The Social Psychology of Decision Making

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Grounded in the work of economists, statisticians, and philosophers (see Edwards, 1954), the study of behavioral decisions has become an essentially interdisciplinary endeavor, with important contributions coming from cognitive, social, and organizational psychology. Despite its multidisciplinary character, however, the field of study known as human judgment and decision making has developed an independent identity, with its own problem definition, concepts, research tradition, and even its own dedicated journals. Readers interested in this literature can consult the excellent in-depth review by Slovic, Lichtenstein, and Fischhoff (1988), as well as other comprehensive reviews published in recent years (Abelson & Levi, 1985; Payne, Bettman, & Johnson, 1992; Stevenson, Busemeyer, & Nayler, 1990). No useful purpose would be served by providing another review of the same literature, nor would such a review be entirely suitable for a handbook of social psychology. Instead this chapter focuses on the contributions of social psychological theory and research to our understanding of human judgments and decisions. Although social psychology offers no unified approach to the study of decision making, nor a single body of research devoted specifically to this topic, many lines of research converge on the decision-making process. We will draw on this work to establish a framework for our discussion.

CONCEPTUAL PARADIGMS

The decision environment confronts the decision maker with a host of potential challenges. Most important, perhaps, is the problem structuring that occurs prior to making a decision: becoming aware of a problem that requires a decision, specifying possible courses of action, collecting information about the alternatives, identifying likely future events and other circumstances relevant to the decision, and considering the possible outcomes contingent on the chosen action and the prevailing circumstances (Albert, Aschenbrenner, & Schmalhofer, 1989; Slovic, Lichtenstein, & Fischhoff, 1988). After structuring the problem, the decision maker needs to estimate the probabilities of outcomes associated with the different alternatives, appraise the subjective values or utilities of the outcomes, integrate these judgments to choose a preferred course of action, and then implement the decision at an appropriate opportunity. Finally, decision makers can use feedback from implementation of the behavioral decision to reevaluate it for future reference. Depending on their degree of satisfaction with the results, they can restructure the problem, reassess the subjective probabilities and values of possible outcomes, and change their views about the preferred course of action.

Aspects of the decision environment have received varying degrees of attention in the human judgment and decision-making literature as well as in research conducted by social psychologists. Before turning to a more detailed discussion, however, it may be instructive to consider the general theoretical orientations or paradigms that have guided this work.

The Judgment and Decision-Making Paradigm

With its roots in economics and statistics, the starting point of much work on human judgment and decision making is a rational model of choice behavior. The decision maker is likened to an intuitive statistician who carefully considers the alternatives and makes full use of all available information in accordance with normative, statistical principles of probability and logic (Peterson & Beach, 1967). Perhaps the most important explanatory concept in the analysis of decisions under conditions of uncertainty is the subjective expected utility (SEU) of available alternatives (Edwards, 1955). In the case of simple bets that have only two possible outcomes, winning or losing, the SEU of a bet or gamble is a function of the subjective probability of winning or losing, and the corresponding subjective
values or utilities of these outcomes. In more complex decision situations, multidimensional alternatives are viewed as bundles of attributes, or states of the world, producing outcomes with subjective probabilities and utilities for the decision maker. More precisely, the subjective expected utility of a decision alternative A is defined as

$$SEU(A) = \sum_{i=1}^{n} SP_i U_i,$$

where $SP_i$ is the subjective probability that decision alternative A will produce outcome $i$, $U_i$ is the subjective utility of outcome $i$, and the sum is taken over the $n$ outcomes produced by alternative A. The decision situation is formulated such that the alternatives are mutually exclusive and that one and only one state (or bundle of states) of the world will obtain.

The SEU model assumes that a subjective expected utility is produced for each alternative and that decision makers choose the alternative with the highest SEU. It is well known, however, that people do not always make the same choices even under apparently identical conditions. This has led theorists to develop probabilistic choice models (e.g., Coombs, 1958; Luce, 1959; Thurstone, 1927) in which each decision alternative has a certain probability of being selected. In random choice models, this probability increases with the subjective expected utility of the alternative, whereas in constant choice models, the SEUs of the different alternatives vary across occasions, thus producing seemingly inconsistent decisions (see Slovic, Lichtenstein, & Fischhoff, 1988 for a discussion).

At least as used by psychologists, however, the SEU model is taken not as an accurate description of the way decisions are made, but rather as an ideal or normative model against which actual judgments and decisions can be compared. In fact, a great deal of research in the past 20 years has been designed to show that real-life decisions fall far short of the ideal. Due presumably to cognitive limitations of the human decision maker (Simon, 1956), subjective probability estimates are biased in numerous ways, deviating systematically from normative values (Kahneman, Slovic, & Tversky, 1982; Nisbett & Ross, 1980), and decisions often seem to follow rules that are incompatible with utility maximization (Coombs, 1975; Kahneman & Tversky, 1979; Tversky, 1969, 1972a). Some of the research that has led to these conclusions is considered in later sections. Yet, despite its known shortcomings, subjective expected utility theory continues to serve as a useful framework for basic and applied research on judgment and decision making. Even if inaccurate in detail, it has been found to provide an excellent approximation to account for many judgments and decisions (Coombs & Huang, 1976; Goodman, Saltzman, Edwards, & Krantz, 1979).

The Social Psychological Paradigm

Social psychology deals with decision making in the more general context of predicting and explaining human behavior. Although not always explicitly recognized, behavior always involves a choice, even if the alternative is taking no action and thus maintaining the present state (Ajzen & Fishbein, 1980; Davidson & Morrison, 1983; Jaccard, 1981). The decision to engage (or not to engage) in a behavior is usually conceptualized as a behavioral intention (Fishbein & Ajzen, 1975; Gollwitzer, 1993; Kuhl & Beckman, 1985; Triandis, 1977), the formulation of a conscious plan to perform some future action (see Eagly & Chaiken, 1993, chap. 4, for a discussion). Like choices between alternatives, behavioral decisions are considered to be probabilistic. The stronger the intention, the greater the likelihood that the person will engage (or at least try to engage) in the intended behavior.

The attitude construct is the central social psychological concept used to explain behavioral intentions and actual behavior (Allport, 1935, 1968). Although formal definitions vary, most social psychologists today agree that attitude is the tendency to respond to an object with some degree of favorableness or unfavorableness (Eagly & Chaiken, 1993). It is the evaluative reaction to the attitude object that is considered to be the core of a person’s attitude. Consistent with the cognitive tenor of most current theorizing in social psychology, this evaluative reaction is generally thought to be based on the person’s expectations or beliefs concerning the attitude object. Similar to utility maximization theory in work on judgment and decision making, the most widely accepted theory of attitude formation describes the relation between beliefs about an object and attitude toward the object in terms of an expectancy-value (EV) model (see Feather, 1982).

One of the first and most complete statements of the EV model can be found in Fishbein’s (1963, 1967a) summation theory of attitude, although somewhat narrower versions were proposed earlier by Peak (1955), Carlson (1956), and Rosenberg (1956). In Fishbein’s theory, people’s evaluations of, or attitudes toward, an object are determined by their salient beliefs about the object, where a belief is defined as the subjective probability that the object has a certain attribute (Fishbein & Ajzen, 1975). The terms object and attribute are used in the generic sense and refer to any discriminable aspect of an individual’s world. When the object of the attitude is a behavior, the attributes for the most part are the consequences resulting from performing the behavior.

In the context of behavioral decisions, therefore, each belief associates the behavior with a certain outcome. According to the expectancy-value model, a person’s overall attitude toward the behavior is determined by the subjective values or evaluations of the outcomes associated with the behavior and by the strength of these associations. Attitudes toward a behavior are acquired inevitably as we form beliefs about the consequences of the behavior, and as the subjective values of these consequences become linked to the behavior (Fishbein, 1967a). Specifically, the evaluation of each outcome contributes to the attitude in direct proportion to the person’s subjective probability that the behavior will lead to the outcome in question. The basic structure of the model is essentially the same as the subjective expected utility model (Ajzen & Fishbein, 1970; Feather, 1959):

$$A_n = \sum_{i=1}^{n} b_i e_i$$
where $A_e$ is the attitude toward behavior $B$, $b_i$ is the strength of the belief (the subjective probability) that the behavior will lead to outcome $i$, $e_i$ is the evaluation of outcome $i$, and $n$ is the number of outcomes (see Fishbein & Ajzen, 1975). People can form many different beliefs about an object, but it is assumed that they can attend to only a relatively small number at any given moment. It is these salient beliefs that are considered to be the prevailing determinants of a person’s attitude. Some correlational evidence is available to support the importance of belief salience in the formation of attitudes. The probability associated with a given belief (i.e., its strength) correlates with the frequency with which the belief is emitted in a sample of respondents (i.e., with its salience; Fishbein, 1963) as well as with order of belief emission (Kaplan & Fishbein, 1969); and salient beliefs tend to correlate more highly with an independent measure of attitude than do nonsalient beliefs (Ajzen, Petkova, & Driver, 1993; van der Pligt & Eiser, 1984).

**SEU versus EV Model**

Despite its apparent similarity to the SEU model, the EV model of attitude differs substantially from the utility maximization model in a number of important ways. One fundamental difference is that the attitude model makes no assumptions about rationality. Instead, it relies on the much weaker requirement of internal consistency. Attitudes are assumed to follow reasonably from beliefs about the attitude object, as described by the expectancy-value model. The more positive the beliefs, and the more strongly they are held, the more favorable should be the attitude. In a similar manner, intentions and behavior are expected to be consistent with the attitude. The source of the beliefs, and their verticality, are immaterial in this model. Whether true or false, biased or unbiased, beliefs represent the subjectively held information on which attitudes are based. Social psychology stipulated from the outset that people may hold beliefs about many objects and issues that are derived not from a logical process of reasoning but instead are biased by emotions or desires and may serve a variety of personal needs. This view can be seen in work on such topics as prejudice and stereotypes (Allport, 1954), cognitive dissonance theory (Festinger, 1957), self-serving attributions and judgments (Kunda, 1988; Miller & Ross, 1975), and social judgment theory in persuasion (Hovland & Sherif, 1952; Sherif & Hovland, 1961).

Structurally, the EV model has a superficial resemblance to the subjective expected utility model, but closer examination again reveals important differences. Perhaps most important is the definition of outcomes and their subjective probabilities. In the SEU model, the outcomes of a given behavior are defined by the events and circumstances (states of the world) at the time of behavioral performance. The situation is structured such that one and only one state or combination of states must occur. In combination, the person’s choice and the existing circumstances determine the outcome of the behavior. Imagine, for example, that a person’s recreational alternatives on a given day are hiking or watching a movie on television, and that the relevant states of the world are sunshine versus rain and presence versus absence of company. Each decision (hiking or watching TV) can produce one of four outcomes, depending on the four possible combinations of circumstances. Thus, hiking can involve a pleasant walk through the woods with friends (if the sun is shining and the person has company), a pleasant but lonely walk (if the sun is shining and no company is available), a wet but sociable experience (if it rains and there are friends), and a wet and lonely experience (if it rains and the person is alone). Each of these four possibilities is considered one outcome, and because they are mutually exclusive and exhaustive, their probabilities add to one. Similarly, four subjective utilities are associated with the four possible outcomes. The decision maker is assumed to evaluate the utility of a pleasant walk with friends, of a pleasant walk alone, and so on.

Expectancy-value models of attitude construct the decision situation in a different fashion. A belief is associated with each salient state of the world, and subjective probabilities and values are assigned to each. Treated in this manner, the different outcomes are not mutually exclusive, nor do their probabilities sum to one. In the previous example, hiking would elicit only two salient beliefs: the belief that if I go hiking it will rain, and the belief that if I go hiking I will have company. Because a person can assign high or low probabilities to rain as well as to having company, the subjective probabilities of these two events need not add to one. The evaluations that are entered into the EV model also refer only to the two possible experiences. A person would be expected to evaluate the experience of hiking in the rain and the experience of hiking with company, independent of each other. The subjective probabilities are then multiplied with the corresponding evaluations, and the products are summed across the two salient beliefs.

