Chapter 5 Homework: Inferential Statistics

1. Assume that you are conducting an experiment in human performance. You have two groups: experimental (the group that receives the treatment) and control (the group that does not receive the treatment). Briefly describe your experiment, your research hypothesis, and your null hypothesis.

2. Assume that you are conducting an experiment in human performance. You have two groups: experimental (the group that receives the treatment) and control (the group that does not receive the treatment). What steps would you take to make a decision about the effectiveness of your treatment?

3. A researcher is interested in testing the relationship between the amount of fat in one's diet and the development of cancer of any type. What is the research hypothesis? What is the null hypothesis?

4. A researcher is interested in testing the relationship between the amount of fat in one's diet and the development of cancer of any type. How will the researcher determine whether or not there is a relationship between dietary fat and cancer? What steps will the researcher take?

5. A researcher is interested in testing the relationship between the amount of fat in one's diet and the development of cancer of any type. Assume that the researcher made an error of the second type (i.e., a Type II error). What did the researcher do to make this error?

6. An investigator wants to conduct a study to determine whether there is a relationship between how many carrots you eat and your ability to see better. What is the research hypothesis? What is the null hypothesis?

7. An investigator wants to conduct a study to determine whether there is a relationship between how many carrots you eat and your ability to see better. What steps will the investigator take to determine whether or not there is a relationship between carrot eating and eyesight?

8. An investigator wants to conduct a study to determine whether there is a relationship between how many carrots you eat and your ability to see better. Assume that the investigator made an error of the first type (i.e., a Type I error). What did the investigator do to make this error?

Read this quote, and then answer questions 9 to 12 about this actual study.

> "The *Surgeon General's Report on Physical Activity and Health* brings together overwhelming evidence linking physical activity (PA) to numerous health benefits and provides a solid foundation upon which to promote regular PA for citizens of all ages. . . . Accordingly, the leisure time activity patterns of adolescent boys and girls [in Iowa] were studied in order to gain a better

understanding of the habitual PA patterns in this population. Data were collected from 6,025 children in grades 4 through 12 during fall 1996 using a self-report questionnaire administered during physical education classes. Depending upon age and gender, anywhere from 5% to 15% of Iowa youth report being completely sedentary. Contrary to the findings of most national-scope studies, there was little difference in the extent of participation in PA for boys and girls. Overall, approximately 58% of Iowa boys and 54% of Iowa girls report participating in PA 3 or more days per week for 30 min or more per occasion, figures that are far short of the national health goal of 75%. Findings also reveal that participation in leisure-time PA declines substantially with age." (Hensley and Major, *RQES*, March 1998, A-33)

9. What is the dependent variable in this study?

10. There are two independent variables in this study. Name them.

11. State the null hypothesis for each independent variable.

12. What was the authors' conclusion regarding the null hypothesis for the each independent variable?

Use the following choices to answer questions 13 to 16.

A. chi-square
B. *t* test for dependent groups
C. *t* test for independent groups
D. one-way ANOVA

13. This method is used when there is one dependent variable and there are more than two groups for a single independent variable.

14. This method is used to test the association between 2 nominal variables.

15. This method is used when one group of subjects is measured on only 2 separate occasions.

16. This is the simplest test to use when only 2 groups are tested on one occasion.

Read the following description and then answer items 17 to 21.

Researchers are interested in determining whether there is a difference between two exercise regimens (A and B). The researchers think that the regimens may have differential effects on a treadmill test where the participants run to exhaustion.

17. Write the appropriate null hypothesis.

18. Write the alternative hypotheses.

19. What is the dependent variable in this study?

20. Describe what happens if the researchers makes a Type I error.

21. Describe what happens if the researchers make a Type II error.