The Financial Cost of Sadness *

Jennifer S. Lerner[1], Ye Li[2], and Elke U. Weber[2]

[1] Harvard Kennedy School, Harvard University, 79 John F. Kennedy Street, Cambridge, MA, 02138, USA
[2] Center for Decision Sciences, Columbia University, 3022 Broadway Avenue, New York, NY, 10027, USA

* This research was supported by NSF grants PECASE SES-0239637 and SES-0820441 to Jennifer Lerner and SES-0820496 to Elke Weber. We 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.

Abstract

Hundreds of studies have examined the "sadder-but-wiser" hypothesis (i.e., that sad people make wiser decisions), and most find support for it. But there is reason to believe that intertemporal choices (consuming now versus later) will not benefit from sadness. Three experiments tested whether sadness increases desire to acquire rewards *now* even if it means foregoing greater financial rewards in the future. Each experiment induced sadness or a neutral mood among randomly-assigned participants and then offered intertemporal choices. Results revealed that sadness dramatically increased impatience: Relative to median neutral-mood participants, median sad-mood participants were willing to accept 13% to 34% less money today to avoid waiting 3 months for payment. Sadness increased impatience even though the emotion was normatively irrelevant to the choice. Implying emotion-specific mechanisms, participants in a disgust condition were not more impatient than neutral participants. In sum, sadness increases financial costs when making tradeoffs between time and money.

Keywords: Sadness, Emotion, Intertemporal Choice, Present Bias

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." More recently, beginning with empirical tests of "depressive realism" (Alloy & Abramson, 1979), hundreds of papers have found support for the "sadder-but-wiser" hypothesis—that sadness and depression make individuals wiser. 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 over-attributing causality to individuals (Keltner, Ellsworth, & Edwards, 1993).

In the present paper, we test the economic implications of the "sadder-but-wiser" hypothesis's presumed underlying mechanisms. Specifically, we focus on the domain of intertemporal choice, for three 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 minutes before eating the first one. Those who were able to postpone immediate gratification 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).

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 be irrationally impatient (Frederick, Loewenstein, & O'Donoghue, 2002), leading to such societal problems as credit card debt (Meier & Sprenger, 2010) and overeating/under-exercising (Chabris, Laibson, Morris, Schuldt, & Taubinsky, 2008). Field studies, natural experiments, and laboratory experiments report discounting that far exceeds 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 papers have examined the effects of positive emotion on intertemporal choice (Ifcher & Zarghamee, 2011; Pyone & Isen, 2011), finding that positive affect makes people more patient. What is surprising is that, to our knowledge, no papers have examined the potential causal role 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. Several papers have found that emotions of the same valence can have opposing effects from each other on decision making (e.g., fear decreases while anger increases preferences for risky options (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), our overarching hypothesis is that experimentally-primed sadness will carry over to shape subsequent financial choices.

At least two possible, but opposing, hypotheses could causally link sadness to impatient intertemporal choices. According to the *sadder-but-wiser hypothesis*, sadness should motivate individuals to more analytically think through the financial implications of the various choice options, and therefore *decrease* impatience. Consistent with this idea, sadness increases systematic thought and reduces biases that generally arise from insufficiently systematic thought. For example, sadness reduces the fundamental attribution error by increasing consideration of situational factors in attributing causality (Small, Lerner, & Fischhoff, 2006).

On the other hand, a case can be made for a *myopic-misery hypothesis* in which sadness *increases* 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).

An additional 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 sadness may increase discounting by intensifying 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 William James (1890) called the "material self." Several studies examining the endowment effect have found that sad decision makers pay a higher buying price than neutral-state decision makers (Cryder, et al., 2008; Lerner, et al., 2004). Moreover, the more decision makers focus on the self prior to the purchase, the more money they are willing to pay (Cryder, et al., 2008). Finally,

although Clark and Isen's (1982) findings on mood repair motives do not have direct implications regarding whether sad individuals want the smaller reward now or the larger reward later on, they do imply an essential link between sadness and reward. If that theory applies here, then decision makers in any negative state (e.g., sadness or disgust) should both 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 per se or apply to the superordinate category of negative emotion. Disgust—another negative emotion—may help to answer this question. 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 would imply? Disgust 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). If so, disgust, if anything, should *diminish* impatience, since it triggers a goal of expelling rather than acquiring (Keltner & Lerner, 2011). Three experiments that randomly assigned decision-makers to emotional states tested these hypotheses.

