

Lab: Collecting Observational Data

The purpose of this lab is to gain experience collecting the three types of observational data that are most commonly used in behavioral research. To do this, we will observe the waterfowl at the Berkeley Aquatic Park. Working in groups of 4 students, you will monitor two types of behavior: a) predator-scanning behavior and b) wing flapping. Within each group, two pairs of students will collect the same type of data at the same time (this means observing the same animal(s) using the same method) so that we can examine inter-observer variability within groups. For the purposes of the lab, we will define predator scanning as holding the head up and looking around the environment and wing flapping as rising slightly from the water and flapping the wings in place. In addition we will perform an exercise to learn how to define and quantify behavior.

The three data collection procedures that you will try are as follows:

- 1. All occurrence sampling.** This protocol records all instances of a given behavior performed during a given time period. Although all occurrence sampling can be used to follow single animals, it is more commonly used while watching multiple individuals and recording all instances of the behavior by all individuals.

Advantages: simultaneously accumulate data from multiple individuals. Disadvantages: can be difficult to keep track of everything going on. Uses: quantifying rates of behavior, quantifying synchrony of actions by different individuals.

To implement: watch a group of birds for a total of 15 minutes. During this period, record all instances of wing flapping by all of the birds in the group. To make this easier, have one person watch the birds and call out “flap” each time that a bird flaps its wings. Have a second person place a tick mark on the data sheet each time the observer calls “flap.”

- 2 Scan sampling.** This protocol is intended to imitate a series of instantaneous photos of the study animals, with successive photos taken at a specified time interval. Since we can't instantaneously record what all of the animals are doing, the best approximation is to visually scan from one end of the study population to the other, recording what each animal is doing at the first instant that you see it. The time interval between the start of each scan should be the same. Because it takes some time to complete each scan, you should always start in the same place and visually scan in the same direction to keep the time interval between successive observations as standard as possible.

Advantages: can simultaneously collect data on multiple animals. Disadvantages: successive scans may not be temporally independent, may be difficult to see all animals all the time. Uses: best for non-social behavior, including activity budgets (percentage of time spent in different activities), spatial distributions, synchrony of behaviors.

To implement: use scan sampling to record the number of birds flapping their wings and the number of birds scanning for predators, with a 2 minute interval between scans. To make this easier, have one person visually scan the birds and call out “flap”, “scan”, or “other” for each animal sighted, where “flap” = wing flapping, “scan” = predator scanning and “other” = other behavior. A second person can tick off on the associated data sheet each “flap”, “scan” and

“other” entry. Continue for a total of 20 minutes (10 scans). Rotate activities among group members so that everybody gets a chance to visually scan the birds and record the data.

- 3. Focal animal sampling.** This protocol follows a single animal for a specified period of time. During that period, you can either record everything that the animal does, or record all occurrences of a select set of behaviors. This protocol can be repeated for any number of different individuals. The critical parameter is how you choose which animal to watch; without a preset procedure for picking focal individuals, you are likely to bias your data by selecting animals that are particularly visible or that are doing something particularly exciting. A better approach is to have a list of all of the individuals to be watched and to work your way through that list, starting with the next animal on the list (after the one you finished with) each time that you resume data collection.

Advantages: very detailed information on the individuals sampled. Disadvantages: only single animal sampled at a time. Uses: good for calculating rates or durations of specific activities, not good for assessing synchronous behaviors.

To implement: use focal animal sampling to record the number of instances and total duration of scanning by 4 different birds. Follow each bird for 5 minutes. To make this easier, have one person watch the bird and call out “start” when it raises its head and “stop” when it lowers its head. A second person should both keep track of the time and record the data, specifically the start and stop time for each scanning event.

Additional comments: these data collection protocols can be modified or combined as best suits the project in question. Some additional data collection procedures exist as well. For example, behavioral data can also be collected *ad libitum*, which means that observers simply record a free-form narrative of everything they see. Although easy to collect, this type of data is often difficult to analyze because it lacks any type of temporal or procedural consistency. In all cases, it’s critical to define the behaviors being observed carefully and to be sure that all observers are using the same definition. Before starting any data collection protocol, it’s critical to think about the questions that you hope to answer from your data and to determine which type of collection procedure will best address those questions. Frequently, you may end up employing several different protocols to observe the same population of animals. For example, you may use scan sampling to determine the spatial distribution of individuals but use focal animal sampling to compare the extent to which different individuals engage in a specific behavior. As part of the cricket lab to be conducted later during the course, you will need to decide which of these protocols best fits the research question(s) that the lab will address.

References:

- Altmann, J. 1974. Observational study of behavior: sampling methods. *Behaviour* 48:227-265.
- Lehner, P. N. 1996. Handbook of Ethological Methods. Second Edition. Cambridge University Press, Cambridge, UK.
- Martin, P and P Bateson. 1993. Measuring Behaviour: An Introductory Guide. Second Edition. Cambridge University Press, Cambridge, UK.
- Ploger, B.J. and Yasukawa, K. 2003. Exploring Animal Behavior in Laboratory and Field. Academic Press. San Diego.

Group Name/Number: _____ Date: _____

1. Defining Behaviors (you may make annotations/answer on the back of this sheet)

- a. Observe a single bird or a group for 10 minutes and identify three behaviors.
- b. Draw rough sketches to describe the behaviors you named. You should do this while you are watching the behavior.
- c. Name each behavior.
- d. Make a rigorous definition of the behavior, in order to quantify it. For example if the behavior is a tail wag, what would constitute one tail wag? Describe this explicitly.
- e. For each behavior: is it a state or an event?

2. All occurrence sampling. Fifteen minute observation period of multiple birds.

Start time: _____ End time: _____

of occurrences
of wing flapping:

3. Scan sampling. Two minute interval between scans, multiple birds observed during each scan.

Scan #	Time	# of animals		
		wing flapping	predator scanning	doing something else
1				
2				

3

4

5

6

7

8

9

10

4. Focal animal sampling. Five minute observation period for each bird, total of four birds observed.

Bird #1 Start time: End time:

Time head up:

Time head down:

Bird #2 Start time: End time:

Time head up:

Time head down:

Bird #3 Start time: End time:

Time head up:

Time head down:

Bird #4

Start time:

End time:

Time head up:

Time head down:

Bird #5

Start time:

End time:

Time head up:

Time head down:
