LOSS AVERSION AND THE GAIN/LOSS COMPARISON HYPOTHESIS

By Sean P. Conway

Loss aversion is a psychological construct, which posits that monetary losses affect behavior to a disproportionate degree when compared to monetary gains of equal value. However, recently researchers have suggested that loss aversion may not be as universal as psychologists once thought (Erev, Ert, & Yechiam, 2008; Ert & Erev, 2013; Gal, 2006; Gal & Rucker, 2018; Yechiam, 2018). McGraw, Larsen, Kahneman, and Schkade (2010) proposed that a psychological comparison of losses and gains on a common scale is behind loss aversion. While they present evidence that they claim supports this hypothesis, methodological flaws in their study make this a tenuous conclusion (notably the use of scales with unequal numbers of points as well as a confounding of the independent and dependent variable).

The present study attempted to correct these methodological flaws and test McGraw et al.'s (2010) gain/loss comparison hypothesis, with the independent variable (comparison between gains and losses) placed in the framing of the question. That is, the study asked participants two questions each about a series of 50-50 hypothetical gambles (for values of $1, $5, $50, and $200), one question about the effect that a loss would have on them and the other question about the effect that a gain would have on them. However, participants were randomly assigned to respond to a question about the effect of a loss (gain) of $*x* knowing that there is also a possibility that they could gain (lose) $*x*, or to a question with only the relevant gain (loss) mentioned.

This study hypothesized that participants who compare gains and losses would show both loss aversion and reversed loss aversion (gains having a greater impact than losses) (Harinck, Van Beest, Van Dijk, & Van Zeeland, 2007), while participants in the non-comparison condition would show indifference across gambles.

These results suggest that while magnitude and condition both influenced affective judgments, the predicted interaction between the two variables did not occur. Participants in the comparison condition displayed a trend towards loss aversion, while participants in the non-comparison condition displayed a slight trend towards reversed loss aversion. Future research should consider pilot testing questions to ensure understanding by participants as well as test this framing manipulation in a decision-making context (as opposed to an affective judgment)

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Chapter I

Introduction

Loss aversion is the psychological construct proposing that humans view monetary losses as having a greater impact on behavior than do gains of equal absolute value (Kahneman & Tversky, 1984). The present study examines a potential psychological mechanism behind loss aversion while also attempting to clarify a methodologically problematic study from recent literature (McGraw, Larsen, Kahneman, & Schkade, 2010).

McGraw et al. (2010) conducted several studies examining loss aversion by asking participants to give their judged feelings about hypothetical events. That is, rather than asking participants to make hypothetical *decisions* about events, they instead asked participants to make judgments about how they would *feel*, given a hypothetical scenario. This is notable because most loss aversion research involves decisions, whether real or hypothetical, rather than judgments. In McGraw et al.'s (2010) Study 1a, all participants were instructed to imagine that they were playing a single gamble, with a 50-50 chance to gain or lose $200. However, they were randomly assigned to respond on either a bipolar scale, a unipolar intensity scale, or a three-point relative intensity scale (see Figure 1 for all scales used). The scale to which they were assigned also determined the questions to which they responded. Those assigned to the bipolar scale responded to two questions- one question asking them to indicate the effect that winning $200 would have on their feelings, and the other question asking them to indicate the effect that losing $200 would

have on their feelings (note that the order was counterbalanced). The bipolar scale had two opposite poles, with negative and positive effects occurring on the left and right ends of the scale, respectively. Those assigned to the unipolar scale also responded to two questions - one question asking them to indicate the effect that winning $200 would have on their feelings, the other question asking them to indicate the effect that losing $200 would have on their feelings. Note that the order was again counterbalanced. The unipolar scale had one pole, with all effects judged on the same side (the right side). However, those assigned to the relative intensity scale responded to only one question-a question asking them to indicate which event, a gain of $200 or a loss of $200, would have a greater effect on their feelings. The relative intensity scale required only one judgment (as opposed to the unipolar and bipolar scales, which each required two judgments). Note that when responding on the relative intensity scale, the left and right event side would each have either a gain or loss of $200. The placing of these events was counterbalanced across participants. In addition, while the relative intensity scale did have two opposite poles, these poles were based on comparisons of gains and losses, not on the positive and negative feelings shown on the bipolar scale. Results showed that participants viewed the loss as having greater intensity than the gain when responding on the unipolar intensity scale and the relative intensity scale, but not on the bipolar scale. The researchers then created a categorical variable by coding responses into either “loss > gain” (individuals that judged the effect of the loss to be *greater* than the effect of the gain, i.e. *loss aversion*), “loss = gain” (individuals that judged the effect of the loss to be *equal* to the effects of the gain, i.e. *indifference*) or “loss < gain” (individuals that judged

the effect of the loss to be *less* than the effect of the gain). McGraw et al. (2010) found *no loss aversion* in the bipolar scale condition, meaning there were no differences in the frequencies with which participants were classified into the three categories ("loss > gain", "loss = gain", "loss < gain"). Among participants in the unipolar condition, they found that significantly more participants were classified as loss averse (54%) compared to those classified as showing reversed loss aversion (11%). Among participants in the relative intensity scale condition, 80% of participants were classified as loss averse compared to only 6% classified as reversed loss averse. All tests were conducted using the non-parametric sign test. The results suggested to the researchers that the relative intensity scale created psychological comparisons of gains and losses, leading to loss aversion.

In a follow-up experiment (Study 1b), McGraw et al. (2010) decided to test whether or not the absence of the comparison of gains and losses would affect the presence of loss aversion. Participants were all presented with the aforementioned hypothetical 50-50 gamble for $200. They were then randomly assigned either to indicate the effect that a gain of $200 would have on their feelings or to indicate the effect that a loss of $200 would have on their feelings. All participants responded on the unipolar scale from McGraw et al.'s (2010) Experiment 1a (see Figure 1). The researchers failed to find loss aversion - that is, the mean absolute value of the intensity of the effect that participants in the loss condition anticipated was not significantly different from the mean absolute value of the effect that those participants in the gain condition anticipated. This

again suggested to the researchers that eliminating comparisons also eliminated loss aversion.

The researchers then conducted a third experiment, Study 2, where participants were presented with a hypothetical 50-50 gamble for $50. They had to assess the effect of a gain or loss of $50 on their feelings using either the bipolar scale or the relative intensity scale (scales and methods remained the same as in previous experiments). Participants were also asked to make a choice regarding the gamble. That is, they were asked to indicate if they would actually play this (hypothetical) gamble. This was done to include a decision-making component in the research, as most work involving loss aversion incorporates decisions rather than affective judgments. McGraw et al. (2010) found that there were significantly more loss averse participants in the relative intensity scale condition compared to the unipolar intensity scale condition. The results showed that, among individuals in the bipolar scale condition, participants were equally did not differ on their willingness to accept the gamble based on whether or not they displayed loss aversion in their affective judgments. However, individuals in the relative intensity condition who rejected the gamble were far more likely to have loss averse judgments than to have viewed the gains and losses as equal in effect or to have viewed the effect of the gain as greater than the effect of the loss. Thus, according to McGraw et al. (2010), the comparisons created by the relative intensity scale elicited loss averse decisions as well as judgments. The researchers did conduct a fourth study, using similar methods (McGraw et al., 2010, Study 3) which purported to show that a similar asymmetry in positive and negative emotional images, using the bipolar and relative intensity scales.

However, this will be not discussed in further detail, as the question of interest for the present study is about monetary judgments, not judgments of the emotions elicited by images.

The results suggested to the researchers that loss aversion comes from the psychological comparison of losses and gains, which they claimed the bipolar scale fails to capture, as it places gains and losses on separate poles. McGraw et al. (2010) argued that placing the two valences (i.e., good and bad) on opposite sides creates difficulty in eliciting loss aversion through forcing participants to consider each gain or loss in isolation. They claimed that while people appear to be loss averse in decision-making, judgments made using a bipolar scale do not show loss aversion because gains and losses are considered separately, rather than compared to one another. According to McGraw et al. (2010), the unipolar scale, which puts losses and gains in common scale units, and the relative intensity scale, which explicitly encourages comparisons between losses and gains, are able to elicit loss aversion.

However, McGraw et al.'s (2010) methods had several limitations. First, in all three studies, scale type was used as both the independent and dependent variable. That is, participants were randomly assigned to a type of scale (unipolar, bipolar, or relative intensity) and this scale was also to be their mode of response. Such a choice could make results difficult to interpret, with mode of response confounded between conditions. Another concern is that participants in the bipolar scale condition and unipolar condition made two responses while participants in the relative intensity scale condition only made one. Furthermore, none of the three scales used in McGraw et al.'s (2010) studies had

equal numbers of scale points - the bipolar scale had nine points, the unipolar scale had five, while the relative intensity scale had three points. Aside from issues regarding the inequality of scale points across conditions, previous research has shown that Likert scales utilizing three scale points create unreliable data (Preston & Colman, 2000). The results they found may have arisen because of the number of scale points themselves. It may be the case that the bipolar scale does not capture loss aversion (although the results of the present study suggest this to be a tenuous claim), but the methods used by McGraw et al. (2010) do not justify this conclusion.

McGraw et al. (2010)'s methods clearly need to be refined to provide a more severe test of their comparison hypothesis. The present study was conducted to do so. Furthermore, in the coming sections, previous research findings and the theoretical background behind loss aversion will also be examined, to determine how McGraw et al.'s (2010) conclusions relate to other findings in the field.

