

Emotion and Decision Making

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Abstract

The topic of emotion and decision making is an old one. Classic Western philosophical perspectives generally considered emotion a contaminating influence on cognition, one that needed to be suppressed, ignored, or ideally brought in line with reason. Recent psychological research shows that, contrary to such pessimistic perspectives, emotion plays a largely functional and adaptive role in regulating cognition and decision making. We first outline how affect regulates cognition using the affect-as-information account as a guiding framework. We next discuss foundational research on the role of emotion in regulating cognition and decision making consistent with this account. Finally, we end with a discussion of new research developments and open research questions.

INTRODUCTION

We all know that emotions are useless and bad for our peace of mind and our blood pressure.

B.F. Skinner, 1948, p. 92

The topic of emotion and decision making is an old one. Classic Western philosophical treatments of emotion and reason generally considered emotion a contaminating influence on cognition, one that needed to be suppressed, ignored, or ideally brought in line with reason (Aristotle, 1991; Plato, 1992). The Stoics, for example, strongly advocated the idea that emotions were useless, unruly impediments to reason that enticed people to behave in substandard ways. Therefore, their experience should be minimized and ultimately made a slave to reason. Echoes of this “rationalist” perspective can also be seen in eighteenth-century Enlightenment philosophers who similarly argued that the emotions were a disruptive and disorganizing force in the mind that should be ignored (Kant, 1960). In contrast to these less than charitable treatments of emotion, Scottish

philosopher David Hume (1739/1888) suggested that emotion formed an essential element of reason. Indeed, for Hume, it was reason that should be slave of the passions (i.e., emotion) rather than the other way around.

Early psychological treatments of emotion and decision making generally accepted this rather dismal view. As illustrated in the epigraph that begins this essay, Skinner's view of emotion was decidedly dismissive. It was not only behaviorists such as Skinner who maintained such a dismal view of emotion; it was broadly held within the discipline (e.g., Freud, 1930/1961). Moreover, when the cognitive revolution swept across psychology in the 1960s, empirical examination of emotion fell out of favor as researchers adopted a cold computational model of the human mind.

The study of emotion only began to regain a foothold in psychology in the late 1970s and early 1980s. This new research revealed a more rosy view of how emotion influenced thinking. Rather than having a dysfunctional role, the consensus view now is that emotion plays a largely functional role in regulating cognition and decision making. Indeed, when the ability to experience emotion is impaired or absent, people have considerable difficulty effectively navigating even the most mundane decision contexts (Damasio, 1994).

In what follows, we outline how affect regulates cognition and decision making. We begin by discussing foundational research on this topic across several different domains. We end with a discussion of new research developments and open research questions.

Before continuing, it is necessary to define some key terms. The first concerns what we mean by affect. Clore and Huntsinger (2007) defined affect as a representation of value (i.e., the goodness or badness of something) that can take several different forms including neurological, physiological, experiential, cognitive, and behavioral. An affective state involves the co-occurrence of several of these reactions. Emotions represent affective states with an object and reflect an underlying appraisal. Although emotions can be classified according to valence (i.e., positive or negative), their influence on cognition depends on the appraisal pattern that accompanies their experience. In contrast, moods are diffuse affective states that lack specific objects and appraisals. We thus speak of affective feelings as the category that comprises both emotion and mood.

FOUNDATIONAL RESEARCH

Over the past three decades, a significant amount of research across a wide variety of domains indicates that affective feelings may adaptively influence how people process information and thus impact decision making. A useful way to understand the impact of affective states on cognition can be found in the affect-as-information account (Schwarz & Clore, 1983).

AFFECT-AS-INFORMATION ACCOUNT

According to this account, affective feelings are conscious information about unconscious appraisals of situations. This appraisal process is always active, giving rise not only to strong emotional feelings but also to weaker affective cues, which are always available as evaluations of our current situation. Said another way, just as emotional facial expressions provide affective information to others, affective feelings play a role in judgment and cognition by providing such affective information to oneself. As such, affective feelings serve an adaptive and important feedback function and they provide a sufficient basis for many judgments and cognitive processing decisions.

