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### The Effect of Symbolic, Linguistic Information on the Discounting of Delayed, Real Liquid Rewards

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# THE EFFECT OF SYMBOLIC, LINGUISTIC INFORMATION ON THE DISCOUNTING OF DELAYED, REAL LIQUID REWARDS

*Ryan Hoopes*

*Mentors: Leonard Green, Carl Craver, and Mark Povich*

Delay discounting refers to the decrease in subjective value of an outcome as time to its receipt increases. Unlike nonhuman animals, humans display a magnitude effect: larger, delayed rewards are discounted less steeply than smaller, delayed rewards. However, there are notable differences in the ways discounting experiments are conducted with humans and animals. Human experiments typically involve hypothetical, monetary rewards, with the amounts and delays stated explicitly. In contrast, in animal experiments, amounts and delays are experienced directly and outcomes are primary, consumable reinforcers. Thus, putative species differences in the effect of amount on degree of discounting may be due to these procedural differences. To evaluate this possibility, two experiments studied the effect of symbolic, linguistic information on the degree to which humans discount the value of delayed, real liquid rewards. There were two experimental groups: a symbolic group in which linguistic information was provided as to the amount of (9.6 and 28.8 ml) and delay to (5, 15, and 60 seconds) the liquid reward, and a non-symbolic group in which no information as to amounts and delays was presented. A computer-run, adjusting-amount procedure was used to estimate the relative subjective values of the rewards. Overall, the results showed a magnitude effect in the symbolic group, but no effect of amount in the non-symbolic group. In addition, there was a differential effect of delay on degree of discounting in the symbolic, but not in the non-symbolic, group. These results suggest that the difference between human and nonhuman animals in the effect of amount on degree of discounting is due, in part, to procedural differences and support the generality of the discounting approach to decision-making.