

The Financial Costs of Sadness

Jennifer S. Lerner¹, Ye Li², and Elke U. Weber²

¹Harvard Kennedy School, Harvard University, and ²Center for Decision Sciences, Columbia University

Psychological Science
 24(1) 72–79
 © The Author(s) 2013
 Reprints and permission:
sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0956797612450302
<http://pss.sagepub.com>



Abstract

We hypothesized a phenomenon that we term myopic misery. According to our hypothesis, sadness increases impatience and creates a myopic focus on obtaining money immediately instead of later. This focus, in turn, increases intertemporal discount rates and thereby produces substantial financial costs. In three experiments, we randomly assigned participants to sad- and neutral-state conditions, and then offered intertemporal choices. Disgust served as a comparison condition in Experiments 1 and 2. Sadness significantly increased impatience: Relative to median neutral-state participants, median sad-state participants accepted 13% to 34% less money immediately to avoid waiting 3 months for payment. In Experiment 2, impatient thoughts mediated the effects. Experiment 3 revealed that sadness made people more present biased (i.e., wanting something immediately), but not globally more impatient. Disgusted participants were not more impatient than neutral participants, and that lack of difference implies that the same financial effects do not arise from all negative emotions. These results show that myopic misery is a robust and potentially harmful phenomenon.

Keywords

decision making, emotion, judgment, myopic misery, sadness, intertemporal choice, present bias

Received 12/2/11; Revision accepted 5/1/12

Samuel Taylor Coleridge (1772–1834), the English poet and philosopher, experienced profound bouts of anxiety and depression throughout his life. This life experience may have given rise to his famous phrase “a sadder and a wiser man” (Coleridge, 1857, p. 51). More recently, beginning with empirical tests of *depressive realism* (Alloy & Abramson, 1979), hundreds of studies have found support for the sadder-but-wiser hypothesis: Sadness and depression make individuals wiser than nondepressed or happy people. For example, sadness tends to be associated with careful, deliberative, *System 2* thought (Kahneman, 2011) as opposed to heuristic, impulsive *System 1* thought (Keltner & Lerner, 2011). Sadness has been shown to reduce a range of otherwise robust cognitive biases, including having overly optimistic views of one’s importance, reputation, and abilities (Alloy & Abramson, 1979); relying on stereotypes (Park & Banaji, 2000); and overattributing causality to individuals (Keltner, Ellsworth, & Edwards, 1993).

In the present experiments, we tested the economic implications of the presumed underlying mechanisms of the sadder-but-wiser hypothesis. Specifically, we focused on the domain of intertemporal choice, for four interrelated reasons. First, quantifiable standards of wisdom apply in this domain. Second, intertemporal choices requiring a decision between a sooner (usually smaller) reward and a later (usually larger) reward are pervasive in daily life. Third, intertemporal choices have important consequences. In one well-known experiment,

Mischel and Ebbesen (1970) offered preschoolers one marshmallow and promised them a second if they could wait 15 min before eating the first one. Those who were able to postpone immediate gratification, compared with those who were not, developed into more cognitively and socially competent adolescents: They had greater self-esteem, higher SAT scores, and better educational and economic achievements as adults (Mischel et al., 2011). Our fourth and final reason is that recent theoretical discoveries regarding sadness and choice (described in the section Hypotheses) suggest that sadness has unique implications for choices involving intertemporal trade-offs.

Normative Approaches to Intertemporal Choice

To be sure, future gains have less utility than equivalent immediate gains and should be discounted to a smaller present value (Loewenstein & Prelec, 1992). But the extent to which people discount future outcomes tends to indicate irrational impatience (Frederick, Loewenstein, & O’Donoghue, 2002), which leads to such societal problems as credit-card debt (Meier &

Corresponding Author:

Jennifer S. Lerner, Harvard University, Harvard Kennedy School,
 Cambridge, MA 02138
 E-mail: jennifer_lerner@harvard.edu

Sprenger, 2010) and overeating and underexercising (Chabris, Laibson, Morris, Schuldt, & Taubinsky, 2008). Field studies, natural experiments, and laboratory experiments have demonstrated that discounting can far exceed market-based interest rates (Frederick et al., 2002). Given that emotion has been posited as a main driver for irrational impatience in intertemporal choices (Loewenstein & Prelec, 1992; Loewenstein, Read, & Baumeister, 2003), it is not surprising that at least two studies have examined the effects of positive emotion on intertemporal choice (Ifcher & Zarghamee, 2011; Pyone & Isen, 2011). Both studies found that higher levels of positive affect make people more patient.

What is surprising is that, to our knowledge, no studies have examined the potential causal effect of negative emotions on time discounting. This is a significant gap. One cannot assume that the effects of negative emotions will simply be the opposite of the effects of positive emotions. Moreover, several studies have found that emotions of the same valence can have opposing effects on decision making. For example, fear decreases preference for risky options, whereas anger increases such preference (Lerner & Keltner, 2000, 2001).

Hypotheses

Drawing on conceptual models of emotion and cognition (e.g., Forgas, 1995; Lerner & Keltner, 2000; Raghunathan & Pham, 1999; Schwarz & Clore, 1983), we reasoned that experimentally primed sadness would shape subsequent financial choices. On the one hand, according to the sadder-but-wiser hypothesis, sadness, compared with neutral emotions, should motivate individuals to more analytically think through the financial implications of the various choice options available, and therefore should decrease impatience. Consistent with this idea are findings that sadness increases systematic thought and reduces biases that generally arise from insufficiently systematic thought. For example, by increasing consideration of situational factors in attributing causality, sadness reduces the fundamental attribution error (Small, Lerner, & Fischhoff, 2006).

On the other hand, a case can be made for a *myopic-misery hypothesis*, according to which sadness should increase impatience because sadness, arising from a sense of loss, triggers an implicit goal of reward replacement (Lerner, Small, & Loewenstein, 2004). Raghunathan and Pham (1999) found, for example, that sad individuals are biased toward high-reward, high-risk options over low-reward, low-risk options. Until the reward is received, the sad feeling may create a sense of urgency (Keltner & Lerner, 2011; but see Ellsworth & Scherer, 2003).

Another line of research also points to the myopic-misery hypothesis. If one considers intertemporal choices as battles between the current self (i.e., “I want it now”) and the future self (i.e., “I will benefit from waiting and getting more later”); Parfit, 1984; Thaler & Shefrin, 1981), then compared with neutral emotion, sadness may increase discounting by intensifying the

salience of the current self. Indeed, sadness has been shown to trigger a generalized devaluation of the self (Cryder, Lerner, Gross, & Dahl, 2008; Lerner et al., 2004), which creates an implicit desire to enhance what James (1890) called the “material self” (p. 292). Several studies examining the endowment effect have found that sad decision makers pay a higher buying price than do neutral-state decision makers (Cryder et al., 2008; Lerner et al., 2004). Moreover, the more decision makers focus on the self prior to a purchase, the more money they are willing to pay (Cryder et al., 2008). Finally, Clark and Isen’s (1982) theory on mood-repair motives—the idea that people engage in certain behaviors, such as donating to charity, in order to relieve negative feelings—may hold implications regarding whether sad individuals want a smaller reward immediately or a larger reward later on (Cialdini, Darby, & Vincent, 1973). If that theory applies more broadly to intertemporal choice, then decision makers in any negative state (e.g., sadness or disgust), compared with those in a neutral state, may show increased discounting.

Thus, two competing hypotheses could apply to the effect of sadness on intertemporal choice. To complicate matters, one might also question whether these hypotheses apply to sadness specifically or to the superordinate category of negative emotion. For example, will the effects of disgust mirror those of sadness, as a negative-mood-repair hypothesis would imply? Or will disgust have unique effects, as the reward-replacement hypothesis for sadness (Lerner et al., 2004) would imply? Reward replacement does not apply to disgust, which is thought to have evolved as a strategy for keeping humans away from indigestible foods and harmful behaviors (Keltner & Lerner, 2011; Rozin, Haidt, & McCauley, 1993). Thus, disgust, if anything, should diminish impatience, because it triggers a goal of expelling rather than acquiring (Keltner & Lerner, 2011). In three experiments, we randomly assigned decision makers to emotional states to test these hypotheses.

Experiment I

Method

We randomly assigned 202 participants (116 females, 86 males; mean age = 25 years, range = 18–63 years) to neutral-, sad-, and disgusted-state conditions. Participants were students and local residents from the Harvard Decision Science Laboratory participant pool who responded to an advertisement offering \$15 for participation. Each participant sat in a private cubicle within a laboratory. Our emotion-induction procedure drew on established methods (Gross & Levenson, 1995; Lerner et al., 2004). Participants first watched a 3-min video clip: a clip about the death of a boy’s mentor (Gross & Levenson, 1995) in the sadness condition, a clip about an unsanitary toilet (Lerner et al., 2004) in the disgust condition, and a clip about the Great Barrier Reef (Lerner et al., 2004) in the neutral-state condition. Participants in the sad-state and disgusted-state conditions next wrote an essay about

a situation during which they had experienced sadness or disgust, respectively. Participants in the neutral-state condition wrote an essay about their nightly activities.

Participants then made 27 choices between receiving cash amounts (between \$11 and \$80) immediately and larger cash amounts (between \$25 and \$85) at points in the future ranging from 1 week to 6 months (Kirby, Petry, & Bickel, 1999). Following standard behavioral-economics procedures (Weber et al., 2007), we incentivized participants to express their true preferences by selecting 1 of the participants in each session (median of 13 participants per session) and paying that person his or her preferred alternative for a randomly selected choice pair. If the choice was for a reward on that day, the participant was paid at the end of the session in cash. If the choice was for a later reward, it was paid by a check mailed at the later time.