The Origins of Loss Aversion

Before moving on to the methods and results of the present study, background research in loss aversion will be discussed. Loss aversion originally arose from the work of psychologists Daniel Kahneman and Amos Tversky, who questioned the validity of standard economic models of decision making. Standard economic theory had long assumed that agents behave rationally, selfishly, and with invariant preferences-that is, preferences that are stable across contexts (Thaler, 2015). In a paper proposing their theory of decision-making under risk, Prospect Theory, Kahneman and Tversky (1979)

criticized Expected Utility Theory (EUT), the standard descriptive model of economic decision making. EUT suggests that people's preferences under risk should align with the option with the greatest expected value. Expected value refers to the average return that one would expect to receive from a gamble or an uncertain situation. Expected value is calculated by multiplying the monetary value of each outcome by the probability that it will occur and summing up all of these values. For example, take a gamble with a 50% chance of winning $100, a 25% chance of losing $150, and a 25% chance of winning $500. The expected value of this gamble is calculated as follows: EV = (.50 x +$100) + (.25 x -150) + (.25 x +500) = $50 -$37.50 + $125 = +$137.50. If an individual were to accept this gamble, they can expect an average return of $137.50. EUT suggests that when choosing between options, people select the option with the highest expected value. EUT also suggests that individuals' risk aversion remains stable-that is, individual preference for a certain outcome over a risky (or uncertain) outcome with an equivalent expected value should remain constant across contexts. EUT purports to be both a normative model of decision making (suggesting how people *should* make decisions) and a descriptive model of decision-making (describing how people actually *do* make decisions). Kahneman and Tversky (1979) took issue with the latter, presenting findings that, in their view, suggested that people do not make decisions as rationally as EUT proposes.

Kahneman and Tversky (1979) presented participants with hypothetical gambles, asked them to choose between them, and found that their choices did not actually meet the criteria of EUT. All monetary amounts in the study were in Israeli currency, as the

study was conducted with Israeli subjects. In one problem from the study, the researchers asked participants to choose between two prospects (the term Kahneman and Tversky designated for an individual outcome) - Prospect A, an 80% chance to win 4,000 pounds and Prospect B, 3,000 pounds with certainty. Participants were more likely to accept the certain (100% chance) gain of 3,000 pounds (EV = 3,000 pounds x 1.00 = 3,000 pounds) over the probable (80% chance) gain of 4,000 pounds (EV = 4,000 pounds x .80 = 3200 pounds). However, in another problem from the study, participants were asked to choose between an 80% chance to lose 4,000 pounds and a certain loss of 3,000 pounds. Participants were more likely accept the probable (80% chance) loss of 4,000 pounds (EV = -4,000 pounds x .80 = -3,200 pounds) over the certain (100%) loss of 3,000 pounds (EV = -3,000 pounds x 1.00 = -3,000 pounds). Put more simply, the participants preferred +3,000 to +3,200 in the first problem shown, but they preferred -3,200 to -3,000 in the second problem shown. This series of problems suggested to Kahneman and Tversky (1979) that participants do not appear to make decisions solely based on expected value, and that their preferences for certainty or risk may vary according to whether gains or losses are involved. Participants preferred certainty to risk when dealing with positive prospects but preferred the reverse with negative prospects. This preference reversal was dubbed the reflection effect.

Prospect theory. The violations of EUT demonstrated in their paper led Kahneman and Tversky (1979) to develop prospect theory, a descriptive model of decision-making. The theory proposed a model of choice under risk, made up by an editing stage and an evaluation stage. The editing stage describes the initial process by

which the available choices are simplified, and it consists of coding, combination, segregation, and cancellation. Coding refers to the tendency for gains and losses to be viewed not in isolation, but in comparison to a neutral reference point (e.g. one's current amount of wealth). During combination, redundant outcomes are combined (e.g. a 25% chance to win $200 and a 25% chance to win $200 yields 50% for $200). Segregation refers the division of outcomes into different categories, such as risky and non-risky. Finally, during cancellation, the identical aspects of multiple outcomes are removed. For example, if an individual is choosing between two options, both of which include a 25% chance of winning $500 (with all other aspects different), this redundancy is removed from the choice. Individuals would then compare options based on other attributes.

The evaluation stage is the most theoretically important part of prospect theory, as individuals' predicted choice preferences can be derived from the model. Furthermore, the fact that prospect theory predicts that individuals' preferences do deviate from rationality is what distinguished it from standard models (e.g., EUT). Prospect theory proposed that the utility (or general, subjective value) of an outcome is based on two functions, v, the value function, and π, the weighting function. The utility for any prospect is then the sum of the monetary value of each outcome multiplied by the decision weight for each outcome (Kahneman & Tversky, 1979). The value function is discussed below, as it is relevant for the present study on loss aversion, but the weighting function, which pertains more to probability itself and its effect on decision making (and is irrelevant for the present study), will not be discussed.

The value function has several important characteristics. First, the function has a steeper slope in the loss domain that it has in the domain of gains (see Figure 1). The model was created this way to propose that the negative impact of monetary losses is stronger than the positive impact of monetary gains (i.e., loss aversion). Kahneman and Tversky (1979) also noted that the value function is concave for monetary gains and convex for monetary losses (see Figure 2). They noted that their own participants showed risk-*aversion* when presented with risky prospects involving only gains and risk-*seeking* when presented with risky prospects involving only losses (the reflection effect), even when the opposing choices had equal probability and equal absolute value. However, it should be noted that Kahneman and Tversky (1979) did not actually test loss aversion (this would come in later work, e.g. Tversky & Kahneman, 1992), a point mentioned by Yechiam (2018). Yechiam (2018) argued that Kahneman and Tversky (1979) appeared to take loss aversion as an assumption in the development of their prospect theory and did not provide the empirical evidence that they provided for the reflection effect and other violations of rationality (further discussed below).

Kahneman and Tversky (1979) also discussed the work of Williams (1966), who conducted early research on the difference between pure risk (involving only potential losses) and speculative risk (involving potential gains and losses). Williams (1966) conducted three "tests", each with the same participants. Test 1 and 2 had results relevant to the present discussion, while Test 3 will not be discussed, as it contained survey data related to participants' insurance-purchasing habits. In his Test 1, Williams (1966) presented participants with twelve hypothetical situations (referred to by the researcher as

"ventures), each with a potential gain and a potential loss (e.g., Venture 1 entailed a possible gain of $100 and a possible loss of $100). For each individual situation, participants were to provide the *lowest possible probability* for the gain to occur, in order for them to be willing to participate. For example, a subject who responded with "20%" for the above example indicated that they would not participate in this hypothetical gamble if there were not at least a 20% chance of gaining $100. In Test 2, Williams (1966) provided participants with twelve additional hypothetical scenarios, each with a possible monetary loss and a fee that could be paid to avoid this loss (e.g. $5000 loss, $100 fee). Participants were to respond with the *lowest probability of loss* required for them to be willing to pay the fee to transfer the risk to another individual. For example, in the aforementioned example of a $5000 loss and a $100 fee, an individual who responds with a probability of 20% is indicating that if the probability of losing $5000 was 20% or larger, they would be willing to pay a $100 fee to transfer this risk to someone else. The researchers arranged the tests such that all situations in Test 1 also had parallel situations in Test 2. For example, the $5000 loss and $100 fee situation from Test 2 had a comparable situation in Test 1, where participants were presented with a potential $100 gain and $4900 loss. The researchers found that on average, participants required higher probabilities of loss in Test 2 before they would pay a small fee to avoid the risk altogether, compared to the probabilities they required to decline participation in the gamble in Test 1. That is, participants were willing to accept higher probabilities of loss over paying a small fee in Test 2, while in Test 1, an even lower probability of loss would cause them to avoid participating in a gamble altogether, even though they had the

possibility to win money. Participants would much rather hold onto the existing possibility of a potential loss (Test 2) than they would accept an additional risk, even one that could result in potential gains. These findings indicate that participants appeared to be *risk-averse* for situations involving speculative risk (both gains and losses are possible) but *risk seeking* for situations involving pure risk (only loss is possible). This is in line with Kahneman and Tversky's (1979) results. Williams' (1966) results showing different behavior when individuals are faced with losses alone compared to gains and losses may be relevant for the present study. However, Williams (1966) does note that the results could be due to inertia, which is the tendency for humans to elect to remain in their current situations (i.e., the status quo, as suggested by Gal (2006)). In other words, participants in Williams' (1966) Test 2 may have simply required a higher probability of loss to pay money to transfer the risk because they would have rather remained in their current situation than have left it. Gal (2006) also wrote about inertia in the context of the *risky bet premium*, the finding that when presented with a 50-50 risky bet, people tend to require a payment greater than the expected value of the bet to participate in it. Gal (2006) argued that psychological inertia, a tendency to remain at the status quo over change in the absence of a strong enough motivation, could better explain effects such as the risky bet premium, compared to the commonly proposed loss aversion explanation. This inertia/status quo explanation could readily explain Williams' (1966) results as well. Williams' (1966) participants may have simply lacked the motivation to take on an additional risk.

Limits of Loss Aversion

While loss aversion may be important to consider for those attempting creating a model of decision-making, it does not appear to be universal. Yechiam (2018) argued that Kahneman and Tversky (1979) had misrepresented the evidence for loss aversion from previous studies. For example, Yechiam (2018) stated that they had mistakenly reported a study by Galenter and Pliner (1974) as having found an asymmetry between the positive and negative ends of a utility function in a psychophysical study of monetary gains and losses, when Galenter and Pliner (1974) themselves describe this asymmetry as non-existent. Yechiam (2018) also chronicled the missteps made by another set of authors - Fishburn and Kochenberger (1979), who had conducted a review of studies examining the utility of gains and losses and had concluded that loss aversion was found (though this term was not used at the time). However, after re-examining the studies considered by Fishburn and Kochenberger (1979), Yechiam (2018) argued that while there was evidence for loss aversion at large monetary amounts, this did not appear to be the case for small amounts. Yechiam also examined studies where loss aversion was not found (studies that were not discussed by Kahneman and Tversky (1979)), such as Davidson, Siegel, and Suppes (1955) who found the utilities of gains and losses to be symmetrical, and Lichenstein (1965), who found that, when using actual incentivized bets, participants weighted large losses more than large gains. Yechiam concluded that, at the time of Kahneman and Tversky's (1979) paper, the evidence for loss aversion was mixed if not non-existent and perhaps pointed towards a loss aversion for large amounts, but not for

small amounts (a recurring finding in the loss aversion literature, discussed further below).

