All changes in the direction of this intermediate level will be sought out by the organism and will have a positively reinforcing effect. The difference between Hebb’s and Berlyne’s postulates is elucidated in Fig. 4.18, which shows the relationships that the two authors hypothesized to exist between arousal potential (stimulus input) and activation, on the one hand, and between activation and attractiveness (i.e., preferred activa-

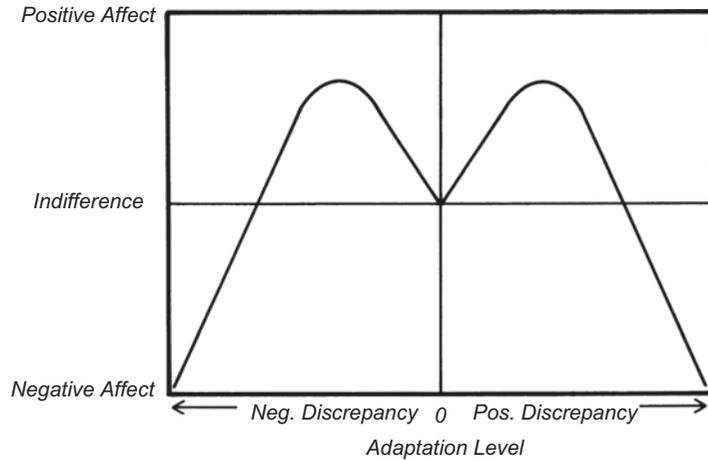
tion level), on the other. Their approaches differ primarily with respect to the area of low arousal potential. In general, the empirical data seem to support Berlyne’s position. Note that these theoretical notions about activation are closely related to discrepancy theories of motivation. McClelland based his theory of motivation on a discrepancy model (McClelland, Atkinson, Clark, & Lowell, 1953). Discrepancy theories state that relatively small deviations from a norm state are experienced as pleasurable and have motivating characteristics. This applies to deviations in either direction from the norm or adaptation level (Helson 1964, 1973; see the example below). Adaptation levels represent neutral points in the individual’s value system or frame of reference that serve as a basis for all perceptual experiences and judgments. They are constantly shifting in the direction of past experience.

- A much cited example for the affective outcomes of deviation from the adaptation level is a study by Haber (1958). Participants first immersed both hands in water at near-body temperature. After they had adapted to this temperature, i.e., come to experience it as neither pleasant nor unpleasant, but neutral, they placed their hands in another bucket containing water that was colder or warmer by varying degrees. Figure 4.19 shows the results. Small deviations produced a positive affect, whereas larger deviations resulted in an increasingly negative affect, producing what is known as the “butterfly curve.”



**Fig. 4.18** Contrasting postulates by Hebb and Berlyne concerning the relationships between arousal potential and activation and between activation and attractiveness (preferred activation level)

**Fig. 4.19** Hypothetical relations between stimulus condition deviating from the adaptation level and hedonic value



## 4.7 Cognitive Appraisal Theories

Situational stimulus events represent pieces of information that must be processed in order to arrive at a cognitive representation of a situation. This endows the situation with meaning, which in turn motivates and influences behavior. Hence, the cognitive interpretation of a situation affects behavior.

The crucial point here is that stimulus events do not determine behavior directly or indiscriminately, but that they are interpreted by the individual and transformed into a coherent picture of the immediate situation. It would also be wrong to assume that people proceed from a complete representation of the situation, as suggested by Lewin's motivational analysis of conflict situations. There are numerous theoretical models postulating that an appraisal of the situation involves cognitive and motivational processes; the most important of these will be outlined below. First, we will consider emotions, which Schneider and Dittrich (1990) consider to be the organizational core of motivation, both energizing behavior and giving it general direction. Emotions are not simply "internal stimuli." Rather they are the outcome of information processing in which cognitive events play a significant role. Schachter's two-factor theory of emotion and its modifications by Valins, as well as Lazarus' theory of appraisal of threatening situations, are examples of this approach.

### 4.7.1 Emotion as an Outcome of a Cognitive Appraisal

The psychology of emotion has recently begun to attract a great deal of attention – largely as a result of developments in neuropsychological research (LeDoux, 1996). Subsequent to the cognitive revolution in psychology in the 1960s, research was long dominated by approaches that saw emotions primarily in terms of their information content or simply as epiphenomena with no functional significance of their own. The earlier research traditions reported in this chapter, however, had also neglected the subject of emotions. One reason for this neglect was that the theoretical position that emotions might have occupied as an organism-related input of vital importance to behavior was already occupied by the concept of drive.

Emotions can be regarded as the organizational core of motivation or indeed as a rudimentary motivation system (Schneider & Dittrich, 1990) within which different emotions can select, energize, and direct behavior appropriate to the situations in which they arise. The appraisal of a situation, in terms of its potential benefits or threats, is central to Arnold's (1960) sequential model of emotions. This model states that it is the "intuitive" appraisal of a situation that elicits emotion and its physiological responses. Appraisal consists of an affective judgment that is experienced as a behavioral

approach or avoidance tendency. The concomitant physiological responses determine the emotions expressed. The final step in the sequence is an approach or avoidance response.

From today's perspective, Arnold's positions – and especially her notions about the relationship of emotions to processes within the central nervous system – are rather speculative.

### 4.7.2 Emotion-Triggering Situations

John Watson (1913), the founder of behaviorism, observed emotional reactions in neonates that were evidently innate rather than learned. These included reactions to strong stimuli, such as sudden noises and loss of physical support, both of which elicited fear. Restrictions of bodily movement elicited anger. Body contact, e.g., stroking of the skin, elicited affection (Watson, 1924; Watson & Morgan, 1917). These unconditioned "stimuli" can be replaced by a variety of previously neutral stimuli by means of classical conditioning (cf. Harris, 1979; Watson & Rayner, 1920) and thus trigger the emotional response formerly evoked by the unconditioned stimuli.

