

# Reconciling Loss Aversion and Gain Seeking in Judged Emotions

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Barbara A. Mellers<sup>1,2</sup> , Siyuan Yin<sup>2</sup>, and Jonathan Z. Berman<sup>3</sup>

<sup>1</sup>Department of Psychology, University of Pennsylvania; <sup>2</sup>Department of Marketing, The Wharton School, University of Pennsylvania; and <sup>3</sup>Department of Marketing, London Business School

## Abstract

Is the pain of a loss greater in magnitude than the pleasure of a comparable gain? Studies that compare positive feelings about a gain with negative feelings about a comparable loss have found mixed answers to this question. The pain of a loss can be greater than, less than, or equal to the pleasure of a comparable gain. We offer a new approach to test hedonic loss aversion. This method uses emotional reactions to the reference point, a positive change, and a negative change. When we manipulated the reference point (i.e., pleasurable and painful), two distinct patterns emerged. Pain surpassed pleasure (loss aversion) when the reference point was positive, and pleasure exceeded pain (gain seeking) when the reference point was negative. A reference-dependent version of prospect theory accounts for the results. If the carriers of utility are changes from a reference point—not necessarily the status quo—both loss aversion and gain seeking are predicted. Loss aversion and gain seeking can be reconciled if you take the starting point into account.

## Keywords

emotions, feelings, loss aversion, gain seeking, prospect theory

Loss aversion is a fundamental principle in psychology and economics that Kahneman and Tversky (1979) proposed to describe human choices. They assumed the reference point was the status quo, and from there, they proposed that the disutility of a loss was greater in magnitude than the utility of a comparable gain. Loss aversion is illustrated in Figure 1. The utilities associated with equivalent-sized gains and losses differ; losses have greater impact than comparable gains.

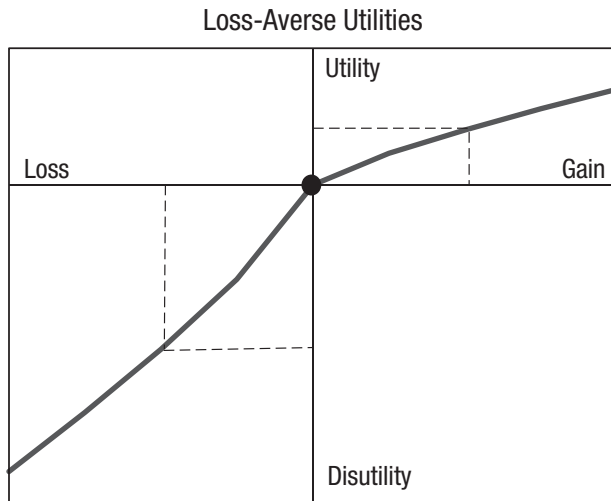
Loss aversion captures many observations about human choices. For example, it explains why consumers are more sensitive to price increases than to price decreases (Hardie et al., 1993) and why investors hold on to stocks that have decreased in value and sell those that have increased. Shefrin and Statman (1985) wrote that when people buy a stock, they open a mental account. If the stock goes up, people encode it as a gain, so they are willing to sell it. But if the stock goes down, it is not counted as a loss until the stock is sold and the account is closed. Hence, losers are kept, and winners are sold. Numerous laboratory studies have identified empirical violations of prospect theory (Birnbau, 2008; Erev et al., 2008; Harinck et al., 2007),

but it still remains the dominant descriptive account of human choice.