It can be seen that many fewer cognitive operations are assumed by the EV model than by the SEU model. According to the expectancy-value model, a person who associates $n$ salient outcomes with performance of a given behavior has to assess $n$ probabilities and values. In the SEU model, if the states of the world are defined in a binary fashion (rain vs. sunshine, alone vs. with friends), the person must judge $2^n$ probabilities and utilities. The greater simplicity of the EV model comes, however, at a price. Whereas in the SEU model, the sum of the products is the mean (i.e., expected) utility of a behavior’s outcomes, in the expectancy-value model, the sum has no precise quantitative meaning. Instead it represents a measure of the degree of positive or negative evaluation associated with a behavior. We can predict that the more positive this evaluation or attitude, the stronger should be the intention to engage in the behavior, but the absolute numerical value of the summation term is largely arbitrary.

**A Conceptual Framework**

The expectancy-value model and its behavioral implications are used to organize the remainder of this chapter. In the context of the EV model, information embodied in salient beliefs about behavioral alternatives is basic to an understanding of human decision making. Salient beliefs,
together with the evaluative implications they carry, are considered to be responsible for people's preferences, which, in turn, determine their behavioral decisions. We thus begin with a discussion of research on the nature of human judgments, dealing with factors that influence the beliefs a person comes to hold. The extent to which people systematically process information to arrive at their judgments is considered, as is evidence for systematic biases and errors of a cognitive and of a motivational nature. We then examine a number of models that attempt to predict and explain preferences among alternatives, including prospect theory, different regression models, and the expectation-value model. These discussions are followed by a review of research dealing with the relation between attitudes or preferences and actual decisions and actions. The role of volition is also considered in this context. The chapter concludes with a brief review of decision making in small groups of interacting individuals.

JUDGMENTS: THE NATURE AND FUNCTION OF BELIEFS

Because beliefs represent the subjective foundation of knowledge on which decisions are based, it is important to understand their nature and functions. Like investigators in the area of judgment and decision making, social psychologists have invested a great deal of effort trying to understand the processes involved in belief formation and change. Much of this work is known collectively as social cognition (see Fiske & Taylor, 1991), although information relevant to the question of belief change can also be found in research on persuasive communication (Hovland, Janis, & Kelley, 1953; McGuire, 1969; Petty & Cacioppo, 1986). It is beyond the scope of this chapter to attempt a thorough review of this extensive literature. Instead, we consider a few issues most relevant to decision making and highlight some of the major conclusions that have emerged from research on the nature and function of beliefs.

A central development in social psychological theories of belief formation and change is the recognition that not all judgments receive the same degree of scrutiny. On one extreme is the controlled, highly reasoned, central processing mode where available information is systematically reviewed, analyzed, and integrated prior to any judgment or decision. On the other extreme is the automatic, intuitive, or peripheral mode where judgments may rely on relatively superficial situational cues, on category membership, or on simple cognitive heuristics. It is usually assumed that the heuristic or peripheral mode, requiring less time and effort, is the preferred or default mode, and that the central mode is invoked only when needed. This assumption is captured in the terms lazy organism (McGuire, 1969) and cognitive miser (Taylor, 1981; see also Fiske & Neuberg, 1990). Although systematic and heuristic modes of processing can be invoked simultaneously, one mode will tend to predominate, depending on the person's motivation and ability to scrutinize evidence and process available information. High motivation and ability predispose systematic processing, whereas low motivation or ability tend to produce reliance on peripheral cues or cognitive heuristics (Chaiken, 1980, 1987; Chaiken, Liberman, & Eagly, 1989; Fazio, 1990; Fiske & Neuberg, 1990; Petty & Cacioppo, 1986).

Systematic Information Processing

People undoubtedly can and do make systematic use of information to form their judgments and opinions. Conclusions often follow quite logically from relevant premises (McGuire, 1960; Wyer, 1970); impressions people form of each other are influenced predictably by the information they have about the other person (e.g., Anderson, 1965; Asch, 1946; Schneider, Hastorf, & Ellsworth, 1979); and the information contained in persuasive communications usually serves to change opinions in the advocated direction (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975; Hovland, Janis, & Kelley, 1953).

Consistent with the dual-mode processing models, information retrieval and analysis tends to increase with motivation and ability to engage in systematic deliberations. Illustrations of this effect can be found in research on persuasive communication. For example, work on the elaboration likelihood model (Petty & Cacioppo, 1986) often uses a thought listing task to elicit cognitive responses to the message. The number of thoughts listed immediately after exposure to a communication is taken as a measure of message elaboration—of cognitive activity during exposure (Petty, Ostrom, & Brock, 1981). Personal relevance of the message and distraction are typically used to manipulate, respectively, motivation and ability to process. Using these procedures, it has been found consistently that the number of cognitive responses increases with personal relevance (e.g., Leippe & Elkin, 1987; Petty & Cacioppo, 1979a, 1979b) and decreases with degree of distraction (e.g., Osterhouse & Brock, 1970; Petty, Wells, & Brock, 1976). In addition, it has also been reported that temporary moods can influence extent of processing, with positive mood states resulting in less processing than negative mood states (Mackie & Worth, 1991; Schwarz, Bless, & Bohner, 1991).

Whereas, high motivation and a relatively low cognitive load are conducive to systematic information processing, the more interesting question for present purposes is how effective people are in their utilization of information. Initial work on human judgment and decision making was quite optimistic in this regard. Research concerning intuitive judgments suggested that normative models of statistics and probability provide a good first approximation for a psychological theory of inference (see Peterson & Beach, 1967). The human judge seemed to make systematic use of available information in a manner that was quite consistent with the formal models. For example, when revising hypotheses in light of new information, people were found to follow the logic of Bayes's theorem, albeit somewhat conservatively (Edwards, Lindman, & Phillips, 1965). They tended to use new information appropriately, but not to the extent justified by the normative model. Paradoxically, when expressing confidence in their probability estimates, people were often found to be overconfident. Although confidence in
a judgment was found to increase, as it should, with the judgment’s accuracy; the observed confidence tended to be greater than was warranted (see Lichtenstein, Fischhoff, & Phillips, 1982). Related to overconfidence in judgments, people were observed to overestimate the reliability of data from small samples (Tversky & Kahneman, 1971) and to be unaware that their retroactive estimates of an event’s probability, after it has already occurred, is influenced by their knowledge of the outcome (Fischhoff, 1975). These systematic deviations from normative expectations notwithstanding, human judgments appeared, by and large, to be consistent with formal models.

Cognitive Heuristics and Biases

Early views of human beings as intuitive statisticians were soon challenged by theorists who focused on the limited cognitive capabilities of the decision maker. Sharply critical of the model of humans as rational maximizers of expected utility, Simon (1955, 1956) proposed that actual decision behavior can better be described as a process of bounded rationality. The strategy of a person who operates under bounded rationality is to reach a satisfactory level of achievement, not necessarily the best possible level. Instead of making a priori assumptions about people’s information-processing strategies, Simon proposed to study these processes empirically, focusing on the perceptual, cognitive, and learning aspects of judgment and decision making.

Bounded rationality, it must be noted, is not equivalent to heuristic information processing. People operating under bounded rationality may systematically analyze available information, limited only by their cognitive capabilities and time constraints. Or, if their goals can be satisfied by a lower level of performance, they may forgo systematic processing and rely instead on simple cognitive heuristics or situational cues. Thus, both processing modes—systematic and heuristic—are subject to bounded rationality.

A great deal of empirical research in the past 20 years has focused on the cognitive limitations of human judgment, and on the biases and errors that such limitations can produce. The principle of utility maximization and statistical models of probability are not seen as ideals that prescribe how judgments and decisions should be made, and it is recognized that these models can often predict actual decisions quite well. However, it is generally agreed that they provide only limited information about the actual processes that underlie judgments and decisions. In one of the first comprehensive reviews of the judgment literature, Slovic and Lichtenstein (1971) concluded that although people try to make systematic use of information, they have a difficult time doing so effectively. To reduce cognitive effort, they resort to simplified strategies that often lead them to neglect or misuse relevant information.

This theme was taken up by Kahneman and Tversky (1973; Tversky & Kahneman, 1974) whose work has had a profound influence on the study of judgment and decision making. Examining the factors that influence subjective probability estimates, Kahneman and Tversky concluded that human information processing is guided not by Bayes’s theorem or by any other statistical calculus but rather by a variety of simple intuitive heuristics or rules of thumb. Adaptive under most circumstances, these heuristics often lead to judgments that are quite similar to the probabilities that would be derived from formal models. However, they can also produce systematic biases and errors.

Accessibility

One way to estimate an event’s probability is to judge its relative frequency. However, when the relative frequency is not immediately available, people must search their memories for relevant instances. The ease with which such instances come to mind—their accessibility in memory—will tend to influence the probability estimates (Tversky & Kahneman, 1973). Easy to apply, this heuristic has a certain degree of validity because frequent events are likely to be more readily accessible in memory. However, probability judgments that rely on the accessibility heuristic can easily be biased by any factor that increases the event’s ease of retrieval, even if that factor is unrelated to the event’s actual frequency of occurrence.

Events that come to mind easily because they have been encountered recently or frequently are said to be primed (see Higgins, Chapter 5, this volume). Frequent exposure to media reports of natural and man-made disasters, for example, can prime the accessibility of such events. Thus, the frequencies of well-publicized causes of death from accidents, homicides, and natural disasters tend to be underestimated; whereas the frequencies of death from less publicized causes (strokes, diabetes, etc.) tend to be underestimated (Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978).

Recent priming of such concepts as hostility or cooperation can influence interpretation of ambiguous behavior in line with the meaning of the prime (e.g., Bargh & Pietromonaco, 1982; Higgins, Rholes, & Jones, 1977). Similarly, racial and gender categories can be primed, producing judgments and decisions that tend to be consistent with the person’s racial and sexual stereotypes (Gaertner & McLaughlin, 1983; Trenibinski & Richards, 1986).

In contrast to the consistent effects of priming manipulations, research has not been very successful in trying to identify inherent stimulus characteristics that enhance accessibility. One property of a stimulus that should make it readily accessible in memory is its salience, the degree to which it is unique or different, thus attracting attention. Salient stimuli tend to be viewed as causal agents (Fiske, Kenny, & Taylor, 1982; Taylor & Fiske, 1978) and to draw more extreme evaluative reactions (Fiske & Taylor, 1991), but the expectation that salience will enhance memory has not been confirmed. Salient stimuli are sometimes recalled better than nonsalient stimuli, and sometimes the reverse is true (see McArthur, 1981). Another factor initially postulated to enhance accessibility in memory is the vividness of an event (Nisbett & Ross, 1980; Tversky & Kahneman, 1973). As a general rule, visual information and case-specific information are thought to be more vivid, and should be recalled better, than verbal information, especially of a statistical nature. Empirical research, however, has failed to confirm the predicted effects of
vividness on accessibility of information in memory (see Taylor & Thompson, 1982).

Perceived salience or accessibility has been invoked as a possible explanation of the false consensus effect, the tendency to view one’s own judgments, opinions, and behaviors as typical (Ross, Greene, & House, 1977; see Marks & Miller, 1988, for a review). One’s own opinion or behavior, being readily accessible, may be used as a point of reference that biases judgments to produce a false sense of concordance (but see Marks & Miller, 1988, for a discussion of other possible explanations).

