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It is proposed that a future time interval's perceived length will be affected by whether the interval ends with a gain or loss. Confirming this, several experiments indicate that consumers perceive intervals ending with losses as shorter than equivalent intervals ending with gains. The authors explore the mechanisms underlying these effects, and they identify several parallels between the current effects and loss aversion. The authors further show that these changes in time perception influence consumption decisions, and they consider the implications of the findings for theories of time perception and intertemporal choice.

Keywords: temporal loss aversion, future time perception, intertemporal discounting, consumer planning

Looming Losses in Future Time Perception

Imagine two consumers who learn that to keep their jobs, each must move from Manhattan to San Francisco in two months. Imagine further that for one of these consumers, moving to California represents the fulfillment of a long-standing wish, so she focuses on all that she will gain in the move (e.g., nice weather, spectacular scenery). Imagine, however, that for the other consumer, the move represents a painful departure from home, and he focuses instead on what will be lost (e.g., the excitement of Manhattan, proximity to family). The two consumers, though facing the same move in two months' time, starkly differ in terms of whether they perceive the move as a gain or a loss relative to their current positions. Although there are likely many consequences of this difference, this article focuses on a subtle but potentially important consequence: whether coding the move as a gain or loss influences how long the time until the move seems.

Such fluctuations in future time perception could be consequential for decision making and consumer behavior. For example, decisions about trading off current versus future consumption or about what discount rate to apply to a future transaction (Loewenstein, Read, and Baumeister 2003) may be affected by the perceived nearness, and not just the objective nearness, of the "future" in question. Similarly, consumer planning, including estimates of future consumption and decisions about repeat purchases, may also be affected by the perceived, and not just the actual, length of the focal time interval (Morwitz 1997).

Previous research has extensively investigated the factors influencing the perceived duration of past, or experienced, time intervals (Faro, Leclerc, and Hastie 2005; Fraisse 1984; Vohs and Schmeichel 2003; Zakay and Block 1996, 1997). However, future time perception, and its impact on decision making, has only recently attracted research interest. Initial explorations have suggested that future time perception is indeed malleable, with, for example, time intervals seeming longer when described by amounts of time instead of by dates (LeBoeuf 2006). Recent work also confirms that future time perception is important, inasmuch as people's subjective perceptions of time are related to their intertemporal preferences (Zauberman et al. 2009). This article contributes to this area of research by examining a potentially important and prevalent influence on time perception: We examine whether time perception is affected by the expectation of an impending interval ending favorably, with a gain, or unfavorably, with a loss. Next, we review two streams of literature that lead to different predictions about how impending gains and losses might affect time perception.

MOTIVATED PERCEPTION AND REASONING

Insofar as consumers enjoy receiving gains but dislike incurring losses, they should also be relatively motivated to receive those gains and avoid those losses, all else being equal (the hedonic principle; for a brief review, see Harinck et al. 2007). Might such motivations distort the perceived proximity of future gains and losses?

Indeed, much psychological research suggests that motivation can bias perception and reasoning. For example, early research has suggested that objects that are valued

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(e.g., coins) tend to be perceived as physically larger than they should be (Bruner and Goodman 1947) or to be otherwise "perceptually accentuated" (Bruner and Postman 1949, p. 19). More recent research has shown the myriad ways that motivation can distort perception and reasoning, documenting how motivation enables people to literally see what they want to see (Balcetis and Dunning 2006), to reach desired conclusions (Kunda 1990), and to minimize the impact of negative experiences (Kermer et al. 2006). Thus, to the degree that people are motivated to receive gains and avoid losses and to receive those gains soon, they may come to perceive those gains as occurring relatively near in time, compared with losses.

Gains may also seem nearer than losses for other reasons. For example, people may be motivated to underestimate (or not fully consider) the amount of effort required to reach a gain. Consider the opening example: Someone who perceives moving to San Francisco as a gain may underestimate what needs to be done to prepare for the move, preferring instead to focus more on the positive change itself than on the (less desirable) time until the change. More generally, fluctuations in time perception may arise because a future interval bounded by a gain or loss has at least two key features: the time until the change and the valenced end point. People facing gains may be motivated to focus relatively more on the end point than people facing losses, who may instead prefer to focus on the (relatively positive) intervening interval. This may make loss-bounded intervals seem longer than equivalent gain-bounded intervals because focusing on a future interval and its duration (instead of on its end point) may make an interval seem relatively long. (Indeed, prior research has suggested that, in general, attending to the passage of time makes experienced intervals seem longer [Zakay and Block 1996, 1997].)

For all these reasons, the motivation to receive a gain may make desired end states appear relatively near in time, with future time intervals ending with gains thus seeming shorter than equivalent intervals ending with losses. In H_{1a}, we articulate this "wishful-thinking" prediction:

> H_{1a}: Intervals ending with gains seem shorter than equivalent intervals ending with losses.

LOOMING LOSSES

Although the wishful-thinking account is plausible, there is also support for the competing prediction that losses might seem nearer than equidistant gains. Specifically, consider research on loss aversion, which has shown that losses have a greater subjective impact than gains (Kahneman and Tversky 1984; Tversky and Kahneman 1991); as is often stated, losses "loom larger" than gains (Kahneman and Tversky 1979, p. 279). For example, in general, losing $100 feels more painful than gaining $100 feels good (Kahneman and Tversky 1979). Loss aversion has been shown to influence a wide variety of responses, including decisions about gambles (Kahneman and Tversky 1984), reactions to price increases (Putler 1992), and decisions about upgrading durable goods (Okada 2001). Thus, losses seem to loom larger than gains in many contexts.

What does this research on loss aversion suggest about time perception? A possibility is that, just as losses generally seem larger and more prominent than gains, losses might also seem *nearer* and more proximal than gains. That is, losses may quite literally "loom" closer in time. This may happen for several reasons.

First, as we noted previously, losses may be perceived as larger than gains of equivalent absolute value (Kahneman and Tversky 1979). Just as increased size is often taken as a cue to increased physical proximity in visual perception (Ittelson 1951), the increased subjective size of losses may similarly be taken as a cue to increased perceived temporal proximity, with losses seeming nearer than gains to the extent that they seem larger than gains.

Second, note that the greater subjective impact of losses observed in the loss-aversion literature may not only reflect losses seeming larger than gains. Research suggests that negative events elicit more processing than positive events (Wright 1991) and that losses may capture more attention than gains (Baumeister et al. 2001; Rozin and Royzman 2001; see also Carmon and Ariely 2000). Thus, impending losses may draw more attention than impending gains. If so, it is possible that people who contemplate an impending interval with a loss end point focus relatively more on the end point and relatively less on the intervening interval and its duration than those who contemplate an interval with a gain end point. If a focus on an impending interval's duration exaggerates its apparent length while distraction from the interval's extent shrinks it (cf. Zakay and Block 1996, 1997), losses may consequently seem nearer than gains.