Loss aversion is also a claim about emotions. Kahneman and Tversky (1979) wrote, “The aggravation that one experiences in losing a sum of money appears to be greater than the pleasure associated with gaining the same amount” (p. 279). Loss aversion implies that if people rate the pleasure of gains and the pain of comparable losses, the pain of losses should exceed the pleasure of gains. Researchers have tested this conjecture with bipolar ratings on unidimensional scales (e.g., –5 to 5) labeled from pain to pleasure. Some studies have supported loss aversion (Baumeister et al., 2001; Rozin & Royzman, 2001). But others have shown no differences between the magnitudes of pleasure and pain (Charpentier et al., 2016; Mellers, 2000), and still others have demonstrated that the pleasure of gains can even exceed the pain of comparable losses (Mellers &

## Corresponding Author:

Barbara A. Mellers, Department of Psychology and Department of Marketing, The Wharton School, University of Pennsylvania  
 E-mail: [mellers@wharton.upenn.edu](mailto:mellers@wharton.upenn.edu)



**Fig. 1.** Prospect theory's utility function with the reference point at the origin (the status quo). Utility varies along the  $y$ -axis, and monetary amounts vary along the  $x$ -axis. Loss aversion implies that the slope of the utilities is steeper in the loss domain than the gain domain, as highlighted by the dashed lines.

Ritov, 2010; Peters et al., 2003). What explains these inconsistencies?

McGraw et al. (2010) offered a solution. In typical studies, participants evaluate their feelings about gains and losses using bipolar rating scales that measure emotions. With these scales, gains and losses are not compared directly. So people assess the strength of a gain relative to other gains and the strength of a loss relative to other losses. But when people are given a scale of intensity and asked which is more intense, they must make the comparison.<sup>1</sup> McGraw et al. showed what happens with bipolar scales by asking participants to consider playing a fair 50/50 gamble with \$200 stakes. Participants judged the pleasure of winning \$200 and the pain of losing \$200 on a rating scale. The judgments of pleasure and pain were virtually identical, which is inconsistent with loss aversion. Then, McGraw et al. asked participants to compare the intensity of their feelings associated with winning \$200 and losing \$200. Which feelings were more intense? The majority said the loss would feel more intense than the gain. McGraw et al. argued that intensity comparisons were superior to bipolar ratings because they predicted participants' decisions of whether to accept or reject the gamble.

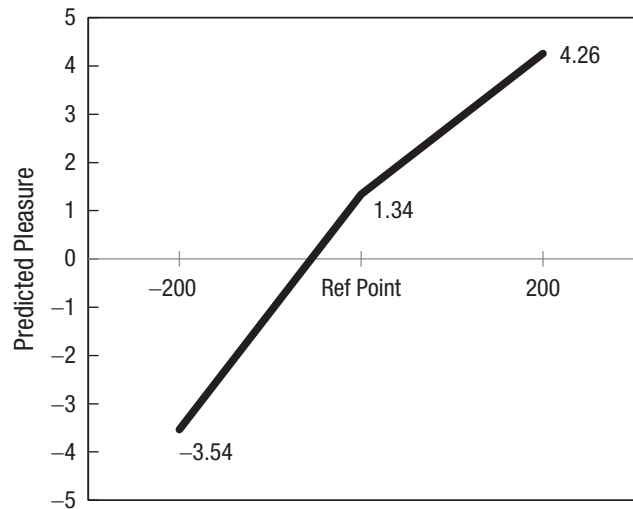
We provide an alternative explanation. In previous studies, researchers often failed to measure feelings about the reference point. Instead, they assumed those feelings were zero. But loss aversion requires a comparison of changes in feelings relative to the reference point. To illustrate this process, Berman and Mellers (2014) asked participants to rate their current affective

state on a scale from  $-5$  (*extremely bad*) to  $+5$  (*extremely good*).<sup>2</sup> Participants then imagined they were playing a fair 50/50 gamble with \$200 stakes. They rated their anticipated emotions if they won or lost \$200. Berman and Mellers found that only 17% of the 151 participants rated their affective state as 0. The average rating of participants' affective state prior to considering the gamble was 1.34, mildly positive, as shown in Figure 2.

