



Articulating What Is Learned In Decisions From Experience



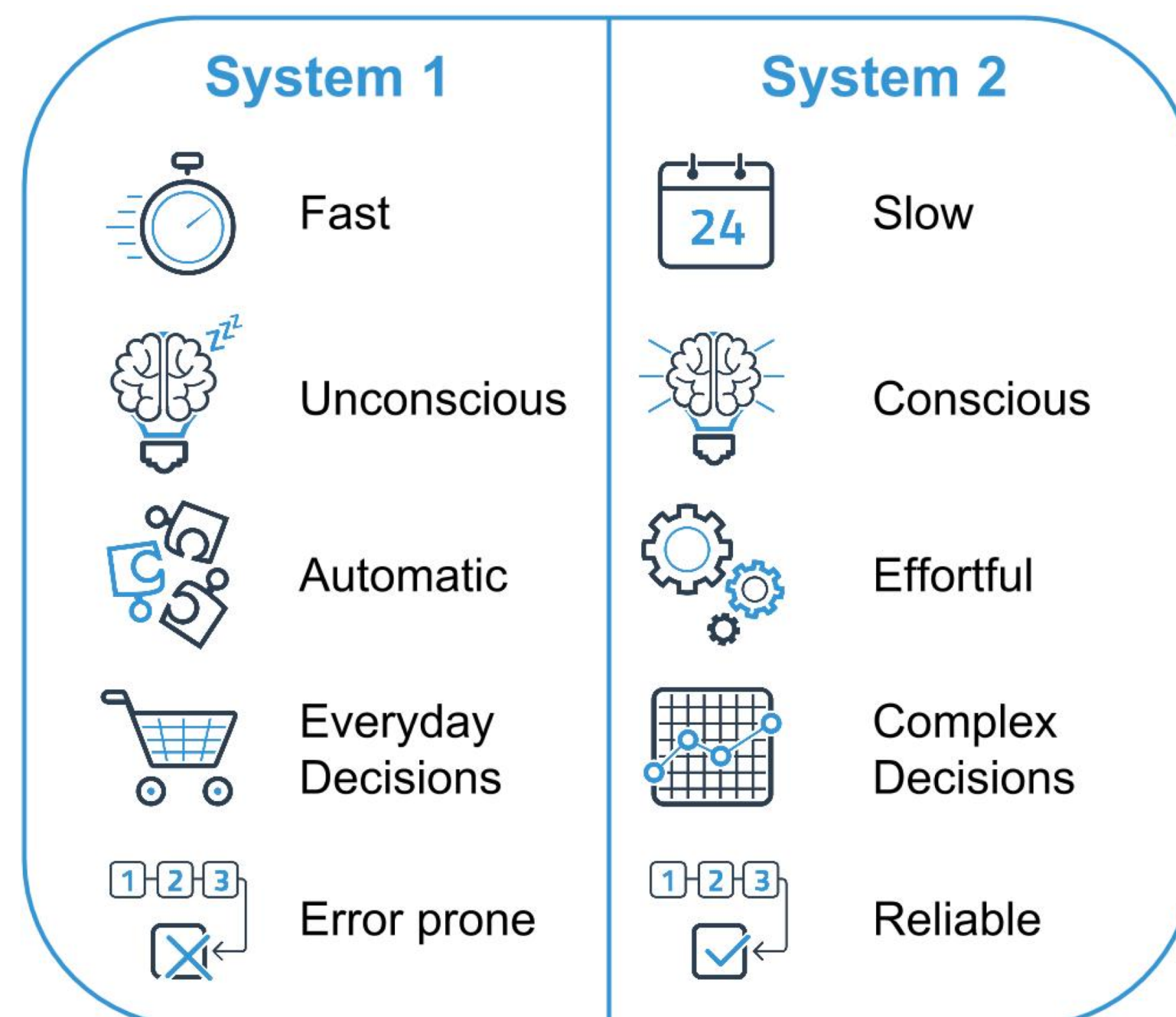
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Abstract

What do people learn from experience? Is it merely implicit behavioral tendencies? If so, would articulating what is learned change behavior? Online participants (N=126) experienced 100 trials of a decisions-from-experience problem, with outcome feedback. They then summarized what they had learned and estimated the probability of the risky gain either for themselves (Self condition) or for another hypothetical player (Other condition), or not (Control condition). Finally, they did 20 more decision trials. Verbalizing a social message to another person significantly increased sure choices in subsequent choices. And in general participants underestimated the probabilities of both certain and risky prospects, and articulating a summary message (Self or Other) seemed to increase this effect.

