

THE ROLE OF AFFECT IN DECISION MAKING

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Until recently, emotions attracted little attention from decision researchers. Decision making was viewed as a cognitive process—a matter of estimating which of various alternative actions would yield the most positive consequences.¹ Decision makers were assumed to evaluate the potential consequences of their decisions dispassionately and to choose actions that maximized the “utility” of those consequences. Once chosen, it was assumed that the utility-maximizing course of action would be implemented automatically.

The critiques of traditional decision theory that emerged in the late 1960s under the heading of “behavioral decision theory” largely adhered to this cognitive perspective. The main thrust of behavioral decision theory has been to identify (1) cognitive errors that people make when they judge the likelihood of future consequences and (2) simplifying heuristics that people use to cope with the complexity of decision making (e.g., Tversky & Kahneman, 1974). The boom in decision research associated with the emergence of behavioral decision theory, then, largely ignored the role played by emotions in decision making.

The last several years, however, have witnessed a burst of interest in the role of emotions in decision making. Research conducted within the last decade has shown that (1) even incidental affect—*affect that is unrelated to the decision at hand*—can have a significant impact on judgment and choice (for reviews, see Clore, 1992; Forgas, 1995; Isen, 1993; Lerner & Keltner, 2000; Schwarz, 1990), that (2) emotional deficits, whether innate (Damasio, 1994)

or experimentally induced (Wilson et al., 1993), can degrade the quality of decision making, and that (3) incorporating affect in models of decision making can greatly increase their explanatory power (Lopes, 1987; Lopes & Oden, 1998; Mellers, Schwartz, Ho, & Ritov, 1997). Thus, contemporary decision research is characterized by an intense focus on emotion.

Our goal in this chapter is to highlight and organize these new emotion-related developments in decision research. We organize our review around a general theoretical framework for understanding the different ways in which emotions enter into decision making. Such a framework, we hope, can facilitate integration of the wide-ranging findings that have emerged from recent research and shed new light on several central topics in decision theory, such as how people deal with outcomes that are uncertain and how they discount delayed costs and benefits.

The proposed framework helps to address not only descriptive issues but also normative ones. Throughout recorded human intellectual history there has been active debate about the nature of the role of emotions or “passions” in human behavior, with the dominant view being that passions are a negative force in human behavior (for discussion, see Elster, 1999; Hirschman, 1977; Solomon, 1993; Zajonc, 1998). By contrast, some of the latest research has been characterized by a new appreciation of the positive functions served by emotions (e.g., Damasio, 1994; Frank, 1988, 1992; Isen, 1993).² By clarifying some of the different ways in which emotion enters into deci-

sion making, our framework sheds light on both the functions and the pitfalls of emotional influences on decision making. Emotions clearly do serve essential functions in decision making, but they are also a potential source of biased judgment and reckless action (see Averill, 1983; Berkowitz, 1990; Tangney, Hill-Barlow, et al., 1996; Tangney, Wagner, et al., 1996).

Two Types of Affective Influences

To understand the different roles played by emotions in decision making, one needs to distinguish two different ways in which emotions enter into decision making. These two influences are depicted in Figure 31.1.

The first influence—of *expected emotions*—consists of predictions about the emotional consequences of decision outcomes. Dominant models of decision making, such as the expected utility model, assume that people attempt to predict the emotional consequences associated with alternative courses of action and then select actions that maximize positive emotions and minimize negative emotions. This influence of expected emotions on decision making is depicted in Figure 31.1 by line *a*, running from the expected emotions produced by the consequences of a decision to the decision itself. As an example, consider an investor's choice of whether to move some of her savings into a risky high-tech stock fund. In making this decision, the investor might attempt to predict the probabilities of different outcomes, such as losing or gaining different amounts of money (line *e*, stemming from the decision to its expected consequences) and how she would feel under the various scenarios she can envision (line *f*, running from consequences to feelings). For example, she might muse, "If I invest in the high-tech fund and it happens to take a dive at this moment, I'll feel regret about having transferred the funds." The desire to avoid experiencing regret might then dissuade her from transferring the funds (line *a*). Note that the expected emotions are not experienced as emotions per se at the time of decision making; rather, as the label suggests, they are expectations about emotions that will be experienced in the future. The first section of this chapter focuses on expected emotions.

The second kind of affective influence on decision making, discussed in the second section, consists of *immediate emotions* that are experienced at the time of decision making. Immediate emotions influence decision making in two qualitatively distinct ways: (1) They can exert a *direct* impact, as depicted in Figure 31.1 by line *d*, and (2) they can exert an *indirect* impact, by altering the decision maker's expectations of the probability (line *h*) or desirability (line *i*) of future consequences or by changing the way that these consequences (objective and emotional) are processed.³ Both direct and indirect impacts of im-

mediate emotions can be illustrated by the example of the conflicted investor. As an example of a direct impact, the prospective investor might experience immediate anxiety at the prospect of shifting savings to the high-tech fund. This anxiety might then deter her from investing in the risky stock. As an example of an indirect influence, her preexisting good mood when she is making her decision may make her feel more optimistic about the prospects of the fund, about her ability to shrug off regret if the fund were to drop in value, or about the gratifying uses to which any profits could be put. All of these influences might encourage her to "throw caution to the wind."

As the investing example illustrates, immediate emotions reflect the combined effects of emotions that arise from contemplating the consequences of the decision itself—what we call *anticipatory influences*—as well as emotions that arise from factors unrelated to the decision, which we call *incidental influences*.⁴ Anticipatory influences are depicted in Figure 31.1 by lines *b* and *c*, running from expected consequences and expected emotions to immediate emotions. Returning to the conflicted investor, the act of thinking about the objective or subjective consequences of investing or not investing in the fund could induce anxiety. Note, however, that anticipatory influences are not simply a shrunken version of the emotions that will be experienced in the future once the fund has either gained or lost in value but are qualitatively different. In general, because immediate emotions depend on a variety of factors that have little or no influence on expected emotions, the immediate emotions associated with thinking about the consequences of a decision will differ in intensity and quality from the emotion experienced when the consequence occurs. Because the nature of these anticipatory emotions and their determinants are different from the nature and determinants of expected emotions, anticipatory emotions often propel behavior in directions that are very different from those that arise from a contemplation of expected consequences and their associated emotions (for applications of this point to decision making under risk, see Loewenstein, Weber, Hsee, & Welch, 2001). For example, many people experience intense fear when they think about flying in airplanes, even though they recognize that the risks are minuscule. At the opposite extreme, the same person who is afraid of flying may experience no fear about driving but recognize that the objective risks of driving are far greater.

Incidental influences on immediate emotions are depicted by line *g* in Figure 31.1. Recall that incidental influences are emotional influences that do not result from consideration of the decision(s) at hand. Such influences could include the individual's immediate environment or chronic dispositional affect. As suggested, if the weather is warm and sunny, the conflicted investor might experience incidental happiness at the time she contemplates

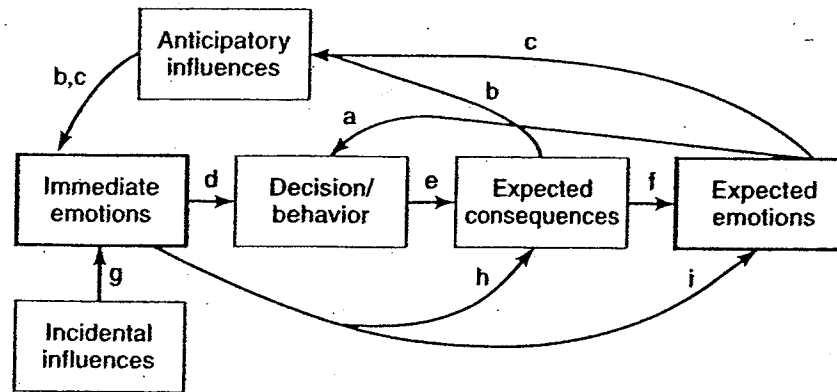


Figure 31.1 Determinants and consequences of immediate and expected emotions.

her choice. Note that incidental influences, by their very definition, are unrelated to the expected emotional consequences of the decision and are thus especially likely to produce divergences between immediate and expected emotions.

Emotions can enter into decision making in other ways that are not depicted in Figure 31.1 and which we do not discuss in any detail. For example, decisions that are difficult to make, perhaps because they involve "taboo" trade-offs such as lives against money, can evoke negative emotions (Luce, 1998; Luce, Bettman, & Payne, 1997; Luce, Payne, & Bettman, 1999), which can influence decision makers' choice processes or even cause them to avoid the decision altogether.

The remainder of the chapter is organized as follows. The first section reviews research on expected emotions. We begin by discussing some of the unrealistic assumptions that decision theorists sometimes make about the emotional consequences of decision making. Next, we review different attempts to increase the realism with which expected emotions are modeled, focusing on two important generic categories of decision making: decision making under risk and intertemporal choice. Finally, we review research on "affective forecasting," which documents systematic errors people make when predicting the emotional consequences of their own decisions.

The second section reviews research on the effects of immediate emotions on decision making. We first discuss the different routes, both direct and indirect, by which immediate emotions influence decision making. Next, we discuss the determinants of immediate emotions, focusing in turn on anticipatory and incidental influences. Of special concern is the question of why immediate emotions often propel decision makers in directions that are different from those that would be dictated by a contemplation of expected emotions. We end the section with a discussion of the conditions under which immediate emotions do and do not affect decision making.

We conclude the chapter with a discussion of the benefits and pitfalls of emotional influences on decision making. This discussion draws explicitly on our theoretical framework and its differentiation between expected and immediate emotions. Expected emotions clearly play an essential role in decision making; indeed, most theories of decision making assume that they are all that matter. However, two major factors limit the efficacy of decision making based on expected emotions: the fact that people systematically mispredict their own affective reactions to the outcomes of their own decisions and the fact that expected emotions leave out "gut" considerations that are important to people. The strength of immediate emotions is that they provide such amorphous, but often important, inputs into decision making. The pitfall of immediate emotions is that they often crowd out considerations of expected emotions altogether and cause people to make decisions that ignore or underweight important future consequences. Both types of emotions, therefore, are essential to decision making, but the wrong mix in the wrong situation can be destructive.