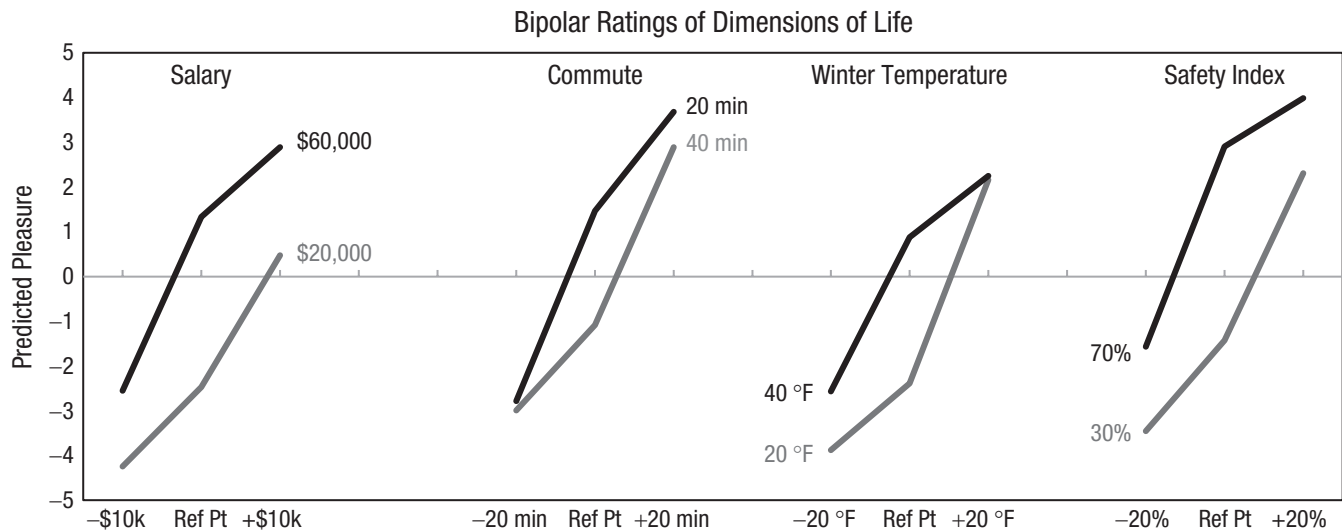
Why does this matter? When Berman and Mellers (2014) computed the difference between feelings about winning \$200 and feelings before the gamble ( $4.26 - 1.34 = 2.92$ ) and compared that with the difference between feelings before the gamble and feelings about losing \$200 ( $1.34 - (-3.54) = 4.88$ ), results were consistent with loss aversion. The negative change ( $-4.88$ ) was significantly greater in magnitude than the positive change (2.92). If Berman and Mellers had assumed that participants' initial affective state was 0, they would have compared 4.26 with  $-3.54$  and concluded that the results were consistent with gain seeking. That is, the pleasure of the gain would have been stronger than the pain of a comparable loss. But because feelings about the reference point were mildly positive, differences were consistent with loss aversion.

## Manipulating Reference Points

Together with Yin, we next explored loss aversion with easily quantified dimensions of life. We asked participants



**Fig. 2.** The relative effect of feelings about gains versus losses when compared with emotions about the reference point ("Ref Point"). The graph shows participants' average rating of their affective state before considering a 50/50 gamble with \$200 stakes and their imagined feelings after winning \$200 and after losing \$200 (Berman & Mellers, 2014). The change in feelings from the reference point to the loss is greater in magnitude than the change in feelings from the reference point to the gain.



**Fig. 3.** Feelings about changes in salary, commute time, average winter temperature, and city safety index (from left to right). The upper black lines reflect judgments when the reference point (“Ref Pt”) was pleasurable, and the lower gray lines represent judgments when the reference point was painful. Results obtained with pleasurable reference points show loss aversion, and those obtained with painful reference points show gain seeking.

to assume a particular status quo in their lives, which was a reference point for a salary, a commute time, an average winter temperature, and a city safety index. A city’s safety index refers to the percentage of U.S. cities that are less safe, so larger percentages are better. For each dimension, participants evaluated how they felt about the reference point and how they anticipated feeling about changes from the status quo. One item read,

Imagine that, due to circumstances out of your control, you must move. Suppose that in the new city, your commute time is 20 minutes longer than your current commute. How would you feel? Suppose that in the new city, your commute is 20 minutes shorter. How would you feel?