Watson and many others after him, however, were wrong in assuming that any arbitrarily chosen stimulus can be classically conditioned. Research has shown that not every stimulus is equally suitable for eliciting a particular emotion. "Appropriate" stimuli evidently possess a certain unconditioned prepotency that may be conducive – or resistant – to a particular conditioning process (Valentine, 1930).

#### Definition

The prepotency of certain stimuli to be paired with particular emotions is called "preparedness" (Schwartz, 1974; Seligman, 1971).

For example, it is easy to condition fear of snakes or spiders (see the following study), despite the fact that there is little opportunity for negative experiences with the two species in many parts of the world. Jones and Jones (1928)

#### Study

##### *Preparedness for Conditioning Fear*

Differences in the unconditioned preparedness of objects for conditioning fear were demonstrated by Öhman, Fredrikson, Hughdal, and Rimmö (1976). Participants in their study were administered a slight electric shock to the fingertip at the same time as they were shown a picture – either a phobic stimulus (snake or spider) or a neutral stimulus (flower or mushroom). A single presentation of the phobic stimuli proved sufficient to condition the fear response. Although it took longer to condition the fear response with the neutral stimuli, the response was also extinguished much sooner in this condition.

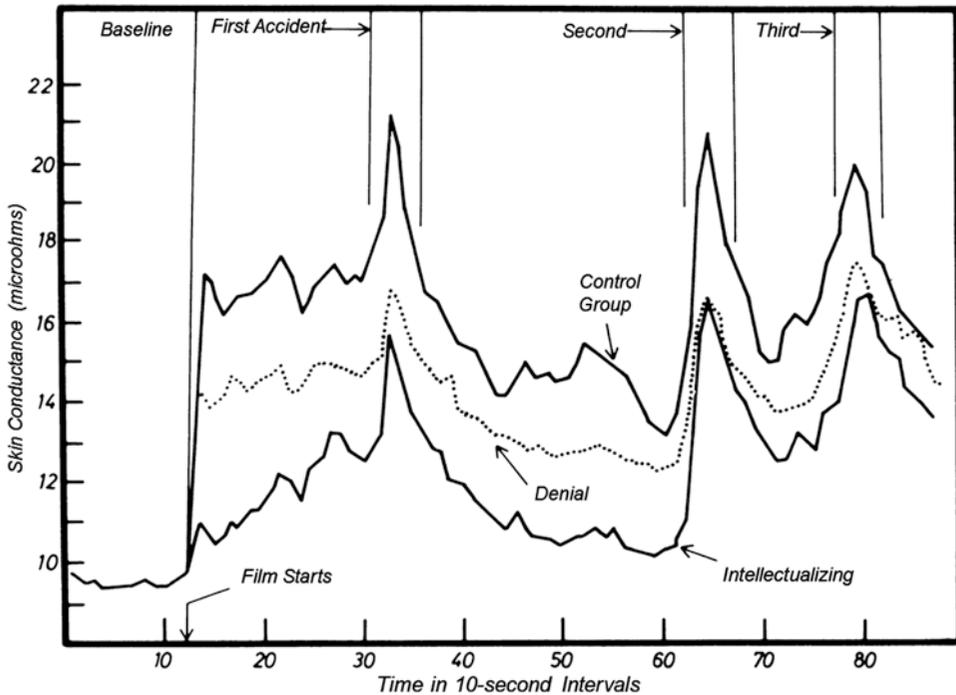
observed fear of snakes in 4-year-olds who had no cause for such fear, leading them to assume a biogenetic predisposition.

### 4.7.3 Appraisal of Threatening Situations

Magda Arnold's (1960) sequential model of emotions was the first to assign a central role to the appraisal of a given situation in terms of its potential benefits or threats. This general model of cognitive appraisal of situations was further elaborated and experimentally tested by Lazarus (1968).

#### 4.7.3.1 Lazarus' Approach to Stress and Coping

According to Lazarus' model, cognitive components relating to situational appraisal and to physiological activation do not simply coexist, they complement each other. Cognitive processes involved in the assessment of a situation can directly influence the physiological activation component, i.e., conditional on the successive intermediate outcomes of such appraisals, there can be a feedback effect on emotions and behavior. Lazarus' experiments focused on coping in threatening and stressful situations. They were



**Fig. 4.20** Effects of experimental conditions on skin conductance (baselines equalized by covariance adjustment). (After Lazarus, Opton, Nomikos & Rankin, 1965, p. 628)

based on a model that assumes two sequential stages of cognitive activity:

1. Primary appraisal of whether and to what extent the situation is threatening
2. Secondary appraisal of possible means of dealing with the threatening situation

Essentially, either of two strategies can be applied here: direct action, accompanied by the corresponding emotions, e.g., attack (anger), withdrawal (fear), and inactivity (depression), or reappraisal, resulting in a more favorable, less threatening view of the situation and thus reducing the fear-related emotional arousal level.

Lazarus induced stress in his participants by showing them films with threatening contents: an anthropological film about circumcision rites among Australian aborigines and an accident-prevention film showing close-ups of several accidents in a sawmill (e.g., someone losing his thumb while working with a circular saw). In a study with the latter film, Lazarus, Opton, Nomikos,

and Rankin (1965) presented participants with two types of cognitive reappraisal before showing them the film. Both reappraisal strategies were designed to make the film less threatening. One involved “denial” (it was only a make-believe film with actors); the other involved “intellectualizing” (viewing the film in a detached manner). Galvanic skin responses were recorded continuously during the viewing session to serve as a measure of emotional arousal level. Results are shown in Fig. 4.20. Compared with an uninstructed control group, those who were induced to reappraise the situation through denial and especially intellectualization showed a considerable decrease in the autonomic arousal state.

Such results are difficult to interpret within the framework of drive and learning theories. After all, the same fear arousing stimuli lead to different responses depending on the intervening cognitive appraisals of the situation (for theoretical implications, see Heckhausen, 1973).

