

The role of memory in multi-alternative, multi-attribute context effects

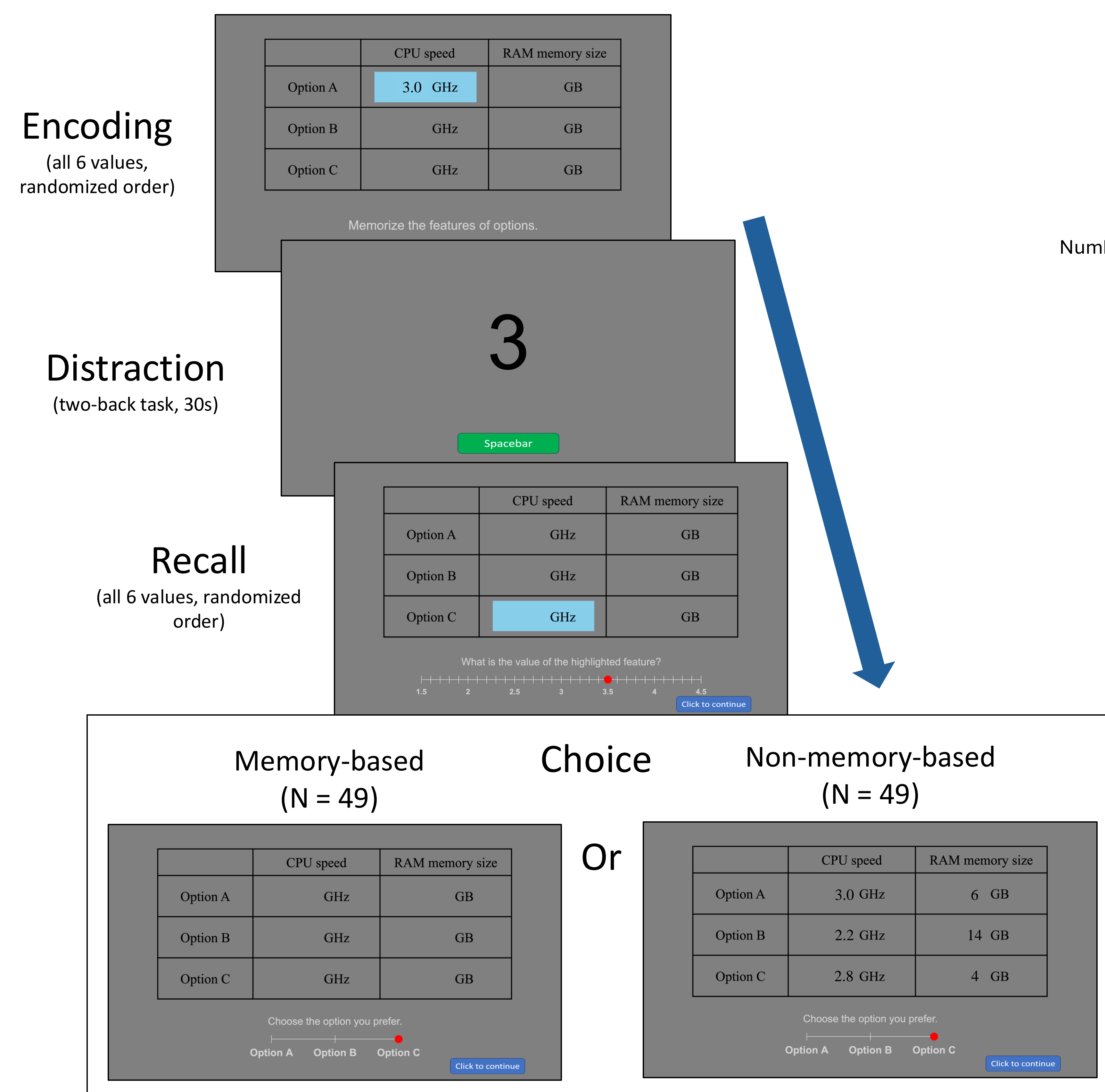
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Introduction

- The attraction effect occurs when an option similar to but worse than another option increase the preference for the latter.
- The attraction effect is typically studied in situations where individuals have full access to option information during decision-making.
- However, in many real-life situations, people must make decisions based on their memory of the options.
- We study the attraction effect in a setting where people made decisions based on their memory of options.

Methods

- Choice task: Choose one laptop among three based on CPU speed RAM size
- Main trials (12 trials)
 - Laptop X: faster CPU but smaller RAM
 - Laptop Y: slower CPU but bigger RAM
 - Laptop Z: decoy option targeting either X or Y
- Filler trials (4 trials)
 - One option was the best in terms of both CPU and RAM
- Measure of the attraction effect
 - Relative Share of Target (RST): choice share of the target relative to the competitor
 - 'Target' refers to the option similar to but better than the decoy option Z and 'competitor' refers to the remaining option which is better than the target in one attribute (e.g., CPU speed) but worse in the other attribute (e.g., RAM size).