There is also a third, rather different reason to predict that losses may seem nearer than gains: If waiting for a gain entails (positive) anticipation and waiting for a loss entails (negative) dread, people may want to expedite losses (to minimize dread) and delay gains (to maximize savoring; Loewenstein 1987). Thus, in contrast to the wishful-thinking prediction that consumers will be motivated to perceive gains as near, consumers may be motivated to perceive losses as nearer than gains in an attempt to manage the amount of savoring and dread that they expect.

For these reasons and in contrast to a wishful-thinking prediction, losses may seem nearer than equidistant gains. In H_{1b}, we state this "looming-losses" prediction:

> H_{1b}: Intervals ending with losses seem shorter than equivalent intervals ending with gains.

CONSEQUENCES OF SHIFTS IN SUBJECTIVE TIME PERCEPTION

In what follows, we first investigate whether the wishful-thinking or looming-losses prediction best characterizes future time perception, and we examine the mechanisms underlying these effects. Another important aim of this research is to examine whether fluctuations in time perception caused by impending gains and losses have consequences for behavior. As we noted previously, decisions about what people plan, do, or consume during an interval (or at an interval's end point) are likely to be affected by perceived interval length (Morwitz 1997) and thus are potentially influenced by an interval end point's valence. In particular, the wishful-thinking account predicts that people will plan less consumption (e.g., to do less, to order less) when facing time intervals bounded with gains than when facing (equivalent but longer-seeming) intervals bounded with losses. The looming-losses account predicts the opposite: People will plan more consumption for (longer-seeming) gain-bounded intervals than for (shorter-seeming) loss-bounded intervals.

Furthermore, if end point valence affects future time perception, it may also affect intertemporal choice. Specifically, because a future interval of a given objective length seems longer, people may use higher discount rates for transactions occurring at the interval's end because they may feel entitled to more compensation for enduring the interval's passage (cf. Zauberman et al. 2009). The wishful-thinking account predicts that consumers facing a loss (rather than a gain) at the interval's end will employ a greater discount rate because the loss-bounded interval will seem longer. The looming-losses account again predicts the opposite: Impending gains should lengthen intervals and foster greater discounting (relative to impending losses). We summarize these competing predictions as follows:

- H_{2a} (wishful thinking): Consumers facing a gain, rather than a loss, at the end of an upcoming interval perceive the interval as shorter, leading them to anticipate less consumption for the interval and exhibit lower discount rates for the interval.
- H_{2b} (looming losses): Consumers facing a loss, rather than a gain, at the end of an upcoming interval perceive the interval as shorter, leading them to anticipate less consumption for the interval and exhibit lower discount rates for the interval.

Testing these hypotheses also entails generalizing the effect of end point valence to different situations and response scales. That is, the dependent variables used to capture planned consumption and discount rates should converge to the main dependent variable used to capture perceived interval length. It is also worth noting that we do not view either looming losses or wishful thinking as the more reasonable, or even more normative, account. Indeed, there is no a priori reason that either account should precede or dominate the other in time perception. In the following experiments, we test these contrasting predictions about future time perception, and we examine the implications of the findings for consumption and intertemporal choice.

EXPERIMENT 1

Experiment 1 tested the competing predictions of H_{1a} and H_{1b} by examining whether an impending two-month interval seems longer when it ends with a gain or a loss.

Method

Participants and design. We randomly assigned 109 undergraduate students, participating for class credit, to the gain or loss condition.

Procedure. Participants were seated in front of personal computers and were asked (through on-screen instructions) to imagine that they were moving into a new office in two months. We manipulated the valence of the move by varying how the new and current offices compared in square footage and number of windows. Specifically, participants in the gain (loss) condition read, "Imagine that your current office is 80 sqft (120 sqft) and has no (two) window(s). You will move into another office that is 100 sqft and has 1 window, two months from today."

Thus, the new office was the same for all participants, and both the gain and the loss involved a change of 20 square feet and one window. While the office dimensions remained on the screen, participants were asked, "How long does this time period until the move seem to you?" They indicated their responses on a seven-point scale (adapted from LeBoeuf [2006] and used throughout this article), ranging from "seems very short" to "seems very long." No numbers appeared on the scale because the goal was to prompt participants to rate how long the interval *seemed* (rather than to cue participants to match the number of months to a particular scale value).

Results

In support of the idea that losses may loom nearer than gains (and consistent with H_{1b}), participants moving to a worse office perceived the two-month interval as shorter ($M_{loss} = 3.41$) than those moving to a better office ($M_{gain} = 4.39$; $t(107) = 3.35$, $p < .01$).

To explore the generality of this effect, we replicated this result in a follow-up study using a different context and time interval. Participants (N = 46 undergraduate students, participating for class credit) expected to change to either a worse or a better job in three months. For all participants, the new job offered 25 vacation days and a 20-minute commute. Participants randomly assigned to the gain condition learned that their current job offered 20 vacation days and a 30-minute commute, whereas those assigned to the loss condition learned that their current job offered 30 vacation days and a 10-minute commute. Corroborating the previous results, participants in the loss condition rated the time until the job change as shorter ($M_{loss} = 3.55$) than those in the gain condition ($M_{gain} = 4.54$; $t(44) = 2.03$, $p < .05$).

Another follow-up study (N = 157) used the same job-change materials and examined the robustness of the current effect over different time intervals, using a 2 (end point valence: gain, loss) × 3 (interval length: 1, 2, or 4 months) between-subjects design. An analysis of variance (ANOVA) revealed only a significant valence main effect ($F(1, 151) = 15.70$, $p < .001$, other ps > .35). Collapsed across the three time intervals, participants moving to a worse office perceived the interval until the move as shorter ($M_{loss} = 3.64$) than those moving to a better office ($M_{gain} = 4.57$).

Discussion

The results show that, when assessing a future time interval's perceived length, people are sensitive to whether they stand to gain or lose at the interval's end. Consistent with H_{1b} (looming losses), but not with H_{1a} (wishful thinking), when an interval ends with a loss relative to a person's current position, the interval seems shorter than when the same interval ends with a relative gain. This effect seems to hold across contexts and interval lengths. Whereas prior research has indicated that losses have a subjectively greater impact than equivalent gains (Tversky and Kahneman 1991), the current findings suggest that losses, in addition to looming larger, loom nearer than gains.

Readers may wonder about an alternative interpretation of Experiment 1's results. Recall that we indirectly manipulated the perception of the interval end point by varying participants' starting positions (e.g., a big office or a small office) and holding the end point itself constant. We did this to show that what was important was how the end point was coded (e.g., as a gain or a loss), rather than the end point's objective magnitude (e.g., 100 square feet versus some other size). However, the methodology entailed that those anticipating losses faced objectively better circumstances for the duration of the interval (e.g., better job, bigger office) than those anticipating gains. Thus, an ambiguity is whether the impending losses themselves shortened intervals compared with impending gains or, instead, whether the prospect of experiencing relatively good circumstances during the interval led peopl to assume that the "loss" interval would pass quickly (relative to those in the gain conditions, who would be experiencing somewhat worse intrainterval circumstances).

