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Title: I Want It Now! Query Theory Explains Discounting Anomalies for Gains *and* Losses

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I Want It Now! Query Theory Explains Discounting Anomalies for Gains *and* Losses

Consumers discount delayed gains (default is a smaller, sooner gain) more than accelerated gains (default is a larger, later gain) and delayed losses *less* than accelerated losses. We find that the prominence of thoughts in favor of the smaller, sooner amount mediates the direction effect for gains *and* losses.

ABSTRACT WORD COUNT: 49 / 40-50

Imagine a consumer expecting to receive $100 now, but being given the option to receive $110 in 3 months instead. Now imagine the consumer expects to receive $110 in three months, but is given the option to receive $100 now. Although in both scenarios consumers often prefer the sooner amount despite it being smaller, they tend to prefer it more strongly in the first scenario than in the second scenario. Initial expectations influence consumer preferences such that they are more impatient when faced with a delay (when the default is to receive a smaller, sooner gain, but there is an option to receive a larger, later gain instead) than with an acceleration (when the default is to receive a larger, later gain, but there is an option to receive a smaller, sooner gain instead). This is the classic "direction effect": people discount delayed gains more than accelerated gains (Loewenstein 1988). For losses, however, this direction effect is reversed and people discount delayed losses *less* than accelerated losses (Benzion, Rapoport, and Yagil 1989; Shelley 1993).

We use Query Theory as a process account to explain the effect of direction (delay vs. acceleration) on intertemporal choice. Query Theory suggests that decision makers construct their preferences by asking internal queries about the available choice options (e.g., $100 now or $110 later; Johnson, Haubl, and Keinan 2007; Weber et al. 2007). Query Theory posits that queries are asked sequentially and that arguments for the default choice option are generated first. In other words, when presented with a delay scenario, people first query their episodic knowledge base for arguments in favor of the default (i.e., "What argues for choosing $100 now?"), before considering arguments in favor of the alternative (i.e., "What argues for choosing $110 later?"). Due to output interference, retrieval for later queries is less successful and, thus, the balance of support tends to favor the default option (Johnson et al. 2007). Weber et al. (2007) successfully used Query Theory to explain the direction effect within gains, but it has not yet been applied to discounting of losses.

The present research was designed to replicate the sign (gains vs. losses) by direction (delay vs. acceleration) interaction using a between-subjects design and to confirm and extend Query Theory to the discounting of losses.

METHOD

In a 2 (sign: gain vs. loss) x 2 (direction: delay vs. acceleration) between-subjects design, U.S. residents (N = 607) were randomly assigned to read one of four hypothetical decision scenarios: delayed gain, accelerated gain, delayed loss, or accelerated loss. Participants used a type-aloud protocol to record their thoughts before making their decisions (Johnson et al. 2007; Weber et al. 2007). Participants subsequently coded their own previously recorded thoughts as favoring receiving [paying] now, favoring receiving [paying] later, or favoring neither.

RESULTS

Replicating the sign effect, participants discounted gains more than losses. Replicating the sign by direction interaction, participants discounted delayed gains *more* than accelerated gains, but delayed losses *less* than accelerated losses.

As predicted by Query Theory, across sign, thoughts favoring receiving/paying now (i.e., now thoughts) clustered earlier in the delay conditions (when now was the default) than in the acceleration conditions (when later was the default), the proportion of now thoughts was greater in the delay conditions than in the acceleration conditions, and the effect of direction (delay vs. acceleration) on the proportion of now thoughts was fully mediated by thought clustering. In other words, when the default was to receive [pay] now, thoughts favoring receiving [paying] now were clustered earlier, which led to a greater proportion of these thoughts.

As predicted, a greater prominence of now thoughts (i.e., earlier and more now thoughts) translated to *greater* discounting of gains and to *lower* discounting of losses. In fact, the prominence of now thoughts significantly mediated the relationship between direction and discounting for gains *and* for losses. As predicted by Query Theory, now thoughts were more prominent for delayed outcomes than accelerated outcomes and this led to increased discounting of gains and reduced discounting of losses.

DISCUSSION

Using a between-subject design, our study replicated the sign effect and the sign by direction interaction effect (i.e., the direction effect for gains and the reverse direction effect for losses). More importantly, we provide a process-level causal account for the sign by direction interaction. Confirming a Query Theory process account, the overall prominence of now thoughts mediated the effect of direction on discounting for gains *and* losses.

