Stat 101 – Lecture 18

Observational Studies

- Simply observing what happens
  - A sample survey is one kind of observational study.
  - There are other observational studies that are not surveys.

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Tanning and Skin Cancer

- This observational study involved 1,500 people.
- Selected a group of people who had skin cancer and another group of people who did not have skin cancer.
- Asked all participants whether they used tanning beds.

2

Sodium and Blood Pressure

- Enroll 100 individuals in the study.
- Give each individual a food diary and ask him/her to record everything they eat each day for the next month.
- From the diary the amount of sodium in the diet is found.
- Measure their blood pressure.

3

Differences

- Retrospective – look at past records and historical data.
  - Tanning and Skin Cancer
- Prospective – identify subjects and collect data as events unfold.
  - Sodium and Blood Pressure

4

Experiments

- Explanatory variable – Factor.
- Response variable.
- Subjects – Participants – Experimental Units.
- Treatments.

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Experiments

- The experimenter must actively and deliberately manipulate the factor(s) to establish the method of treatment.
- Experimental units are assigned to the treatments.

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Sodium and Blood Pressure

- 20 subjects.
- Factor – amount of dietary sodium.
- Treatments: low sodium diet and high sodium diet.
- 10 subjects randomly assigned to each treatment.
- Response – systolic blood pressure.

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Experimental Principles

- Control
  - Control outside variables
  - Control group
- Randomize
  - Randomly assigning units to treatments
  - Random selections of units

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Experimental Principles

- Replicate
  - within an experiment.
  - repeating entire experiments.
- Block

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Control

- Control outside variables that may affect the response.
  - Have subjects of the same age, gender, general health, ethnic group.
  - By controlling outside variables you prevent those variables from causing variation in the response.

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Control

- Control group
  - Have a group of subjects that do not receive a treatment.
  - Allows one to see if any of the treatments in an experiment is better than not treating subjects.

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Randomization

- Randomly assign subjects to treatments.
- Randomly assign a run order to the various trials in an experiment.

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