Expected Emotions

Descriptive and prescriptive theories of decision making, to the degree that they incorporate emotions at all, typically assume that expected emotions are the only emotions that matter. Decision making is viewed as consequentialist in character; people are assumed to choose options that they expect will maximize the net balance of positive to negative emotions (e.g., "I'll be happier if I choose a red car instead of yellow car"). Many theories are quite naive, however, in the implicit or explicit assumptions they make about the determinants of emotion or in the way that they are taken into account by decision makers. In this section, we enumerate some of these unrealistic assumptions about emotions and the efforts that have been

made to develop theoretical models that incorporate more realistic assumptions.

Consequentialist Decision Theories and Their Assumptions

Even when decision theorists do not deliberately make any assumptions about emotions, their theoretical models inevitably incorporate implicit assumptions. Models of decision making, such as the expected utility model, that continue to be widely employed in research and applied in practical settings assume that all people care about are the concrete, absolute outcomes of their decisions. In contrast, modern cognitive-appraisal theories of emotion capture the insight that the emotions associated with outcomes depend not only on the specific outcomes that are experienced but also on a host of other characteristics, such as whether those outcomes were expected or unexpected and whether they were caused by situational or individual factors (Lazarus, 1991; Ortony, Clore, & Collins, 1988; Roseman, 1984; Scherer, 1999; Smith & Ellsworth, 1985; Weiner, 1986).⁵

This next section reviews efforts by decision researchers to develop more descriptively realistic models of the role of expected emotions in decision making. To make sense of these efforts, some background on consequentialist models of decision making is essential. Consequentialist models of decision making address two major problems, each of which has spawned a large amount of research. The first problem, which is addressed by models of *decision making under risk*, is how to choose among outcomes that may not happen—that is, that are probabilistic. If people choose options so as to produce maximally desirable consequences, they must evaluate not only the desirability of different outcomes but also their likelihood of occurring, and they must integrate these likelihoods into their decision-making calculus in some fashion. The second problem, which is addressed by models of *inter-temporal choice*, is how to make decisions involving consequences that extend over different points in time.

Decision Making Under Risk

For centuries, the dominant theoretical model for dealing with uncertainty was the expected utility model (EU). EU remains in widespread use despite ample evidence of its limitations (for recent reviews of EU's limitations, see Camerer, 1992; Harless & Camerer, 1994). EU assumes that people choose between alternative courses of action by assessing the desirability or "utility" of each action's possible outcomes and weighting those utilities by their probability of occurring. The normative status of EU was enhanced by the demonstration by von Neumann & Morgenstern (1944) that the model could be derived from a fairly compelling set of choice *axioms*. These axioms are

primitive, and seemingly sensible, assumptions about decision making, such as that people should obey transitivity—if they prefer gamble A over B and B over C, then they should prefer A over C. However, descriptive research has identified a number of expected utility *anomalies*—patterns of behavior that contradict the axioms and therefore violate the predictions of the model (Kahneman & Tversky, 1979; Tversky & Kahneman, 1984). Many of these anomalies can be attributed to the model's unrealistic assumptions about emotions. Next we review several of these assumptions and efforts to update them.

First Innovation: Relaxing the Assumption of Asset Integration

Perhaps the single most important theoretical advance in modeling decision making under uncertainty has been the abandonment of the assumption of "asset integration." EU, as it was originally proposed, assumes that what people care about—what makes them happy or sad—is their overall situation after consequences occur. However, as first pointed out by Markowitz (1952) and developed further by Kahneman and Tversky (see also Kahneman & Tversky, 1979; Tversky & Kahneman, 1992), when people evaluate the possible consequences of gambles, they do not think in terms of the final levels of wealth associated with different outcomes but in terms of incremental gains and losses.

To illustrate this modification, consider an individual's choice of whether to accept or reject a gamble that offers a 50% chance of winning \$200 and a 50% chance of losing \$100. If the individual currently possesses \$100,000 in wealth, then EU assumes that she views this choice as one between the utility of a sure level of wealth of \$100,000 or a 50% chance of experiencing the utility associated with \$99,900 and a 50% chance of experiencing the utility of \$100,200. Markowitz (1952) pointed out, however, that most people would not view the gamble in these terms but would instead perceive the choice as one between the utility of gaining and losing nothing and a 50-50 chance of gaining \$200 or losing \$100. If the individual gambled and ended up \$100 poorer, she might *want* to react joyfully by thinking, "I feel great because I have \$99,900," but the reality is that she would more likely lament having lost \$100. Incorporating the assumption that people choose between risky prospects based on their anticipated feelings toward gains and losses (as opposed to final asset positions) is a major step in the direction of realism about emotions and has wide-ranging implications for decision making (Tversky & Kahneman, 1984; Yates, Yaniv, & Smith, 1991).

Other recent models of decision making under uncertainty not only relax the assumption of asset integration but also explicitly account for the fact that individuals care about emotional attributes of choice alternatives. In

contrast to the expected utility model and its variants, which assume that people evaluate gambles in terms of probabilities and utilities of their outcomes, Lopes and colleagues (Lopes, 1987; Lopes & Oden, 1998) argue that risky decision making is a function of two dimensions: security/potential and aspiration level. Security/potential is a dispositional variable that is closely related to risk aversion. Security-minded individuals, according to the theory, focus on the worst outcome of a gamble, whereas potential-minded individuals focus on the best. Aspiration level is a situational variable that reflects the opportunities at hand, as well as the constraints imposed by the environment (e.g., the decision maker's need to earn a certain amount). Initial tests of this model do suggest that some people focus on best outcomes and others focus on worst outcomes. However, the exact role that affect plays in these effects remains to be specified.

Second Innovation: Pleasure and Pain from Counterfactual Comparisons

A second line of efforts to modify EU in the direction of greater emotional realism responds to the observation that people often compare the consequences of their decisions to what could have happened under different circumstances, which results in "counterfactual emotions" (see Mellers et al., 1997). Two important counterfactual emotions are disappointment and elation, both of which stem from a comparison of what happens against what was expected to happen. Winning nothing from a gamble is likely to feel worse if the alternative was to win \$1,000 than if it was to win \$100 and worse if there was a 99% chance of winning the \$1,000 than if there was only a 1% chance of winning the \$1,000. These types of emotional reactions are incorporated into a number of different "disappointment theories" of decision making under risk (Bell, 1982; Gul, 1991; Loomes & Sugden, 1986).

A particularly striking example of the role of counterfactual thoughts in shaping emotion comes from research on Olympic medalists in the 1992 games. Medvec, Madley, and Gilovich (1995) found that bronze medalists, on average, displayed more positive affect when receiving their medals than did silver medalists. To explain these findings, Medvec and Savitsky (1997) proposed that just making a cutoff, as in the case of bronze medalists, elicits downward counterfactual comparisons ("I might have not won any award"). By contrast, just missing a cutoff, as in the case of silver medalists, elicits upward counterfactual comparisons ("I might have won the gold"). Thus, counterfactual thoughts can reverse the expected relationship between objective achievement and subjective satisfaction.

Other theories incorporate a different counterfactual emotion—regret—which results from a comparison between the outcome one experiences as a consequence of

a decision and the outcome one would have experienced if one had chosen differently. Early versions of regret theory (Loomes & Sugden, 1982) predicted that decision makers' desire to minimize feelings of regret could lead to suboptimal decision outcomes, such as *violations of transitivity* and *violations of dominance* (if A offers higher probabilities of superior outcomes than B, then it should be chosen; Bell, 1982; Loomes, Starmer, & Sugden, 1992). But empirical tests have, at best, provided mixed support for either regret or disappointment theories. Robust and systematic effects of regret have mainly been observed in conditions that make the possibility of regret highly salient to decision makers (Zeelenberg & Beattie, 1997; Zeelenberg, Beattie, van der Plight, & de Vries, 1996).

The mixed support for early regret and disappointment theories may be surprising to those who have experienced the intensity of these emotions. However, note that for regret or disappointment to influence decision making, it is not sufficient that it *occurs*. Although regret and disappointment may be experienced intensely *after* the consequences of one's actions are experienced, to influence decision making they must be anticipated at the moment of decision and taken into account. Moreover, even if people do anticipate experiencing regret or disappointment, they might believe it is not sensible to take these emotions into account and hence might try to prevent them from influencing their decisions.⁶ Thus, for example, it seems unlikely that the Olympic athletes studied by Medvec et al. (1995) trained any less hard (or harder!) because they imagined themselves not being happy if they won a silver medal; they probably were not aware of the effect and would not consider it relevant to their decision making if they had been.

Another possible reason for the mixed empirical support for regret theories may be that they are misspecified. The original regret theories (Bell, 1982; Loomes & Sugden, 1982, 1987) assumed that the intensity of experienced regret depends on a simple comparison of the outcome one experiences against the outcome one would have experienced if one had made a different choice. Consider, for example, the choice between gambles A and B represented in the table below, in which the payoffs depend on the roll of a die. The theory assumed that if an individual chose gamble B and rolled a 4 (giving her a payoff of \$10), she would experience a level of regret that depended only on the comparison of \$10 (what she received) to \$20 (what she would have received if she had chosen A).

Choice	roll 1, 2, or 3	roll 4	roll 5 or 6
A	\$10	\$20	\$0
B	\$20	\$10	\$0

This assumption is probably unrealistic. Sugden (1986), for example, questions whether it is regret that people really care about (and avoid) or whether it is *recrimination*—

regret accompanied by the feeling that one should have known better. Given that gamble B is obviously the right choice, Sugden would predict that the individual would feel much less bad if, having chosen B, she rolled a 4 than if, having chosen A, she rolled a 1, 2 or 3. In naturalistic settings, especially given the operation of hindsight (Fischhoff, 1975), recrimination may be particularly intense because, after the fact, people will almost always be able to find clues that they believe should have been evident beforehand about which decision would provide the best payoff.