Both before the emotion-induction procedure and immediately after the intertemporal-choice task, participants reported how intensely they felt each of 19 emotional states, including sadness, disgust, and neutrality (“indifferent,” “neutral,” and “unemotional”).

Results and discussion

The emotion-induction procedure was effective in both magnitude and specificity. Participants in the sad-state condition reported feeling more sadness ($M = 3.72$) than neutrality ($M = 1.66$), $t(78) = 6.72$, $p < .0001$; disgust ($M = 1.00$), $t(78) = 13.68$, $p < .0001$; or any other measured negative emotion, including anger ($M = 1.30$), $t(78) = 13.50$, $p < .0001$, and fear ($M = 1.31$), $t(78) = 13.12$, $p < .001$. Comparable specific effects were found for the neutral and disgust conditions. All results held when we controlled for preinduction emotions.¹

From a rational perspective, the incidental emotions induced by watching the video and writing the essay should not have carried over to the financial decisions. Nonetheless, substantial carryover occurred. Sad participants were more impatient than neutral participants were in their choices; that is, they were more willing to forgo larger rewards in the future to obtain smaller rewards immediately. We used maximum-likelihood estimation to fit each participant’s choices to an exponential discounting function, $D(t) = \delta^t$, where smaller values of δ (the annual discount factor) indicate more impatience.² Mean annual exponential discount factors are shown in Figure 1. Sad participants were more impatient (mean $\delta = .21$, median $\delta = .04$) than neutral participants (mean $\delta = .28$, median $\delta = .19$; Mann-Whitney $z = 2.04$, $p = .04$).³ In monetary terms, the median sad participant required \$37 immediately to forgo receiving \$85 in 3 months, whereas the median neutral participant required \$56 immediately. Disgusted participants (mean $\delta = .31$, median $\delta = .24$) discounted about as much as did neutral participants ($z = 0.46$, n.s.) and discounted less than did sad participants ($z = 1.87$, $p = .06$). Thus, sadder participants were not wiser participants in the case of these intertemporal choices. Even though the induced sadness was incidental to these decisions, it actually increased preference for immediate rewards (compared with neutral emotion), whereas disgust did not.

Experiment 2

In Experiment 2, we had two goals. First, to test the reliability of the effect observed in Experiment 1, we used a different intertemporal-choice task and a Web-based, nationwide sample. Second, we applied query theory (Johnson, Häubl, & Keinan, 2007; Weber et al., 2007) and its psychological process model of preference construction to help us explain how

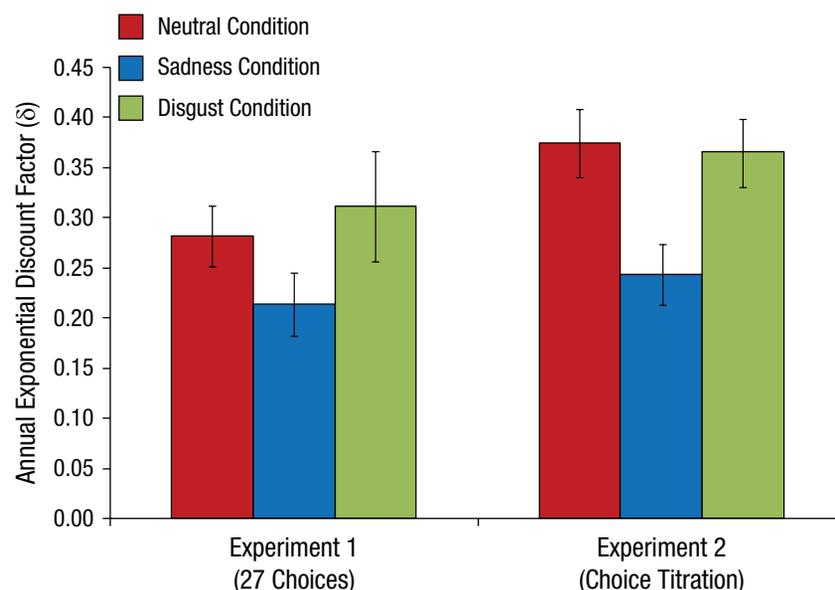


Fig. 1. Results from Experiments 1 and 2: annual exponential discount factor (δ) as a function of experiment and participant’s induced emotion. Larger numbers correspond to greater patience. Error bars represent ± 1 SEM.

intertemporal decisions are made differently by individuals who feel sad versus disgusted or neutral. Query theory assumes that people implicitly and sequentially query their knowledge base for arguments that support either of the two choice options, and that the first query retrieves arguments that give more support than do the arguments retrieved by subsequent queries. Because decision makers who first think about the earlier option in an intertemporal choice have been shown to be more impatient than those who first think about the later option (Weber et al., 2007), we hypothesized that sadness would make people more likely to first generate reasons favoring the earlier rather than the later reward, and that they would therefore generate more such reasons than sad or neutral-state participants; as a result, their behavior would be consistent with the notion that sad people seek self-enhancement by acquiring external goods (Cryder et al., 2008).

