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# Emotion and the Framing of Risky Choice

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**Abstract** One of the most noted phenomena in social and political decision-making is the occurrence of a framing effect. For example, on problems involving risky choices, individuals tend to act risk-averse when the problem is framed in terms of gains (e.g., saving lives, making money) and risk-seeking when the same problem is instead framed in terms of losses (e.g., deaths, losing money). Scholars have begun to identify the processes underlying framing effects as well as the conditions under which framing effects occur. Yet, extant work focuses nearly exclusively on cognitive processes, despite growing recognition of the importance of emotion in general decision-making tasks. In this paper, we explore the impact of emotional states on risk attitudes and framing. We find that emotions significantly influence both individuals' tendencies to take risks and the impact of a frame on risky choices (e.g., emotions amplify or depress a frame's impact). The precise role of emotions depends on the problem domain (e.g., a life-death or a financial decision), and the specific type of emotion under study. Moreover, in contrast to much work in political science, we show that emotions need to be distinguished beyond their positive or negative valence, as different negative emotions exert opposite effects. Our results accentuate the importance of integrating emotions into research areas traditionally dominated by more cognitive perspectives.

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Citizens' political preferences form the foundation of democratic governance. It is thus not surprising that scholars devote a considerable amount of attention to studying the processes by which individuals form their political attitudes. The portrait that emerges from these studies makes clear that, in forming their opinions, citizens do *not* satisfy the requisites of the "ideal rational decision-maker." As Berelson (1954, pp. 309–311) and his colleagues explained over fifty years ago: "The democratic citizen is expected…to have arrived at his principles by reason and to have considered rationally the implications and alleged consequences of the alternative proposals…[Yet] it appears that a sense of fitness is a more striking feature of political preference than *reason* and *calculation*" (emphasis added).

Two notable ways in which citizens deviate from this bygone ideal is by invoking emotion in their decisions, as opposed to pure reason, and by exhibiting susceptibility to framing effects. Some types of framing effects occur when individuals' preferences shift due to arbitrary variations in information rather than reflecting calculations across all conceivable dimensions of a decision. Political behavior research on each of these topics—emotion and framing—has proven quite progressive over the last decade (e.g., Marcus 2003; Druckman 2004; Chong and Druckman 2007). Yet, surprisingly, few political behavior scholars have explored the relationship between emotion and framing, with the latter being construed almost always in purely cognitive terms.

In what follows, we explore the relative impact of emotions as opposed to frames as well as the moderating effects of emotions on how people process frames. We focus on the impact of emotion on the framing of risky choice problems, which is a variant of valence or equivalency framing. Equivalency framing effects occur when "*logically equivalent* phrases cause individuals to alter their preferences (Tversky and Kahneman 1981, 1987)… typically involve[ing] casting the same information in either a positive or a negative light…" (Druckman 2004, p. 671). An example of an equivalency framing effect is when people reject a policy program when told that it will result in 5% unemployment but prefer it when told that it will result in 95% employment.[1] Numerous authors highlight the relevance of these types of framing effects for studies of voting and public opinion, campaigns, policy-making, foreign-policy decision-making, coalition bargaining, judicial decision-making, and a variety of other topics (e.g., Quattrone and Tversky 1988; McDermott 1998; Bartels 2003; Levy 2003; Druckman 2004).

In the next section, we discuss extant work on risky choice, particularly emphasizing the role of framing in shaping such choices. We then turn to a

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[1] Druckman (2004, p. 672) explains that these types of equivalency framing effects "differ from value or *issue* framing effects, as studied in the political communication literature… Issue framing effects refer to situations where, by emphasizing a subset of potentially relevant considerations, a speaker leads individuals to focus on these considerations when constructing their opinions. For example, describing a hate group in terms of free speech as opposed to public safety causes people to base their rally opinions on free speech instead of public safety considerations." For studies on issue framing and emotion—with particular focus on how different frames lead to alternative emotional reactions—see Brewer (2001), Gross and D'Ambrosio (2004), Marcus et al. (2005), Gross (2006), Gross and Brewer (2006). Also see Lerner and Keltner (2001), who explore emotions and equivalency framing effects. Some of their results are similar to ours although we look across domains, at preference confidence, and at different specific emotions.

discussion of how emotion not only affects risk preferences but also how it might interact with frames in shaping risky decisions. We also briefly discuss how emotions might influence the confidence individuals maintain in their expressed preferences. From these discussions, we derive predictions about the competing and interactive effects of frames and emotions, and about the impact of emotions on preference confidence. We test our expectations with two experiments. After presenting the results, we conclude with a brief discussion of implications. Our findings reveal the importance of incorporating emotions into studies of cognitive framing (both in terms of competing and interactive effects), how emotions need to be distinguished beyond their positive and negative valences, how the specific role of emotions and frames vary across problem domains, and how emotions influence the confidence one has in his or her preferences.

## Risky Choice and Framing

Politicians regularly face risky choices in decisions that range from whether to go to war to deciding which policies will maximize their odds of being reelected. Citizens make risky decisions every time they vote for one candidate instead of another. The framing of risky choices plays a major role in any such decision-making pursuit. As is well known from the work on prospect theory conducted by Kahneman and Tversky (1979, 1984), frames strongly influence risk propensity, such that people appear quite risk-averse when approaching gains, and remain much more risk-seeking when confronting losses.

One of the most persistent criticisms of prospect theory is that it lacks a theory of framing. Payne, Bettman, and Johnson (1993, p. 66) succinctly captured this sentiment when they stated, "clearly, the development of a theory of framing is badly needed" (e.g., Riker 1995; Wittman 1995; Druckman 2001a,b). In the fifteen years since Payne et al.'s statement, there has been progress. Scholars have begun to identify mediational processes and moderating variables. For example, Jou et al. (1996) present a theory that posits cognitive accessibility processing as underlying framing effects. Others show that framing effects are less likely to occur when the respondent is a male (Fagley and Miller 1997), has high cognitive ability (Stanovich and West 1998), or briefly thinks through his or her decision (Takemura 1994). Moreover, framing effects tend to disappear when a decision-maker provides a compelling rationale for his or her decision (Sieck and Yates 1997).[2] Additionally, Kanner (2004) shows that framing can be manipulated by secondary actors by either changing the actor's confidence about future outcomes, or discounting the utility of a given choice.

Notably absent from this list, however, is significant study into emotional factors that might compete and/or interact with framing effects. De Martino et al. (2006, p. 684) explain that framing studies "emphasize the operation of analytic processes in guiding choice behavior. However, more intuitive or emotional responses can play a key role…" The authors go on to show, using fMRI technology, that framing effects

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[2] For contextual limitations, see Bless et al. (1998), Druckman (2004).

are associated with amygdala activity in the brain, "suggesting a key role for an emotional system" (also see Lerner and Keltner 2001; Chang 2007). Similarly, Loewenstein et al. (2001, p. 274) explain, "feelings play a much more prominent role in risk decision-making than they are given credit for by the cognitive-consequentialist tradition of judgment and decision-making research." They continue by arguing that (p. 280), "the decision-theoretic approach to decision-making under risk has largely ignored the role played by emotions…very little attention has been given to the impact of emotions…" (also see Shiv et al. 2005, p. 438).