Overcoming the mixed support of early regret theories, a recent series of studies explicitly built in the assumption that people care not only about the relative outcomes of a decision but also about what the chosen outcome implies for their own self-evaluation as a competent, intelligent person (see Josephs, Larrick, Steele, & Nisbett, 1992; Larrick, 1993). Specifically, these researchers hypothesize that a motive to protect self-esteem from the threat of regret about a particular choice will influence the choice, especially if the decision maker will receive feedback about the results of forgone alternatives. Several studies support this view. For example, Larrick and Boles (1995) compared two employment negotiation situations, one in which coming to agreement on salary precluded recruits from receiving other salary offers (limited regret potential), the other in which other salary offers might still be received even after agreement had been reached (maximal regret potential). Results revealed that recruits were willing to settle for less money when reaching agreement would preclude receiving feedback. According to the researchers, the motivation to avoid experiencing regret (in this case, if a better offer came through) can have a strong influence on decision making.

Mellers, Schwartz, Ho, and Ritov (1997) have also proposed a new theory that incorporates counterfactual emotion and that appears to have greater explanatory power than the early regret theories. The theory assumes that the feelings associated with the resolution of uncertainty depend not only on the outcome one would have experienced had one made a different choice (as in regret theories) and on the a priori probability of experiencing a better or worse outcome (as in disappointment theories) but also on the *surprise* that one experiences. Mellers et al.'s theory can therefore be viewed as a synthesis of disappointment and regret theories that also incorporates the idea that people respond with greater emotional intensity to outcomes that are surprising—that is, unexpected.

Third Innovation: Nonlinear Probability Weighting

A third significant theoretical breakthrough in modeling decision making under risk has come from the recognition that the weight that people place on the various potential consequences of a decision is not directly proportional to

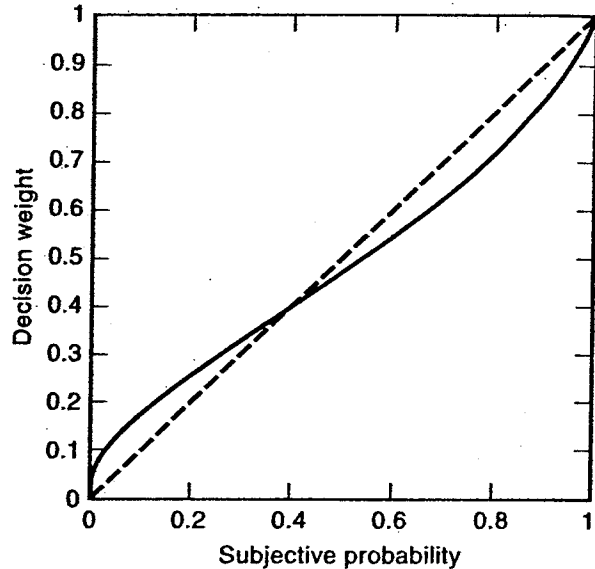


Figure 31.2 Probability weighting function.

the probability of the consequence occurring. Whereas EU assumes that people weight uncertain outcomes according to their raw probability of occurring, numerous studies have shown that a nonlinear probability weighting function best describes behavior (see, e.g., Edwards, 1953, 1954; Kahneman & Tversky, 1979; Quiggin, 1982). Figure 31.2 illustrates a probability weighting function that is broadly consistent with observed decision-making behavior. The function incorporates three primary assumptions: (1) that people overweight small probabilities, (2) that they are insensitive to variations of probability in the mid-range, and (3) that they underweight moderate and high probabilities (Prelec, 1998). The impact of the first and third of these features can be glimpsed in parimutuel betting (e.g., on horses or dogs): Because people overweight small probabilities, long shots (which have a small probability of winning) tend to be favored by amateur bettors (and hence provide substandard returns). Because they underweight moderate and high probabilities, strongly favored entrants (which have a high probability of winning) tend to be undervalued (Hausch, Lo, & Ziemba, 1994; Thaler & Ziemba, 1988). (In the second section, which focuses on immediate emotion, we elaborate on the possible role played by immediate emotions in probability weighting.)

Intertemporal Choice

Recall that the second major problem that confronts consequentialist models of decision making is how to evaluate consequences of decisions that are delayed in time—that is, decisions that involve a temporal dimension. The discounted utility model (DU) is the dominant model of decision making that specifies how decision makers deal with delayed outcomes (see Loewenstein, 1992). DU is

closely parallel to EU in structure and underlying assumptions. Like EU, DU has been axiomatically derived (Koopmans, 1960), and a series of DU anomalies have been identified that call into question the descriptive realism of the axioms (Loewenstein & Prelec, 1992).

First Innovation: Hyperbolic Discounting

The discounted utility model assumes that people treat future flows of utility in much the same way that financiers treat money flows—that they *discount* them at a fixed discount rate according to when they will be experienced. Most models of intertemporal choice assume that people generally place less weight on outcomes that are delayed, referred to as “positive time discounting.” Discounting at a fixed rate means that a given time delay leads to the same discounting regardless of when it occurs. Thus delaying delivery of an object by 1 month leads, according to DU, to the same degree of time discounting, whether the delay makes the difference between experiencing the outcome in 1 month rather than immediately or in 24 months rather than 23 months. There is, however, overwhelming evidence that people (as well as other animals) do not discount the future in this fashion (Kirby & Herrnstein, 1995; Rachlin & Raineri, 1992; Vuchinich & Simpson, 1998). Rather, people care more about the same time delay if it occurs earlier than if it occurs later. This general pattern, which has been labeled “hyperbolic time discounting” (Ainslie, 1975), has profound implications for behavior. Most important, hyperbolic time discounting can produce a pattern of behavior that is commonly referred to as “impulsivity.” People are farsighted toward future decisions; they choose options that give substantial weight to long-term costs and benefits. However, when making decisions with immediate consequences, they will tend to be much more shortsighted and to place disproportionate weight on immediate costs and benefits.

Although hyperbolic time discounting is well documented, it has significant limitations as an explanation for impulsivity (see Loewenstein, 1996). First, it does not explain why certain types of consumption are commonly associated with impulsivity whereas others are not. People commonly display impulsive behavior when they are hungry, thirsty, sexually aroused, or in elevated emotional states such as anger or fear. When not in one of these states, people often make relatively evenhanded trade-offs between immediate and delayed gratifications. The hyperbolic discounting perspective has difficulty accounting for such situation- and reward-specific variations in impulsivity. Second, the hyperbolic discounting perspective cannot explain why many situational features other than time delay—for example, physical proximity and sensory contact with a desired object—are commonly associated with impulsive behavior (Hoch & Loewenstein, 1991). For example, pet shops rely on the emotions elicited by physical

contact with a cute animal to produce impulse acquisitions by people whose homes are not set up for a pet.

As the foregoing discussion suggests, an additional factor that may be operating in these situations is the impact of immediate emotions. Many emotional states, as well as physical drives such as hunger and sexual desire, are powerfully influenced by temporal and other forms of proximity. Neurochemical research on animals shows that the expectation of an imminent reward produces an aversive dopaminic state in the brain that is analogous to the impact of food expectation on hunger (Gratton & Wise, 1994). That is, the mere expectation of an imminent reward seems to trigger appetitive mechanisms at the most basic level of the brain’s reward system. Short time delays, however, are only one factor that can produce such a visceral response. Other forms of proximity, such as physical closeness or sensory contact (the sight, smell, sound, or feeling of a desired object), can elicit visceral cravings and alter one’s course of action (Rolls, 1999). In addition, dispositional affect may serve to amplify or attenuate these effects. Ability to delay gratification varies across individuals (Mischel, Shoda, & Peake, 1988), as does susceptibility to experiencing positive versus negative affective states (Larsen & Ketelaar, 1989).

The case of hyperbolic discounting, therefore, illustrates the difficulty of separating out the influence of expected and immediate emotions. In this case, an innovation in modeling expected emotions—the assumption that people discount delayed costs and benefits hyperbolically—may represent an attempt to deal with effects that are at least partially produced by immediate emotions.

Second Innovation: Affective Forecasting

An important complication that affects intertemporal decision making is the fact that tastes often change with the passage of time. Changes in tastes can result from a multitude of factors: fluctuations in bodily states such as hunger and satiation; habit formation as a result of past consumption; and maturation as a function of aging and life experiences. Normative models of decision making assume that the only tastes that are relevant to decision making are those that prevail at the time at which the consequences of decisions are experienced. However, considerable research on “affective forecasting” finds that people make systematic errors in predicting their own future tastes (for a review of these errors, see Loewenstein & Schkade, 1999; for a formal model of these errors and discussion of their consequences for economic behavior, see Loewenstein, O’Donoghue, & Rabin, 2000).

Two sources of misprediction errors identified in the literature are (1) people’s underappreciation of their own powers of adaptation to both favorable and unfavorable events (see Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Loewenstein & Frederick, 1997) and (2) the ten-

dency to exaggerate the hedonic impact of any event on which one's attention is focused (Wilson, Wheatley, Meyers, Gilbert, & Axson, 2000). Numerous studies have obtained results that are consistent with one or both of these effects. Schkade and Kahneman (1998), for example, found that students at Midwestern universities thought they would be happier in California, and students at California universities believed they would be less happy in the Midwest, despite no significant difference between the two groups in mean levels of self-reported well-being.⁷ Loewenstein and Frederick (1997) found that, across a wide range of changes in objective circumstances, people expected future changes to affect their overall well-being much more than they believed that matched changes in the past had actually affected their well-being; they seemed to recognize that they had adapted to change that took place in the past but not to realize that they would adapt to similar change in the future. An especially interesting example of failure to predict adaptation involved reactions to tenure decisions among university faculty. Gilbert et al. (1998) studied assistant professors' forecasts of how they would feel at various points in time after their tenure decisions and compared these forecasts to the self-reported well-being of others whose tenure decisions had been made in the past. Current assistant professors predicted that they would be much happier during the first 5 years after a positive decision and much less happy after a negative decision, but recognized that the impact of the tenure decision would be minimal 5 years later. In fact, both groups converged to baseline levels of happiness shortly after the decision. All of these findings, as well as many others, could be attributed to either a focusing illusion (when people exaggerate the impact on well-being of specific narrow changes in their circumstances) or to underprediction of adaptation (when people underappreciate the degree to which they will get used to the changes).