Because our study is the first to compare the processes underlying discounting of gains and losses, our results can uniquely inform interventions to help consumers make intertemporal choices they are less likely to regret, whether it's the dieter who succumbs to the dessert tray (Metcalfe and Mischel 1999), the worker who retires with insufficient savings (Thaler and Benartzi 2004), or the community that overfishes their lake (Hendrickx, Poortinga, and van der Kooij 2001). Because the intertemporal choice literature studies mostly gain decisions, a naïve choice architect might assume that acceleration frames are a panacea to reduce discounting. Our study confirms that the story is more nuanced. For gains, impatience (i.e., the desire to have the gain now) increases discounting. To decrease the discounting of gains, we need to *decrease* impatience. For losses, however, impatience (i.e., the desire to get the loss over with now) translates to lower discounting. Therefore, to decrease discounting of losses we need to *increase* impatience. Whether with changes to how decisions are presented (e.g., with different default options or with different framings) or how options are considered (i.e., training people to consider the alternative option before the default option), giving consumers the tools to change the prominence of their impatient "act now" thoughts when faced with intertemporal decisions will arm them against making decisions they will later regret.

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EXTENDED ABSTRACT WORD COUNT: 956 / 40-50

I Want It Now! Query Theory Explains Discounting Anomalies for Gains *and* Losses

Imagine expecting to receive $100 now, but being given the option to receive $110 in 3 months instead. Now imagine expecting to receive $110 in three months, but being given the option to receive $100 now. In both scenarios, several factors (e.g., uncertainty, Weber and Chapman 2005; resource slack, Zauberman and Lynch 2005; interest on investment, e.g., Franklin 1784; Samuelson 1937; and present bias, Benhabib, Bisin, and Schotter 2007; Laibson 1997) motivate us to prefer the sooner amount despite it being smaller. However, we tend to prefer the smaller, sooner amount more in the first scenario than in the second scenario. Our initial expectation of when we will receive the money influences our preferences such that we are more impatient when faced with a delay (when the default is to receive a smaller, sooner gain, but there is an option to receive a larger, later gain instead) than with an acceleration (when the default is to receive a larger, later gain, but there is an option to receive a smaller, sooner gain instead). This is the classic "direction effect": we discount delayed gains more than accelerated gains (Loewenstein 1988). For losses, however, this direction effect is reversed and we discount delayed losses *less* than accelerated losses (Benzion, Rapoport, and Yagil 1989; Shelley 1993).

Why does the standard direction effect reverse for losses? Although these asymmetries in discounting are well established, to date no studies have collected process data and this interaction is largely unexplained. We use Query Theory as a process account to explain the effect of direction (delay vs. acceleration) on intertemporal choice. According to theories of preference construction, to arrive at a choice, people actively construct their preferences rather than merely recalling stored preferences (Lichtenstein and Slovic 2006; Weber and Johnson 2009). Query Theory suggests that decision makers construct their preferences by asking internal queries about the available choice options (e.g., $100 now or $110 later; Johnson, Haubl, and

Keinan 2007; Weber et al. 2007; Weber and Johnson 2011). Query Theory posits that queries are asked sequentially and that arguments for the default choice option are generated first. In other words, when presented with a delay scenario, people first query their episodic knowledge base for arguments in favor of the default (i.e., "What argues for choosing $100 now?"), before considering arguments in favor of the alternative (i.e., "What argues for choosing $110 later?"). Due to output interference, retrieval for later queries is less successful and, thus, the balance of support tends to favor the default option (Johnson et al. 2007).

Weber et al. (2007) used Query Theory to explain the direction effect within gains. For gains, the prominence of thoughts in favor of the default (thoughts in favor of the smaller, sooner gain for the delay scenario and thoughts in favor of the larger, later gain for the acceleration scenario) mediates the effect of direction on discounting (Weber et al. 2007). In other words, people have earlier and more impatient thoughts and, as a result, discount more, when the smaller, sooner gain is the default (delay) than when the larger, later gain is the default (acceleration). Query Theory has not yet been applied to discounting of losses.

Thus, the present research was designed to replicate the sign (gains vs. losses) by direction (delay vs. acceleration) interaction using a between-subjects design (previous studies used within-subjects designs) and to confirm and extend Query Theory to the discounting of losses. This led us to have several hypotheses:

H1: We will replicate standard discounting asymmetries.

H1a: Replicating the sign effect (Thaler 1981), gains will be discounted more than losses.

H1b: Replicating the sign by direction interaction (Benzion et al. 1989; Shelley 1993), delayed gains will be discounted more than accelerated gains whereas delayed losses will be discounted less than accelerated losses.

H2: As predicted by Query Theory, across gains and losses, (a) thoughts in favor of the default option will cluster earlier than thoughts in favor of the alternative option, (b) there will be more thoughts in favor of the default option than in favor of the alternative option, and (c) the effect of the default on the proportion of thoughts in favor of the default option will be mediated by the clustering of thoughts.