Lazarus offered a behavioral explanation assuming a process of interaction between the

individual and the situation at hand. In fact, he developed a dynamic transactional model assuming a continuous process of reciprocal influences (Lazarus & Launier, 1979).

Lazarus distinguished three different outcomes of stress appraisal:

- Harm–loss (i.e., an already experienced impairment)
- Threat (i.e., potential and feared loss or injury)
- Challenge (i.e., anticipated opportunities for mastery or gain)

The amount of stress experienced depends on the extent to which an individual feels he or she

has been harmed, threatened, or challenged, as well as on the person–environment relations within the particular life sphere. There are two facets to the appraisal of these relations – what is at stake (primary appraisal) and the coping resources and options available (secondary appraisal).

Coping – i.e., dealing with conflicts or coming to terms with difficulties – has two main purposes:

1. Gaining control over or modifying the person–situation variables producing the stress (problem-oriented coping)
2. Gaining control over stress-related emotions (emotion-oriented coping)

### Study

#### *Appraisal of Everyday Stressful Events*

Folkman and Lazarus (1980) conducted a field study to examine everyday stressful events and the related coping patterns. The authors addressed two main questions. First, do coping responses to everyday stressful events reflect person-specific dispositions, meaning that they remain consistent across events, or are they situation-specific and inconsistent? Second, which of the following five factors influence individual coping responses: type of event (context), persons involved, appraisal of the event, age, and gender?

Over the course of a year, 100 men and women between the ages of 45 and 64 were surveyed on stressful events and how they had attempted to cope with them on repeated occasions. It emerged that stressful events almost always evoked both emotion-focused

and problem-focused coping responses. There was a greater tendency toward variability than toward consistency in the coping responses of the individual participants. In fact, it emerged that whether emotion or problem-focused coping mechanisms were used hinged primarily on the context (family, health, job) and on the appraisal of the event. The work context was conducive to attempts to solve the problem; the health context to emotional control. Contrary to commonly held sex stereotypes, there were no gender differences in the choice of emotion-focused coping mechanisms. However, men did report more problem-focused coping than women in work situations that could not be changed and had to be accepted.

A key finding of this study is that everyday approaches to coping with stress do not reflect person-specific dispositions, but situationally appropriate patterns of behavior.

## 4.7.4 Cognitive Dissonance

Few approaches within motivation theory generated as much research in the 1960s as did Festinger's (1957, 1964) theory of cognitive dissonance, with more than 1000 empirical studies being conducted (see Joule & Beauvois, 1998).

Recent work has focused primarily on attitudinal change and the establishment of a conflict-free self. Nevertheless, the roots of the theory can be found in the tradition of motivational psychology (Beckmann, 1984).

In formulating his theory of cognitive dissonance, Festinger (1957) was influenced by Lewin's field theory and Heider's cognitive balance theory.

- The basic assumption of the theory is that individuals strive for harmony, consistency, and congruence in their cognitive representation of themselves and their environment, insofar as this representation has immediate meaning, i.e., is relevant to the current situation. The theory deals with the relationships between various cognitive elements (knowledge, opinions, values, attitudes) and with the motivational effects mediated by striving for consistency in the face of two conflicting elements.

The first question to be asked is what is meant by “relationships” and “elements.” Relationships exist between two elements, i.e., within a pair of elements. The relationship is either irrelevant or relevant – the two elements are either related or they are not. It can be consonant – whereby one element logically follows from the other – or dissonant, whereby the opposite of one element logically follows from the other. The latter state generates a negative affect.

This negative affect, which is triggered solely by the experience of dissonance, and not by factors such as its unpleasant consequences, will motivate the individual to engage in dissonance reduction (Harmon-Jones, 2000). Like Lewin’s field theory and Heider’s cognitive balance theory, Festinger’s (1957) conceptualization of the motivational component represents a kind of homeostatic model. Whenever an imbalance is registered, the organism is motivated to restore equilibrium (homeostasis). This approach is also consistent with a theory of generalized drive, as proposed by Raup (1925) or Richter (1927). Of course, the criticisms directed at the latter approaches also apply to the present conception of a motivation to reduce dissonance. Beckmann (1984), in contrast, took a functional approach, assuming dissonance reduction to serve the purpose of ensuring that an action is performed effectively and without conflict. Seen from this perspective, processes of dissonance reduction facilitate action control. Harmon-Jones and Harmon-Jones (2002) have advocated a similar approach and provided empirical support for their arguments in a series of experiments.

There are three ways to reduce dissonance:

1. By changing one or more elements within dissonant relationships
2. By adding new elements that are consonant with the existing ones
3. By reducing the significance of the dissonant elements

#### Example

The various possibilities can be illustrated using the example of smokers who find themselves confronted with the information that smoking causes lung cancer. They can achieve reduction of the dissonance by (1) changing an element within the dissonant relationship – by quitting altogether; by reducing the number of cigarettes smoked per day and then seeing themselves as light smokers, to whom the link between smoking and lung cancer does not apply; or by reasoning that the information on lung cancer applies only to cigarettes and not to pipes, which is what they smoke. Alternatively, they can (2) add new elements to reduce the dissonance, by thinking about their many friends who smoke and who are in the best of health or by reasoning that there are many factors contributing to lung cancer that are beyond individual control. Finally, they can (3) increase the significance of smoking, e.g., by saying that it makes them feel better and increases their performance, or they can reduce the significance of lung cancer, e.g., by saying that it is or soon will be curable or by doubting the validity of the link between smoking and lung cancer. (Surveys have shown that this skepticism is more widespread among smokers than nonsmokers and particularly prevalent among heavy smokers.)

The strength of the motivation to reduce dissonance depends on the individual significance of the cognitions standing in dissonant

relation to one another and on the number of cognitions involved. People will be more motivated to restore consonance when faced with information that is contrary to their world view than when the cognitions are less relevant to their self-concept.

