Sampling Animal Behavior

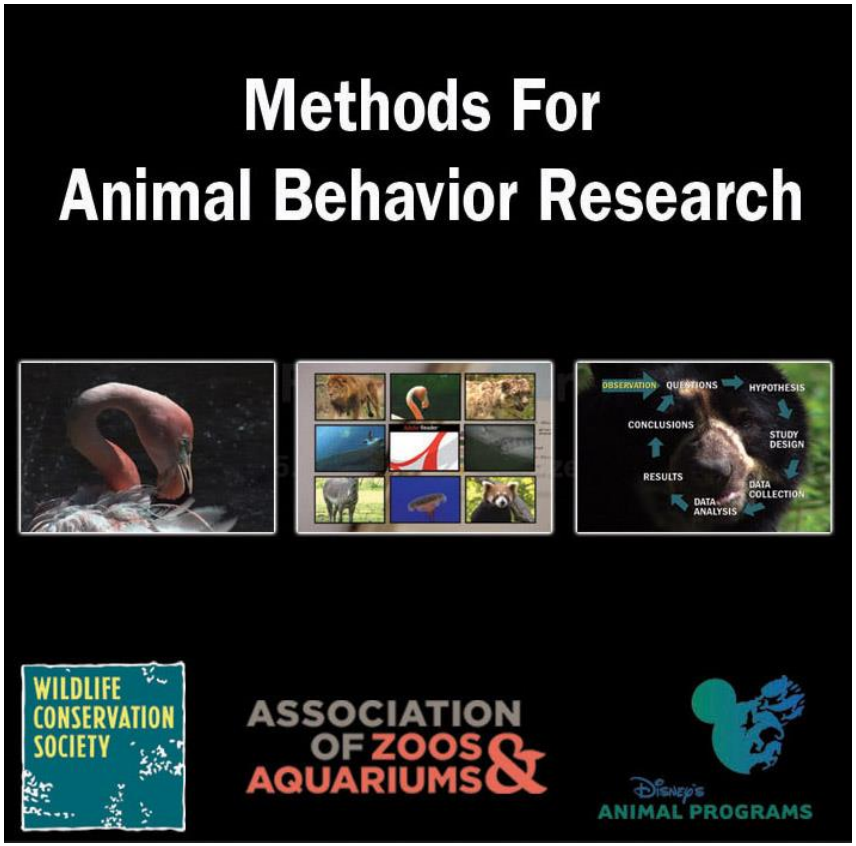
Animal Behavior Society Workshop

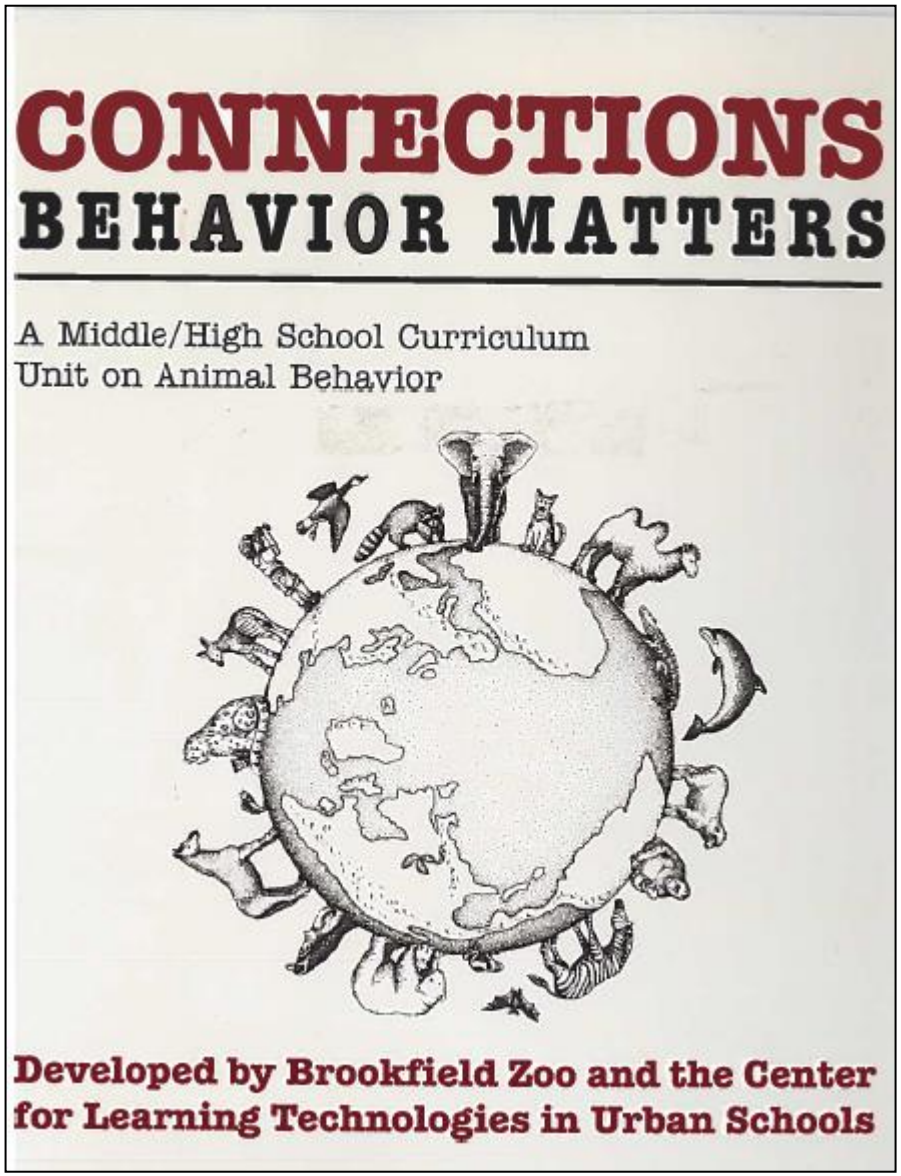
July 30, 2016

Sue Margulis, Canisius College margulis@canisius.edu

Lead-in to the class

- Understand and be able to construct an ethogram
- Know the difference between a *state* behavior and an *event (all-occurrence)* behavior
- Review hypothesis testing and development of “answerable” questions





These resources provide excellent background and practice for students. The Methods for Animal Behavior Research DVD can be purchased for only $5, from Dr. David Powell (St. Louis Zoo). The video clips here for practicing methods are detailed and lengthy. The "Behavior Matters" curriculum is available from Brookfield Zoo. Although it was designed for middle and high school, the methods practice works very well for college classes as well.

The state of animal behavior circa 1970's

- Early days of field work
- Researchers trying to observe everything in all animals
- Lack of standardization of how this is done
- As a result…inability to compare, contrast, combine

Observational Study of Behavior: Sampling Methods

- Importance of “sampling” behavior
- Avoid bias

Behaviour, Vol. 49, No. 3/4 (1974), pp. 227-267

The Nature Documentary Fallacy

- Write down anything that is interesting
- No clear, defined method
- Focus on what is interesting to you

Problems with this approach?

"I saw two monkeys fighting."

- how many monkeys were around all together?
- Did these animals know each other?
- How much time did I spend watching them?

Importance of standardizing methods

Choice of method depends on

- Questions
- Type of behavior
  - States
  - Events

Q: Are males more aggressive than females?

- On the average, do males spend more of the day involved in aggressive behavior than do females ?
- Do males initiate aggressive bouts more often than do females?
- Are the aggressive acts of males more serious, more intense, more potentially destructive ?
- Is the response to an aggressive act more likely to be an aggressive act if the recipient is a male?

To decide on what method is appropriate to allow you to answer a question, you need to understand the methods.

Methods described in Altmann

- Ad libitum sampling — "notes"
- ~~Sociometric matrix completion~~
- Focal-animal sampling
- Sampling all occurrences of some behaviors — Adding selected events
- ~~Sequence sampling~~
- One-zero sampling — Yes/no
- Instantaneous and scan sampling

Focal animal, or continuous sampling

- Watch 1 animal (or subgroup), and record all of its activities for a pre-determined period of time
- Must be able to identify individuals
- Useful for observing both states and events
- Best way to observe interactions
- Unbiased record of behavior