The earliest articulations of the affect-as-information account applied exclusively to affective influences on judgment, asserting that affective feelings serve as input to evaluative judgments, with positive affect often resulting in more positive judgments than negative affect (e.g., Schwarz & Clore, 1983). This early model, however, was later expanded to account for differences in cognitive processing. Consistent with functional theories of emotion that assert that affect serves a signaling function that adaptively directs our behaviors, Schwarz and Clore theorized that affective cues can similarly serve to direct our cognitive processing by providing information about our psychological environment (Schwarz & Clore, 1983, 2007).

According to this view, negative affective cues indicate the presence of a problem, and thus trigger more careful, detailed processing in an attempt to resolve the perceived problem. In contrast, positive affective cues signal a safe and benign environment, and thus trigger more heuristic processing, attention to global or big picture, gist-based information that comes quickly to mind and that has served them well in the past. Some have suggested that these differences are the result of positive affect increasing confidence in global, heuristic processes, and general knowledge structures, thereby promoting reliance on such approaches, whereas negative affect is associated with decreased confidence in such information, thereby promoting reliance careful and detailed processing.

The affect-as-information account can also explain the influence of specific emotions on cognition. The idea here is that different emotions convey different information about the ways in which objects are positive or negative so that emotions of similar valence can have different effects and their implications for judgment and cognition depend on their object. This idea will be explained in more detail shortly (see Specific Emotions section below).

In what follows, we first review evidence consistent with the idea that general positive and negative feelings produce reliable differences in judgment and styles of thinking. Our discussion is organized around domains that have clear implications for decision making. As will become clear shortly, whether

positive or negative affect hinders or helps decision making and cognitive performance depends on the nature of the task. This literature is now quite voluminous; therefore, our review is necessarily selective and hence incomplete. We then turn our focus to how specific emotions, such as anger and disgust, influence judgment and styles of thinking.

GENERAL POSITIVE AND NEGATIVE FEELINGS

Judgment. When making evaluative judgments, people often implicitly ask themselves “how do I feel about it?” Currently experienced affective reactions then inform people of the value of whatever happens to be the object of judgment (Schwarz & Clore, 1983) and are experienced as liking or disliking.

Schwarz and Clore (1983) first demonstrated the informational influence of mood in studies examining life-satisfaction judgments. In a telephone survey people were called on either rainy or sunny spring days and asked how satisfied they were with their lives as a whole. The weather reliably influenced people’s moods—people called on sunny days were happier than those called on dreary days. As part of an implicit misattribution process, these feelings were then drawn on by respondents when rating their levels of life satisfaction, leading them to report being more satisfied with life on a sunny than a rainy day. The influence of mood on judgments of life satisfaction, however, disappeared when participants were first asked about the weather. Asking about the weather did not change their feelings, but it did change what their feelings seemed to be about.

A parallel influence of mood can be seen in risk judgments. The experience of positive affect, as compared to negative affect, leads people to see less risk in their environment (Gasper & Clore, 1998). This informational influence of affective feelings on judgment is quite robust, and has been found for judgments of consumer products, the self, and other people (for a review, see Schwarz & Clore, 2007).

Perception. Happy people tend to focus on the forest or the big picture and sad people tend to focus on the trees or the details. As an example, when judging the similarity between a series of geometric figures people in positive moods base their judgments on the global features of the stimuli more than people in negative moods who base their judgments on the local features (Gasper & Clore, 2002). Subsequent research employing a flanker task, which more directly captures attentional broadening and narrowing, suggests that positive and negative affect have these effects by fundamentally adjusting the scope of visual attention (Rowe, Hirsh, & Anderson, 2007). In a flanker

task, participants respond to the identity of a central letter while ignoring irrelevant flanking letters. On some trials the flanking letters are compatible (SSSSS) and other trials the flanking letters are incompatible (HHSHH) with the central letter. Consistent with the idea that positive affect broadens attention, happy as compared to sad participants exhibited slower reaction times to the incompatible trials relative to the compatible ones. Such results reveal that positive affect promoted a widened focus of attention leading to distraction by the irrelevant flankers and slowing of responses to the central stimulus, whereas the narrowed focus generated by negative affect facilitated performance by reducing such distraction.