Results

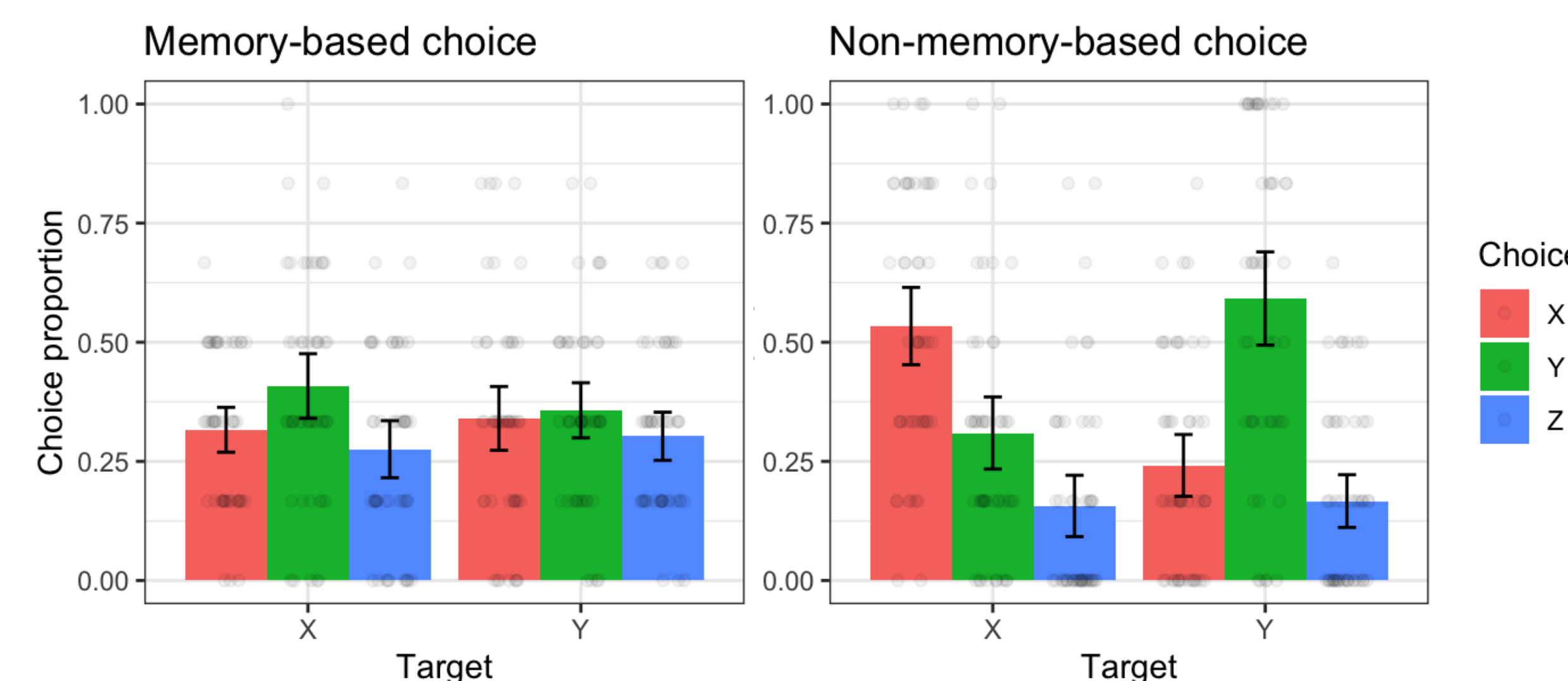


Figure 2. Choice proportions. Participants in the non-memory-based choice group preferred Laptop X when the decoy targeted Laptop X, and Laptop Y when the decoy targeted Laptop Y. Participants in the memory-based choice group did not show such a pattern. Similarly, the attraction effect (estimated by equal-weight RST) was greater in the non-memory-based than the memory-based choice group ($t(92.0) = 4.30, p < 0.0001, \text{Cohen's } d = 0.87$). Error bars are 95% confidence intervals. Dots are individual participants.