Experiment 1

We randomly assigned 202 participants (57% female; ages 18 to 63) to either a neutral, sadness, or disgust condition. Each participant sat in a private cubicle within a laboratory at Harvard University. Drawing on established methods (Gross & Levenson, 1995; Lerner, et al., 2004), our emotion-induction procedure was the same in all three experiments. Participants first watched three-minute video clips about the death of a boy's mentor (Gross & Levenson, 1995) in the sadness condition, about an unsanitary toilet (Lerner, et al., 2004) in the disgust condition,

and about the Great Barrier Reef (Lerner, et al., 2004) in the neutral-state condition. Depending on condition, participants next wrote an essay about a situation during which they had experienced sadness or disgust, or an essay about their nightly activities. Both before the emotion-induction procedure and immediately after the choice task, participants reported how intensely they felt 19 emotions, including emotions measuring sadness, disgust, and a neutral state.

Participants then made 27 choices between receiving cash amounts today (between $11-$80) and larger cash amounts (between $25-$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 randomly selecting one of the choice pairs for one of the participants in each session (median of 13 participants per session) and paying out that person's preferred alternative. Choices of a reward that day were paid at the end of the session in cash. Later rewards were paid by a check mailed at the later time.

The emotion-induction procedure was effective in both magnitude and specificity for all three experiments. Sad-condition participants reported feeling more sad ($M = 3.72$) than feeling neutral ($M = 1.66$), $t(78) = 6.72$, $p < .0001$, disgusted ($M = 1.00$), $t(78) = 13.68$, $p < .0001$, 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.

From a rational perspective, there should have been no carry-over of the incidental emotions induced by the video-watching and essay-writing to the financial decisions. Nonetheless, substantial carry-over occurred. Sad participants were more impatient than neutral

participants in their choices, i.e., more willing to forego larger rewards in the future to obtain smaller rewards now. We used maximum-likelihood estimation to fit choices to an exponential discounting function, $D(t) = \delta^t$, where *smaller* values of δ (the annual discount factor) indicate more impatience.[1,2] Sad participants were more impatient, discounting more ($M_\delta = .21$, $median_\delta = .04$) than neutral participants did ($M_\delta = .28$, $median_\delta = .19$) [Mann-Whitney $Z = 2.04$, $p = .04$]. In monetary terms, whereas the median sad participant would settle for $37 today rather than wait 3 months to receive $85, the median neutral participant required $56 today instead. Importantly, disgusted participants ($M_\delta = .31$, $median_\delta = .24$) discounted about the same as neutral participants did [$Z = .46$, *ns*] and less than sad participants did [$Z = 1.87$, $p = .06$]. Thus, sadder was not wiser for these intertemporal choices. Even though induced sadness should be irrelevant to these decisions, it actually increased preference for immediate rewards whereas disgust did not.

-----Insert Figure 1 here-----

Experiment 2

Experiment 2 addressed two goals. First, it tested the reliability of this effect using a different intertemporal choice task and a web-based, nationwide sample. Second, it applied Query Theory (Johnson, Häubl, & Keinan, 2007; Weber, et al., 2007), a psychological process model of preference construction, to explain how intertemporal decisions are made differently by individuals who feel sad versus disgusted or neutral. Query Theory assumes that people

---

[1] An annual discount *factor* is how much money received in one year is valued relative to money today and can be between zero and one. Lower discount factors correspond to greater impatience. In contrast, higher discount *rates* correspond to *less* impatience.

[2] We also replicated all results by fitting participants' choices to a hyperbolic discounting function, $D(t) = (1 + \kappa \cdot t)^{-1}$, where larger values of κ and smaller values for D indicate more impatience. All results were similar across both discounting functions for Experiments 1 and 2.

implicitly and sequentially query their knowledge base for arguments that support either of the two choice options, and that the first query retrieves more support than subsequent queries. Because decision-makers who first think about the earlier option have been shown to be more impatient (Weber, et al., 2007), we hypothesized that sadness would make people more likely to first generate reasons favoring the earlier reward (and thus generate more such reasons), consistent with the notion that sad people seek self-enhancement by acquiring external goods (Cryder, et al., 2008).

