

**Chapter 2 Notes****Collecting Data Sensibly****Section 2.1 – Statistical Studies: Observation and Experimentation**

- **Observation and Experimentation**

In what ways are observational studies and experiments similar?

What are some important differences between observational studies and experiments?

Describe the confounding variable from each of the three examples found on page 29:

- 1.
- 2.
- 3.

- **Drawing Conclusions from Statistical Studies**

Under what conditions is it possible to show a cause-and-effect relationship?

**Homework: 1, 2, 3, 8, 11**

**Section 2.2 – Sampling**

- **Bias in Sampling**

Provide a brief example of each type of bias:

1. Selection bias:
2. Measurement and response bias:
3. Nonresponse bias:

- **Random Sampling**

Which of the following is a simple random sampling method? Are both? Neither?

- A. One in which each individual has the same chance of being selected
- B. One in which each sample of a certain size is equally likely to be selected

Explain your choice:

The most common sampling frame is a list. Give two other examples of sampling frames:

- 1.
- 2.

Comment on the differences between sampling with or without replacement and under what conditions one might be preferred over the other:

Why is the sample selection process so important?

Respond to the claim that a relatively small sample can accurately reflect the population:

- **Other Sampling Methods**

Briefly describe each of the following methods and under what conditions they might be desirable.

Important: What is the role of *randomization* in each method?

1. Stratified Random Sampling
2. Cluster Sampling
3. Systematic Sampling
4. Convenience Sampling

How is stratified sampling different from cluster sampling?

**Homework: 14, 16, 18, 19, 23, 25, 25, 28, 31, 32**

**Section 2.3 - Simple Comparative Experiments**

Give a brief definition of an experiment using the words explanatory and response variables:

What is another word for explanatory variable?

What is the relationship between explanatory and response variables?

What is an extraneous factor?

What happens when two or more factors become confounded?

Discuss the importance of the four key concepts in experimental design:

1. Randomization
2. Blocking
3. Direct Control
4. Replication

Read the example of “Anna the waitress” beginning at the bottom of page 46. Design your own experiment set in a workplace or similar environment that you have experienced. Be sure to include the key concepts outlined in the text.

**Homework: 33, 34, 35, 38, 39**

**Section 2.4 - More on Experimental Design**

- **Use of a Control Group**

Note: A control group is not mandatory for a good experimental design.

Briefly describe the purpose of a control group:

- **Use of a Placebo**

When is it desirable to use a placebo?

- **Single-Blind and Double-Blind Experiments**

Who is blind in a single-blind experiment and why?

Describe the process of creating a double-blind experiment:

Why would double-blind be preferable to single-blind?

- **Experimental Units and Replication**

What is an experimental unit and how is it related to replication?

- **Using Volunteers as Subjects in an Experiment**

Sometimes the use of volunteers is necessary, how is good experimental design preserved?

**Homework: 53, 54, 55, 57, 59**

### **Section 2.6 – Interpreting and Communicating the Results of Statistical Analyses**

Briefly summarize the issues that should be addressed when conducting an observational study:

- 1.
- 2.
- 3.

Briefly summarize the issues that should be addressed when conducting an experiment:

1.

2.

3.

- **A Word to the Wise: Cautions and Limitations**

Briefly summarize the common mistakes when collecting data:

1.

2.

3.