To address this interpretation, in Experiment 2, we held starting positions (and, thus, intrainterval circumstances) constant, manipulating only interval end points. We also measured perceptions of the quality of the current and new offices. If perceived interval length is affected specifically by the interval end point, perceptions of the new office, rather than perceptions of the current office, should mediate the effect of end point valence on perceived interval length.

EXPERIMENT 2

In Experiment 2, participants assessed the apparent proximity of an office move occurring in three months. The two main changes from Experiment 1 were that (1) participants started in offices of equal dimensions, with the dimensions of the new offices manipulated to instantiate gains and losses, and (2) participants rated the quality of the current and new offices.

Method

Participants and design. Fifty-eight undergraduate students, participating for class credit, were randomly assigned to the gain or loss condition.

Procedure. The materials, again administered by computer, paralleled Experiment 1. Participants were told that they were moving in three months from a 100-square-foot, one-window office to a 120-square-foot, two-window office (gain condition) or to an 80-square-foot, zero-window office (loss condition). Again, participants rated how long the time until the move seemed. Next, participants responded to the question, "Overall, how 'good' an office do you think the current office is?" and to an identical question about the new office (order counterbalanced). All ratings were made on seven-point scales.

Results

The results corroborated Experiment 1: Even with the intrainterval circumstances held constant, participants anticipating a loss perceived the interval as shorter than participants anticipating a gain (M_{loss} = 3.18 versus M_{gain} = 5.10; t(56) = 4.90, $p < .01$). Furthermore, as intended, those anticipating a loss saw the new office as worse than those anticipating a gain (M_{loss} = 1.85 versus M_{gain} = 5.60; t(56) = 14.98, $p < .001$).

To test whether perceptions of the new office mediated the effect of end point valence on time perception, we followed Baron and Kenny's (1986) recommended procedure. First, we regressed perceptions of the new office (the proposed mediator) on end point valence (0 = loss, 1 = gain). As we discussed previously, manipulated end point valence reliably affected perceptions of the new office (b = 3.74, t_b = 14.98, d.f. = 56, $p < .001$). Second, we regressed perceived interval length on manipulated end point valence, confirming that participants anticipating a loss perceived the interval as reliably shorter than participants anticipating a gain (b = 1.92, t_b = 4.90, d.f. = 56, $p < .001$). Finally, we regressed perceived interval length on both manipulated end point valence and perceptions of the new office. In this analysis, the effect of manipulated end point valence was no longer reliable (b = .37, t_b = .44, d.f. = 55, $p = .66$), but perceptions of the new office became a significant predictor (b = .41, t_b = 2.02, d.f. = 55, $p < .05$), suggesting that perceptions of the new office mediated the manipulation's effect on time perception.

We next examined whether perceptions of the current office played a similar mediating role. Although all participants faced the same current office, those anticipating a gain rated the current office less positively than those anticipating a loss (M_{gain} = 3.80 versus M_{loss} = 4.96; t(56) = –3.42, $p < .01$). Thus, although we objectively controlled the quality of the current office across conditions, there was a contrast effect, with the current office seeming better when (loss-condition) participants could compare it with a worse office than when (gain-condition) participants could compare it with a better office. To examine whether this might account for the findings, we followed the same steps as we did previously. Regressions showed that end point valence affected perceptions of the current office (b = –1.16, t_b = –3.42, d.f. = 56, $p < .01$) and perceived interval length (b = 1.92, d.f. = 56, t_b = 4.90, $p < .001$). However, when both end point valence and perceptions of the current office were entered as predictors of interval length, manipulated end point valence was a reliable predictor (b = 2.04, t_b = 4.71, d.f. = 55, $p < .001$), but ratings of the current office were not (b = .10, t_b = .67, d.f. = 55, $p = .50$).

Discussion

A future time interval seems shorter when its end point entails a loss than when it entails a gain. This effect arises when the quality of the end point is manipulated indirectly, by manipulating starting positions (as in Experiment 1), and when the end point is manipulated directly, with the quality of the interval held constant (as in Experiment 2). Experiment 2 further suggests that the effect on time perception of the impending gain or loss is independent of any effect of the perceived quality of the interval itself and, instead, is driven by perceptions of what will happen at the interval's end. Overall, Experiments 1 and 2 find no support for a wishful-thinking pattern in time perception and suggest instead that losses loom nearer than equivalent gains.

EXPERIMENT 3

Experiments 1 and 2 suggest that time intervals that end with losses seem shorter than equivalent intervals that end with gains. Experiment 3 explores the mechanisms that might underlie this effect. As we noted previously, the prediction that loss-bounded intervals will seem shorter than gain-bounded intervals stems in part from research on loss aversion: In general, losses loom larger than gains and thus have a greater subjective impact on decision making (Kahneman and Tversky 1979, 1984), feelings (McGraw et al. 2009), and attention (Baumeister et al. 2001; Rozin and Royzman 2001) than gains. The finding that losses also loom nearer in time than gains implies that there may be an analogue of loss aversion in time perception.

That being said, an unrelated stream of research would also lead to the prediction that loss-bounded intervals will seem shorter than gain-bounded intervals. Specifically, consumers awaiting a gain may feel (positive) anticipation, and those awaiting a loss may feel (negative) dread. Because of this, consumers may want to expedite losses (to minimize dread) but delay gains (to maximize anticipation; Loewenstein 1987). Thus, consumers may be motivated to perceive losses as nearer than gains to reduce expected dread and increase expected anticipation, and the current effects may have more to do with such a motivation than with a temporal instantiation of loss aversion.

Therefore, Experiment 3 investigates whether the observed effects are indeed related to loss aversion or whether the effects might be better explained by appealing to factors such as anticipation and dread. In particular, Experiment 3 employs an important moderator of loss aversion: intentions. Novemsky and Kahneman (2005a) show that intentions (namely, the intended use of the item that will be given up or "lost") moderate the incidence of loss aversion. They find that items for which exchange is intended or expected do not give rise to loss aversion; for example, in general, money used for purchasing is not subject to loss aversion because money is typically intended to be exchanged. Intentions may have this effect because, when exchange is expected, transactions may not be coded as losses and gains from the reference point in the way that they would be were exchange not expected (Novemsky and Kahneman 2005a, b).