Method

Experiment 2 tested this hypothesis on 189 participants (133 females, 56 males; mean age = 40 years, range = 19–69 years) from the Columbia University Center for Decision Sciences Virtual Lab participant pool. Each participant received \$5 for completing the experiment.

After completing the same emotion-induction procedure as in Experiment 1 (including preinduction and postchoice manipulation checks; Gross & Levenson, 1995; Lerner et al., 2004), participants made choices between receiving an Amazon.com gift certificate worth \$50 immediately or a gift certificate worth more in 3 months (Weber et al., 2007). This titration task included 11 choices in which the larger, later amount ranged from \$55 to \$105 (in \$5 increments). We calculated the discount factor at the implied indifference point midway between where a participant preferred the immediate payment and where he or she preferred the later payment. We incentivized participants to express their true preferences by randomly selecting 1 out of every 50 participants to realize one of his or her choices. All gift certificates were sent electronically.

Before making the 11 choices, participants were asked to indicate what was going through their mind as they thought about the upcoming choices, using an established thought-listing protocol (Weber et al., 2007). Participants typed as many thoughts as they could think of into a customized interactive Web form one thought at a time. (They had previously practiced listing thoughts this way, at the beginning of the experiment.) After making their choices, participants were shown their previously listed thoughts, one at a time, and asked to indicate whether each thought favored receiving the money immediately, receiving the money later, receiving the money both immediately and later, or receiving the money neither immediately nor later.

Results and discussion

As in Experiment 1, sad participants were more impatient, requiring more additional compensation to wait for 3 months

($M = \$30.72$, median = \$27.50), than were neutral participants ($M = \$22.72$, median = \$17.50; $z = 2.71$, $p < .01$) or disgusted participants ($M = \$22.74$, median = \$17.50; $z = 2.65$, $p < .01$). These choices implied steeper discounting for sad participants (mean $\delta = .24$, median $\delta = .17$) than for neutral participants (mean $\delta = .37$, median $\delta = .30$; $z = 2.71$, $p < .01$) or disgusted participants (mean $\delta = .37$, median $\delta = .30$; $z = 2.65$, $p < .01$; Fig. 1).

Participants listed between 1 and 23 thoughts ($M = 3.73$, $SD = 2.74$, median = 3) about their decisions. Of these thoughts, 40% were patient (e.g., “Up to \$105 would be a really nice gift to receive”), 39% were impatient (e.g., “Extra money for Christmas if I take \$50 now”), and 21% were neither (e.g., “Will I be lucky enough to win”). (These categorizations were based on subjects’ own ratings at the end of the experiment.) Sad participants listed more impatient thoughts ($M = 1.73$) than either neutral ($M = 1.22$) or disgusted ($M = 1.15$) participants did (medians = 1 in all three groups; z s = 2.84 and 2.23, $ps < .01$ and $.05$). But sad participants did not list significantly more patient thoughts (sad participants: $M = 1.58$; neutral participants: $M = 1.32$; disgusted participants: $M = 1.37$; all medians = 1; z s = 0.28 and 0.22, n.s.).

We analyzed the ordering of the listed thoughts by calculating the standardized median rank difference (SMRD; Johnson et al., 2007; Weber et al., 2007), with scores of +1 corresponding to all “impatient” thoughts coming before all “patient” thoughts and scores of –1 corresponding to the opposite. Sad participants generated impatient thoughts significantly earlier (mean $SMRD = .47$, median $SMRD = 1$) than did neutral participants (mean $SMRD = .03$, median $SMRD = 0$; $z = 2.65$, $p < .01$) and disgusted participants (mean $SMRD = .005$, median $SMRD = 0$; $z = 2.48$, $p < .05$). SMRD scores fully mediated the difference in discount factors between the sad participants and neutral participants ($p < .01$, bootstrapped mediation; Shrout & Bolger, 2002), as shown in Figure 2, which illustrates our mediation model.⁴ That is, adding SMRD scores as a control to a linear regression of discount factor on condition (sad vs. neutral) reduced the magnitude of the standardized coefficient for the effect of condition from 0.25 to 0.11, so that it became nonsignificant, from $p < .005$ to $p < .14$.

Thus, compared with neutral emotion or disgust, sadness again induced greater impatience: The median sad participant required \$65 immediately to forgo receiving \$100 in 3 months, whereas the median neutral or disgusted participant required \$74 immediately. Moreover, Experiment 2 identified a mechanism for how sadness affects impatience: Reasons for preferring the immediate reward came to mind sooner and more frequently when participants were sad as opposed to disgusted or neutral.

