

Maladaptive Choice Behavior by Pigeons

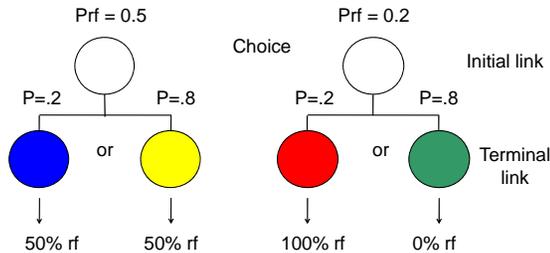
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INTRODUCTION

- Humans sometimes make irrational choices (gambling, when the expected return is negative). Optimal Forging Theory suggests that animals should make rational choices.
- Stagner & Zentall (2010) gave pigeons a task in which choice of one alternative could lead to reinforcement 20% of the time with signaled reinforcement, while choice of the other alternative led to reinforcement 50% of the time, unsignaled (see figure below). They found that the pigeons preferred the 20% reinforcement alternative.

Stagner & Zentall (2010) Sample Choice Trial



PURPOSE

- In the present study we asked if the pigeons were attracted to the signal for reinforcement (100%) or were avoiding the ambiguous signals (50%).
- We manipulated the magnitude of reinforcement rather than the percentage of reinforcement. This made the task more analogous to a human gambling task.

METHODS

Subjects.

- 8 White Carneaux Pigeons 5-8 years of age.

Apparatus.

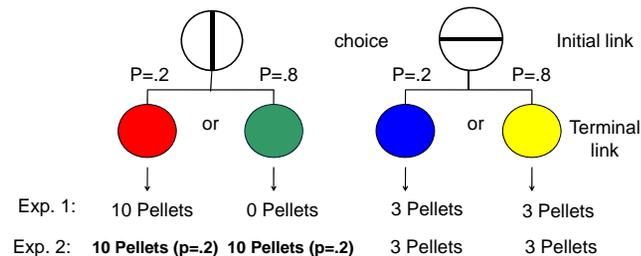
- A standard 3-key operant chamber.

METHODS (cont.)

Procedure

- Experiment 1: On forced trials, either a vertical or horizontal line was presented on one of the side keys.
- If the shape was vertical, for example, a peck would change vertical to one colored light 20% of the time that was followed by 10 pellets of food or another colored light 80% of the time that was never followed by food.
- If the shape was horizontal, for example, a peck would change horizontal to one colored light 20% of the time or another colored light 80% of the time, both of which were followed by 3 pellets of food.
- In each training session, there was a total of 40 forced trials, 20 vertical and 20 horizontal. There were also 20 choice trials in which both vertical and horizontal were presented on the side keys. Following the pigeon's choice of one of these shapes, the unchosen shape would turn off and the contingency associated with the chosen shape would follow (see figure).
- Pigeons received a total of 40 sessions of training, and colors and shapes were counterbalanced over subjects.

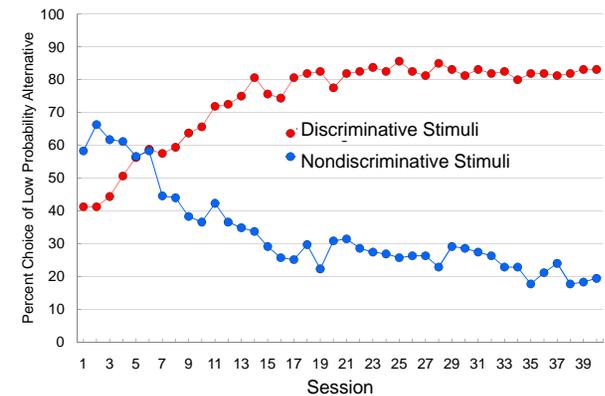
Zentall & Stagner (2010) Sample Choice Trial



- Experiment 2: The experiment was repeated with new pigeons but the red and green stimuli were nondiscriminative. Thus, ten pellets of reinforcement could follow both red and green 20% of time.

RESULTS

- Experiment 1: Pigeons preferred the alternative that provided them with less food 82% of the time (red function in figure).
- Experiment 2: Pigeons now preferred the alternative that provided them with more food 80% of the time (blue function in figure).



CONCLUSIONS

- Pigeons preferred a lower probability of reinforcement alternative (mean = 2 pellets) when reinforcement was signaled over the certain 3 pellets, but not when reinforcement was signaled.
- This task is analogous to a human gambling task in which high valued low probability outcomes are preferred over low valued certain outcomes of greater absolute value. Thus, human gambling may result from a basic behavioral process also characteristic of other animals.

REFERENCE

Stagner, J. P. & Zentall, T. R. 2010 Suboptimal choice behavior by pigeons. *Psychonomic Bulletin & Review* 17, 412–416. (doi:10.3758/PBR.17.3.412)