Instantaneous or scan sampling

- Watch 1 animal or a group of animals, and record what the animal(s) is doing at pre-set intervals
- Don’t necessarily need to be able to identify individuals
- Useful for observing states only
- Can monitor large groups

Practicing instantaneous (scan) sampling

- Meerkat ethogram
- Meerkat data sheet

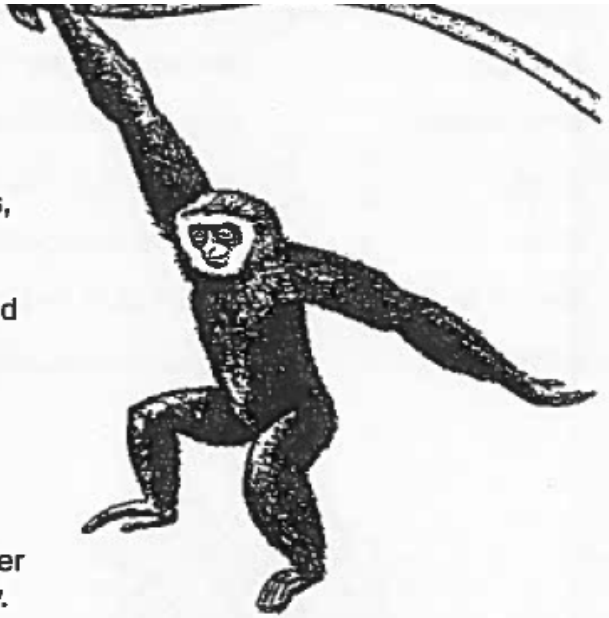
This example comes from the Behavior Matters curriculum.

Ethogram of State Behaviors

Sentry:	animal stands upright on hind legs, alert, looking at surroundings
Forage:	animal consumes or manipulates food or digs in the dirt in search of food
Locomote:	animal runs, walks, or climbs around exhibit
Rest:	animal sits or lies immobile, eyes open or closed, not doing anything else
Play:	animals engage in rough and tumble social interaction or chasing
Social Groom:	animal uses its teeth or front paws to comb through another animal's fur
Other:	any other behavior not listed above

Practicing continuous sampling

Ethogram of State Behaviors



Rest:	animal sits, stands, or lies immobile (not moving) with eyes open and not doing any other activity
Locomotion:	any movement by the animal (on the ground, rocks, or in trees)
Forage:	animal searches for, moves or handles, or eats food or water
Groom:	one animal runs its fingers or teeth through the fur of another
Play:	moving of objects or apparently "purposeless" and non-threatening movement that may involve another animal. Note who is involved and describe the play.
On Mom:	infant clings to fur of mother
Other:	any behavior not listed above
Out of view (oov):	animal is not visible

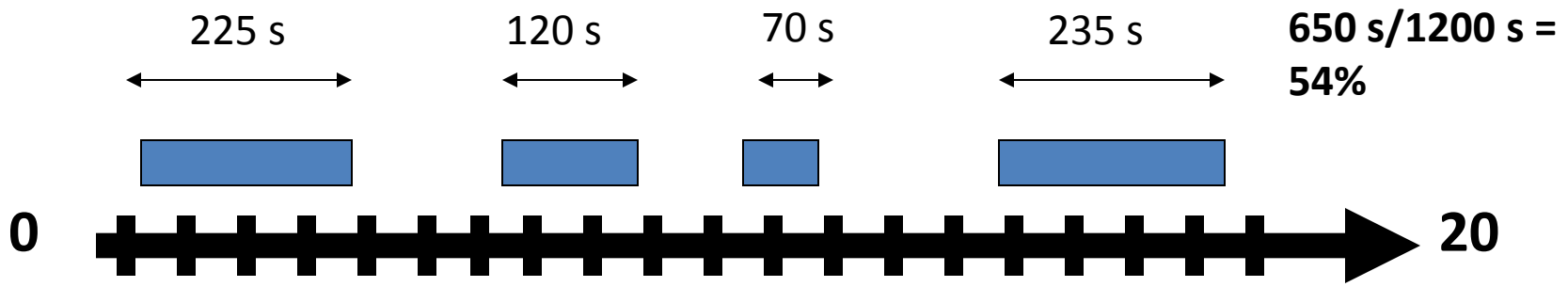
This example comes from the Behavior Matters Curriculum. It is important to point out with this example that one must indicate who the initiator and recipient of any interaction are. Additionally, one state ends when the next state begins. Events can occur during states.

