The WAGER Vol. 9(39) – Hitting the Books… and the Tables Part 1: The Role of Information Source in Risky Decision-Making

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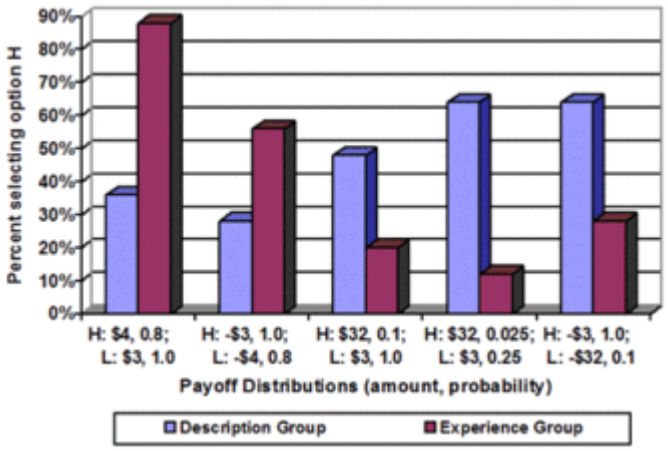
A common premise of gambling problem prevention programs is that many people who run in to trouble because of their gambling simply don't understand the odds of the game – they are not sufficiently well-educated to understand probability, or they have not learned that the odds favor the casinos to win in every game. This week and next week's WAGERs review two articles challenging this commonly held premise and suggesting the opposite: those who are not given the exact odds of a game perform more cautiously (Hertwig, Barron, Weber, & Erev, 2004) and those who are better educated make riskier choices in a gambling task (Evans, Kemish, & Turnbull, 2004). This week, the WAGER reviews Hertwig et al.'s study (2004).

In their study, Hertwig et al. had 100 participants complete problems in which they chose between two options with different chances of winning or losing varying amounts of money. The authors compared choices made by subjects who were provided with descriptions of the possible payoffs and their probabilities for each option to choices made by subjects who received no descriptive information about the options but were allowed to sample from the two before making a decision. For example, for the first choice participants in the descriptive group were informed that they could select an option in which they had an 80% chance of winning $4 (and consequently, a 20% chance of not winning anything) or an option in which they had a 100% chance of winning $3. For that same choice, participants in the experience group were given no information, but could test either option (e.g., choose an option and see the result) as many times as they wished prior to making their final selection Figure 1 shows the percent of participants in each group choosing the option with the higher expected value (i.e., the higher average amount one would expect to win).

Figure 1. Percent of participants choosing option w/ highest expected

value (option H) for each decision problem (adapted from Hertwig et al., 2004).



Note. All differences between groups are statistically significant at the $p < .05$ level ($z > 1.96$). One condition, not presented here, in which both payoffs had low odds ($4, 0.2 vs. $3, 0.25) did not elicit significantly different response from the two groups.

When both possible options had similarly high probabilities of winning, the participants who received descriptions of the odds were more likely to select the less risky but less advantageous bet (i.e., problem 1 – a certain gain of $3 was chosen over a 20% chance of not winning $4) than participants who selected options based on experience. When both possible options had similarly high probabilities of losing, the description group participants were more likely to select the more risky, less advantageous bet (i.e. problem 2 – a 20% chance of not losing $4 over a certain loss of $3).

When the odds differed greatly between two winning options, the participants who received descriptions were more likely to choose the riskier but more advantageous bet (i.e., problems 3 & 4 – a 10% chance at $32 over a certain gain of $3, and a small chance, one in forty, of winning $32 over a more probable chance, one in four, of winning $3) than participants choosing based on experience. For losing options with divergent odds, the description group participants were more likely to select the less risky, more advantageous bet (i.e., problem 5 – a certain loss of $3 over a 10% chance of losing $32).

In each problem, participants who received descriptions of the odds reliably overweighed the probability of rare events as compared to the group that selected options based on their experience (i.e., their calculations included an expectation that the rare event would occur in a limited number of trials, whereas the

experience group members held expectations that the rare even would not occur in a limited number of trials). In problem 1, they overweighed the chance of not winning $4, in problem 2, they overweighed the chance of not losing $4, in problems 3 and 4 they overweighed the chance of winning $32, and in problem 5 they overweighed the chance of losing $32, when compared to participants in the experience group. It is important to note that "overweighting" is a relative term in this scenario – the description group reliably gives more weight to rare events than does the experience group. Whether the weight participants give to the rare events is too high or too low is better determined by whether they select the options with the highest expected value, an outcome that varies from problem to problem for both groups.

This experiment demonstrates that learning or being told the odds (e.g., that there is a 1 in 40 chance of winning a lottery) might actually increase risky decision-making in some gambling situations. People who read descriptions of the odds overestimated the occurrence of rare events – in the case of gambling, the chance of winning. People using their own experience to make decisions underestimated the occurrence of rare events. Consequently, this research suggests that those who are educated about the odds of different games might overestimate their chance of winning, and those who have learned from their own experience might underestimate their chances.

Hertwig et al.'s study has its limitations. The experiment shows us that people who read the odds overestimate rare events when compared to those who learn the odds through experience. But as Figure 1 shows, this overestimation can sometimes lead to disadvantageous choices and sometimes to advantageous choices. Though in gambling the most obvious rare event is winning, it is possible that this overestimation bias also can lead to cautious choices in some instances (e.g., if the player overestimates the chances that a dealer or fellow player has a certain card and leaves the game before being drawn in). In addition, participants in the experience group might not have sampled the options enough to get a sense of the odds – for a few problems it is quite likely that they did not ever experience the rare event prior to selection. Despite these concerns, this study raises questions about the role of descriptive information in decision-making and the effectiveness of prevention programs that rest exclusively on conventional education about gambling and its odds.

Next week, we focus on the role of general education in gambling choices.

Comments on this article can be addressed to Sarah Nelson.

References

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