Online Appendix A
Instructions for and numbers used in Experiment 1

Imagine that you went gambling with your friends over the weekend. On the following pages, you will be presented with a series of possible outcomes. Please consider each situation independently. Imagining that you experienced each set of outcomes, please rate how these outcomes would make you feel.

Over the course of the weekend, you won $X, but you lost $Y (taking home $Z more than you started with). How good or bad would you feel about the outcome at the end of the weekend? I couldn't feel worse about the outcome (1) *to* I couldn't feel better about the outcome (10)

Set 1
(the four sets of numbers below were presented in a random order for one half of participants)
you won $800, but you lost $600 (taking home $200 more than you started with).
you won $300, but you lost $100 (taking home $200 more than you started with).
you won $250, but you lost $750 (taking home $500 less than you started with).
you won $1,000, but you lost $1,500 (taking home $500 less than you started with).

Set 2
(the four sets of number below were presented in a random order for the other half of participants)
you won $1,500, but you lost $1,000 (taking home $500 more than you started with
you won $750, but you lost $250 (taking home $500 more than you started with).
you won $100, but you lost $300 (taking home $200 less than you started with
you won $600, but you lost $800 (taking home $200 less than you started with).

Online Appendix B
Outline for Games Played in Experiment 2: Roulette Game

Introduction:
On the following pages, you will be playing two different games of chance. You will be playing for real money in each of the games. Along the way, you will receive tokens to help you keep track of how much you are winning and losing. You will get one green token for every 10 cents that you win (this money is yours to keep at the end of the game) and one red token for every 10 cents that you lose (this is money you will owe at the end of the game).

You will earn $1 for participating in the experiment, and you cannot lose more than $1 in total throughout (so you won't walk away with less than you started with, but you can make more than the base amount).

[Game 1 vs. Game 2 first] and [High vs. Low condition first] varied in the below, so each person had one Variable game and one Even-Odd game, one high and one low condition]

Variable -
In the [second] game, the amount of money you can win or lose on each spin varies. Instead of making a guess about where the ball will land, you can spin the wheel at whichever speed you choose, where 1 is the slowest (so the wheel will spin the least), and 10 is the fastest (so the wheel will spin the most). You will make or lose the amount of money that appears on the wheel where the ball lands after each spin. You will be playing 10 rounds of this game.
   a. High outcome: play 10 rounds of game, end +12, -8. Win 8 (sum to $1.20), lose 2 (sum to $0.80)
   b. Low outcome: play 10 rounds of game, end +5, -1. Win 8 (sum to $0.50), lose 2 (sum to $0.10)

Even-Odd-
In the [first] game, I will spin a ball on a wheel with odd and even spaces. You can choose whether you think that the ball will land in an odd or an even space when the wheel stops spinning. If your guess is correct, you will receive $0.10 at the end of the game, as indicated by the green tokens on your screen. If your guess is incorrect, you will owe $0.10 at the end of the game, as indicated by the red tokens in the upper right corner of your screen. You will be playing [XX] rounds of this game.
   a. High condition: play 20 rounds of game. Win 12, lose 8
   b. Low condition: play 6 rounds of game. Win 5, lose 1

After each game, wins and losses displayed on screen for 1 seconds, with the images in the center of the screen and the words: "You won $X.XX in this game, and you lost $Y.YY." Keep the same page, and after 1 sec, add the below questions:

DVs
How satisfied are you with your experience in the game?
How satisfied are you with your final outcomes? [1- not at all satisfied to 6- completely satisfied]
After both games: Of the two games you just played, which game do you think you did better in?

Online Appendix C
Additional Details for Experiment 3

Instructions:
Please imagine that you were flipping a fair coin. You were betting that the coin would land on heads, and were paid $1 for each time the coin landed on heads and gave up $1 each time the coin landed on tails. You tossed the coin and saw the following outcomes:

[Participants saw one set of three coin flip scenarios, all from the same condition. Questions were presented one per page in a random order, with the DV on the same page as the description of the outcome of the coin flips]

Values Used Across Conditions:
Negative, Low Condition:
$4 outcome - 4 heads (win $4) 8 tails (lose $8)
$5 outcome - 2 heads (win $2) 7 tails (lose $7)
$6 outcome - 3 heads (win $3) 9 tails (lose $9)