H3: As predicted by Query Theory (a) thoughts in favor of the smaller, sooner option ("now" thoughts) will be more prominent in delay scenarios than acceleration scenarios for gains and *losses, (b) the prominence of now thoughts will predict discounting, albeit in opposite directions for gains and losses (This seemingly counterintuitive prediction is a direct result of how discounting operates—wanting to realize a gain now is equivalent to a high discount rate and wanting to realize a loss now is equivalent to a low discount rate. Thus, if more prominent now thoughts lead to a desire to realize outcomes now, they will lead to greater discounting of gains and to lower discounting of losses.), and (c) the prominence of now thoughts will mediate the effect of direction on discounting for gains* and *losses.*

METHOD

Participants

U.S. residents (N = 752) were recruited and run online through the Center for Decision Sciences' Virtual Lab. Participants were compensated $4 for their time. Data from 145 (19%) participants were excluded for one of four reasons: (1) 80 participants did not complete the study or had missing data due to a technical error, (2) 29 participants had extreme survey completion times (i.e., outside two standard deviations of the mean of the natural logarithm of time; M_{time} = 16.08 minutes, $M_{ln\ time}$ = 2.63, S*D* = 0.52), (3) 26 participants had nonmonotonic (i.e., repeated switching between now and future amounts) or perverse preferences (e.g, preferred smaller, later

gains over larger, sooner gains) in the choice titrator, and (3) 10 participants provided extreme and inconsistent responses on the choice titrator and a follow-up matching question.

Analyses were based on the data from the remaining 607 participants (75% female, M_{age} = 37.51, SD_{age} = 11.95). Participants came from a range of socio-economic backgrounds: 80% had at least a two-year college degree, 59% were married, 64% had children, and the median household income was in the $50,000-$99,999 bracket.

Procedure

In a 2 (sign: gain vs. loss) x 2 (direction: delay vs. acceleration) between-subjects design, participants were randomly assigned to read one of four hypothetical decision scenarios: delayed gain, accelerated gain, delayed loss, or accelerated loss. Participants used a type-aloud protocol to record their thoughts before making their decisions (Johnson et al. 2007; Weber et al. 2007). Participants subsequently coded their own previously recorded thoughts. Lastly, participants reported demographic information.

Materials

Discounting Scenarios. Participants read a hypothetical scenario indicating that they had been selected to receive a gift certificate (gain) or that they had been fined for a parking violation (loss). Participants in the delayed gain [loss] condition chose between receiving [paying] $50 now and receiving [paying] a larger amount in three months instead. Participants in the accelerated gain [loss] condition chose between receiving [paying] $75 in three months and receiving [paying] a smaller amount now instead.

Thought Listing. After doing a warm-up to learn the thought-listing software, participants were prompted to report any thoughts that went through their minds as they contemplated the

scenario. They listed these thoughts one by one using a type-aloud protocol (Johnson et al. 2007; Weber et al. 2007).

Choice Titration. Participants in the delayed gain [loss] condition were given a series of choices between the default of receiving [paying] $50 now and a different amount three months from now. The delayed (later) amount ranged from $40 to $90 in $5 increments. Participants in the accelerated gain [loss] condition were given a series of choices between the default of receiving [paying] $75 three months from now and a different amount now. The accelerated (now) amount ranged from $35 to $85 in $5 increments. The assumed indifference point was the value midway between the dollar amounts of the varying gift certificate [fine] at which participants switched from consistently preferring the fixed amount to consistently preferring the varying amount.

Thought Coding. Participants coded each of their own previously listed thoughts as favoring receiving [paying] now, favoring receiving [paying] later, or favoring neither.