Categorization. The tendency of happy moods to produce a focus on the big picture and heuristic processing facilitates formation of broad or inclusive categories, whereas the tendency of sad moods to produce a focus on the details and systematic processing facilitates formation of narrow or exclusive categories. Happy moods, for example, lead individuals to form more inclusive categories in which atypical or unusual exemplars (e.g., feet) are assigned to the category vehicle (Isen & Daubman, 1984). Similarly, happy participants describe past events at a greater level of abstractness than sad participants who describe such events using more concrete language (Beukeboom & Semin, 2005).

Creative Problem Solving. Work on categorization suggests that positive affect leads people to perceive greater relatedness among diverse stimuli than negative affect. As a consequence, happy individuals generally outperform sad individuals on measures of creative problem solving. Relative to sad or neutral moods, for example, happy moods have been associated with increased performance on the Remote Associates Test (RAT), in which participants are given three words (e.g., mower, atomic, foreign) and are asked to find one word that relates to each of them (e.g., power). Likewise, happy individuals have been shown to be better able to entertain ideas about how objects might serve different purposes and thus, are more successful at completing Duncker's candle problem solving task (Isen, Daubman, & Nowicki, 1987).

Analytic Reasoning Tasks. Unlike creative problem solving tasks, in which performance is boosted by top-down processing and a broadened focus, performance on analytic reasoning tasks is facilitated by systematic processing and attention to detail. Thus, sad individuals generally outperform happy

individuals on such tasks. Melton (1995), for example, found that sad participants performed better on a syllogistic reasoning task than happy participants.

Heuristics and Biases. Judgmental and reasoning biases are nonrandom mistakes that result from application of certain heuristics and general knowledge structures. These heuristics and biases come to mind easily but point judgment and reasoning toward formally incorrect responses. The superficial and top-down processing style produced by positive affect should make people more susceptible to a variety of judgmental and reasoning biases. Conversely, the systematic and bottom-up processing style produced by negative affect should make people less susceptible to such biases. Empirically this is the case. Take for example the availability bias or ease of retrieval heuristic. This heuristic reflects a judgmental rule under which individuals base their frequency or likelihood estimates on how easily they can recall relevant information (Tversky & Kahneman, 1973). Consistent with the idea that positive affect foster heuristic processing, and negative affect systematic processing, individuals in happy moods are more likely to fall prey to the availability bias than those in sad moods (Ruder & Bless, 2003). A similar effect can be seen in research on the correspondence bias, which reflects people's tendency to jump to dispositional explanations for others behavior even when such behavior is constrained by situational demands. As with the availability bias, happy people are more likely to commit this judgmental bias than sad people, who instead tend to explain others' behavior as due to situational demands (Forgas, 1998).

Although the tendency to think more systematically may insulate sad people from many judgmental biases, one exception can be found in research examining the influence of affective feelings on anchoring effects. Anchoring effects occur when judgments are influenced by a salient anchor or starting point, even when the value of the anchor is arbitrary or meaningless. For example, in a classic demonstration of this effect Tversky and Kahneman (1974) asked their participants two consecutive questions about the percentage of African countries in the United Nations. The first question asked participants to say whether the percentage of countries was higher or lower than an arbitrary number (e.g., 65% or 10%) that was chosen by spinning a wheel. Participants were then asked to estimate of this percentage. Final estimates were higher when the initial anchor was a higher value and lower when the anchor was smaller value.

One explanation for anchoring effects is that when people entertain an initial starting value, they begin by testing the possibility that this value is correct (Mussweiler, 2003). This biased hypothesis testing calls to mind

information consistent with the anchor (e.g., “Africa is huge,” “There must be a lot of countries in Africa”), which in turn increases the impact of this initial value on final judgments. The more extensively individuals entertain the idea that an anchor is correct, the more information consistent with the anchor that comes to mind, ultimately biasing final judgments toward the anchor. The more elaborate and extensive processing of information triggered by negative affect should increase the accessibility of information consistent with the anchor. As a result sad individuals are more susceptible to judgmental anchoring (Bodenhausen, Gabriel, & Lineberger, 2000).