Negative, High Condition:
$4 outcome - 34 heads (win $34) 38 tails (lose $38)
$5 outcome - 52 heads (win $52) 57 tails (lose $57)
$6 outcome - 43 heads (win $43) 49 tails (lose $49)

Positive, Low Condition:
$4 outcome - 8 heads (win $8) 4 tails (lose $4)
$5 outcome - 7 heads (win $7) 2 tails (lose $2)
$6 outcome - 9 heads (win $9) 3 tails (lose $3)

Positive, High Condition:
$4 outcome - 38 heads (win $38) 34 tails (lose $34)
$5 outcome - 57 heads (win $57) 52 tails (lose $52)
$6 outcome - 49 heads (win $49) 43 tails (lose $43)

Dependent Variable: How satisfied would you be with this outcome?
- (1) Extremely Dissatisfied to (7) Extremely Satisfied

Fair Coin Manipulation Check: What is the chance of getting a heads in a coin flip like the ones on the prior pages?
- 0% chance
- 25% chance
- 50% chance
- 75% chance
- 100% chance
- Other

Online Appendix D
Additional Details for Experiment 6

Sample Win Question:
Please imagine that you went gambling with your friends over the weekend. Over the course of the weekend, you won $100, but you lost $25 (winning overall). Please state how many of each of the following items you think you would be able to purchase with the $100 you won, whether or not you would actually use the money to make the purchase. For example, if the item was a stapler and you thought you would be able to buy 10 staplers using the $100, then you would write 10 in the space provided.

Sample Loss Question:
Please imagine that you went gambling with your friends over the weekend. Over the course of the weekend, you won $100, but you lost $175 (losing overall). Please state how many of each of the following items you think you would be able to purchase with the $100 you won, whether or not you would actually use the money to make the purchase. For example, if the item was a stapler and you thought you would be able to buy 10 staplers using the $100, then you would write 10 in the space provided.

Specific numbers used (value in **bold** was subject of purchasing power question). Participants received two questions from the same group below.

Overall win (testing consistent gain):
Winning $75: **+100**, -25
Winning $25: **+100**, -75

Overall win (testing contrasting loss):
Winning $75: +$175, **-100**
Winning $25: +125, **-100**

Overall loss (testing consistent loss):
Losing $75:   +25,   **-100**
Losing $25:   +75,   **-100**

Overall loss (testing contrasting gain):
Losing $75:   **+100**, -25
Losing $25:   **+100**, -125

Neutral (testing neutral gain; same values for both questions):
Neutral $0:   **+100,** -100

Neutral (testing neutral loss; same values for both questions):
Neutral $0:   +100, **-100**

Items (set 1):
Bottles of water
Mugs
Picture frames
Boxes of cereal
Snickers bars

Items (set 2)
Tubes of toothpaste
Pairs of socks
Boxes of tissues
Cans of soup
2-liter bottles of soda

Supplementary Experiment 1:

Shifting attention to eliminate focus on asymmetric attributes

The current experiment replicates findings from the paper and examines whether it is possible to eliminate patterns observed by redirecting attention towards net outcomes.

Method

Participants. Two-hundred one participants were recruited online through Mechanical Turk, and they completed the study in exchange for $0.50. Participants ranged in age from 19 to 74 ($M = 34.81$), and 39% were female.

Design and Procedure. As in Experiment 1, participants were told to imagine that they had been gambling with friends the previous weekend, and they were asked to state how they would feel if they had experienced each of a series of outcomes. Participants saw four scenarios in a random order, presented sequentially with one on each screen. These outcomes were randomly selected from one of two possible sets, using the same values as were used in Experiment 1. Two of the outcomes were matched to have equivalent levels of net gains, but varied levels of component gains and losses. The other two outcomes were matched to have equivalent levels of net losses, but varied levels of component gains and losses. For example, participants read: *Over the course of the weekend, you won $800, but you lost $600 (taking home $200 more than you started with).* In another question, the values switched from $800 and $600 to $300 and $100. The numbers provided to participants were counterbalanced.