These postulates have been confirmed for a variety of spheres of action, partly through field studies in real-life settings but mostly through studies in artificial laboratory situations. Festinger (1957) assumed cognitive dissonance and its reduction to occur in five main spheres, each of which saw intense empirical investigation:

1. Postdecision conflicts
2. Forced compliance to do something one would not have undertaken on one's own initiative
3. Selection of information
4. Challenged convictions of social groups
5. Unexpected outcomes of actions and their consequences

#### 4.7.4.1 Postdecision Conflicts

The resolution of a conflict by means of a decision can often give rise to cognitive dissonance (Festinger 1964). Whenever one of two alternatives has been chosen, the positive aspects of the rejected alternative and the negative aspects of the chosen alternative will contribute to the dissonance of the decision. Conversely, the negative aspects of the rejected alternative and the positive

##### Example

Participants in this study were asked to rate household appliances in terms of their attractiveness. In return for their participation, they were allowed to select one of two of these appliances to keep. For one group, the choice was between two products rated to be equally attractive, e.g., a toaster and an electric coffee maker (high dissonance); for another, the choice was between an attractive product and a product rated to be much less attractive (low dissonance).

The participants were then asked to rate each product again. In general, these postdecision ratings indicated a marked increase in the attractiveness of the chosen product relative to the rejected product. The net change from the first to the second rating was more pronounced for the high-dissonance group that had to choose between equally attractive alternatives than for the low-dissonance group.

aspects of the chosen alternative will increase the consonance of the decision.

The findings reported by Brehm (1956) illustrate this point. Since Brehm's first study in 1956, there have been numerous empirical confirmations of dissonance reduction in postdecision conflicts. The pattern observed here, in which the balance between the chosen and the rejected alternative is tipped in favor of the former, is known as the divergence effect. Generally speaking, the more choices there are, and the less they differ in qualitative terms, the stronger the observed divergence effect will be. Dissonance reduction can also be achieved by retroactive changes in the relative weights of the criteria on which the decision was based. Penner, Fitch, and Weick (1966) asked study participants to rate the importance of eight character traits in a corporate vice president. They were then asked to choose between two candidates on the basis of personality profiles, each of which attributed four of the eight traits to each candidate. After making their choice, participants were again asked to rate the importance of the eight traits. The traits of the chosen candidate were retroactively assigned a higher value.

The opposite of a divergence effect has also been observed: a convergence effect or effect of regret in which the chosen alternative is assigned a lower value, and the rejected alternative a higher value (e.g., Walster, 1964). Festinger (1964) sees this self-induced increase in dissonance immediately after a decision as a protective response in people with a low tolerance for

dissonance. It represents an attempt to nullify the decision that has just been made.

A dynamic view suggests that the effect of regret may be a short-lived one occurring immediately after a decision has been made, prior to the onset of the divergence effect. Convergence effects seem to be complications that require individual differences to be taken into consideration; this is highly unusual in dissonance research (see Beckmann & Kuhl, 1984).

#### 4.7.4.2 Forced Compliance

The sphere of action that has seen the most investigation is that of forced compliance, a particular dissonance-inducing situation in which people are led to do things that do not seem entirely justifiable. Dissonance will occur only from actions entered into voluntarily and to which the individual has made a personal commitment (Brehm & Cohen, 1962).

To reduce the dissonance arising from such situations, the value of the action must be increased retroactively or its negative aspects trivialized. Compliance now appears to have been more reasonable and justifiable.

A number of research techniques have been developed to produce conditions of forced compliance and insufficient justification. In an early study, Festinger and Carlsmith (1959) presented participants with extremely boring tasks. These participants were then asked to tell other potential participants that the experiment was extremely interesting. In return, participants in one group received 20 dollars, while those in another group were given just 1 dollar. Subsequent ratings showed that participants who received less compensation rated the experiment as more interesting than those who had received high compensation. The greater dissonance of the latter group, which arose from consenting to deceive others for a paltry reward, was reduced in retrospect by falsifying the facts.

It soon emerged, however, that forced compliance does not always lead to dissonance reduction. Brehm and Cohen (1962) postulated two

#### Study

##### *Attitude Change in the Context of Bribery*

Frey and Irle (1972) studied the effects of freedom of choice (given vs. not given) and commitment (public vs. anonymous) by means of experimental variation. Participants were paid DM 1 or DM 8 to prepare a discussion paper arguing against lowering the voting age from 21 to 18. For some, the task was obligatory; for others, it was voluntary. Some participants had to present the paper publicly, identifying themselves as the author; others were allowed to present it anonymously. Prior to the experiment, all participants were in favor of lowering the voting age. Findings showed that a reduction in dissonance, i.e., a change of attitude in favor of not lowering the voting age, occurred only in the presence of freedom of choice and public commitment. The absence of both resulted in the “bribery” effect, with attitude change occurring only in the higher-pay condition. In the two other conditions, in which only one facet was present (freedom of choice or public commitment), neither dissonance reduction nor bribery effects were observed.

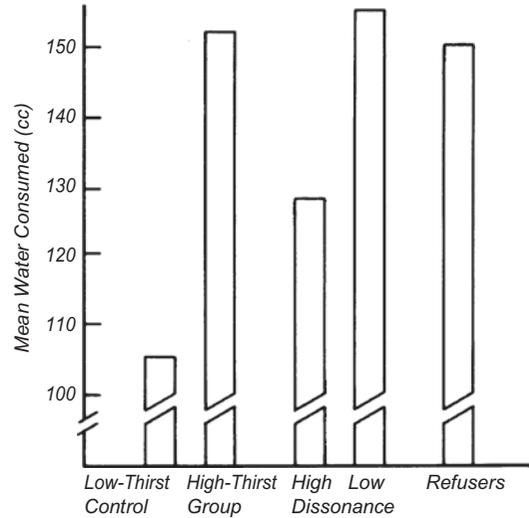
further conditions, in addition to the discrepancy and the importance of relevant cognitions, that are necessary for dissonance reduction.