Gal and Rucker (2018) were also highly critical of the loss aversion construct. They criticized the lack of consideration for the role of contextual factors and the muddled distinction between whether loss aversion is a descriptive or an explanatory principle. Specifically, loss aversion (and prospect theory in general) was proposed by Kahneman and Tversky (1979) as a descriptive theory of decision-making - *describing* the decisions people actually make. However, aspects of prospect theory, such as loss aversion, are often cited as *explanations* of *how* people make decisions. Indeed, the lack of an explanatory psychological mechanism has been a critique of the loss aversion hypothesis (Gal, 2006). Gal (2006) argued that loss aversion could be more readily explained by psychological inertia - that is a tendency for individuals to stay at their status quo. For example, Gal (2006) argued that individuals might not choose to take a risky 50-50 bet because they have no clear preference for it and would rather remain at the status quo. This explanation proposes that individuals avoid losses not because losses are weighted more heavily than gains, but because a lack sufficient of motivation and preference will result in inaction over action. Gal (2006) presented evidence in favor of this hypothesis by asking participants to allocate a hypothetical $100 sum of money between a risky 50-50 bet and a small guaranteed investment. Gal (2006) also presented participants with a single risky bet task, where they were asked to give the minimum return that they would require to accept the bet as well as their hypothetical decision on whether or not they would accept it. The single risky bet task functioned as a test of the

status quo (where declining the bet was a decision to remain at the status quo), whereas the allocation task included no status quo option. The results showed that participants were far more willing to invest in the hypothetical risky bet in the allocation task than in the single risky bet task. Gal (2006) argued that this was strong evidence in favor of the status quo/inaction hypothesis. Gal and Rucker (2018) provided additional evidence in favor of the status quo hypothesis by asking participants to choose between a 100% chance of receiving $0 and 50-50 risky bet (where $15 would either be lost or gained). There was a slight preference for the risky bet, in two separate iterations of the experiment. Gal and Rucker (2018)'s work suggests, at least according to the authors, that providing individuals with sufficient incentive and framing a decision as a choice between $0 and a risky bet (as opposed to the status quo framing) may elicit results to the opposite of what is predicted by the loss aversion hypothesis. It is clear from this evidence and the arguments made by Gal (2006), Gal and Rucker (2018), and Yechiam (2018) that loss aversion is a controversial construct in need of contextualization (i.e. a clarification of *when* it occurs) as well as an explanatory psychological mechanism (i.e. a clarification of *how* it occurs).

Moderating factors. Gal and Rucker (2018) described three forms of the loss aversion hypothesis: the strong version, the weak version, and a third version (which they do not name). Strong loss aversion describes the idea that all losses loom larger than gains. Weak loss aversion proposes that losses loom larger than gains on average, even though gains may outweigh losses in certain contexts (as opposed to the universal loss aversion proposed by strong loss aversion). Gal and Rucker's (2018) third (and more

nuanced) version of the loss aversion hypothesis argues that the weights of losses and gains are contingent on moderating factors and the context of the situation. Such factors may include motivation, the goods exchanged, the range of possible loss/gain values, among others (Gal & Rucker, 2018).

Erev, Ert, and Yechiam (2008) conducted a series of experiments testing the effects of decision from experience (DFE). In DFE paradigms, participants are not given information about outcome; rather they are to learn about the outcomes' probabilities through repeated decisions between options, randomly sampled from a binomial distribution. When choosing between mixed gambles or zero dollars with certainty, participants were indifferent. However, they preferred the risky option in decision problems that involved only gains (with uncertainty). The authors suggested that diminishing sensitivity from a reference point could better explain the behavior regarding risk in DFE. However, they clarified that loss aversion appears to be robust when participants are presented with concrete information about prospects. Ert and Erev (2013) documented how loss aversion can be sensitive to framing effects. Notably, loss aversion tends to occur more frequently with high nominal magnitudes (magnitudes with magnitudes large in name/number only but not in real value, e.g. 1000 cents; also found by Erev et al., 2008), when the non-risky option is framed as the status quo, and with gambles of high (rather than low) magnitudes.

Other researchers have documented magnitude effects, showing that loss aversion tends to occur at gambles of relatively high magnitudes (e.g. 200 euros) and may be eliminated or even reversed at gambles of low magnitudes (Harinck, Van Djik, Van

Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012; Yechiam, 2018). Specifically, Harinck et al. (2007) found loss averse judgments (how pleasant/unpleasant participants would expect to be losing a given amount of money) for 50/50 gambles of 50 euros, but not for magnitudes of 5 euros, 2 euros, 1 euro, 50 euro cents, or 10 euro cents. The exact definition of a "low" or a "high" magnitude can be difficult to operationalize (and likely differs between individuals), but for the Harinck et al. (2007) study, low magnitudes appear to be less than 5 euros. High magnitudes appear to be at least 50 euros. In Experiments 2 and 3, using alternative paradigms (affective judgments regarding hypothetical gambles and providing certainty equivalents for gambles, respectively), Harinck et al. (2007) conceptually replicated these findings, while finding evidence of reversed loss aversion (gains being viewed as having greater subjective value than losses) at low magnitudes. Additionally, Harinck et al. (2012) found further evidence of reversed loss aversion at low magnitudes. More specifically, the researchers showed that presenting the loss before a possible gain can create greater loss aversion when compared to presenting the gain before a loss, presumably because doing so makes the loss more salient in participants' minds. Related to these findings, when reviewing previous studies, Ert and Erev (2013) found a large variation in the loss aversion coefficient but found that it tends to scale positively with magnitude. Yechiam (2018), in his argument against the general loss aversion hypothesis, argued that large losses do appear to be overweighted compared to large gains. This is notable because the original formulation of loss aversion stated that it is a universal principle and magnitude independent (Yechiam, 2018; Gal & Rucker, 2018).

It is clear from the literature reviewed that loss aversion is not the universal phenomenon it was once considered. Factors such as magnitude (Harinck, Van Djik, Van Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012; Yechiam, 2018), nominal magnitude (Ert & Erev, 2013), presentation order (Harinck et al., 2012), framing (Erev & Ert, 2008), and motivation (Gal, 2006; Gal & Rucker, 2018), among others may play a role in observing loss aversion. Also important is determining the existence of a psychological mechanism behind loss aversion (Gal, 2006; Gal & Rucker, 2018), as an adequate psychological theory must both describe and explain behavior. The present work aims to do so by clarifying the aforementioned study by McGraw et al. (2010).

Present Study

As discussed above, the methods and results of the McGraw et al. (2010) study are problematic for a number of reasons, several of which were mentioned above. Gal and Rucker (2018) noted that McGraw et al's (2010) losses of $50 and $200 could be particularly large for the undergraduate participants surveyed. Since "large" amounts of money can be subjective (based on an individual's personal wealth), and undergraduates tend to have low incomes, it is entirely possible that the amounts used by McGraw et al. (2010) were large enough to create loss aversion in the undergraduate participants simply because they are viewed as very large by this population specifically. In other words, the participants may not be loss averse for all amounts, but simply for amounts greater than $50. Furthermore, the idea that loss aversion exists for large amounts of money is a fairly

unchallenged concept (Gal & Rucker, 2018; Yechiam, 2018; Ert & Erev, 2013; Harinck, Van Djik, Van Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012). Gal and Rucker (2018) also suggested that McGraw et al.'s "methodology introduces new methodological problems, such as susceptibility of their approach to participants' lay theories regarding the relative impact of losses and gains" (Gal & Rucker, 2018, p. 507). In other words, according to Gal and Rucker (2018), the methods of McGraw et al. (2010) may bias participants towards a belief that losses are worse than gains are positive, despite the participants not actually believing so. However, the authors do not discuss this potential bias (or specify its full implications) in depth. Furthermore, if McGraw et al.'s (2010) results assessed the same construct as other research on loss aversion, researchers should be able to replicate past findings relating to loss aversion. A prominent example is reversed loss aversion on amounts of low magnitude (Ert & Erev, 2013; Harinck et al. 2007; Harinck et al. 2012). Researchers found reversed loss aversion results using different paradigms, typically examining behavioral loss aversion, that is, utilizing decision making paradigms (whether real or hypothetical), and examining whether losses impact decisions more so than gains. However, McGraw et al. (2010) suggested that the judged/anticipated feeling of losses is behind behavioral loss aversion. Therefore, it follows that if McGraw et al.'s (2010) method of measuring *judged* loss aversion is related to *behavioral* loss aversion, *reversed* loss aversion should arise from low magnitude gambles, based on the research discussed above (Harinck et al. 2007; Harinck et al. 2012).

The present study is intended to clarify the mechanism behind loss aversion and the context under which it occurs, based on a reworking of McGraw et al.'s (2010) study. To the present researcher's knowledge, there has been no attempt to replicate their results to date. The present study was conducted to test McGraw et al.'s (2010) hypothesis - that loss averse judgments can be observed when respondents are asked to consider both gains and losses together and that they will not occur when respondents consider gains and losses separately. It is worth mentioning that Williams' (1966) results, which showed that participants were more averse to losses when the losses were presented alone compared to when gains were also presented, may be relevant for McGraw et al.'s (2010) comparison hypothesis. It may be that presenting losses by themselves does not lead to loss aversion if individuals do not have corresponding gains against which to frame them.

