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Abstract
We examined the impact of specific emotions on the endowment effect, the tendency for selling prices to exceed buying or "choice" prices for the same object. As predicted by appraisal-tendency theory, disgust induced by a prior, irrelevant situation carried over to normatively unrelated economic decisions, reducing selling and choice prices and eliminating the endowment effect. Sadness also carried over, reducing selling prices but increasing choice prices—producing a "reverse endowment effect" in which choice prices exceeded selling prices. The results demonstrate that incidental emotions can influence decisions even when real money is at stake, and that emotions of the same valence can have opposing effects on such decisions.

Disciplines
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Research Report

Heart Strings and Purse Strings
Carryover Effects of Emotions on Economic Decisions

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ABSTRACT
We examined the impact of specific emotions on the endowment effect, the tendency for selling prices to exceed buying or "choice" prices for the same object. As predicted by appraisal-tendency theory, disgust induced by a prior, irrelevant situation carried over to normatively unrelated economic decisions, reducing selling and choice prices and eliminating the endowment effect. Sadness also carried over, reducing selling prices but increasing choice prices--producing a "reverse endowment effect" in which choice prices exceeded selling prices. The results demonstrate that incidental emotions can influence decisions even when real money is at stake, and that emotions of the same valence can have opposing effects on such decisions.

Two decades of research document the tendency for incidental emotion to color normatively unrelated judgments and decisions (for reviews, see Forgas, 1995; Loewenstein & Lerner, 2002; Schwarz, 1990). Early research found that positive emotions trigger more optimistic assessments than negative emotions, whereas negative emotions trigger more pessimistic assessments than positive emotions, even if the source of the emotion has no relation to the target judgments (Johnson & Tversky, 1983). More recent research has demonstrated the importance of examining specific emotions in addition to global (positive-negative) feelings (Bodenhausen, Sheppard, & Kramer, 1994; DeSteno, Petty, Wegener, & Rucker, 2000). Experiments reveal that emotions not only arise from but also elicit specific appraisals (Keltner, Ellsworth, & Edwards, 1993; Lerner & Keltner, 2001; Tiedens & Linton, 2001), as predicted by appraisal-tendency theory (Lerner & Keltner, 2000). Although tailored to help the individual respond to the event that evoked the emotion, such appraisals persist beyond the eliciting situation, becoming an implicit lens for interpreting subsequent situations. For example, fear arises from and evokes appraisals of uncertainty and lack of situational control, which are two central determinants of risk judgments (Slovic, 1987), whereas anger arises from and evokes appraisals of certainty and individual control (Smith & Ellsworth, 1985). Experimental results are consistent with appraisal-tendency theory in that anger triggered in one situation evokes more optimistic risk estimates and risk-seeking choices in unrelated situations, whereas fear does the opposite (Lerner, Gonzalez, Small, & Fischhoff, 2003; Lerner & Keltner, 2001).

Among the many recent studies that document carryover effects of specific emotions, none examined their impact on behavior with financial consequences. This gap is significant, for two reasons. First, including financial consequences provides a stronger test of the emotional-carryover hypothesis. It may be that emotions have little impact when real money is at stake. Second, the field of behavioral economics (i.e., the application of psychological insights to

economics) has been strongly influenced by cognitively focused research on decision making, but has been largely untouched by decision researchers' recent interest in emotions. The study presented here was intended to bridge this gap.

PRESENT STUDY

Experiment Overview

A 3 X 2 between-subjects design crossed an emotion manipulation (neutral, disgust, sadness) with an ownership manipulation: Half the participants were endowed with an object and then given the opportunity to sell it back at a range of prices (*sell* condition); the other half were shown, but not given, the object and then asked whether they would prefer to receive the object or to receive various cash amounts (*choice* condition). To reduce potential demand effects, we presented the experiment as two unrelated studies with separate consent forms. In "Study 1" (titled "imagination research"), participants watched a film clip and wrote a response; "Study 2" (titled "asset-pricing research") presented the sell or choice procedures.

This manipulation of ownership status mirrors procedures for testing the *endowment effect*–that is, the tendency for selling prices to exceed buying or "choice" prices for the same object. The endowment effect is one of the most important and robust economic anomalies (see Kahneman, Knetsch, & Thaler, 1991).

Hypotheses

On the basis of earlier evidence that emotions often persist beyond the eliciting situation and affect subsequent behavior and cognition, we hypothesized that emotions triggered in the first (emotion induction) stage of the experiment would influence valuations in the second. We hypothesized that disgust, which revolves around the appraisal theme of being too close to an indigestible object or idea (Lazarus, 1991), would evoke an implicit action tendency to expel current objects and avoid taking in anything new (Rozin, Haidt, & McCauley, 1993). We therefore expected that, relative to neutral emotion, experimentally induced disgust would reduce both selling prices among participants who owned the experimental object (an "expel" goal) and choice prices among participants who did not (an "avoid taking anything in" goal). Moreover, we predicted greater reduction when the object was already owned (i.e., selling price) than when it was available for purchase because proximity of the object should augment contamination.