Experiment 3

We conducted Experiment 3 to answer a new question. Does sadness (compared with neutral emotion) produce a general increase in impatience, or is its effect limited to choices offering an immediate payoff? A key innovation in modeling

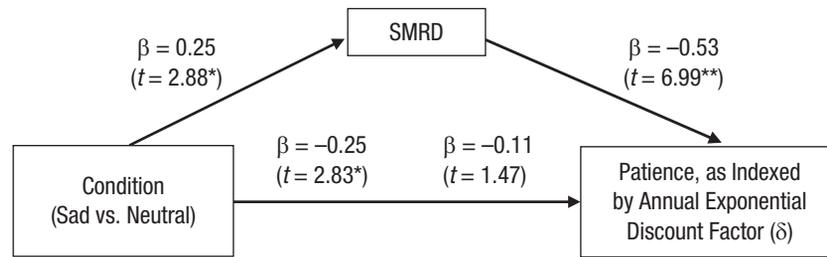


Fig. 2. Results from Experiment 2: mediation model showing the influence of emotion condition (sad vs. neutral) on patience (indexed by the annual exponential discount factor, δ), as mediated by the standardized median rank difference (SMRD) between the order of patient and impatient thoughts in the thought-listing task. A higher SMRD indicated earlier listing of impatient thoughts and later listing of patient thoughts. Standardized regression coefficients are shown; asterisks indicate significant coefficients ($*p < .01$, $**p < .001$). Along the lower path, the values to the left are from the model without SMRD, and the values to the right are from the model that included SMRD.

discounting distinguishes between two types of processes that are represented in the quasi-hyperbolic discounting function, $D(t) = \beta \times \delta^t$, for length of delay $t > 0$, and $D(0) = 1$ (Laibson, 1997; O'Donoghue & Rabin, 1999). One process (δ) reflects an economically rational—that is, time-consistent—exponential discounting of rewards that is sensitive to the length of delay, t . The other process, *present bias* (β), discounts all future rewards when there is any delay (regardless of its length) and therefore cannot be strictly rational. We tentatively hypothesized that sadness (compared with neutral emotion) would increase the desire to get something immediately—not just sooner—and would therefore increase present bias (β) more than it increases time-consistent discounting (δ).

Method

In Experiment 3, all procedures were generally the same as in the first two experiments, except that the disgust condition was no longer used for comparison. Participants were 203 individuals from two labs: 42 females and 34 males from the Harvard Decision Science Laboratory participant pool (mean age = 36 years, range = 19–64) and 93 females and 34 males from the Columbia University Center for Decision Sciences Virtual Lab, a Web-based system (mean age = 39 years, range = 19–68). Participants completed the same emotion-induction procedure (including preinduction and postchoice manipulation checks; Gross & Levenson, 1995; Lerner et al., 2004) as in Experiment 1. After the emotion induction, participants made 42 choices (McClure, Laibson, Loewenstein, & Cohen, 2004) between receiving smaller cash amounts (between \$6 and \$40) earlier (immediately, 2 weeks from the day of the experiment, or 4 weeks from the day of the experiment) and larger cash amounts (between \$7 and \$57) later (2, 4, or 6 weeks, respectively, from the day of the experiment). Thus, participants made choices between smaller, immediate rewards and larger, later rewards or between smaller, later rewards and larger, even later rewards. As before, we incentivized participants by randomly selecting a portion of the participants to realize one of their choices.

Results and discussion

As predicted, sadness biased choices toward immediate rewards but did not affect impatience in choices between two later options. We fit each participant's choices to the quasi-hyperbolic discounting function using maximum-likelihood estimation, constraining β and δ between 0 and 1. Figure 3 gives the mean values for both parameters in the two conditions. A significant portion of participants showed evidence of present bias (47%); β was marginally more likely to be below 1 among sad participants (53%) than among neutral participants (40%), $\chi^2(1, N = 203) = 3.17, p = .08$. Sad participants displayed more present bias (mean $\beta = .94$, median $\beta = .999$) than did neutral participants (mean $\beta = .98$, median $\beta = 1.000$; $z = 2.07, p < .05$), discounting all nonimmediate rewards by almost 4 percentage points more than neutral participants did.⁵ In monetary terms, \$50 was worth \$2 less to the median sad participant if there was any delay in receiving it. In contrast, sad (mean $\delta = .23$, median $\delta = .04$) and neutral (mean $\delta = .24$, median $\delta = .08$) participants discounted already delayed rewards equally ($z = 0.74, n.s.$). Thus, sadness (compared with neutral emotion) increases the desire to get something immediately, not just sooner.

General Discussion

The present experiments, conducted with multiple methods and across two laboratories, reveal a new construct—myopic misery—as well as mediating mechanisms that explain it. The findings do not support the maxim that sadder is wiser, instead supporting the opposite: Sadness makes one myopic. Although sadness may make people more accurate in some contexts (Alloy & Abramson, 1979), it also makes them prefer immediate gratification—and that preference is not an attribute associated with wisdom.