Manipulations. The present study extended McGraw et al.'s (2010) method of asking participants about their anticipated feelings about gains and losses in a 50-50 gamble, with several key alterations. McGraw et al. (2010) used the scale type (bipolar vs. unipolar vs. relative intensity) as the independent variable, to manipulate comparisons of losses and gains. The present study maintains manipulation of comparisons as the independent variable but places the manipulation in the framing of the question rather than in the type of scale used. Rather than placing the psychological comparison of losses/gains in the scale (thus using different measures for the dependent variable as a function of the independent variable and confounding the experiment), the present study places the comparison in the framing of the questions about losses and gains (the first independent variable, two levels, between-subjects). Participants in the non-comparison

condition were simply asked to imagine that they were to play a coin toss gamble and to respond with the anticipated effects that the gain and loss would have on them (each in a separate question). Specifically, participants in the non-comparison condition were asked, "What effect would a gain (loss) of $*x* have on you?" However, those in the comparison condition were asked about the gamble and the effects of a gain and a loss, with the caveat that the question was framed in a way that made the comparison of a gain and a loss salient. Specifically, participants in the comparison condition were asked, "What effect would a gain (loss) of $*x* have on you, given that there is a possibility that you could instead lose (gain) $*x*?" Note that participants in both conditions answered equal amounts of questions. The nine-point bipolar scale was the method of response used by participants. This allowed for comparisons across the two framing conditions while avoiding the issues of comparing different scales or treating scale type as both an independent variable and a dependent variable. Although McGraw et al. (2010) claimed that the bipolar scale cannot be used to observe loss aversion, the present study posited that loss aversion can be observed with the bipolar scale - providing it is used when comparing gains and losses (rather than considering them individually). Using this scale and still observing loss aversion may provide even stronger evidence in favor of this comparison hypothesis.

Secondly, the present study asked participants not only about gambles for $200, but also about gambles for $1, $5, $50, or $200 (the second independent variable, four levels, within-subjects). These values were chosen to be similar to the amounts designated as small ($1 and $5) and large ($50 and $200) by Harinck et al. (2007), who

used similar amounts, albeit in euros. The study avoided the use of cent values due to possible confounds from nominal magnitude effects (Erev, Ert, & Yechiam, 2008; Ert & Erev, 2013). The wording of the gamble was also changed to ask about a coin toss gamble rather than a 50-50 gamble, as people's intuitive judgment about probability is known to be suspect (Kahneman 2003, 2011).

The dependent variable is the degree of loss aversion shown, operationalized by subtracting the absolute value of the loss judgment from the absolute value of the gain judgment for each of the four gambles. For example, a participant who selected a value of -4 for the effect of a loss and a value +2 for the effect of a gain, would have a response coded as -2 (i.e., $|+2| - |-4| = 2 - 4 = -2$). This response indicates loss aversion, i.e. that the effect of the loss was judged by the participant to be greater than the effect of the gain. All negative values will indicate loss averse judgments. Values of zero indicate that the loss and gain were judged to have equal effect. Finally, all positive values indicate reversed loss aversion, or that the effect of the gain is judged greater than the effect of the loss. All values discussed refer to these subtracted responses, unless indicated otherwise.

Hypotheses. If McGraw et al.'s (2010) proposal that the comparison of gains and losses is behind loss aversion is true, the following hypotheses should hold:

H1**)** For gambles of large magnitudes ($50 and $200), participants in the comparison condition will judge losses to have a greater effect than gains (loss aversion). No such effects will be observed in the non-comparison condition.

H2**)** For gambles of small magnitudes ($1 and $5), participants in the comparison condition will judge gains to have a greater effect than losses (reversed loss aversion). No such effects will be observed in the non-comparison condition.

Analyses. The analyses took place in several steps, with the first step beginning with a mixed model ANOVA. A mixed model ANOVA was used to analyze the results, with framing condition (comparison, non-comparison) as a between-subjects variable and magnitude ($1, $5, $50, $200) as a within-subjects variable. For each gamble, the absolute value of the loss judgment was subtracted from the absolute value of the gain judgment, as to make the results easier to interpret. Therefore, a positive value indicates that the gain has a greater effect than the corresponding loss (reversed loss aversion), and vice versa for a negative value (loss aversion). Values of zero indicate indifference. No main effect was predicted for either the framing variable or the magnitude variable. A significant interaction was predicted to occur between the two variables, such that losses of $50 and $200 would be judged to have a greater effect than their corresponding gains, while losses of $1 and $5 would be judged to have less of an effect than their corresponding gains. However, this pattern was predicted to be restricted to participants in the comparison condition. Participants in the non-comparison condition were predicted to show indifference across gambles. In other words, loss aversion was predicted to occur for the comparison condition only, but only for the values of $50 and $200. Reversed loss aversion would also occur for the comparison condition only, but only for the values of $5 and $1. No effect was predicted for the values of $1, $5, $50, and $200 for the non-comparison condition. For a conceptual presentation of these hypotheses, see Table 1.

For all analyses, 95% confidence intervals were used to assess whether the mean values differed from zero.

Following the mixed model ANOVA, two separate repeated-measures ANOVAs were performed. The first repeated-measures ANOVA was performed on the data from participants in the comparison condition only. A significant effect of magnitude was predicted, such that higher magnitudes ($50 and $200) would be loss averse, while lower magnitudes ($1 and $5) would show reversed loss aversion. The second repeated-measures ANOVA was performed on data from participants in the non-comparison condition only. No significant effect was predicted, as participants in this condition were predicted to show indifference across magnitudes.

Following the repeated measures ANOVAs, a paired samples *t*-test was performed on the data from the comparison condition only. However, because participant in this condition were predicted to be loss averse for large magnitudes ($50 and $200) but reversed for large magnitudes ($1 and $5), responses for these two magnitudes were averaged together. That is, the absolute values of the loss judgment subtracted from absolute values the gain judgment (as described above) were averaged between the $1 magnitude and the $5 magnitude, as well as between the $50 magnitude and the $200 magnitude. This created data for two separate within-subjects conditions (small and large), upon which the paired samples t-test was performed. A significant difference was predicted, as the comparison condition was predicted to create loss aversion for large magnitudes but reversed loss aversion for small magnitudes.

Following the paired samples *t*-test, four separate one-way ANOVAs were performed. Each test was performed on an individual magnitude value, with framing condition (comparison, non-comparison) as the independent variable. Significant effects were predicted for all four tests, with the means for the comparison condition predicted to be greater than the means for the non-comparison condition for the magnitudes of $1 and $5, while the means for the comparison condition were predicted to be less than the means for the non-comparison condition for the magnitudes of $50 and $200. One-way ANOVAs were used in lieu of independent samples *t*-tests as to allow for correction of unequal variances via Welch's test.

Chapter II

Method

Participants

A total of 227 participants (131 male, 89 female, 1 other) were initially recruited from Amazon's MTurk crowdsourcing service, as these participants have shown to more closely represent the general population (compared to undergraduate participants), while maintaining high quality experimental data (Burhmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013; Paolacci, Chandler, & Ipeirotis, 2010). Of the 227 MTurk participants, 214 indicated that they were currently employed. Of these 227 participants, 147 provided their gross annual salary (M = 51,410.48, SD = 50,962.89), six of the participants provided their gross monthly salary (M = 3,508.33, SD = 3,359.53), 14 of the participants provided their hourly rate/salary (M = 13.06, SD = 5.08), and 60 of the MTurk participants did not provide information regarding their salary or wages.

In addition to the 227 participants recruited from MTurk, 41 participants (5 male, 36 female) were recruited from undergraduate students enrolled in psychology courses at the University of Wisconsin-Oshkosh. The procedure for these participants was identical to the procedure for MTurk participants, aside from the compensation (students were given one course credit rather than USD $0.25 for participation). This additional collection was conducted in order to supplement the initial data collected as well as to clarify issues in the data.

Materials and Procedure

For those participants recruited from Amazon's MTurk, The Human Intelligence Task (HIT) shown on the MTurk site instructed those who signed up that they were to be linked to a survey on the website Qualtrics (where the experiment took place). They were told that they are to complete the survey, after which they will receive a code from Qualtrics. They were told that they should enter the code on MTurk so that their participation in the study can be verified and payment can be provided. Participants recruited from the University of Wisconsin-Oshkosh signed up for the study via the SONA Systems website. The link to the study directed them to the online survey on the Qualtrics website.

Prior to participating, participants read and signed an electronic informed consent form (see Appendix A). The form stated that they were participating in a study asking questions about money.

Participants responded to hypothetical coin toss gambles, with 50-50 chances to gain or lose $1, $5, $50, or $200. Participants responded with their anticipated feelings regarding gaining or losing each of these different amounts of money. However, they were randomly assigned to respond to comparison questions or non-comparison questions (both involving two judgments per gamble). The non-comparison questions read, "Imagine that you are to play a coin toss gamble. What effect would the loss (gain) of $*x* have on you?" The nine-point bipolar scale was scaled from "a very large negative effect" to "a very large positive effect". The comparison scale questions read, "Imagine that you are to play a coin toss gamble. What effect would the loss (gain) of $*x* have on

you, given that there is a possibility that the coin toss could instead make you lose $*x*?" The order of gamble magnitudes ($1, $5, $50, and $200) and question valence (gain, loss) were randomized across all participants. Randomization, rather than a complete counterbalancing, was chosen to improve efficiency in data collection. See Appendices B and C for sample questionnaires and the nine-point bipolar scale (which all participants will respond to). Note that all questions were presented individually in the actual study, aside from the demographics questions. See Appendices B and C for questionnaires.

The study was a 2 (framing condition: comparison or non-comparison, between-subjects) x 4 (magnitude: $1, $5, $50, or $200, within-subjects) mixed-design experiment with one dependent variable (judgments). The comparison condition had 125 participants, while the non-comparison condition had 143 participants.