RESULTS

Asymmetric Discounting

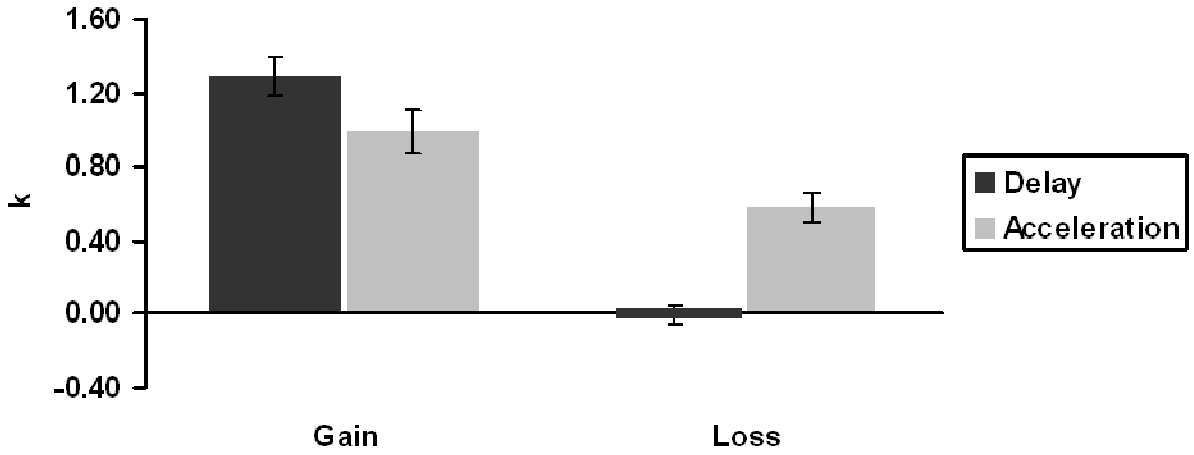
To test for replications of the sign effect (H1a) and the sign by direction interaction (H1b), we investigated participants' intertemporal choices. Discount rates were quantified using the hyperbolic equation, $k = (A - V) / (V * D)$, where A is the delayed amount, V is the immediate amount, and D is the delay in years (Mazur 1987). Increasing values of k indicate greater discounting (i.e., k functions like a discount rate). We conducted a 2 (sign: gain vs. loss) x 2 (direction: delay vs. acceleration) univariate analysis of variance.

Replicating the sign effect (H1a), participants discounted gains ($k = 1.14$, $SD = 1.21$) significantly more than losses ($k = 0.28$, $SD = 0.97$), $F(1, 603) = 94.23$, $p < .001$, *partial* η^2 =

0.14. As predicted by hypothesis 1b, the main effect of direction was *not* significant, $F(1, 603) = 2.61$, $p > .10$, *partial* $\eta^2 = .004$, but the interaction of sign and direction *was* significant, $F(1, 603) = 25.71$, $p < .001$, *partial* $\eta^2 = .04$. As shown in Figure 1 and replicating the sign by direction interaction, participants discounted delayed gains ($k = 1.29$, $SD = 1.09$) *more* than accelerated gains ($k = 0.99$, $SD = 1.31$), but delayed losses ($k = -0.00$, $SD = 0.75$) *less* than accelerated losses ($k = 0.58$, $SD = 1.09$). Planned contrast tests showed that the direction effect was marginally significant for gains, $t(215.8) = 1.88$, $p = .06$, *Cohen's d* = .25, and the reversed direction effect was highly significant for losses, $t(378) = -6.12$, $p < .001$, *Cohen's d* = .63. Supporting hypotheses 1a, participants discounted gains more than losses (the sign effect). Supporting hypothesis 1b, participants discounted delayed gains more than accelerated gains, and delayed losses less than accelerated losses (the sign by direction interaction).

FIGURE 1

DISCOUNTING BY SIGN (GAIN VS. LOSS) AND BY DIRECTION (DELAY VS. ACCELERATION). ERROR BARS SHOW +/- ONE STANDARD ERROR.



Clustering and Balance of Thoughts

We examined the clustering of thoughts as well as the proportion of thoughts to test three tenets of Query Theory: (H2a) thoughts in favor of the default option cluster earlier than thoughts in favor of the alternative option, (H2b) there are more thoughts in favor of the default option than in favor of the alternative option, and (H2c) the effect of the default on the proportion of thoughts in favor of the default option is mediated by the clustering of thoughts.

Participants listed between 1 and 12 thoughts (M = 2.91, SD = 1.60). Number of thoughts did not differ by condition, ps > .2. Forty-four participants provided only irrelevant thoughts (thoughts coded as neither favoring now nor favoring later); their data are excluded from the remaining analyses. We measured thought clustering using the standardized median rank difference metric: SMRD = $2(MR_L - MR_N)/n$, where MR_L is the median rank of thoughts favoring receiving/paying later ("later thoughts"), MR_N is the median rank of thoughts favoring receiving/paying now ("now thoughts"), and n is the total number of relevant thoughts (Johnson et al. 2007; Weber et al. 2007). Positive numbers indicate that now thoughts clustered earlier than later thoughts, and randomly interspersed now and later thoughts produce a SMRD of zero.

