Chapter 4: Designing Studies

Key Vocabulary:

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| voluntary response sample  confounded  population  sample  design  convenience sampling  biased  simple random sample  table of random digits  probability sample  stratified random sample  strata  undercoverage  nonresponse  response bias  sampling frame  systematic random sample | observational study  experimental units  subjects  treatment  factor  level  placebo effect  control group  randomization  completely randomized experiment  statistically significant  replication  hidden bias  double-blind experiment  block design  matched pairs design |

4.1 Sampling and Surveys (pp.206-230)

1. How does a population differ from a sample?
2. What are the steps to planning a sample survey?
3. Why are *voluntary response samples* unreliable?
4. Why might *convenience sampling* be unreliable?
5. What is a *biased* study?
6. Define *simple random sample*.
7. What two properties of a *table of random digits* make it a good choice for creating a simple random sample?
8. State the two steps in choosing an *SRS*?



1. How do you select a *stratified random sample*?
2. What is *cluster sampling*?
3. What is the difference between a strata and a cluster? Look at example on page 218
4. Give an example of *undercoverage* in a sample.
5. Give an example of *non-response bias* in a sample.
6. What factors can cause *response bias* in a sample?
7. How can the wording of questions cause *bias* in a sample?

What is the difference between *nonresponse* and *voluntary response*?

4.2 Experiments (pp.231-261)

1. How does an *experiment* differ to an *observational study*?
2. What is a *lurking variable*?
3. What is *confounding*?
4. Check Your Understanding pg 233
5. Explain the difference between *experimental* *units* and *subjects*.
6. Define *treatment*.
7. What is the difference between *factor* and *level* in an experiment? Example on page 235.
8. Explain how to perform a completely randomized design.
9. What is the significance of using a *control group*?
10. Check Your Understanding pg 240
11. The basic principles of statistical design of experiments are:



1. Describe the *placebo effect*.
2. Define *randomization*.
3. Check Your Understanding pg 244

6. Define *statistically significant*.
7. Describe a *block design*.
8. When does *randomization* take place in a block design, and how does this differ to a completely randomized design?
9. What is the goal of a *matched pairs design*?
10. State the two most common ways in which *matched pairs* experiments are designed.



1. What are the advantages of a *double-blind study*?

4.3 Using Studies Wisely (pp.261-271)

1. What are the criteria for establishing causation?

2. What are the criteria for establishing inference for a population from a given sample?