

Lecture 3: Chapter 3, Section 3

Designing Studies

(Focus on Observational Studies)

- Design; Experiment or Observational Study
- Establishing Causation
- Paired vs. Two-sample Design
- Pitfalls of Observational Studies

Looking Back: *Review*

□ 4 Stages of Statistics

■ Data Production

□ Obtain unbiased sample (*discussed in Lecture 1*)

□ Design a study that assesses sampled values of single variable or relationship without bias

■ Displaying and Summarizing

■ Probability

■ Statistical Inference

Definitions

- **Observational study:** researchers record variables' values as they naturally occur (can be *retrospective* or *prospective*).
- **Sample survey:** observational study with self-reported values, often opinions
- **Experiment:** researchers manipulate explanatory variable, observe response
- **Anecdotal evidence:** personal accounts by one or a few individuals selected haphazardly or by convenience. *(To be avoided.)*