Reference points were manipulated in a between-subjects design, so participants saw only one reference point per dimension. This way, we could learn whether the valence of affective state associated with the reference point would influence the relative impact of gains and losses. For example, some participants were asked to assume their current commute took 20 min, which we anticipated would be evaluated positively. Others were told their current commute was 40 min, which we anticipated would be evaluated negatively.

Figure 3 shows that when the reference point was positive (\$60,000 salary, 20-min commute, average winter temperature of 40 °F, and 70% safety index), judged feelings showed loss aversion. The difference between

the reference point (middle points in the upper black lines) and a negative change (lowest points) was greater in magnitude than the difference between the reference point and a positive change (uppermost points; also see Table 1).

When the reference point was negative (\$20,000 salary, 40-min commute, average winter temperature of 20 °F, and 30% city safety index), judged feelings showed gain seeking. The difference between a positive change and the reference point exceeded the difference between a negative change and the reference point (see also Table 1).

In sum, by manipulating reference points, we learned that loss aversion and gain seeking could be reconciled. If the reference point was pleasurable, negative changes from the reference point had a greater impact than comparable positive ones, an indication of loss aversion. If the reference point was painful, positive changes from the reference point had a greater impact than comparable negative ones, consistent with gain seeking. Could the results have been due to ceiling and floor effects? It seems unlikely that participants were constrained by the response scale because the average ratings were not at the endpoints of the scale, which means that participants could have expressed stronger emotions if they had wished.

What would have happened if we had used intensity comparisons? To find out, we had two new groups of participants compare the relative intensities of gains and losses. For example, participants were asked the following question:

**Table 1.** Intensity Comparisons and Bipolar Ratings in the Study Examining Feelings About Life Dimensions

Reference point and change	Intensity comparisons		Bipolar ratings			
	Participants reporting losses as more intense than gains (%)	Direction	Loss	Reference point	Gain	Direction
Positive reference points						
\$60,000 salary ( $\pm$ \$10,000)	75	LA*	-2.55	1.33	2.89	LA*
20-min commute ( $\pm$ 20 min)	58	LA*	-2.78	1.46	3.68	LA*
Average winter temperature = 40 °F ( $\pm$ 20 °F)	63	LA*	-2.57	0.88	2.25	LA*
City safety index (70%) ( $\pm$ 20%)	72	LA*	-1.57	2.97	3.98	LA*
Negative reference points						
\$20,000 salary ( $\pm$ \$10,000)	63	LA*	-3.88	-2.39	2.16	GS*
40-min commute ( $\pm$ 20 min)	82	LA*	-3.45	-1.43	2.31	GS*
Average winter temperature = 10 °F ( $\pm$ 20 °F)	81	LA*	-4.25	-2.45	0.47	GS*
City safety index (30%) ( $\pm$ 20%)	59	LA*	-3.99	-1.08	2.89	GS*

Note: The "Direction" columns indicate the direction of change with greater magnitude in the intensity comparisons and the direction of greater change from the reference point with bipolar ratings. LA = loss aversion; GS = gain seeking.

\* $p < .05$ .

Assume you live in a city with an average winter temperature of 40 F. Imagine that, due to reasons out of your control, you must move. Consider two situations: (1) In the new city, the average winter temperature is 20 F colder; (2) In the new city, the average winter temperature is 20 F warmer. In which situation would your emotions be stronger?<sup>3</sup>

Table 1 shows that with intensity comparisons, participants said that negative changes would have greater impact than positive ones, regardless of the sign of the emotions associated with the reference point. Table 1 summarizes the direction of greater intensity for all reference points, and asterisks mean that intensities were significantly different. In sum, intensity comparisons revealed a new pattern. Participants displayed loss aversion with both positive and negative reference points.