Synthesis of Expected Emotions

Decision researchers are becoming increasingly sophisticated when it comes to modeling people's emotional reactions to the consequences of their own decisions. Major advances include recognizing that people (1) respond emotionally to relative changes in their situations rather than to the absolute consequences of their decisions, (2) compare what happened against counterfactual scenarios and derive utility not only from concrete outcomes but also from what the outcomes imply for one's competence, and (3) discount outcomes for uncertainty and time delay in a fashion that is different from that specified by standard models. All of these advances have important consequences for decision making, and incorporating these insights into models of decision making increases the models' explanatory power.

As researchers are becoming more sophisticated in modeling people's emotional reactions to outcomes, they are also becoming aware of limitations in people's ability to predict their own hedonic reactions to events. Such miscalculations may constitute a major source of suboptimality in decision making. Many, if not most, of the consequences of decisions occur in the future, when the emotions an individual experiences may be different from those that prevailed when the decision was made. Optimal decision making involves making decisions that will result in positive emotions at the time at which the consequences of the decision will actually be experienced. But the different types of forecasting errors just discussed suggest that people are often systematically biased when it comes to predicting those emotions.

Immediate Emotion

Recall that emotions enter into decision making not only as future anticipated consequences (i.e., expected emotions) but also as feelings experienced at the moment of decision making. Such immediate emotions often drive behavior in directions that are different from those dictated by a consequentialist evaluation of future consequences. This section provides an overview of the ways in which immediate emotions enter into decision making. First, we discuss relevant research on the mechanisms, both direct and indirect, through which affect influences decision making. Next, we discuss two types of influences on immediate emotions—anticipatory influences and incidental influences—and identify their respective determinants.

Direct and Indirect Influences of Immediate Affect

Immediate emotions influence decision making via two routes, which we refer to as *direct* and *indirect*.⁸ Indirect effects are those that are mediated by (1) changes in expected emotions (immediate emotions influence people's expectations of the emotions they will experience in the future, which affects the decisions they make) or (2) changes in the quality and/or quantity of information processing. Direct effects are those that are *not* mediated by changes in expected emotions or in cognitive processing.

Direct Effects of Immediate Affect

Emotions and moods can exert a direct impact on behavior, as illustrated by line *d* in Figure 31.1 (running from immediate emotions to decisions/behavior), even without altering the decision maker's perceptions of decision attributes (e.g., probabilities and outcome values). The na-

ture of such influences depends critically on the intensity of the experienced emotions (see Loewenstein, 1996).

Low and Moderate Levels of Intensity. At low and moderate levels of affect intensity, immediate emotions appear to play a largely "advisory" role. A number of theories posit that emotions carry information that people use as an input into the decisions they face (e.g., Damasio, 1994; Slovic, Finucane, Peters, & MacGregor, in press). Affect-as-information theory represents the most well-developed of these approaches (Clore, 1992; Schwarz, 1990; Schwarz & Clore, 1983). According to the affect-as-information hypothesis, when making evaluative judgments, people ask themselves, "How do I feel about it?" and then use their present feelings to form the judgment. Applied to decision making, if present feelings happen to be positive, then the decision maker's evaluations of specific options are likely to be relatively positive, and vice versa for negative feelings (see Clore, 1992; Clore, Schwarz, & Conway, 1994; Schwarz, 1990; Schwarz & Clore, 1983, 1996).

Immediate affect does not appear to influence all types of decisions, but only those for which affect is relevant (e.g. Schwarz, 1990; Wilson, Dunn, Kraft, & Lisle, 1989). For example, a decision about which movie to see renders your present feelings highly relevant (see Pham, 1998). Other decisions, such as whether to run an analysis of variance or a regression on your data, do not render feelings particularly relevant. Feelings are less relevant to the statistical decision in part because expected consequences are not affectively charged (for most researchers) and in part because other considerations dominate. In support of the latter idea, feelings have been shown to influence evaluations of unfamiliar, but not familiar, consumer products (Srull, 1983, 1984). Presumably, consumers have specific factual knowledge about the familiar products, which renders them less vulnerable to affective influences.

The importance of relevance can be seen not only in studies that compare different types of decisions but also in studies that manipulate the perceived relevance of emotions to a particular decision. For example, one study found that participants' immediate emotions influenced their decisions about whether to attend a movie, but only when instructions emphasized the subjective benefits they might get from relaxing at the movie and not when instructions emphasized the instrumental benefits one might get from seeing the movie (in this case, qualifying for a subsequent study that would pay \$4.00; Pham, 1998). Other studies have shown that encouraging participants to attribute their present feelings to judgment-irrelevant situational factors reliably reduces the tendency for situational affect to inform judgment (Keltner, Locke, & Audrain, 1993; Schwarz & Clore, 1983). For example, although reading a sad story can temporarily reduce estimates of life satisfaction, having participants focus on the

causes of their present sad feelings before rating life satisfaction reduces this effect (Keltner, Locke, & Audrain, 1993).

Certain kinds of accountability manipulations that encourage individuals to carefully scrutinize the relevance of any cues used in forming an opinion also attenuate the impact of immediate emotions on judgment and choice (Lerner & Tetlock, 1999). For example, the tendency for incidental anger to increase punitiveness in unrelated legal cases was attenuated by accountability (Lerner, Goldberg, & Tetlock, 1998). But highlighting the irrelevance of specific affective reactions is not a simple matter. Given that cognitive and affective pathways overlap considerably (Panksepp, 1998), it is often difficult to discern whether one's present feelings are reactions to a judgment/decision target or simply incidental feelings carried over from other events. People are usually completely unaware that emotion activated in one situation has influenced their judgment in another situation (Johnson & Tversky, 1983; Lerner et al., 1998; Wilson & Brekke, 1996). Even if people do become aware of undesirable influences on their judgments and choices, they may have difficulty discounting those influences without over- or undercompensating (see Strack, 1992; Wegener & Petty, 1997; Zillmann, 1971). Moreover, efforts to suppress the emotional experience itself meet with limited success and sometimes have the unintended effect of increasing underlying sympathetic nervous system arousal (Gross & Levenson, 1993).

To recap, these types of "advisory" influences are *weak* in the sense that they can be altered by the relatively simple manipulations just discussed (see Forgas, 1995, and chapter 30, this volume, for a review of conditions that limit the potential for affect to infuse judgment). Aside from problems of over- and undercorrection, increasing decision makers' level of vigilance is often sufficient to attenuate the impact of weak-to-moderate immediate emotions.⁹

Higher Levels of Intensity. As emotions intensify, they exert an ever-increasing influence on behavior. Indeed, at sufficient levels of intensity, emotions can overwhelm cognitive processing and deliberative decision making altogether. Under the influence of intense emotions, people often report themselves as being (or having been) "out of control" or "acting against their own self-interest" (Baumeister, Heatherton, & Tice, 1994; Bazerman, Tenbrunsel, & Wade-Benzoni, 1998; Hoch & Loewenstein, 1991; Loewenstein, 1996). The overriding of cognition by intense emotions is perhaps best illustrated in the clinical literature by cases of patients with affective disorders such as agoraphobia who are typically well aware that there is little or nothing to fear in the situations they find so difficult (Barlow, 1988, p. 13) but are helpless to act on that awareness. (Human-subjects committees rarely, if ever, allow researchers to induce intense emotion, so such research on

nonclinical populations is scant.) As Rolls (1999, p. 282) writes,

Emotions often seem very intense in humans; indeed sometimes so intense that they produce behaviour which does not seem to be adaptive, such as fainting instead of producing an active escape response, or freezing instead of avoiding, or vacillating endlessly about emotional situations and decisions, or falling hopelessly in love even when it can be predicted to be without hope or to bring ruin. The puzzle is not only that the emotion is so intense, but also that even with our rational, reasoning, capacities, humans still find themselves in these situations, and may find it difficult to produce reasonable and effective behaviour for resolving the situation.

Such divergences between emotional reactions and cognitive evaluations arise, Rolls argues, because “in humans, the reward and punishment systems may operate implicitly in comparable ways to those in other animals. But in addition to this, humans have the explicit system (closely related to consciousness) which enables us consciously to look and predict many steps ahead” (1999, p. 282). Expressed in our terminology, immediate and expected emotions often propel behavior in different directions.

The direct impact of immediate emotions depends not only on their intensity but also on their qualitative character. Specific emotions carry specific “action tendencies” (Frijda, 1986; Frijda & Mesquita, 1994) or implicit goals that, all things being equal, signal the most evolutionarily adaptive response. In this view, emotions save cognitive processing by triggering time-tested responses to universal experiences (such as loss, injustice, and threat). For example, anger triggers aggression, and fear triggers flight. Lazarus (1991) has argued that each emotion is associated with a *core-relational theme*—“the central relational harm or benefit in adaptational encounters that underlies each specific kind of emotion” (p. 121). According to Lazarus, when a person appraises a given situation, whatever emotion happens to be active can produce an action impulse that is consistent with the core-relational theme of the emotion.