Introduction

What are underlying learning mechanisms for decisions from experience? (e.g. Seger, 1994; Evans, 2003; Kahneman & Egan, 2011):



- Benjamin and Budescu (2015) provide evidence that the implicit learning mode (decisions from experience) results in more risk aversion and acknowledgement of information uncertainty, while participants learning from explicit descriptions provided better summaries more confidently.
- In problem solving, verbalizing to others in the social learning condition helps induce rules and abstractions better than in the individual learning (Schwartz, 1995); in category learning, verbalizing to a partner helps produce simpler and more sharable referents (Voiklis & Corter, 2012).

Research Questions

- Does the production of verbalizations (to others, to self) affect subsequent decision-making?
- How does the verbalization of implicit learning experience affect probability estimation?
- What information is learned and how is it presented?

Methods and Materials

- 126 volunteer participants (56 female and 76 male; Aged from 23 to 71, mean 39) from amazon mechanical turk, an online worker marketplace (See Figure 1 for interface).
- Procedure: training(100 trials)→verbalization→testing(20 trials)
- DM Problems: Each participant saw either a high probability or a low probability problem(Table 1).

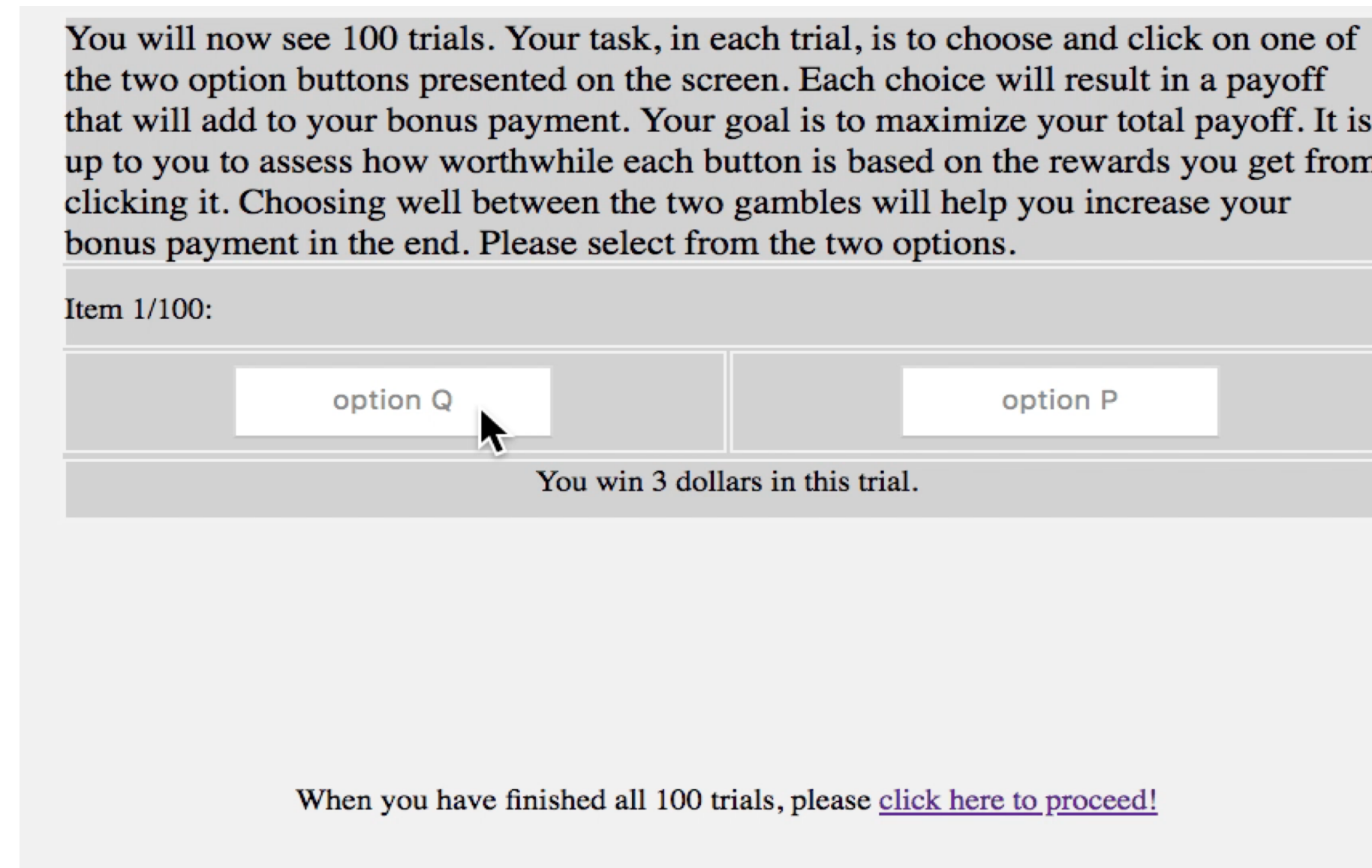


Figure 1. Interface for the first 100 trials: post-trial feedback

	Option p- Payoff	Option p- Probability	Option q- Payoff	Option q- Probability
high prob	\$3	100%	\$7	60%
low prob	\$3	100%	\$28	15%