Table 1 also presents bipolar ratings (from Fig. 3) for comparison with intensities. Bipolar ratings are also summarized in terms of the direction of greater emotions relative to the reference point, and asterisks show the statistical significance. Bipolar ratings depended on the starting point. When judged feelings about the reference point were positive, participants were loss averse. When judged feelings about the reference point were painful, participants were gain seeking.

### An Explanation for Loss Aversion and Gain Seeking

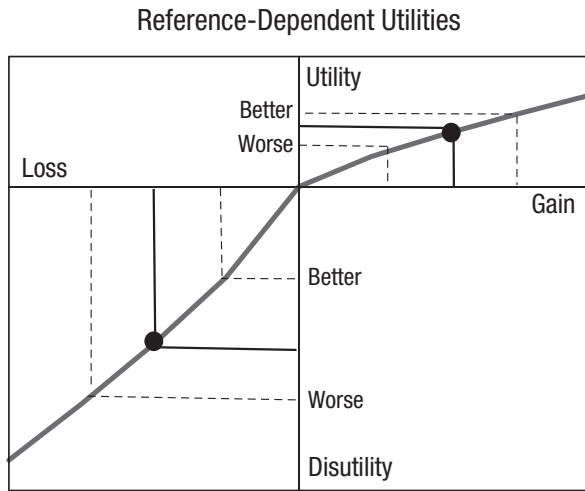
Although we do not have a theoretical account of intensity comparisons, we can explain the loss aversion and

gain seeking in bipolar ratings with a reference-dependent version of prospect theory.<sup>4</sup> Prospect theory asserts that losses have greater impact than equivalent gains when evaluated relative to the status quo (Fig. 1). Suppose that the carriers of utility were changes from any salient reference point. Figure 4 illustrates this reference-dependent theory. The  $x$ -axis is monetary amounts, and the  $y$ -axis shows utilities. When the reference point is in the gain domain (upper right), the theory predicts loss aversion. The distance between the loss and the reference point is greater than the distance between the gain and the reference point. But if the reference point is in the loss domain (lower left), the theory predicts gain seeking. The distance between the gain and the reference point exceeds the distance between the loss and the reference point. By this account, loss aversion and gain seeking can both occur if the reference point is permitted to deviate from the status quo.

Kahneman and Tversky (1979) noted that changes in the reference point could affect choices. For example, people might find themselves at the racetrack and down by \$100. If they have not made peace with their losses, they might be risk seeking. The pleasure of winning back the \$100 might be stronger than the pain of losing another \$100, which would be consistent with gain seeking.

### Expectations as Reference Points

Reference points can be expectations, personal goals, and aspiration levels. Do the same patterns emerge with these reference points? To find out, we used a similar design but examined different types of reference points.



**Fig. 4.** A modified version of prospect theory’s utility function with utility on the *y*-axis and monetary change along the *x*-axis. Black dots are positive and negative reference points. Dotted lines showing gains and losses of equal magnitudes from the reference point are projected on the *y*-axis to represent changes in utilities. When the reference point is positive, loss aversion is predicted. When the reference point is negative, gain seeking emerges.

We used expectations about academic grades and personal goals with exercises. For example, one grade question said,

Imagine you are a student taking a challenging course. You just took the final exam and you are expecting to get a B in the course. How do you feel about it? Suppose that, instead of a B, you receive an A. How would you feel? Now suppose that, instead of a B, you receive a C. How would you feel?

Another grade question told different participants to imagine that they expected a D, asked how they would feel about it, and then asked how they would feel about grades of C and F. Personal goals were about exercising, specifically, completing seven or 27 sit-ups. Outcomes were five more sit-ups and five fewer sit-ups for each personal goal.

We soon learned that participants differed greatly in their feelings about grade expectations and exercise goals. For instance, most participants felt that a grade of B was positive (89%), a few felt it was neutral (3%), and some felt it was negative (8%). Therefore, we sorted participants according to the sign of their feelings about the reference point. Table 2 shows the percentages of participants who reported positive, neutral, and negative feelings for expected grades and exercises.