Experiment 3 builds on this moderating role of exchange expectations in loss aversion by again presenting an office-move scenario, but here we manipulate whether participants expect to exchange their current offices. If the effects explored here are related to, and share characteristics of, loss aversion, learning that an office must be given up when it was expected all along to be exchanged should have a weaker influence on time perception than learning that an office must be given up when such an exchange was *not* expected (because an expected change is less likely to be coded as a "loss" and to give rise to loss aversion). This leads to H_3:

> H_3: An impending change has less of an effect on time perception when a person's starting position is inherently temporary (i.e., exchange is expected) than when that starting position is presumed to be permanent (i.e., exchange is not expected).

In Experiment 3, we also measured anticipation and dread to directly gauge their contributions to the observed effects. Finally, we measured the perceived size of the impending changes to assess whether the losses indeed were perceived as larger changes than the gains and to assess whether losses looming larger than gains could explain why losses loom nearer than gains.

Method

Participants and design. We randomly assigned 112 undergraduate students, participating for class credit, to one cell of a 2 (end point valence: loss, gain) × 2 (exchange: expected, not expected) between-subjects design.

Procedure. Participants were asked, on a computer, to contemplate an office move in three months. All participants were assigned the same 100-square-foot, two-window current office, and they were to move either to a 150-square-foot, four-window office (gain condition) or to a 50-square-foot, zero-window office (loss condition). We manipulated whether the current office was expected to be exchanged, with those in the exchange-expected condition first reading, "Imagine that your current office is a *temporary* one. In other words, you know that you will be asked to move into another office soon." These participants then read, "Imagine that your current, temporary office is 100 square feet and has 2 windows. As you expected, you are asked to move into another office as part of a reorganization of the offices in your company." They were then told the dimensions of the new office and that the move would occur in three months.

Participants in the exchange-not-expected condition were not given any initial information about the temporary status of the current office and simply read, "Imagine that your current office is 100 square feet and has 2 windows. You are asked to move into another office as part of a reorganization of the offices in your company." They were then given the dimensions of the new office and the timing of the move.

All participants then indicated how long the period until the move seemed, using the same scale as in Experiment 1. Participants also assessed the magnitude of the impending change by rating how different the two offices seemed from each other, how large a change the move would be, and how big a gain (gain condition) or loss (loss condition) the move would be. Next, they indicated the degree to which they eagerly anticipated the move and the degree to which they dreaded the move. All ratings were made on seven-point scales. Finally, the information about the offices was removed from the screen, and participants were asked to report the size and number of windows of the current office to check whether learning that the current office was temporary may have caused participants not to pay attention to the features of that office.

Results

As we predicted, a 2 (end point valence) × 2 (exchange expectation) ANOVA on interval-length ratings revealed a main effect of end point valence ($M_{loss} = 3.35$ versus $M_{gain} = 4.73$; $F(1, 108) = 23.73$, $p < .001$), but more important, it revealed a significant interaction ($F(1, 108) = 4.00$, $p < .05$). An office loss was viewed as occurring much sooner than a gain when moving from a permanent office ($M_{loss} = 3.04$ versus $M_{gain} = 5.00$; $t(54) = 5.44$, $p < .001$), but the effect of moving to the very same bad (versus good) office was weaker when the initial office was explicitly temporary ($M_{loss} = 3.63$ versus $M_{gain} = 4.45$; $t(54) = 1.85$, $p = .07$). In other words, the effect of end point valence was markedly reduced when participants expected, all along, to exchange their current offices than when such a change was unexpected. Expected exchanges, which are less likely to be coded as true losses and gains and should not give rise to loss aversion (Novemsky and Kahneman 2005a, b), had a smaller effect on time perception (see Figure 1).

Next, we examined whether the current results might be related to the motivation to manage anticipation and dread. A 2 (valence) × 2 (exchange expectation) ANOVA on participants' ratings of how much they anticipated the move revealed only a main effect of valence, such that positive moves were anticipated more than negative ones (M_{gain} = 5.90 versus M_{loss} = 1.81; $F(1, 108) = 367.23$, $p < .001$, other *p*s > .53). A similar ANOVA on ratings of dread also revealed only a main effect of valence: Negative moves were dreaded more than positive ones (M_{loss} = 5.12 versus M_{gain} = 2.13; $F(1, 108) = 87.09$, $p < .001$, other *p*s > .21). Thus, the exchange expectation (permanence) manipulation neither affected anticipation and dread directly nor interacted with valence to affect anticipation and dread. More important, the valence × expectation interaction on interval-length ratings still manifested when we controlled in an analysis of covariance for both rated anticipation and rated dread ($F(1, 106) = 4.94$, $p = .03$), suggesting that the current effects were not merely a function of the amount of anticipation and dread that the changes engendered (and thus were unlikely to be driven only by attempts to manage those emotions).

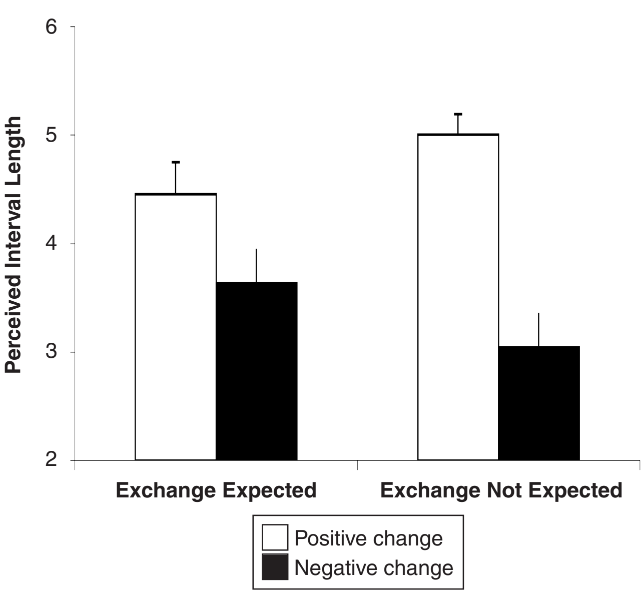
As noted, we also assessed the perceived size of the changes to examine whether, consistent with loss aversion, impending losses seemed larger than impending gains and whether the increased size of losses could account for losses looming near. We averaged the three change-magnitude ratings into one index of perceived change size (Cronbach's $\alpha = .75$). A 2 (valence) × 2 (exchange expectation) ANOVA on this index revealed a main effect of valence, indicating that losses indeed seemed to be larger changes than gains (M_{loss} = 6.00 versus M_{gain} = 5.24; $F(1, 108) = 22.0$, $p < .001$). There was no valence × expectation interaction for change-size ratings ($F(1, 108) = 2.53$, $p = .11$), but it is worth noting that losses seemed much larger than gains when there were no exchange expectations (M_{loss} = 6.19 versus M_{gain} = 5.16; $t(54) = 4.67$, $p < .001$) and that losses and gains seemed closer in size (though they still reliably differed) when exchange was expected and the changes may not have been coded as "true" losses and gains (M_{loss} = 5.84 versus M_{gain} = 5.33; $t(54) = 2.10$, $p = .04$).