Across three experiments, the median sad participant valued future rewards (i.e., those delayed by 3 months) 13% to 34% less than did the median neutral-state participant. These differences emerged even though real money was at stake and even though discount rates in the neutral condition were

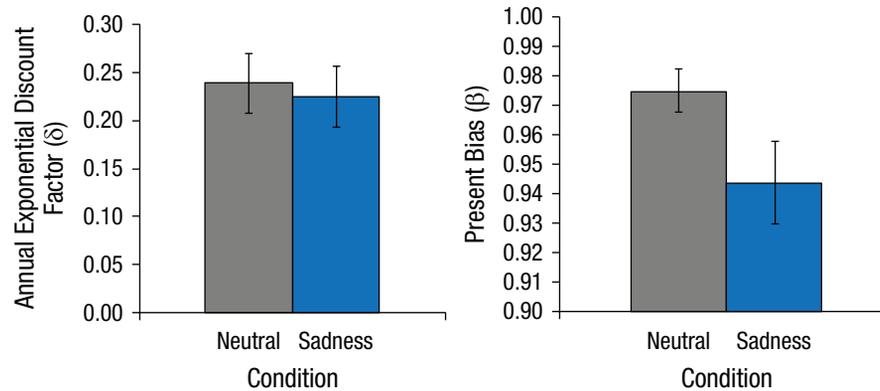


Fig. 3. Results from Experiment 3: mean time-consistent annual exponential discount factor (δ ; left) and present bias (β ; right) as a function of condition. Larger numbers indicate more patience. Error bars represent ± 1 SEM.

already high. Moreover, sadness increased present bias. Present bias can be a particularly harmful form of impatience, as evidenced by the life outcomes revealed in Mischel and Ebbesen's (1970) marshmallow experiments, described in this article's introductory section. It is important to note, however, that sadness might have had an effect on time-consistent discounting (i.e., the exponential discount factor, δ), and not just on present bias, if we had included delays shorter than 2 weeks—an issue that future research could explore.

The present experiments provide theoretical insights into the emotion of sadness. Specifically, having observed increased impatience in sad participants—but not disgusted participants—we inferred that motivational properties unique to sadness, rather than negative emotions as a whole (as mood repair would imply), were at play.

Experiment 2 also provides a window into the thought processes of sad individuals. Recall that all participants were asked to indicate what was going through their mind as they thought about the prospective intertemporal decisions. The data strongly support the prediction of query theory that sad people first generate reasons favoring the immediate reward (and thus generate more such reasons). Compared with neutral participants, sad participants generated a larger number of reasons supporting immediate receipt of the gift certificate early in the thought sequence, many of these reasons describing possible purchases; and such reasons fully mediated the relation between sadness and discounting. These results thus constitute the first evidence that sadness triggers an implicit goal to obtain rewards as soon as possible—even when such urgency comes at financial cost. We conclude that our data support the existence of the proposed phenomenon of myopic misery.

Limitations

We followed a standard behavioral-economics procedure to make choices consequential to participants by realizing one choice for 1 participant in every session in the lab (in Experiments 1 and 3) and for 1 of every 50 online participants

(in Experiments 2 and 3). This probabilistic realization was necessary to work within our research budget, but meant that participants—regardless of condition—could not be sure about receiving any of the rewards they chose. Although the probability of reward was independent of whether participants chose the immediate reward or the future reward, and therefore should not have affected differences among the emotion conditions, it is possible that different results would be obtained if obtaining the reward were certain. Future (well-funded) research could examine this possibility.

It is also up to future research to test whether even stronger effects on discounting can be obtained when the sadness is integral to the financial choices at hand. In the present experiments, sadness was always incidental—that is, it arose as a temporary state from watching a movie that had no normative relevance to the financial choices.

One may be tempted to view the present experiments as extensions of prior work on sadness and purchase prices (e.g., studies of the endowment effect; Cryder et al., 2008; Lerner et al., 2004). But such a view would be inaccurate. Whereas our experiments examined choices between getting money immediately versus later, the endowment studies considered only one moment in time. There is little reason to believe that mechanisms involved in the endowment effect would match mechanisms involved in intertemporal choice. For example, the age of a decision maker affects discounting behavior (Read & Read, 2004), but age does not affect the endowment effect (Kovalchik, Camerer, Grether, Plott, & Allman, 2005).

Practical implications

The results also have implications for the design of public policy. People typically make some of the most consequential choices of their lives while in emotional states. Love drives a decision to propose or accept marriage; anger drives a decision to strike someone; fear drives a decision to abandon one's home in disaster. Sometimes a particular emotion holds inextricable links to a particular set of decisions. Consider, for

example, the intense sadness one feels after the death of a family member and the numerous financial decisions that must be made to settle that person's estate. The present findings may provide valuable insights into how to improve such consequential decisions. Our results suggest that individuals who are sad after the death of a family member might exacerbate their financial hardship by making intertemporal choices that favor immediate consumption more than is wise. Although the U.S. Federal Trade Commission has a "cooling-off rule," giving individuals 3 days to cancel a sale, this rule excludes sales of real estate, insurance, and securities—exactly the sorts of sales one might engage in after the death of a family member, loss of employment, or a natural disaster. Public-policy design and implementation need to be based on consideration of the full range of psychological processes through which decisions are made (Thaler & Sunstein, 2008; Weber et al., 2007). Fully understanding these processes may also help address the economic problems associated with Americans' increasing reliance on credit cards (Meier & Sprenger, 2010).