Persuasion. Research on persuasion illustrates the idea that positive mood produces heuristic or superficial processing and sad moods produce systematic or detailed processing. In this research, typically participants in induced happy and sad moods read a persuasive appeal containing either strong or weak arguments in favor of some position (e.g., comprehensive exams for graduating college seniors). Much of this work demonstrates that the attitudes of people in happy moods seem immune to the quality of message arguments, and are instead often based on heuristic cues, such as source expertise. In contrast, the attitudes of people in sad moods seem attuned to the quality of message arguments and immune to the allure of heuristic cues. Thus, sad individuals tend to process arguments carefully and are more persuaded by strong rather than weak arguments, whereas happy individuals tend to be equally persuaded by both (Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989).

Stereotyping and Impression Formation. When forming impressions of other people, we can rely on global, categorical information (e.g., stereotypes, personality traits) or more local, detailed information (e.g., specific behaviors). Research indicates that happy individuals are more likely to use stereotypes and traits as a basis for impression-based judgments than are individuals in sad or neutral moods. In a mock jury situation, for example, happy people rely more on stereotypes when assessing a defendant’s guilt than sad people and those in neutral moods (Bodenhausen & Moreno, 2000). In other research, Isbell (2004) presented participants with global trait information about a target (Carol is introverted) along with both trait-consistent behaviors (e.g., Carol is quiet around strangers) and trait-inconsistent behaviors (e.g., Carol enjoys karaoke) that the target performed. Happy participants’ judgments reflected the trait information, whereas unhappy participants’ judgments instead reflected the mixed set of behaviors.

SPECIFIC EMOTIONS

Unlike general positive and negative affective feelings, the information conveyed by specific emotions is constrained by the pattern of appraisal that accompanies each emotion (Clore & Huntsinger, 2009; Ortony, Clore, & Collins, 1988). Thus, two emotions of similar valence (e.g., anger and sadness) have opposite influences on cognition and decision making.

Disgust. Disgust involves dislike of the unappealing attributes of objects based on taste. Distasteful things may include anything from foul odors to offensive ideas. Objects associated with feelings of disgust should decrease in value and should be avoided or rejected. Disgust has been examined in an experiment on a phenomenon known as the “endowment effect,” which refers to people’s tendency to set higher selling prices than buying prices for objects they own (Lerner, Small, & Loewenstein, 2004). Consistent with expectations, disgust disrupted the usually robust endowment effect by decreasing the selling price for a small item (a set of highlighter pens) that had been given to participants. The influence of disgust on decision making has been most thoroughly mapped out in studies of moral decision making, because people often report finding immoral acts physically disgusting. Experimentally induced feelings of disgust can be misattributed to moral judgments such that, for example, the feeling of disgust derived from being exposed to a foul smell is incorrectly interpreted as being diagnostic about a moral transgression, thus leading the person to infer that a particular moral action is quite wrong (Schnall, Haidt, Clore, & Jordan, 2008).

Sadness. Sadness reflects displeasure over an undesirable outcome that is relevant to one’s goals. Sadness therefore is accompanied by feelings of general loss and a lack of control and resources. In an attempt to compensate for this loss, sadness often evokes an implicit goal to change one’s circumstances. Consistent with this idea, sadness reverses the usual responses that constitute the endowment effect, lowering the selling price and raising the buying price (Lerner *et al.*, 2004). In effect, sad people attempt to change their circumstances by disposing of what they have in exchange for something new. Similarly, sadness has been shown to increase consumption, especially hedonic consumption, although this effect can be attenuated by decreasing feelings of helplessness that accompany the experience of sadness (Garg & Lerner, 2013). This is especially the case for consumer products that are comforting and rewarding (Raghunathan, Pham, & Corfman, 2006). The sense of loss associated with sadness also makes people more likely to prefer immediate gratification, rather than waiting for larger gains in the future (Lerner, Li, & Weber, 2013).