Table 1. Two types of decision-making problems

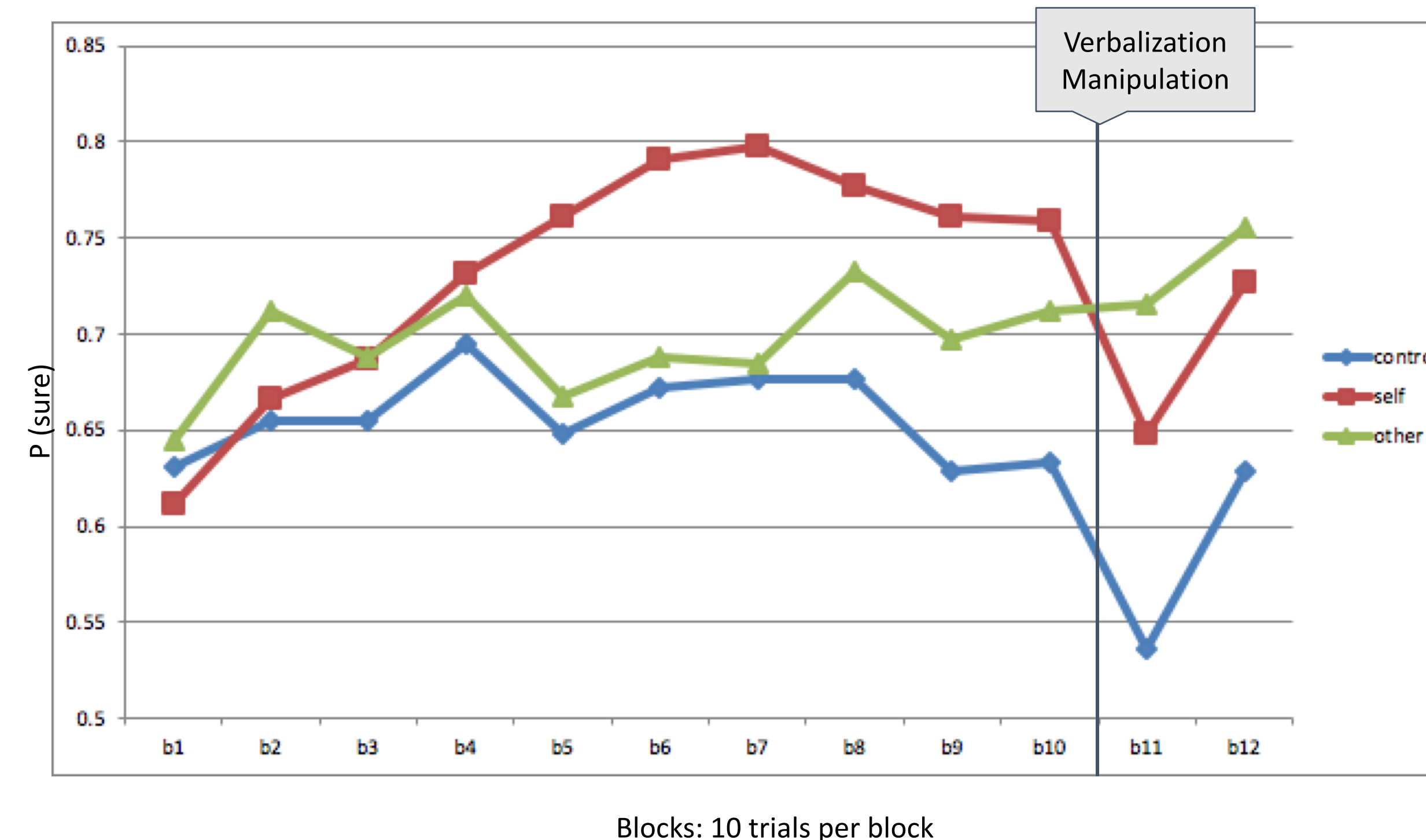


Figure 2. Sure choice proportions over the total 120 trials

Results

Behavioral effects (last 20 trials). Results of the explicit-summarization manipulation showed significant effects, $F(2, 119) = 3.80, p=.025$. For both high- and low-probability problems, formulation of the summary message to others (mean=0.744) led to more sure-thing choices, compared to verbalization to self (mean=0.641) or no verbalization (mean=0.623), $p=0.027, p=0.013$, respectively. Self-summaries did not have any significant effect (Figures 2 & 3).

Subjective estimates. Participants were quite conservative in their probability estimates, in general underestimating probabilities of both the certain and the risky prospects. When participants estimated the probability of the certain event, articulating a summary message (Self or Other) significantly increased conservatism in both high- and low-probability problems, $F(2,120)=3.263, p=.042$. However, when participants estimated the probability of payoff for the risky event, there was no effect of summary message for low-probability problems and only a marginally significant drop (conservatism) observed for high-probability problems $F(2,120)=2.561, p=.081$. The lack of significant effect for estimating the risky options in the low probability problem might be due to a floor effect (Figures 4 & 5).

