

# Study 6: Shaping and Operant Conditioning

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## Abstract

Each rat will be placed in one of the chambers and reinforced by a pellet of food for successive approximations to the response of pressing a lever. The intention of this study is to provide an opportunity to shape an operant behavior.

The systematic study of operant behavior began with Thorndike's classic experiments on problem solving (Thorndike, 1898). Thorndike, of course, found that "satisfiers" could increase the frequency with which a certain behavior was performed. The procedure was also developed by other investigators, most notably by B. F. Skinner (Skinner, 1959). Subsequently, learning theorists noted that Thorndike's procedure involved an explicit response contingency whereas Pavlov's did not. Accordingly, many proposed a theoretical distinction between Pavlov's "classical" procedure and Thorndike's "instrumental" or "operant" paradigm.

In many respects, the relationship between these two paradigms remains at issue even today. The fact that two procedures differ does not necessarily imply that the underlying learning processes are different. Separating the effects of a "classical" process from an "operant" process is a difficult theoretical and empirical problem.

For the most part, we will not be concerned with this issue. However, we will be studying many aspects of operant conditioning in the next few laboratory exercises. Consequently, we will need to train our animals to perform an operant response. This week's study is designed to let you "shape" your rat to perform a simple operant.

## Method

**Subjects.** Our Sprague-Dawley rats will serve as subjects.

**Apparatus.** We will be using the five custom-constructed chambers to test our animals. Each of these chambers will be fitted with a response lever that the animal can press. In addition, we will use the electric clocks to measure time intervals during training. Reinforcers will consist of 45 mg Noyes pellets delivered to the food cup in each box after a tap on the chamber wall.

**Procedure.** We should be able to run our lab in one shift, for a maximum of 90 minutes. During that time we will use the method of “successive approximation” to shape the rat to press the lever for the chocolate sprinkles.

Start by making sure your rat is magazine trained. That is, the tap on the chamber wall should be a strongly conditioned stimulus for approaching the food cup. Spend a few minutes reinstating the tap-food contingency and verify that your rat will approach the food cup from anywhere in the chamber when he hears the tap.

Successive approximation means that the animal is reinforced for performing some component of the response. The criterion for reinforcement is changed systematically until the final level of performance is attained. Consequently, you and your partner should plan a sequence of criteria (sort of like a curriculum for rats) that will lead to a correct lever press. For example, your plan might be something like:

1. turn towards lever.
2. move in direction of lever.
3. approach to within 10 cm of lever.
4. approach to within 5 cm of lever.
5. raise left paw to lever.
6. touch lever.
7. press lever down.

Start by reinforcing the rat every time it performs the first response in the sequence. Once it seems to perform that response reliably, move to the next level and only reinforce those responses. Continue this way until you reach the last step. Every two minutes, note down the approximation that you are currently working on.

When (or if . . .) the rat acquires the lever pressing response, let him press it for continuous reinforcement for 5 minutes.

## Results

This exercise is not really an “experiment”; hence we do not have any hard data to analyze. However, I would like to see the sequence of approximations and your time log.

In addition, I would like to see a “Discussion” section for this and all subsequent lab reports. In the discussion, describe the rat’s final performance and evaluate the effectiveness of your own shaping behavior.

## REFERENCES

- Skinner, B. F. (1959). A case history in scientific method. In Koch, S. (Ed.), *Psychology: A study of a science*. Volume 2, (pp. 359-379). New York: McGraw Hill.
- Thorndike, E. L. (1898). Animal intelligence: An experiment study of the associative processes in animals. *Psychological Review*, Monograph Supplement 2, 8.