Participants were randomly assigned to either the control or the contemplation condition in a between subjects design. Participants in both the control and contemplation conditions were presented with the same initial set of outcomes and asked, "*How good or bad would you feel*

about the outcome at the end of the weekend?" They responded on a scale from 1- "I couldn't

feel worse about the outcome" to 10- "I couldn't feel better about the outcome".

Before responding to the question about each outcome, participants in the contemplation

condition were prompted to think about the outcome and consider the amount that they won in

addition to the amount that they lost. They were instructed to enter "the total amount of money

that [they] took home with [them] (or lost) in total at the end of the weekend." Next, they

considered what they would be able to buy with the money they had earned (or would have been

able to buy had they not lost the money) and described these purchases. Participants in the

control condition went directly to the questions about their feelings towards final outcomes.

Participants completed demographic questions before exiting the survey.

Results and Discussion

To examine changes in the size of the preference for high versus low attribute outcomes

across contemplation and control conditions, I conducted a 2 (between subjects contemplation

condition: contemplate vs. control) by 2 (within subject outcome condition: positive vs. negative)

by 2 (within subject magnitude condition: high vs. low) mixed analysis of variance. See the

figure below for means and 95% confidence intervals, by condition. Peripheral to my

hypothesis, this analysis revealed a main effect of valence, with participants in the positive

outcome conditions reporting higher satisfaction ($M_{POSITIVE} = 7.52$, $SD = 1.70$) than those in the

negative outcome conditions ($M_{NEGATIVE} = 3.10$, $SD = 1.75$; $F(1, 199) = 870.06$, $p < .001$, $\eta_p^2 =$

0.81). While there was no significant main effect of either magnitude or contemplation

condition, there was a significant interaction between net outcome and contemplation condition

($F(1, 199) = 20.07$, $p < 0.001$, $\eta_p^2 = 0.09$), and a significant interaction between magnitude and

contemplation condition ($F(1, 199) = 20.74$, $p < 0.001$, $\eta_p^2 = 0.09$). As in earlier studies, there

was a significant interaction between magnitude and net outcome across contemplation

conditions ($F(1, 199) = 104.47$, $p < 0.001$, $\eta_p^2 = 0.34$).

Average outcome satisfaction, and 95% confidence intervals, on a scale from 1 "I couldn't feel

worse about this outcome" to 10 "I couldn't feel better about this outcome" as a function of

whether outcomes were positive (of equivalent value) or negative (of equivalent value) and

whether or not participants were instructed to contemplate the net outcomes in Supplementary

Experiment 1.
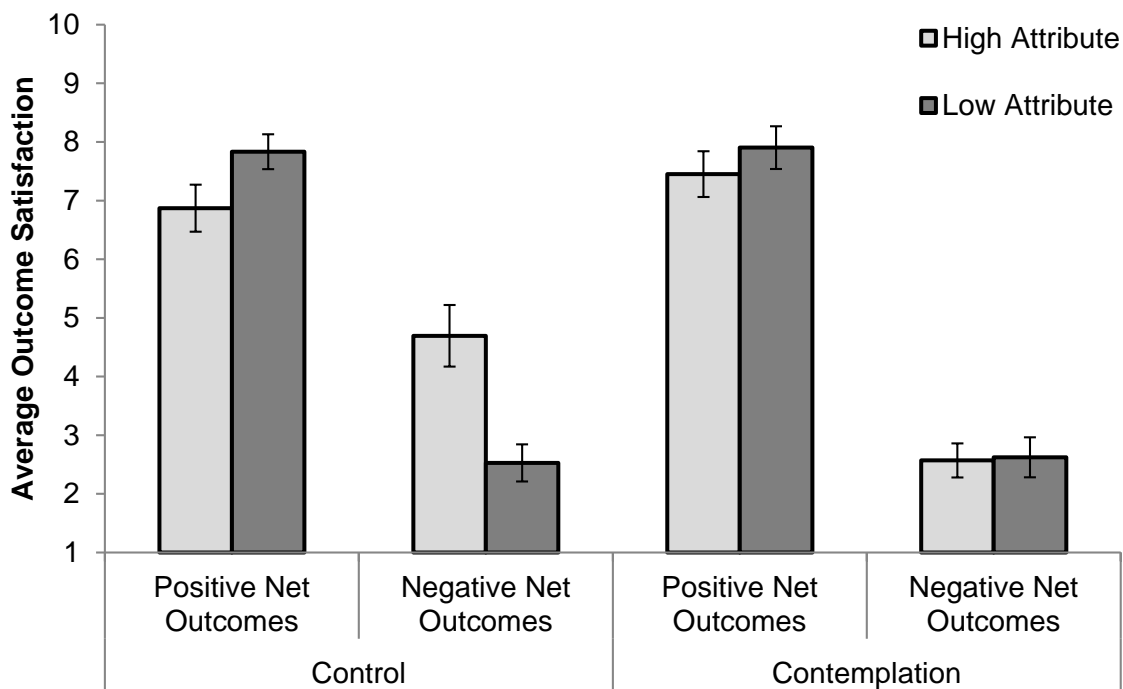
Importantly, as predicted, there was a three-way interaction between magnitude, net