Experiment 2 tested this hypothesis on 189 participants (133 females, 56 males; age range from 19-69 years, with a mean of 40) from the Columbia University Center for Decision Sciences Virtual Lab participant pool. After the emotion induction procedure, participants were given a chance to win an Amazon.com gift certificate worth $50 now or a larger amount in 3 months, in addition to a $5 fee for completing the study (Weber, et al., 2007). This titration task asked participants to make 11 choices between receiving $50 today or amounts between $55 and $105 (in $5 increments) in 3 months. We calculated discount factors at the implied indifference point midway between where participants preferred the earlier versus later payments. We incentivized participants to express their true preferences by randomly selecting 1 out of every 50 participants to have one of their choices played out for real. All gift certificates were sent electronically.

Before making the actual decisions, participants were first asked to indicate what was going through their mind as they thought about this decision, using an established thought-listing protocol (Weber, et al., 2007). Participants typed their thoughts into a customized interactive web form one thought at a time for as many thoughts as they could think of. Participants had previously practiced listing thoughts this way at the beginning of the study. After making the

actual decisions, they were later shown their previously listed thoughts, one at a time, and asked to indicate whether each favored receiving the money now, later, both, or neither.

As in Experiment 1, sad participants were more impatient, requiring more additional compensation to wait for 3 months (M=\$30.72) than neutral participants (M=\$22.72) [t=2.42, p<.05] or disgusted participants [(M=\$22.74), t=2.39, p<.05]. This translated into steeper discounting for sad (M_δ=.24) than neutral [(M_δ=.37), t=2.82, p<.01] or disgusted participants [(M_δ=.37), t=2.67, P<.01].

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"). Sad participants listed more impatient thoughts than either neutral or disgusted participants did (M_{sad} = 1.73 vs. $M_{neutral}$ = 1.22 and $M_{disgust}$ = 1.15, ts = 1.80 and 2.37, p = .07 and p < .05) but did not have significantly more patient thoughts (M_{sad} = 1.58 vs. $M_{neutral}$ = 1.32 and $M_{disgust}$ = 1.37, ts = .82 and .62, *ns*). 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 ($SMRD$ = .47) than neutral participants [($SMRD$ = .03), t = 2.88, p < .01] and disgusted participants ($SMRD$ = .005), t = 2.86, p < .01. SMRD scores fully mediated the difference in discount factors between the sad participants and neutral participants (p < .01, bootstrapped mediation) (Shrout & Bolger, 2002). [3]

[3] Although we do not manipulate the proposed mediator of thought order, Weber and colleagues (2007) did just that in a nearly identical experimental setup to establish the *causal* relationship between thought order and patience.

Thus, sadness again induced greater impatience: the median sad participant would settle for $65 today rather than wait 3 months to receive $100 whereas the median neutral or disgusted participant required $74 today instead. Moreover, Experiment 2 identified a mechanism for how sadness affects impatience: Reasons for the immediate reward came to mind sooner and more frequently when participants had been made sad as opposed to disgusted or neutral.

-----Insert Figure 2 here-----

Experiment 3

Experiment 3 introduced a new question. Does sadness produce a general increase in impatience or is its effect limited to choices offering an immediate payoff? A key innovation in modeling discounting distinguishes between two types of processes that are represented in the quasi-hyperbolic discounting function, $D(t)=\beta\delta^t$, for $t > 0$ (Laibson, 1997; O'Donoghue & Rabin, 1999). One process (δ) reflects economically-rational 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 is therefore far from rational. We hypothesized that sadness increases the desire to get something *now*, not just sooner, and should therefore increase present bias (β) but not rational discounting (δ).