Thus, losses loomed nearer and also larger than gains, especially for unexpected exchanges. As these findings suggest, perceived interval length and perceived change size were negatively correlated, with larger changes seeming nearer ($r = -.23$, $p = .02$). However, in an analysis of covariance that controlled for change size, the valence × expectation interaction for perceived interval length still manifested, albeit with only marginal significance ($F(1, 107) = 3.62$, $p = .06$).

Finally, 11 participants incorrectly recalled the current office's size or number of windows. Only 5 of these participants were in the temporary-office conditions. Thus, the weaker impact of end point valence in the temporary condition does not seem to have arisen from participants disproportionately ignoring the features of the temporary office.

Figure 1

PERCEIVED INTERVAL LENGTH AS A FUNCTION OF EXCHANGE EXPECTATIONS AND END POINT VALENCE (STUDY 3)



Discussion

Experiment 3 provides some insight into the factors that might lead losses to seem nearer than gains. In particular, the results suggest that the motivation to maximize savoring and minimize dread is unlikely to be the main source of the current effects.[1] However, the results reveal some noteworthy parallels between the current effects and loss aversion: Losses loom nearer than gains, and losses loom especially near to the extent that they were not expected (and thus are more likely to induce loss aversion). When a change is less likely to induce loss aversion (because it was expected all along), the change has less of an effect on time perception. These findings imply that a phenomenon with the characteristics of loss aversion may manifest in future time perception.

That being said, although the effects explored here share some empirical properties of loss aversion, there is still room to explore what, exactly, leads losses to seem nearer than gains. This phenomenon cannot be fully explained by losses seeming larger than gains, at least as measured in this study: Although there was a significant, negative correlation between perceived interval length and perceived change size, the valence × expectation interaction for perceived interval length was barely affected when we controlled for change size, suggesting that change size cannot fully account for the results.

Other factors, beyond perceived change size, may also lead losses to loom nearer than gains. In particular, the "greater subjective impact" of losses extends to factors beyond the perceived size of the change. For example, losses trigger more intense feelings than gains (McGraw et al. 2009); perhaps events that engender more intense feelings seem nearer (cf. Van Boven, Kane, and McGraw 2009). Similarly, losses may capture more attention than gains (Baumeister et al. 2001; Rozin and Royzman 2001). Consequently, consumers may be relatively more likely to focus on loss end points than on gain end points (especially when

[1]Loewenstein (1987) suggests that savoring and dread mainly affect decisions when the impending experience is fleeting; thus, perhaps it is unsurprising that these factors do not play a large role in the current findings.

a loss is unexpected) and to neglect a loss-bounded interval's full extent (Zakay and Block 1996, 1997). Experiment 3's data do not enable us to evaluate these perspectives empirically, but they may merit further study. We revisit these issues in the "General Discussion," but first, we investigate whether the current effects have implications for consumer behavior.

EXPERIMENT 4

Thus far, we have shown that losses appear to loom nearer in time than gains, with loss-bounded intervals seeming shorter than equivalent gain-bounded intervals. An important question, however, is whether these effects have consequences for consumption and behavior. Naturally, such consequences would have clear managerial relevance: Insight into the factors that influence consumers' willingness to make a purchase in a particular time interval should allow managers to more effectively predict and influence whether consumers will purchase items sooner rather than later, or more frequently rather than less.

A pilot question asked at the end of Experiment 3 suggests that the current effects indeed have consequences for planned consumption. All participants were asked to indicate, through an open-ended question, how many times they thought they would need to order office supplies for the current office before moving into the new office. In the "permanent current office" conditions, participants estimated that they would order supplies fewer times when anticipating a loss rather than a gain (M_{loss} = 2.08 versus M_{gain} = 2.94; t(54) = 1.90, p = .03 [one-tailed]), consistent with the finding that participants in the loss condition perceived the interval as shorter than those in the gain condition. An important goal of Experiments 4 and 5 is to replicate this impact of end point valence on other consumer-related variables and specifically to investigate whether, as H_{2b} predicts, consumers plan less consumption (Experiment 4) and discount the future less (Experiment 5) for intervals bounded with losses.

Another goal of Experiments 4 and 5 is to rule out an artifactual explanation of the results. Specifically, we assessed perceived interval length by asking participants to rate how long the interval until the change seemed. Perhaps, to answer this question, participants compared the objective interval length with some sense of how long they wanted the interval to be (i.e., how long does this interval seem *relative to how long I want it to be*?). Because people likely want gains to happen sooner than losses, the same target interval may seem longer than desired when it entails a gain rather than a loss; such comparisons may explain why losses were rated as nearer than gains. By measuring planned consumption and discount rates, Experiments 4 and 5 should allay concerns that the effects of end point valence are driven by one particular response format.

Finally, a subsidiary goal of Experiments 4 and 5 is to investigate whether the gains and losses that affect time perception can themselves be brought about by changes in product use. As we describe next, we investigate whether an anticipated product upgrade (downgrade) will be coded as a gain (loss) and subsequently influence time perception.

Method

Participants and design. We randomly assigned 99 undergraduate students, participating in return for class credit, to one cell of a 2 (end point valence: loss, gain) × 2 (order: length-perception question first, length-perception question second) between-subjects design.

Procedure. Working on a computer, participants considered a scenario involving replacing a cell phone with either a better or a worse model. Participants in the gain conditions were asked to imagine that their employer currently provided them with a Motorola RAZR phone. Participants in the loss conditions were told that their current employer-provided phone was an Apple iPhone. All participants were then told that their company decided to standardize employee phones to streamline communication and that new phones would be distributed in two months. Participants in the gain conditions learned that the new phone would be the more advanced iPhone, whereas participants in the loss conditions learned that it would be the less advanced RAZR. Below these instructions were pictures of the two phones.

In the length-perception-question-first condition, participants first indicated how long the time interval until the phone replacement seemed. Next, they were informed that they would need a new car charger (only compatible with the new phone) for use when traveling. Participants were informed that the company would pay for the charger but that each person must order his or her own charger. Participants were asked, "Do you think you will have enough time to order the new car charger before the new phone arrives?" They responded using a scale ranging from 1 ("definitely not") to 4 ("definitely yes").

In the length-perception-question-second condition, the order of these questions was reversed, with participants first answering the car-charger question and then answering the interval-length question. This order manipulation enabled us to examine whether people spontaneously consider the apparent length of a time interval when making consumption decisions for that interval or whether time perception only affects consumption decisions when participants are specifically asked to consider time before making those decisions. Finally, using seven-point scales, all participants indicated how good the current and new phones seemed.