As mentioned, we explore two ways in which emotions influence the framing of risky choices. First, emotional response may provide a competing influence (with the frame) on cognitive interpretations of choice. Second, emotional considerations might either exacerbate or ameliorate the influence of a particular frame itself. In other words, emotion may provide an important key in explaining variance in framing effects, including susceptibility to them. Our goal is not to negate earlier cognitively focused work, but rather to supplement it by integrating emotion into an understanding of framing effects. We next describe how emotional states can directly affect individuals' risk assessments, and then how emotions might exacerbate or depress the impact of a frame.

## Emotion and Risk

A growing literature suggests that emotions can affect risk assessments in systematic and predictable ways. This work goes back, at least, to Bower (1981) who posited a relationship between mood and memory, suggesting that mood congruence enhanced memory (e.g., individuals in a bad mood proved more likely to remember negative events while those in a good mood more readily recalled positive experiences). Johnson and Tversky (1983) extend this logic to argue that specific emotions could affect risk assessment. They show that positive emotions trigger optimistic risk assessments, while negative emotions lead to more pessimistic risk assessments. This proved true even when the specific emotion resulted from factors wholly unrelated to the issue whose risk individuals assessed. For example, sad people tend to inflate their risk of negative events like getting cancer more than happy people (also see Hsee and Weber 1997). In short, this work suggests that positive emotions, such as enthusiasm, tend to lead to greater risk-seeking because people become more optimistic about future outcomes when they are feeling good. Similarly, negative emotions, such as anxiety, tend to make individuals more pessimistic about future outcomes, and this can lead to risk aversion.

More recent work in psychology accentuates the importance of moving beyond general positive and negative mood states into the study of discrete emotions. DeSteno et al. (2000), for example, demonstrate that mood states increase the perceived likelihood of emotion specific (i.e., beyond just positive or negative) congruent future events. For instance, an angry individual will perceive future events that generate anger (a negative emotion) as likely but sad events (also a negative emotion) as less likely to occur. DeSteno et al. argue that this effect results

from the informational value provided by particular emotional states (also see Bodenhausen et al. 1994; Mitchell et al. 2001).[3] This interpretation is consistent with Clore's (see Schwarz and Clore 2003, for a review) affect-as-information model of mood.

Lerner et al. (2003, p. 144) emphasize the "importance of examining specific emotions rather than global (positive–negative) feelings." They reference Smith and Ellsworth's (1985) appraisal-tendency theory to argue that emotions become an implicit perceptual lens for interpreting situations. From this perspective, negative emotions, such as fear or distress, that generate anxiety stem from appraisals of uncertainty and the need for situational control, while other negative emotions, such as anger or hostility, that generate aversion emerge from certainty married to the same need for control. Because of this, hostility or anger produces optimism about future outcomes (due to certainty) and risk-seeking choices, possibly because of the desire for revenge in the face of a clear target. In contrast, distress or fear leads to pessimistic judgments (due to uncertainty) of the future and greater risk aversion as individuals strive to figure out who or what is hurting them, and how they can best stop the threat (Lerner and Keltner 2000; Lerner and Keltner 2001; Lerner et al. 2004). The central point to take from this work lies in the critical importance of differentiating specific negative emotions that vary in their concomitant certainty and consequential affect on risk (e.g., distress or anxiety versus anger or aversion).[4]

While much prior work in political science ignores such distinctions between types of negative emotions (e.g., Abelson et al. 1982; Marcus 1988; Marcus et al. 2000; Brader 2006; Brader et al. 2007), some recent work recognizes the varying impact of negative emotions. Notably, MacKuen et al. (2005, p. 3) emphasize the need to distinguish the negative emotion of anxiety from another negative "emotional response not previously considered… the emotion of aversion," which

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[3] In later work, DeSteno et al. (2004) apply their model to persuasive communication, arguing that specific emotions can alter the effectiveness of certain appeals based on their emotional framing. They note that the "influence of affective states on judgments of likelihood may not occur as a function of simple valence." In other words, the extent to which an emotional state will influence a particular judgment depends on the event and the context, as well as the specific emotion elicited. Based on their earlier findings, they suggest that persuasive attempts will be more successful when they are framed to match the emotional state of the observer. Mayer et al. (1992) also investigated mood congruent judgments in a series of experiments designed to show the generalizability of the phenomenon. They showed that individuals judge attributes to be more characteristic, and judge outcomes to be more likely, when mood is congruent. In addition, they note that negative affect deflates the perceived risk of a positive event (also see, e.g., Berkowitz and Harmon-Jones 2004).

[4] This view mirrors Slovic's (1999) argument that emotions serve an orienting function. In this view (Slovic et al. 2004, 2005), risk is understood and acted upon in two fundamental, and profoundly different, ways. The first approach considers risk as feelings; the second understands risk as analysis. The first represents a rapid, intuitive, often unconscious experiential response or reaction to perceived danger or threat; this interpretation constitutes the "affect heuristic" (Finucane et al. 2000). Because this system evolved to aid humans in survival, it remains the most common and automatic way for individuals to assimilate risk. The second approach considers risk as an analytic problem requiring normative solutions involving rationality and logic. This process is relatively slower, and requires much greater conscious effort. While many advocates of this approach consider emotional responses to risk as irrational, more recent work in neuroscience demonstrates that these systems work largely in parallel and take direction from each other (Damasio 1994).

includes feelings of anger and disgust (e.g., Marcus et al. 2000, p. 168; Marcus 2003).

For some tasks, different positive emotions can have distinct effects as well.[5] However, we are unaware of any expectations (e.g., from the work on which we build) of variation in distinct positive emotions when it comes to risk attitudes or framing effects. As far as we know, positive emotions, such as enthusiasm, should generally lead to risk-seeking as suggested above.

## Emotions as a Framing Moderator

Aside from directly influencing risk assessments, emotional states can condition the impact of a given frame. Marcus et al.'s (2000) influential model of affective intelligence posits that people tend to become more involved and interested when they feel positive emotions such as enthusiasm, but actually become more attentive to external stimuli, information-seeking, and open to attitude change when they are experiencing negative emotions that generate anxiety (e.g., distress) (also see Brader 2006). Marcus et al. (2005) assert that people with a high level of anxiety or distress should prove more susceptible to preference change because they are more attuned to external information (e.g., frames). The logic behind this is that anxiety signals a "sense of danger and novelty… [and] alerts people to stop, think, and adjust behavior" (Marcus et al. 2005, p. 950). More concretely, anxiety triggers the surveillance system of evaluation which "monitors the environment for novel and threatening stimuli…[and] interrupts habitual routine and engages thought" (Marcus et al. 2000, p. 53). Increased attention to the environment means increased power of information and how that information is framed (as opposed to reliance on long-standing risk-attitudes).