**Perceived Relevance**

Judgments are likely to take account of information only to the extent that the information is perceived to be relevant to the judgment in question. Several apparent biases and errors can be traced to this simple principle. Perhaps the most intensely studied judgmental bias, known as the base-rate fallacy, is the tendency to neglect base rates in favor of individuating information (Kahneman & Tversky, 1973). Participants in Kahneman and Tversky’s study read personality descriptions of different individuals sampled at random from a group of 70 engineers and 30 lawyers, or from a group of 30 engineers and 70 lawyers. A given individual’s judged likelihood of being an engineer (or a lawyer) was found to be strongly affected by the personality description, but in violation of statistical principles, the sample base rates had no significant effects on these judgments. Kahneman and Tversky postulated the operation of a representativeness heuristic to explain the neglect of base rates in human judgment. People are said to judge the likelihood of a given event by its perceived similarity to the population from which it was sampled (i.e., by its representativeness). Because base rates are not represented in any given instance, they tend to be neglected.

In a large number of subsequent experiments, investigators have explored the base-rate fallacy, and the conditions under which base rates are, or are not, taken into account (e.g., Ginosar & Trope, 1987; Hamill, Wilson, & Nisbett, 1980; Lyon & Slovic, 1976; Nisbett & Borgida, 1977). The most generally applicable explanation attributes use or nonuse of base rates to the perceived relevance of the base-rate information (Bar-Hillel, 1980). In some instances, the experimental procedure may enhance or reduce the apparent relevance of base-rate information. For example, in the Kahneman and Tversky (1973) study, base rates were presented between subjects, such that any given participant was exposed to only one base rate, while individuating information was presented within subjects, such that each participant read all the different personality descriptions. This procedure makes readily apparent the importance of the personality descriptions, but it deemphasizes the relevance of the base rate. In an analogous fashion, manipulation of base rates in a within-subjects design increases their utilization (Fischhoff, Slovic, & Lichtenstein, 1979).

**Perceived Causality**

When the situation is structured such that the relevance of base-rate information becomes readily apparent, people use it more appropriately. An important case in point is the perception of causality. Base rates can be quite arbitrary, having no causal significance in relation to the phenomenon of interest, as in the Kahneman and Tversky study. In some situations, however, they imply a property that does have a causal impact on the judged event. For example, when judging the likelihood that a given student has passed a test, information concerning the base-rate level of success in the student’s class provides information about the difficulty of the test, a factor that has a clear causal relation to the judged event. In situations of this kind, people have been shown to take account of the base-rate information (e.g., Ajzen, 1977; Manis, Dovalina, Avis, & Cardozo, 1980; Tversky & Kahneman, 1980).

In his analysis of the attribution process, Kelley (1972, 1973) described several prototypical intuitive theories of causation. In the multiple necessary cause schema, for instance, an observed behavior is assumed to result from the joint operation of two or more causes, while in the person-entity schema, behavior is seen as caused either by the actor or by the situation. Whereas research on judgment and decision making is concerned with the biasing potential of such intuitive theories, Kelley’s view of causal schemas emphasizes their reasonableness. They are assumed to permit fast and relatively accurate inferences when lack of time or competing requirements make it impractical to perform a more thorough analysis.

**Perceived Covariation**

Going beyond the perception of causal links, it has been suggested that, in general, judgments concerning covariation among events are prone to systematic biases and errors (see Crocker, 1981). Preconceived ideas or hypotheses are assumed to be responsible for certain biases of this kind, notably illusory correlations: People overestimate the co-occurrence of informational items that intuitively appear to go together and fail to detect actual relations that do not conform to their intuitive theories (Chapman & Chapman, 1967, 1969; see also Berman & Kenny, 1976; Shweder, 1975).

Illusory correlations have been invoked as a possible explanation of negative stereotyping (Hamilton, 1979; Hamilton & Gifford, 1976). In this view, minority group members are associated with negative behaviors because in the majority culture, both are relatively rare events. Empirical research has provided support for the paired distinctiveness hypotheses, as well as information about its limiting conditions (see Mullen & Johnson, 1990, for a meta-analysis).

**The Overattribution Bias**

The accessibility and perceived relevance of information may be at least in part responsible for overattribution of behavior to properties of the actor, and to underutilization of situational cues, a pervasive phenomenon in social perception also known as the fundamental attribution error (Ross, 1977; see Fiske & Taylor, 1991, for a review). Not unlike the initial approach to judgment and decision making, early work on causal attribution took as its starting point the systematic, logical aspects of the inference process (e.g., Jones & Davis, 1965; Kelley, 1967, 1972). However, these analyses also emphasized biases and errors likely to result
from cognitive limitations. In his work on causal attribution in social perception, Heider (1958) argued that an acting individual stands out against the background of the situation, that the individual is the most salient aspect, engulfing the visual field. Because salient stimuli tend to be viewed as causal agents (Taylor & Fiske, 1978), behavior is likely to be attributed to enduring internal characteristics of the actor, such as attitudes or personality traits, rather than to situational demands. Numerous empirical investigations have confirmed the tendency to attribute observed behavior to an actor’s dispositions even when situational factors could fully account for the behavior (e.g., Jones & Harris, 1967; Miller, Jones, & Hinkle, 1981; Ross, Amabile, & Steinmetz, 1977; Yandrell & Insko, 1977).

Explanations of the overattribution bias in terms of an acting person’s salience in the observer’s visual field are called into question by the finding that this bias retains its power even when the information is provided verbally rather than visually. Attribution to an actor of behavior-consistent dispositions appears to occur rapidly, often without awareness (Winter & Uleman, 1984; Winter, Uleman, & Cuninff, 1985). Inferential processes that follow initial coding of the behavior in terms of dispositions can lead to revised judgments that take into account demands of the situation. The behavior of an actor who is seen hitting another person may initially be labeled as aggressive, but on further thought it may come to be reclassified as self-defensive. Consistent with this two-stage model, it has been found that increased cognitive load strengthens the overattribution bias (Gilbert & Krull, 1988; Gilbert, Pelham, & Krull, 1988). A high cognitive load presumably permits the spontaneous, relatively automatic attribution of behavior to corresponding dispositions, but it prevents further processing and revision of judgments to take account of situational factors.

A different two-stage model capable of accounting for the underutilization of situational cues has been offered by Trope (1986). The two stages in this model are called identification and dispositional inference. At the initial stage, before any dispositional attributions are made, an actor’s behavior must be identified as expressing a certain disposition. This identification is the result of an inference process that takes into account not only the nature of the behavior but also prior information about the actor and, importantly, situational cues. A relatively ambiguous behavior, such as physical contact with another person, may be identified as an aggressive act (rather than as accidental) if the actor is known to have behaved aggressively in the past or if the situation suggests that the actor was provoked. The provocation, at this stage, serves as a situational cue that favors identification of the act as aggressive in nature. Situational cues come into play again at the second stage, where they may produce a discounting of the action’s dispositional significance. Thus, situational cues may in fact exert a strong impact on attributional judgments, but because of their contradictory effects at the identification and dispositional inference stages, they may appear to be underutilized. In support of this explanation, overattribution of behavior to dispositional factors is found to increase with the ambiguity of the action (Trope, 1986).

When behavior is ambiguous, observers rely on situational cues to identify it, a process that works against the discounting of dispositional influence at the second stage.

**Observers versus Actors.** Observers of an actor’s behavior are more susceptible to the overattribution bias than are actors trying to account for their own behavior (Jones & Nisbett, 1972; see Kelley & Michela, 1980, for a review). One possible explanation for this effect is differences between actors and observers in the relative salience of behavior and situation. Unlike the observer for whom the actor’s behavior is salient, the actor’s attention is focused on the environment. As a result, observers tend to attribute another person’s behavior to that person’s enduring dispositions, whereas actors tend to attribute their own behavior to environmental factors (Storms, 1973). A second explanation relies on the idea that observer and actor have access to different kinds of information. As a general rule, actors have more information about their own feelings, intentions, and other internal states than observers, and they are also more aware of differences in their own behavior across situations (Eisen, 1979; Jones & Nisbett, 1972; White & Younger, 1988).

Although empirical research has often demonstrated actor-observer differences in causal attributions, the effects are usually quite small and are moderated by a variety of factors, such as the type of behavior that is being explained and the observer’s orientation. Thus, positive behaviors are often attributed to the actor rather than to the environment, while the reverse tends to be true for negative behaviors; and being asked to take the perspective of an actor or observer can greatly modify the attributions made (see Fiske & Taylor, 1991; Monson & Snyder, 1977).

**Cognitive Heuristics and Biases: The Question of Accuracy**

The multitude of cognitive biases that have been identified depict much human judgment as intuitive rather than thoroughly reasoned, and as prone to systematic error. Concluding that normative models of inference are unrealistic from a descriptive point of view, investigators have turned their attention to the psychological processes that produce the observed biases and errors. One of the increasingly important tools in this quest is the verbal protocol, people’s on-line reports of their mental activities (Newell & Simon, 1972).

This strategy stands in apparent contrast to a controversial view in social psychology which holds that people are largely unaware of the mechanisms by which they arrive at their inferences. Said to have no direct access to their cognitive processes, they—much like outside observers—must rely on visible events and circumstances to infer the reasons for their own judgments and actions (Bem, 1967, 1972; Nisbett & Wilson, 1977a). This view disputes the descriptive validity of any self-report measures, and it raises doubts about our ability to unravel cognitive mechanisms by means of verbal protocols. These challenges to the validity of verbal self-reports have been contested on theoretical as well as methodological grounds (e.g., Cooper & Fazio, 1984;
Jones, Linder, Kiesler, Zanna, & Brehm, 1968; Kiesler & Pallak, 1976; Mills, 1967; Quattrone, 1985; Smith & Miller, 1978; White, 1980). Moreover, a distinction has been made between retrospective self-reports, which may be biased by selective or distorted recall, and concurrent verbal protocols, which ask for reports of contents in short-term memory (Ericsson & Simon, 1980).

Challenges to the accuracy of verbal self-reports raise more general questions about the criteria to be used for assessing the validity of human judgments (Funder, 1987; Hastie & Rasinski, 1988; Kruglanski, 1989a; Kruglanski & Ajzen, 1983). In certain domains of judgment—notably probability estimation—formal models, such as Bayes’s theorem, are used to derive normative expectations against which intuitive judgments are compared (e.g., Kahneman & Tversky, 1973; Kelley, 1973). Where normative models are lacking, investigators sometimes rely on direct verification, such as by comparing intuitive frequency estimates with known frequencies (e.g., Tversky & Kahneman, 1974). And when direct verification is impossible, the criterion for comparison may be no more than the investigator’s presumed superior understanding of the situation (e.g., Nisbett & Wilson, 1977b).

Not surprisingly, given the difficulty of establishing objective accuracy criteria, it has been argued that cognitive biases and errors may be more apparent than real (Funder, 1987; McArthur & Baron, 1983; Swann, 1984). First, the conditions of the psychological laboratory, in which errors and biases have been documented, may lack external validity. Situations that make it possible to use formal models or other mechanisms of valid inference are rarely present in the real world in which judgments are normally made. Available information is often biased or incomplete, and some of the needed information may be missing altogether. Formal models may therefore be poor criteria for evaluating the accuracy of intuitive inferences (Einhorn & Hogarth, 1951; Fischhoff & Beryth-Maron, 1983; Kahneman & Tversky, 1982; Nisbett, Krantz, Jepson, & Kunda, 1983). Second, as noted earlier, cognitive biases are often attenuated or disappear altogether when the situation provides all relevant information and is structured to make its relevance readily apparent (Ajzen, 1977; Bar-Hillel, 1980; Fischhoff, Slovic, & Lichtenstein, 1979; Kruglanski, Friedland, & Farkash, 1984; see Kruglanski & Ajzen, 1983). Finally, empirical research has demonstrated that people can be taught to apply statistical reasoning to their intuitive judgments (e.g., Alpert & Balfia, 1982; Fong, Krantz, & Nisbett, 1986; Lehman, Lempert, & Nisbett, 1985). These considerations suggest that human judgment in the real world is possibly confined less by cognitive limitations than by inaccurate and incomplete informational input, by insufficient formal training, and by lack of time or motivation to process the available information in a systematic manner.