After answering the questions about hypothetical gambles, participants answered demographics questions about their gender, race, employment, income, and gambling habits, as to gain information about the characteristics of the sample.

Following completion of the study, participants were debriefed about the nature of the experiment (see Appendix D). The debriefing assured them that the gambles were hypothetical, and their monetary compensation from the experiment did not at all rest on their choices in the experiment. After the codes that participants entered on MTurk were checked and verified, MTurk participants were paid for their participation. Participants from the University of Wisconsin-Oshkosh were awarded one credit on the SONA website after completion.

Variables

This study had two independent variables: framing condition (between-subjects) and magnitude (within-subjects). There were two conditions: the comparison condition and the non-comparison condition. The magnitude variable has four levels: $1, $5, $50, and $200. The dependent variable of interest is the absolute value of the difference between the gain judgment and the loss judgment, operationalized as $\left| \text{gain}_{\$x} - \text{loss}_{\$x} \right|$. Unless otherwise indicated, the dependent variable in the analysis refers to this value.

Chapter III

Results

Analyses

The aforementioned analyses were performed twice. The initial analysis was conducted using the data from all participants. However, a second analysis was conducted, using only the data from participants respond to questions about losses with a "negative" or "neutral" value, as well as responded to questions about gains with a "positive" or "neutral" value. That is, those participants (N = 152) whose responses indicated that they would prefer to lose money and/or dislike to gain money were excluded. This was done so to avoid issues with participants who may have had difficulty understanding the wording of the questions or who failed to attend to the questions adequately. However, rather than exclude these individuals' data completely, the analyses were conducted twice to assess whether the conclusions of the study differed based on the exclusion of this data. All analyses were conducted on the absolute value of loss judgments. Results were generally consistent across both analyses.

Analysis 1: All cases . A mixed model ANOVA was conducted, with framing condition (comparison, non-comparison) as a between-subjects factor and magnitude ($1, $5, $50, $200) as a within-subjects factor. The main effect of magnitude was statistically significant, $F(3, 777) = 6.57$, $p < .001$, $\eta^2 = .025$. Estimated marginal means were calculated for each of the four magnitude levels, along with 95% confidence intervals (See Table 2). The 95% confidence intervals demonstrated that the only marginal means significantly different from zero were those for the $1, $5, and $200 levels. The marginal

mean for the $1 level was significantly *less than* zero (*M* = -0.11, *SE* = 0.06, 95% *CI* [-0.22, -0.01]). This indicates a loss averse response (i.e., losses were judged more negatively than gains were judged positively). The marginal mean for the $5 level was significantly *greater than* zero (*M* = 0.13, *SE* = .06, 95% *CI* [0.01, 0.24]). This indicates a reversed loss averse (i.e., gains were judged more positively than gains were judged negatively). The marginal mean for $200 was significantly *less than* zero (*M* = -0.11, *SE* = 0.06, 95% *CI* [-0.22, -0.01]). This indicates a loss averse response (i.e., losses were judged more negatively than gains were judged positively). See Table 2.

The main effect of framing condition was statistically significant, $F(1, 259) = 13.51$, $p < .001$, $\eta^2 = .05$. Estimated marginal means and 95% confidence intervals were calculated for both conditions (see Table 3). Both means were significantly different from zero. The mean for the comparison condition was significantly *less than* zero (*M* = -0.16, *SE* = 0.06, 95% *CI* [-0.28, -0.05]). This indicates that participants in the comparison condition were loss averse on average. The mean for the non-comparison condition was significantly *greater than* zero, (*M* = 0.13, *SE* = 0.06, 95% *CI* [0.02, 0.24]). This indicates that participants in the comparison condition showed reversed loss aversion, on average. See Table 3.

The interaction between magnitude and framing condition was not statistically significant, $F(3, 777) = 0.34$, $p = .80$, $\eta^2 = .001$. However, several of the marginal means were still significantly different from zero, including that of the $5 level in the non-comparison condition (*M* = 0.31, *SE* = 0.08, 95% *CI* [0.15, 0.46]), the $50 level in the non-comparison condition (*M* = 0.19, *SE* = 0.08, 95% *CI* [0.04, 0.35]), the $1 level in the

comparison condition (*M* = -0.24, *SE* = 0.08, 95% *CI* [-0.40, -0.08]), and the $200 level in the comparison condition (*M* = -0.24, *SE* = 0.08, 95% *CI* [-0.40, -0.08]). See Table 4.

Next, a repeated measure ANOVA was conducted on the data from the comparison condition only, with magnitude as a within-subjects factor (4 levels). The effect of magnitude was not statistically significant, $F(3, 360) = 1.69$, $\eta^2 = .01$.

A repeated measures ANOVA was conducted on the data from the non-comparison condition only, with magnitude as a within-subjects factor (4 levels). The effect of magnitude was not statistically significant, $F(3, 417) = 5.76$, $p = .001$, $\eta^2 = .04$.

A paired samples *t*-test was conducted on the data from the comparison condition only. The responses for the values of $1 and $5 were averaged, as were the responses for the values of $50 and $200, to create two levels, small and large. There was no significant difference between the means for the small (*M* = 0.48, *SD* = 1.12) and large levels (*M* = 1.52, *SD* = 2.61), $t(120) = 0.58$, $p = .56$.

A one-way ANOVA was conducted on the responses for the $1 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was statistically significant, $F(1, 261) = 6.59$, $p = .01$, indicating heterogeneity of variances. Welch's unequal variances t-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 236.75) = 5.38, $p = .02$, indicating a difference between the comparison and non-comparison condition. The mean for the comparison condition was significantly below zero (*M* = -0.24, *SD* = 0.98, *SE* = 0.09, 95% *CI* = -0.42, -0.07). The mean for the non-comparison condition was above

zero, though this was not statistically significant (M = 0.01, SD = 0.81, SE = 0.07, 95% CI [-0.12, 0.15]).

A one-way ANOVA was conducted on the responses for the $5 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was statistically significant, $F(1, 263) = 6.98$, $p = .01$, indicating heterogeneity of variances. Welch's unequal variances t-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 262.95) = 10.43, $p = .001$, indicating a difference between the comparison and non-comparison condition. The mean for the comparison condition was less than zero (indicating loss aversion), though this was not statistically significant (M = -0.06, SD = 0.86, SE = 0.08, 95% CI = -0.21, 0.10). The mean for the non-comparison condition was significantly greater than zero (M = 0.31, SD = 0.96, SE = 0.08, 95% CI [0.15, 0.47]), indicating reversed loss aversion.

A one-way ANOVA was conducted on the responses for the $50 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was marginally significant, $F(1, 260) = 2.43$, $p = .12$, suggesting heterogeneity of variances. Welch's unequal variances t-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 256.74) = 7.12, $p = .01$, indicating a difference between the comparison and non-comparison condition. The mean for the comparison condition was below zero, though this was not statistically significant (M = -0.12, SD = 0.92, SE = 0.08, 95% CI = 0.04, 0.35). The mean for the non-comparison condition was significantly greater than zero (M = 0.19, SD = 0.94, SE = 0.08, 95% CI [0.04, 0.35]).

Lastly, a one-way ANOVA was conducted on the responses for the $200 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was *statistically* significant, $F(1, 261) = 6.59$, $p = .01$, indicating heterogeneity of variances. Welch's unequal variances *t*-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 236.75) = 5.38, $p = .02$. The mean for the comparison condition was significantly less than zero ($M = -0.24$, $SD = 0.98$, $SE = 0.09$, 95% *CI* [-0.42, -0.07]), suggesting loss aversion. The mean for the non-comparison condition was above zero, suggesting reversed loss aversion, though this was not statistically significant ($M = 0.01$, $SD = 0.81$, $SE =0$ .07, 95% *CI* [-0.12, 0.15]).

Analysis 2: Selected cases. As discussed above, a second analysis was performed, including only those participants who provided non-contradictory responses (responded neutrally or negatively to losses and neutrally or positively to gains). This analysis is identical to the first.

A mixed model ANOVA was conducted, with framing condition (comparison, non-comparison) as a between-subjects factor and magnitude ($1, $5, $50, $200) as a within-subjects factor. The main effect of magnitude was statistically significant, $F(3, 226) = 5.31$, $p = .001$, $\eta^2 = .05$. Estimated marginal means were calculated for each of the four magnitude levels, along with 95% confidence intervals. The 95% confidence intervals demonstrated that the only marginal means significantly different from zero were those for the $1 and $200 levels. This differs from the first analysis, where the marginal means for $1, $5, and $200 were significantly different than zero. The marginal mean for $1 was significantly less than zero ($M = -0.20$, $SE = 0.08$, 95% *CI* [-0.36, -

0.05]). The marginal mean for $200 was significantly greater than zero (*M* = -0.20, *SE* = 0.08, 95% *CI* [-0.36,-0.05]).

The main effect of framing condition was statistically significant, $F(1, 112) = 9.36$, $p = .003$, $\eta^2 = .08$. However, the only mean that was significantly different from zero was that of the comparison condition (*M* = -0.29, *SE* = 0.12, 95% *CI* [-0.51, -0.06]), which was significantly less than zero. This differs from the first analysis, where both means differed from zero.

The interaction between magnitude and framing condition was not statistically significant, $F(3, 336) = 0.27$, $p = .85$. However, several means differed significantly from zero, including that of the $1 level in the comparison condition (*M* = -0.39, *SE* = 0.14, 95% *CI* [-0.66, -0.12]), the $200 level in the comparison condition (*M* = -0.39, *SE* = 0.14, 95% *CI* =-0.66, -0.12], and the $5 level in the non-comparison condition (*M* = 0.36, *SE* = 0.09, 95% *CI* [0.19, 0.54]). See Table 5.