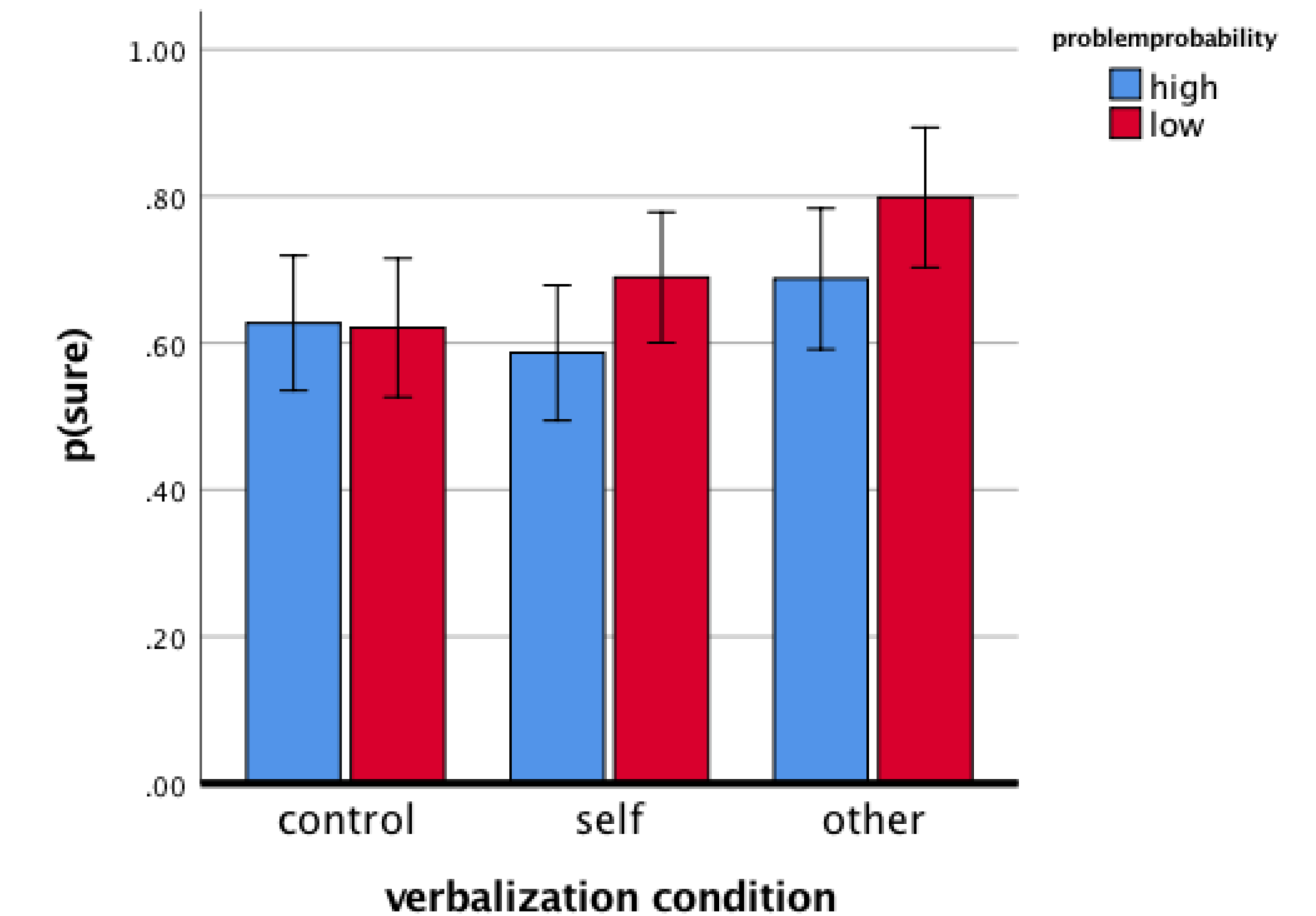


Figure 3. Sure choice proportions across three verbalization conditions In the testing session (last 20 trials)