**Motivational Biases**

Perhaps more damaging to the image of human rationality than cognitive heuristics and biases are suggestions that human judgment is distorted by preferences, needs, and desires. As a general rule, more desirable events are seen as more likely, a correlation that can be interpreted as *wishful thinking*, implying a causal effect of evaluation on belief (McGuire, 1960), as *rationalization*, implying a causal effect of belief on evaluation (the *Pollyanna principle*, Matlin & Stang, 1978), or both (McGuire & McGuire, 1991). We are here concerned with wishful thinking because it suggests that people’s judgments may be influenced by motivational factors that are irrelevant to a logical analysis. Such factors can be both unconscious and irrational.

**Ego Enhancement and Defense**

People generally hold positive beliefs about the self, attributing to themselves more positive than negative personality characteristics (Allcke, 1985; see Greenwald, 1980; Taylor & Brown, 1988). A self-serving attributional bias may be one way to fashion and maintain this favorable self-image. Consistent with this idea, it has been reported that people readily take credit for success but are reluctant to accept blame for failure (e.g., Beckman, 1970; Bradley, 1978; Johnson, Feigenbaum, & Weiby, 1964; Snyder, Stephan, & Rosenfield, 1976; see Ross & Pletcher, 1985). The tendency to attribute one’s own success to internal rather than external factors occurs despite the presumed salience for the actor of external factors.

**Need for Effective Control**

Many theorists have posited that people have a need to feel in control of their outcomes (e.g., Brehm, 1966; Fiske & Neuberg, 1990; Kelley, 1971; Langer, 1975; Swann, 1990; Walster, 1966). A sense of control can mitigate the aversiveness of stressful events (Averill, 1973; Miller, 1979; Thompson, 1981) while perceived loss of control can undermine mental health (Abramson, Seligman, & Teasdale, 1978; Hiroto, 1974; Seligman, 1975). A variety of motivational biases have been attributed to people’s need to maintain or restore a sense of effective control. Not only is this need held capable of increasing attributional activity in general (Pittman & D’Angostino, 1985), it is said to predispose explanation of behavior in terms of internal rather than external factors (Kelley, 1971; Miller, Norman, & Wright, 1978) and in terms of *hedonically relevant* factors related to the negative or positive outcomes of the actor’s behavior (Jones & Davis, 1965; Jones & DeCharms, 1957). The tendency to take credit for success and to blame failure on external factors can also be interpreted as an attempt to maintain a sense of mastery over the environment (see Miller & Ross, 1975).

Specific beliefs about the self and about the world are assumed to serve the need for effective control. Among these are the belief in a just world where people deserve what they get and get what they deserve (Lerner, 1970; Lerner, Miller, & Holmes, 1976), the belief in the avoidability of physical harm to the self (Walster, 1966; see Fishbein & Ajzen, 1973), victims’ attributions of their misfortunes to their own behavior (Bulman & Wortman,
starting point the assumption that people are motivated to make accurate judgments and arrive at veridical opinions. This assumption is inherent in the economic model of humans, it is implied in much work on human judgment and decision making, and it is the guiding principle in the theory of social comparison processes (Festinger, 1954) and in the heuristic-systematic model of persuasion (Chaiken, 1980; Chaiken, Liberman, & Eagly, 1989).

The operation of accuracy motives has been systematically studied in the assessment of one’s own abilities (Trope, 1975, 1980, 1983). To interact effectively with their environment, to be able to predict and control future outcomes, people need to have an accurate assessment of their abilities. Consistent with this proposition, people are found to prefer accurate information about their abilities to information that enhances or protects the self (Trope, 1979; Trope & Ben-Yair, 1982).

At the same time, however, competing needs may work against the search for accurate information. Perhaps the most complete analysis of these issues can be found in Kruglanski’s (1980, 1989b) theory of lay epistemics. In this analysis, beliefs are formed as a result of a sequence of operations for generating and validating cognitions. This epistemic sequence is initiated by interest in knowledge about a certain topic, termed need for structure, which is heightened when immediate action is required. Need for structure initiates the epistemic sequence, but also demands cognitive closure to reach a decision (Kruglanski & Freund, 1983). By cutting off further processing, increased need for closure can produce a confirmatory bias, a tendency to look for evidence that supports rather than disconfirms the hypotheses in question (Klayman & Ha, 1987; Skov & Sherman, 1986; Snyder & Swann, 1978).

That the confirmatory bias is not always observed (Ginozar & Trope, 1987; Higgins & King, 1981; Trope & Mackie, 1987; see Higgins & Bargh, 1987 for a review) may, according to the theory of lay epistemics, be due to a second epistemic motivation, the fear of invalidity. Cognitive closure is delayed, and information processing prolonged, when the cost of making a mistake is high (Mayeless & Kruglanski, 1987). Motivational biases are explained by a preference for desirable conclusions, a motivation that may freeze processing when a desirable belief is formed, or if this is difficult to attain, halt the process in a state of ambiguity (e.g., Snyder & Wicklund, 1981).

**PREFERENCES: BELIEFS AND ATTITUDES**

Although the details may be in dispute, there is general agreement that preferences between alternatives are based on judgments or beliefs about them. As we have seen, treatments of decision making dwell heavily on the judgments that are part of the decision-making process (e.g., Bell, Raiffa, & Tversky, 1988, Dawes, 1988; Slovic, Lichtenstein, & Fischhoff, 1988; Stevenson, Busemeyer, & Naylor, 1990) and decision researchers and theorists have often stipulated an essential equivalence of judgment, preference, and choice. Thus, in the introduction to their review of information processing in judgment, Slovic

**Need for Consistency**

Perhaps the most frequently mentioned motivational factor assumed to influence beliefs and bias human judgments is the presumed need or preference for consistency among cognitions. This preference, first studied systematically by Heider (1944, 1958) and made popular by Festinger’s (1957) theory of cognitive dissonance, has been explored in a large number of empirical investigations. The research has demonstrated that under well-defined conditions, people tend to draw inferences that are consistent with their existing attitudes or with their preceding behavior (see Eagly & Chaiken, 1993, for a review).

**Motivation versus Cognition**

Most if not all of the presumed motivational biases can also be interpreted in cognitive terms (see Nisbett & Ross, 1980). If people generally believed that they have the ability and motivation to succeed, attribution of success to internal factors and failure to external factors would follow logically from their expectations (see Fishbein & Ajzen, 1975; Feather, 1969; Miller & Ross, 1975). At this point, which interpretation to accept—the motivational or the cognitive—is largely a matter of personal preference (see Ross & Fletcher, 1985). In the spirit of the “cognitive revolution” in social psychology, most theorists have until recently preferred the cognitive perspective. However, with the increasing recognition of the role of affect and motivation in information processing (see Fiske & Taylor, 1991; Sorrentino & Higgins, 1986, 1990), we find several attempts to provide direct evidence for the operation of motivational biases. One set of studies focuses on the assumption that internal attributions of success help to maintain or enhance self-esteem (e.g., McFarland & Ross, 1982; Reimer, 1975; Weiner, Russell, & Lerman, 1978). Consistent with this assumption, it has been found that failure on a task leads to lower self-esteem than success, but only when the failure is attributed to lack of ability, not when it is attributed to the difficulty of the task (McFarland & Ross, 1982).

Another set of studies has dealt with the motivational effects of cognitive dissonance. Although many phenomena attributed to the operation of dissonance can be explained in cognitive terms (see Bem, 1967, 1972), empirical research has verified a key motivational postulate of dissonance theory: Dissonance-arousing situations tend to produce an unpleasant psychological state, sometimes involving physical tension or arousal (see Cooper & Fazio, 1984; Fazio & Cooper, 1983). According to dissonance theory, people attempt to reduce or eliminate this unpleasant state by restoring consistency among their cognitions and actions.
and Lichtenstein (1971) stated, "The distinction between judgments and decisions is a tenous one and will not be maintained here; we shall use these terms interchangeably" (p. 652). And while cautioning against this equation, and pointing out that judgment is neither necessary nor sufficient for choice, Abelsohn and Levi (1985) failed to pursue the distinction in their own review of decision making and decision theory.

In contrast, social psychologists have been greatly concerned with the distinctions between judgments (beliefs), preferences (attitudes), and decisions (intentions and actions), as well as with the relations among these variables (see Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975). In this section, we deal with attitudes and their relations to beliefs.

**Options with Single-Attribute Outcomes**

When the outcomes of decision alternatives differ along a single attribute, such as money, it is possible to estimate subjective probability and utility functions by observing preferences among bets or gambles that differ in value or probability (see Krantz, Luce, Suppes, & Tversky, 1971). Choices among additional alternatives can then be predicted on the basis of the subjective expected utility model, using the estimated probability and utility functions. Studies have shown that single-attribute utility functions for money can predict preferences among gambles quite well (e.g., Davidson, Suppes, & Siegel, 1957; Tversky, 1967). Thus, choices among simple monetary gambles seem to be based on beliefs about the likelihood of gaining or losing a certain amount of money, together with the subjective values of these outcomes. However, the ability to predict does not prove the accuracy of the subjective expected utility model. Any model in which people are assumed to prefer more of a valuable property to less, or higher probabilities of attaining a valuable outcome to lower probabilities, would predict preferences quite well, even if the model was deficient in its details (Dawes & Corrigan, 1974).

Most tests of the subjective expected utility model have therefore taken a more indirect approach. Modern utility theory and its measurement procedures are based on a set of axioms developed by von Neumann and Morgenstern (1947) and Savage (1954). Violations of these axioms are taken as evidence against the utility maximization principle. One well-known violation is related to the axiom known as the sure-thing principle. According to this axiom, preferences among alternatives should not be affected by the value of a shared outcome. Although intuitively obvious, violations of this principle have been repeatedly demonstrated (e.g., Allais, 1953; Ellsberg, 1961; Kahneman & Tversky, 1979). Another important axiom of utility theory is transitivity of preferences: If alternative A is preferred to B, and B to C, then A should be preferred to C. Choices contrary to this compelling idea have also been demonstrated in empirical investigations (e.g., Tversky, 1969), as have other violations of expected utility axioms (see Schoemaker, 1980).

Perhaps the most fundamental assumption underlying expected utility theory is the idea that people have reasonably well-defined preferences among different possible outcomes of a decision. Yet even this article of faith has been called into question by work showing that people have difficulty assessing their own likes and dislikes or anticipating their future preferences, and that values are highly unstable (Fischhoff, Slovic, & Lichtenstein, 1980; Kahneman & Snell, 1990; March, 1978).

**Prospect Theory**

Observed violations of utility axioms have led decision theorists to develop alternatives to the subjective expected utility model (e.g., Bell, 1982; Coombs, 1975), with the best known example being prospect theory (Kahneman & Tversky, 1979). In prospect theory, the value of an option, termed a risky prospect, is still a function of the product of probabilities and utilities associated with its outcomes. However, an attempt is made to take into account contextual factors that impact on the decision, and the probability and utility functions are designed to maximize descriptive accuracy. Consistent with the proposal made by Edwards (1954), subjective probabilities are replaced by subjective weights attached to the probabilities of outcomes. In addition, the utilities of outcomes are defined in terms of gains or losses in relation to a reference point or adaptation level.

Prospect theory recognizes two phases in the choice process, the editing or framing phase (Tversky & Kahneman, 1981) and the decision phase in which the edited prospects are evaluated and the prospect with the highest value is selected. Framing determines how the decision problem is structured, and it can greatly affect the choices that are made. For example, most people prefer the prospect of winning $3,000 with certainty to the prospect of winning $4,000 with a probability of .80, even though the second prospect has a greater expected value (Kahneman & Tversky, 1979). This certainty effect is reversed, however, when the gains are replaced by losses. Thus, most people prefer the prospect of losing $4,000 with a probability of .80 to the prospect of losing $3,000 with certainty. This reversal is known as the reflection effect; it implies risk aversion in the case of gains and risk proneness in the case of losses.

During the editing or framing phase, people are assumed to engage in such activities as separating risky from riskless components, grouping equivalent outcomes together, rounding off probabilities, coding outcomes as gains or losses, and removing outcomes shared by all alternatives. The particular frame adopted depends on the problem's formulation, on individual differences in perspective, and on problem-solving style.