In contrast, negative emotions of aversion, such as anger, will not have this effect. "[A]version is an actively negative emotion distinct from both anxiety and the absence of enthusiasm (Learner and Keltner 2001)… when people experience an aversive response… they will avoid exposure to learning [i.e., information]" (MacKuen et al. 2005, pp. 7–8). Aversive emotions like anger, then, trigger the disposition rather than the surveillance system; the disposition system leads people to be less attuned to the external environment.[6] (For a detailed discussion of the causes and consequences of anger, see Berkowitz and Harmon-Jones 2004a, b). Similarly, increases in positive emotions such as enthusiasm tend to temper the impact of external information such as alternative frames because it also activates the disposition system.[7] Notably, then, as with our expectations regarding direct effects on risk-attitudes, we expect different negative emotions to have distinct effects in moderating the frame's impact with aversive emotions like anger having

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[5] Lerner and Keltner (2000, pp. 477–480) offer an example of expected differences among the positive emotions of pride and surprise (but not with regard to risk attitudes) (also see Lerner and Small 2002, p. 300).

[6] We thank an anonymous reviewer for guidance on this point.

[7] This is consistent with Kowert and Hermann (1997) who find that experimental participants who are low on measures of the negative emotion anxiety appear less susceptible to framing effects.

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similar effects to positive emotions like enthusiasm, but different effects than negative anxiety emotions such as distress.

## Preference Confidence

A final topic which we explore is preference confidence. While citizens' preferences themselves play an important role in democratic governance, preferences also matter because they often determine subsequent behaviors (e.g., policy decisions, voting, and participation). The likelihood that an individual's behaviors will reflect his or her preferences dramatically increases as the individual gains confidence in the preference. Increased confidence in a particular preference also leads individuals to deepen their commitment to the preference, to ignore and not pursue additional information, and to resist persuasion (e.g., Sieck and Yates 1997, p. 218; Visser et al. 2003, pp. 135–136; Druckman 2004).

As far as we know, the role of emotions in affecting preference confidence has gone unexplored. It seems plausible and consistent with our theoretical discussion that the certainty that comes with aversion or anger (and possibly enthusiasm) will increase confidence while the uncertainty common with anxiety will depress confidence. This prediction also would be consistent with work showing that anger relies on heuristic processing, in ways similar to positive emotions (Moons and Mackie 2007).[8]

## Predictions

It is relatively straightforward to derive predictions from these research programs on emotion and risk, and emotion and information seeking. As should be clear, both literatures point to distinct effects for positive emotions, negative aversive emotions, and negative anxious emotions. In terms of operationalizing each specific type of emotion, we follow prior work. For the positive emotion, we focus on enthusiasm which has been central to work by Marcus and his colleagues on the affective intelligence model (e.g., Marcus et al. 2000, 2005). We also follow Marcus et al. (2005, p. 962) by focusing on distress to capture anxiety. Our negative aversion emotion is anger (see, e.g., Watson et al. 1988; Marcus et al. 2000, p. 168; Lerner and Keltner 2001; Lerner et al. 2003).[9] Our specific predictions are as follows.

1. *Enthusiasm will be positively correlated with risk-seeking behavior, regardless of frame.* We expect this finding because positive emotions like enthusiasm lead to optimistic appraisals of risk, regardless of the consequentialist data. So when an individual is presented with a positive frame, he or she will expect a positive outcome to be particularly likely given his or her current mood congruent state.

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[8] We thank an anonymous reviewer for this insight.

[9] Lerner and Keltner (2000, 2001) focus on fear rather than distress, but as they make clear, the same logic applies to analogous emotions like distress (i.e., in terms of their implications for certainty and control) (also see Schwarz 2000; Nabi 2003).

However, when presented with a negative frame, the individual will see the negative outcome as particularly unlikely given the incongruence between the frame and his or her present level of enthusiasm.

2. *Distress and anger will produce distinct impacts on risk-seeking behavior (due to the aforementioned difference in uncertainty).* First, distress will be negatively correlated with risk-seeking behavior.[10] Second, anger will be positively correlated with risk-seeking. This would also be consistent with adopting a negative frame (also see Lerner and Keltner's 2000, p. 146).

3. *Exposure to a negative (dying or losing) frame will be positively correlated with risk-seeking behavior.* This is the conventional framing prediction that negative frames lead to risk-seeking choices while positive frames produce a tendency toward risk-aversion (Tversky and Kahneman 1981, 1987).

4. *Distress and anger will produce distinct impacts on the frames. First, distress will enhance the impact of frames.* We expect this effect to be particularly pronounced in the negative frame due to congruence enhancement. This hypothesis derives from the expectation that, as explained, distress generally increases attention to external information. Second, *anger will temper the impact of the frame*, due to its operation through the disposition system.

5. *Enthusiasm will temper the impact of frame.* We expect this effect to be particularly pronounced in the positive frame because of congruence effects.

6. *Anger and enthusiasm will increase preference confidence while distress will depress confidence.*

To test our expectations, we implemented two experiments. We now describe each.

## Experiment 1

Participants, Design, and Procedure

In the first experiment, a total of 214 individuals participated in the main part of the study in exchange for a cash payment and a snack. We recruited participants from a large, public university and the surrounding urban community by taking out newspaper advertisements, advertising in classes, sending e-mails, posting flyers, and contacting local community organizations. We invited participants to take part in a preference formation study at the university's Political Psychology Laboratory. While students constituted a majority of the sample, a substantial numbers of non-students also participated (approximately 35%).[11]

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[10] This prediction finds a counterpart in the decisional paralysis so characteristic of depression. Anxiety, distress, and depression often intertwine. And, indeed, there may be some good evolutionary reasons why paralysis in feelings of distress promotes survival. Freezing in fear or distress, for example, often prevents predators from attacking.

[11] The average age was about 26. Other sample statistics include: 57% females, 88% Caucasian, 52% self-identified Democrats, and 27% self-identified Republicans.

Each participant responded to two randomly ordered framing problems and a background questionnaire.[12] We used two classic and widely cited risky-choice framing problems: (1) a problem that focuses on the outbreak of a *disease* (Tversky and Kahneman 1981, p. 453), and (2) a problem that focuses on how to *invest* a community grant (Tversky and Kahneman 1987, pp. 74–75).[13] For the disease problem, we randomly exposed some respondents to the following positively framed description and question:

> Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:
> If Program A is adopted, 200 people will be saved.
> If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved.
> Which of the two programs would you favor?