Next, a repeated measure ANOVA was conducted on the data from the comparison condition only, with magnitude as a within-subjects factor (4 levels). The effect of magnitude was not statistically significant, $F(3, 81) = 1.38$, $p = .26$, $\eta^2 = .05$. However, the means for both the $1 level (*M* = -0.39, *SE* = 0.17, 95% *CI* [-0.75, -0.04]) and the $200 level (*M* = -0.39, *SE* = 0.17, 95% *CI* [-0.75, -0.04]) were significantly less than zero. There was, however, a trend towards loss aversion.

Next, a repeated measure ANOVA was conducted on the data from the non-comparison condition only, with magnitude as a within-subjects factor (4 levels). The effect of magnitude was statistically significant, $F(3, 255) = 7.28$, $p < .001$, $\eta^2 = .08$.

However, the only mean that differed significantly from zero was that of the $5 mean (*M* = 0.36, *SE* = 0.10, 95% *CI* [0.17, 0.55]), which was significantly greater than zero. There was, however, a trend towards reversed loss aversion.

Next, a paired samples *t*-test was conducted on the data from the comparison condition only. The responses for the values of $1 and $5 were averaged, as were the responses for the values of $50 and $200, to create two levels, small and large. There was no difference between the mean for the small magnitudes (*M* = -0.27, *SD* = 0.63) and the mean for the large magnitudes (*M* = -0.30, *SD* = 0.82), *t*(27) = 0.44, *p* = .66.

A one-way ANOVA was conducted on the responses for the $1 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was statistically significant, *F*(1, 112) = 6.70, *p* = .01, indicating heterogeneity of variances. Welch's unequal variances *t*-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 36.01) = 4.18, *p* = .05, indicating a difference between the mean for the comparison condition and the mean for the non-comparison condition. The mean for the comparison condition (*M* = -0.24, *SD* = 0.98, *SE* = 0.09, 95% *CI* [-0.42, -0.07]) was significantly less than zero. The mean for the non-comparison condition (*M* = 0.01, *SD* = 0.81, *SE* = 0.07, 95% *CI* [-.12, 0.15]) was not significantly different than zero.

A one-way ANOVA was conducted on the responses for the $5 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was statistically significant, *F*(1, 112) = 5.93, *p* = .02. Welch's unequal variances *t*-test was used to correct for this violation. Welch's test was statistically

significant, Welch's statistic (1, 68.69) = 11.80, p = .001, indicating a difference between the mean for the comparison condition and the mean for the non-comparison condition. The mean for the comparison condition (M = -0.06, SD = 0.86, SE = 0.08, 95% CI [-0.21, 0.10]) was not significantly different from zero. The mean for the non-comparison condition (M =0.31, SD = 0.96, SE = 0.08, 95% CI [(0.15, 0.47]) was significantly greater than zero.

A one-way ANOVA was conducted on the responses for the $50 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was not statistically significant, F(1, 112) = 0.27, p = .60. However, to remain consistent across analyses, Welch's test was still used to test for mean differences. Welch's test was not statistically significant, Welch's statistic (1, 44.02) = 2.96, p = .09. The mean for the comparison condition was not significantly different from zero (M = -0.12, SD = 0.92, SE = 0.08, 95% CI [-0.28, 0.05]). However, the mean for the non-comparison condition was significantly greater than zero (M = 0.19, SD = 0.94, SE = 0.08, 95% CI [0.04, 0.35}).

Finally, a one-way ANOVA was conducted on the responses for the $200 value, with framing condition as the between-subjects factor. Levene's test for homogeneity of variances was statistically significant, F(1,112) = 6.70, p = .01. Welch's unequal variances t-test was used to correct for this violation. Welch's test was statistically significant, Welch's statistic (1, 36.01) = 4.18, p = .05, indicating a difference between the mean for the comparison condition and the mean for the non-comparison condition. The mean for the comparison condition was significantly less than zero (M = -0.24, SD =

0.98, *SE* = 0.09, 95% *CI* [-0.42, -0.07]). The mean for the non-comparison condition was not significantly different from zero (*M* = 0.01, *SD* = 0.81, *SE* = 0.07, 95% *CI* [-0.12, 0.15]).

Chapter IV

Discussion

Summary of Results

This study was conducted under the hypotheses that, within the comparison condition, loss aversion would occur for large magnitudes and reversed loss aversion would occur for small magnitudes. Previous decision making research has shown that individuals are typically loss averse for large magnitudes (Gal & Rucker, 2018; Yechiam, 2018; Ert & Erev, 2013; Harinck, Van Djik, Van Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012) but reversed loss averse for small magnitudes (Harinck, Van Djik, Van Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012).

Two analyses were conducted, one on all cases and another on selected cases. This was done to examine the consistency in the results from those participants whose results were logically consistent (i.e. preferred to gain money and not to lose money) compared to all participants. The results were generally consistent across both analyses. The findings from the mixed model ANOVA showed that while magnitude and condition affected judgment, this did not lead to an interaction between the two variables. The main effect of magnitude suggests that the $1 and the $200 values were viewed more negatively than the other magnitude levels. The main effect of condition shows that overall, the participants in the comparison condition displayed loss aversion, while those in the non-comparison condition displayed reversed loss aversion. However, the effect sizes observed were small, and those means that differed from zero tended to do so by small magnitudes.

The lack of an interaction between magnitude and condition demonstrates the failed predictions made for this study (see Table 1). For the predictions to have been borne out, the means for the comparison condition would need to have displayed a different pattern than was actually found. The comparison condition was predicted to have means below zero for the values of $200 and $50 but above zero for the values of $1 and $5. However, the only means in the comparison condition that differed from zero were those of $1 and $200 (note that this was found in both analyses). Furthermore, the means for $5 and $50 were also below zero (albeit not significantly). In other words, the hypotheses predicted that in the comparison condition, loss aversion would occur for the values of $50 and $200 but reversed loss aversion for the values of $1 and $5. On the contrary, the results illustrated a general finding of loss aversion displayed throughout the comparison condition.

The non-significant paired samples *t*-test in the comparison condition further illustrates the failed predictions. If participants were to be loss averse for large values but reversed loss averse for small values, this test would have found a significant difference.

As for the non-comparison condition, the aforementioned hypotheses predicted indifference throughout the entire condition. That is, the means for all magnitude levels were predicted to show no significant differences compared to zero. However, in the non-comparison condition, the means for $5 and $50 were significantly greater than zero, suggesting reversed loss aversion. The means for $1 and $200 were slightly above zero (albeit not significantly). This differs from the hypotheses made, as there appears to be a slight trend towards reversed loss aversion throughout the non-comparison condition.

To illustrate the results from this study and contrast them with the predictions made prior to data collection, a table of the conceptual findings is included below (see Table 6). The results differ notably from those in Table 1. Possible explanations for these results will be discussed below.

Methodological Issues

First, it is necessary to discuss potential issues with the present study's methodology. In particular, participants in the comparison condition may have encountered difficulty understanding the questions posed to them. The phrasing of the question as "What effect would a gain of $\$x$ have on you given that there is a possibility that you could also lose $\$x$?" may have confused participants. It may have not been clear to them that the gains and losses discussed were mutually exclusive, i.e. that one could not simultaneously gain and lose money in the hypothetical gambles discussed. This is evident in the difference between the number of participants whose data was not contradictory (n = 28 in the comparison condition, n = 87 in the non-comparison condition). This strong of a difference in data quality between conditions is likely due to the wording of the questions rather than due to any attentional issues. A possible solution to these issues may have been to create a pilot study for these questions. Such a test could provide answers as to whether or not individuals can accurately understand the framing manipulation that is being applied. Unfortunately, this solution was not thought of until after data collection was complete. However, it is unknown if more clearly worded questions would lead to the effects that were initially predicted or merely stronger effects

in the direction already observed. Such a question can only be answered through a conceptual replication of the present study with alternately worded questions that have been adequately tested in a pilot study.

Furthermore, the present study collected data online for convenience, efficiency, and to obtain a more diverse sample. However, perhaps a future study should attempt to replicate the present study using an in-person experiment. This would allow participants to ask questions regarding materials that are unclear to them as well potentially increase engagement, allowing all questions to be accurately processed.

Other Limitations

As mentioned above, significant effects were found, specifically at $1 and $200 in the comparison condition (loss aversion) and $5 and $50 in the non-comparison condition (reversed loss aversion). However, such effects were very small, with all η^2 values below .10 and all mean values under an absolute value of .50 (with the largest possible value being an absolute value of 4). With such small effects in an experimental setting, it is difficult to know what implications these results have for human judgment and decision-making. As discussed above, clearer wording for those participants in the comparison condition may lead to stronger effects (although without further study this is only speculation).

In addition, the present study simply asked participants to provide their affective judgments to hypothetical gains and losses on a Likert-type scale. This was done to provide a more adequate test of the work of McGraw et al. (2010). In doing so, this study

may have been far enough removed from the previously discussed studies that incorporated decision making (Ert & Erev, 2013; Harinck, Van Djik, Van Beest, & Mersmann, 2007; Harinck, Van Beest, Van Djik, & Van Zeelan, 2012) that the predicted results were unable to occur. In other words, while individuals may make decisions implying loss aversion for large magnitudes and reversed loss aversion for small magnitudes, the manipulation used in the present study was unable to elicit these effects in the absence of a decision-making component.