In Experiment 3, all procedures other than the intertemporal choice task were the same as in the first two experiments, except that disgust was not studied. After the emotion induction, a total of 203 participants in two labs (66.5% female, median age of 34.5) made 42 choices (McClure, Laibson, Loewenstein, & Cohen, 2004) between receiving smaller cash amounts (between $6-$40) earlier (today, 2 weeks from today, or 4 weeks from today) and larger cash amounts (between $7-$57) later (2, 4, or 6 weeks from today). As before, we incentivized participants by randomly selecting a portion of the participants to have one of their choices

played out for real. Participants' choices were fit to the quasi-hyperbolic discounting function using maximum-likelihood estimation.

As predicted, sadness increased choices in favor of immediate rewards but did not affect impatience in choices between later options. Sad participants displayed more present-bias (M_β=.94) than neutral participants did [(M_β=.98), t(201)=1.94, p=.05], discounting all non-immediate rewards by almost four percentage points more than neutral participants did. In monetary terms, $25 was worth $1 less to the median sad participant if there was *any* delay in receiving it. In contrast, sad (M_δ=.23) and neutral (M_δ =.24) participants discounted already delayed rewards equally, t(201)=.32, *ns.*

-----Insert Figure 3 here-----

General Discussion

The present experiments reveal the financial costs of sadness for intertemporal choices. The findings do *not* support the maxim that sadder is wiser, instead supporting the opposite: sadness is more myopic. Although sadness may make people more accurate in some contexts (Alloy & Abramson, 1979), it also makes them prefer immediate gratification—not an attribute associated with wisdom.

Across three experiments, the median sad participant valued rewards delayed by a mere 3 months 13% to 34% less than the median neutral-state participant and rewards with *any* delay by 4% less. These differences emerged even though real money was at stake. Moreover, sadness increased present bias. Present bias can be a particularly harmful form of impatience, as evidenced by the life outcomes associated with Mischel and Ebbesen's marshmallow experiments, described earlier.

The present studies reveal basic insights into the emotion of sadness. Specifically, having observed increased impatience for sadness -- and not for disgust -- implies that motivational properties unique to sadness rather than to negative emotions as a whole (as mood-repair would imply), are at play.

The studies provide a window into the thought processes of sad individuals versus neutral individuals. Recall that all participants were asked to indicate what was going through their mind as they thought about the prospective intertemporal decision. The data show that sadness strongly accentuates the prediction of Query Theory that people first generate reasons favoring the immediate reward (and thus generate more such reasons). Sad respondents, in particular, generated a larger number of reasons supporting immediate receipt of the gift certificate early in the thought sequence, many of them describing possible purchases; such reasons fully mediated the relation between sadness and discounting. These results thus reveal the first evidence that sadness triggers an implicit goal to obtain the rewards as soon as possible—even when such urgency comes at financial cost.

Limitations. The present experiments also have limitations. Borrowing methods from behavioral economics to create real financial consequences, we followed a standard procedure for telling participants that one participant in every session (in the lab, in Experiments 1 and 3) or 1 in every 50 participants (online, in Experiment 2) would be selected to have one of their choices played out for real. While this randomization was necessary to work within our research budget, it meant that participants could not be sure about receiving the rewards they chose. Although the probability of reward is independent of whether one chooses the immediate reward or the future reward, it is possible that the present results could vary if obtaining the money were certain. Future (well-funded) research could examine this possibility.

Another avenue we could not explore here involves the potential for obtaining different (and possibly even stronger) effects as a function of whether the sadness is integral or incidental to the financial choices at hand. In the present studies, sadness was always incidental—i.e., it arose as a temporary state from watching a movie that had no normative relevance to the financial choices at hand.

One may be tempted to view the present studies as extensions of prior work on sadness and purchase prices, as examined in studies of the endowment effect (Cryder, et al., 2008; Lerner, et al., 2004). But such a view would be inaccurate. Whereas the present studies examine choices between getting money now 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). Indeed, given the research suggesting that humans think about choices differently when future time periods are involved (Figner et al., 2010), it makes more sense to predict that the two (endowment effect and discounting behavior) are orthogonal.

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 amidst 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 for improving such consequential decisions. Our results suggest that such individuals might exacerbate their financial hardship by making intertemporal choices that favor immediate consumption more than is wise. Although the United States' Federal Trade Commission (FTC) has a "cooling-off rule," giving individuals three days to cancel a sale, this rule exempts 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. In this and other ways, public policy design and implementation needs to take into consideration the full range of psychological processes through which decisions are made (Thaler & Sunstein, 2008; Weber, et al., 2007). Fully understanding the processes may help address the economic problems associated with the increasing American reliance on credit cards (Meier & Sprenger, 2010).