The action tendency produced by an emotion appears to linger for some period if it is not discharged—that is, if an emotion-relieving action is not taken. The result can be that the implicit emotion goals (or *appraisal tendencies*) from one situation imbue judgments in unrelated situations (see Keltner, Ellsworth, & Edwards, 1993; Lerner & Keltner, 2000, 2001; Raghunathan & Pham, 1999). Scholars as far back as Aristotle (1962) have described the perils of emotional carryover. Recent studies highlight ways of deactivating the carryover. For example, a study of anger and punitive judgments found that the attainment of emotion-

specific goals moderated the effects of emotion on judgment (Goldberg, Lerner, & Tetlock, 1999). Participants viewed a film clip of an anger-inducing crime in which a violent perpetrator was said either to have been punished or to have evaded punishment because of a legal technicality. In an ostensibly separate study, participants then read fictional legal cases and specified what they viewed as appropriate punishment for the defendants. In both conditions, participants reported equivalent levels of anger in response to the crime. However, it was only in the condition in which the perpetrator evaded punishment that participants’ anger led to increased punitive judgments in unrelated legal cases. If the perpetrator had been appropriately punished and the goal of anger served, participants’ anger did not lead to elevated punitive judgments.

As reviewed earlier, affect-as-information theory also highlights a reliable way to attenuate direct emotional carryover. Specifically, encouraging decision makers to attribute the incidental emotion to a judgment-irrelevant source reliably reduces emotional carryover (Schwarz & Clore, 1983) unless the incidental emotion happens to match the chronic disposition of the decision maker. Gasper and Clore (1998) have shown, for example, that dispositionally anxious individuals rely on incidental feelings of state anxiety to inform subsequent judgments, even if the anxious individuals have attributed their incidental state anxiety to a judgment-irrelevant source.

Indirect Effects of Immediate Affect

Emotions exert not only a direct influence on behavior but also an indirect influence via their impact on judgments of expected consequences and emotional reactions to them, as well as the quality and quantity of information processing.

Indirect Effects on Expected Values. A number of studies have found that immediate emotions influence people’s judgments of the probability of positive and negative outcomes (line *h* in Figure 31.1). A well-replicated finding is that people in good moods make optimistic judgments and choices and people in bad moods make pessimistic judgments and choices (see Bower, 1981, 1991; Isen, Shalke, Clark, & Karp, 1978; Johnson & Tversky, 1983; Kavanagh & Bower, 1985; Mayer, Gaschke, Braverman, & Evans, 1992; Mayer & Hanson, 1995; Schwarz & Clore, 1983; Wright & Bower, 1992). For example, a pivotal set of studies found that people who read happy newspaper articles subsequently made more optimistic judgments about risk than people who read sad articles (Johnson & Tversky, 1983).¹⁰

Immediate emotions influence people’s perceptions not only of the likelihood of different outcomes but also of how they will feel about those outcomes. Loewenstein and

colleagues find that when people attempt to predict their own future feelings and behavior, they tend to "project" their current feelings onto the future (see Loewenstein et al., 2000; Loewenstein, Prelec, & Shatto, 1996). When people are in a "cold" state—for example, not hungry, angry, sexually aroused, and so forth—they underappreciate what it will feel like to be in a hot state in the future and how such a state will affect their behavior. They make an analogous mistake when in a hot state and predicting how they will feel or behave when the heat dissipates—that is, when they are in a cold state. Such "hot/cold empathy gaps" occur not only prospectively, when people predict their own future feelings and behavior, but also retrospectively (as in the infamous "morning after" syndrome in which a cold morning self struggles to make sense of a hot past self's evening escapades; Loewenstein, 1996; Loewenstein & Schkade, 1999) and interpersonally, whereby people have difficulty predicting the behavior of others who are in a different visceral state than themselves (VanBoven, Dunning, & Loewenstein, 2000; VanBoven, Loewenstein, Welch, & Dunning, 2001).

Visceral states for which hot/cold empathy gaps have been documented include hunger (Read & van Leeuwen, 1998), curiosity (Loewenstein et al., 1996), anxiety (Sieff, Dawes, & Loewenstein, 1999), pain (Read & Loewenstein, 1999), sexual arousal (Loewenstein, Nagin, & Paternoster, 1997), and embarrassment (VanBoven et al., 2001). In the study of sexual arousal, for example, the researchers found that male youths who were exposed to sexually arousing materials reported substantially higher likelihoods of behaving aggressively in a hypothetical date scenario than did youths who were not exposed to arousing materials (Loewenstein et al., 1997).

Indirect Effects on the Nature of Processing. Immediate emotions can systematically bias the interpretation of decision-relevant cues such that decision makers selectively attend to, encode, and retrieve emotion-relevant information (see Bower, 1981, 1991; Niedenthal & Kitayama, 1994; Niedenthal & Setterlund, 1994). Some studies of selective processing suggest that emotional valence (positivity vs. negativity) determines the nature of subsequent information processing (see Forgas, 1989, 1995; Forgas & Moylan, 1991). For example, a host of studies find that, whereas negative emotions narrow attentional focus, positive emotions broaden attentional focus (Basso, Scheff, Ris, & Dember, 1996; Conway & Giannopoulos, 1993; Derryberry & Tucker, 1994; Isen, 1999; Kienen, 1987). In one illustrative study in which participants were supposed to choose a team partner, participants in negative moods were more goal directed than participants in positive moods. Not only did the former spend more time considering interpersonal aspects of potential partners, but they also remembered more negative features of potential partners than did participants in positive moods

(Forgas, 1991). Participants in positive moods, by contrast, reached decisions rapidly, with fewer repetitions, and were not as focused on particular attributes. Other studies on selective information processing suggest that incidental emotions exert an emotion-specific, rather than global, valence effect (see Niedenthal, Halberstadt, & Innes-Ker, 1999).

Indirect Effects on Depth of Processing. Several emotion theorists have posited that negative emotions trigger more systematic processing than positive emotions (see Schwarz, 1990; Schwarz & Bless, 1991). One possible explanation is that emotions serve an adaptive function by signaling situations that demand increased attention. Whereas happy feelings signal that "all is well," negative feelings alert the body to the fact that a problem needs attention.¹¹ In line with these predictions, several studies find that dysphoric mood is associated with vigilant, ruminative thought (Lyubomirsky & Nolen-Hoeksema, 1995; Nolen-Hoeksema & Morrow, 1993), whereas happiness is associated with relatively heuristic processing (Bodenhausen, Kramer, & Süsser, 1994; Forgas, 1998). Forgas (1998) found, for example, that happy participants were more likely to demonstrate a correspondence bias, over-attributing behavior to individual characteristics rather than to situational influences. Similarly, Bodenhausen and colleagues (1994) found that happiness increased reliance on use of stereotypes, which indicates categorical rather than piecemeal processing.

More recent studies have suggested a refinement of the original hypothesis that happiness decreases processing motivations. Bless and colleagues (1996) found that although happy moods increased and sad moods decreased reliance on general knowledge structures, happiness did not lower cognitive performance across the board. In fact, happy participants outperformed sad ones when they performed a secondary task in addition to the primary task, but only when the amount of script-inconsistent information in the primary task was small. This pattern of findings indicates higher reliance on general knowledge structures under happy rather than sad moods, but not a general reduction in processing motivation. Other refinements that have been proposed examine the effect of arousal level, in addition to affect valence (Bodenhausen, 1993).

Other recent studies suggest that specific emotions, rather than emotional valence, drive depth-of-processing effects. For example, Tiedens and Linton (2001) have shown in a series of studies that, whereas emotions characterized by a sense of certainty (e.g., contentment and anger) lead decision makers to rely on heuristic cues, emotions characterized by uncertainty (e.g., worry and surprise) lead decision makers to scrutinize information carefully. In their work, the appraisal dimension of certainty carries considerably more explanatory power than does

the valence dimension. Along the same lines, Bodenhausen, Sheppard, and Kramer (1994) found that, although sadness and anger share the same (negative) valence, anger triggered heuristic decision processes and sadness did not.

Determinants of Immediate Emotions

The immediate emotions experienced by a decision maker reflect the combined effect of two factors: *anticipatory influences*, which stem from thinking about the future consequences of the decision at hand, and *incidental influences*, which encompass all factors that are unrelated to future consequences of one's decisions. Here it may be useful to contrast these influences with expected emotions. Whereas expected emotions fundamentally consist of cognitions (about future affect or utility), immediate emotions consist of present feelings that happen to influence decisions. In the case of anticipatory influences, the present feelings stem from anticipated choices or utilities. In the case of incidental influences, the present feelings stem from factors unrelated to the decision at hand that nevertheless influence decision making.

Anticipatory Influences

Thinking about the future consequences of one's decisions has some predictable effects on immediate (on-line) emotions. Thinking about negative consequences generally produces negative affect. Thinking about positive consequences generally produces positive affect, although it can produce frustration if the decision maker becomes impatient for the consequences to occur. Moreover, the intensity of experienced affect is generally monotonically related to the hedonic significance of the consequences themselves; outcomes that will cause a lot of pleasure or pain when they occur typically lead to commensurately intense anticipatory emotions. All of these response patterns produce a rough parallelism between the nature and intensity of anticipatory emotions and the anticipated consequences that produce them.

As noted in the introduction, however, the immediate emotions that result from anticipation often propel behavior in different directions from those dictated by a contemplation of expected emotions (Loewenstein, Weber, Hsee, & Welch, 2001). To understand why, one needs to examine the specific determinants of anticipatory emotions and how they differ from the determinants of expected emotions.

Differential Sensitivity to Probabilities. In the expected utility model (which incorporates expected affect), the value of an uncertain prospect is the sum of the products of outcome utilities and their probabilities of occurring. Thus probabilities and payoffs are on an equal footing when it comes to determining the value of a gamble. The same is

not true for anticipatory emotional reactions to uncertain prospects. Psychophysiological studies of anxiety indicate that probabilities play a relatively subordinate role in determining emotional reactions. In a typical experiment, animal or human participants experience "countdown" periods of established length, at the end of which they receive, with some probability, a painful electric shock of varying intensity. A common finding from these studies is that physiological responses to the impending shock are correlated with the intensity of the anticipated shock but not with probability, except in the extreme case in which there is a zero probability of a shock (e.g. Monat, Averill, & Lazarus, 1972). Anticipation of a shock is sufficient to arouse participants, but the likelihood of being shocked has little impact on the level of arousal.

One potential explanation for the lack of responsiveness to probability may be that anticipatory emotions arise as a reaction to mental images of a decision's outcomes (Damasio, 1994). Such images are discrete and not much affected by probabilities; one's mental image of what it would be like to experience a crash landing on an airplane, for example, is likely to be about the same regardless of whether there is a 1 in 10 million chance of crashing or a 1 in 10,000 chance of crashing. One's mental image of a crash landing, however, is likely to be very different from one's mental image of a safe landing. Consistent with this interpretation, one study of risk perceptions found virtually a complete dissociation between intellectual judgments of risk and emotional reactions to the same risks (Sjoeberg, 1998). Other studies have found that the technique of capturing one's "mental image" of an object is an especially useful tool for predicting subsequent evaluations of that object (see Peters & Slovic, 1996, 2000; Sjoeberg, 1998; Slovic et al., in press; Slovic, Flynn, & Layman, 1991). For example, MacGregor, Slovic, Dreman, and Berry (1999) found that affective imagery, elicited by word associations, predicted preferences for investing in new companies in the stock market. Affective images were also useful predictors of such varied outcomes as preferences for visiting certain cities (Slovic, Layman, et al., 1991) and adolescents' decisions to take part in health-threatening and health-enhancing behaviors (Benthin et al., 1995). Moreover, people who are able to generate more vivid mental imagery experience certain kinds of emotions more intensely. Thus, vivid imagers, as compared with those who do not form vivid images, salivate significantly more while thinking about their favorite food (White, 1978), become more sexually aroused in structured fantasy exercises (Smith & Over, 1987), and have greater ability to voluntarily increase their heart rate using visual imagery (Carroll, Baker, & Preston, 1979).

The lack of a linear relationship between the probability that an outcome will occur and the emotions associated with anticipating the outcome may help to explain the phenomena discussed earlier in this chapter in the sub-

section on nonlinear probability weighting. The idea that people's affective reactions to an outcome depend on the nature of the outcome but much less on its probability can help to explain the overweighting of small probabilities and insensitivity to variations in probability in the mid-region of the scale. It can also help to explain the recent finding that probability weighting depends on the emotional impact of the associated outcomes (Rottenstreich & Hsee, 2000). In one study, participants were asked to indicate a cash certainty equivalent for avoiding an undesirable outcome that occurred with different levels of probability. The undesirable outcome was either a loss of \$20 (a relatively pallid outcome) or a brief but painful electric shock (a more emotional/visceral outcome). When the outcome was pallid (losing \$20), the participants were quite sensitive to probability variations: The median certainty equivalent changed from \$1 (for $p = .01$) to \$18 (for $p = .99$). However, when the outcome evoked emotion (receiving an electric shock), participants were extremely insensitive to probability variations: The median certainty equivalent changed only from \$7 (for $p = .01$) to \$10 (for $p = .99$). In other words, when probability increased by a factor of 99 (from 1% to 99%), the certainty equivalent increased by less than a factor of 1.5 (from \$7 to \$10). The probability weighting function is flatter (i.e., more overweighting of small probabilities) for vivid outcomes that evoke emotions than for pallid outcomes.

Vividness effects can also help to explain other curious findings in the decision-making literature. For example, Johnson and Tversky (1983) found that people were willing to pay more for airline travel insurance covering death from "terrorist acts" (a highly imaginable event) than death from "all possible causes" (which, of course, implicitly subsumes terrorist acts, in addition to a range of other causes, but does not bring spontaneous mental images to mind). It is also well established that people place greater importance on identifiable victims than statistical victims, which could be explained by the fact that identifiable victims produce more vivid imagery (see Schelling, 1984).

Time Interval Between a Decision and Its Consequences. Another factor that affects immediate emotions differently from expected emotions and that can therefore cause the two influences on decision making to diverge is the time interval between a decision and its consequences. As an event approaches in time, anticipatory emotions such as fear and excitement tend to intensify, even when evaluations of the event's probability or likely severity remain constant (Loewenstein, 1987; Roth, Breivik, Jorgensen, & Hofmann, 1996). For example, when research participants are told that they will receive an electric shock at a specific point in time, heart rate, galvanic skin conductance, and self-reported anxiety all increase as that moment approaches in time (Breznitz, 1971; Monat, 1976).

The intensification of immediate emotions as decision consequences become imminent may contribute to the well-known phenomenon of "chickening out," as illustrated by two studies reported by VanBoven et al. (2001). In one study, participants were offered a payment of \$1 in exchange for telling a joke in front of a class the following week. When the appointed time arrived, students who had agreed to tell the joke and those who had declined to do so were given the opportunity to change their minds. As predicted, there was substantial chickening out. Sixty-seven percent of those who initially volunteered to tell a joke (6 out of 9) decided not to do so when the time came, but none of those who had initially declined the offer (0 out of 49) changed their minds and decided to tell a joke at the last minute ($p < .01$). Moreover, these changes were not accompanied by predictive changes in the students' self-reported perceived probability or severity of possible negative consequences. In a second study, the researchers manipulated affect by having half of the students view a fear-inducing film clip just before they decided whether to tell a joke in front of the class one week later in exchange for payment. As predicted, students who watched the film clip were significantly less likely to volunteer to tell the joke as compared with those who did not view the film. The tendency to chicken out is probably augmented, in many situations, by the tendency, demonstrated in research by Liberman and Trope (1998), for people to place greater weight on practical considerations relative to more vague dimensions of desirability as the moment of taking an action draws near.

Perceived Control. Another dimension that distinguishes hedonic expectations from anticipatory emotions is control (see Johnson & Tversky, 1984). Whereas perceptions of control are orthogonal to the normative determinants of expected emotions (i.e., probability and value), they are critical determinants of anticipatory emotion. Seligman and Maier (1967), for example, showed that dogs who were given shocks that they could terminate by making body motions got fewer ulcers than "yoked" dogs who received identical, but uncontrollable, sequences of shock. More recently, in an experiment with humans, Sanderson, Rapee, and Barlow (1988) administered a known panic-provoking agent (5.5% carbon dioxide, CD) to panic-prone patients. Half of the participants were told that they could reduce the concentration of CD by turning a dial when a light was illuminated. Although they did not actually take advantage of the opportunity to turn the dial (which was inoperative), this group reported fewer and less severe panic symptoms, had fewer catastrophic thoughts, and reported less distress.

Evolutionary Preparedness. Many animals, including humans, seem to be evolutionarily prepared to experience a fear reaction to certain types of stimuli. For example, cage-

reared mice exhibit a powerful fear reaction to the smell of cat fur, even when they have never been exposed to a cat previously (Panksepp, 1998). There has been no demonstration that cognitive evaluations of probabilities or outcome values—that is, expected emotions—are linked to such evolutionary preparedness except insofar as expected emotions are influenced by immediate emotions (which themselves depend on preparedness). To the degree that emotional reactions to risks depend on evolutionary programming whereas cognitive evaluations do not, evolutionary preparedness can constitute a source of divergence between anticipatory and expected emotional influences on behavior.¹²

Synthesis. To recap, although anticipatory affect and expected affect both share the same decision target, their determinants are quite different. First, unlike expected emotions, anticipatory emotional responses to future events seem to be relatively insensitive to probabilities. Second, anticipatory affective responses are especially sensitive to the timing and vividness of outcomes in ways that expected emotions are not. Third, anticipatory affective responses depend on the individual's control over the environment, even if such control does not affect probabilities and outcomes. Finally, animals, including people, seem to be evolutionarily prepared to fear certain types of objects and experiences and not others. These differences should not be surprising. Whereas expected affect is fundamentally a *cognition* (about future utilities), anticipatory affect is fundamentally an *emotion* (about future utilities). As such, they should proceed along distinct neural pathways, and they should also have different potential to shape behavior (for elaboration, see Panksepp, 1998).

Incidental Influences

The immediate emotions that people experience when making a decision are influenced not only by contemplating the decision itself but also by other factors that are incidental to—that is, unrelated to—the decision (Bodenhausen, 1993). Because incidental emotions do not arise from considering the consequences of decisions, their influence on decision making is typically considered non-normative. Many effects of incidental emotions have already been discussed in the previous sections on direct and indirect influences. It is useful here, however, to briefly review two (nonindependent) sources of incidental affect: dispositional (trait) affect and situational affect.

Dispositional Affect. Dispositional affect can be an important source of immediate emotion. Whereas situational affect involves a transient reaction to specific events (see the following subsection), dispositional affect represents a tendency to react in a particular affective way to a variety of events across time and situations (Frijda, 1994; Lazarus,

1994). Recent research points to systematic links between specific emotion dispositions and specific judgment and choice propensities. Lerner and Keltner (2000, 2001) hypothesized and found that fearful individuals made relatively pessimistic risk assessments and risk-averse choices but that angry individuals made optimistic judgments and risk-seeking choices. Moreover, the judgments and choices of angry individuals more closely resembled those of happy individuals than those of fearful individuals—a counterintuitive pattern that was predicted based on the fact that happiness and anger are both associated with cognitive appraisals of certainty and control. Fear, by contrast, is associated with appraisals of uncertainty and lack of individual control (Smith & Ellsworth, 1985). Specific emotion dispositions, it appears, activate specific “appraisal tendencies” that guide the perception of judgments and choices.

Dispositional and state affect may influence decision making in an interactive fashion. Recently, it has been argued that dispositional affect moderates the influence of state affect on judgment by providing a schema through which events are interpreted (Gasper & Clore, 1998; Magai & McFadden, 1995). In support of this view, Gasper and Clore (1998) found that when dispositional affect matched state affect, state affect exerted a stronger influence on judgment; when it did not match, state affect exerted a weaker influence. Similarly, the origins of dispositional affect may interact recursively with cognitive aspects of decision making.

