

# Homework 1

## Stat 145

4 points

**Chapters 1 & 4. Answer the following questions on a separate piece of paper.**

1. Describe the following as both qualitative variables and quantitative variables: **speed, time, distance, amount of water.**
2. Identify the measurement scale (N.O.I.R.) for each of the following variables:
  - A. Gender of a child
  - B. Religious preference of an individual
  - C. The rank of a student in a math class
  - D. The attitude score of a subject on a prejudice personality inventory
  - E. Time required to complete a task
  - F. Difficulty of a task measured as “Easy,” “Mildly Difficult,” or “Difficult.”
3. Give three examples of each type of measurement scale (N.O.I.R.).
4. What are the main characteristics of observational studies? What are the main characteristics of experiments? What are the main differences between these two types of research designs?

**Use the following description to answer question #4.**

A researcher randomly sampled 100 college students taking introductory psychology courses at UNM to study the effects of sleep deprivation on short-term memory. Sampled students were randomly assigned into one of three sleep conditions: (1) Sleep deprived for 24 hours, (2) Sleep deprived for 48 hours, or (3) Sleep deprived for 72 hours. After being deprived sleep for the specified number of hours, each student was asked to memorize a list of 10 nouns. Students then waited 15 minutes and then were asked to recall as many nouns from the list as possible. The number of “hits” or nouns correctly recalled was recorded.

5. (A) What is the independent variable AND what are the levels of the independent variable? (B) What is the dependent variable AND what score from each student is being analyzed?
6. Briefly define each of the following sampling methods: (1) Simple random sampling (SRS), (2) Stratified random sampling, and (3) Volunteer sampling.
7. What is/are the main purpose(s) of random assignment?

8. Briefly describe when it is appropriate to use each of the following experimental designs: (1) Block design and (2) Matched pairs/Repeated measures design.

**Use the following description to answer question #9.**

A study of the relationship between physical fitness and leadership uses as subjects middle-aged executives who have volunteered for an exercise program. The executives are divided into a low-fitness group and a high-fitness group on the basis of a physical examination. All subjects then take a psychological test designed to measure leadership, and the results for the two groups are compared.

9. Is this an observational study or an experiment? Explain your answer.

**Use the following description to answer question #10.**

What is the preferred treatment for breast cancer that is detected in its early stages? The most common treatment was once to perform a mastectomy (i.e., surgical removal of the breast). It is now usual to remove only the tumor and nearby lymph nodes, followed by radiation. To study whether these treatments differ in the effectiveness, a medical team examines the records of 25 large hospitals and compares the survival times after surgery of all women who have had either treatment.

10. (A) What is the independent variable and what are the levels of the independent variable? (B) What is the dependent variable and what is being recorded? (C) Explain why this study is not an experiment. (D) Identify some of the confounding variables that likely prevent the results from this study from determining which treatment is more effective.

**Use the following description to answer question #11.**

A campus committee is interested in finding out if full-time students at the Valencia Campus would be willing to pay a parking permit fee each semester in order to raise funds to expand student services such as child care, learning resources, and academic counseling.

11. (A) Describe the characteristic of the population from which the sample of students would be randomly selected. (B) Describe a method and procedure for randomly sampling students from the population. (C) After obtaining the sample of students, how would the students be contacted in order to fill out the survey?

**Use the following description to answer question #12.**

People who eat lots of fruits and vegetables have lower rates of colon cancer than those who eat little of these foods. Fruits and vegetables are rich in “antioxidants” such as vitamins A, C, and E. Will taking antioxidants help prevent colon cancer? A clinical trial studied this question with 864 people who were identified as being at risk for colon cancer. The subjects were divided into four groups: daily beta carotene, daily vitamins C and E, all three vitamins every day, and daily placebo. Administrators utilized a *double-blind* procedure when interacting with subjects in each of the four groups. After four years, the researchers were surprised to find no significant difference in colon cancer among the groups.

12. (A) What is the independent variable and what are the levels of the independent variable? (B) What is the dependent variable and what is being recorded? (C) What does the term *double-blind* mean? (D) Explain what is meant by “no significant difference.” (E) Suggest some possible lurking or confounding variables that may explain why people who eat lots of fruits and vegetables have lower rates of colon cancer.