Anger. Anger is a rather complex emotion that has two key ingredients: being displeased at an undesirable outcome and disapproval of the blameworthy actions that caused them. Thus, anger has been shown to increase judgments of blame (Keltner, Ellsworth, & Edwards, 1993). Because anger is associated with a feeling of one's position being correct it has been shown to increase support for actions associated with one's group. In the research on emotional reactions to terrorism, for example, anger after the September 11 attacks was associated with support for the Iraq war and the perception that it was less risky (Lerner, Gonzalez, Small, & Fischhoff, 2003). The feeling of confidence associated with anger also encourages a more heuristic or superficial style of thinking. Thus, anger tends to increase reliance on stereotypes and on heuristic cues (e.g., source expertise) when processing persuasive messages (Bodenhausen & Moreno, 2000; Tiedens & Linton, 2001).

Fear and Anxiety. Fear and anxiety involve displeasure about the prospect of an undesirable outcome and are accompanied by feelings of threat and uncertainty. As such, the experience of fear and anxiety is linked to increased judgments of risk (Gasper & Clore, 1998). In research on perceptions of terrorism and the second Iraq war, for example, fearful people perceived greater risk from terrorism (Lerner *et al.*, 2003). Fear and anxiety are also linked to a tendency to make risk-averse decisions, a more pessimistic outlook on future events (Lerner & Keltner, 2001), and preferences for consumer products that emphasize safety (Raghunathan *et al.*, 2006). Feelings of threat and uncertainty that accompany the experience of fear and anxiety also encourage a more systematic or detailed style of thinking. Fearful people, for example, avoid relying on stereotypes when making judgments and, when processing persuasive message, they also avoid relying on heuristic cues (Tiedens & Linton, 2001).

CUTTING-EDGE RESEARCH

One way to understand the influence of general positive and negative feelings (and specific emotions) on cognition is that particular feelings have particular cognitive signatures. Positive affect and negative affect directly produce changes in how we process information, with positive feelings generating a global, heuristic and superficial style of thinking and negative feelings generating a local, systematic and detailed style of thinking. Indeed, the research reviewed above would seem to provide convincing evidence for this idea. New research, however, suggests that the influence of general positive and negative feelings (and specific emotions) may be quite a bit

more flexible than original assumed. We now turn our attention to a new perspective on how affect influences cognition and decision making.

A COGNITIVE FLEXIBILITY ACCOUNT

The cognitive flexibility account builds on the affect-as-information approach just described and represents a more flexible variant of the earlier processing account. Rather than assuming that affect simply provides information about the benign or problematic nature of a situation, the cognitive malleability approach emphasizes that the information that affect provides is considerably more general and less constrained than previously thought. According to this view, the influence of positive affect on cognition is like that of reward in that it is not dedicated to any one cognitive outcome, but tends to reinforce whatever cognitive responses are associated with it. This view underscores that people more or less automatically tend to experience affective feelings as reactions to their current mental content. Thus, affective reactions convey information about the value of accessible mental content, including whatever thoughts and styles of processing happen to be in mind at the moment.

In terms of general styles of thinking, positive affect may lead people to view accessible processing strategies (e.g., heuristic or systematic, global or local) as appropriate ways of dealing with incoming information. Negative affect should have the opposite effect. Thus, positive and negative feelings should adjust whether people rely on accessible thoughts and responses. In effect, positive affect serves as a green light, or a “go signal” that validates and facilitates the use of accessible styles of thinking, whereas negative affect serves as a red light, or a “stop signal” that invalidates and inhibits their use (Clore & Huntsinger, 2009; Huntsinger & Clore, 2012).

According to a cognitive flexibility account, then, the impact of affective feelings on cognition should be flexible. That is, because affective feelings simply confer positive or negative value on cognitively accessible mental content, their impact on cognition should depend on what thoughts and processing inclinations happen to be accessible at the moment. We now selectively review evidence consistent with this account.

Perception. According to a cognitive flexibility account the seemingly robust finding that people in happy moods focus broadly, and those in sad moods focus narrowly, can be explained by the fact that people generally show a tendency to focus broadly. Not only is such a focus the default for most people, this general tendency is only strengthened in most experimental contexts. Therefore, rather than directly triggering a broad focus or a narrow focus, in

past research positive and negative affect may have had their effects by conferring positive or negative value on this highly accessible way of viewing the world.