Ethogram of Event Behaviors

Touch:	one animal puts hand on the arm, head, or other body part of another animal; gesture is gentle and friendly, not aggressive
Bite/Hit:	aggressive, hard, rapid touch or push, or placing mouth on another animal and closing with apparent force

Comparing methods: Observe for 20 minutes. Record occurrence of a particular behavior

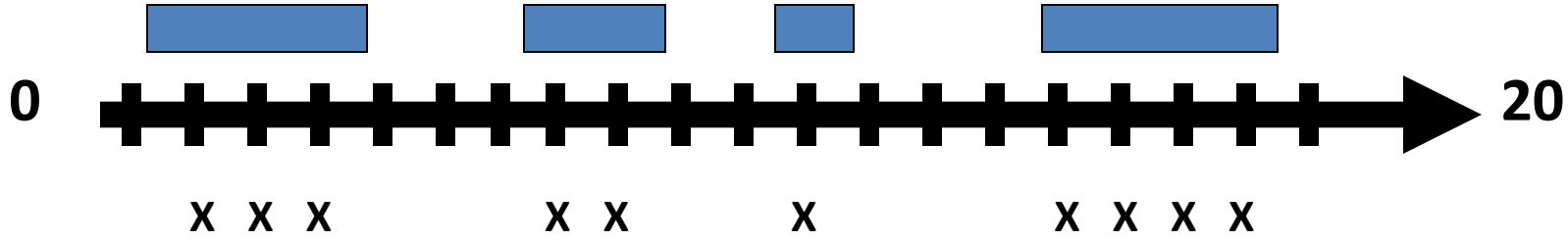
Continuous sampling



This is a great way to illustrate how similar (or different) the 2 methods can be. In this example, each blue box represents a bout of a particular behavior. The numbers indicate the number of seconds (out of 20 minutes, or 1200 s) that each bout lasted. Summing these up tells you what proportion of your observation was spent in that state.

Comparing methods: Observe for 20 minutes. Record occurrence of a particular behavior

This represents the same observation, but this time with instantaneous data collection, every minute. The "X" indicates a point observation occurring during a "blue bar." You can see that the percent time spent in this behavior is very similar to the previous slide, which used continuous sampling.

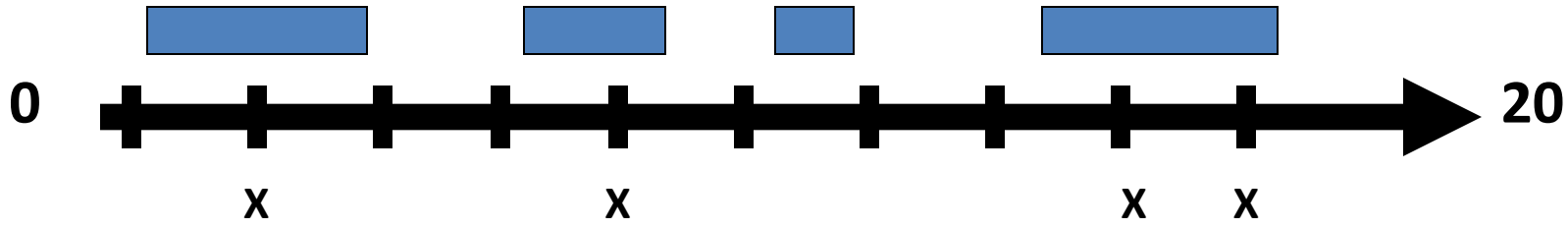


Instantaneous sampling

10 of 20 scans = 50%

Comparing methods: Observe for 20 minutes. Record occurrence of a particular behavior

In this examples, instantaneous sampling is done every 2 minutes instead of every minute. The results are less similar now. The farther apart the scan, the more difference one is likely to see; the closer together the scans, the greater similarity with continuous sampling.



Instantaneous sampling

4 of 10 scans = 40%

Comparing data recording methods

This activity is associated with an activity developed for use in both the Behavior Matters curriculum, and in "Learning the Skills of Research: Animal Behavior Exercises in the Laboratory and Field" by E Jakob and M Hodge.