Two elements of this problem are worth noting. First, the two choices—Program A and Program B—are equivalent in expected values. Both would result in saving 200 people in expectation (i.e., 1/3*600 = 200), but Program A has a certain or risk-averse outcome whereas Program B has an uncertain or risk-seeking outcome. Second, the programs are framed in terms of how many lives will be saved. This differs from the version that other recipients (randomly) receive where, after receiving the same exact initial description, they are told of the same programs but framed negatively in terms of people dying:

> If Program A is adopted, 400 people will die.
> If Program B is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.
> Which of the two programs would you favor?

The investment problem had two analogous (randomly distributed) versions. The positive frame asked:

> Imagine that the community where you live was given a $3,000 government grant for future community development. The community *must* however immediately invest the grant in one of two programs, and everyone agrees that the estimated impact of each program is as follows:
> If *Program Y* is adopted, your community will gain $1,000.
> If *Program Z* is adopted, there is a 50% chance that your community will gain $2,000 and a 50% chance that your community will gain nothing.
> Which program would you vote for—Program Y or Program Z?

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[12] Respondents actually responded to four randomly ordered problems, however, two of these problems are not relevant to this study. There also were randomly assigned experimental conditions that are not relevant to this study, and thus, we do not discuss them (see Druckman 2004 for discussion). Like other studies that include multiple problems (e.g., Fagley and Miller 1997; Jou et al. 1996), we instructed participants to treat each problem independently and imagine that they were being confronted with each scenario (see Frisch 1993, p. 419; Levin et al. 2002 on using multiple problems).

[13] We use a variation of the Tversky and Kahneman's (1987, pp. 74–75) investment problem.

Again, notice Program Y is a risk-averse choice while Program Z constitutes a risk-seeking option (that is equivalent in expected outcome). The negative frame stated:

> Imagine that the community where you live was given a $3,000 government grant for future community development. The community *must* however immediately invest the grant in one of two programs, and everyone agrees that the estimated impact of each program is as follows:
> If *Program Y* is adopted, your community will lose $1,000.
> If *Program Z* is adopted, there is a 50% chance that your community will lose nothing and a 50% chance that your community will lose $2,000.
> Which program would you vote for—Program Y or Program Z?

We used two problems from different domains (i.e., life and money) because prior work has shown that framing effects sometimes vary by topic. People tend to be more risk-seeking with problems involving life-death choices than with problems involving public property, personal money, or investment (Wang 1996 p. 153; Jou et al. 1996, pp. 8–9; Kühberger et al. 1999, pp. 221–222).[14]

As should be clear, for each problem, participants expressed a preference for one of two alternatives (i.e., Program A or B, or Program Y or Z). A framing effect occurs when, compared to individuals who receive a positive frame, individuals who receive a negative frame are significantly more likely to express a preference for the risk-seeking alternative (see Druckman 2001a). For example, in the original disease experiment, Tversky and Kahneman (1981, pp. 453) found that those who received the negative (dying) frame were significantly more likely to express a preference for the risk-seeking Program B (78%), than those who received the positive (saved) frame (28%). This difference in the percentages is called a preference shift (e.g., a 50% preference shift). In the original investment experiment, Tversky and Kahneman (1987, pp. 74–75) find 64% of respondents opt for Program Z (the risk-seeking alternative) when given the negative frame and only 28% do so when given the positive frame.

We randomly assigned each participant to either receive both problems using a positive frame ($N = 101$) or both problems using a negative frame ($N = 113$).[15] (The problems themselves appeared in a random order.) Participants dealt with one problem at a time and expressed a preference for each problem by checking an alternative on a separate page that followed the particular problem. For each problem, participants also recorded how confident they were that their "choice is the best possible choice." This item allows us to explore preference confidence, as previously discussed.

Participants also completed a background questionnaire that included our emotion measures as well as other demographic and social questions. To gauge the

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[14] This variation stems from differences in the location of lives and money on individuals' utility curves (see Fagley and Miller 1997 pp. 361–362; also see Fagley and Miller 1990; Marteau 1989; Levin and Chapman 1990; Levin et al. 1998).

[15] Consistency in the frame used follows prior work (Fagley and Miller 1997).

participants' emotional states, we used select items from Watson et al.'s (1988) well known PANAS scale. For example, we measured distress by asking respondents: "To what extent do you feel *distressed* right now, at this present moment?" Respondents chose one of five response options: "very slightly," "a little," "moderately," "quite a bit," or "extremely."[16] We coded the variable so that higher scores indicate greater distress. We used analogous items to measure anger and enthusiasm.[17]

The background questionnaire included other items that prior work has shown to be relevant to risk attitudes and/or framing. We measured propensity toward risk using questions from Zuckerman's risk taking scale (see Bromiley and Curley 1992, p. 123). Specifically, we include four items (scenarios) to which a person can report a risk-averse or risk-seeking response. We then added together risk-averse responses to create a risk aversion scale. While we expect more risk taking individuals to make more risk-seeking choices and more risk neutral individuals to be more susceptible to framing effects, past research on the effects of risk propensity has been inconclusive (see, e.g., Fagley and Miller 1990, p. 505; Bromiley and Curley 1992; Druckman 2001b).

We also account for expertise since some have posited that experts differ from non-experts in risk attitudes (Bajtelsmit 1999, Unpublished manuscript), and/or susceptibility to framing effects (e.g., Larrick et al. 1993). We construct our expertise measure by combining two commonly used constructs (in the behavioral decision-making literature). First, we measured need for cognition by using Bizer et al.'s (2000) scale, where higher scores indicate greater need for cognition. Second, we asked participants to report the number of economics and statistics courses they had taken (Larrick et al. 1993). We classified participants as experts if they were above the median for both need for cognition and the number of classes

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[16] These questions clearly tapped into the current emotional state of the subject, which could have reflected either "state"-based (i.e., the subject is transiently enthusiastic at the moment) or "trait"-based tendencies (the subject is endemically anxious in most situations). We remain agnostic as to the source of the emotion in this context, although future research might explore potential differences in the impact of state versus trait based emotion on risky decision-making. Obviously, this test examines the impact of background emotion on current choice. Experiment 2, reported below, experimentally manipulates background emotion to induce equivalency in emotional states in order to examine their impact on choice.