Figure 5 shows predicted feelings about possible outcomes for participants with positive and negative

feelings about the reference point. For simplicity, we excluded participants with neutral feelings. When the reference point was pleasurable, loss aversion occurred. When the reference point was painful, gain seeking emerged. In sum, patterns of loss aversion and gain seeking were similar when reference points were the status quo (Fig. 3), expectations (Fig. 5), and personal goals (Fig. 5).

### Emotions in Markets

Next, we used our approach to measuring loss aversion in a behavioral-economics context. The endowment effect is the classic finding that selling prices are often higher than buying prices for a good, even in a laboratory, although economic theory predicts that they should be identical (Kahneman et al., 1991). In endowment studies, researchers conduct experimental markets and randomly assign participants to the role of buyer or seller. Sellers are given a good, and buyers are allowed to purchase it. Sellers set their selling prices, and buyers decide their buying prices. According to economic theory, when people are randomly assigned to the roles of buyers and sellers, buying and selling prices should be equal on average. But selling prices are consistently higher than buying prices.

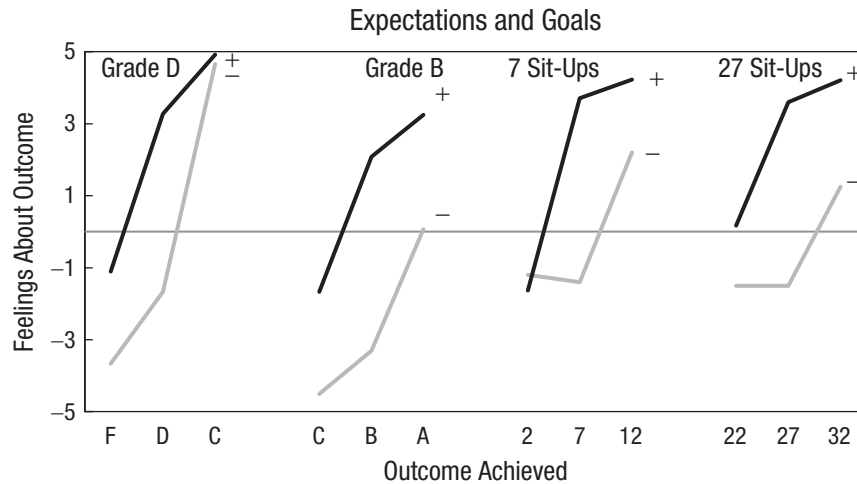
Kahneman et al. (1991) suggested that sellers view the exchange as a loss, and buyers view it as a gain. Sellers demand more than buyers are willing to pay because sellers anticipate the pain of a loss and buyers anticipate the pleasure of a gain. Several other accounts have been proposed, including accounts based on information processing (Carmon & Ariely, 2000; Johnson et al., 2007), contextual effects (Walasek & Stewart, 2015), inertia (Gal, 2006), and reference prices (Weaver & Frederick, 2012).

Weaver and Frederick (2012) suggested that prices depend not just on how much buyers and sellers value the good, but also on the reference price (or a salient price of the good). For example, suppose buyers and

**Table 2.** Percentage of Participants Who Felt Positive, Neutral, or Negative About Achieving Expected Outcomes

Expected outcome	Positive feelings	Neutral feelings	Negative feelings
Course grade			
B grade	89	3	8
D grade	11	8	81
Exercise			
27 sit-ups	94	2	4
7 sit-ups	86	10	4





**Fig. 5.** Feelings about outcomes when reference points are expectations and personal goals. From left to right, results are shown for grades and exercises. The upper black lines are judgments of participants who said that the reference point was pleasurable (+), and the lower gray lines show judgments of participants who reported that the reference point was painful (-). Participants who said that the reference point was pleasurable showed loss aversion, and those who said it was painful showed gain seeking.

sellers value a good at \$3. In one market, the reference price is \$1, and in another, it is \$5. In the market with a \$1 reference price, buyers will not pay \$3 because \$3 would be a bad deal. Selling prices will be higher than buying prices. In the market with a \$5 reference price, sellers will demand more than \$3 to part with their goods because \$3 would be a bad deal. Again, selling prices will be higher than buying prices.