Relation to McGraw et al. (2010)

McGraw et al. (2010) argued that loss aversion is difficult to observe on a bipolar scale, due to the placement of gains and losses on separate poles of the scale eliminating the comparisons of gains and losses. While the present results did not conform to the predictions outlined in Table 1, they present compelling evidence that loss aversion can in fact be observed with the bipolar scale, providing that some other manipulation is used to induce comparisons (as in the present use of a framing manipulation). It is likely that the lack of a comparison-based manipulation in the McGraw et al. (2010) study is behind their failure to observe loss aversion, rather than the bipolar scale itself. To be clear, the reversed loss aversion observed in the non-comparison condition suggests that the bipolar scale does not necessarily predispose participants toward a particular preference. With this being said, the loss aversion observed in the comparison condition shows that it is possible to observe loss aversion using a bipolar scale as a response method.

Unfortunately, the present study cannot answer all potential issues with the McGraw et al. (2010) study. As discussed earlier, the researchers were able to find loss aversion with the highly truncated (3-point) relative intensity scale (see Figure 2). However, the use of only three scale points was a problematic limitation to their study. It is still unclear whether their results indicate a genuine effect due to the relative intensity scale inducing comparisons between gains and losses or if they are simply an artifact of the truncated scale used. Future research should explore the similarities between a scale that induces comparisons and an explicit induction of comparisons via framing manipulations.

Future Research

In the future, research should attempt to use a version of the relative intensity scale used by McGraw et al. (2010). While the three-point version used by the researchers is far too truncated (Preston & Colman, 2000), perhaps a larger version of the scale could be implemented. Future research using this scale should attempt to do so in a manner that attempts to induce the comparison process proposed by McGraw et al. (2010) that may be essential for loss aversion.

As mentioned above, the potentially problematic wording of the questions for those participants in the comparison condition is one flaw to the present study. A future study should be conducted, in which the methodology is identical to the present one, but the wording is pilot tested to ensure understanding amongst participants.

Research should also investigate the inertia explanation suggested by Gal (2006) and Gal & Rucker (2018). The theory of psychological inertia proposes that loss aversion only exists as an artifact of inertia, which refers to the preference for inaction over inaction in the absence of a strong enough incentive. It may be the case that in the absence of psychological comparisons between gains and losses (as in the non-comparison condition), indifference may be observed. In turn, the framing manipulation used in the comparison condition may have "neutralized" this inertia, eliciting the generally loss averse results found in the present research. Note that this explanation does not solve the question of whether or not loss aversion or psychological inertia accounts for effects already observed in past research, but it does integrate both accounts into the present data

Finally, future research should continue to examine moderators of loss aversion, both in an affective judgment context and a decision-making context. Such moderators may include magnitude, riskiness, personality, income, among others. Research should also continue to focus on the processes/mechanisms behind loss aversion and other similar effects (Gal, 2006), rather than simply on the effects themselves.

Conclusion

While the present study is inconclusive as to the full scope of McGraw et al.'s (2010) hypothesis, the results do show that the bipolar scale can be used to elicit loss aversion when used in conjunction with a framing manipulation (as in the comparison condition). Moreover, as in the case of the non-comparison condition, the bipolar scale

can even be used to elicit reversed loss aversion. Although this study does not answer all loss aversion questions, it is a step forward for understanding the cognitive process by which this effect occurs.

Tables

Table 1

Predicted conceptual results for a framing and magnitude manipulation.

	Framing Condition (Between-Subjects)	
Magnitude (Within-Subjects)	Comparison	Non-Comparison
$1	Reversed loss aversion	No effect
$5	Reversed loss aversion	No effect
$50	Loss aversion	No effect
$200	Loss aversion	No effect

Table 2
Estimated Marginal Means for the Main Effect of Magnitude in a Mixed Model ANOVA, All Cases

Magnitude	*M*	*SE*	95% CI
$1	-0.11	0.06	[-0.22, -0.01]
$5	0.13	0.06	[0.012, 0.24]
$50	0.04	0.06	[-0.08, 0.15]
$200	-0.11	0.06	[-.22, -.01]

Table 3

Estimated Marginal Means for the Main Effect of Condition in a Mixed Model ANOVA, All Cases

Condition	*M*	*SE*	95% CI
Comparison	-0.16	0.06	[-0.28, -0.05]
Non-Comparison	0.13	0.06	[0.02, 0.24]

Note. n = 125 in comparison condition, n = 143 in non-comparison condition.

Table 4

Means for the Interaction of Condition and Magnitude in a Mixed Model ANOVA, All Cases

Condition	Magnitude	*M*	*SE*	95% CI
Comparison	$1	-0.24	0.08	[-0.40, -0.08]
	$5	-0.06	0.08	[-0.22, 0.11]
	$50	-0.12	0.09	[-0.28, 0.05]
	$200	-0.24	0.08	[-0.40, -0.08]
Non-Comparison	$1	0.01	0.08	[-0.13, 0.16]
	$5	0.31	0.08	[0.15, 0.46]
	$50	0.19	0.08	[0.04, 0.35]
	$200	0.01	0.08	[-0.13, 0.16]

Note. $n = 125$ in comparison condition, $n = 143$ in non-comparison condition.

Table 5

Means for the Interaction of Condition and Magnitude in a Mixed Model ANOVA, Selected Cases

Condition	Magnitude	*M*	*SE*	95% CI
Comparison	$1	-0.39	0.14	[-0.66, -0.12]
	$5	-0.14	0.16	[-0.45, 0.16]
	$50	-0.21	0.17	[-0.56, 0.13]
	$200	-0.39	0.14	[-0.66, -0.12]
Non-Comparison	$1	-0.01	0.08	[-0.17, 0.14]
	$5	0.36	0.09	[0.19, 0.54]
	$50	0.14	0.10	[-0.06, 0.34]
	$200	-0.01	0.08	[-0.17, 0.14]

Note. $n = 125$ in comparison condition, $n = 143$ in non-comparison condition.

Table 6

Conceptual results from a framing and magnitude manipulation

	Framing (Between-Subjects)	
Magnitude (Within-Subjects)	Comparison	Non-Comparison
$1	Loss aversion	Indifference
$5	Indifference	Reversed loss aversion
$50	Indifference	Reversed loss aversion
$200	Loss aversion	Indifference

Figures

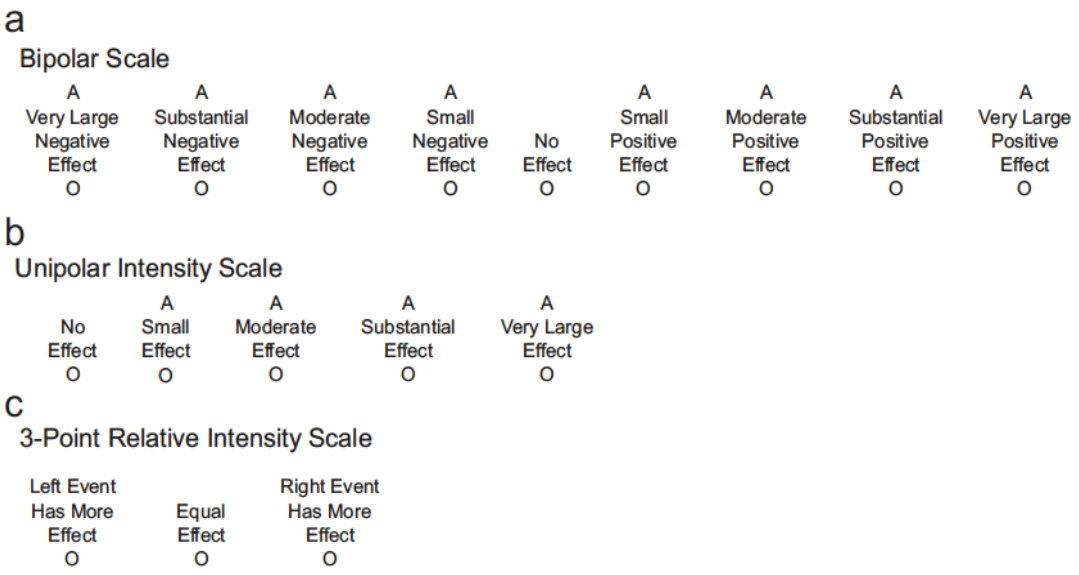

Figure 1. Reprinted from "Comparing gains and losses" by A.P. McGraw, J.T. Larsen, D. Kahneman, and D. Schkade, 2010, *Psychological Science*, *21*(10), p. 1439. Copyright 2010 by the authors.

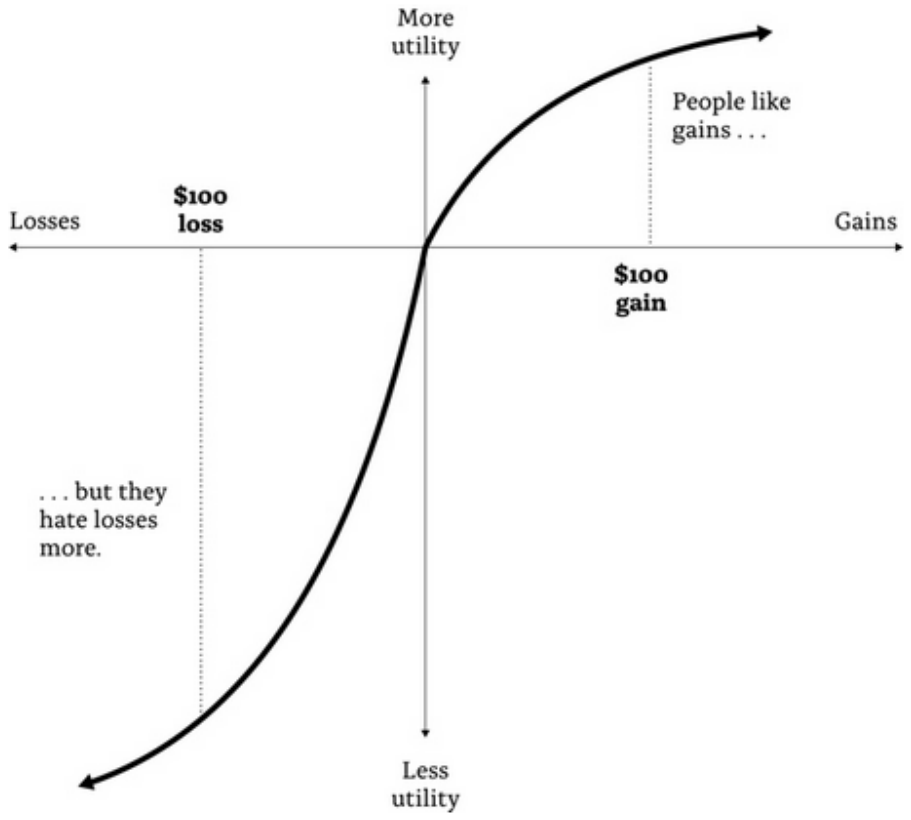

Figure 2. The value function. Reprinted from *Misbehaving: The making of behavioral economics* (p. 84) by R. Thaler, 2015, New York, NY: W. W. Norton & Company.