- Pick a partner
- Watch a 9-minute video of an okapi
  - First run-through to develop ethogram
  - Second run-through for data collection
    - One of you does a “continuous” observation
    - One of you does an “instantaneous” observation (every 30 seconds)
- Calculate activity budgets (percent time spent in each behavior)

The Ethogram

- Should include both states and events (at least 8 states and 2 events)
- Should include “other” and “out of view” as 2 of your states
- Be sure you agree with your partner on definitions

Calculating activity budgets

Continuous

- Calculate # seconds engaged in each entry (state behaviors only) on data sheet.
- Sum up total # seconds for each behavior
- Total # seconds engaged in behavior / total # seconds of observation
- # occurrences of each event (does not go into activity budget)

Instantaneous

- Count number of scans engaged in each behavior
- Divide by total number of scans

USE A VIDEO

What method is best?

- What observation method would you choose if you are observing vigilance in a large herd of zebras?
- What observation method would you choose if you are observing aggressive interactions in a small group of gorillas?
- What observation method would you choose if you are comparing activity budgets of wild and zoo-housed lions?
- What observation method would you choose if you are observing displacements of birds at a birdfeeder?

Part 2: inter-observer reliability

- Watch a 2nd video of white-cheeked gibbons
- Use the ethogram from the focal sampling practice (states only)
- Use an instantaneous method, every 30 seconds
- Do not communicate with one another
- Record your data simultaneously
- Compare your results
    - Percent agreement
- How similar?

Calculating reliability

- If you and your partner have
  - 20 scans
  - You have the same behavior for 18 of them
  - 18/20 = 90% agreement

It is best to choose a relatively simple video here, preferably one with an easily-identifiable individual. Calculating reliability is much easier when instantaneous sampling is used. This exercise provides valuable insights into why two observers might score things differently (errors of apprehension, lack of sufficient practice, observer error).

USE A VIDEO HERE

Finding videos, shooting videos

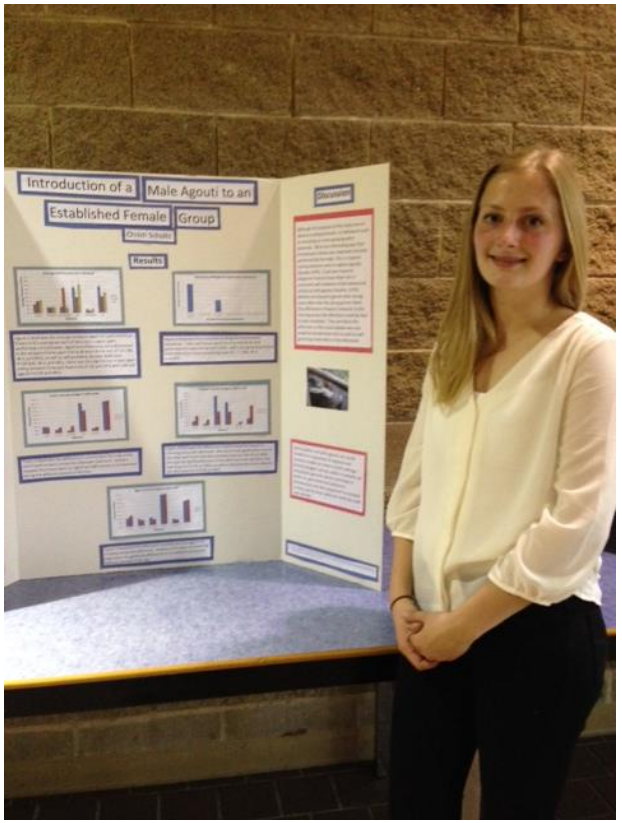
- You tube is your friend!
- Shooting videos – very time-consuming, not as easy as you might think

- https://www.youtube.com/watch?v=M_AL93uqlow

Joan Strassmann has some excellent videos available on her Youtube channel (https://www.youtube.com/user/strassm), but you also can search Youtube and see what you can find.

Is that all? After you collect the data, you need to…

- Enter the data into computer
- Analyze the data
- Write up the results
- Present the findings to peers through publication or presentation



Behavioral research from start to finish