We conducted three experimental markets, one with a fixed reference price and two with manipulated reference prices, and measured participants' prices and emotions about exchanges. Participants were randomly assigned to the role of buyer or seller. Sellers were given a good, and buyers could purchase one. In one market, the good was a bag of Lindt candy, and participants were told its actual cost of \$4.95. In the other markets, the good was a package of gel pens costing \$11.99, but participants were told the price was either \$5.95 or \$19.95. Sellers reported minimum selling prices, and buyers stated maximum buying prices. Both groups judged their feelings about an exchange at their offered price, three better prices, and three worse prices. Then we set the market price and conducted exchanges.<sup>5</sup> Table 3 shows that selling prices were markedly higher than buying prices. Moreover, buying and selling prices in the pens markets varied with the reference price, as predicted by reference-price theory (Weaver & Frederick, 2012).

How did people feel about exchanges in the markets? Figure 6 displays buyers' and sellers' feelings when the prices they offered were their reference

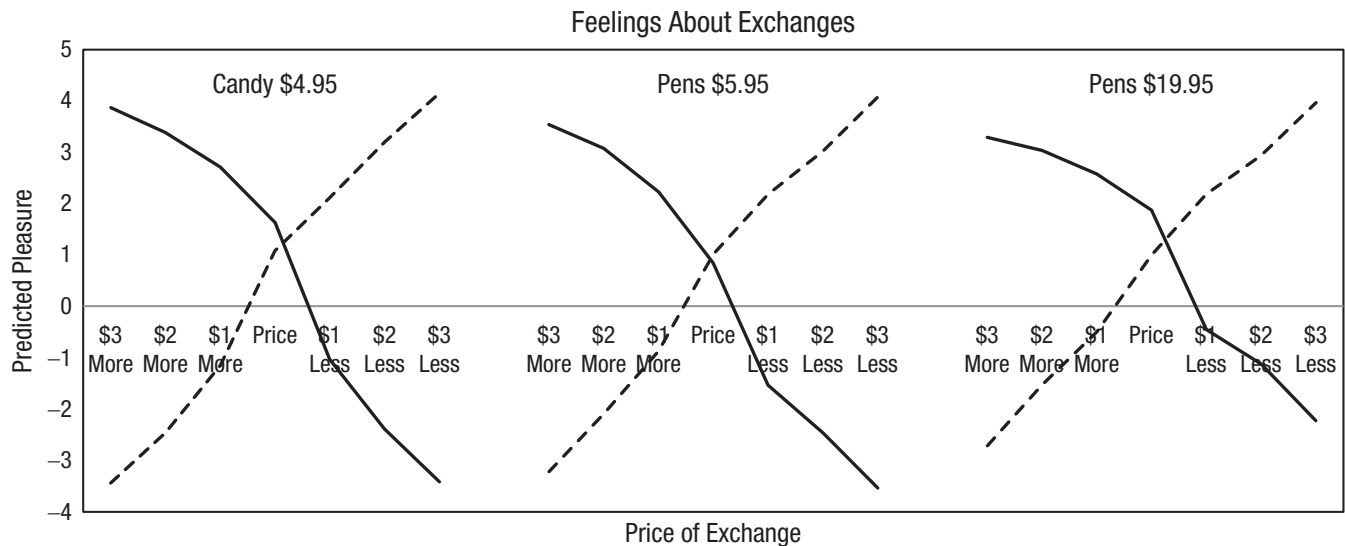
points (i.e., buying and selling prices). Feelings about exchanges at offered prices appear where the lines cross. In the candy market with a fixed reference price (left graph), both groups felt positive about a trade at the offered prices. More important, the lines showing buyers' and sellers' feelings have significant kinks at the reference points; the pain of a worse price was greater in magnitude than the pleasure of a better price.

