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Decision Making

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Classical theories of decision making were cognitive in nature: they assumed that decision makers dispassionately evaluated the consequences of alternative courses of action and chose the one that would yield the most positive consequences (for review, Loewenstein and Lerner, 2003). Research in the last several decades has, however, demonstrated powerful effects of emotion on decision making. Moreover, understanding the effects of emotion has become an essential part of building descriptively valid theories of decision making. Here we review some of the ways in which emotion enters into decision making.

Broadly speaking, there are two types of affective influences: those of *expected emotions* and those of *immediate emotions* (Loewenstein and Lerner, 2003).

1. Expected emotions

Expected emotions are cognitive predictions about the emotional consequences of decision outcomes. That is, 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 when outcomes materialize in the future. For example, in deciding whether to invest in a high-risk and high-return commercial development project, a potential investor might attempt to predict whether she will feel regret (or relief) if she did not invest in the project and it yielded huge returns (or losses). Thus, her expectations for emotional outcomes constitute expected emotion.

We present this lengthy definition of expected emotion because theories of decision making -- to the degree that they incorporate emotions at all -- have typically assumed that expected emotion is the only emotion that matters. For example, a standard expected utility model assumes that people attempt to predict the emotional consequences associated with alternative courses of action and then select an action that maximizes the net balance of future positive to negative emotions.

Although most economic models of expected emotion have historically been relatively naïve, incorporating unrealistic assumptions about emotion, a number of important innovations for modeling expected emotion have been introduced. Most notably, researchers now recognize that people (1) respond emotionally to relative changes rather than to absolute consequences of their

decisions (Kahneman and Tversky, 1979; Markowitz, 1952); (2) compare what happened against counterfactual scenarios and derive pleasure not only from concrete outcomes but also from other aspects, such as what the outcomes imply for one's competence, (Bell, 1982; Loomes and Sugden, 1982; Mellers *et al.*, 1997); and (3) care more about the same time delay if it occurs earlier than later (for review, see Loewenstein and Lerner, 2003).

Expected emotions clearly play an essential role in decision making. However, two major factors limit the efficacy of decision making based on expected emotions. First, people systematically mispredict their own affective reactions to outcomes of their own decisions (see Gilbert and Wilson, 2000; Loewenstein and Schkade, 1999). Second, expected emotions do not capture all the factors that decision makers should care about, leaving key criteria out of the decision process (Loewenstein and Lerner, 2003). For example, cognitively analyzing reasons for preferring a particular choice object to another was shown to reduce post-choice satisfaction with the chosen object, presumably by leaving out important considerations that cannot be captured by expected emotions (Wilson *et al.*, 1993).

2. Immediate emotions

Whereas expected emotions fundamentally consist of cognitions, immediate emotions are real emotions experienced at the time of decision making. That is, immediate emotions include not only a cognitive component but also somatic components such as facial expressions and autonomic nervous system

changes. Immediate emotions exert influence on decision making either by carrying information that people use as an input into the decision they face (Schwarz and Clore, 1983, see *Affect-as-information*), by overwhelming deliberative decision making in high intensity (Loewenstein, 1996), or by changing the nature and /or depth of processing (Tiedens and Linton, 2001).

Broadly speaking, affective influences from immediate emotions fall into one of two categories: *anticipatory influences* and *incidental influences*.

2.1. Anticipatory Influences (also known as Integral Influences)

Anticipatory influences are the influences from immediate emotions that arise from contemplating the consequences of the decision itself. For example, while thinking about possible consequences of investing in a risky project, the investor might experience immediate anxiety at the thought of the project failing. This type of immediate emotion is also commonly called *integral emotion*.

Although arising from thinking about consequences of decision, integral emotions depend on a variety of factors that have little or no influence on expected emotions and thus are qualitatively different from expected emotions. First, unlike expected emotions, integral emotions are relatively insensitive to probabilities. For example, when decision outcomes are pallid (e.g. losing \$20) decision makers are quite sensitive to probability variations. But when decision outcomes are emotionally evocative (e.g. electric shock) decision

makers are insensitive to probability variations (Rottenstreich and Hsee, 2000). Second, integral emotions are especially sensitive to the timing and vividness of outcomes. As an event approaches in time, integral emotions such as fear tend to intensify, even when evaluations of the event's probability, or likely severity, remain constant (VanBoven *et al.*, 2005). As an event increases in vividness, a similar pattern of emotion intensification occurs. For example, people pay more for insurance protecting against death due to terrorism than for insurance protecting against any reason (Johnson *et al.*, 1993), presumably because it is easier to vividly form a mental image of death by terrorism than it is to form an image of "death by any reason."

Taken together, integral emotions are qualitatively different from expected emotions and thus often propel behavior in directions that are very different from those that would be dictated by a contemplation of expected emotions. For example, emotional reactions to risky situations often diverge from cognitive assessments of those risks, leading people to be afraid of flying but not driving even if objective risks are far greater for the latter (Loewenstein *et al.*, 2001, Slovic and Peters, 2006).

There is no simple dichotomy between good and bad influences of integral emotions. On one hand, integral emotions can be problematic for decision making. As has been suggested, they often crowd out considerations of expected emotions and cause people to make decision that ignore or underweight important future consequences (Loewenstein and Lerner, 2003)

(See Cognitive Bias in this volume.) On the other hand, however, integral emotions provide intangible but important inputs into decision making as well as impetus to execute the decision. Recent neuroscientific studies show that individual with major emotional deficits lack the “somatic markers” and thus might have difficulty making good decisions (Bechara *et al.*, 1997). However, well-reasoned studies dispute the evidence for somatic markers (Maia and McClelland, 2004). Thus, more research is needed to understand when and how integral emotions serve helpful or harmful roles in decision making. Interested readers can find further discussion in Vohs *et al.* (forthcoming).

2.2. Incidental Influences

Incidental influences are the influences from immediate emotions that arise from factors unrelated to the decision at hand. Such factors could include individual’s immediate environment or chronic dispositional affect. For example, if the weather is sunny, the conflicted investor might experience incidental happiness at the time she contemplates her choice. This type of immediate emotion is also commonly called *incidental emotion*. Influences from incidental emotions are difficult to justify because such emotions, by definition, arise from factors that are incidental to—that is, normatively irrelevant to—the decision. Nevertheless, numerous studies have revealed powerful effects of incidental emotions on decision making.

Incidental emotion influences are apparent in decision making under risk. Generally speaking, it has been argued that people tend to be more optimistic

when they are in good moods than when they are in bad moods (Forgas, 2003). Recent studies, however, have begun to reveal more nuanced effects of specific emotions. For example, whereas fearful individuals make relatively pessimistic and risk-averse choices, angry individuals make relatively optimistic and risk-seeking choices (Lerner and Keltner, 2001). Moreover, choices of angry individuals more closely resemble those of happy individuals than those of fearful individuals. Importantly, it has been shown that appraisal patterns of each specific emotion carry over to a new situation and drive such emotion specific effects.

Incidental emotions also affect other kinds of decisions, such as valuation of objects and decisions regarding prosocial behavior. For example, sadness from past situations increases buying prices and decreases selling prices of an object. Disgust, on the other hand, decreases both buying and selling prices (Lerner *et al.*, 2004). Incidental happiness induced by finding a dime in a phone booth or receiving free cookies increases people's willingness to help others (Isen and Levin, 1972). Similarly, incidental gratitude also increases people's willingness to engage in costly helping behavior (Bartlett and DeSteno, 2006). Considering that these effects all held even when real outcomes were at stake, these studies demonstrate reliable and non-negligible effects of incidental emotions. Fleeting feelings from one's past can systematically alter decisions in the present.

3. Conclusions

As the foregoing review indicates, emotions enter into decision making in various ways. Decision makers predict and take into account emotional consequences of alternative decision outcomes. Such *expected emotions* are not experienced as emotion per se but influence decision making as predictions about emotions that will be experienced when outcomes materialize in the future. Immediate emotions, on the other hand, are real emotions experienced at the moment of decision making. Whereas *integral immediate emotions* are emotions that arise from contemplating the consequences of the decision itself, *incidental immediate emotions* are emotions that arise from factors unrelated to the decision at hand. Many emotional experiences, however, span the categories reviewed here. For example, decisions that involve a choice between two core values, such as lives against money, may evoke negative integral and incidental emotion (Luce, 1998).

Affective influences on decision making cannot be dichotomized into good and bad influences. Emotions, both expected and immediate ones, clearly serve essential functions in decision making. But they are also a potential source of biased choice and reckless action (See “Cognitive Bias” in this volume for strategies to identify bias). More research is needed to fully elucidate how and why different kinds of emotions influence decision making. Some of the most exciting research combines models from multiple disciplines, including psychology, economics, and neuroscience. In sum, what was once a neglected area of study (emotional influences in decision making) has now become a dynamic field, forging an innovative path of interdisciplinary research.

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