Situational (State) Affect. Lingering (incidental) moods and emotions contribute to situational affect. Research on anger, for example, reveals that even when the object of a subsequent decision bears no relation to the source of one's anger, anger still increases tendencies to overlook mitigating details before attributing blame, to perceive ambiguous behavior as hostile, to discount the role of uncontrollable factors when attributing causality, and to punish others for their mistakes (Goldberg et al., 1999; Keltner, Ellsworth, & Edwards, 1993; Lerner & Dodge, 1993; Lerner et al., 1998; Quigley & Tedeschi, 1996). The specific influence of such incidental emotions appears to depend not only on the valence of the emotion (i.e., positive or negative) but also on the specific nature of the emotion. For example, consistent with dispositional-affect findings reported previously, Lerner and Keltner (2000, 2001) found that incidental (experimentally manipulated) state fear and anger had opposing effects on risk perception, even though the risks evaluated had no normative relation to the source of participants' emotions. People induced to feel anger perceived far less risk than did people induced to feel fear, and appraisals of control mediated this emotion-judgment pattern. Specific-emotion effects have also been observed for other negative emotions, such as sadness and anxiety. Raghunathan and Pham (1999) con-

trasted the effects of incidental state anxiety and incidental state sadness, both on gambling decisions and on job-selection decisions. Drawing on the core themes and appraisal patterns associated with these emotions (see Lazarus, 1991; Roseman, 1984; Smith & Ellsworth, 1985), they hypothesized that sadness would trigger the implicit goal of replacing loss, whereas fear would trigger the implicit goal of reducing uncertainty. As predicted, the emotional carryover effects were consistent with the underlying appraisal themes of each emotion. Across both of these outcome domains, incidental sadness increased tendencies to favor high-risk-high-reward options. Incidental anxiety, in contrast, increased tendencies to favor low-risk-low-reward options.

The preceding evidence pertains to full-blown induced emotions. It is important to note, however, that even minimal sensory cues can contribute to situational affect and influence subsequent decision making. As any magazine reader knows, advertisers bank on eliciting this kind of incidental affect. Although empirical work on this topic has been less than abundant, several good studies attest to the fact that sights, scents, and sounds do influence affect and decision making. For example, Baron (1997) found that passersby in a shopping mall were significantly more likely to help in response to requests from a confederate when the request was made in the presence of pleasant ambient odors than in the absence of such odors. Researchers have documented numerous other effects of odor on cognitive processes (see Engen, 1991), driving behavior (Baron & Kalsher, 1998), and task performance (Baron & Thomley, 1994). Similarly, other environmental factors, such as crowding, sights, and sounds, can all instigate incidental affect (Gifford, 1987).

Synthesis of Immediate Emotions

Immediate emotions can have both direct and indirect effects on decision making. Direct effects include action tendencies associated with specific emotions, as well as general valence effects in which decision makers select relatively more optimistic courses of action when in a good mood than when in a bad one. At lower levels of intensity, people seem to be able to overcome the influence of immediate emotions when they deem those emotions to be irrelevant to a decision at hand. At higher levels of intensity, emotions progressively assume control of behavior. Indirect effects include changes in the prediction of consequences, selective processing of information, and changes in the quality and depth of processing.

Immediate emotions are the joint product of two types of inputs: *Anticipatory influences* stem from contemplation of the consequences of the decision at hand. *Incidental influences* reflect any factors that influence immediate emotions that are unrelated to the decision. For reasons that we have specified in this section, each of these influ-

ences can cause immediate emotions to propel behavior in directions different from those dictated by a consideration of expected emotions.

Benefits and Pitfalls of Expected and Immediate Emotions

Throughout most of recorded human intellectual history, emotions have been viewed in largely negative terms—as an unruly and unpredictable corrupting influence. Accounts of human behavior, from the ancient Greeks to Enlightenment philosophers, focused mainly on the role played by emotions in self-control problems—on the propensity for emotions to override reason, deliberation, or self-interest. This negative view of emotions is evident not only in philosophical discussions throughout recorded intellectual history, but also in literature, and even in the modern legal system (in which “crimes of passion” are treated differently because the perpetrator is viewed as being “out of control”).

Recently, however, emotions have begun to enjoy a significant rehabilitation. Rather than ignoring emotions altogether or focusing exclusively on their hypothesized role in producing self-destructive behavior, recent influential research on emotion highlights both (1) the essential functions served by emotions in coordinating cognition and behavior and (2) the detrimental consequences associated with ignoring emotions. This rehabilitation of emotions finds expression not only in the work of academics but also in the popular literature, as evidenced by such best sellers as *Emotional Intelligence: Why It Can Matter More Than IQ* (Goleman, 1995) and *The Gift of Fear: Survival Signals That Protect Us From Violence* (DeBecker, 1997).

As is usually the case in such matters, both perspectives have some validity. Emotions *do* often impel people in directions that are not commensurate with self-interest. But emotions also serve essential functions. Our distinction between expected and immediate emotions can shed light on these two effects.

The benefits and pitfalls of expected and immediate emotions are summarized in Table 31.1. The main benefit of expected emotions is that they take explicit account of the consequences of a decision. Maximizing the positivity of expected emotions is widely seen as a normatively compelling criterion for decision making and forms the basis of most theories of “rational choice.” But decision making on the basis of expected emotions is beneficial only to the extent that two conditions are met. First, expected emotions must encompass all the factors that decision makers care about. Second, the expectations themselves must be accurate.

On the first condition, evidence that expected emotions *do not* capture everything people care about comes from research, which shows that blocked access to one’s im-

Table 31.1 Benefits and Pitfalls of Expected and Immediate Affect

	Expected Affect	Immediate Affect
Definition	Predictions about how one will feel if certain decision outcomes occur	Affect experienced at the time of making a decision (produced by anticipatory or incidental factors)
Time when affect occurs	Future: when decision outcomes are experienced	Present: at time of decision
Potential benefits associated with incorporating affect	Determination of optimal course of action to maximize long-term well-being	Prioritizing information processing and introducing important, but intangible, considerations
Potential pitfalls associated with incorporating affect	When expectations are biased (e.g., forecasting errors), decision making will be commensurately biased	Can propel behavior in directions that are counter to self-interest

mediate emotions degrades the quality of decision making. A clever set of studies has shown that introspecting about one's reasons for preferring a particular choice object—hence deflecting attention from one's feelings—reduces the quality of decision making (see Wilson et al., 1993; Wilson & Schooler, 1991). In one study (Wilson, Kraft, & Dunn, 1989), research participants rated the quality of several strawberry jams, and half were asked to give reasons for liking or disliking the jams. The ratings of those who were not asked to provide reasons for their tastes correlated strongly with the jam ratings given by experts, but the ratings of those who did give reasons showed absolutely no relationship to the expert ratings. In an even more compelling study, college students selected their favorite poster from among a set (see Wilson et al., 1993). Students asked to provide reasons why they liked or disliked the posters ended up, on average, less happy with their choice of poster and less likely to keep it on display in their dorm rooms than were those who were not asked to provide reasons. Apparently, analyzing reasons “cognitivizes” one's preferences and makes salient certain features about the target that may not have anything to do with why we liked or disliked it in the first place.

A fundamentally similar point about the importance of immediate emotions for decision quality comes from neuroscientific studies. Damasio, Bechara, and colleagues (Bechara, Damasio, Damasio, & Anderson, 1994; Bechara, Damasio, Damasio, & Lee, 1999; Damasio, 1994) show that individuals with minimal cognitive, but major emotional, deficits have difficulty making decisions and, when they do, often make poor decisions. In one study that compared normal participants with neurologically impaired participants, the impaired participants repeatedly chose a high-risk option until they went bankrupt. Moreover, physiological measures taken during the task suggested that they did so because they lacked the necessary “somatic mark-

ers”—affective signals through which decision makers would normally encode the consequences of alternative courses of action. Although the impaired participants technically knew that certain options were risky, they apparently failed to experience the fear that would normally be associated with repeatedly choosing those high-risk options. These studies, and the studies by Wilson and colleagues (Wilson et al., 1989; Wilson, Kraft, & Dunn, 1989; Wilson & Schooler, 1991), converge on the common conclusion that immediate affect constitutes an important input into decision making. If expected emotions captured everything that people care about, then the absence of immediate emotional influences would not degrade decisions as much as it does.

The second condition necessary for expected emotions to be beneficial is that predictions regarding future emotions must be accurate. Earlier in the chapter, we reviewed some of the large number of recent studies that document pervasive and systematic biases in people's predictions of their own future emotions. Such biases in the prediction of future emotional states can have diverse negative consequences for decision making. For example, the hot-cold empathy gap suggests that nonaddicts, or addicts who are not currently craving drugs, will underpredict the force of future drug craving (see Loewenstein, 1999). This may explain why only 15% of high school students who were occasional smokers (less than one cigarette per day) predicted that they might be smoking in 5 years when in fact 43% were still smoking 5 years later (Slovic, 2000). The hot-cold empathy gap can also shed light on the differences between healthy and sick persons' attitudes toward “heroic measures” to extend the lives of terminally ill individuals. Many healthy Americans state that they do not want to die in a nursing home or hospital or, worse yet, an intensive care unit, but 90% of dying patients, most of whom die in acute care hospitals, view favorably the care they receive. In one study

(Slevin, Plant, Lynch, Drinkwater, & Gregory, 1988), different groups of respondents were asked whether they would accept a grueling course of chemotherapy if it would extend their lives by 3 months. No radiotherapists and only 6% of oncologists and 10% of healthy people said that they would accept the chemotherapy; but 42% of current cancer patients say they would. The premise of advanced directives, such as living wills, is that people can predict what they will want at a time when they cannot express their wishes. Results such as these cast doubt on this assumption (see Coppola et al., 1999; Druley et al., 1993).

We conclude, therefore, that neither of the two conditions for expected emotions is completely met. Expected emotions do not capture all the factors that decision makers care about, and decision makers predict such emotions in a biased fashion.