Conclusions. In conclusion, these experiments, combining methods from psychology and economics, reliably revealed that sadder is not necessarily wiser when it comes to financial choices. Instead, sadness—but not disgust—made people more myopic, and thus willing to forego greater later gains for instant gratification. The present studies involved over 600 subjects across two different laboratories; experimental designs that allow causal conclusions; precise, widely-accepted, and quantifiable normative standards; a comparison negative emotion (disgust); meaningful motivations (i.e., money) for participants to optimize choice outcomes; and a meditational 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 the formation of powerful interventions for optimizing decision-making environments (Thaler & Sunstein, 2008).

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*(4), 441-485. doi: 10.1037/0096-3445.108.4.441

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*(2), 237-269. doi: 10.1007/s11166-008-9053-x

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: Elsevier.

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*(6), 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, US: Oxford University Press.

Figner, B., Knoch, D., Johnson, E. J., Krosch, A. R., Lisanby, S. H., Fehr, E., & Weber, E. U. (2010). Lateral prefrontal cortex and self-control in intertemporal choice. . *Nature Neuroscience, 13*, 538-539.

Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin, 117*(1), 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*(2), 351-401.

Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Journal of Cognition & Emotion, 9*(1), 87–108.

Ifcher, J., & Zarghamee, H. (2011). Happiness and Time Preference: The Effect of Positive Affect in a Random-Assignment Experiment. *American Economic Review, Forthcoming*.

James, W. (1890). *Principles of psychology*. New York: 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*(3), 461-474.

Kahneman, D. (2011). *Thinking, Fast and Slow*. New York: 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*(5), 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.). New York: 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*(1), 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*(2), 443-477.

Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition and Emotion, 14*(4), 473-493.

Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*(1), 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*(5), 337-341.

Loewenstein, G., & Prelec, D. (1992). Anomalies in intertemporal choice: Evidence and an interpretation. *The Quarterly Journal of Economics, 107*(2), 573-597.

Loewenstein, G., Read, D., & Baumeister, R. (2003). *Time and Decision: Economic and Psychological Perspectives on Intertemporal Choice*. New York: 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*(5695), 503-507

Meier, S., & Sprenger, C. (2010). Present-Biased Preferences and Credit Card Borrowing. *American Economic Journal: Applied Economics, 2*(1), 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, Forthcoming*. doi: 10.1093/scan/nsq081

Mischel, W., & Ebbesen, E. B. (1970). Attention in delay of gratification. *Journal of Personality and Social Psychology, 16*(2), 329-337. doi: 10.1037/h0029815

O'Donoghue, T., & Rabin, M. (1999). Doing It Now or Later. *The American Economic Review, 89*(1), 103-124.

Parfit, D. (1984). *Reasons and Persons*. Oxford: 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*(6), 1005-1023. doi: 10.1037/0022-3514.78.6.1005

Pyone, J. S., & Isen, A. M. (2011). Positive Affect, Intertemporal Choice, and Levels of Thinking: Increasing Consumers' Willingness to Wait. [Article]. *Journal of Marketing Research (JMR), 48*(3), 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*(1), 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*(1), 22-32. doi: DOI: 10.1016/j.obhdp.2004.01.002

Rozin, P., Haidt, J., & McCauley, C. R. (1993). Disgust *Handbook of emotions.* (pp. 575-594): New York, NY, US: 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*(3), 513-523.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*(4), 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*(2), 289-298.

Thaler, R. H., & Shefrin, H. M. (1981). An economic theory of self-control. *The Journal of Political Economy*, 392-406.

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New York: 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*(6), 516-523.