Consistent with this logic, new research shows that the link between general positive and negative feelings and a focus on the forest or the trees depends on whether people are inclined to focus broadly or narrowly (Huntsinger, 2012; Huntsinger, Clore, & Bar-Anan, 2010). In this research, when a global focus was dominant, happy people focused on the forest and sad people the trees. However, when a local focus was dominant, now happy people focused on the trees and sad people the forest. This result was found for a variety of different measures of broadened or narrowed attention, including tasks thought to capture fundamental shifts in the scope of attention such as the flanker task described earlier (for a review, see Huntsinger, 2013). These results suggest that the influence of affective feelings on categorization and creativity, which are assumed to result from affective shifts in attention to the forest or trees, should show similar flexibility. This possibility awaits empirical examination.

Heuristics. Similar flexibility can be seen in research on what is called the conjunction fallacy (Tversky & Kahneman, 1974). In a classic example of this fallacy, people read a personality sketch of a woman named Linda in which she was described as outspoken and very bright, and was deeply concerned with issues of discrimination and social justice as a student. Participants were then asked which of two alternatives was most likely: (i) That Linda is a bank teller or (ii) Linda is a bank teller and active in the feminist movement. Most participants chose option two because it seems more “representative” of Linda based on the description they read (i.e., Linda just “looks like” a feminist), even though the conjunction of two events is necessarily less likely than either one occurring in isolation. Because this tendency is only reinforced by a heuristic style of thinking, past research suggests that happy people should be more apt to commit this logical mistake than sad people. From a cognitive flexibility account, however, whether happy or sad people fall prey to the conjunction fallacy ultimately should depend on whether a heuristic or systematic style of thinking is most accessible at the moment. Consistent with this reasoning, when primed with a heuristic style of thinking, happy people commit this fallacy more than sad people, but when primed with a systematic style of thinking, happy people commit this fallacy less than sad people (Huntsinger & Ray, 2014).

Impression Formation and Stereotyping. From a cognitive flexibility account, the customary influence of positive and negative affect on stereotyping

results from the fact that global, category-based processing tends to be the default tendency in impression formation tasks (Fiske & Taylor, 2008). Thus, in past research affect may have had its influence merely as a result of positive affect conferring positive value on this already accessible tendency, and negative affect conferring negative value. Consistent with this logic, making a local, item-based processing tendency momentarily dominant reverses the link between affect and the use of global, category-based information (Hunsinger, Isbell, & Clore, 2012). Now happy people form impressions based on presented behavioral information and sad people form impressions based on presented trait information.

SUMMARY

The research just reviewed suggests that general affective feelings are not tied to particular styles of thinking. Rather, the influence of general affective feelings on thinking and decision making is flexibly responsive to changing cognitive contexts, including whether different ways of attending to and thinking about the world are most in mind at the moment (for an extensive review, see Hunsinger, Isbell, & Clore, 2014).

KEY ISSUES FOR FUTURE RESEARCH

Over the past 30–40 years, researchers have provided a detailed portrait of how emotion influences cognition and decision making. Although early research seemed to indicate that emotion has direct and dedicated effects on cognition, new research suggests that such a conclusion may have been premature. Indeed, at least for general positive and negative feelings, this new research suggests that such feelings do not have particular cognitive signatures. Rather their influence depends on the momentary cognitive context.

Of course, as with any empirical endeavor, there always remain outstanding, unanswered questions, some of which are suggested by existing research and some that will only emerge as more work is done. Below we suggest key issues for future research:

- Future research is needed to determine the neurobiological underpinnings emotional influences on cognition. In order to fully understand how emotion influences cognition and decision making a neurologically plausible model of their interaction needs to be developed.
- Although researchers have begun to show the flexible impact of general positive and negative feelings on cognition and decision making, it remains an open question whether specific emotions will display similar

flexible effects. This is an important area for future research, and there reason to suspect similar flexibility. According to the cognitive flexibility account, emotions associated with certainty (e.g., anger and happiness) should lead people to adopt whatever style of information processing is activated, whereas emotions associated uncertainty (e.g., anxiety, sadness) should lead people to reject activated styles of information processing. Thus, like more general positive and negative feelings, this account suggests that the influence of emotion on cognition should be flexibly responsive to change in styles of thinking.

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