As predicted by Query Theory and hypothesis 2(a, b, and c), across sign, now thoughts occurred significantly earlier in the delay conditions (when now was the default; M = 0.55, SD = 0.79) than in the acceleration conditions (when later was the default; M = 0.28, SD = 0.91), $t(561) = 3.75$, $p < .001$, *Cohen's d* = .32, the proportion of now thoughts (the number of now thoughts divided by the total number of relevant thoughts) was greater in the delay conditions (M = 0.73, SD = 0.36) than in the acceleration conditions (M = 0.64, SD = 0.39), $t(561) = 2.79$, p = .006, *Cohen's d* = .24, and the effect of direction (delay vs. acceleration) on the proportion of now thoughts was fully mediated by thought clustering, $p < .001$ (see Appendix A for the mediation analysis). When the default was to receive [pay] now, thoughts favoring receiving

[paying] now were clustered earlier, which led to a greater relative proportion of these thoughts. This supports Query Theory's output interference account: early thoughts in favor of the default option inhibit later thoughts about the alternative option and, thus, the balance of support favors the default option.

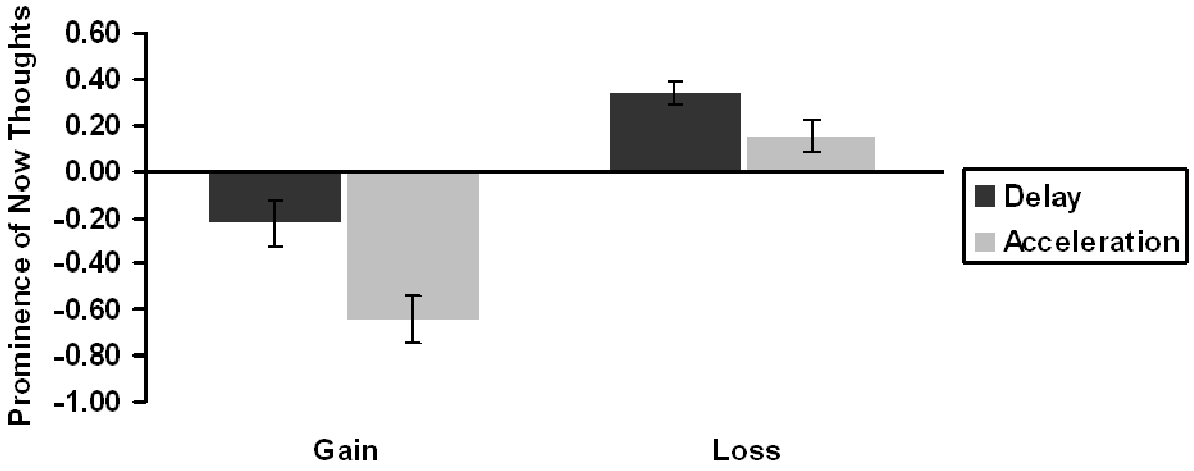
Prominence of Now Thoughts

We next wanted to test hypothesis 3a: As predicted by Query Theory, now thoughts are more prominent for delayed outcomes than accelerated outcomes across sign (i.e., a main effect of direction, but no sign by direction interaction). Thus, we created a measure of the *prominence of now thoughts* by averaging the z-scores of SMRD and the proportion of now thoughts, $r(563) = .82$, $p < .001$. Higher numbers indicate a greater prominence of now thoughts (i.e., earlier and more now thoughts).

We conducted a 2 (sign: gain vs. loss) x 2 (direction: delay vs. acceleration) univariate analysis of variance. As shown in Figure 2, now thoughts were significantly more prominent for loss decisions ($M = 0.25$, $SD = 0.79$) than gain decisions ($M = -0.43$, $SD = 1.05$), $F(1, 559) = 77.44$, $p < .001$, *partial* $\eta^2 = 0.12$. As predicted by Query Theory, now thoughts were significantly more prominent for delay decisions ($M = 0.13$, $SD = 0.89$) than acceleration decisions ($M = -0.14$, $SD = 1.00$), $F(1, 559) = 15.24$, $p < .001$, *partial* $\eta^2 = .03$. Also as predicted by Query Theory, the sign by direction interaction was not significant, $F(1, 559) = 2.19$, $p > .10$, *partial* $\eta^2 = .004$. Confirming hypothesis 3a and as predicted by Query Theory, participants thought about acting now earlier and more often when considering delaying (vs. accelerating) gains or losses. Unexpectedly, participants also thought about acting now earlier and more often when considering losses (vs. gains); we will return to this result in the Discussion.

FIGURE 2

THE PROMINENCE OF NOW THOUGHTS BY SIGN (GAIN VS. LOSS) AND BY DIRECTION (DELAY VS. ACCELERATION). ERROR BARS SHOW +/- ONE STANDARD ERROR.