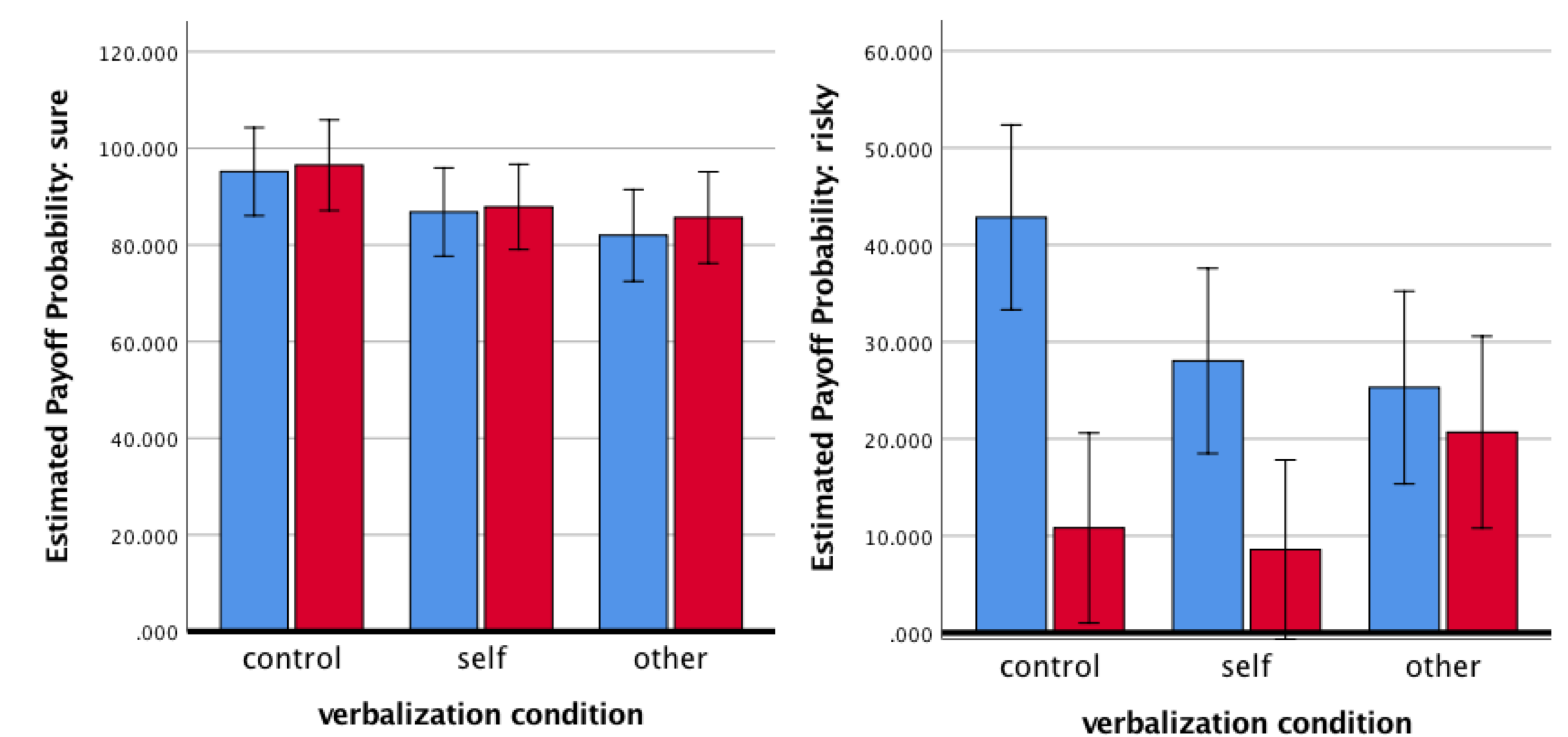


Figure 4. Estimated payoff probability for the sure option.

Figure 5. Estimated payoff probability for the risky option.

Example Summaries: Other
“click q, [because] p has more zeroes than wins.”
“Go with the three dollars most of the time, but occasionally try your luck to get the 7 dollars, since it has fairly good odds.”

Example Summaries: Self
“Second option had consistent payoff. I am risk averse so I only tried the other a couple of times and hit zero so I stayed with the sure thing.”



Figure 6. Content analysis of participants' verbalizations

General Discussion

- Here, articulating what is learned from experience, especially in the form of a social summary message to another person, significantly increased sure choices in the subsequent decision making.
- Also, articulation of learning seemed to lead to underestimation for both certain and risky events, indicating “social conservatism”.
- In the Control and Self Summary conditions, the new test trials elicited exploratory behavior (but not in the Other condition). This may indicate a social motive to seem consistent when giving advice.

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References

- Seger, C. A. (1994). Implicit learning. *Psychological bulletin*, 115(2), 163.
- Evans, J. S. B. (2003). In two minds: dual-process accounts of reasoning. *Trends in cognitive sciences*, 7(10), 454-459.
- Kahneman, D., & Egan, P. (2011). *Thinking, fast and slow*(Vol. 1). New York: Farrar, Straus and Giroux.
- Benjamin, D., & Budescu, D. V. (2015). Advice from experience: Communicating incomplete information incompletely. *Journal of Behavioral Decision Making*, 28(1), 36-49.
- Voiklis, J., & Corter, J. E. (2012). Conventional wisdom: Negotiating conventions of reference enhances category learning. *Cognitive Science*, 36(4), 607-634.
- Schwartz, D. L. (1995). The emergence of abstract representations in dyad problem solving. *The journal of the learning sciences*, 4(3), 321-354.
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