

TUTORIAL 5 - METHODS

Quantifying Behaviour: who, what, and when to watch

Introduction To test any hypothesis in science, you need to measure, and therefore to quantify, your observations. In behavioural ecology, this often means watching animal behaviour, but a slapdash approach to this won't do; one must carefully plan which individuals to watch, when to watch them, and what behaviour to record. You will learn in this tutorial that in every study you have to weigh the advantages and disadvantages of the various options open to you.

Procedure You will watch a videotape of several animals doing various things. Watch through a few minutes of the video once and try to write down the main classes of behaviour that you see, and the time when each begins and ends.

When the videotape segment is over, discuss with the whole class the following questions:

- 1. Defining behaviours.** What were the main classes of behaviour you observed? How did you define each behaviour?
- 2. Choosing which behaviours to record.** What information were you able to record? Why were there some things you couldn't record? How did you decide what to record and what to leave out?

Sampling methods. The preceding discussion should have convinced you of the importance of carefully planning one's observations. Perhaps the most important decision to be made is which sampling method to use. There are many possibilities; we'll try two of the commonest:

Focal animal (or "focal ") sampling: Here, one watches a single animal (a "focal " animal) for a given period, noting all behaviours and the times they begin and end. To try this today, you'll pick an individual to watch, and watch it for three minutes. You will ultimately determine the % of time spent at each behaviour by the focal animal.

Scan sampling: Here, one notes the behaviour of each animal in a group at set intervals, just as the sweeps of an air traffic controller's radar screen samples the positions of airplanes. To try this, you'll note the behaviour of all individuals visible on the screen every 10 seconds for three minutes. You will ultimately determine the number of 10 s intervals in which you record each behaviour.

To get an idea of the information each of these methods provides, organize yourselves into trios, in which one person will be an observer, another a timer-recorder, and the third a data recorder. Each half of the class will use one of the sampling methods to record three or so behaviours for three minutes. Then discuss the following questions:

1. What do these animals spend most of their time doing? Which sampling method is better for answering this question? Why?
2. Which sampling method was better at recording behaviours that lasted a long time? Which was better for behaviours that were brief?
3. Which sampling method allowed you to record sequences of behaviours?

TUTORIAL 6 - METHODS

Asking Questions in Behavioural Ecology: from hypotheses to predictions to results

The object of this tutorial is to get firsthand experience in forming testable hypotheses and predictions about a behaviour that begs for functional explanations: parent birds beating up their own offspring. The TA will present some background information on the peculiar species that does this (the moorhen, Gallinula chloropus) and then we will go through the following exercises:

Step 1: Stating your hypothesis. Based on the natural history of the bird and your new-found theoretical background in behavioural ecology, come up with some explanations for the behaviour. Why might parents attack their own offspring; what function could this behaviour possibly serve? The TA will list all the potential explanations on the board and discuss them with you, then will present the hypotheses that those two giants in the field, Leonard and Horn, came up with in their own study of moorhens.

Step 2: Making your predictions. Now that you know the hypotheses, how would you test them? The only rule we'll give you for now is that you can't experiment - everything has to be done by observation. What sorts of patterns would you expect in moorhen behaviour or ecology if one or the other hypothesis were true, and how would you go out and collect the necessary data?

Step 3: Testing the predictions. The TA will now show how Leonard and Horn tested their hypotheses, the results they got, and their conclusions.

Step 4: Re-evaluating, devising experiments. Do you agree with their conclusions (you get A+ if you do, D- if you don't)? Can you think of experimental manipulations that would test their interpretation more rigourously, or that would test extensions of their or your own ideas?