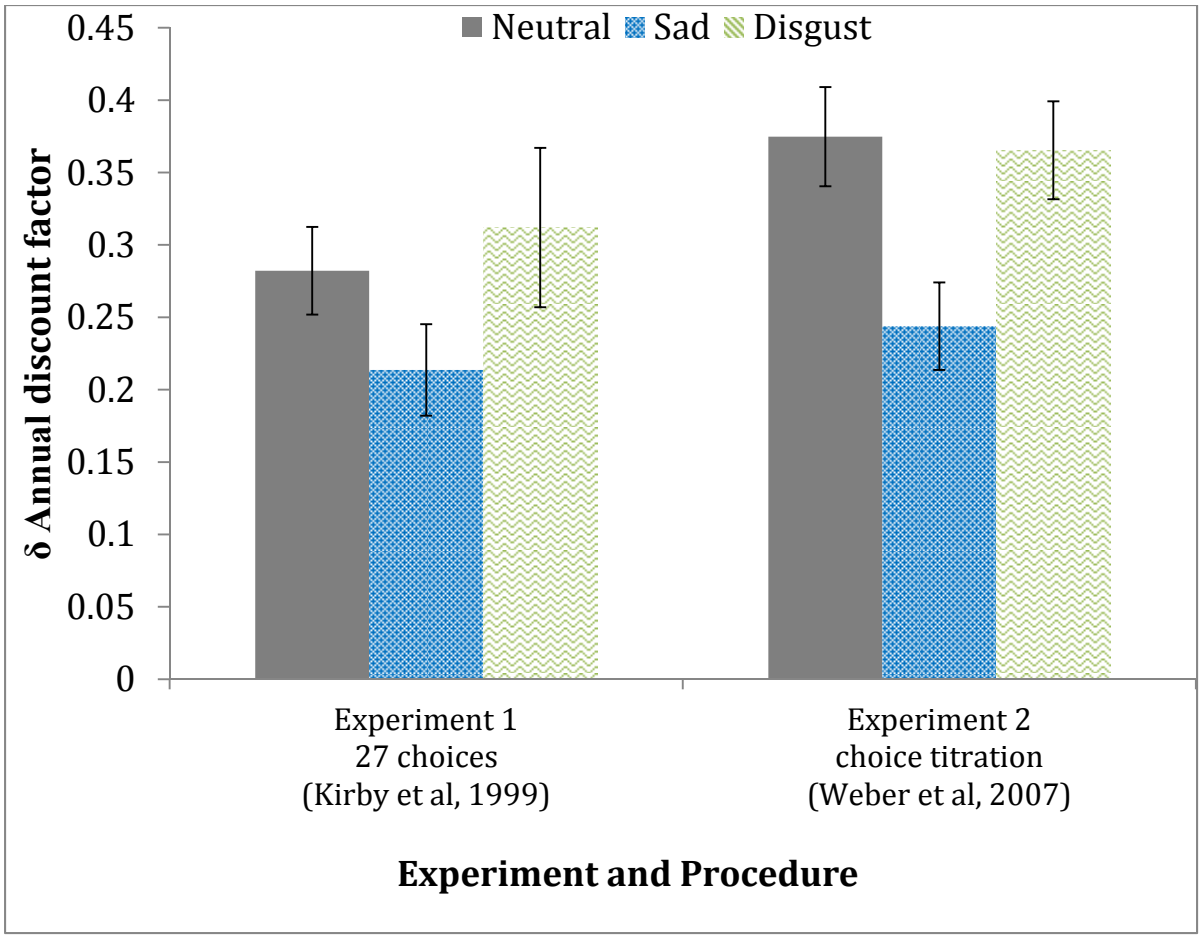

Figure 1. Average patience levels in choices between rewards today or later, as determined by exponential discounting (δ) in experiments 1 and 2. Larger numbers (closer to 1) are more patient. Error bars represent ±1SEM.

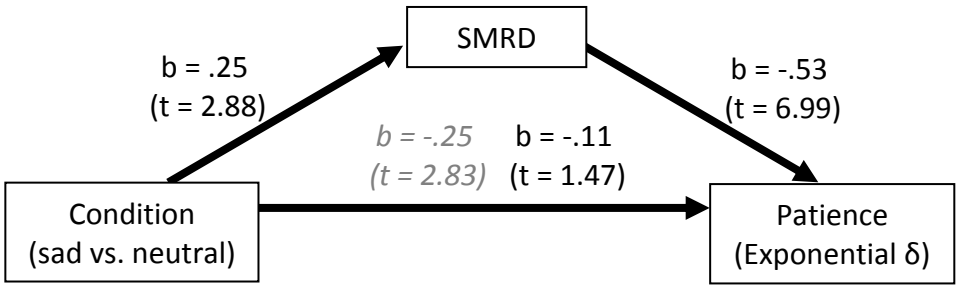

Figure 2. Mediation analysis for Experiment 2, showing that sad participants tend to think of reasons favoring receiving the money sooner before thoughts favoring receiving more money later. SMRD denotes the standardized median rank difference between the order of "patient" and "impatient" thoughts. A SMRD of +1 (-1) corresponds to all impatient (patient) thoughts first.

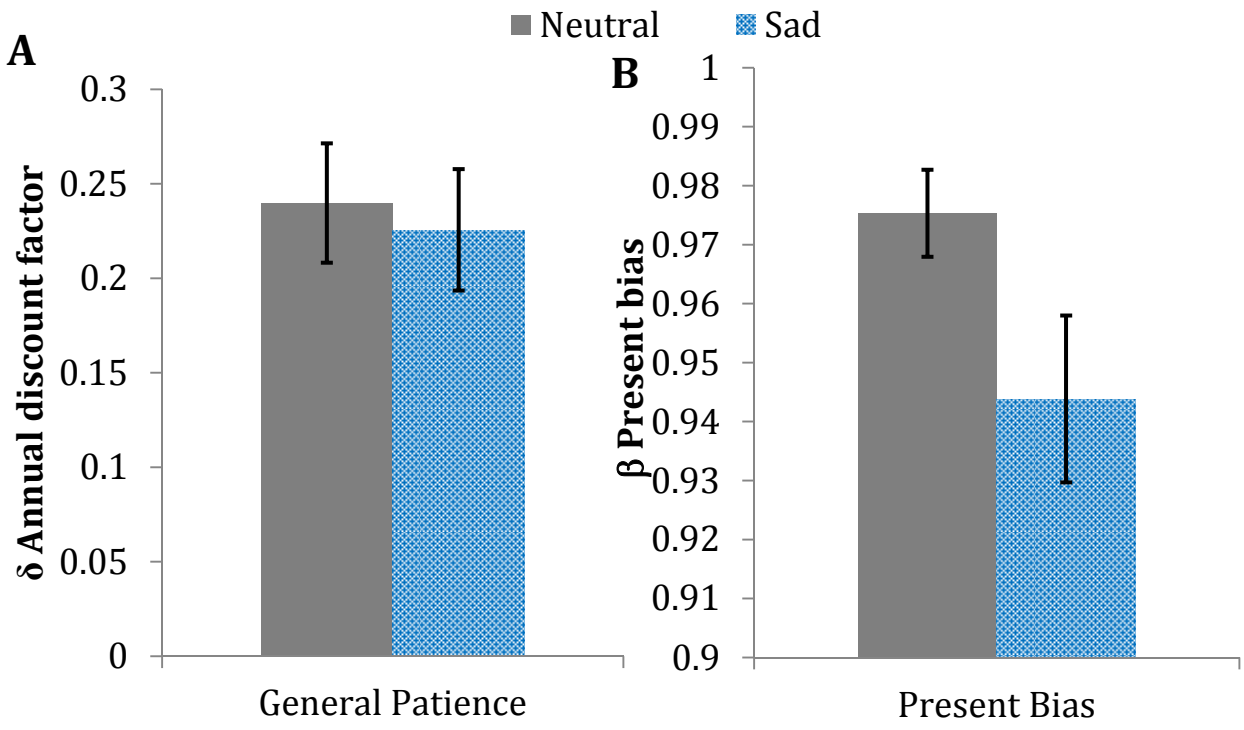

Figure 3. Average patience levels in choices between rewards today and later, or choices between rewards later and even later, as modeled by quasi-hyperbolic discounting (Experiment 3). Closer to 1 is more patient. Error bars represent ±1SEM. (**A**) Rational discounting (δ). (**B**) Present bias (β), or how much a decision maker discounts all future rewards when there is *any* delay (regardless of its length). Sadness increases the desire to get something *now*, not just sooner. For both panels, larger numbers are more patient.