- First, the individual must feel that he or she entered into the forced decision voluntarily.
- Second, a personal commitment to an action alternative is required.

The realization of having made a voluntary commitment to a course of action that is in contradiction with one’s own attitudes triggers cognitive dissonance. This dissonance may, in turn, lead to attitudinal change.

The motivational aspects of cognitive dissonance can even modify the effects of organismic needs. Mansson (1969) induced thirst in study participants by giving them crackers topped with a spread that made their mouths feel hot and dry. They were then invited to take part in a 24-h thirst experiment and offered either a high or a low reward for their participation. They were given a printed form on which they indicated their consent or refusal to participate in the experiment. Those who did not wish to participate constituted the “refuser” group. There were also two control groups: a high-thirst and a low-thirst control group. Members of these groups were not asked to participate in a thirst experiment. The low-thirst control group was given plain crackers, while the high-thirst control group was given crackers with the thirst-inducing spread. Prior to the expected thirst experiment, which did not in fact take place, data were collected from all groups on a variety of variables relating to the thirst experience. The predictions of dissonance theory were confirmed. Participants who had been prepared to subject themselves to a long period of fluid deprivation without sufficient justification (low reward) behaved as if they were experiencing little thirst, similarly to the low-thirst control group. Relative to the group given a strong justification (high reward) for participating in the experiment and to the high-thirst control group, these participants rated themselves to be less thirsty. They drank less water, perceived fewer thirst-related words in a recognition task, required more trials to learn thirst-related paired associates, and gave fewer thirst-related responses in the TAT stories they generated. Figure 4.21 shows the average amount of water consumed by members of the various groups prior to the expected onset of the 24-h period of deprivation. The amount of water drunk in the high-dissonance group differs significantly from that consumed in all other groups.

Dissonance reduction is thus capable of modifying the effects of organismic drive states, such as thirst and fear, on learning and behavior. These findings emphasize the considerable influence of intervening cognitive processes in otherwise identical conditions.



**Fig. 4.21** Mean amount of water consumed in the low-thirst and high-thirst control groups, the high- and low-dissonance groups, and the refuser group (Based on Mansson, 1969, p. 90)

#### 4.7.4.3 Selection of Information

Selection of information is a particularly effective way to reduce postdecision dissonance. The individual seeks out and gives preference to information that supports the chosen alternative and devalues the rejected one, while avoiding information that does the reverse. Ehrlich, Guttman, Schönbach, and Mills (1957) found that new car owners were more likely to read advertisements for the car they had just bought than for makes they had considered but did not buy.

Subsequent investigations showed that people were more likely to seek support for the chosen alternative than to avoid information casting doubt on their decision (cf. Wicklund & Brehm, 1976). A crucial factor here is the ease with which consonant and dissonant information can be refuted. People tend to prefer consonant information that is hard to refute and dissonant information that is easy to refute – and to avoid easily refutable consonant information and less easily refutable dissonant information. These, in any case, were the findings of a field study conducted by Lowin (1967) during the presidential election of 1964. Supporters of Lyndon Johnson and of Barry Goldwater received promotional materials containing excerpts from the cam-

paign literature of the rival candidates. Some of the arguments were easily refuted, others were hard to refute. The participants were told that they could order additional materials free of charge. It emerged that there were more requests for hard-to-refute than for easy-to-refute consonant messages. The reverse held for dissonant messages.

An interesting case arises when dissonant information may prove beneficial after a decision

has been made. If, for example, a student who has already signed up for a course run by a certain professor is given the opportunity to find out more about the examinations set by that professor, he or she will not avoid negative information. In this case, cognitive dissonance is not reduced, but accepted, because the negative information obtained may facilitate the goal of passing the exam (cf. Canon, 1964; Clarke & James, 1967; Freedman, 1965; Frey, 1981).

#### Example

Members of a small sect had gathered in a US town to await a cataclysmic flood that would occur on a certain day in December and would spell the end of the world. The faithful few would be whisked off to another planet in flying saucers. When this failed to occur, the dissonance between their expectations and reality could not be tolerated and had to be reduced. What could have been more logical than to abandon their beliefs about the end of the world and their personal salvation? However, only members of the sect who had been instructed to wait for the inevitable cataclysm on their own elsewhere responded in this way. Those members of the group who experienced the anticlimax together reduced the dissonance in the opposite way. They worked themselves up into a state of even greater fervor and missionary

zeal, continuing to inform others that the end of the world was nigh, even though the prophecy had gone unfulfilled. In this case, dissonance reduction was closely linked to social interaction between the members of the group.

Hardyck and Braden (1962) report another field study involving a small religious sect ("True World"), the members of which expected an atom bomb attack on a certain day. They hid in below-ground shelters for 42 days after the assumed catastrophe. When they realized that a bomb had not in fact been dropped, they reduced the dissonance not through increased missionary fervor, but by adding consonant cognitive elements to the dissonant relationship. Specifically, they became convinced that they had passed God's test and prevented the catastrophe from occurring by virtue of their faith.

#### 4.7.4.4 Challenged Convictions of Social Groups

Festinger, Riecken, and Schachter (1956) introduced this topic with a fascinating field study entitled *When Prophecy Fails* (see the example below).

#### 4.7.4.5 Unexpected Outcomes of Actions and Their Consequences

There are situational conditions leading to dissonance reduction that were not specified by Festinger (1957) in his original formulation of

dissonance theory, but derived from it later. One such category concerns the mismatch between high effort expenditure and disappointing outcomes. Another category concerns the consequences of an action in terms of the self-concept.

