

Abstract

In the real world, intertemporal choices are typically made when the outcomes are uncertain—e.g., when investing in your IRA, there is uncertainty in how much it will be worth. Yet, little is known about how people make decisions with multiple uncertain outcomes over time. The more nuanced investigations of time preference have looked at delayed gambles but only with 2 outcomes. Research on risk preferences has shown that binary gambles are evaluated differently than multiple gambles⁴. Combining these two streams of research, we investigate how multiple outcome risk in the future affects intertemporal choices.

Risky Intertemporal Choices

- Adding risk attenuates the immediacy effect²
- People have a direct preference for certainty in risky intertemporal choice – even those framed as losses³
- Adding risk and time may both increase the perceived distance of a risky intertemporal choice
- How does uncertainty in the amount received by the gamble relate to uncertainty in the outcome of the gamble

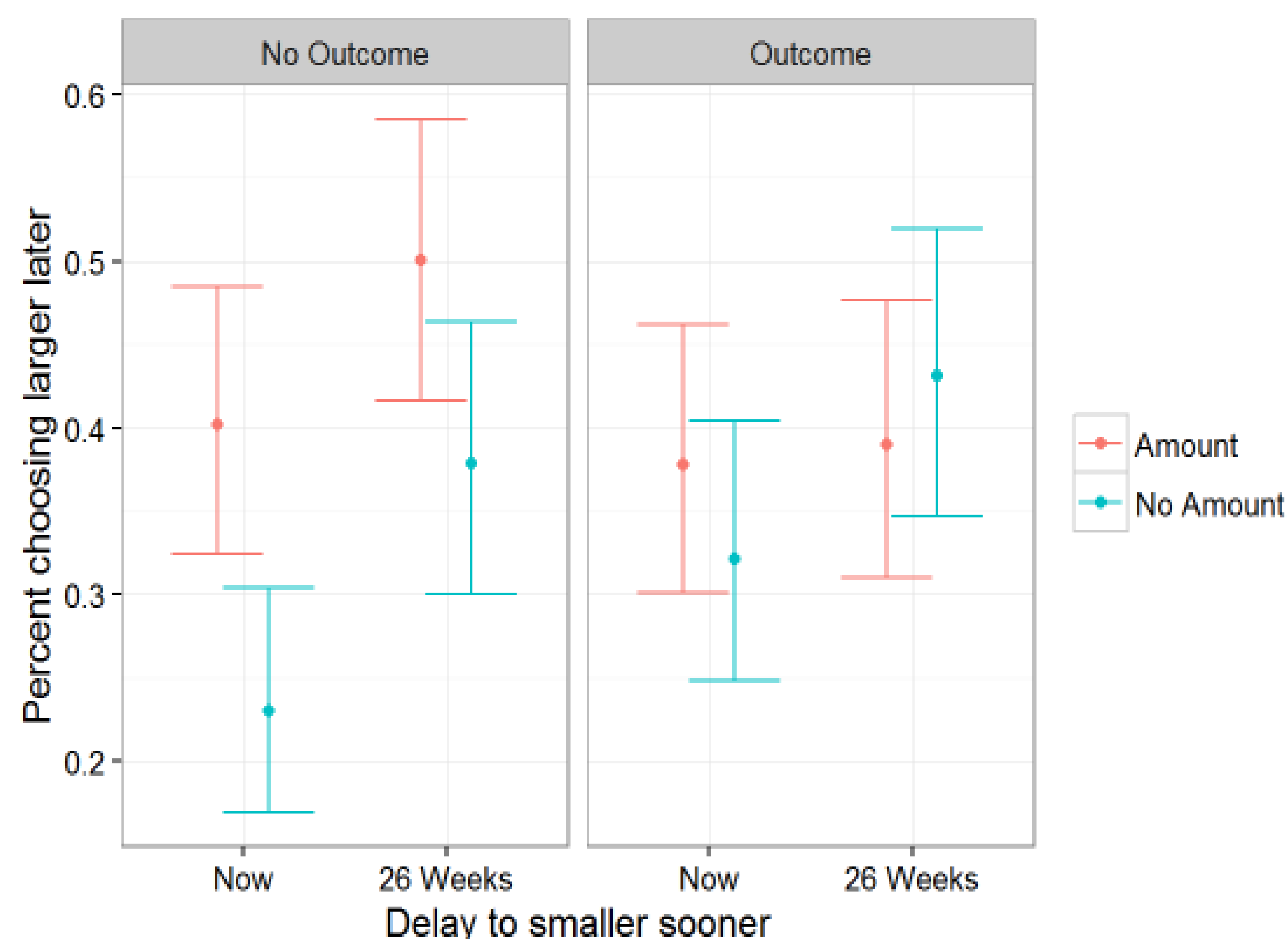
Research Question

- Baucells and Heukamp¹ posit that adding risk and time both increase the perceived distance an outcome
- Further, this distance is subadditive – risk and time combined has a smaller effect on choosing patiently than what we would expect from combining them together
- Uncertainty in the amount will have a smaller effect than uncertainty in the outcome
- These effects should be subadditive

Study 1 Method

- 258 MTurkers made risky intertemporal choices
- Each participant made 8 choices from a 2 (delay until smaller sooner) x 2 (risk in the amount received from the gamble) x 2 (risk in the outcome of the gamble)
- Risk in the amount received: a random amount between \$50 and \$100
- Risk in the outcome: a 50% chance of receiving \$100 and a 50% chance of receiving \$0