The middle and right graphs in Figure 6 show results of markets for pens with manipulated reference prices. Again, buyers and sellers felt pleasure about making an exchange at their offered prices, and both groups showed loss aversion. Slopes of the lines are significantly greater below the reference point than above it.

Sellers displayed loss aversion in all markets, and buyers showed loss aversion in all but the \$19.95 market for pens. The reference-dependent version of prospect theory describes the feelings of buyers and sellers in these experimental markets. Buyers and sellers have positive reference points, and changes from those points reveal loss aversion. Once again, if we had assumed that reference points were 0 on the rating

**Table 3.** Average Buying and Selling Prices in Three Markets With Reference Prices

Market	Buying price	Selling price
Candy, reference price = \$4.95	\$3.99	\$5.71
Pens, reference price = \$5.95	\$4.57	\$6.20
Pens, reference price = \$19.95	\$6.22	\$14.98



**Fig. 6.** Bipolar ratings about exchanges in the candy and pen markets. Solid lines show prices offered by sellers, and dashed lines show prices offered by buyers. Both groups felt greater pain about bad deals than pleasure about comparable good deals.

scale, buyers and sellers would appear to have been gain seeking. They would appear to have anticipated greater pleasure from a good deal than pain from a bad deal. Given the mildly positive feelings about the reference points, results are consistent with loss aversion.

## Discussion

We see no reason to throw out bipolar ratings with the bath water. When used appropriately, they can determine whether the pain of a loss surpasses the pleasure of an equivalent gain relative to the reference point. The key is to measure feelings about the reference point. People are typically loss averse when reference points are pleasurable and gain seeking when reference points are painful. A reference-dependent version of prospect theory that allows the carriers of utility to be changes from *any* salient reference point predicts both patterns, regardless of whether reference points are the status quo, expectations, personal goals, or even buying and selling prices in experimental markets.

Pleasure and pain are likely shaped by natural selection. Some researchers have argued that loss aversion makes evolutionary sense if survival depends on avoiding negative experiences (McDermott et al. 2008; Zamir, 2015). When reference points are positive, people are loss averse and might seek safety and protection. Why take risks if resources are sufficient? When reference points are negative, people are gain seeking and may feel the need to take bigger chances. Greater risks could be required if resources are insufficient. Such asymmetries are likely to drive prevention and promotion (Higgins, 1997). Both pleasure and pain can

promote survival and fitness; it all depends on where you start.

## Recommended Reading

- Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). (See References). A discussion of how three well-known phenomena, the endowment effect, loss aversion, and the status quo bias, pose problems for standard economic theory and what they mean about human nature.
- McDermott, R., Fowler, J. H., & Smirnov, O. (2008). (See References). A consideration of the evolutionary benefits of prospect theory's assumptions.
- Mellers, B. A. (2000). (See References). A historical account of the role of emotions in normative and descriptive theories of human choice.

## Transparency

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*Declaration of Conflicting Interests*

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## ORCID iD

Barbara A. Mellers  <https://orcid.org/0000-0001-9869-5880>

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## Notes

1. McGraw et al. said that people could express how much more intense one outcome was than the other. They used 3-point and 9-point rating scales of relative intensity. For simplicity, we used a binary response in our research reported here.
2. In studies with bipolar ratings reported here, we used the same response scale from  $-5$  (*extremely bad*) to  $5$  (*extremely good*).
3. Participants made intensity comparisons using a forced-choice method with two responses. McGraw et al. (2010) allowed indifference as a third response option.
4. A related theory was proposed by Kőszegi and Rabin (2006).
5. We set the market price by drawing the supply and demand curves for participants and showed them where the curves intersected. In the \$5.95 pen market, 47 of the 120 buyer-seller pairs made exchanges. In the \$19.95 pen market, 23 of the 70 pairs made exchanges. And in the \$4.95 candy market, 27 of the 62 pairs made exchanges. Thus, in all markets, fewer than 50% of pairs made exchanges.

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