

ANIMAL BEHAVIOR

LAB #2

Sampling Methods, Data Collection, & Ethograms Pond Exercise

Summary

Today we will be venturing outside to the University Pond to develop your behavioral observation skills. It's not the African savannah, but given the recent budget cuts, it is the best we can do. The goal of this exercise is to develop your behavioral observation and data collection skills. You should also come away from this lab with a deeper understanding of how to describe and classify animal behaviors.

Background

A) Sampling Methods

It is usually neither feasible nor necessary to record all behaviors of all animals of interest all the time. A variety of sampling methods can be used to obtain a partial record that still provides us with a valid picture of the behavior in question. In most instances, behaviors can either be classified as short events (*e.g.* lunging at an opponent) or states lasting an appreciable time (*e.g.* a threat display). We can summarize the occurrence of both with counts or frequencies, while the latter can further be characterized with regard to their duration.

1. *Ad Libitum* Sampling: Often abbreviated as *ad lib*, records as much information as possible. It is informal, non-systematic, and often used in field notes. *Ad lib* sampling may sound thorough, but because the observer can never keep track of everything that is going on, the results of these observations will always be biased by the behaviors, individuals, or situations that most attract the observer's attention. It is therefore hard to derive reliable, precise and quantitative information based on these observations. Its main value is in research planning, and in studying rare but fairly obvious behaviors.

2. Focal Animal Sampling: Here, all occurrences of specified actions of one individual are recorded during a predetermined sample period (*e.g.*, one hour). The observer also records the length of the sample period, and the amount of time the focal animal is in view ("time in"). This method can provide unbiased data relevant to a wide variety of questions, particularly if animals remain in the field of view.

3. All Occurrence Sampling: The observer focuses on a particular behavior rather than a particular individual. For example, one might count the number of alarm calls given in a group of velvet monkeys. This is a useful method for providing the rate of occurrence of a behavior (# occurrences per unit time) or for studying the synchrony of behaviors within a group. The behavior under study should be obvious to the observer, and not so frequent that recording becomes impossible.

4. Instantaneous or Scan Sampling: An animal's activities are recorded at pre-selected moments (e.g., every 30 seconds). It is a sample of states (you are unlikely to catch an animal "in the act" of doing a behavior classified as an event), and is used to study the percent of time spent in a certain activity. If the behaviors of all members of a group are surveyed within a short period of time, we call it scan sampling. This provides data on the distribution of behavioral states in a group. Instantaneous or scan sampling is best done with a sample interval as short as possible, and with behaviors that are very easily identified. The behaviors should ideally be relatively long compared to the sample interval. It is an excellent method for collecting a large amount of data on a group of animals.

B) Data Collection

Data collection is the cornerstone of good science. It should be accurate, repeatable, and relevant to the question at hand. Preliminary data collection is particularly important since you will often base entire research projects from it. So always be careful and thorough. Most behavioral data collection is done digitally now days, but we are going to start with old school field notebooks. Try to include everything you can think of in your notebook including the location, the species involved, the temperature, the habitat, and the wind speed. It is best to err on the side of caution.

C) Ethograms

An ethogram is an inventory of the behaviors of a species, with the behaviors thoroughly described and organized into categories. The ethogram places the animal's behavioral repertoire into an organized structure, which enables animal behaviorists to discover how each behavior helps the animal to survive, to mate, and to reproduce. Ethograms are the results of a scan sampling of a single organism. Usually they are presented in graph format (see sample below).

There is no one right way to describe behavior. Structure descriptions characterize the appearance or physical form of the behavior. In other words, the behavior is described in terms of the subject's posture, movements, and sounds. Think, for example, about how you might describe a handshake in terms of postures, movements, and sounds of two interacting people.

Consequence descriptions are the presumed effects of the subject's behavior on itself, on its environment, or on other organisms. In "consequence description," the behavior is described with respect to its presumed consequences without paying particular attention to the subject's posture, movements, and sounds. The handshake, which could be described above as postures and movements, could also be described as a "greeting ceremony" in a consequence description. Categories such as "obtain food" or "escape predators" are descriptions in terms of their consequences. For example, "turn light on" is a consequence description, while "push switch down using index finger" is a description in terms of structure. Consequence description is the more economical of the two methods because it does not require the observer to make subtle discriminations between very complex movements. Subtle discriminations are important, but when first learning how to do ethograms, the structure description may be confusing. On the other hand, without structure descriptions, different workers may end up studying structurally

different behaviors with similar consequences. For example, handshakes and "high fives" are both greetings involving the hands, but they occur in different contexts and are often used by different individuals.