The probability and utility functions are defined in prospect theory such as to take account of pervasive phenomena in decision making. To accommodate the certainty effect, outcomes considered certain to occur are given greater weight than outcomes that are less than certain. Similarly, the theory incorporates the reflection effect by postulating a S-shaped utility function in which the declining value of losses is steeper than the increasing value of gains.

Formulated to take account of well-established empirical phenomena, prospect theory is descriptively more
accurate than many alternative models, but it has been criticized on theoretical as well as empirical grounds (see Abelson & Levi, 1985, for a discussion). Whatever its ultimate fate, however, the theory has already had a marked impact on the field. It has directed attention to a variety of psychological processes involved in decision making by highlighting the importance of framing and by emphasizing the need to take into account known deviations from utility maximization axioms.

**Options with Multivariate Outcomes**

Most decision situations of interest to social psychologists confront the individual with alternatives whose outcomes differ along more than one dimension. Whether the choice is among automobiles, political candidates, birth control methods, or leisure activities, each available option has a multitude of attributes, some positive and some negative. Preferences must somehow take these different aspects into account.

**Regression Models**

The complexities of multivariate decisions are often studied in the context of a linear regression model (see Slovic & Lichtenstein, 1971). One approach is to regress preferences on the values of the different attributes, as suggested in Brunswik's (1952, 1956) lens model. A given attribute can be considered a cue that is assumed to be weighted and combined in a linear fashion with all other cues in arriving at the overall judgment. The degree to which the different cues are utilized can be estimated by means of a multiple regression analysis, and the fit of the linear model is given by the value of the multiple correlation.

Although capable of handling nonlinear combination rules, applications of information integration theory (Anderson, 1968, 1971, 1974, 1981; Anderson & Shanteau, 1970) to attitude formation usually assume a linear model. According to this theory, preferences, like other kinds of judgment, are based on two basic operations: **valuation** and integration. Each item of information is given a scale value, which represents its relevance to the judgment, and a weight reflecting its importance. The weighted scale values of different cues are integrated according to a simple algebraic rule, usually the sum or average of the weighted scale values.

Using a procedure known as **functional measurement** (Anderson, 1970, 1982), it is possible to test the linear model while at the same time estimating the scale values and weights of the different cues. Respondents are asked to provide multiple evaluative judgments in relation to all possible combinations of cue values. The judgments are tested for linearity (i.e., for absence of significant interactions) by means of analysis of variance techniques and, given appropriate assumptions, the marginal means can serve as estimates of scale values or weights. The price paid is that we must obtain multiple judgments of all possible cue combinations. Some of these combinations may have low ecological validity (i.e., they may be highly unlikely or unrealistic), and inclusion of such combinations may be disruptive of the very process under investigation (Brunswik, 1952; Slovic, Lichtenstein, & Fischhoff, 1988).

Numerous studies have shown that a simple linear model is remarkably successful in accounting for variance in many kinds of judgments, including preferences among choice alternatives and other evaluative responses (see Anderson, 1991; Eagly & Chaiken, 1993; Slovic, Fischhoff, & Lichtenstein, 1977; Slovic & Lichtenstein, 1971). There is doubt, however, as to the descriptive accuracy of these models, and their ability to provide substantive information about the psychological factors underlying a given preference may be limited.

First, predictive accuracy is no guarantee that people actually combine information in a linear fashion. In fact, there is considerable evidence for nonlinear or configural information integration, even when most of the variance can be explained by a linear model (e.g., Einhorn, 1970; Higgins & Rholes, 1976; Tversky, 1969; Wiggins & Hoffman, 1968; see Goldberg, 1968; Slovic & Lichtenstein, 1971). Moreover, it must be realized that the linear combination rule is applied to the values of the attributes or cues as provided by the experimenter. Tests of the linear model, therefore, are tests of the extent to which it is possible to account for judgments by combining in a weighted linear fashion the information given to respondents. Even though the linear model is quite successful in this regard, descriptively it may fail to capture the important processes involved. It is well known that human judgments go beyond the information given (Bruner, 1957). People often draw far-ranging inferences on the basis of a limited set of data, as has been shown in research on impression formation (e.g., Asch, 1946; Norman, 1963; Wisher, 1960), and inferences or elaborations are also implicated in the formation and change of attitudes that result from exposure to persuasive communications (see Fishbein & Ajzen, 1981; Petty & Cacioppo, 1986). Thus, from a descriptive point of view, attitudes toward decision alternatives are likely to be derived not only from the cues describing the alternatives but also from the additional beliefs that are formed as the information is being processed (Ajzen, 1977).

A second difficulty of the multiple regression and analysis of variance approaches to information integration has to do with the limited substantive information they provide about the considerations that enter decisions in real life. Weights and scale values are inferred from the judgments made by respondents. Multiple stimulus objects are constructed by varying the values of several attributes and respondents are asked to evaluate the objects. The contributions of the different attribute dimensions to these judgments are given by their regression coefficients in a multiple regression analysis, or by the marginal means in functional measurement.

Although quite elegant, there is no easy way to apply this methodology to real-life situations of interest to social psychologists. Many important decisions in everyday life, such as choice among political candidates in a particular election or accepting a specific job offer, are unique events whose important attribute dimensions may not be relevant to other alternatives. Such decisions are not amenable to investigation by means of systematically manipulating attribute dimensions. A linear model may or may not describe
the way information is generally used to arrive at evaluative judgments or decisions, but a different methodology is needed to obtain descriptively useful, substantive information in unique decision-making situations.

**Expectancy-Value Model**

Less sophisticated from a psychometric perspective, the expectancy-value model favored by many social psychologists offers a possible approach to obtaining substantive information about the considerations that underlie evaluative judgments in real life. Instead of inferring subjective probabilities and values from judgments, these variables are assessed directly by means of simple rating scales (see Ajzen & Fishbein, 1980; Fishbein & Raven, 1962). No more than interval scale measurement is generally assumed, with the consequence that any linear transformation of obtained measures is permissible. Indeed, measures of belief are often scored in a bipolar fashion (e.g., from -5 to +5) rather than in a unipolar fashion as would befit measures of probability, and the ratings are usually elicited on scales that are only loosely related to probability, such as true-false or agree-disagree (see Fishbein & Ajzen, 1975, for a discussion). More generally, it has been proposed that empirical criteria be used to determine the best way of scoring the measures of probabilities and values that enter into the EV model (Ajzen, 1991; Evans, 1991; Holbrook, 1977; Orth, 1985). For example, when an independent measure of attitude is available to serve as the criterion, multiple regression techniques can be used to find the scoring scheme that produces the best fit.

Because the EV model assumes that attitudes toward a given course of action are determined by salient beliefs about the consequences of the decision, it becomes important to identify and measure these salient beliefs. In work with the expectancy-value model of attitude, it has been recommended practice to conduct a pilot study in which salient beliefs about the attitude object are elicited in a free-response format (see Ajzen & Fishbein, 1980). When the object is a behavior, the respondents are asked to list the advantages and disadvantages that come to mind when they think about engaging in the activity. The particular beliefs listed by a given respondent are considered to be that person’s salient beliefs, and the most frequently mentioned beliefs in the pilot sample constitute the set of beliefs salient in the research population, termed modal salient beliefs.

Tests of the expectancy-value model typically rely on a list of modal salient beliefs constructed in a pilot study. With respect to each belief, ratings of subjective probabilities and values are obtained, and the products of the ratings are summed to produce an estimate of attitude. This estimate is then correlated with an alternative measure of attitude, usually an evaluative semantic differential scale (e.g., Fishbein, 1963; Manstead, Proffitt, & Sharp, 1983; Smith & Clark, 1973). Most studies of this kind have obtained at least moderately high correlations (e.g., Cronen & Convillo, 1975; Fishbein, 1963; Fishbein & Coombs, 1974; see Ajzen, 1991; Eagly & Chaiken, 1993). However, even high correlations are only suggestive of the model’s validity. Because of the correlational nature of the test, it is possible to argue that salient beliefs are elicited to be consistent with existing attitudes, rather than being the determinants of those attitudes. More direct evidence for the causal impact of beliefs on attitudes comes from a limited number of studies in which it was shown that producing changes in salient beliefs leads to corresponding changes in attitudes (Lutz, 1975; Fishbein, Ajzen, & Mc Ardle, 1980; Mitchell & Olson, 1981; Olson, Toy, & Dover, 1982; see Eagly & Chaiken, 1993, for a review).

Many investigators have found the EV approach useful in trying to come to terms with applied problems. The expectancy-value model has been used to explain attitudes and behavior in such varied domains as choice of infant feeding methods (Manstead, Proffitt, & Sharp, 1983), marijuana use (Beardon & Woodside, 1978), consumer behavior (Bonfield, 1974; Brinberg & Durand, 1983), voting choice (Bowman & Fishbein, 1975; Fishbein & Coombs, 1974), cigarette smoking (Babrow, Black, & Tiffany, 1990; Budd, 1996; Loken, 1982), choice of leisure activities (Ajzen & Driver, 1991), family planning (Cohen, Severy, & Ahtola, 1978; Crawford & Boyer, 1985; Davidson & Jaccard, 1975), participation in cancer screening (DeVellis, Blalock, & Sandler, 1990; Ronis & Kaiser, 1989), exercising (Codin, Shephard, & Colantonio, 1986; Riddle, 1980), occupational choice (Greenstein, Miller, & Weldon, 1979), reenlisting in the military (Hom & Hulin, 1981), seat belt use (Jonah, 1984; Wittenbraker, Gibbs, & Kahle, 1983), dental hygiene (McCaul, O’Neill, & Glasgow, 1988; Toneatto & Bink, 1987), and a host of other issues. The content of salient beliefs about the outcomes of these various behaviors, together with measures of subjective probability and value, provide a useful picture of the kinds of factors that may be important in determining positive or negative attitudes with respect to a given course of action. The salient considerations reported by people help to explain their behavioral preferences and provide a starting point for the development of effective intervention programs.

**Alternative Models of Preferences**

The models we have reviewed in this section in one way or another explain attitudes or preferences as weighted linear combinations of expected utilities associated with the outcomes of available options. This view has been criticized for the high cognitive demands it seems to place on the decision maker (e.g., Abelson, 1976; Jaccard & Becker, 1985; McGuire, 1985; Tversky, 1972a). It would be extremely burdensome if even minor decisions in everyday life had to be preceded by a thorough evaluation of potential consequences. The linear information integration models thus appear to contradict common sense as well as widely accepted views of information processing that emphasize bounded rationality, efficiency, and the minimization of effort. Even if useful for purposes of prediction, the linear models may thus lack descriptive validity.

In defense of the expectancy-value model, it has been pointed out that a review and integration of salient beliefs is assumed to occur only in the formation of attitudes. Once an attitude has been formed, it can be stored in
memory and retrieved directly when confronted with the need to make a decision (Ajzen & Fishbein, 1980; Eagly & Chaiken, 1993). Several studies have provided evidence for the relative independence of memory for general evaluations and specific items of information on which the evaluations are based (Dreben, Fiske, & Hastie, 1979; Fiske & Pavelchak, 1986; Hastie & Park, 1986).

In reaction to the excessive cognitive demands of models that rely on notions of subjective expected utility or summation of weighted salient beliefs, theorists have proposed alternative views of the decision-making process. One approach conceives decision alternatives as bundles of attributes, each of which can serve as a choice criterion. The best-known example is Tversky's (1972a, 1972b) elimination by aspects (EBA) model. In this model, the most salient attribute or aspect is considered first, and any alternative that does not include the aspect in question is eliminated. This process continues with the next salient aspect until only one course of action remains. Consider, for example, how people choose a restaurant for dinner. The most salient attribute on a given occasion might be a preference for Chinese food. Only restaurants that serve Chinese food are retained; all others are immediately eliminated. The next most salient attribute, perhaps a maximum 15-minute driving distance, is then applied, further eliminating all alternatives that do not meet this criterion. The elimination process continues in this fashion until only one restaurant remains with all the required aspects. Cognitively simple, and intuitively appealing, the EBA model does not assure that the option with the greatest overall desirability will necessarily be selected. Unlike the SEU and EV models, in which salient negative attributes of a given alternative can be compensated for by positive attributes, in the process described by the EBA model, such an alternative would be eliminated early in the decision sequence.

