

# Now or Later? Query Theory Explains Asymmetric Discounting for Gains & Losses

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## Abstract

Query theory explains greater discounting when people are asked to delay rather than accelerate positive outcomes (receipt of gift certificates). Decision frame (delay or accelerate) influences the order in which internal queries for the two options (consume now vs. consume later) are generated, affecting the balance of support—fewer arguments are generated for later queries. The present study applied query theory to intertemporal decisions with negative outcomes (payment of parking fines). Whereas for gains, people are more impatient when delaying than accelerating consumption, for losses, participants were more impatient when accelerating rather than delaying payment. Query theory explains this pattern of results.

## Theoretical Background

People are impatient and discount future outcomes, but they are inconsistent in their impatience and discounting.

- **Sign:** People are more impatient for gains than for losses (Benzion et al., 1989; Shelley, 1993).
- **Frame:** Choice default impacts discounting of gains (e.g., Loewenstein, 1988).
  - **Delay:** People are impatient if initially told they can have a prize today and then asked how much of an increase they will need to delay receipt of the prize.
  - **Accelerate:** People are less impatient if told they can have a prize later and then asked how much of a decrease they will accept to accelerate receipt of the prize.
- **Sign x Frame:** For gains, people are more impatient in delay frames vs. accelerate frames whereas, for losses, they are more impatient in accelerate frames vs. delay frames (Benzion et al., 1989; Shelley, 1993).

**Query Theory** (QT: Johnson et al., 2007; Weber et al., 2007): To arrive at a choice, people generate internal queries (e.g., do now?, do later?) — serially and beginning with queries about the status quo (*thought order*). Due to output interference, retrieval for later queries is less successful. Thus, the balance of support (*proportion of 'do now' thoughts minus proportion of 'do later' thoughts*) favors the status quo and leads to differences in discounting. As predicted by QT, prominence of impatient thoughts mediates the effect of frame on discounting for gains (Weber et al., 2007).

**In the current study, we replicate asymmetries in discounting.** Participants discount gains more than losses. For a gift certificate, they discount more in a delay (vs. accelerate) frame whereas, for a fine, they discount more in an accelerate (vs. delay) frame. **Query theory explains this reversal; the prominence of impatient thoughts is the most significant predictor of discounting.**

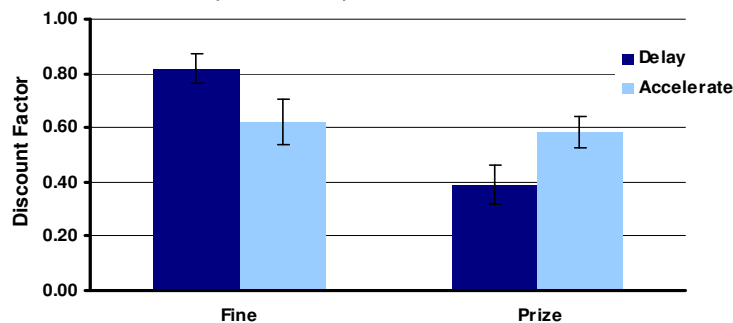
## Methods

- Participants ( $N = 47$ ) from the Center for Decision Sciences' Virtual Lab participated online.
- Each P made 2 hypothetical choices: fine delay & prize accelerate or fine accelerate & prize delay
- Ps listed their thoughts about a choice before expressing their time preference (today vs. 3 months from today) via a choice titrator, used to compute Ps' discount factors. Ps then coded their previously listed thoughts as favoring paying/receiving now vs. paying/receiving later.

## Results

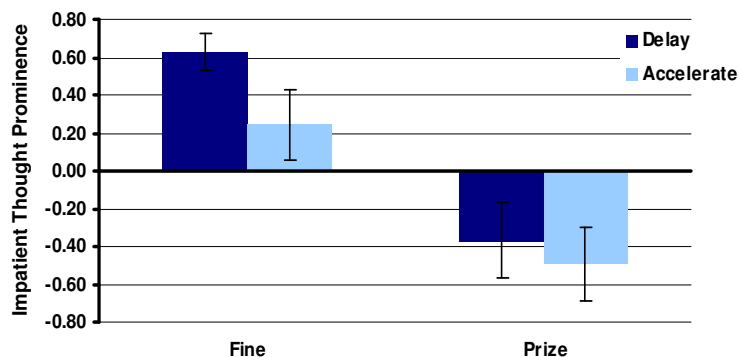
$$\text{Discount Factor} = \left( \frac{\text{amount now}}{\text{amount later}} \right)^{(1/t)}$$

[smaller numbers indicate *more* discounting]



Predictors of Discount Factor: Sign:  $B = -0.10$ ,  $SE = 0.03$ ,  $t(82) = -3.10$ ,  $p = .003$   
Sign x Frame:  $B = 0.09$ ,  $SE = 0.03$ ,  $t(82) = 2.79$ ,  $p = .007$   
Impatient Thought Prominence:  $B = -0.15$ ,  $SE = .04$ ,  $t(82) = 3.68$ ,  $p < .001$

**Impatient Thought Prominence** combines thought order and proportion of 'do now' thoughts minus proportion of 'do later' thoughts. (Cronbach's  $\alpha = .93$ )



Predictors of Impatient Thought Prominence: Sign X Frame:  $B = -0.13$ ,  $SE = 0.09$ ,  $t(85) = -1.45$ ,  $p = .15$

• For gains, frame & impatient thought prominence predict discounting, replicating Weber et al. (2007).

• For losses, frame & impatient thought prominence again predict discounting. Therefore, QT explains discounting for losses as well as gains.

• Across conditions, sign, Sign x Frame, & impatient thought prominence predict discounting. **We replicate discounting asymmetries and find evidence for a QT explanation of the reversal in the effect of frame between signs.**

• Across gains *and* losses, there is a preference to 'do now' and there are more impatient thoughts in the delay (vs. accelerate) frames. However, a 'now bias' means *more* discounting for gains (receive later *only if* large amount later) but *less* discounting for losses (pay later *only if* small amount later). Thus, for losses, we multiplied impatient thought prominence by -1 for use as a predictor of discounting.

• Impatient thought prominence does not significantly mediate the Sign x Frame effect on discounting ( $p = .18$ ). However, in support of QT, thought order does significantly mediate the effect of sign ( $Z = 2.81$ ,  $p = .005$ ) and Sign x Frame ( $Z = -1.83$ ,  $p = .07$ ) on relative proportion of impatient thoughts. **Thus, sign and status quo affect the order of thought generation, which determines the balance of support.**

## Discussion

The current study replicates discounting inconsistencies. People discount gains more than losses. Further, they discount more in a delay frame for gains, but more in an accelerate frame for losses. Impatient thought prominence predicts discounting, supporting a Query Theory explanation of the reversal.

While thoughts did not significantly mediate the effect of Sign x Frame on discounting, we attribute this to small sample size. Further, due to restricted ranges in the choice titrators, Ps were constrained in expressing their discount factors—38% of participants maxed out the titrators. Thus, the current study was a conservative test of our hypotheses; extending the titrator ranges in future studies should strengthen our findings.

## References

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