But if expected emotions do not capture everything, what is it that immediate emotions contribute? First, as postulated early on by Simon (1967), emotions direct attention to important events. Viewing the central nervous system as a serial information processor, Simon argued that emotions serve as "cognitive interrupts" that tell us what's important, thus facilitating prioritization of processing resources (see the section on indirect effects of immediate affect). Emotions thus enable intrapersonal adaptive responses to changing environments (Ekman & Davidson, 1994; Frijda, 1986; Nesse, 1990; Robert & Carnevale, 1997; Rolls, 1999).²³

Second, emotions provide useful information about the desirability of different courses of action, a function highlighted by a number of other new theories (Brehm, 1999; Frank, 1992; Frijda, 1988; Johnson-Laird & Oatley, 1992; Keltner & Kring, 1998; Lerner & Keltner, 2000; Levenson, 1994; Panksepp, 1998; Slovic et al., in press), including Damasio's (1994) "somatic marker hypothesis." Note that this benefit is the mirror image of one of the major limitations of expected emotions—that they don't incorporate all considerations that are important to people. Immediate emotions may incorporate factors such as moral or aesthetic values that people have difficulty articulating and which, perhaps as a result, tend to receive little weight in deliberative decision making.

Third, immediate emotions often provide the motivation necessary to implement chosen courses of action (Frijda, 1986, 1988; Frijda & Mesquita, 1994; Keltner & Gross, 1999). In conventional decision theory, behavior is viewed as a matter of simply choosing an appropriate course of action. Once chosen, it is implicitly assumed that the action will automatically be executed. As a large literature on self-control reveals, however, there is often a big difference between *knowing* what's best and *doing* what's best (Baumeister et al., 1994; Loewenstein, 1996; Metcalfe & Mischel, 1999; Mischel, Cantor, & Feldman, 1996; Schelling, 1978).

Although immediate emotions provide useful information about the best course of action, as well as the impetus to execute it, their historically negative reputation has some empirical grounding. A tendency to override deliberations—to cause people to behave self-destructively—has been well documented (Loewenstein, 1996; Loewenstein et al., 2001). Immediate emotions can exert such influences on decision making for three reasons.

First, there may be a mismatch between the evolutionary adaptiveness of emotions and current decision-making environments. Emotions, like other visceral influences, have evolved to motivate people to perform certain kinds of typically adaptive behaviors (Nesse, 1990). Hunger provides a motive for eating, sex for copulation; and specific emotions likewise are programmed to produce specific actions. However, all of these functions evolved during a time when people were not faced with the range of temptations that are currently available—for example, abundant high-fat foods, pornography, and pleasure-producing drugs. Although we may realize, at times, that some of these temptations are not good for us, the motivational function of emotions can operate largely independent of higher level cognitive functioning and can overwhelm our cognitive evaluations of self-interest.

Second, as discussed in the second section of the chapter, immediate emotions are responsive to a wide range of factors, such as vividness and the proximity of consequences, that are difficult to justify as normative guides to behavior. As a result, anticipatory influences sometimes drive immediate emotions, and hence behavior, in directions that are opposed to those dictated by a dispassionate appraisal of consequences. For example, as discussed earlier, many people are afraid of flying but not of driving, even though they recognize that driving is far more dangerous. The influence of incidental emotions—emotions elicited by factors unrelated to a decision—is particularly difficult to so justify.

Third, as discussed in the section on indirect effects, immediate emotions can distort people's evaluations of the probability and value of different possible consequences of a decision, thus distorting the influence of expected emotions. Sometimes distortions arise from direct influences of immediate emotions (e.g. Goldberg et al., 1999; Lerner et al., 1998; Lerner & Keltner, 2000, 2001; Loewenstein, 1996; Loewenstein et al., 2001; Schwarz, 1990; Schwarz & Clore, 1983). Other times they arise from indirect influences, such as when specific emotions trigger the over- or underscrutinization of information (e.g., Bless et al., 1996; Bodenhausen, Sheppard, & Kramer, 1994; Bodenhausen, Kramer, & Süsser, 1994; Nolen-Hoeksema & Morrow, 1993; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Tiedens & Linton, in press).

The benefits and pitfalls of expected and immediate emotions are very nearly mirror images of one another. The main benefit of expected emotions is that they pro-

vide a guide to behavior that takes account of the long-term consequences of one's actions. The main pitfalls are that such long-term consequences are not the only things that people care about and that people make systematic errors when it comes to predicting those consequences. The main benefit of immediate emotions is that they provide information to decision makers about intangible but important values that are not captured by expected emotions. The main pitfalls of immediate emotions are that they can drive people to take actions that run contrary to their long-term actions and can distort people's evaluations of expected emotions.

Summary

In this chapter we have sought to draw attention to some of the complexities in the ways that emotions enter into decision making. Conventional theories of decision making include only expected emotions. This approach has been enriched by recent efforts to elucidate the nature and determinants of the emotions that decision makers are assumed to anticipate experiencing (and thus take into account when making decisions). However, it neglects to take account of the important influence of immediate emotions—emotions experienced at the time of decision making. Immediate emotions can influence decisions indirectly by altering the decision maker's perceptions of probabilities or outcomes or by altering the quality and quantity of processing of decision-relevant cues. They can also affect behavior directly. As the intensity of immediate emotions intensifies, they progressively take control of decision making and override rational decision making.

Beyond simply pointing out the complex ways in which emotions influence decision making, our investigation of the role of emotions in decision making also draws attention to two fundamental limitations of the decision-making perspective. First, not all behavior should be treated as the product of decisions. Affect does serve as an input into decision making, as highlighted by many recent theoretical perspectives, but it also, in some cases, exerts direct effects that circumvent decision making altogether. Second, no simple dichotomy between good and bad influences of affect can be drawn. We have seen that the traditional view ("all affect is irrational") is not tenable. The absence or suppression of affect can lead decisions astray, and the presence of affect can guide behavior in adaptive ways, such as by regulating processing strategies. We have also seen that a simple dichotomy between beneficial expected affect and destructive immediate affect does not do justice to the benefits and pitfalls of each of these influences. Both the traditional view that one should suppress or disregard emotions and the modern, more benign, view that emotions are crucial guides to behavior capture important aspects of reality. Both imme-

mediate affect *and* expected affect are crucial for normal functioning but are also potential sources of bias. Expected affect can lead to decision errors because people are prone to systematic errors in predicting how they will feel in the future. Immediate emotions can produce decision errors for reasons that were understood by the ancient Greeks; they can distort people's judgments of self-interest. Even when people have a realistic understanding of their own self-interest, immediate emotions can cause people to "lose control" of their own behavior. But these potential biases should be weighed against the essential functions they serve, such as prioritizing processing goals and introducing important, but intangible, "gut" feelings. Any comprehensive understanding of decision making or of the limits of the decision-making perspective must come to terms with these diverse, sometimes conflicting, and sometimes complementary functions of expected and immediate emotions.

NOTES

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1. For a notable exception, see Janis and Mann (1977).
2. An appreciation for the positive functions is not entirely new in behavioral science. Darwin (1872/1998) was one of the first to hypothesize the adaptive mechanisms through which emotion might guide human behavior.
3. Forgas's affect infusion model (1995) proposes a similar set of processes with respect to social judgment.
4. See Bodenhausen (1993) for the original use of this term.
5. For thorough discussion of cognitive-appraisal theories of emotion, we refer the interested reader to chapter 29 in this volume.
6. For judgment and decision-making research that explicitly draws on cognitive-appraisal theories of emotion, see Lerner and Keltner, 2000, in press; Tiedens & Linton, in press.
7. Alternatively, people may exaggerate the amount of regret they will experience and hence overweight considerations of regret in decision making.
8. An alternative interpretation is that students in California have a higher threshold for classifying themselves as happy than students in the Midwest. More generally, many findings in the well-being literature may be open to reinterpretation when one considers problems of numerical anchors, defensive response tendencies, and specifying the underlying parameters involved in global assessments of well-being.
9. This distinction is largely consistent with Forgas's (1995) affect infusion model, which specifies that one's present feelings can influence judgment via two routes: affect priming (indirect route) and affect-as-information

(direct route). Our framework elaborates on this idea by specifying how different processes interact with different kinds of emotional inputs and the consequences of those interactions for decision making.

9. It would be critical, of course, for manipulations that increase processing vigilance to occur *prior* to exposure to information about the decision. People have trouble retroactively correcting for faulty encoding of information (Lerner & Tetlock, 1999).

10. When it comes to *behavior*, however, Isen and colleagues (Isen, Nygren, & Ashby, 1988) have observed a rather different pattern. Because positive-affect individuals want to protect their positive state, they are less inclined to risk meaningful loss than are controls.

11. This pattern would also be consistent with hypotheses about affective motivations. Whereas negative moods trigger a "mood repair" goal of focusing on problems, positive moods trigger a "mood maintenance" goal of not paying too much attention to details (Isen & Geva, 1987; Isen et al., 1988).

12. Even when there is not such *direct* fear programming, evolutionary programming can take more subtle forms. For example, it appears that animals are biologically "prepared" to become fear-conditioned to certain objects—such as snakes, spiders, water, and enclosed spaces—but not to others; not all stimuli have the same capacity to become conditioned aversive stimuli (see Ohman, 1993, 1994). It also appears that fear conditioning can occur vicariously—by an animal observing a fear reaction by another animal—and that such vicarious conditioning also exhibits the phenomenon of preparedness (e.g., Cook & Mineka, 1990; Mineka & Cook, 1993).

13. Theorists have also proposed that emotions serve *interpersonal functions*. For example, they help humans to respond quickly to specific problems and opportunities in the social environment, including forming attachments, resolving injustices, negotiating hierarchies, and adhering to social norms (Barrett & Campos, 1987; Ekman, 1992; Frank, 1988; Keltner & Ekman, 2000; Keltner & Kring, 1998; Lutz & White, 1986; Nesse, 1990; Schwarz, 1990). Emotions enable such responses by providing information about ongoing social relations (Nesse, 1990). For example, emotional communication in the voice, face, and posture signals socially relevant information to individuals in interactions about their own, and their interaction partners', emotions, intentions, attitudes, and orientations to the relationship (Buck, 1984; Ekman, 1984; Keltner, 1995).

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