outcome, and contemplation conditions ($F(1, 199) = 62.65$, $p < 0.001$, $\eta_p^2 = 0.24$). The data

shows the familiar two-way interaction in the control condition, but not in the contemplation conditions. In other words, after explicitly contemplating the net outcome, participants rated their satisfaction with outcomes of equivalent net value more similarly, irrespective of the component gains and losses that comprised them.

These results are consistent with the hypothesis that a shift in attention accounts for the pattern of results in the control condition, although it does not rule out alternative accounts. Once attention is redirected to both positive and negative attributes as well as net outcomes, differences in evaluations across high and low attribute alternatives dissipate. Additionally, the results suggest that careful thought can increase the extent to which people place equal weight on component attributes, focusing instead on net outcomes. This equal weighting leads people to treat component attributes as though they are fungible and brings evaluations closer to those of normative predictions.

Supplementary Experiment 2

Calories and Football Yards

Experiment 1 introduces an examination of basic patterns in two distinct domains, investigating how people perceive differences between calories consumed and calories burned in a dieting context and how they perceive differences between yards gained and yards lost on the football field. I chose these domains because of their normative netting properties. In dieting, a person's weight-loss is determined by the sum of calories in minus calories out. In football, a team's location on the field is determined by the sum of yards gained minus yards lost, thus creating a clear normative benchmark around an additive decision rule in each case. Since these evaluation rules should hold irrespective of component attribute levels, these domains allow us to understand how judgments vary beyond normative predictions.

Method

Participants. Ninety-nine US residents were recruited online from Amazon.com's Mechanical Turk platform for nominal compensation. Participants ranged in age from 18 to 68 years ($M = 34$), and 30% were female.

Design and procedure. Participants each responded to two questions about calorie consumption and two about football. Both questions on the same topic were presented sequentially, with the order of questions and topics randomized. The calorie questions instructed participants to imagine two people trying to lose weight. To ensure that participants understood that burning calories was positive in the context of weight loss, they read: "Rather than always reducing calories, they can "earn" additional calories through exercise. When they exercise more, they can eat more calories and still stick to their diet, as long as the extra calories earned are greater than the extra calories consumed." They then read about two people's consumption from

the previous day. In each question, one of the individuals had both consumed and burned a

higher overall level of calories. However, the net difference in consumption was held constant.

Both people had consumed 200 calories more than they burned (net negative) in one question,

and had burned 200 calories more than they consumed (net positive) in the other. Participants

were then asked to choose which person performed better on their dieting plan, and responded on

a scale from 1 – definitely [the person who had consumed and burned fewer calories] to 6 –

definitely [the person who had consumed and burned more calories].

The football questions told participants to imagine that there were two football teams

playing in separate games. To emphasize an overall background that was either positive or

negative, they were told that both teams were either doing well (net positive condition) or poorly

(net negative condition) so far this season. After starting at the 50 yard line, the teams described

as doing well had each gained 10 yards more than they had given up in the game. The teams

described as doing poorly had each given up 10 yards more than they had gained in the game. In

each case, one of the teams was described as having gained and given up more yards than the

other. Participants were asked to choose which team they believed was now closer to scoring

and responded on a scale from 1 – definitely [the team that had gained and given up fewer yards]

to 6 – definitely [the team that had gained and given up more yards].