Mismatch between effort and outcome. Having tried hard, but in vain, seems to result in cognitive dissonance. To reduce that dissonance, attempts must be made to justify one's futile efforts retrospectively by increasing the value of the aspired goal (unless the expenditure of effort is trivialized or denied). Most impressive among the studies of this phenomenon are the animal experiments by

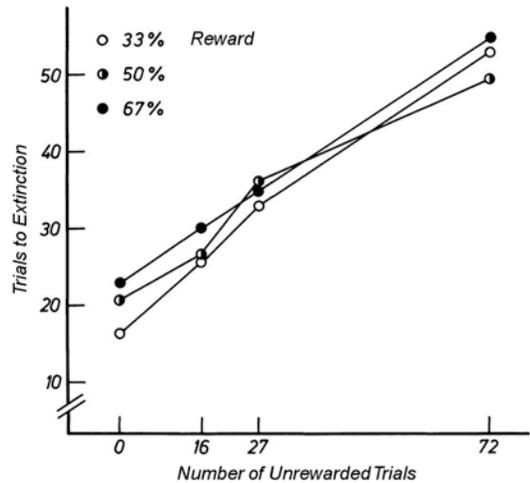
Lawrence and Festinger (1962) subtitled *The Psychology of Insufficient Reward*. The authors were able to demonstrate that cognitive dissonance and its reduction are not found only in humans, but can also be observed in infrahuman organisms, suggesting that dissonance theory also applies to nonverbal and noncommunicative behavior.

Hungry rats were trained to run a straight runway to obtain food under conditions that had previously been shown to inhibit learning and that the animals would avoid if easier or more reliable paths to the goal were made available. Three kinds of difficulty conditions were implemented in the acquisition phase: partial reinforcement, delayed reinforcement, and the requirement of greater effort expenditure (in this case, the rats had to run up an incline of a certain steepness). The dependent measure and indicator of dissonance reduction was resistance to extinction, i.e., the number of nonreinforced trials before the learned behavior was extinguished (in some cases, also its strength).

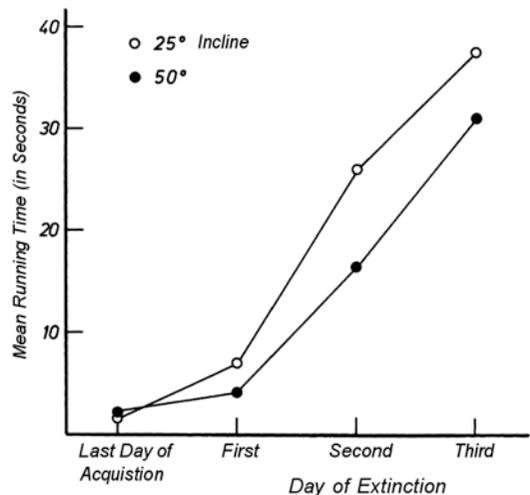
Lawrence and Festinger designed these experiments to test two implications of dissonance theory:

1. Every dissonance that results from nonreinforcement, delayed reinforcement, or reinforcement only after high effort expenditure will be reduced by attributing “extra attractions” to the goal, deriving from other motives like exploration or sensory stimulation.
2. Because dissonance is cumulative, it must be constantly reduced by a corresponding increase in the strength of these “extra attractions.”

Sixteen separate experiments supported both of these hypotheses. In the case of partial reinforcement, the absolute number and relative proportion of nonreinforced trials was varied independently. (Learning theory research generally specified only ratios of nonreinforced to reinforced trials.) Figure 4.22 shows that resistance to extinction after partial reward was not a function of the ratio of reinforced to nonreinforced trials, but increased sharply as a function of the number of nonreinforced trials. This finding supports the postulate that dissonance is cumulative and has to



**Fig. 4.22** Resistance to extinction as a function of the number of unrewarded trials in three conditions with different ratios of reinforced to nonreinforced trials (Based on Lawrence & Festinger, 1962, p. 91)



**Fig. 4.23** Mean running time (in seconds) in the extinction phase by effort condition in the acquisition phase (incline of 25° or 50°) (Based on data from Lawrence & Festinger, 1962, p. 143)

be constantly reduced by elevating the attractions of the goal. If the dominant drive (hunger) is high in the acquisition phase, however, resistance to extinction increases as a function of the number of nonreinforced trials in the acquisition phase. These results suggest that greater dissonance resulting from the nonoccurrence of the expected reward under conditions of high drive level also

leads to increased dissonance reduction in the form of attributing extra attractions to the goal. Findings about the relative expenditure of effort were also in line with these hypotheses. Rats that had to run up an incline of 50° ran faster (Fig. 4.23) during the extinction phase than rats faced with an incline of just 25°. Likewise, resistance to extinction was greater in the former group. These findings on effort proved to be independent of the reinforcement schedule.

Varying both the amount of effort required and the number of nonreinforcements independently resulted in a summation of the effects of the two conditions. These and other findings led Lawrence and Festinger to the following conclusion:

If an organism continues to engage in an activity while processing information that, considered alone, would lead it to discontinue the activity, it will develop some extra attraction for the activity or its consequences in order to give itself additional justification for continuing to engage in the behavior. (Lawrence & Festinger, 1962, p. 156)

Dissonance-inducing outcomes of an accomplished action. Behaving in a way that is inconsistent with one's expectations, i.e., in conflict with the self-concept, is likely to induce dissonance and to result in unambiguous effects of dissonance reduction.

The experimental paradigm for inducing dissonance with the self-concept was introduced by Aronson and Carlsmith (1962) and is also used in research on achievement motivation and cognitive attribution (Chaps. 6 and 14). In this paradigm, participants are set a task that has been designed to result in either success or failure, causing them to adopt either a high or a low self-estimation of their ability on that task. Later they receive feedback on their performance that contradicts their expectations either in a positive or negative direction. According to Aronson, both scenarios will result in cognitive dissonance and initiate attempts to reduce it. Dissonance reduction can be achieved in various ways, the relative effectiveness of which was investigated in a number of subsequent studies.

For example, Irle and Krolage (1973) found that self-esteem increased more in the case of

positive discrepancy from the test results than it decreased in the case of negative discrepancy from the results. (These findings are consistent with many others relating to self-serving biases in the attribution of success and failure; cf. Bradley, 1978; Fitch, 1970; Miller, 1976; see also Chap. 14.)