Prominence of Now Thoughts and Discounting

Next, we wanted to test hypothesis 3b that, as predicted by Query Theory, the prominence of now thoughts predicts discounting of both gains and losses, albeit in opposite directions. As predicted, for gains, a greater prominence of now thoughts translated to *greater* discounting, $B = 0.56$, $SE = 0.07$, $t(206) = 8.00$, $p < .001$, *partial* $r^2 = .24$. Also as predicted, for losses, a greater prominence of now thoughts translated to *lower* discounting, $B = -0.53$, $SE = 0.06$, $t(353) = -8.92$, $p < .001$, *partial* $r^2 = .18$. In other words, confirming hypothesis 3b, earlier and more thoughts about *receiving* money now translated to greater discounting of gains and earlier and more thoughts about *paying* money now translated to lower discounting of losses.

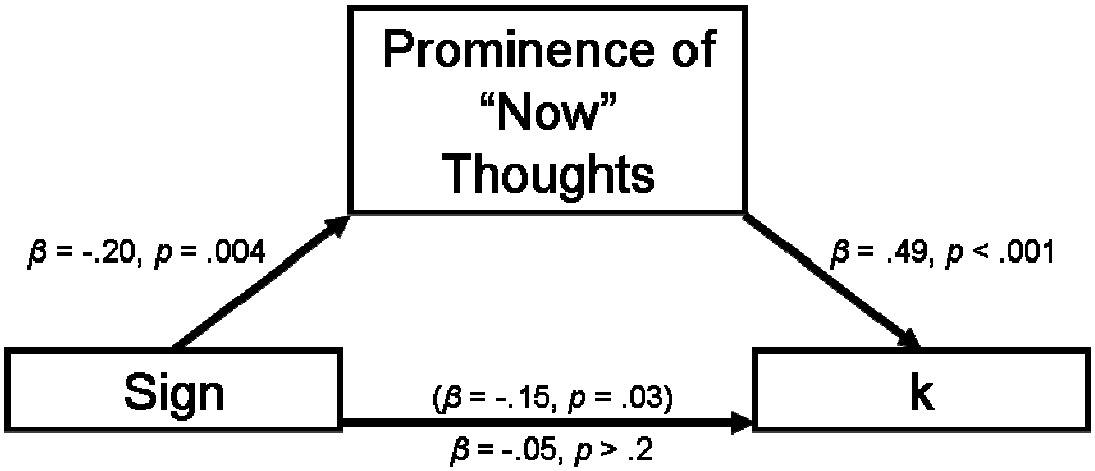
Mediation of Discounting by Prominence of Now Thoughts

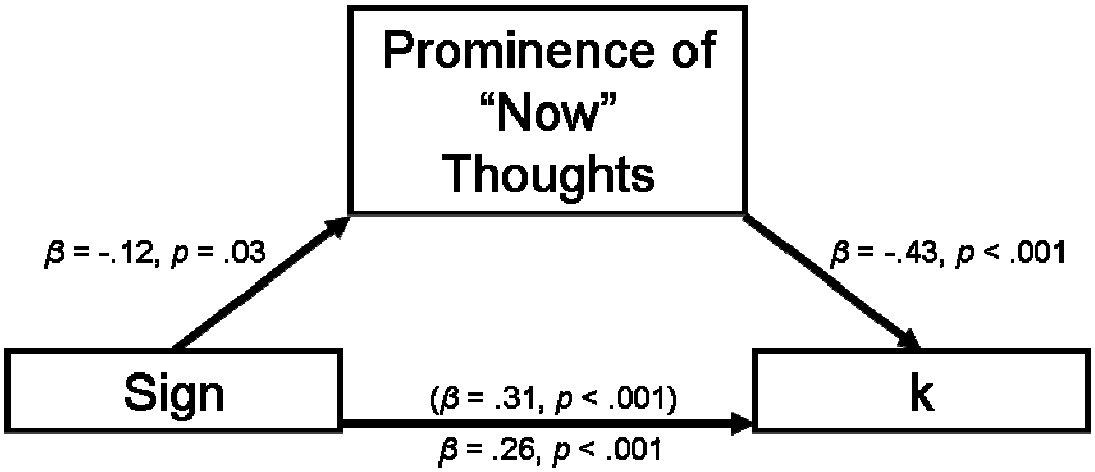
Lastly, to test hypothesis 3c that the prominence of now thoughts mediates the relationship between direction and discounting for gains and for losses, we conducted two series of linear regressions (one for gains and one for losses), each following the steps outlined by

Baron and Kenny (1986) and Shrout and Bolger (2002). Figure 3 summarizes the mediation analyses (see Appendix B for the full analyses). Bootstrapping tests (as recommended by Shrout and Bolger 2002) confirmed that the prominence of now thoughts significantly mediated the relationship between direction and discounting for gains (p = .004) and for losses (p = .02). Confirming hypothesis 3c and as predicted by Query Theory, for gains *and* for losses, direction influenced the prominence of now thoughts, which, in turn, influenced discounting. Specifically, now thoughts were more prominent for delayed outcomes than accelerated outcomes and this led to increased discounting of gains and reduced discounting of losses.