[17] As we will shortly discuss, the background questionnaire included various expertise measures such as need for cognition items and questions about statistics background. We worried that asking these items before having the participants complete the problems could prompt them to view the problems in a more statistical sense and exert more thought, which could substantially change the impact of the problems (see Bless et al. 1998 for evidence of such effects). For this reason, participants filled out the background questionnaire after all participants in a given session finished the problems (the typical session had ten participants). We did, however, include another condition that randomly assigned participants to complete the background questionnaire without taking part in the framing problems. Forty participants were assigned to this condition (these participants were not included in the aforementioned 214 who were in the "main part" of the experiment). The average emotion scores for these participants were nearly identical to the scores of participants who read the problems first. Specifically, the respective averages for the participants in the main experiment and the forty participants in the non-treatment condition are as follows. For anger: 1.78 (*SD*: 1.13; *n*: 213) and 1.79 (1.06; 40); for distress: 1.87 (1.17; 212) and 1.85 (1.04; 40); and for enthusiasm: 3.75 (2.76; 213) and 3.77 (.82; 40). This confirms that, as our hypotheses assume, the problems themselves did not affect the participants' emotional states, and thus, any emotion effects stem from emotion influencing reactions to the problems.

since we expect a moderating effect only for individuals who possess both motivation and ability (e.g., Payne et al. 1993, p. 112).

The impact of gender on framing effects has long puzzled researchers, and thus, we include a dummy variable that identifies female participants. Fagley and Miller (1990, p. 507, 1997) find that women exhibited framing effects while men did not in both monetary and life domains. However, Druckman (2001a) did not replicate this and in general the results are mixed. Evidence also suggests that males tend to be more optimistic than females (Lerner et al. 2003, p. 146) and will thus prefer the risky options (risk-seekers) (Kowert and Hermann 1997, p. 623; Bajtelsmit, 1999, Unpublished manuscript). Finally, we control for whether the participant is a self-identified student or non-student (recall that our sample included a mix of students and older non-students).[18]

Framing Results

We begin by investigating for the presence of framing effects (e.g., hypothesis 3). In Tables 1 and 2, we present crosstabs of preferences by frame received for each problem. Both show significant framing effects; exposure to the negative (dying) frame in the disease problem leads 67% of respondents to opt for the risk-seeking alternative, compared with just 45% who received the positive (saving) frame ($z = 3.24$ ; $p < .01$ for one-tailed difference of proportions test). The analogous percentages for the investment problem are 66% and 28% ($z = 5.55$ ; $p < .01$). Also, consistent with the aforementioned tendency towards risk-seeking in life-death problems, we see greater risk-seeking behavior, across frames, in the disease problem (57%) than in the investment problem (48%) ($z = 1.87$; $p < .05$).

To explore the impact of emotions and the other variables, we use logit regression. The dependent preference variable is coded such that 0 equals a positive or risk-averse preference while 1 equals a negative or risk-seeking preference. Similarly, frame is coded with 0 indicating exposure to a positive or gains frame and 1 identifying participants exposed to the negative or losses frame. A significant positive coefficient on the frame variable would indicate a framing effect. All other variables are coded as noted above, and are re-scaled to be between 0 and 1.[19] We display the results in Table 3.

The first regression, which is for the disease problem, shows a significant main framing effect—those who received the negative frame express significantly more negative or risk-seeking preferences. The results also support most of the emotion hypotheses. Anger leads to more risk-seeking behavior (hypothesis 2), distress leads to less risk-seeking behavior (hypothesis 2), and enthusiasm leads to more risk-seeking behavior (hypothesis 1). The distinct directional impacts of anger and distress accentuate the importance of distinguishing negative emotions.

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[18] The results are the same if we instead use a continuous measure of age. We opt for the dichotomous measure since it is mostly meant to test for differences between student and non-student participants.

[19] The results are the same when using alternative models, such as ANOVA.

**Table 1** Preference by frame for the disease problem (Experiment 1)

|  | Negative (dying) frame | Positive (saving) frame | Total |
|---|---|---|---|
| Negative (risk-seeking) preference | 67% ($n = 76$) | 45% (45) | 57% (121) |
| Positive (risk-averse) preference | 33% (37) | 55% (56) | 43% (93) |
| Total | 100% (113) | 100% (101) | 100% (214) |

**Table 2** Preference by frame for the investment problem (Experiment 1)

|  | Negative (loss) frame | Positive (gain) frame | Total |
|---|---|---|---|
| Negative (risk-seeking) preference | 66% (75) | 28% (28) | 48% (103) |
| Positive (risk-averse) preference | 34% (38) | 72% (73) | 52% (111) |
| Total | 100% (113) | 100% (101) | 100% (214) |

**Table 3** Determinants of risk-seeking preferences (Experiment 1)

| Independent variable | Disease problem | Investment problem |
|---|---|---|
| Negative frame | 1.75* (1.00) | 1.64* (.97) |
| Anger | 1.49* (.92) | .32 (.86) |
| Distress | −2.68** (1.13) | .67 (.87) |
| Enthusiasm | 2.81** (1.12) | 2.11** (1.01) |
| Anger × frame | −1.56 (1.35) | −.48 (1.27) |
| Distress × frame | 3.82** (1.49) | −.86 (1.30) |
| Enthusiasm × frame | −4.21** (1.38) | −.65 (1.29) |
| Risk aversion tendency | −.50 (.67) | .63 (.67) |
| Female | .82 (.54) | −1.02* (.56) |
| Non-student | .87 (.55) | .99* (.55) |
| Expert | −.73 (.54) | .09 (.53) |
| Risk neutrality × frame | −.67 (.68) | .98 (.64) |
| Female × frame | 1.27* (.72) | .98 (.72) |
| Non-student × frame | .07 (.77) | −1.04 (.74) |
| Expert × frame | .57 (.71) | −.20 (.69) |
| Constant | −.55 (.75) | −2.13** (.75) |
| Log likelihood | −113.09 | −116.66 |
| Number of observations | 200 | 201 |

*Note*: The dependent variable is coded so that 0 = choice of the positive risk-averse alternative and 1 = choice of the negative risk-seeking alternative. Table entries are logit coefficients with standard errors in parentheses. ** $p \leq .05$; * $p \leq .1$ for two-tailed tests

To explore the moderating effects of emotions, we interact each emotion variable with the frame variable; a significant coefficient indicates a moderating effect. Interestingly, we see evidence that two of the emotional states moderate framing effects. Enthusiasm tempers the framing effect such that those who are more
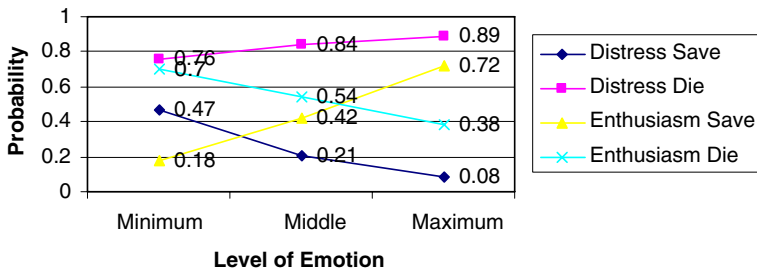
**Fig. 1** Probability of risk-seeking preference (Experiment 1 Disease Problem)

enthusiastic tend to be less affected by the frame (the interaction is highly significant and negative) (hypothesis 5). The opposite is the case for distress, as predicted (hypothesis 4)—increased distress leads to a greater impact of the frame. Finally, anger does not display a significant moderating effect (and its sign is in the opposite direction of what was predicted). This may not be too surprising since distress may be a more relevant negative emotion than anger given the life-death nature of problem (i.e., death may cause people to become upset). The differing results for distress and anger also support our claim that it is necessary to distinguish types of negative emotions when it comes to their effects on attention to external information.

