Observational Studies – Week #3

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Review of papers

Taking the NEXT Step – The Trial

Define or Refine your research question **

- To refine your question, you may need to do some informal observations
- Or you may conduct a pilot project

Start designing your trial

1. Choose the measures that will help you answer your research question
2. Choose the appropriate recording methods

Descriptive (Observational) vs Experimental

What is the difference?

Descriptive Study

“Both descriptive and experimental research should include quantification, but quantification and statistical analysis must NOT become the overlords of good quality observation.”

[Lehner, 1996]

Descriptive Study

"Nowadays, it is regarded as modern to set experimentation above observation (no matter how assumption-free) and to see quantification as a more important source of understanding than description. We tend to forget that description is the foundation of all science."

[Lorenz, 1991 in Lehner, 1996]

Descriptive vs Experimental

Experiment – may feel more scientific

BUT

Many questions about behaviour are better handled with an observation / descriptive study

Measures

- Validity – measuring what you think you are measuring – suckling vs amount of milk
- Reliability – consistent and repeatable measures

Measures

- Confounding variables

Experimental Designs

- Completely Randomized Design
  - Treatment vs Control - 1 treatment factor
  - Randomly assign units to each treatment group
  - Easiest design to implement
  - CONS:
    - What about other sources of variation?

Experimental Designs

- Factorial Designs
  - More than 1 treatment effect
  - M/F and Trmt/Control
  - Now we can study the interaction between the two
  - Randomly assign units to each factor level
  - CONS:
    - What about other sources of variation?

Experimental Designs

- Randomly Complete Block Design (RCBD)
  - Treatment/Control group
  - 4 Zoos – identical trial set-up – but we know there will be variation due to the location (Zoo)
    - BLOCK = Zoo
    - Variation within the Zoo will be less than the variation between the Zoos

Experimental Designs

- Repeated Measures
  - How do you decide whether you have Repeated Measures or not?
  - What is your experimental unit?
  - How many measurements have you taken on your experimental unit?
    - If more than 1 – then chances are you have a repeated measures design

Latin Square Design

- Used when you want to control for within subject variation
- The animal you are studying acts as its own control
  - The animal is exposed to all the treatments

Matched Pairs Design

- Latin Square is one example
- One animal in the Control group – matching to another animal in the Treatment group
  - Match for age, sex, other factors

Study Development of a behaviour or an animal?

- Two ways:
  - Longitudinal – study the same animal over time
  - Challenges?
  - Cross-Sectional – study different animals at different ages
  - Challenges?

Validity: extension of last week

- How well are the measures you've decided on and your experimental design – answering your research question?
  - Internal Validity – your research applies to your sample
  - External Validity – your research applies to other populations, species, situations

Internal Validity

- How well your methodology – what you are doing – answers your research question.
- Threats or Changes:
  - Over time – maturating subjects
  - Testing procedures – are they constant?
  - Instruments or mechanics of data collection
  - Selection biases

External Validity

- How applicable are your results to other situations, populations, or species
- Threats or Changes:
  - Generalize across ALL subjects
  - Generalize across ALL environments
  - What about times?
  - Is your treatment sensitizing your subjects? Your presence?

What is the best way to conduct a study in animal behaviour?

- All depends on your Research Question
- Experimental designs may also depend on:
  - Number of animals you have access to
- Measurements you are taking

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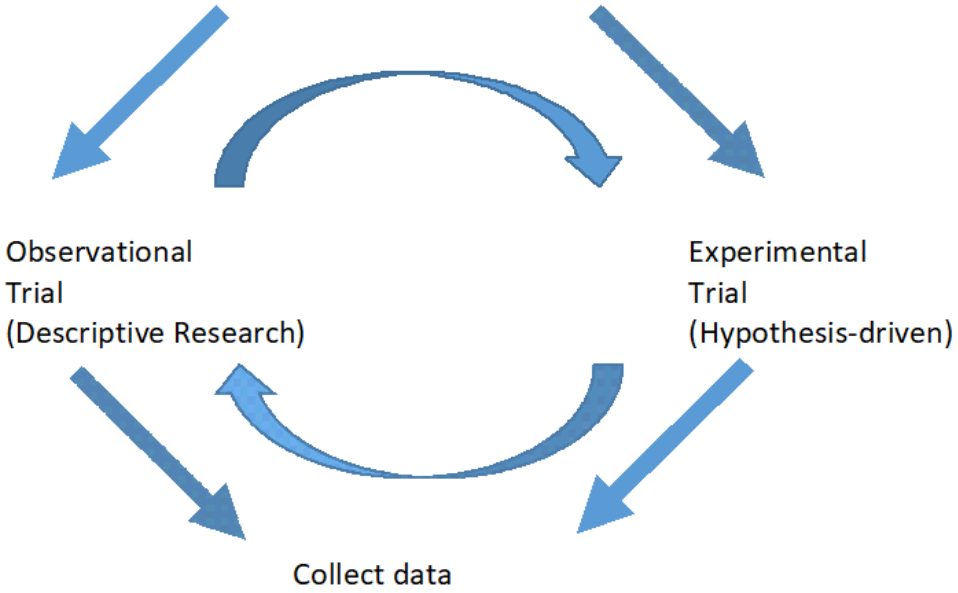

Data Collection

- How do you enter data for analysis?
- What information do you capture?
- What program do you use?

Data Collection Exercise

Next Week

- This week we took a look at:
  - Descriptive vs Experimental
  - Experimental Designs
- Next week, we will look at:
  - Statistical Analyses
  - General overview on what to do and what NOT to do