Results

Participants thought that the iPhone was a better phone than the RAZR (M_{iphone} = 6.06 versus M_{razr} = 3.48; t(98) = 10.51, p < .01), as we intended. Of greater interest, we examined whether anticipating a better or worse phone would affect time perception. As we predicted, a 2 (valence) × 2 (order) ANOVA revealed a significant main effect of end point valence on perceived interval length (F(1, 95) = 23.6, p < .001): Participants receiving a worse phone perceived the interval until the exchange as shorter (M_{loss} = 3.64) than participants receiving a better phone (M_{gain} = 5.16). The analysis also revealed a significant effect of order (F(1, 95) = 7.65, p = .007) and an order × valence interaction (F(1, 95) = 6.81, p = .01). There was a larger difference between the gain and the loss conditions when length perception was asked first (M_{loss} = 2.85 versus M_{gain} = 5.14;

$t(52) = 5.73$, $p < .001$) than when it was asked second ($M_{loss} = 4.50$ versus $M_{gain} = 5.19$; $t(43) = 1.46$, $p = .15$).[2]

We also expected that participants would be less likely to view the interval as sufficiently long to order a new charger in the loss than in the gain condition. Indeed, a 2 (valence) × 2 (order) ANOVA revealed a main effect of valence ($F(1, 95) = 12.4$, $p = .001$): Participants in the loss condition were less likely to perceive that the interval afforded sufficient time to order the charger ($M_{loss} = 3.30$) than participants in the gain condition ($M_{gain} = 3.73$). The analysis revealed a main effect of order ($F(1, 95) = 4.94$, $p = .03$) but no interaction ($F(1, 95) = .31$, $p = .58$): Valence reliably affected responses whether the time-perception question preceded the charger question ($t(52) = 2.50$, $p = .02$) or followed that question ($t(43) = 2.45$, $p = .02$).

Discussion

Experiment 4 suggests that whether an interval ends with a loss or a gain not only affects time perception but also affects planned consumption. These effects on consumption do not seem to depend on consumers being explicitly asked to consider interval length before making consumption decisions, indicating the robustness of the effect. This study also shows that the gains and losses that influence time perception can arise from anticipated product use.

However, an alternative explanation for the finding is that participants might be more eager to receive the iPhone (gain condition) than the RAZR (loss condition) and thus be more motivated to order the iPhone's charger. Therefore, the enhanced perception that there will be time to order the charger in the gain condition could be due to differences in prioritizing the charger rather than to differences in time perception per se. To address this concern, Experiment 5 employs a consumption variable that is unrelated to the impending gain or loss.

EXPERIMENT 5

Experiment 5 examines whether the looming-losses phenomenon affects consumer impatience with respect to a transaction that co-occurs with, but is unrelated to, an impending gain or loss. In particular, an end-of-interval transaction might be expected to be discounted less when the interval incidentally ends with a loss than when it ends with a gain, precisely because intervals ending with losses seem shorter than those ending with gains. In Experiment 5, we specifically examined whether participants are more willing in the gain than in the loss condition to pay a premium to receive an item immediately, instead of having to wait to receive it until after the interval passes.

Method

Participants and design. We randomly assigned 185 undergraduate students, participating for class credit, to either the gain or loss condition.

Stimuli and procedure. The stimuli and procedure paralleled those of Experiment 4, with the following changes: First, we used the Samsung Blackjack as the more advanced phone, so that participants were switching either to the Blackjack from the RAZR (gain condition) or to the RAZR from the Blackjack (loss condition). We did this to ensure that the prior results were not due to any peculiarities in how the iPhone, which was the subject of much media attention when these studies were run, was perceived.

As in Experiment 4, participants were told of the impending phone switch (in two months), were shown the phones, and were asked to rate how long the time until the switch seemed. Next, participants answered the following question:

> Now, imagine that you want to purchase a laptop for your personal use ...:
>
> 1. You can purchase the laptop today at a store for \$1,100. If you do this, you will receive the laptop today.
>
> 2. You can order the same laptop for only \$1,000 through a company-sponsored program. However, if you do this, you will not receive the laptop until the day that you receive your new cell phone.

Participants were asked to choose between these options. Finally, using seven-point scales, they rated how good the current and new phones seemed.

Results

As we predicted, participants thought that the Blackjack was a better phone than the RAZR ($M_{Blackjack} = 5.38$ versus $M_{Razr} = 4.04$; $t(184) = 8.05$, $p < .01$). As we also predicted, those expecting to receive the RAZR perceived the interval until the exchange as shorter ($M_{loss} = 3.97$) than those expecting to receive the Blackjack ($M_{gain} = 4.63$; $t(183) = 2.72$, $p = .007$).

Even more noteworthy, more participants preferred to pay \$1,100 to receive a laptop immediately (versus \$1,000 to receive it in two months) when anticipating an end-of-interval gain ($M_{gain} = 56\%$) rather than loss ($M_{loss} = 41\%$; $\chi^2(1) = 3.86$, $p = .05$; N = 185). Importantly, the perceived length of the time interval mediated this effect of end point valence: When perceived interval length and end point valence were both included as predictors of participants' choices in a logistic regression, the effect of end point valence on willingness to pay the premium was no longer significant (Wald $\chi^2(1) = 2.27$, $p = .13$), but the effect of perceived interval length was significant (Wald $\chi^2(1) = 4.93$, $p < .03$).

Discussion

More participants chose to pay a premium to receive an item immediately, rather than to receive it at the end of a two-month interval, when they were anticipating a gain at the end of that interval rather than a loss. The perceived length of the target interval mediated this effect of end point valence on choice, suggesting that this effect of end point valence arose precisely because the interval actually seemed longer in the gain condition than in the loss condition. Taken together, the findings from Experiments 4 and 5 indicate that whether a person faces a gain or a loss at an interval's

[2]Though unexpected, this interaction does not qualify the study's main conclusions, especially given that the differences in time perception were in the predicted direction under both orders. Order may have had an effect because answering the phone-charger question may have prompted considerations not just of interval length but also of other factors relevant to the charger question (e.g., a person's busyness during the interval). Those factors may have influenced the subsequent length judgment or may have distracted people from the phone's valence, thus weakening the effect of the valence manipulation.

end critically influences consumption decisions for that interval.

GENERAL DISCUSSION

At the outset of this article, we contrasted two possible ways that gains and losses can influence time perception. The wishful-thinking prediction proposed that gains seem nearer than losses, and the looming-losses prediction held that losses seem nearer than gains. Across several experiments, we found convincing evidence for looming losses: Experiment 1 established that intervals preceding losses seem shorter than equivalent intervals preceding gains. Experiment 2 showed that this effect is driven by perceptions of the quality of the interval end point rather than by perceptions of the quality of the interval itself. Experiment 3 investigated why loss-bounded intervals seem shorter than gain-bounded intervals and found parallels between the current effects and loss aversion. Finally, Experiments 4 and 5 replicated these findings in a consumer context while employing managerially important dependent measures and different response scales.