To gauge the substantive main effect, we assume average values on all variables, except distress. In this case, if an individual has no distress (=0), then he or she has nearly a 60% chance of opting for the risk-seeking alternative. The same individual's probability of being risk-seeking drops to .51 if his or her level of distress rises to the midpoint (=.5), and the all the way to .43 if he or she is maximally distressed (=1).[20] This substantial tendency away from risk-seeking and toward risk aversion is heightened even further (by quite a bit) for individuals who receive the gains or save frame since higher levels of distress enhance the impact of the frame.

The precise nature of the interaction between distress and the save frame can be seen in Fig. 1, which plots the expected probability of opting for the risk-seeking alternative for different levels of emotion (minimum, median, and maximum), contingent on frame. (We do this for distress and enthusiasm since those have significant main effects and interactions.) The figure shows that as distress increases, the size of the framing effect substantially widens. Those with no distress (minimum) display a small framing effect (i.e., a .76 probability of risk-seeking for the save frame and .47 for the die frame) while those with maximal distress (maximum) show enormous susceptibility to the frames (with respective probabilities of .89 and .08). We also see that the previously discussed main effect of distress in reducing risky choice occurs only for those exposed to save frame. (The marginal increase for those exposed to the die frame is not significant.)

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[20] We used *Clarify* to compute these probabilities (as well as ones subsequently reported). Standard errors are available from the authors.

We see the inverse relationship with enthusiasm—those with no enthusiasm (minimum) display a significant framing effect (.70 and .18) while those with maximal (maximum) enthusiasm not only show no framing effect in the predicted direction but they actually flip their risk-preferences (.38 and .72) (i.e., maximally enthusiastic people display more risk-seeking in the save frame). Additionally, we see that the aforementioned main effect of enthusiasm enhancing risk-seeking only occurs for those exposed to the save frame.

Apart from the emotion variables, the only other significant finding is that females are more susceptible to framing effects (the interaction is significant and positive). This is consistent with some prior work, although, as mentioned, gender effects have been inconsistent overall (see Fagley and Miller 1990, 1997). It also shows that variations in emotion by gender do not wholly explain the impact of gender (see Lerner et al. 2003). The lack of significance for the other variables is interesting insofar as prior work focuses on risk proclivity, expertise, and age rather than emotion. Our results suggest that emotions play a much more salient role.

The second column in Table 3 presents the results for the investment problem. Frame again has a significant impact with the negative framing leading to substantially more risk-seeking behavior. This time, however, only one of the three emotions directly affects risk attitudes; enthusiasm leads to more risk-seeking behavior (as predicted by hypothesis 1). Moreover, none of the emotion variables moderate framing effects. As for the controls, the results show that females are significantly more risk-averse as are younger people. We suspect the age finding reflects the fact, for the student participants, that smaller amounts of money are more meaningful, leading to risk aversion.

We find the different results across domains intriguing. Variation in risk attitudes by problem area has received little attention, beyond the aforementioned expectation of greater risk-seeking behavior on life and death problems. Moreover, we know of no work that explores differences in the impact of emotion on risk attitudes by problem domain. There is, however, some evidentiary basis for the greater impact of life and death decisions over other types of choice in terms of exerting an impact on risky choice in risk-sensitive optimal foraging theory, which suggests that risk-seeking increases the closer an organism comes to subsistence level survival (McDermott et al. 2008). Our finding that negative emotions mattered only on a life and death problem and not a financial problem may reflect the inherently emotional nature of life-death decisions, or may suggest that such decisions remain less susceptible to abstract decision-making and conscious override. In contrast, investment decisions, especially when not involving the person's own money, are not particularly distressing or anger provoking. The significance of enthusiasm on the investment problem may be akin to an irrational exuberance (or greed) that occurs when it comes to decisions involving money.

Our results suggest that emotions affect risk attitudes and in some domains moderate framing effects. Moreover, different negative emotions can have opposite effects; emotions should not be grouped simply based on valence. The impact of emotions will depend on the specific emotions (beyond valence), the issue at hand (problem domain), and the relationship under study (moderating or direct effect).

**Table 4** Determinants of preference confidence (Experiment 1)

| Independent variable | Disease problem | Investment problem |
|---|---|---|
| Frame agreement | .30* (.16) | −.001 (.16) |
| Anger | .30 (.27) | .49* (.28) |
| Distress | −.43[+] (.27) | −.41[+] (.27) |
| Enthusiasm | .37 (.28) | .34 (.27) |
| Female | −.64** (.16) | −.04 (.16) |
| Non-student | −.05 (.16) | .08 (.16) |
| Expert | .21 (.15) | .01 (.15) |
| Log likelihood | −350.42 | −312.98 |
| Number of observations | 206 | 206 |

*Note*: The dependent variable is coded so that higher scores indicated increased confidence. Table entries are ordered probit coefficients with standard errors in parentheses. ** $p \leq .05$; * $p \leq .1$; [+] $p \leq .13$ for two-tailed tests. Cutpoints are available from the authors

### Preference Confidence

As mentioned, after expressing their preferences, participants were asked to rate the confidence they had in their expressed preference on a 7-point scale ranging from a low score of "not confident at all" to "moderately confident" to a high score of "very confident." We examine preference confidence by using ordered probit regressions with confidence scores as the dependent variable. The key independent variables are our three emotion variables. Recall that we expect that anger and enthusiasm will increase confidence while distress will decrease it.

In our analyses, we also include a variable called "frame agreement" that measures whether a participant's preference on a given problem matches the preference that would be predicted from the frame the participant received. For example, agreement occurs if a participant who received the negative (positive) frame expressed a preference for the risk-seeking (risk-averse) program (i.e., it equals 1 if the participant's preference agreed with the frame and 0 if not).[21] We expect that possibly being affected by the frame will generate overconfidence since it mitigates conflict (see Tetlock 1986; Druckman 2004; also see Kuklinski et al. 2000; Payne et al. 1993, p. 209). We also include the female variable as well as the non-student and expertise variables (the latter two may increase preference confidence (e.g., Sieck and Yates 1997)).[22]

The results in Table 4 show that emotions affect preference confidence.[23] Specifically, higher levels of distress cause individuals to be less confident in their preferences for both problems. On the investment problem, anger also is significant,

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[21] While a score of 1 is not sufficient evidence that the frame had a causal impact, it is a necessary condition and is the most direct measure available.