A more radical departure from conventional models of preference and choice can be found in Abelson's (1976, 1981) script model. Criticizing the traditional approaches as overly elementaristic and static, Abelson proposed that behavior is guided by expectations concerning coherent sequences of events, called scripts. People acquire scripted expectations throughout their lives by direct observation, or by exposure to secondhand information. For example, as a result of repeated visits to restaurants, individuals develop scripts concerning the expected sequence of events, such as being seated, studying the menu, selecting a meal, being served, eating, paying, and leaving the restaurant. Well-established scripts can guide behavior without the intervention of elaborate cognitive processes, to the point of "mindlessness" (Langer, 1989a, 1989b; Langer, Blank, & Charowitz, 1978).

**CHOICE: ATTITUDES, INTENTIONS, AND ACTIONS**

Most decision models capture only part, perhaps a small part, of the cognitive and motivational processes involved in complex decision situations (see Hogarth, 1987; Janis & Mann, 1977). Attitudes toward a given course of action, and their cognitive underpinnings, provide a narrow perspective on the decision-making process in real life. Decisions, especially decisions concerning important and complex issues, are often preceded by a great deal of conflict and followed by cognitive adjustments to the changed circumstances. This section reviews work on the effects of attitudes on behavior, as well as some of the complexities in realistic decision contexts.

**Conflict in Decision Making**

Almost inevitably, complex decisions require resolution of conflict that results from competing forces of attraction and repulsion. In his influential analysis of conflict and conflict resolution, Lewin (1935, 1938) visualized a potential course of action as an activity region in a person's life-space, and its positive and negative attributes as force fields that create approach-and-avoidance tendencies. Lewin argued that as the individual approaches the activity region (comes closer to making a decision), the region's positive and negative valences grow in strength, and he postulated that the avoidance gradient is steeper than the approach gradient. Figure 11.1 depicts a typical approach-avoidance conflict in which neither tendency is completely dominant. In a conflict of this kind, the individual is predicted at first to approach the decision point because the attractive force generated by the positive valence dominates the avoidance force generated by the negative valence. However, as the psychological distance from the decision grows smaller, the avoidance tendency...
overcomes the approach tendency, and the individual retreats to the point of equilibrium. The conflict shown in Figure 11.1 is concerned with a single course of action. This analysis can be generalized to deal with multiple approach-avoidance conflicts that involve decisions among two or more alternatives, each of which has positive as well as negative attributes.

The approach-avoidance conflict is resolved by raising or lowering the gradients until either the approach tendency or the avoidance tendency completely dominates the decision (see Gerard & Orive, 1987, for a discussion). This can be accomplished by actually changing one or more attributes of a decision alternative, or by cognitive work that reassesses the likelihood or utility of valenced outcomes. For example, when making a career choice, people can try to increase the attractiveness of an available job offer by negotiating more favorable conditions or by revising the subjective utilities they associate with the attributes of the existing offer.

Much of the empirical support for Lewin's conflict model comes from animal research, based on formalizations of the model in the terminology of behavior theory (Hull, 1932, 1938; Miller, 1944, 1959; see Heilizer, 1977a, 1977b). Working with rats, and using hunger and fear as approach and avoidance forces, Miller demonstrated hesitation at some distance from the physical goal, presumably at the point of equilibrium, and he showed that this point can be moved closer to the goal by increasing habit strength or by raising hunger, and that it can be moved in the opposite direction by reinforcing an avoidance tendency or by raising fear.

The idea that complex decisions can produce conflict at various stages of the decision-making processes is fundamental to Janis and Mann's (1977) analysis of conflict, choice, and commitment (see also Janis, 1999). The decision itself is broken down into five stages: assessing the need for a decision, reviewing the available alternatives, weighing the alternatives, choosing an alternative, and adhering to the choice. Each successive stage provides feedback that is used to evaluate the decision. If dissatisfied, the decision maker may revert to a previous stage. For example, if after weighing the alternatives, no alternative is deemed suitable, the person may revert to the reviewing stage and look for additional options. If this process does not produce an acceptable alternative, the person may go back to the initial stage and reexamine the need to make a decision.

Consistent with the cognitive miser view, people are assumed to maintain the status quo and avoid the stress associated with decisional conflict unless circumstances demand a change of behavior. Little conflict is generated if an acceptable alternative is readily available, but if it is not, the resulting stress can produce defensive avoidance: procrastinating, shifting responsibility for the decision to others, exaggerating the desirability of the status quo, and so forth. Alternatively, the person may be stricken with panic, a state called hypervigilance, with a paralyzing effect on action. These deficient modes of information processing contrast with vigilance, systematic information processing that involves a thorough survey of possible courses of action, collection of information relevant to the alternatives, careful weighing of their costs and benefits, and development of contingency plans.

It is difficult to validate in detail a complex decision model of this kind, but with its description of decision-making stages and its emphasis on stress and decisional conflict, it offers a useful perspective for the analysis of decision making in real life (see Abelson & Levi, 1985).

Attitudes and the Prediction of Behavior

In some decision situations, preference and choice are virtually indistinguishable. When participants in an investigation are asked to choose between alternative bets, the preferred bet is equivalent to the choice. A similar situation exists in the voting booth when the voter selects the preferred candidate. In other decision situations, choice does not necessarily follow from preference. A person may prefer seeing movie A rather than movie B, but because of social or situational pressures decides to see movie B anyway. The relation between attitudes or preferences on one hand and actual behavior on the other has been a major topic of investigation in social psychology for many years.

Concern about the attitude-behavior relation arose primarily in response to disappointing empirical findings that started to appear in the 1930s (e.g., Corey, 1937; LaPiere, 1934). Theorists began to question the definition and measurement of the attitude construct, as well as the assumption that attitudes influence behavior (e.g., Blumer, 1955; Deutscher, 1966; Festinger, 1964a). The greatest challenge to the attitude concept was posed by a review of the empirical studies in the late 1960s that revealed little if any relation between verbal attitudes and overt actions (Wicker, 1969).

Attitude-Behavior Compatibility

Evidence for weak relations between attitudes and behavior comes primarily from studies that attempt to predict a specific action, usually in a unique experimental context, from general attitudes that appear to be relevant to the behavior in question (see Ajzen & Fishbein, 1977). Investigators might try to predict imitation of a Black person's response to a petition from general attitudes toward Blacks (Himmelstein & Moore, 1963), or work attendance from attitudes toward the company (Bernberg, 1952). A moment's reflection, however, shows no compelling logic linking abstract attitudes to specific actions performed under a given set of circumstances. An analogy in the case of decisions among alternatives would be an attempt to predict students' choices between a course offered in the psychology department and a different course offered in the sociology department from their general preferences between psychology and sociology. Students who generally prefer sociology over psychology may nevertheless choose the psychology course, perhaps because no similar course is offered in sociology, because the psychology course fulfills a distribution requirement, or because a number of friends are enrolled in the psychology course.
In their review of the attitude-behavior literature, Ajzen and Fishbein (1977) discovered that out of 195 studies, 54 attempted to predict specific actions from very general attitude measures. About one-half of these studies obtained nonsignificant results, and the remainder reported relations of disappointingly low magnitude. Ajzen and Fishbein formulated a principle of compatibility to clarify the conditions under which strong attitude-behavior correlations can be expected. Similar to Guttmann's (1955) contiguity hypothesis, the principle of compatibility states that measures of attitude and behavior are compatible, and should thus correlate with each other, to the extent that they address the same behavior, directed at the same target, and in the same context. Compatibility can be established either by aggregating behaviors to elevate the generality of the behavioral measure to that of a general attitude, or by measuring attitudes with respect to the specific behavior of interest. Numerous investigations have supported the principle of compatibility by showing that attitudes correlate strongly with behavior when the two constructs are assessed at the same level of generality or specificity (e.g., Fishbein & Ajzen, 1974; Weigel & Newman, 1976; Werner, 1978; for reviews see Ajzen, 1988; Kraiss, 1995).

**Attitude Accessibility**

The success of the compatibility principle notwithstanding, search has continued for conditions under which attitudes will either be poor or good predictors of behavior. A large number of potential moderating variables have been suggested, including personality characteristics, involvement, amount of knowledge, and the internal consistency of the attitude (see Ajzen, 1988, for a review). The most comprehensive framework for understanding the operation of moderating variables, however, has been offered by Fazio (1986, 1990). According to Fazio's analysis, attitudes, and especially general attitudes, often fail to predict behavior because they are not sufficiently accessible to be automatically activated. Fazio's (1990) MODE model distinguishes between a deliberative or controlled mode of information processing and spontaneous or automatic processing, usually defined as processing that occurs unintentionally and without much cognitive effort (cf. Bargh, 1984). Attitudes are assumed to guide behavior in a spontaneous fashion when people are either not sufficiently motivated to engage in extensive deliberations, or when they are incapable of doing so. But to guide behavior in a spontaneous fashion, attitudes have to be automatically activated in the presence of the attitude object. Measures of attitude will fail to predict behavior when the behavior is performed under circumstances that favor neither deliberative construction or recall of the relevant attitude nor its automatic activation.

The spontaneous mode of attitude-behavior influence is said to involve a sequence of steps. At the point of behavior, the attitude must be automatically activated, thus becoming available to guide action. Automatic activation, in turn, depends on attitude strength because strong attitudes, with a well-established association between object and evaluation, are assumed to be chronically accessible in memory. Once activated, the attitude is said to influence perception or construction of the situation and thus to produce attitude-consistent behavior.

Using response latency as an indicator of attitude accessibility, it has been shown that attitudes with relatively fast response times predict behavior better than attitudes with relatively slow response times (Fazio, Powell, & Williams, 1989; Fazio & Williams, 1986). In addition, variables likely to influence attitude accessibility, such as direct experience with the attitude object and repeated expressions of the attitude, have also been shown to improve attitudinal prediction of behavior (Fazio, Chen, McDonel, & Sherman, 1982; Houston & Fazio, 1989; Powell & Fazio, 1984; Began & Fazio, 1977). Recent analyses and empirical studies, however, have questioned the proposition that only highly accessible attitudes are automatically activated (Barth, Chaiken, Govender, & Pratto, 1992; see Chaiken & Bargh, 1983, and Fazio, 1993, for an exchange) and have tried to explain the moderating effects of such variables as direct experience in terms of attitude stability rather than accessibility (Doll & Ajzen, 1992; see Ajzen, 1996).

**The Role of Intentions**

The decision to adopt a certain course of action logically precedes actual performance of the behavior. Consistent with this reasoning, social psychologists tend to view intentions as mediating between attitudes and actions (e.g., Bagozzi & Warshaw, 1990; Bentler & Speckart, 1979; Fishbein & Ajzen, 1975; Colantizer, 1993; Kuhl, 1985; Locke & Latham, 1990; Triandis, 1980). Undoubtedly, the most popular models in this domain are the theory of reasoned action (Ajzen & Fishbein, 1973, 1980; Fishbein, 1967b; Fishbein & Ajzen, 1975) and its successor, the theory of planned behavior (Ajzen, 1985, 1991). On the assumption that most behaviors of interest to social psychologists are under volitional control (see Ajzen & Fishbein, 1980), the theory of reasoned action stipulates that intention is the immediate antecedent of the corresponding behavior. At least with respect to volitional acts, people are expected to do what they intend to do. Intention, in turn, is determined by two factors, the attitude toward the behavior, expressing a personal preference, and subjective norm, reflecting the perceived social pressure to perform or not to perform the behavior. Attitude and subjective norm combine in a weighted linear fashion to produce the intention. The complete model representing the theory of reasoned action can thus be written as follows.

$$B = \lambda (w_1 A_B + w_2 \alpha SN)$$

where $B$ is the behavior, $\lambda$ is the intention, $A_B$ is the attitude toward the behavior, $SN$ is the subjective norm, and $w_1$ and $w_2$ are empirically determined weights. The approximation sign indicates that a measure of intentions is expected to predict subsequent behavior only if intentions have not changed as a result of intervening events.