APPENDIX A

Informed Consent Form

<u>Instructions</u>: Fill in study specific descriptions noted in red and delete this section before submitting with application. If you are using this form, you must also request a "Waiver to Document Informed Consent" in your application

Consent to Participate in Online Survey Research Using MTurk

Study Title: Loss Aversion and the Gain/Loss Comparison Hypothesis

Study Description: We are researchers at the University of Wisconsin Oshkosh doing a research study about money. The purpose of this research study is to assess how people think about money. Approximately 120 subjects will participate in this study. If you agree to participate, you will be asked to complete an online survey that will take approximately 10 minutes to complete. You will be asked to answer questions about hypothetical monetary gambles, along with questions about your age and gender. Upon completing the study, you will be given a code to enter onto MTurk. Entering this code will ensure that you receive payment.

Risks/ Benefits: Risks to participants are considered minimal. Collection of data and survey responses using the internet involves the same risks that a person would encounter in everyday use of the internet, such as fatigue or breach of confidentiality. While the researchers have taken every reasonable step to protect your confidentiality, there is always the possibility of interception or hacking of the data by third parties that is not under the control of the research team. There will be no costs for participating. Benefits of participating include payment from Amazon of USD $0.25. You may also benefit from learning about what it is like to participate in a psychology research study. The benefit to society is the contribution to scientific knowledge.

Compensation: You will be paid USD $0.25, provided completion of the study (i.e., entering the correct code onto MTurk).

Confidentiality Researchers will have access to your MTurk worker ID which may be able to link to your personal information on your Amazon public profile page, depending on your settings you have on your Amazon profile. Amazon will have access to your MTurk ID and personal information (social security number, IP address, bank account information, etc...) and would be able to link it to your survey responses if the survey is created using MTurk internal software. MTurk worker IDs will not be shared with anyone outside the study team and will be used solely for the purposes of distributing compensation and will not be stored with your (survey responses/data). We will not be accessing any personally identifying information about you that you may have put on your Amazon public profile page. Worker IDs will be removed from the dataset after the codes entered have been verified. Data will be retained on the Amazon (and Qualtrics/Survey Monkey) servers for two weeks and will be deleted by the research staff after this time. However, data may exist on backups or server logs beyond the timeframe of this research project. Data transferred from the survey site will be saved on a password protected computer for 6 months. Any reports and presentations about the findings from this study will not include your name or any other information that could identify you. We may store this data for use in future research. However, no information in the data could be used to identify you.

Voluntary Participation: Your participation in this study is voluntary. You may choose to not answer any of the questions or withdraw from this study at any time without penalty. Your decision will not change any present or future relationship with the University of Wisconsin Oshkosh or Amazon.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Justyna Olszewska at olszewsj@uwosh.edu or Sean Conway at conwas01@uwosh.edu.

Who do I contact for questions about my rights as a research participant? Contact the UW Oshkosh IRB Chair at (920) 424-3215 or irb@uwosh.edu.

Research Subject's Consent to Participate in Research: By entering this survey/ selecting I agree, you are indicating that you have read the consent form, you are age 18 or older and that you voluntarily agree to participate in this online research study. Please make sure that you have read and agree to Amazon's Mechanical Turk participant and privacy agreements as these may impact the disclosure and use of your personal information.

APPENDIX B

Sample Questionnaire - Comparison Condition

Below is a sample questionnaire for participants in the comparison condition. Note that all participants will answer each question individually (i.e., only one question on the screen at a time, aside from the two demographics questions).

1) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $1 have on you given that there is a possibility that you could also gain $1?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

2) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $1 have on you given that there is a possibility that you could also lose $1?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

3) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $5 have on you given that there is a possibility that you could also gain $5?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

4) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $5 have on you given that there is a possibility that you could also lose $5?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

5) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $50 have on you given that there is a possibility that you could also gain $50?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

6) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $50 have on you given that there is a possibility that you could also lose $50?

A Very Large No Effect A Very Large

Negative Effect Positive Effect

-4 -3 -2 -1 0 1 2 3 4

7) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $200 have on you given that there is a possibility that you could also gain $200?

A Very Large Negative Effect				No Effect			A Very Large Positive Effect	
-4	-3	-2	-1	0	1	2	3	4

8) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $200 have on you given that there is a possibility that you could also lose $200?

A Very Large Negative Effect				No Effect			A Very Large Positive Effect	
-4	-3	-2	-1	0	1	2	3	4

Demographics Questions:

1. What is your sex?
   ____ Male
   ____ Female
   ____ Other/Self-identify; please specify: _____

2. Do you currently work full-time or part-time?
   ____ Full-time
   ____ Part-time
   ____ Not applicable; I am not currently employed.
3. For how many years have you been working? Please write down the total number of years.

____ years_____ months
____ Not applicable; I have never been employed.

4. What is your current gross annual salary (before taxes and other deductions)?

_____(gross annual salary) OR _____ (gross monthly salary) OR _____hourly rate/salary
   ____ Not applicable; I am not currently employed.

5. What is your current job title? _____
____ Not applicable; I am not currently employed.

6. What is your ethnicity?
   ____ African American/Black
   ____ Asian American/Asian
   ____ European American/White/Caucasian
   ____ Hispanic/Latino(a)
   ____ Indian or Pakistani
   ____ Middle Eastern
   ____ American Indian/Alaskan Native
   ____ Multi-ethnic
   ____ Other

7. What is your education level?
   ____ Some high school
   ____ High school/GED
   ____ Some college
   ____ Bachelor's Degree
   ____ Master's Degree
   ____ Advanced graduate work or Ph.D.
   ____ Not sure

8. Are you an U.S. citizen?
   ____ Yes
   ____ No

9. Have you ever gambled before?
   ___ Yes
   ___ No

10. How often do you gamble?
    ___ Never
    ___ Seldom
    ___ Sometimes
    ___ Often

APPENDIX C

Sample Questionnaire - Non-Comparison Condition

Below is a sample questionnaire for participants in the comparison condition. Note that all participants will answer each question individually (i.e., only one question on the screen at a time, aside from the two demographics questions).

1) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $1 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

2) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $1 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

3) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $5 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

4) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $5 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

5) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $50 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

6) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $50 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

7) Imagine that you are to play an imaginary coin toss gamble. What effect would a loss of $200 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

8) Imagine that you are to play an imaginary coin toss gamble. What effect would a gain of $200 have on you?

A Very Large Negative Effect | No Effect | A Very Large Positive Effect

-4 -3 -2 -1 0 1 2 3 4

Demographics Questions:

1. What is your sex?

____ Male
____ Female
____ Other/Self-identify; please specify: _____

2. Do you currently work full-time or part-time?

____ Full-time
____ Part-time
____ Not applicable; I am not currently employed.

3. For how many years have you been working? Please write down the total number of years.

____ years_____ months
____ Not applicable; I have never been employed.

4. What is your current gross annual salary (before taxes and other deductions)?

_____(gross annual salary) OR _____ (gross monthly salary) OR _____hourly rate/salary
____ Not applicable; I am not currently employed.

5. What is your current job title? _____
____ Not applicable; I am not currently employed.

6. What is your ethnicity?

____ African American/Black
____ Asian American/Asian
____ European American/White/Caucasian
____ Hispanic/Latino(a)
____ Indian or Pakistani
____ Middle Eastern
____ American Indian/Alaskan Native
____ Multi-ethnic
____ Other

7. What is your education level?
    ____ Some high school
    ____ High school/GED
    ____ Some college
    ____ Bachelor's Degree
    ____ Master's Degree
    ____ Advanced graduate work or Ph.D.
    ____ Not sure

8. Are you an U.S. citizen?
    ____ Yes
    ____ No

9. Have you ever gambled before?
    ___ Yes
    ___ No

10. How often do you gamble?
    ___ Never
    ___ Seldom
    ___ Sometimes
    ___ Often

APPENDIX D

Debriefing Form

DEBRIEFING

Thank you for completing this study!

The aim of this research study is to test the idea of loss aversion. Loss aversion is the idea that people dislike monetary losses more than they like monetary gains. In other words, people like receiving money, but dislike losing money even more.

We hope to show how manipulating how people compare losses and gains can change the way they feel about these losses and gains. We predict that asking people to compare monetary gains and losses will create loss aversion, but the absence of these comparisons will lead to indifference between gains and losses.

These potential results could be relevant for everyday life. If people think about and make decisions about money in an irrational way, it may be necessary to improve the way our finance system works and educate people on how to best make decisions.

Furthermore, if the comparison process is behind loss aversion, it may be necessary to determine under what circumstances this process arises.
If you have any questions or concerns, please contact: Sean Conway (conwas01@uwosh.edu) or Justyna Olszewska (olszewsj@uwosh.edu).

Thank you again for your participation!

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