Study 1 Results

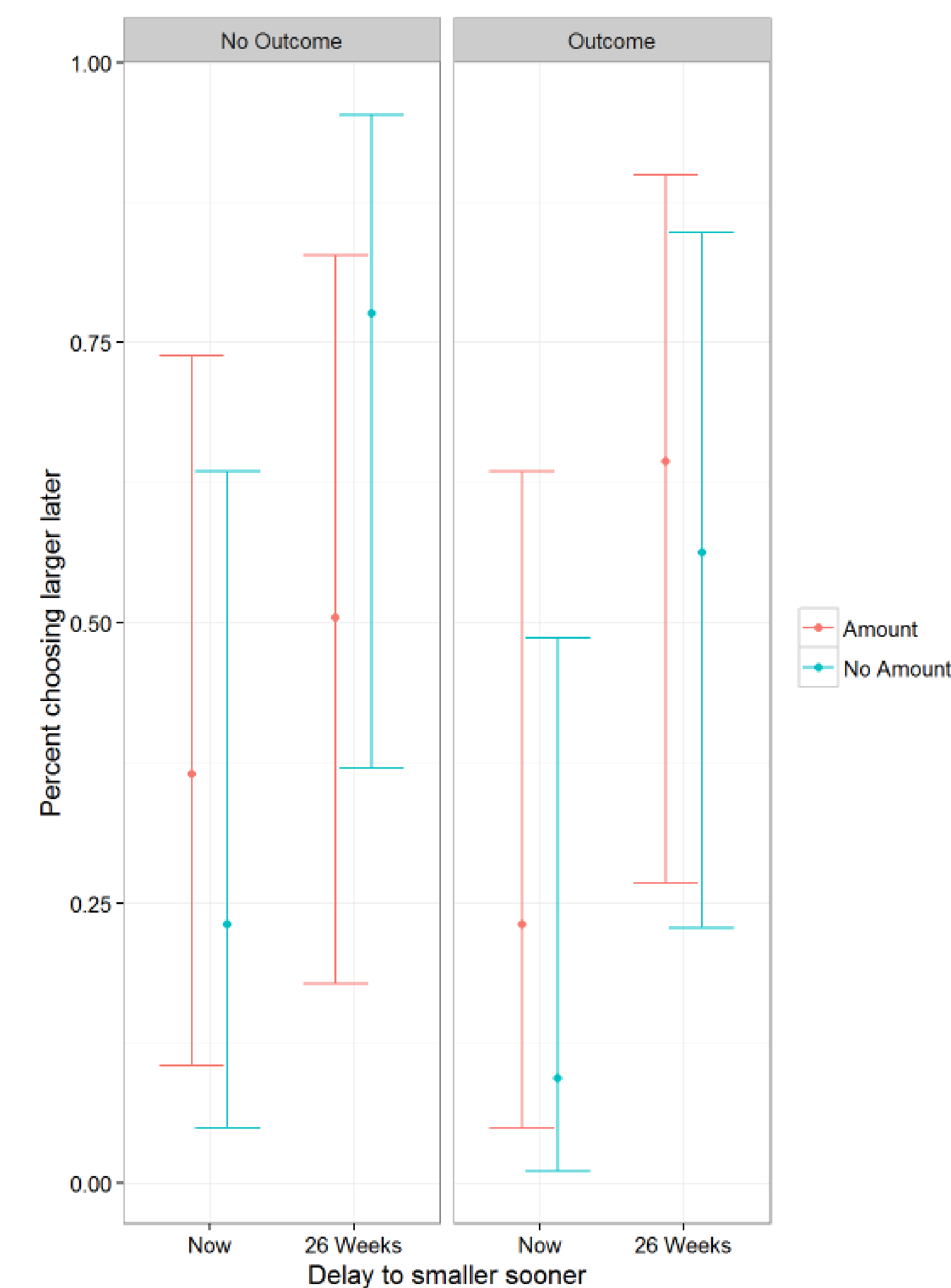


- When there is amount risk people are more likely to choose the larger later (LL) option
- No main effect of outcome
- No interaction between outcome and delay to the smaller sooner (Failure to replicate Weber and Chapman²)
- Planned contrasts show that amount risk has a larger effect on choice of LL than outcome risk (opposite of what we predicted)
- Subadditive interaction between amount and outcome, such that when both are present the effect of amount on the likelihood of choosing the larger later option is attenuated

Study 2 Method (Pilot Study)

- Same as study 1 but with token negative values instead of receiving \$0
- This was done to see if zero is a special value in risky intertemporal choices

Study 2 Results



- There are no main effects; however, the study is underpowered
- There is no interaction between outcome and delay to the smaller sooner

Conclusions/Outstanding Questions

- Multiple outcome gambles are discounted differently than binary outcome gambles
- Mixed gambles with a token negative amount seem to be discounted similarly to those with neutral outcomes
- Cognitive models that attempt to understand risky intertemporal choices should account for the type of risk involved
- Why does amount have a larger effect than outcome?
 - Complexity associated with differences in amount
 - Leading to diminished attention to time

References

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3. Hardisty, D., Pfeffer, J. (2015). *Intertemporal uncertainty Avoidance: When the Future is Uncertain, People Prefer the Present, and When the Present is Uncertain, People Prefer the Future*. Management Science. 53. 1-9
4. Tversky, A., Kahneman, D. (1992). *Advances in Prospect Theory*. Journal of Risk and Uncertainty. 5 (4). 297-323

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