Results and Discussion

The dependent variable of interest was choice of the high (vs. low) attribute alternative

across contexts. A 2 (attribute level: high vs. low) by 2 (domain: calories vs. football) repeated

measures analysis of variance revealed that participants were more likely to view the

person/team with higher gains and losses as making greater progress towards their goal when the

net progress was negative (consuming more calories than burned or giving up more yards than

gained) than when it was positive ($M_{NEG} = 3.68$, $SD_{NEG} = 0.96$ vs. $M_{POS} = 3.40$, $SD_{POS} = 1.05$;

$F(98) = 5.42$, $p = 0.022$, $\eta^2 = 0.05$). These results were consistent across both the calorie ($M_{NEG} =$

3.64, $SD_{NEG} = 1.48$ vs. $M_{POS} = 3.35$, $SD_{POS} = 1.44$) and the football ($M_{NEG} = 3.73$, $SD_{NEG} = 1.33$

vs. $M_{POS} = 3.45$, $SD_{POS} = 1.33$) domains, with no significant interaction across domains ($F < 1$, ns).

Overall, this experiment provides initial evidence that preference for a given level of positive and

negative attributes depends on the valence of the option's net attribute levels.

Supplementary Experiment 3: Restaurant Reviews

The experiments in the main text showed that people can evaluate outcomes with high magnitudes as superior when net outcomes are negative, but outcomes with low attribute levels as superior when net outcomes are positive. This experiment extends patterns from evaluation to choice, and investigates a new domain, asking participants to select which restaurant they would choose on the basis of restaurant reviews. The current experiment uses a between-subjects design, and explores what it means for an attribute to be "positive" or "negative". Specifically, it examines whether the same patterns persist across two different scales, a negative five to positive five scale and a zero to ten scale. The goal of this variation is to determine whether the same pattern persists not only when the valence of the outcome is explicit (e.g., -5 to -1 for negative attributes vs. 1 to 5 for positive attributes) but also when the valence is implicit relative to a scale's midpoint (e.g., 0-4 vs. 6-10). This design also investigates whether patterns will extend to cases where decision rules are more ambiguous, in which people may or may not believe that ratings should be combined additively.

Method

Participants. One-hundred ninety-six US residents were recruited online from Amazon.com's Mechanical Turk platform for nominal compensation. Participants ranged in age from 18 to 68 years ($M = 34$), and 54% were female.

Design and procedure. Participants read and responded to a single question about which restaurant they would choose. The question was randomly selected from one of four options that varied the net option value (positive vs. negative) and the scale (-5 to 5 vs. 0 to 10) of the restaurant alternatives in a two by two crossed design. For the options with net positive values, participants read: "*Imagine that you live in a city known for its excellent restaurants and*

that you are choosing between two nearby restaurants for dinner tonight, both of which you've heard great things about. The two restaurants have similar food, service and décor. However, there are some differences in reviews by local magazines, as shown below." They then chose between two restaurants that had received two reviews with average ratings of 1.5 on the -5 to 5 scale, equivalent to 6.5 on the 0 to 10 scale. One restaurant received high magnitude reviews equal to +5 and -2 or 10 and 3 on each scale, respectively. The other restaurant received low magnitude reviews equal to +3 and 0 or 8 and 5 on each scale, respectively.

For the options with net negative values, participants instead read: *"Imagine that you live in a city in the middle of nowhere, with a bad reputation for restaurants and that you are choosing between two nearby restaurants for dinner tonight, although neither one looks good to you. The two restaurants have similar food, service and décor. However, there are some differences in reviews by local magazines, as shown below."* They then chose between two restaurants with average ratings of -1.5 on the -5 to 5 scale, equivalent to 3.5 on the 0 to 10 scale. These restaurant reviews paralleled those for the positively valued options. One restaurant received high magnitude reviews equal to -5 and +2 or 0 and 7 on each scale, respectively. The other restaurant received low magnitude reviews equal to -3 and 0 or 2 and 5 on each scale, respectively.

Participants were asked "Based on these reviews, where would you choose to dine?" and selected one of the two options provided to them. They responded to demographic questions before completing the survey.