Mechanisms Underlying the Effects

The central finding that losses, which loom larger than gains in decision making, also loom nearer than gains in time may be aptly called "temporal loss aversion." Experiment 3 in particular suggests that a phenomenon paralleling loss aversion emerges in time perception. It is important to consider why this might be: What is it about loss aversion, or about losses and gains more generally, that alters time perception?

Several factors may explain why losses loom nearer than gains. Next, we briefly consider some of these factors, but we do not propose that these processes are mutually exclusive. On the contrary, given the generality and robustness of the observed effects, it is plausible that these processes collectively induce fluctuations in future time perception.

First, the greater subjective size of an end-of-interval loss (versus a similar gain) may make it seem nearer. In support of this possibility, Experiment 3 revealed a significant, negative correlation between perceived interval length and perceived change size. However, perceived change size did not fully account for the time-perception effects observed in Experiment 3; thus, the current effects are likely not solely driven by perceived size. However, it is possible that the greater subjective impact of losses nevertheless plays a substantial role in time perception and that this greater subjective impact manifests in ways other than size. For example, the greater subjective impact of losses also emerges in the intensity of feelings (which are more intense for losses than for gains; McGraw et al. 2009); perhaps events that engender intense feelings seem near (Van Boven, Kane, and McGraw 2009).

Second, in general, losses may attract more attention than gains (Baumeister et al. 2001; Rozin and Royzman 2001; Wright 1991; see also Carmon and Ariely 2000). If so, a loss at the end of an interval may capture more attention than a gain at the end of an equivalent interval; the end point focus induced by losses may lead people to attend less to the intervening interval when evaluating a loss-bounded than when evaluating a gain-bounded interval. The resulting decrease in attention to interval duration in the case of losses may explain why loss-bounded intervals seem shorter than equivalent gain-bounded intervals (Zakay and Block 1996, 1997). We did not directly measure attention to the end point versus the interval, but this attentional account may merit future investigation.

Third, the results may even be compatible with an evolutionary or adaptation perspective (cf. Baumeister et al. 2001; Rozin and Royzman 2001). When danger is imminent, it is likely more adaptive to err in the direction of exaggerating the proximity of the danger because perceiving dangers as temporally near may galvanize necessary coping resources. Although both this account and the attentional account are somewhat speculative, they could explain not only why losses seem nearer than gains but also why unexpected losses loomed nearer than expected negativity in Experiment 3: Unexpected dangers may require a greater galvanization of resources and draw more attention than expected dangers.

In summary, losses loom nearer in time, with parallels to loss aversion. Many factors likely contribute to this effect, and further research that isolates the precise mechanisms underlying these effects would be welcome.

Alternative Explanations

It is possible to rule out certain artifactual explanations for the findings. As we discussed, the results do not seem to arise only because the end point manipulation alters the perceived quality of the interval itself (Experiment 2) or simply because participants are motivated to maximize savoring and minimize dread (Experiment 3).

Experiments 3, 4, and 5 cast doubt on another artifactual explanation: scale reinterpretation. As we noted, if, when rating an interval's apparent length, respondents compare the objective interval length with some sense of how long they want the interval to be, they may rate gain intervals as longer than loss intervals because the same interval may seem longer than desired when it precedes a gain than when it precedes a loss. This account could explain the main effect of interval valence on rated interval length, but the consumption-related results of Experiments 4 and 5 show that the effects of losses and gains on time perception can be detected on response scales that are not susceptible to such interpretations. Furthermore, scale reinterpretation does not easily account for the interaction of interval valence with exchange expectations in Experiment 3. To explain this interaction, the scale reinterpretation account must propose that people think that gains from temporary states should occur somewhat later than gains from permanent states (thus leading temporary states to be rated as relatively near in time) but that losses from temporary states should occur somewhat sooner than losses from permanent states (thus leading temporary states to be rated as relatively far in time). Given that there is no a priori basis for such predictions, scale reinterpretation seems unable to fully account for the findings.

Theoretical and Managerial Relevance

The results have important theoretical and managerial implications. First, the central finding that losses seem nearer than gains suggests another way that "losses loom larger" can be defined: A literal interpretation of the word "loom" seems to hold true. More generally, consistent with the argument that perceptions are attuned to detecting changes relative to some reference point (Kahneman and Tversky 1979), there is another perceptual domain in which losses and gains play a special role: time perception.

Second, temporal loss aversion may partially explain the "sign effect," or the finding that people discount future gains more than future losses: For example, people need to be paid a lot to wait for a reward, but they are unwilling to pay much to delay a fine (Thaler 1981). The results suggest that deferral intervals seem longer for deferred gains than for deferred losses and that this may be why people discount gains (which seem relatively distant) more than losses (which seem relatively near). In particular, Experiment 5 shows how impending gains and losses can alter time perception to influence consumer impatience. Experiment 5 also suggests not only that gains and losses are discounted differently from each other but also that any transaction that occurs at the same time as an irrelevant gain (loss) will be discounted more (less) sharply than it might be otherwise because the co-occurring gain or loss may distort time perception.

From a managerial perspective, the results may have implications both for naturally occurring gains and losses (e.g., paying taxes, receiving refunds) and for events that can be differentially framed either to motivate consumers to act soon or to foster perceptions that there is ample time remaining. For example, the start of the school year can be framed as a gain or a loss to children or parents (e.g., by focusing children on the excitement of the new year or on the loss of free time). Framing the start of school as a loss may paradoxically spur back-to-school shopping because the (negative) start of school should loom relatively near in time. Even more noteworthy, such framing may affect the family's planning for the interim: To the extent that time seems limited because the start of school looms near, the family may decide, for example, that there is not enough time for an end-of-summer vacation.

Note also that such fluctuations in time perception are especially important for firms engaging in advance selling, which occurs when sellers allow buyers to purchase at some time before consumption, such as when consumers buy tickets in advance for entertainment or travel (Shugan and Xie 2000). Advance sellers should take into account possible fluctuations in time perception: Inasmuch as positive events seem more distant than negative ones, event valence may affect consumer willingness to precommit to future consumption.

Suggestions for Further Research

This article opens up many directions for further research. In particular, a negative outcome can be distinguished from a loss, and a positive outcome can be distinguished from a gain. Experiment 3 suggests that true "gains" and "losses" play a special role in time perception because the effects of the very same interval end points were diminished when the exchanges were expected, perhaps because such expected exchanges were not coded as true gains and losses (Novemsky and Kahneman 2005a, b). That being said, we find it plausible that bad or good interval end points may influence time perception even without an explicit reference point relative to which a loss or a gain can be assessed. Indeed, we collected preliminary evidence supporting this contention.