Conclusion

These experiments, combining methods from psychology and economics, revealed that the sadder person is not necessarily the wiser person when it comes to financial choices. Instead, compared with neutral emotion, sadness—but not disgust—made people more myopic, and therefore willing to forgo greater future gains in return for instant gratification. These experiments involved almost 600 subjects at two different laboratories; used experimental designs that allowed causal conclusions; applied precise, widely accepted, and quantifiable normative standards; incorporated a comparison negative emotion (disgust); provided meaningful motivations (i.e., money) for participants to optimize choice outcomes; and demonstrated a mediational pathway. Given the number of societal problems resulting from a "need it now" mentality, these results may inform not only theories of emotion and financial decision making, but also powerful interventions for optimizing decision-making environments (Thaler & Sunstein, 2008).

Acknowledgments

The authors thank the Harvard Decision Science Laboratory, Viral Gandhi, and Irving Dominguez, as well as Cindy Cryder, Ron Dahl, Mark Edington, Dan Gilbert, James Gross, Dave Hardisty, Yoel Inbar, George Loewenstein, Eric Mattison, Nicole Otchy, and Deborah Small.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

This research was supported by National Science Foundation Grants PECASE SES-0239637 and SES-0820441 to Jennifer S. Lerner and Grant SES-0820496 to Elke U. Weber.

Notes

1. Although we do not report the corresponding results for Experiments 2 and 3, the emotion-induction procedures were equally effective in those experiments.
2. An annual discount factor (as opposed to a discount rate) is how much the money received in 1 year is valued relative to the money received immediately and can be between 0 and 1. Lower discount factors correspond to greater impatience, whereas lower discount rates (as opposed to discount factors) correspond to less impatience. We also replicated all results by fitting participants' choices to a hyperbolic discounting function, $D(t) = (1 + \kappa \times t)^{-1}$, where larger values of κ indicate more impatience. All results in Experiments 1 and 2 were essentially identical to those reported here when we used this alternative function.
3. Because the estimates of the discount factor were nonnormally distributed, we present nonparametric (Mann-Whitney) tests of differences in means for all relevant analyses. Parametric t tests yielded similar results.
4. Although we did not manipulate the proposed mediator of thought order, Weber et al. (2007) did just that in a nearly identical experimental setup and established the causal (not merely correlational) relationship between thought order and patience.
5. The online participants were less present biased than the offline participants (ordered logistic regression, $z = 2.56$, $p < .05$), which suggests that β estimates are potentially negatively biased (cf. Andreoni & Sprenger, in press). However, there was no interaction between emotion condition and lab location ($z = 0.10$, n.s.). Lab location had no main effect and no interaction effect (with emotion condition) on δ ($z_s = 0.31$ and 0.78 , respectively, n.s.).

References

- Alloy, L. B., & Abramson, L. Y. (1979). Judgment of contingency in depressed and nondepressed students: Sadder but wiser? *Journal of Experimental Psychology: General*, *108*, 441–485. doi:10.1037/0096-3445.108.4.441
- Andreoni, J., & Sprenger, C. (in press). Risk preferences are not time preferences. *American Economic Review*.
- Chabris, C., Laibson, D., Morris, C., Schuldt, J., & Taubinsky, D. (2008). Individual laboratory-measured discount rates predict field behavior. *Journal of Risk and Uncertainty*, *37*, 237–269. doi:10.1007/s11166-008-9053-x
- Cialdini, R. B., Darby, B. L., & Vincent, J. E. (1973). Transgression and altruism: A case for hedonism. *Journal of Personality and Social Psychology*, *9*, 502–516.
- Clark, M. S., & Isen, A. M. (1982). Toward understanding the relationship between feeling states and social behavior. In A. H. Hastorf & A. M. Isen (Eds.), *Cognitive social psychology* (pp. 73–108). New York, NY: Elsevier.
- Coleridge, S. T. (1857). *The rime of the ancient mariner*. London, England: Sampson Low, Son & Co.
- Cryder, C. E., Lerner, J. S., Gross, J. J., & Dahl, R. E. (2008). Misery is not miserly: Sad and self-focused individuals spend more. *Psychological Science*, *19*, 525–530.
- Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith

- (Eds.), *Handbook of affective sciences* (pp. 572–595). New York, NY: Oxford University Press.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin*, *117*, 39–66. doi:10.1037/0033-2909.117.1.39
- Frederick, S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature*, *40*, 351–401.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Journal of Cognition & Emotion*, *9*, 87–108.
- Ifcher, J., & Zarghamee, H. (2011). Happiness and time preference: The effect of positive affect in a random-assignment experiment. *American Economic Review*, *101*, 3109–3129.
- James, W. (1890). *Principles of psychology: Vol. 1*. New York, NY: Holt.
- Johnson, E. J., Häubl, G., & Keinan, A. (2007). Aspects of endowment: A query theory of value construction. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *33*, 461–474.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Farrar Straus & Giroux.
- Keltner, D., Ellsworth, P. C., & Edwards, K. (1993). Beyond simple pessimism: Effects of sadness and anger on social perception. *Journal of Personality and Social Psychology*, *64*, 740–752. doi:10.1037/0022-3514.64.5.740
- Keltner, D., & Lerner, J. S. (2011). Emotion. In D. Gilbert, S. Fiske, & G. Lindsay (Eds.), *The handbook of social psychology* (5th ed., Vol. 1, pp. 312–347). New York, NY: McGraw Hill.
- Kirby, K. N., Petry, N. M., & Bickel, W. K. (1999). Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology: General*, *128*, 78–87.
- Kovalchik, S., Camerer, C. F., Grether, D. M., Plott, C. R., & Allman, J. M. (2005). Aging and decision-making: A comparison between neurologically healthy elderly and young individuals. *Journal of Economic Behavior & Organization*, *58*, 79–94.
- Laibson, D. (1997). Golden eggs and hyperbolic discounting. *Quarterly Journal of Economics*, *112*, 443–477.
- Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition & Emotion*, *14*, 473–493.
- Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*, 146–159.
- Lerner, J. S., Small, D. A., & Loewenstein, G. (2004). Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychological Science*, *15*, 337–341.
- Loewenstein, G., & Prelec, D. (1992). Anomalies in intertemporal choice: Evidence and an interpretation. *Quarterly Journal of Economics*, *107*, 573–597.
- Loewenstein, G., Read, D., & Baumeister, R. (2003). *Time and decision: Economic and psychological perspectives on intertemporal choice*. New York, NY: Russell Sage Foundation Press.
- McClure, S. M., Laibson, D. I., Loewenstein, G., & Cohen, J. D. (2004). Separate neural systems value immediate and delayed monetary rewards. *Science*, *306*, 503–507.
- Meier, S., & Sprenger, C. (2010). Present-biased preferences and credit card borrowing. *American Economic Journal: Applied Economics*, *2*, 193–210.
- Mischel, W., Ayduk, O., Berman, M. G., Casey, B. J., Gotlib, I. H., Jonides, J., . . . Shoda, Y. (2011). “Willpower” over the life span: Decomposing self-regulation. *Social Cognitive and Affective Neuroscience*, *6*, 252–256. doi:10.1093/scan/nsq081
- Mischel, W., & Ebbesen, E. B. (1970). Attention in delay of gratification. *Journal of Personality and Social Psychology*, *16*, 329–337. doi:10.1037/h0029815
- O'Donoghue, T., & Rabin, M. (1999). Doing it now or later. *American Economic Review*, *89*, 103–124.
- Parfit, D. (1984). *Reasons and persons*. Oxford, England: Oxford University Press.
- Park, J., & Banaji, M. R. (2000). Mood and heuristics: The influence of happy and sad states on sensitivity and bias in stereotyping. *Journal of Personality and Social Psychology*, *78*, 1005–1023. doi:10.1037/0022-3514.78.6.1005
- Pryor, J. S., & Isen, A. M. (2011). Positive affect, intertemporal choice, and levels of thinking: Increasing consumers' willingness to wait. *Journal of Marketing Research*, *48*, 532–543. doi:10.1509/jmkr.48.3.532
- Raghunathan, R., & Pham, M. T. (1999). All negative moods are not equal: Motivational influences of anxiety and sadness on decision making. *Organizational Behavior and Human Decision Processes*, *79*, 56–77. doi:10.1006/obhd.1999.2838
- Read, D., & Read, N. L. (2004). Time discounting over the lifespan. *Organizational Behavior and Human Decision Processes*, *94*, 22–32. doi:10.1016/j.obhdp.2004.01.002
- Rozin, P., Haidt, J., & McCauley, C. R. (1993). Disgust. In M. Lewis & J. Haviland (Eds.), *Handbook of emotions* (pp. 575–595). New York, NY: Guilford Press.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, *45*, 513–523.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422–445.
- Small, D. A., Lerner, J. S., & Fischhoff, B. (2006). Emotion priming and attributions for terrorism: Americans' reactions in a national field experiment. *Political Psychology*, *27*, 289–298.
- Thaler, R. H., & Shefrin, H. M. (1981). An economic theory of self-control. *Journal of Political Economy*, *89*, 392–406.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New York, NY: Penguin.
- Weber, E. U., Johnson, E. J., Milch, K. F., Chang, H., Brodscholl, J. C., & Goldstein, D. G. (2007). Asymmetric discounting in intertemporal choice: A query-theory account. *Psychological Science*, *18*, 516–523.