Results and Discussion

A 2 (net option value: positive vs. negative) by 2 (scale: -5 to 5 vs. 0 to 10) analysis of variance revealed that participants were more likely to choose the high magnitude alternative

when the restaurants had a net negative value (51%) than when they had a net positive value

(32%; $F(1,192) = 7.13$, $p = .008$, $\eta^2 = .036$), consistent with my hypothesis. However, there was

no main effect of scale ($F(1,192) = 2.10$, $p > .100$) and no interaction between net option value

and scale ($F(1,192) = 0.17$, $p > .100$). These results suggest that participants responded to the

net option value of the choice set and this led people to choose the option that had higher

magnitudes of both positive and negative attributes (i.e., review ratings) when the net option

value was negative, but to choose the option that had lower magnitudes of positive and negative

attributes when the net option value was positive. Furthermore, findings suggest that participants

were able to identify which attributes were positive or negative irrespective of whether the

attributes were presented to them on a scale that contained (-5 to 5) or lacked (0 to 10) explicit

mention of valence. In other words, people appear to process net outcome valence as well as

component valence relative to a natural reference point (in this case, the midpoint of the scale)

without specific mention of positivity or negativity.

Supplementary Experiment 4: Additive Values

The following study was included to probe the possibility that participants were relying on ratio calculations to form judgments, and this heuristic was solely responsible for the observed patterns. Prior research has shown that people are more likely to rely on additive (vs. multiplicative, or ratio based) decision rules when making computations across numbers that have ratios that are easy to compute (Wright, 2001). For example, people would be more likely to rely on additive decision rules when comparing values such as 311 and 611 rather than 300 and 600. Thus, the current study examines non-round numbers such as these to further identify the role of ratios. If participants were solely relying on a ratio heuristic, I would expect the patterns observed in prior studies to be severely muted when considering these new stimuli.

Method

Participants. Fifty-four US residents were recruited online from Amazon.com's Mechanical Turk platform for nominal compensation. Participants ranged in age from 20 to 69 years ($M = 31$), and 52% were female.

Design and procedure. The study design was nearly identical to that used in Experiment 1. Participants were told to imagine that they had been gambling with friends the previous weekend, and they were asked to state how they would feel if they had experienced each of a series of outcomes. Participants saw four scenarios in a random order, presented sequentially with one on each screen. Two of the outcomes were matched to have equivalent positive net outcomes, but higher or lower magnitudes of component gains and losses. The other two outcomes were matched to have equivalent net negative outcomes, but higher or lower magnitudes of component gains and losses. In other words, these outcomes were designed using a 2 (net outcome: positive vs. negative) by 2 (magnitude: high vs. low) within-subject design.

For example, participants read: *Over the course of the weekend, you won $822, but you lost $622 (taking home $200 more than you started with). How good or bad would you feel about the outcome at the end of the weekend?* They responded on a scale from 1- "I couldn't feel worse about the outcome" to 10- "I couldn't feel better about the outcome". The set of outcomes participants saw were randomly selected from one of two possible sets, with net outcomes of either positive or negative $200 or $500. The central change from Experiment 1 was that the stimuli used were designed so that all pairs of numbers being compared shared the same final two digits. For example, $800 and $600 were updated to $822 and $622, and $1,000 and $1,500 were updated to $1,019 and $1,519.

Results and Discussion

A two (net outcome: positive, negative) by two (magnitude: high, low) within-subject analysis of variance revealed a main effect of net outcome valence ($F(1, 54) = 111.91, p<.001$, $\eta^2=.68$), such that people felt better about the outcomes when they won more than they lost. There was no significant overall effect of having higher versus lower magnitudes of gains and losses after controlling for net value ($F(1,54) = 2.76, p>0.10$). However, consistent with my hypothesis, there was a significant interaction between net outcome and magnitude ($F(1, 54) = 8.42, p=.005, \eta^2=.14$). In other words, given an equivalent net negative outcome, participants reported feeling better when they had higher ($M = 3.27, SD = 2.52$) rather than lower ($M = 2.62, SD = 1.88$) magnitudes of wins and losses. This pattern disappeared in the case of net positive outcomes, in which participants (directionally) reported feeling better when they had lower magnitudes of wins and losses ($M = 7.78, SD = 2.19$) then when they had higher magnitudes of wins and losses ($M = 7.62, SD = 2.25$).