[22] We also ran regressions with dummy variables indicating the order in which the individual received the problem (e.g., the disease problem first or second). These variables do not affect the substantive results we present here.

[23] In Table 4, we also note significance when $p \leq .13$ for a two-tailed test, since on both problems this allows us to note that distress is very close to significant (and would be if we used a one-tailed test).

leading to increased confidence. While these results are consistent with our expectations, we also find no significant effect for enthusiasm (although it is signed in the predicted direction).

While noting the speculative nature of our findings, we also highlight four implications. First, the results suggest that negative emotions may matter more than positive emotions when it comes to preference confidence, perhaps reflecting a negativity bias of some sort. This asymmetry would not be uncommon or atypical; loss aversion robustly demonstrates the greater impact of loss on risk propensity overall. Second, the results again accentuate the importance of distinguishing negative emotions from one another, according to variations in control and uncertainty. Third, they also reveal that reasoning may differ across problem domain. Fourth, even if emotions do not directly affect preference formation, they may still be consequential—in the case of the investment problem, anger and distress did not influence the alternative chosen but did affect confidence in that decision. On the disease problem, we also see two other variables are significant— frame agreement and being female.

## Experiment 2

The design of our second experiment mimicked that used in the first experiment with one major exception. This time instead of measuring individuals' emotions with standard items, we experimentally induced emotional variations between participants. This approach enables us to assess the possibility that our experiment 1 emotion results stem from some other unmeasured variable (e.g., a spurious relationship) (Lerner and Keltner 2000, pp. 486–487). It also might provide insight into the relative impact of chronic versus temporary emotional states. Emotions expressed in the first experiment may have reflected either dispositional variations between individuals or situational—shorter term—distinctions that individuals happen to be experiencing. In our second experiment, emotional variations are presumably temporary (i.e. "state"-based as opposed to "trait"-based) as determined by the experimental manipulation.

Participants, Design, and Procedure

A total of 185 individuals participated in the experiment, after having completed an unrelated survey. Participants were non-student community members who had been asked to take part in an unrelated voting behavior study (for details on the sample, which was largely representative of the community, see Druckman 2007, unpublished manuscript). After completing the unrelated study, we asked a sub-sample of individuals to take part in another study (i.e., the experiment described here) in exchange for a cash payment.

We randomly assigned each participant to one of six experimental conditions that varied the frame—using either a positive frame ($N = 91$) or a negative frame ($N = 94$)—and the emotional inducement—priming enthusiasm, anger, or distress.

Our emotional inducement technique followed the approach used by Lerner and Keltner (2001, p. 152) (also see Lerner et al. 2003; DeSteno et al. 2004). Specifically, prior to receiving the framing problems, participants were asked to "Imagine a few things that make you feel ["enthusiastic or excited"/"angry"/ "distressed or upset"]." We then asked participants to answer the same two framing problems we used in the prior study (i.e., the disease and the investment problems).

## Results

We display the results for each problem in Tables 5 and 6. We present the percentages of respondents who reported risk-seeking preferences. We need not include control variables given random assignment to the emotional inducements.[24]

We find significant overall framing effects, across conditions, for both problems. In the disease problem, 66% of participants in the negative frame condition opted for the risk-seeking alternative while 52% did so in the positive frame condition ($z = 1.98$; $p < .05$). The analogous percentages for the investment problem are 66% and 48% ($z = 2.35$; $p < .01$). We do not, however, replicate our prior finding of significantly greater overall risk-seeking behavior in the disease problem (compared to the investment problem).

Enthusiasm again leads to significant increases in risk-seeking behavior, across frames, with 68% displaying such preferences in the disease problem and 66% in the investment problem. Both these percentages significantly exceed the amount of risk-seeking displayed by those in the distress condition (for the disease problem, $z = 2.71$; $p < .01$; for the investment problem, $z = 1.94$; $p < .05$). We find mixed results for the anger group; in the disease problem, as predicted, the anger condition (64%) is significantly greater than the distress condition (43%; $z = 2.35$; $p < .01$), but this is not the case in the investment problem where the respective percentages are 57% and 48% (although it is in the correct direction; $z = 1.0$; $p < .20$). Overall, then, we have strong support across problems that enthusiasm promotes risk-seeking behavior relative to distress, and some support for the hypothesis that anger does the same and thus differs in its impact from the negative emotion of distress. As before, we find slightly different dynamics across problem domains with the disease problem displaying stronger emotion effects.

In terms of emotion and framing, we find evidence consistent with prediction that negative emotions have distinct effects on framing. Distress enhances framing and anger tempers it. For both problems, the distress group displays significant framing effects (for the disease problem, $z = 2.47$; $p < .01$; for the investment problem, $z = 1.62$, $p < .05$) while the anger group does not (for the disease problem, $z = .98$; $p < .20$; for the investment problem, $z = 1.02$; $p < .20$). The results on enthusiasm are more mixed—in the disease problem, enthusiasm clearly vitiates framing as the effect disappears, but a nearly significant framing effect remains in the investment problem ($z = 1.49$; $p < .07$). We thus again find distinctions across domains.

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[24] Given the nature of experiment 2, we were unable to measure some of the relevant controls used in experiment 1 including risk neutrality and expertise.

**Table 5** Risk-seeking preferences by condition for the disease problem (Experiment 2)

|            | Negative (dying) frame | Positive (saving) frame | Total      |
|------------|------------------------|-------------------------|------------|
| Enthusiasm | 69% (32)               | 68% (28)                | 68% (60)   |
| Anger      | 70% (33)               | 58% (36)                | 64% (69)   |
| Distress   | 59% (29)               | 26% (27)                | 43% (56)   |
| Total      | 66% (94)               | 52% (91)                | 59% (185)  |

**Table 6** Risk-seeking preferences by condition for the investment problem (Experiment 2)

|            | Negative (loss) frame | Positive (gain) frame | Total      |
|------------|-----------------------|-----------------------|------------|
| Enthusiasm | 74% (31)              | 56% (27)              | 66% (58)   |
| Anger      | 64% (33)              | 51% (35)              | 57% (68)   |
| Distress   | 59% (29)              | 37% (27)              | 48% (56)   |
| Total      | 66% (93)              | 48% (89)              | 57% (182)  |

We explore preference confidence in Table 7, using a similar approach as in experiment 1. The design of our experiment means we can only investigate relative confidence in the different emotion conditions. Since we predict that anger and enthusiasm will increase confidence, and distress will depress it, we include dummy variables for the former two variables which reveal the effects relative to the distress condition. The results show that for both problems, anger and enthusiasm prompted participants to exhibit significantly greater confidence than those in distress condition. We also again find that frame agreement enhances confidence.