Individuals' ratings of their effort and of the validity of the test were higher in the case of positive discrepancy than they were in that of negative discrepancy. The further the unexpected outcome deviated from the participant's expectations, the less accurately it was remembered. Individuals became convinced that their test score was representative of the mean score expected for the reference group. Interindividual differences in the level of self-esteem also had an effect. This variable interacted with the direction of feedback discrepancy from expectations. The dissonance effects were strongest among participants with high self-esteem and a negative discrepancy from expectations and participants with low self-esteem and a positive discrepancy from expectations.

### Summary

Evidently, a remarkable number and variety of phenomena can serve to reduce cognitive dissonance. Most of these relate to changes in attitudes and beliefs when cognitive dissonance arises from postdecision conflicts, forced compliance in actions that one would not otherwise have undertaken, new information about previously chosen alternatives, challenged beliefs, or unexpected outcomes of actions and their consequences. Festinger (1964) postulated that information processing in the run-up to a decision is objective and impartial but that once a decision has been made, it is biased in favor of that choice. In so doing, he anticipated a volitional specification of dissonance theory and a postulate of the Rubicon model of action phases (Heckhausen, 1987).

The number and theoretical importance of cognitive dissonance studies focused more narrowly on motivational issues, however, has remained limited. Following the resurgence of volitional theory in recent years, dissonance research has again begun to attract increased interest (Beckmann, 1984; Harmon-Jones & Harmon-Jones, 2002).

Indeed, studies such as the animal experiments conducted by Lawrence and Festinger (1962) and Zimbardo's (1969) set of experiments on the cognitive control of drives (cf. Grinker, 1969; Mansson, 1969) have demonstrated the validity of dissonance theory beyond verbal and communicative behavior.

## 4.8 Cognitive Appraisal Theories and Motivational Psychology

All of the above models concerning the behavioral effects of cognitive appraisals of the situation have contributed to an understanding of motivational issues, even when they neglect individual differences. With respect to their possible role as motives, these theoretical models of cognitive appraisal have remained undeveloped and untested; they are motivational models without motives. This may be the reason why authors such as Festinger and Heider have remained ambivalent and doubtful about the contributions their theories can make to the study of motivation.

According to Festinger (1957):

Cognitive dissonance can be seen as an antecedent condition which leads to activity towards dissonance reduction just as hunger leads to activity oriented towards hunger reduction. It is a very different motivation from what psychologists are used to dealing with, but, as we shall see, nonetheless powerful. (Festinger, 1957, p. 3)

From today's perspective, we concur with Festinger to the extent that we see the motivation to reduce dissonance as a motivation that indeed differs from other motivations. Specifically, it is a motivation that serves the realization of actions; a motivation that mobilizes processes to facilitate the implementation of intentions. In other words, it is a volitional process. As mentioned above, the theory of cognitive dissonance can also be seen as a theory of volition. Indeed, Kelly (1962, p. 81) responded to Brehm's approach by pointing out that the aim of dissonance reduction was not to restore balance, but rather "to reconcile force and action."

Beckmann (1984) endorsed this approach. Festinger (1964) had postulated that, in the

predecisional phase, information processing was objective. Information distortion protecting a decision that has been made – that is, dissonance reduction – should occur only in the postdecisional phase. Beckmann (1984), in contrast, assumed that dissonance reduction – in its function as a volitional process that guarantees the achievement or maintenance of action control – may by all means occur before a decision is made if there is no other way of resolving a decisional conflict. This hypothesis was supported by an experimental study in which individuals who were actually house-hunting had to make their choice from a list of apartments that were equal in terms of attractiveness. Attractiveness ratings were taken twice: at the start of the decision process and shortly before participants were asked to announce their decision. During the decision process, a divergency effect occurred. Whereas the attractiveness rating of the apartment that was actually chosen later increased, the ratings of the later rejected alternatives decreased. This obviously helped the individuals to escape the paralyzing situation of the previously mentioned Buridan's ass, who starved between two equally attractive stacks of hay. The distorted information processing resolved the predecision conflict and helped the deciders to commit themselves to one alternative. However, individual differences occurred. Only individuals classified as action-oriented with Kuhl's (1994) action control scale showed the decision-promoting attractiveness distortion. Those individuals who were, according to their scale values, state-oriented – that is, individuals who tend to get lost in unproductive ruminations – remained objective and did not change their initial attractiveness ratings.

Heckhausen's (1987) Rubicon model of action phases (Chap. 11) links up with the volitional aspects of the theory of cognitive dissonance. In line with Festinger (1964), Heckhausen assumes that it is, on principle, functional for alternatives to be evaluated objectively and impartially before a decision is made. Once the Rubicon has been crossed, and a commitment to one alternative made, however, it becomes dysfunctional to dwell on the positive aspects of the alternatives that have been rejected. Such considerations might

demoralize the individual and undermine their resolve to pursue the chosen course of action. Consequently, after crossing the Rubicon, people tend to either forget about the alternatives they have rejected or to play them down. The Rubicon model, however, goes one step further than dissonance theory with respect to the functionality of information processing. The next logical step, once a decision has been made or an intention formed, is to put that intention into

