

Psychology 100

Instructions for Sniffy the Virtual Rat Operant Conditioning Lab

This week's lab will take place in one of the computer labs at Knox. Your TA will tell you where to report for the lab for this week. In this lab, you will be shaping the behavior of Sniffy the Virtual Rat and teaching him to press a bar in a Skinner Box in order to receive a food reward. Please read the lab manual that is attached to these instructions, and carefully follow the directions for magazine training, shaping the bar press, and extinction.

TO FIND THE SNIFFY THE RAT PROGRAM, FOLLOW THESE INSTRUCTIONS.

You will access the program through "KnoxAnyWare." Log into "MyKnox" and click on the link to "KnoxAnyWare." Once you get into the menu of programs that are available, you will see a small icon of a rat labeled "Sniffy Lite." Click on this icon to open the Sniffy the Rat program.

PROCEDURES

When you first open the program, you will see Sniffy moving around the operant chamber (often called a "Skinner Box"). Sniffy is hungry and therefore motivated to perform for food reinforcement. On the left side of the back wall is Sniffy's water spigot. Like a real rat in a typical operant chamber, Sniffy can have a drink of water whenever he wants one. In the center of the back wall is the bar (or lever) that you will train Sniffy to press. Below the bar is the hopper into which Sniffy's food pellets will drop.

At the bottom of the screen is the cumulative recorder of Sniffy's bar presses. As time elapses, a line will be drawn horizontally across the screen from left to right. Every time Sniffy presses the bar, the line will move up a notch. Every time Sniffy gets a food pellet because he pressed the bar, a backslash (\) will be drawn across the line.

When the line reaches the top of the record, it will reset back down to the bottom (this is called a "pen reset"). If Sniffy is not bar pressing, the line will be horizontal. Once you have trained him to press, the steepness of the line will reflect the rate of Sniffy's bar pressing. The faster he presses, the faster the line will rise. The vertical lines (alternating dashed and solid) represent five-minute intervals. Don't confuse these time markers with the heavy vertical lines produced when the recording pen resets.

STEP A: Behavioral Observations

The starting point in operant conditioning is observing what actions your untrained subject naturally exhibits (baseline behaviors). Operant conditioning affects the frequency of spontaneous behaviors, so it is important to find out what your subject does before training begins.

Start with an untrained Sniffy by selecting NEW in the FILE Menu. The first step is to simply watch what Sniffy does. What behaviors does your rat perform? Observe Sniffy to become familiar with the rat's repertoire of behaviors. After watching Sniffy for about 5 minutes, make a list of the things he does and identify up to 8 names of the actions you see him exhibit.

STEP B: Magazine Training

Magazine training is the procedure that you are going to employ to turn the sound made by the food-delivery mechanism into a secondary reinforcer for Sniffy. To start magazine training, wait until Sniffy is quite near the food hopper and then operate the magazine to deliver a pellet of food. If he's close enough, Sniffy will find the food pellet quickly. To save time, give him several pellets of food before he wanders off. Then start delivering the food pellets when he's a little further away from the hopper. He should orient to the hopper and grab each pellet.

When you can "call" him from any part of the chamber by operating the magazine, you know that Sniffy is magazine trained; that is, the sound of the food-delivery mechanism has become a secondary reinforcer. This could take as many as 15 to 20 reinforcements. After every 5 reinforcers determine whether Sniffy has been magazine trained by allowing him to wander away from the magazine and then delivering a food pellet. When the sound of the mechanism calls Sniffy back to the food hopper from anywhere in the chamber, proceed to the next step.

STEP C: Shaping Bar-Pressing Behavior

Shaping is the procedure employed to train an animal to do often something that it normally does rarely or not at all by reinforcing *successive approximations* of the desired behavior. To be effective, the reinforcer must be delivered to the animal *immediately* after the target behavior.

There should be a gradual shift toward the target behavior. For instance, keep track minute by minute of how often you reinforce rearing in various parts of the chamber. As the first approximation of bar pressing, reinforce Sniffy for rearing up on his hind legs anywhere in the chamber. After 15 or 20 reinforcements, he should be rearing fairly often. At that point, stop reinforcing rearing at the side walls and reinforce Sniffy only for rearing up against the back wall. Finally, gradually require him to rear up closer and closer to the bar. If your patience, observational skills, and timing are average, Sniffy should be bar pressing frequently in 30 minutes or so. If you are skilled at conditioning,

you can train him in half that time. The skill involved is to identify and move through the appropriate steps. If you reinforce side-wall rearing too often, Sniffy may fixate on the side walls. If you proceed too quickly, he may acquire several competing actions.

Training Tricks

1. Do not miss any chances to reinforce the target behavior.
2. Move Sniffy to the back wall at least once every minute any way you can.
3. If Sniffy is rearing up near the bar, wait to let him press the bar by himself.

STEP D: Conditioning

If your rat is not shaped in less than half an hour, consider starting over because you have obviously screwed up. If you have been successful, on the other hand, you will see Sniffy pressing the bar four or five times within a minute. When that happens, stop delivering reinforcers. Over the next several minutes, the response rate will climb; the cumulative recorder will grow steeper and steeper. When the line reaches the top of the record, it will reset down to the bottom and continue climbing back up. *Consider conditioning complete when the pen resets a second time.*

STEP E: Demonstrate the conditioning to your TA

You are now ready to demonstrate to your teaching assistant that you have successfully trained Sniffy. Signal to your TA that you are ready to show him/her that Sniffy has been trained. After your TA has verified that conditioning has taken place, you will move on to the next step of the lab.

STEP F: Extinction: What happens when the food stops?

After you have demonstrated successful conditioning to your TA, the next step will be to observe the phenomenon called “extinction” and to record bar pressing minute by minute until the behavior disappears. To institute “extinction,” choose “EXPERIMENT” from the menu and then choose “DESIGN OPERANT EXPERIMENT,” and then click the button labeled extinction. This choice means that Sniffy will no longer be reinforced for bar pressing. Click “OK” and watch what happens over the next several minutes. The interval that we will use to measure extinction is the period from when Sniffy is taken off food reinforcement to the point when we can say that bar pressing has effectively stopped or at least returned to its baseline rate. In a real research setting, we would establish an exact criterion. In our lab however, we will be fairly lenient. Your extinction criterion will be that *extinction will be said to have occurred when Sniffy presses the bar fewer than three times in five minutes.* Your task is to time the period from when you instituted extinction until extinction was complete. You will observe that the rat’s bar pressing rate will decline slowly at first and then flatten out. When the cumulative record has been flat for five minutes (that is, with fewer than 3 bar presses), extinction is complete.

STEP G: WRITE THE REPORT!

The lab report will be a typed series of answers to the following questions:

1. How long did magazine training take? Why was this step necessary? What stimulus was used in magazine training Sniffy?
2. How long did it take to teach Sniffy to press the bar? What were the greatest difficulties you encountered? How might you have shaped Sniffy to engage in some other complex behavior such as scratching his ear?
3. About how many responses did Sniffy make before extinction occurred? Did you extinguish his behavior with or without the sound of the magazine turned on? Do you think that it would take more time or less time to extinguish the bar pressing behavior if the sound of the magazine was still present when the bar was pressed? Why do you think so?
4. Under what conditions do you think spontaneous recovery of Sniffy's bar pressing behavior would occur? What does spontaneous recovery tell us about the nature of extinction?