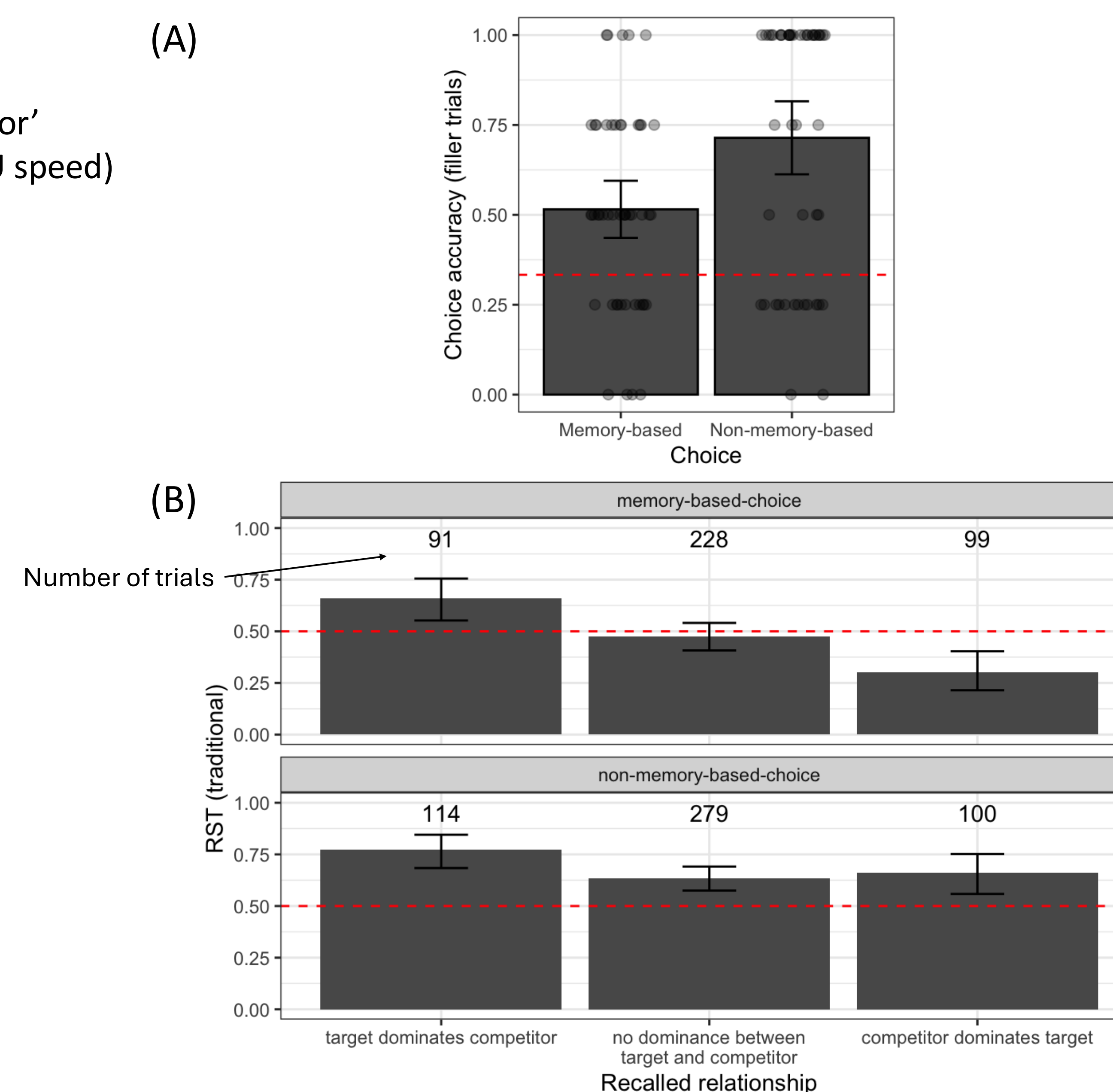


Figure 3. Choice patterns. (A) Filler trial accuracy. Participants in both groups were more accurate than chance level (0.33; red dashed line) in the filler trials where there was an option objectively better than the other two options (memory-based choice: $t(48) = 4.60, p < 0.0001, \text{Cohen's } d = 0.66$). This indicates that participants in the memory-based choice group did not lose all the information from memory and ended up choosing randomly during the task. (B). Relationship between recalled values and choice. Participants in the memory-based choice group showed a clear relationship between the recalled relationship between the target and competitor and the choice of target over competitor. Participants in the non-memory-based choice condition did not. Trials meeting the criteria were pooled from all participants. Red dashed lines indicate the target and competitor are chosen with equally frequency. Error bars are 95% confidence intervals. Dots are individual participants.