The theory of reasoned action is typically evaluated by means of correlational techniques, where measures of attitude and subjective norm are regressed on a measure of
intention, and a correlation is computed between intention and behavior. Over the past 25 years, virtually hundreds of studies have tested and applied the theory of reasoned action in a multitude of different contexts. By and large, the model has been well supported wherever its constructs were carefully operationalized (Eagly & Chaiken, 1993). This conclusion is confirmed by a meta-analysis based on 150 data sets published in 113 articles between 1969 and 1989 (van den Putte, 1991). Disregarding the quality of the methods and procedures employed, the average correlation between intention and behavior was .62, and the average multiple correlation for the prediction of intention was .68 (see also Ajzen, 1996).

The Question of Volitional Control

The requirement imposed by the theory of reasoned action that behavior be under volitional control places limitations on the model’s range of application, and the assumption that most behaviors of interest to social psychologists are in fact under volitional control has frequently been challenged (e.g., Bentler & Speckart, 1979; Liska, 1984; Triandis, 1980). The theory of planned behavior (Ajzen, 1985, 1991) was developed partly in response to these concerns. Consistent with Bandura’s (1977, 1982) work on self-efficacy expectations, the theory of planned behavior incorporates a construct that deals with people’s perception of control over the behavior—their beliefs that they can perform the behavior if they so desire, that they have the required time, skills, and other resources. Logically and formally, perceived behavioral control (PBC) is expected to interact with the other constructs in the theory: Attitudes and subjective norms should influence intentions to the extent that PBC is high, and similarly, the effect of intention on behavior also depends on the degree of perceived behavioral control:

\[ B = PBC \cdot I \alpha PBC[w_1A_B + w_2SN] \]

Research with the theory of planned behavior, however, has shown that most of the variance in intentions and behavior can be accounted for by linear combinations, and the interaction terms are typically not significant (see Ajzen, 1991). Because of these findings, simpler linear models have actually been evaluated in most applications of the theory:

\[ B = [w_1I + w_2PBC] \]

and

\[ I \alpha [w_1A_B + w_2SN + w_3PBC] \]

Studies testing these models have found in virtually every case that inclusion of perceived behavioral control significantly improves prediction of intentions, and in many instances also prediction of behavior (e.g., Ajzen & Driver, 1992; Ajzen & Madden, 1986; Beale & Manstead, 1991; Doll & Ajzen, 1992; Godin, Valois, LePage, & Desharnais, 1992; Madden, Ellen, & Ajzen, 1992; Netemeyer, Burton, & Johnston, 1991; Schifter & Ajzen, 1985; Van Ryn & Vinokur, 1992).

The Question of Sufficiency

Perhaps the most frequent criticism of the theories of reasoned action and planned behavior concerns their sufficiency. Additional variables are said to improve prediction of intention and behavior. Thus, in some applications, personal norm or perceived moral obligation is found to account for additional variance (e.g., Gorsuch & Orberg, 1983; Schwartz & Tessler, 1972; see also Beck & Ajzen, 1991), whereas in others, self-identity or the involvement of the self-concept improves predictive accuracy (e.g., Charig, Piliavin, & Callero, 1988; Granberg & Holmberg, 1990).

Some theorists have suggested that past behavior be included as an additional predictor of intentions and later behavior, usually on the assumption that frequent performance of the behavior produces a habit (Bentler & Speckart, 1979; Triandis, 1977, 1980). Several studies have shown that a measure of past behavior can improve accuracy of prediction (e.g., Bagozzi, 1981; Budd, North, & Spencer, 1984; Fredricks & Dossett, 1983; Sutton & Hallett, 1989). However, a behavior does not necessarily become habitual just because it has been performed many times, and frequency of past behavior may thus be a poor indicator of habit strength. The finding that past behavior often improves prediction of later behavior derives from the stability of behavior over time. Behavioral stability is presumably due to the stability of its determinants. In the case of the theory of planned behavior, temporal stability of behavior must be attributed to the stability of attitudes, subjective norms, perceptions of behavioral control, and intentions. If a measure of past behavior improves prediction of later behavior, over and above these factors, this is best interpreted as an indication that not all of the systematic variance in behavior has been accounted for (see Ajzen, 1991, for a discussion).

Commitment and Persistence

Whatever factors may be needed for accurate prediction of behavior, few social psychologists question the mediating role of intentions, and attempts are being made to explore in detail the processes whereby intentions guide behavior (e.g., Fiske, 1989; Gollwitzer, 1993; Heckhausen, 1981; Kuhl, 1985). According to the theory of planned behavior, intentions constitute behavioral plans that, in combination with appropriate opportunities and resources, enable attainment of a behavioral goal. The important role played by intentions is indicated by the relative success of the model in its many applications, as well as by work on goal setting which has shown that adopting an intention to attain a certain behavioral goal has a strong impact on actual performance (see Locke & Latham, 1990).

It is, however, common experience that intentions, even if accompanied by the requisite opportunities and resources, do not always lead to success. Intentions to maintain a low-calorie diet or to refrain from smoking are good
examples. Just as it is important to distinguish between preference and choice, it is also important to realize that making a decision (forming an intention) and implementing it are not the same (Besch, 1985; Beckman & Kuhl, 1984; Kendzierski, 1990). An early topic of interest in social psychology (see Ach, 1905, 1918; Lewin, 1926), the question of willful action has only in recent years been submitted to empirical investigation. Various factors have been found to influence commitment to a behavioral goal and persistence in the face of obstacles. Thus, it has been shown that specific contextual cues can initiate implementation of an intention (Gollwitzer, 1993), and that it helps to carry out an intention if the person has developed a detailed plan of action (Kendzierski, 1990; Leventhal, Singer, & Jones, 1985; Schiffer & Ajzen, 1985). Also, individual differences in state versus action orientation can affect adherence to an intended course of action (Beckman & Kuhl, 1984; Kuhl, 1985). Individuals are said to be action-oriented if their attention is focused on a fully developed plan of action and they are said to be state-oriented if they attend to an internal or external state that is not directly related to the planned behavior. Many of these issues are being addressed in current theory and research on cognitive self-regulation (see, e.g., Carver & Scheier, 1981; Heckhausen & Gollwitzer, 1987; Kirschenbaum, Tomarken, & Humphrey, 1985; Kuhl & Beckman, 1985; see Karoly, 1993).

**Postdecision Processes**

If—prior to making a decision—people invest cognitive effort to evaluate the available alternatives by weighing conflicting pressures, following the decision they are said to labor just as intensely to justify their choices (Festinger, 1957, 1964b). Festinger described the predecision process as a relatively open-minded, unbiased search and analysis of information that is designed to produce the best possible choice. Commitment to a certain course of action, however, produces dissonance because of negative cognitive elements associated with the chosen alternative and positive elements associated with the rejected alternatives. The magnitude of postdecision dissonance is expected to increase with the number of dissonant elements and their importance. Generally speaking, the greater the conflict prior to making a decision, and the greater the commitment to the chosen course of action, the greater the dissonance following the choice.

An unpleasant psychological state, dissonance is assumed to motivate the decision maker to engage in cognitive work that bolsters the decision. Among other possible strategies, people are expected to engage in selective retrieval and biased reevaluation of existing information about the different alternatives, and to pay selective attention to new information that is consistent with their decisions. As a result of these systematic biases, dissonance theory predicts a spreading apart of attitudes toward the different decision alternatives. In comparison to predecision preferences, after commitment to a given course of action, the chosen alternative should be valued more positively and the unchosen alternatives more negatively (Festinger, 1957).

The spreading-of-attitudes effect predicted by dissonance theory has been confirmed in a number of investigations (e.g., Brehm, 1956; Cottrell, Rajcicki, & Smith, 1974; Festinger, 1964b), although attitude change is often observed only with respect to the chosen alternative and not the rejected ones (e.g., Converse & Cooper, 1979; see Eagly & Chaiken, 1993). Moreover, some studies have failed to obtain support for specific predictions derived from dissonance theory concerning the effects of similarity of decision alternatives and commitment to the chosen course of action (e.g., Brehm & Cohen, 1955; Harris, 1969). To resolve questions raised by this research, it may be necessary to assess the processes that are presumed to mediate the predicted spreading of attitudes: selective attention to decision-consistent information, devaluation of dissonant elements, addition of consonant elements, and so forth (Eagly & Chaiken, 1993; Festinger, 1964b; Fishbein & Ajzen, 1975). After the initial burst of interest in postdecision processes stimulated by dissonance theory, this important area of research has been largely neglected.

**DECISION MAKING IN INTERACTIONS**

For the most part, the decision-making literature tends to focus on decisions made by individuals. Such decisions can take into account the perceived expectations and wishes of other people, an aspect made explicit in the subjective norm construct of attitude-behavior models. Similarly, in social interactions, people's choices are often shaped by the anticipated behaviors of their partners, a situation typically depicted by means of payoff matrices and analyzed formally by game theory (von Neumann & Morgenstern, 1947). Beyond the scope of the present chapter, most work on game theory has been done by economists concerned with the formal structure of different types of games (see, e.g., Fundenberg & Tirole, 1991, for a recent book on game theory), although there is also some interest in a more behavioral or descriptive approach (e.g., Camerer, 1990; Messick, 1985).

In many interactions, the interests of the interacting individuals converge in some respects but diverge in others, a mixture of motives that produces varying degrees of cooperation and competition. In social psychological work, matrix representations borrowed from formal game theory, especially varieties of "non-zero-sum" games, have been adapted to analyze situations of this kind. In these analyses, the outcomes of interacting group members are determined by their joint choices among available alternatives, but unlike the case of zero-sum games, in non-zero-sum games one person's gains need not come at the expense of other group members. By cooperating, the interacting individuals can arrive at a joint decision that is of some benefit to all.

Although game theory offers a wide range of non-zero-sum games, the pattern of interdependence captured by the prisoner's dilemma lent itself most directly to analyses of many social decision-making problems (see Rapoport, 1967; Rapoport & Chammah, 1965). In the two-person prisoner's dilemma game, each player has two options,
called cooperation and competition or defection. They attain the greatest joint outcome by cooperating, but the player who defects while the other cooperates gains even more. If both defect, however, they each lose or gain less than they could have obtained by joint cooperation. The dilemma is that if both act in their own short-term best interests, the pair as a unit and each member individually will lose out in the long run. Choice of the cooperative strategy in this game requires that the players trust each other; without such trust, the competitive strategy logically dominates cooperation.

A torrent of experimental research has explored cooperation and competition in the confines of the two-person prisoner’s dilemma game. Some of the major conclusions to come out of this work can be summarized as follows (see Apfelbaum, 1974, and Pruitt & Kimmel, 1977, for reviews):

1. Players tend to choose the competitive strategy, but cooperation can be greatly enhanced by instructions to maximize joint rather than individual payoffs.
2. Over a long series of trials, cooperation first declines and later rebounds.
3. The most important factor influencing strategy choices is the partner’s behavior: Cooperative or competitive choices by one partner tend to be reciprocated by the other.
4. Cooperation increases when its potential payoffs are large relative to the payoffs that can result from defection.
5. Prior communication between partners increases cooperative choices.
6. Contrary to cultural stereotypes, females tend to choose the competitive strategy more frequently than males.