In sum, evidence from our second experiment—that used a distinct sample and manipulation—confirms what we found in the first study. The framing of problems affects risk preferences, but so do emotions. Moreover, different negative emotions have divergent effects both in terms of their direct impact on risk preferences and on how they interact with the frames. This accentuates the importance of incorporating discrete emotions in the study of risky framing. We also find that emotional states influence preference confidence, which might in turn impact the relationship between preferences and behavior. Finally, the precise impact of emotions and frames may vary across problem domains.

**Table 7** Determinants of preference confidence (Experiment 2)

| Independent variable   | Disease problem | Investment problem |
|------------------------|-----------------|--------------------|
| Frame agreement        | .24[+] (.15)    | .30** (.16)        |
| Anger                  | .51** (.19)     | .54** (.19)        |
| Enthusiasm             | .58** (.20)     | .47** (.20)        |
| Log likelihood         | −340.35         | −308.60            |
| Number of observations | 185             | 181                |

*Note*: The dependent variable is coded so that higher scores indicated increased confidence. Table entries are ordered probit coefficients with standard errors in parentheses. ** $p \leq .05$; * $p \leq .1$; [+] $p \leq .13$ for two-tailed tests. Cutpoints are available from the authors

Recall that in our second experiment, due to the inducements, we can be confident that the emotions reflect temporary states. Thus, the similarity of our results across the two experiments suggests either that the emotions measured in experiment 1 also reflect temporary states, or that chronic emotions (perhaps captured in experiment 1) and temporary emotions have the same effects.

## Towards a Theory of Emotion and Framing

In its original incarnation, Kahneman and Tversky labeled their nascent theory of decision-making under conditions of risk, "value theory" (Kahneman 2000). They did this, in part, to highlight the distinction between decision utility and experienced utility, noting the important difference between thinking and feeling. This differentiation in many ways presaged Slovic et al.'s (2004) delineation of risk as analysis and risk as feelings. While prospect theory progressed in a more cognitive fashion, representing the apex of the revolution it signified in psychology, the underlying notion of experienced utility was not lost altogether. Indeed, Kahneman has gone on to investigate the impact of emotion on assessments of well-being and happiness in his more recent work (Kahneman et. al. 1999). And framing effects can encompass such experiential utility.

One of the ways in which framing effects inculcate emotion is through the process of mental accounting (Thaler 1980). Mental accounting offers a description of how people seek to organize, trade-off, evaluate, assess and rationalize various options and events in their lives. Mental accounts induce strong emotions when they come to be closed, and individuals must draw up a kind of psychic balance sheet for particular experiences. In this way, choosing to instigate or terminate a mental account creatively incurs punishments or rewards, whose timing is often at least partly determined by the actor (Kahneman 2000). In normative judgments, sunk costs should never be counted in rendering decisions concerning future actions, but emotional considerations often pull in an opposite direction, and individuals may choose to delay shutting a particular mental account in order to put off the day of reckoning with past failures. Given previous discussion, it should not be surprising that these emotional and analytical processes can occur simultaneously on different tracks, all the while moving in opposite directions. At some point, the parallel mental processes must arrive at the same station and come to a halt, but conscious processes can sometimes delay that moment of evaluation and assessment.

In this light, emotion can clearly serve as a basis, at least in part, for a more comprehensive understanding of the origins of framing effects (Bueno de Mesquita and McDermott 2004). Emotion can provide a foundation upon which the framing of particular options can be based or constructed, thus influencing decision prior to choice, as well as during choice itself. While prospect theory may not present an explicit theory of framing, the indication of experiential utility points the way to at least one mechanism by which individuals may choose the frames they adopt as default values, through processes of mood congruence.

As with other aspects of prospect theory, the impact of emotion on frames may depend on domain (e.g., Forlani 2002). This may help explain why negative frames

induced more risk-seeking regardless of emotion. For example, distress may have more of an impact in life and death decisions than those concerning investment precisely because the former presents more of an imminent threat of loss in the vast majority of situations; for one thing, loss of life represents a threat encompassing a much broader scope than even the prospect of financial collapse (a theory of domain effects, however, still eludes us). Further, anger may not exert the kind of impact expected precisely because it does not easily map onto a gain/loss divide. Indeed, anger may represent an internal calculus of a relational welfare trade-off ratio, by which individuals assess whether or not others are treating them with the respect they believe they deserve (Tooby et al., n.d.). Rather, anger appears to increase the biased nature of information search, which reduces the impact of a presented frame, precisely because the angry perceiver imposes an internal filter designed to seek biased confirmation and assimilation of preexisting beliefs (Lord et al. 1979). This strategy may exist, in part, to perpetuate the mood state in order to maintain a motivation to fight if necessary.

## Conclusion

Our results, combined with previous literature, suggest the merit of analyzing the impact of specific, discrete emotions on particular outcomes of interest, including their impact on framing effects. Further, the effect of these emotions on particular outcomes of interest may vary by context and domain, such that issues representing more critical, or familiar, challenges may produce systematically different effects. In this case, for example, the disease problem appeared more evocative than the investment one. Loss aversion suggests that losses hurt more than equal gains please; similarly, it may be the case that emotions may exacerbate the assessment of potential losses more than they might influence the assessment of prospective gains.

Overall, emotion clearly affects risk propensity in ways previously underappreciated. And further, emotion can also moderate framing effects in particular contexts (also see Lerner and Keltner 2001; Chang 2007). Importantly, different negative emotions, such as distress and anger, exert opposite effects, at least in some domains. Anger encourages greater risk-seeking, while distress encourages a more cautious approach. The study of decision-making needs to incorporate, explicitly, the effect of specific emotions on particular issues at hand. In so doing, however, it is important that researchers resist exploring a proliferation of emotions. The theoretical work on which we drew suggests that, in the case of negative emotions, there will be differences based on the extent to which the emotion generates anxiety as opposed to aversion. While we focused specifically on distress and anger, we would expect our results to be the same if we had instead looked at fear (an anxiety provoking emotion) and hostility (an aversion emotion), for example (see Lerner and Keltner 2001; however, also see Roseman et al. 1994). Future work also needs to more explicitly explore the origins of emotions and emotional reactions (e.g., Strelau et al. 2002).

Emotions serve motivating functions. As such, discrete emotions can encourage individuals to adopt particular frames for choice, establish internal feedback loops

for experienced utility, and create foundations for the assessment of events through mental accounting. While cognitive biases clearly tell part of the story about the mechanisms by which individuals make rapid and efficient decisions, emotional motives must also enter the narrative to provide a more complete picture of the intertwined processes by which humans make judgments and choices about the world around them.

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