Study 1: Observation

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Abstract

Rats will be observed on a time-sampled schedule for fifty minutes. The inter-observer reliability will be assessed with a per cent agreement score, and the transition matrix of behaviors will be computed from the observations.

Our first study is a modest one. Basically, we will describe our rats' behaviors over a fifty-minute period, using a *time-based* sampling procedure. Of interest is the way the rat distributes its activities and the way different behaviors relate to each other.

Although the observation procedure is simple, the method of analysis can be quite complex. There is, first of all, the issue of reliability of measurement. Are the observations consistent against some operational criterion? Typically, this is assessed by looking at whether two observers agree with respect to a behavioral observation. A simple way to measure agreement is to look at the percentage of observations in which two observers classify the behavior in the same way.

Another aspect of the data is the *time budget*. That is, what percentage of the time is spent in different activities? This measure is particularly easy to compute when behavioral observations have been classified into mutually exclusive categories. A more informative picture of the temporal aspects of a behavior, however, is to look at the distribution of different durations of "bouts" of the behavvior. For example, given that the rat shows behavior x, how many times does that behavior last 10 seconds? How many times does the behavior last 20 seconds? Or 30 seconds? Such an analysis allows one to determine the *lifetime* of a given behavioral "bout."

At the most complex level, one could ask how different behaviors relate to each other. For example, given that the rat is engaged in a bout of behavior x, how likely is it that the rat will next do behavior y? One way to answer this question is to develop a *transition matrix*, in which we examine behaviors at one

time and then relate them to the behavior in the next time interval. This type of analysis can sometimes be used to develop a "Markov chain" that describes behavior over successive episodes. Other, more complicated, measures are also possible, including the possibility of a "grammatical" description of behavior.

Procedure

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

Apparatus. We will use clear plastic observation chambers and a clock that can give 10 second intervals.

Procedure. Each rat will be observed for 50 minutes. During each 10 second interval, each member of the team is to record, *independently*, the dominant behavior of that interval. The behaviors are:

Grooming Washing or brushing movements directed towards the rat's fur.

High sniff Standing with nose above medial plane, with pronounced nostril movement.

Low sniff Standing with nose below medial plane, again with pronounced nostril movement.

Walking Movement on all fours.

Freezing Complete absence of movement except moderate respiration.

Gnawing Chewing some part of the chamber.

Other Not in any of the above categories.

You and your partner should spend some time discussing these categories, and agreeing on their definition. When you are ready, start the time, and record on a sheet of paper with 300 spaces (a ruled sheet with different columns will suffice) the behavior exhibited during successive 10-second intervals. Make sure you and your partner stay synchronized.

Results

I would like to see two apsects of your data. First, I would like a per cent agreement score, consisting of the percentage of observations on which you and your

partner agree. Second, using one of your score sheets, I would like a transitiion matrix. The form of this matrix will be discussed in class before the start of the study.

Along with your notes, provide a short reflection on the behavior of a rat in one of these chambers.