Another avenue for further research involves examining whether past losses loom nearer than past gains. Prior research has mainly investigated the perceived duration of a positive or negative experience (e.g., Thayer and Schiff 1975) rather than perceptions of the time elapsed since a gain or loss. It might be useful to investigate retrospective judgments, in that such judgments might be relatively uncontaminated by certain motivational factors, such as savoring and dread. However, a unique set of motivational factors, such as memory distortion, might accompany retrospective judgments (Taylor 1991). Further research should not only examine whether there is a similar analogue of loss aversion in retrospective time judgments but also explore motivational and perceptual factors unique to perceptions of past intervals.

In conclusion, we find that losses seem more imminent than gains, with consumers perhaps often finding themselves in the unfortunate position of not only ruing an upcoming loss but also perceiving it as happening rather soon. On the positive side, viewing an upcoming loss as near may decrease impatience, reduce procrastination, and foster early attempts at coping. The asymmetry between gains and losses in time perception might even be adaptive. We hope that further research will explore future time perception in general, and temporal loss aversion in particular, to shed light on the psychology of time and on the multitude of consumer decisions involving the future.

REFERENCES

Balcetis, Emily and David Dunning (2006), "See What You Want to See: Motivational Influences on Visual Perception," *Journal of Personality and Social Psychology*, 91 (October), 612–25.

Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Variable in Social Psychology Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173–82.

Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs (2001), "Bad Is Stronger Than Good," *Review of General Psychology*, 5 (December), 323–70.

Bruner, Jerome S. and Cecile C. Goodman (1947), "Value and Need as Organizing Factors in Perception," *Journal of Abnormal and Social Psychology*, 42 (1), 33–44.

——— and Leo Postman (1949), "Perception, Cognition, and Behavior," *Journal of Personality*, 18, 14–31.

Carmon, Ziv and Dan Ariely (2000), "Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers," *Journal of Consumer Research*, 27 (December), 360–70.

Faro, David, France Leclerc, and Reid Hastie (2005), "Perceived Causality as a Cue to Temporal Distance," *Psychological Science*, 16 (September), 673–77.

Fraisse, Paul (1984), "Perception and Estimation of Time," *Annual Review of Psychology*, 35 (February), 1–36.

Harinck, Fieke, Eric Van Dijk, Ilja Van Beest, and Paul Mersmann (2007), "When Gains Loom Larger Than Losses: Reversed Loss Aversion for Small Amounts of Money," *Psychological Science*, 18 (12), 1099–1105.

Ittelson, William H. (1951), "Size as a Cue to Distance: Static Localization," *American Journal of Psychology*, 64 (January), 54–67.

Kahneman, Daniel and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47 (March), 263–91.

——— and ——— (1984), "Choices, Values, and Frames," *American Psychologist*, 39 (4), 341–50.

Kermer, Deborah A., Erin Driver-Linn, Timothy D. Wilson, and Daniel T. Gilbert (2006), "Loss Aversion Is an Affective Forecasting Error," *Psychological Science*, 17 (8), 649–53.

Kunda, Ziva (1990), "The Case for Motivated Reasoning," *Psychological Bulletin*, 108 (November), 480–98.

LeBoeuf, Robyn A. (2006), "Discount Rates for Time Versus Dates: The Sensitivity of Discounting to Time-Interval Description," *Journal of Marketing Research*, 43 (February), 59–72.

Loewenstein, George (1987), "Anticipation and the Value of Delayed Consumption," *The Economic Journal*, 97 (September), 666–84.

———, Daniel Read, and Roy F. Baumeister, eds. (2003), *Time and Decision*. New York: Russell Sage Foundation.

McGraw, Peter, Jeff T. Larsen, Daniel Kahneman, and David Schkade (2009), "Do Bipolar Scales Mask Loss Aversion?" working paper, Leeds School of Business, University of Colorado at Boulder.

Morwitz, Vicki G. (1997), "It Seems Like Only Yesterday: The Nature and Consequences of Telescoping Errors in Marketing Research," *Journal of Consumer Psychology*, 6 (January), 1–29.

Novemsky, Nathan and Daniel Kahneman (2005a), "The Boundaries of Loss Aversion," *Journal of Marketing Research*, 42 (May), 119–28.

——— and ——— (2005b), "How Do Intentions Affect Loss Aversion?" *Journal of Marketing Research*, 42 (May), 139–40.

Okada, Erica (2001), "Trade-Ins, Mental Accounting, and Product Replacement Decisions," *Journal of Consumer Research*, 27 (March), 433–46.

Putler, Daniel (1992), "Incorporating Reference Price Effects into a Theory of Consumer Choice," *Marketing Science*, 11 (Summer), 287–309.

Rozin, Paul and Edward B. Royzman (2001), "Negativity Bias, Negativity Dominance, and Contagion," *Personality and Social Psychology Review*, 5 (November), 296–320.

Shugan, Steve M. and Jinhong Xie (2000), "Advance Pricing of Services and Other Implications of Separating Purchase and Consumption," *Journal of Service Research*, 2 (February), 227–39.

Taylor, Shelley E. (1991), "Asymmetrical Effects of Positive and Negative Events: The Mobilization-Minimization Hypothesis," *Psychological Bulletin*, 110 (July), 67–85.

Thaler, Richard H. (1981), "Some Empirical Evidence on Dynamic Inconsistency," *Economic Letters*, 8 (3), 201–207.

Thayer, Stephen and William Schiff (1975), "Eye-Contact, Facial Expression, and the Experience of Time," *Journal of Social Psychology*, 95 (February), 117–24.

Tversky, Amos and Daniel Kahneman (1991), "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *Quarterly Journal of Economics*, 106 (November), 1039–1061.

Van Boven, Leaf, Joanne Kane, and Peter A. McGraw (2009), "Feeling Close: The Emotional Nature of Psychological Distance," working paper, Department of Psychology and Neuroscience, University of Colorado at Boulder.

Vohs, Kathleen D. and Brandon J. Schmeichel (2003), "Self-Regulation and the Extended Now: Controlling the Self Alters the Subjective Experience of Time," *Journal of Personality and Social Psychology*, 85 (August), 217–30.

Wright, Beatrice A. (1991), "Labeling: The Need for Greater Person-Environment Individuation," in *Handbook of Social and Clinical Psychology: The Health Perspective*, C. Rick Snyder and Donelson R. Forsyth, eds. Elmsford, NY: Pergamon, 469–87.

Zakay, Dan and Richard A. Block (1996), "The Role of Attention in Time Estimation Processes," in *Time, Internal Clocks and Movement*, M.A. Pastor and J. Artieda, eds. Amsterdam: Elsevier, North-Holland, 143–64.

——— and ——— (1997), "Temporal Cognition," *Current Directions in Psychological Science*, 6 (February), 12–16.

Zauberman, Gal, B. Kyu Kim, Selin A. Malkoc, and James R. Bettman (2009), "Discounting Time and Time Discounting: Subjective Time Perception and Intertemporal Preferences," *Journal of Marketing Research*, 46 (August), 543–56.