Chapter 4: Designing Studies

Key Vocabulary:

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| voluntary response sampleconfoundedpopulationsampledesignconvenience samplingbiasedsimple random sampletable of random digitsprobability samplestratified random samplestrataundercoveragenonresponseresponse biassampling framesystematic random sample | observational studyexperimental unitssubjectstreatmentfactorlevelplacebo effectcontrol grouprandomizationcompletely randomized experimentstatistically significantreplicationhidden biasdouble-blind experimentblock designmatched 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*?
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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
	1.
	2.
	3.
	4.
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
	1.
	2.
	3.
11. The basic principles of statistical design of experiments are:
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1. Describe the *placebo effect*.
2. Define *randomization*.
3. Check Your Understanding pg 244
4.
5.
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.
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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?