Sadness, although also a negative emotion, has distinct appraisal themes. It arises from loss and helplessness (Keltner et al., 1993; Lazarus, 1991) and evokes the implicit goal of changing one's circumstances. We therefore predicted that, relative to neutral emotion, sadness would reduce selling prices but increase buying prices, potentially to the extent of reversing the typical endowment effect. Our rationale was that in the case of selling, getting rid of what one has presents an opportunity for changing one's circumstances, whereas in the case of buying, acquiring new goods presents an opportunity for change.

Whereas three of our hypotheses are consistent with the idea that negative moods simply suppress value, the fourth--that sadness increases buying prices--is not. This latter prediction is, however, consistent with evidence that compulsive shoppers tend to experience depression, that shopping tends to elevate depressed moods of compulsive shoppers, and that antidepressant

medication tends to reduce compulsive shopping (Black, Repertinger, Gaffney, & Gabel, 1998; Christenson et al., 1994; Faber & Christenson, 1996).

METHOD

Participants

One hundred ninety-nine participants (119 males, 80 females) responded to an advertisement offering $7 plus additional cash or prizes in exchange for 45 min of participation. Their ages ranged from 16 to 49 years, with a mean of 21.4; the majority were Carnegie Mellon students.

Procedure

Participants were seated in private cubicles (equipped with computers and headsets) with no visual access to other participants. An experimenter explained that two faculty members--a psychologist and an economist--had each contributed a brief study. All participants received two packets of material, one for each study. Participants assigned to the sell condition received, in addition, a highlighter set that they were instructed to hold on to for later use in Study 2.

Emotion Inductions

After completing baseline measures of affect (Positive and Negative Affect Scales scores: Watson, Clark, & Tellegen, 1988), each participant put on the headset and pressed a "start" button on the computer, which launched one of three film clips, depending on the experimental condition. The sadness clip (from *The Champ*) portrayed the death of a boy's mentor, the disgust clip (from *Trainspotting*) portrayed a man using an unsanitary toilet, and the neutral clip (from a National Geographic special) portrayed fish at the Great Barrier Reef. Each clip lasted approximately 4 min.

To make the emotional experiences more personally meaningful and intense, we asked participants in the sadness and disgust conditions to write about how they would feel if they were in the situation depicted in the clip. Participants in the neutral condition wrote about their daily activities. Prior research had found that film clips and self-reflective writing provide an effective means of eliciting discrete target emotions (Lerner, Goldberg, & Tetlock, 1998; Lerner & Keltner, 2001). Next, all participants were instructed to take out their second packet of material and begin Study 2.

Eliciting Buying and Selling Prices

At the start of Study 2, participants assigned to the sell condition, who were already in possession of a highlighter set, received a price-elicitation form that presented them with a series of pair-wise choices. On each of 28 lines, they chose between keeping the highlighter set or trading it for an amount of cash; the amounts ranged from $0.50 to $14.00 in $0.50 increments. So that they would have an incentive to reveal their true values, they were told that one of these choices would be randomly selected to determine what they received at the conclusion of the experiment. Numerous economic experiments (e.g., Kahneman et al., 1991) have employed this

procedure, which is formally equivalent to the "Becker, DeGroot, Marschak" (see Becker, DeGroot, & Marschak, 1964) elicitation method.

Participants assigned to the choice condition were shown the highlighter set, then given a series of choices that were equivalent to those in the sell condition but involved getting the highlighter set (which they did not yet own) or getting the various cash amounts. Note that a choice price is somewhat different from a buying price because it involves a choice between an object versus money, rather than deciding whether to give up money to obtain an object. A choice price has three advantages over a buying price: (a) It does not require participants to give up money, and hence is not limited by the amount of money participants bring to a study; (b) it confronts participants with a choice that is formally identical to, but framed differently from, selling; and (c) it holds constant the money side of the equation–both selling and choice involve choices between receiving or not receiving money. Holding the money side of the equation constant ensures that the effects of the emotions are not operating through feelings about gaining or losing money. Indeed, prior research has shown that the endowment effect is driven by attitudes toward the goods rather than the money (Tversky & Kahneman, 1991).

Emotion-Manipulation Checks

Next, participants were asked to report their feelings during the video clip. To avoid revealing our interest in specific emotions, we included 27 affective states on the form, although only 5 were of interest.[1] A sadness factor included "blue," "downhearted," and "sad" (_ = .91), and a disgust factor included "disgust" and "repulsed" (_ = .92). Response scales ranged from 0 (*did not experience the emotion at all*) to 8 (*experienced the emotion more strongly than ever before*).

Participants then answered a series of questions designed to assess demand awareness, including questions about possible connections between the two studies. No participants guessed that we were interested in whether emotions from Study 1 would influence prices in Study 2. Finally, participants either were given (or kept) the highlighter set or received a cash payment, depending on what they chose for the particular choice (out of 28 choices between cash and highlighter set) that was randomly selected to determine their outcome.