FIGURE 3

THE PROMINENCE OF NOW THOUGHTS SIGNIFICANTLY MEDIATES THE EFFECT OF DIRECTION (DELAY VS. ACCELERATION) ON DISCOUNTING FOR GAINS (TOP) AND FOR LOSSES (BOTTOM).





GENERAL DISCUSSION

Using a between-subject design, in support of hypothesis 1, our study replicated the sign effect and the sign by direction interaction effect (i.e., the direction effect for gains and the reverse direction effect for losses). Participants discounted gains more than losses. They also discounted delayed gains more than accelerated gains, but delayed losses *less* than accelerated losses. More importantly, our use of process data (i.e., thought listings) allowed us to provide, for the first time, a process-level causal account for the sign by direction interaction indicating that the prominence of now thoughts predicted discounting for gains *and* losses.

Confirming a Query Theory process account, not only did the clustering of now thoughts mediate the effect of direction on relative proportion of now thoughts (hypothesis 2), but the overall prominence of now thoughts mediated the effect of direction on discounting (hypothesis 3). Across gains and losses, now thoughts were more prominent in delay scenarios (when the default option is to receive/pay now) than acceleration scenarios (when the default option is to receive/pay later). For gains, greater prominence of now thoughts led to greater discounting whereas, for losses, it led to less discounting.

There was an unexpected effect of sign on the prominence of now thoughts—participants had more prominent now thoughts for losses than gains. Although Query Theory did not directly predict this finding, it may be a result of losses looming larger than equivalent gains (e.g., Kahneman, Knetsch, and Thaler 1991; Novemsky and Kahneman 2005; Tversky and Kahneman 1991), which may cause the default in the loss scenarios to be experienced more strongly than the default in the gain scenarios. Stronger defaults would be expected to induce more prominent thoughts in favor of the default option.

Implications

Because our study is the first to investigate the processes underlying discounting of losses and to compare them to the processes underlying discounting of gains, our results can uniquely inform interventions to help consumers make intertemporal choices they are less likely to subsequently regret. Indeed, all too frequently, people faced with intertemporal choices make decisions that they later regret—the dieter who succumbs to the dessert tray (e.g., Metcalfe and Mischel 1999), the worker who retires with insufficient savings (e.g., Thaler and Benartzi 2004), and the community that overfishes their lake (e.g., Hendrickx, Poortinga, and van der Kooij 2001). Impatience in all of these domains represents a present bias where people want good things now, in part because the immediate option offers greater certainty. This is codified into popular culture in the form of injunctive norms, found in proverbs like "A bird in hand is worth two in the bush," which can be found in most cultures (Weber, Hsee, and Sokolowska 1998).

Because the intertemporal choice literature studies mostly gain decisions and, for gains, people discount less in acceleration than delay frames, a naïve choice architect might assume that acceleration frames are a panacea to reduce discounting. Our study confirms that the story is more nuanced, however. It also underscores the need for a multidisciplinary analysis of reasons

for discounting that includes psychological as well as economic motivators and their interactions (e.g., Hardisty et al. 2010). Gains and losses are discounted differently and for a somewhat different set of reasons, and these differences must be taken into account to craft successful interventions. For gains, impatience (i.e., the desire to have the gain now) increases discounting. To decrease the discounting of gains, we need to *decrease* impatience. For losses, however, impatience (i.e., the desire to get the loss over with now) translates to lower discounting. Therefore, to decrease discounting of losses we need to *increase* impatience.

There are multiple approaches to changing consumers' behavior. First, we can alter how decisions are presented to "nudge" consumers to make better decisions (e.g., Thaler and Sunstein 2008). For intertemporal choices, we can change the default option. For gains, we can decrease impatience, and therefore discounting, by making the later option the default option. For losses, we can increase impatience and decrease discounting by making the sooner option the default option. The success of such interventions for gains has been demonstrated behaviorally by Weber et al. (2007) and the neural process implications, including less activation of brain regions known to code response conflict and self control when the later option is the default, have been shown by Figner et al. (2010). Another way to alter the presentation of decisions is to reframe them. For intertemporal choices, we may be able to reframe gains as losses (e.g., emphasizing the loss of savings rather than the gain in spending money) in order to decrease discounting. Both changing the default and reframing the choice are ways to facilitate "better" intertemporal choices that inspire less regret by consumers. Which method is preferable will depend on which method is more natural in a particular context. For health behaviors, it may be relatively simpler to change the default. A successful example of this is the change in New York City law from "smoking allowed" in restaurants and bars to "no smoking allowed" in restaurants and bars

(Weber et al. 2010). For financial decisions, it may sometimes be easier to reframe the options. Thaler and Benartzi's (2004) extremely successful Save More Tomorrow plan reframes losses to consumption as gains to saving (by coupling increases in savings and raises in salary).