Although results obtained within the prisoner’s dilemma paradigm are quite consistent, they have not contributed substantially to our understanding of decision making in realistic social interactions (Deutsch, 1980; Jones, 1985; Pruitt & Kimmel, 1977). Devoid of content that would give substance and meaning to the conflict represented in the prisoner’s dilemma game, the results of these simulations cannot readily be generalized to the real world. Other simulation games, notably Deutsch’s (1949; Deutsch & Krauss, 1962) trucking game, suffer from the same limitations (see, e.g., Kelley, 1965). In this game, each of two players is to move a truck to a destination point, but the shortest path is a common, one-lane road. The presence of gates at one or both ends of this road provide players with the power to block the other’s access. One of the main findings in this simulation is that players tend to threaten use of the gates, thus inducing each other to take a longer and more costly road to the destination. The shorter path is more likely to be used only when one player has a gate and when there are no alternative routes to the destination. In contrast to results with the prisoner’s dilemma game, the ability to communicate does not seem to enhance cooperation in this situation.

The complexity of mixed motive, conflict of interest situations may be beyond the reach of simple experimental simulations. Perhaps interesting in their own right, and suggestive of issues that may deserve our attention (Rapoport, 1970), games designed to simulate real-world conflict have not lived up to their initial promise.

GROUP DECISION MAKING

Many decisions, and often very important ones, are made not by individuals but by groups. Juries are called on to decide criminal and civil cases; committees set policy in government and industry, as well as in many medical, educational, and religious institutions; and legislative bodies pass laws that govern our lives. Frequently, the group’s purpose is not so much a question of maximizing expected utility as doing justice or finding workable solutions to complicated problems. Research has focused on the process whereby groups reach a decision, and on the quality of those decisions.

Members of many decision-making groups have shared goals and interests. It is possible to think of decision making in such groups as a problem of reconciling or combining the initial judgments or preferences of the individual group members. Even when group members share the same goals and purposes, conflicts can arise because of differences in the subjective probabilities they assign to the outcomes of a given decision alternative, differences in the subjective utilities they assign to these outcomes, or differences in the ways they integrate probabilities and utilities. Differences of this kind are at the heart of social judgment theory (Brehmer, 1976; Hammond, Todd, Wilkins, & Mitchell, 1966). Based on Brunswik’s (1955, 1956) lens model, social judgment research has examined the resolution of cognitive conflicts that arise from differences in decision strategies. Although judgment strategies tend to change rapidly in the face of disagreements, the new strategies are found to be applied inconsistently and disagreements often remain difficult to resolve (see Brehmer, 1976, for a review).

Social Decision Schemes

In interacting groups that permit discussion of the issues, some level of agreement, called the group’s decision rule, is required to cease deliberation and pronounce that a decision has been reached. Frequent decision rules are a plurality, a simple majority, a two-thirds majority, and the familiar unanimity rule usually required for jury verdicts (see Miller, 1989). Decision rules can be formal and explicit, perhaps codified in the voting rules of an organization’s bylaws, or informal and implicit, as when a committee chairperson senses that the discussion has produced sufficient consensus.

Individuals engaged in group discussion to reach a decision exert mutual influence on each other. Making assumptions about potential influence processes, social decision schemes (SDS) are models designed to predict the likelihood of each possible group decision on the basis of the initial distribution of preferences across individuals, together with the applicable decision rule (Davis, 1973, 1980; see Stasser, Kerr, & Davis, 1989). Much of this work has been done in the context of mock jury decisions, where the likelihood that a jury will acquit, convict, or be
h ung is to be predicted from the initial distribution of individual innocent and guilty judgments. Although not dealing directly with the process of interaction, SDS theory permits logical inferences to be drawn about the social influence processes that result in the observed group decisions (see also Hastie, Penrod, & Pennington, 1983; Penrod & Hastie, 1980).

Research on mock jury decisions has varied the type and difficulty of the case; the amount, type, and order of evidence; the size and composition of juries; the decision rule; and the nature of the instructions (e.g., regarding the meaning of reasonable doubt). Many empirical tests have shown that it is usually possible to find a social decision scheme that provides an acceptable fit to the data; it is possible, over a wide range of conditions, to predict the distribution of verdicts across mock juries from knowledge of initial judgments (see Davis, 1980; McGrath, 1984; Penrod & Hastie, 1979; Stasser, Kerr, & Bray, 1982). More often than not, the decision scheme that provides the best fit is one that assumes a two-thirds majority rule. Whichever verdict is initially favored by a two-thirds majority tends to be adopted by the group (e.g., Davis, Bray, & Holt, 1977; Davis, Kerr, Atkin, Holt, & Meck, 1975).

Decision Polarization in Groups

Compared with decisions reached by individuals, group decisions tend to be more extreme, generally in the direction of the position initially preferred by the majority of group members (for reviews, see Cartwright, 1973; Dion, Baron, & Miller, 1970; Isenberg, 1986; Lamn & Myers, 1978). Contrary to popular opinion, which considers groups to be relatively conservative, initial research suggested that groups actually take greater risks than the average individual (Stoner, 1961, 1968). Later research, however, showed that group-induced shifts are independent of the degree of risk involved (see Moscovitch & Zavalloni, 1969). Whatever the issue, the interaction that occurs during group discussions toward consensus appears to polarize the final decision.

A large number of explanatory mechanisms were proposed to account for group-induced polarization (see Pruitt, 1971a, 1971b), but only two have stood up to empirical tests. The social comparison or normative influence explanation attributes the polarizing effect of group discussion to the normative pressures that arise as individuals try to fit into the group. Learning that their position disagrees with the majority opinion, they revise their stand in the majority direction to present themselves in a favorable light. The alternative persuasive argumentation hypothesis views the information exchanged during group discussion as the crucial factor. It assumes that a greater number of valid arguments unfamiliar to the rest of the group is available in support of the majority position than in support of the minority position. The weight of the evidence sways the minority in the direction of the majority (Burnstein & Vinokur, 1975, 1977; Vinokur & Burnstein, 1974, 1978).

The normative and informational interpretations of group-induced polarization have each been supported by empirical research (see Isenberg, 1986; Myers, 1982), suggesting that both processes may play an important part. Attempts to demonstrate the operation of normative influence have generally shown that polarization can be induced by providing information about other group members' positions, without group discussion that would expose individuals to new arguments (e.g., Blascovich, Ginsburg, & Veach, 1975; Myers, 1978). Support for the importance of persuasive argumentation comes from studies in which the extent of polarization is found to increase with the number of valid and novel arguments to which group members are exposed (e.g., Ebbesen & Bowers, 1974; Kaplan & Miller, 1977; Vinokur & Burnstein, 1978).

Dysfunctional Group Decision Making

When taken to the extreme, normative pressures exerted by a group can prevent dispassionate consideration of decision alternatives and can lead to the adoption of counterproductive decisions. This type of dysfunctional decision-making process has been termed groupthink (Janis, 1972), a strong psychological need for consensus that is hypothesized to emerge in relatively isolated and cohesive decision-making groups. In many ways, the cognitive processes said to occur under conditions of groupthink resemble the cognitive biases and errors of individual decision makers, but they take on added force and somewhat different shape in the group context. Among the hypothesized biases are an illusion of unanimity created by suppression of disagreements, rationalization of shared beliefs, adherence to a position in the face of contradictory information, and an illusion of invulnerability due to the protective shield of the group. Group members, especially self-appointed "mindsuases," exert direct pressures toward conformity. As a result, groupthink is expected to lead to poor information search and insufficient attention to the risks of the preferred option; it may discourage systematic consideration of alternative courses of action and lead to the failure to prepare contingency plans (see Janis, 1972; Janis & Mann, 1977).

According to Janis (1972), serious policy blunders have resulted from decision making in the groupthink mode, including American unpreparedness for the attack on Pearl Harbor, the disastrous Bay of Pigs invasion, and the Watergate cover-up. In fact, much of the support for the groupthink analysis comes from case studies of this kind. Recent reviews of the literature, however, have raised concerns about deficiencies in the theory itself and about lack of empirical support for various aspects of the model (see Aldag & Fuller, 1993; Longley & Pruitt, 1980; Park, 1990).

CONCLUSIONS

Work on decision making has come a long way. The initial assumption that decisions are designed to maximize expected utility has proved insufficient to explain actual choices among behavioral alternatives. At the risk of oversimplifying a complex body of research, it may be said that much of the work performed in the past 20 years was driven by attempts to falsify normative models of decision-making processes.
making. In response to the failure of normative models, theory and research became more descriptive, trying to identify how decision problems are formulated, what kinds of information are taken into account and what kinds are neglected, and how these processes impact behavioral decisions. A large number of cognitive and motivational biases were identified and found to produce systematic errors in human judgments.

Social psychologists made important contributions to this effort by demonstrating the operation of cognitive and motivational biases in social judgments, and by applying this knowledge to explain many social psychological phenomena. They also went beyond individual decision making to explore the processes that come into play when people in groups are required to arrive at joint decisions. Perhaps their greatest contribution to our understanding of decision-making processes, however, can be found in theory and research that link social judgments on the one hand to carrying out a behavioral decision on the other. Even if biased, the various cognitive and motivational processes that have been identified lead to the formation of beliefs about the alternative courses of action, about their advantages and disadvantages, about the resources they require, about the expectations of other people, and so forth. Although subjective and not necessarily accurate, these beliefs guide the decisions people make, and it is by examining the beliefs people hold that we can gain an understanding of decision making in real-life situations.

Many of the questions that served as the initial impetus for work on decision making seem to have been answered. Although the establishment of objective accuracy criteria represents a thorny philosophical problem, there is now widespread agreement that human judgments and decisions do not conform to the prescriptions of normative models. These models may provide reasonably good first approximations, but they fail at a descriptive level, and judgments often deviate systematically from predictions. The model of human beings as intuitive statisticians and rational decision makers has given way to the view that although not rational, people are reasonable in their judgments and decisions. They consider a limited set of alternatives sufficient to meet their needs, and they usually take into account a limited amount of information whose relevance to the decision is readily apparent.

Although efforts continue to develop formal models that will do justice to this revised view of the decision maker, there are indications that investigators are turning their attention to a new set of problems. Most theories of decision making, as well as social psychological models that link beliefs to attitudes, and attitudes to intentions and behavior, have dealt primarily with conscious, deliberate, volitional processes. People’s beliefs and attitudes are said to follow reasonably from the available information, and their decisions and actions are taken in a deliberative manner to be consistent with their beliefs and values. Work on dual-mode processing of information, however, suggests that the deliberate mode of operation may have to be supplemented by a spontaneous mode in which cognitive and motivational processes operate at an unconscious level and influence decisions and actions automatically without extensive cognitive mediation. Questions related to automatic aspects of decision making have become a major focus of concern and are likely to stimulate theory and research in the years to come.

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Course: Social Psychology and Decision Making

Instead of an isolate individual process, decision making is often either explicitly or implicitly influenced by the presence of other people. This block takes a social psychological perspective on decision making. The course focuses on: how people's decision making processes are influenced by the actual or imagined presence of others and, how decisions are made in collectives of people. The block introduces a number of social psychological concepts and connects these to decision making research. Tutorial groups (seminars) are the primary teaching tools. Social psychologists have new information about how people divide the world into “us” and “them” that sheds new light on how discrimination operates. Finally, there has been important new research into the dimensions along which people think that they are different from other people, which helps explain why people might engage in practices that they would condemn in others.

1. We focus on three types of theories that executives use in making decisions: theories about the world, theories about other people, and theories about ourselves. S. Plous, The Psychology of Judgment and Decision Making (New York: McGraw Hill, 1993). A forthcoming book will explore these and other topics in greater detail. See Decision making refers to the act of evaluating (i.e., forming opinions of) several alternatives and choosing the one most likely to achieve one or more goals. Common examples include deciding for whom to vote, what to eat or buy, and which college to attend. Decision making plays a key role in many professions, such as public policy, medicine, and management. Thus, following research in social and cognitive psychology, researchers have started employing various process measures (e.g., verbal protocols) and manipulations that were designed to provide a better understanding of the processes underlying judgment and choice. How Judgments and Decisions Are Made.