### Study

#### *Dissonance Reduction or Action Control*

In the experiment conducted by Beckmann and Gollwitzer (1987), participants were provided with various pieces of information about two potential partners in a subsequent discussion. Some of the information was positive, some of it was negative. After the information had been presented, a cued-recall memory test was administered. In two conditions, participants were provided with the information before making their decision. In one of these conditions, the memory test was administered before the decision was made; in the other, afterward. In the third condition, participants made their decision on the basis of photos of the potential partners, and the additional information was only provided, and its recall tested, after the decision had been made. It was only in this final condition that participants recalled significantly more information about the person they had chosen than about the person they had rejected. In both other conditions, including the typical dissonance condition (information provided before the decision, test administered afterward) participants recalled approximately the same amount of information about both potential partners. Interestingly, participants in the third condition recalled more negative than positive attributes of the partner they had chosen, whereas those in the condition where the test was

administered before a decision was made recalled approximately equal numbers of positive and negative attributes. Do these findings disprove the assumptions of cognitive dissonance theory? Viewed from the perspective of volitional theory, the results are by all means in line with expectations. Specifically, participants' ratings of the relevance of the various pieces of information provided showed that information on negative personality attributes was considered much more important than information on positive attributes. When interacting with others, it can be important to know where sensitive points lie, and which topics to avoid to ensure that these do not have a detrimental effect on the conversation.

practice. Information relating to that action is of the essence here and needs to be taken into account, whether or not it is consonant with the decision that has been made. In fact, in some cases, it may be particularly useful or beneficial to consider information that challenges the choice made. Beckmann and Gollwitzer (1987) tested this assumption in the experiment presented below.

In other words, the strategy of reinforcing a decision that has already been made by focusing on its positive aspects and overlooking its negative ones can be reversed if negative information is more relevant to the realization of the action than is positive information. In the preactional phase, after a decision has been made, this approach is extremely functional.

### Summary

This chapter has dealt with the historical development of a number of quite heterogeneous perspectives on the situational determinants of behavior. The spectrum covers momentary need states and drive strengths, situationally induced conflicts and states of arousal, and emotions and cognitions as outcomes of situational appraisals. The only thing that all these determinants of internal or exter-

nal situations have in common is that they are intraindividually variable, meaning that they are not linked to interindividual differences in dispositions.

The situational approach is thus just as one-sided as the person-centered approach and does as little justice to the complexity of motivational processes. A whole series of experiments on the theoretical approaches covered in this chapter provide evidence for this point.

Nevertheless, most of the approaches presented in this chapter have undergone further development without any alteration in this basic perspective, i.e., without the inclusion of person variables. This applies particularly to neo-associationism in social psychology.

Overall, however, there has been a discernible convergence on the main problem in motivation, namely, how to explain the incentive value of goal states. In the process, it has become increasingly apparent that any clarification of the issue of motivation builds on two basic constructs – expectancy and incentive. We return to this issue in Chap. 5, paying particular attention to the development of Lewin's and Hull's approaches, as well as Tolman's approach, which was, from the outset, concerned with goal-oriented behavior involving the constructs of expectancy and incentive. Approaches from cognitive psychology and their further development have helped to clarify the conditions that determine the levels of anticipatory and incentive variables.

## Review Questions

### 1. *What is the principle of homeostasis?*

Organisms endeavor to maintain a state of equilibrium (homeostasis). Whenever an imbalance is registered, the organism is motivated to reestablish the initial state.

### 2. *How does Hull account for the strength of stimulus–response bonds ( $sH_R$ , habits)?*

According to Hull, the strength of a stimulus–response bond ( $sH_R$ ) is solely dependent on the frequency of reinforcement. The frequency or strength of learned responses is solely dependent on the existing drive strength.

### 3. *According to Hull's theory, what energizes behavior and what gives behavior its direction?*

Hull's theory states that it is generalized drive that energizes behavior and learned stimulus–response bonds, or habits, that give it direction.

### 4. *What is affective priming?*

In affective priming, the affective properties of the stimuli to which individ-

uals are exposed are activated extremely quickly, without their conscious awareness. This activation of affective connotations can influence their subsequent judgments and behavior.

### 5. *Which are Lewin's three basic categories of conflict situations?*

1. Approach–approach conflict
2. Avoidance–avoidance conflict
3. Approach–avoidance conflict

### 6. *Which six assumptions relating to conflict phenomena were formulated by Miller (1951, 1956)?*

1. The tendency to approach a goal becomes stronger, the nearer a person is to it (gradient of approach).
2. The tendency to approach a feared stimulus becomes stronger, the nearer a person is to it (gradient of avoidance).
3. The gradient of avoidance is steeper than the gradient of approach.
4. When two incompatible responses are in conflict, the stronger one will prevail.
5. The height of the approach and avoidance gradients is dependent on the strength of the underlying drive.

6. The strength of the response tendency being reinforced increases as a function of the number of reinforcements until learning plateaus out at a maximum level.

7. *What happens in cases of displacement?*

In cases of “displacement,” the original object is replaced perceptually by a more or less similar object that elicits less fear or anxiety. Displacement corresponds to a generalization of the response to the original object. The more the avoidance tendency outweighs the approach tendency, the less similar the displacement object will be to the original object.

8. *What are the postulates of Arnold’s sequential model of emotions?*

The appraisal of a situation, in terms of its potential benefits or threats, is central to Arnold’s (1960) sequential model of emotions. It is the “intuitive” appraisal of a situation that elicits emotion and its physiological responses. Appraisal consists of an affective judgment that is experienced as a behavioral approach or avoidance tendency. The concomitant physiological responses determine the emotions expressed. The final step in the sequence is an approach or avoidance response.

9. *According to Berlyne, what are the components constituting the arousal potential of a situation?*

1. Collative variables (novelty, uncertainty, conflict, complexity, surprise value)
2. Affective stimuli
3. Intense external stimuli
4. Internal stimuli arising from need states

10. *What do dissonance theory and the Rubicon model of action phases have in common; where do they differ?*

Both dissonance theory and the Rubicon model of action phases work on the assumption that information processing in the run-up to a decision is, on principle, objective and impartial, but that once a decision has been made, it is biased in favor of that choice. However, the Rubicon model further distinguishes between information that is relevant to the decision, and information that is relevant to its realization. Only the processing of the first type of information should be biased after a decision, so as to reinforce and stabilize that decision. Because the latter type of information is relevant to proper execution of the action, the Rubicon model states that it should be processed objectively, even if it contradicts the decision that has been made.

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