RESULTS

Preliminary Analyses

Individual analyses of variance (ANOVAs) on self-reported experience of disgust, $F(2, 197) = 208.73$, and sadness, $F(2, 197) = 78.94$, revealed strong emotion-induction effects (ps < 001). Participants felt significantly more disgusted than sad in the disgust condition, $t(64) = 17.28$, and significantly more sad than disgusted in the sad condition, $t(67) = -10.89$ (ps < .001; see Fig. 1). As intended, the emotion inductions produced strong and discrete emotions, not a generalized negativity.

Participants used the full range of pricing options. Values for the highlighter set ranged from \$0.50 to \$14.00, with a mean of \$3.64 (SD = \$2.20). Neither age nor gender correlated with assigned price, so these variables were not included in subsequent analyses. Replicating prior research on the endowment effect, a planned comparison in the neutral condition revealed that selling prices exceeded choice prices ($M_{selling}$ = \$4.80, M_{choice} = \$3.70), $t(63) = -1.73$, $p < .05$

(one-tailed).[2]

Inferential Analyses

We predicted that (relative to neutral emotion) sadness would reduce selling prices but increase choice prices, and disgust would reduce both selling and choice prices. As recommended by Keppel and Zedeck (1989), the data were analyzed using planned 2 X 2 contrasts.

Results supported the hypotheses; Figure 2 displays means and standard errors.[3] As the "change circumstances" hypothesis predicted, compared with neutral emotion, sadness decreased selling prices, $t(65) = 2.95$, $p < .01$, and increased choice prices, $t(65) = -1.98$, $p = .05$. This pattern reversed the traditional endowment effect, creating significantly higher choice prices than selling prices, $t(67) = 3.67$, $p < .01$. ANOVA revealed the expected crossover interaction, $F(1, 134) = 12.56$, $p < .01$.

As the "expel" hypothesis predicted, compared with neutral emotion, disgust reduced choice and sell prices, $F(1, 131) = 13.29$, $p = < .01$. A marginally significant interaction between emotion and ownership also emerged, $F(1, 131) = 3.03$, $p = .08$, driven by the fact that disgust had a stronger simple effect on selling prices, $t(63) = -3.40$, $p < .01$, than on choice prices. Moreover, disgust wiped out the traditional endowment effect, creating statistically indistinguishable selling and choice prices ($t < 1$).

The results confirmed the importance of emotion specificity in that sad participants set significantly higher choice prices than did disgusted participants, $t(65) = -3.70$, $p < .01$, yet statistically indistinguishable selling prices ($t < 1$). ANOVA revealed the expected interaction between emotion (disgust, sadness) and ownership, $F(1, 134) = 5.15$, $p < .05$, as well as main effects of emotion, $F(1, 135) = 10.26$, $p < .01$, and ownership, $F(1, 134) = 9.06$, $p < .01$.

CONCLUSIONS

The current results suggest that emotions can have dramatic effects on economic transactions, even when they arise from a prior, irrelevant, situation. Although economists often posit a strong role of emotion in economics (Krugman, 2001; Loewenstein, 1996) and even find significant correlations between weather (used as a proxy for mood) and stock market returns (Hirshleifer & Shumway, 2003; Kamstra, Kramer, & Levi, 2003), this study demonstrates that emotions of the same valence can have opposing causal effects. Overall, the pattern of results supports the hypotheses that disgust triggers goals to expel, reducing buying and selling prices, whereas sadness triggers the goal of changing one's circumstances, increasing buying prices but reducing selling prices. The effects are sufficiently strong that in one case (disgust) they eliminate the endowment effect, and in the other case (sadness) they actually reverse it. It is worth noting that a second study focusing on selling prices replicated the results.[4]

Beyond advancing theories of emotion and decision making, these results have practical implications. For example, our findings could have implications for the aggregate economic consequences of emotional events such as the terrorist attacks of September 11; they suggest that, contrary to widespread intuition, such events could actually encourage rather than discourage consumer spending, depending on the specific emotions they evoke in individuals. In sum, the present findings highlight both the powerful effects that emotion can play in everyday economic choices and the need for research on the mechanisms driving such effects.

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[1]The full scale is available from the authors.
[2]The selling-price/choice-price ratio of 1.30 is typical in magnitude (e.g., the ratio was 1.46 in Loewenstein & Adler, 1995).
[3]Covarying baseline affect improved the magnitude of the hypothesized effects. Taking a conservative approach, however, we do not report analysis of covariance results.
[4]Data from this study can be obtained by contacting the authors.

Fig. 1. Self-reported emotion in the three emotion conditions. Error bars represent standard errors of the mean.
Fig. 2. Mean selling and choice prices in the three emotion conditions. Error bars represent standard errors of the mean.