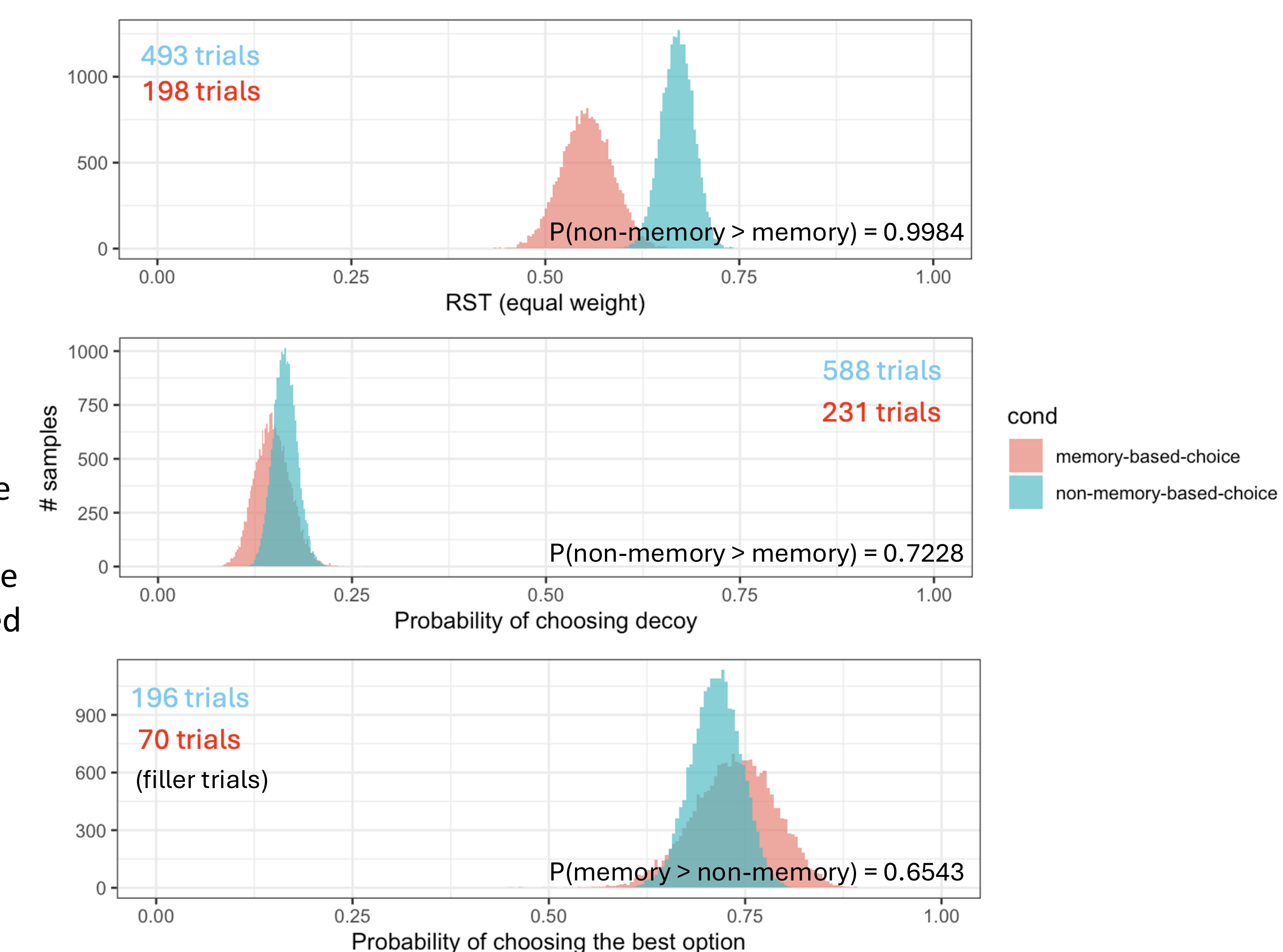


Figure 4. Analysis of trials with perfect information about options. In the memory-based choice group, trials with perfect recall of all six values were analyzed. Due to the small number of trials satisfying the condition, the same kind of trials from a pilot experiment with a highly similar design were added to the analysis. In the non-memory-based choice group, all trials were analyzed since participants saw the correct values when making choices. Estimates related to choice accuracy (i.e., choosing the decoy in main trials and choosing the best option in filler trials) were similar between the memory-based and non-memory-based choice groups. The attraction effect was smaller in the memory-based than non-memory-based choice group. Posterior distributions from Bayesian analyses are plotted for each estimate.

Discussion

- People making choices based on their memory showed a smaller attraction effect than those making choices with the option information available on the screen.
- We observed the same pattern even when we limited the analysis to the trials where the participant perfectly recalled all of the option information in the memory-based choice group.
- The result can be explained if the memory-based choice group engaged less in the attentional process comparing attribute values between options than the non-memory-based-choice group, which can be important in producing the attraction effect (Trueblood, 2022).

References

Trueblood, J. S. (2022). Theories of Context Effects in Multialternative, Multiattribute Choice. *Current Directions in Psychological Science*, 31(5), 428–435.

Figure 1. Behavioral task.