A third type of description is "relational" and concerns the organism's spatial relations to other organisms or something in the environment. The focus is on where the organism is or with whom it is, rather than what it is doing.

Sample Data Sheet

Species: *Mus musculus*

Observers: Brooks and Yasukawa

Date: 15 October 1997

Time: 14:00-15:00

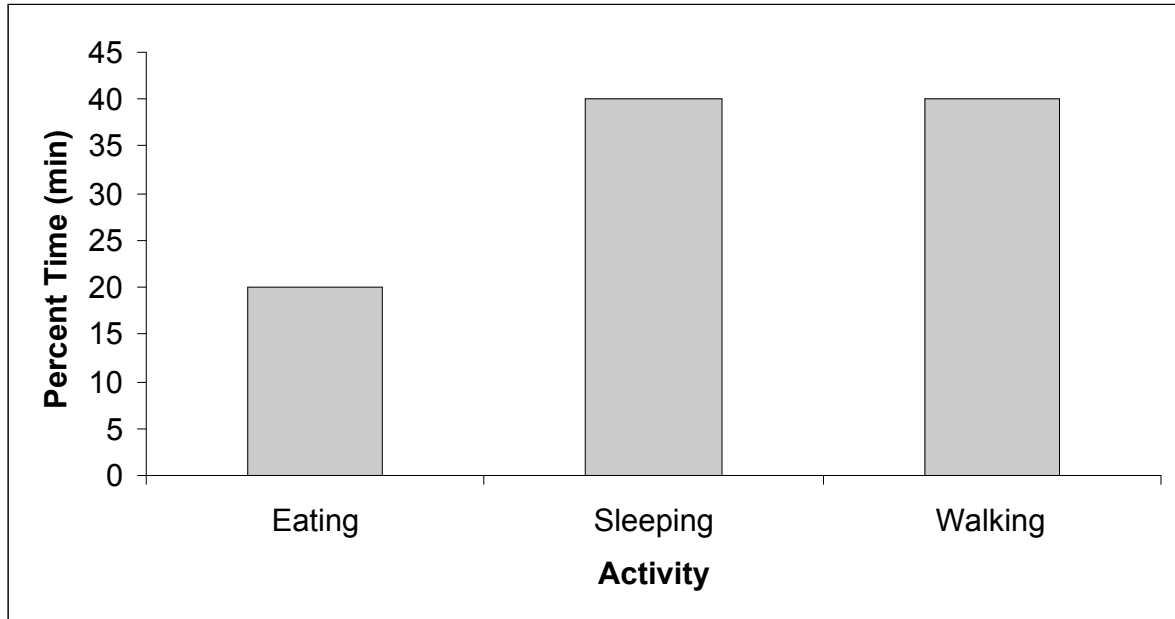
Conditions: natural light, 20
gallon aquarium

Comments: adult male ID# 21

Category of Behavior

Time	Walking	Sleeping	Eating
14:02	x		
14:04	x		
14:06		x	
14:08		x	
14:10		x	
14:12		x	
14:14			x
14:16			x
14:18	x		
14:20	x		

Sample Ethogram



Lab Instructions

- 1) Complete each sampling method described above for 15 minutes each method, taking careful notes regarding your observations. Try to decide *a priori* what the behaviors are and how you will measure them (AKA operational definition). Remember to record the species observed, but avoid anthropomorphisms (such as dragonflies liking the cool, refreshing water).
- 2) Construct an Ethogram of a focal individual noting the species.
- 3) From these observations, create an experimental question, the null and 2 alternative hypotheses, and their corresponding predictions (as discussed in lecture).
- 4) Go to Web of Science and find two citations relevant to your experimental question.
- 5) Your lab report should include 1-4, the raw data typed and added as an appendix.