A second approach to changing behavior is altering the ways in which consumers approach and make decisions. Previous work by Weber et al. (2007) has shown that directing participants to explicitly consider arguments for two intertemporal choice options in the "unnatural" order (i.e., in the order *opposite* to the natural and implicit tendency to consider reasons favoring the default option first and reasons favoring the alternative option second) eliminates the direction effect for gains.

In terms of the current research, these two approaches suggest that intertemporal choices could be presented differently (e.g., with different default dates or with different framings) and/or consumers could be trained to consider the opposite first (i.e., consider the alternative option before the default option). Whether with changes to how decisions are presented or how options are considered, giving consumers the tools to change the prominence of their impatient "act now" thoughts when faced with intertemporal decisions will arm them against making decisions they will later regret.

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APPENDIX A

Mediation of Direction Effect on Proportion of Now Thoughts by Thought Clustering

Using a series of linear regressions (Baron and Kenny 1986; Shrout and Bolger, 2002), we tested the Query Theory prediction that the clustering of now thoughts (as measured by SMRD) mediates the effect of direction (delay vs. acceleration) on the proportion of now thoughts. In step 1, we regressed proportion of now thoughts onto direction, B = -0.04, SE = .02, $t(561) = -2.79$, $p = .006$, *partial* $r^2 = .01$. In step 2, we regressed SMRD onto direction, B = -0.13, SE = 0.04, $t(561) = -3.75$, $p < .001$, *partial* $r^2 = .02$. In step 3, we regressed proportion of now thoughts onto direction plus SMRD. Direction was no longer significant, $B = 0.00$, $SE = 0.01$, $t(560) = 0.47$, $p > .5$, *partial* $r^2 < .01$. As predicted, SMRD *was* significant, $B = 0.37$, $SE = 0.01$, $t(560) = 33.55$, $p < .001$, *partial* $r^2 = .67$. Bootstrapping tests (Shrout and Bolger 2002) confirmed that thought clustering significantly fully mediated the relationship between direction and the relative proportion of now thoughts, $p < .001$. As predicted by Query Theory, when the smaller, sooner amount was the default, thoughts in favor of it clustered earlier in participants' thought listings, which led to relatively more thoughts in favor of receiving/paying now.

APPENDIX B

Mediation of Direction Effect on Discounting by Prominence of Now Thoughts

To test whether the effect of direction (delay vs. acceleration) on discounting was mediated by the prominence of now thoughts, we ran a series of linear regressions separately for gains and for losses. For gains, in step 1, we regressed discounting onto direction, B = -0.18, SE = .08, $t(206) = -2.14$, $p = .03$, *partial* $r^2 = .02$. In step 2, we regressed the prominence of now thoughts onto direction, B = -0.21, $SE = 0.07$, $t(206) = -2.92$, $p = .004$, *partial* $r^2 = .04$. In step 3, we regressed discounting onto direction plus prominence of now thoughts. Direction was no

longer significant, B = -0.06, SE = 0.08, $t(205)$ = -0.85, $p > .10$, *partial* $r^2 < .01$. As predicted, the prominence of now thoughts *was* significant, B = 0.55, SE = 0.07, $t(205)$ = 7.66, $p < .001$, *partial* $r^2 = .22$. Bootstrapping tests confirmed that the prominence of now thoughts significantly fully mediated the relationship between direction and discounting for gains, $p = .004$. When the smaller, sooner gain was the default, thoughts in favor of receiving now were more prominent, which translated to greater discounting of gains.

For losses, in step 1, we regressed discounting onto direction, B = 0.30, SE = .05, $t(353)$ = 6.12, $p < .001$, *partial* $r^2 = .10$. In step 2, we regressed the prominence of now thoughts onto direction, B = -0.09, SE = 0.04, $t(353)$ = -2.24, $p = .03$, *partial* $r^2 = .01$. In step 3, we regressed discounting onto direction plus prominence of now thoughts. Direction remained significant, B = 0.26, SE = 0.05, $t(352)$ = 5.66, $p < .001$, *partial* $r^2 = .08$, but its effect was reduced. As predicted, the prominence of now thoughts was significant, B = -0.49, SE = 0.06, $t(352)$ = -8.57, $p < .001$, *partial* $r^2 = .17$. Bootstrapping tests confirmed that the prominence of now thoughts significantly partially mediated the relationship between direction and discounting for losses, $p = .02$. When the smaller, sooner loss was the default, thoughts in favor of paying now were more prominent, which translated to lower discounting of losses.