**Vocabulary (Matching)**

Anonymity, Block design, Clinical trial, Confidentiality, Confounding, Control group, Completely Randomized Experiment, Double-blinded, Experiment, Explanatory variable, Matched-Pair Experiment, Nonadherers, Placebos, Lurking Variables, Placebo effect, Randomized Comparative Experiment, Response variable, Statistically significant, Subjects, Treatment

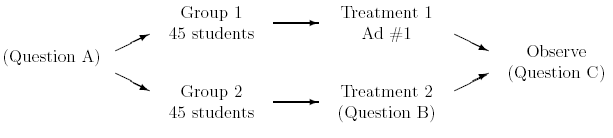
**Multiple Choice/Short Answer Type Questions**

1. Why do we use random comparative experiments?
2. Why are block design sometimes used in experiments?
3. Suppose that you want to study whether an SAT program actually helps students to score higher on the SAT. You gather data on a random sample of students who attended the program and you find that 86% of the sample scored higher on the SAT after attending the program than before attending.
   1. Can you legitimately conclude that the SAT coaching program caused these students to improve their SAT scores?
   2. What could be other explanations for their improvement?
4. Suppose you want to conduct an experiment to investigate whether an SAT prep program will improve student scores. Assume you have 120 students for the study.
   1. Identify the explanatory and response variables.
   2. Draw a diagram to show how you would randomize the experiment.
5. A report in the April 26, 2011 New England Journal of Medicine studied a new treatment for children with severe anxiety disorder. The study was randomized blinded comparative experiment. Data from the study showed that 76% of the children treated with the new drug had reduced anxiety levels. Of the children who were given the placebo, 29% had reduced anxiety levels. Almost none of the patients showed increased anxiety levels.
   1. What is meant by blinded?
   2. What is meant by randomized?
   3. What is the explanatory variable, response variable, and treatment?
6. Fill in the blanks using the following: *matched pair, observational studies, explanatory variables, experiments, double-blind methods, treatment, sample surveys, lurking variables*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_try to gather data without influencing responses. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ,

on the other hand, impose some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order to observe the response.

1. A large company wants to know if 60 minutes of yoga 3 times a week can reduce the stress levels of the employees. The company randomly selects 300 employees and divided them into two groups. One group receives no yoga and the other group receives 60 minutes of yoga 3 times per week. A measure of stress will be done before the experiment begins and another six months later at the end of the study. The stress levels of the two groups were compared.
2. Describe the response variable, explanatory variable
3. This type of study is known as?
4. Could this study be double-blinded?
5. Could this study be single-blinded? How? Would it improve the design?
6. Stress levels can vary depending on the department you work in, your job situation, and maybe even the time of year. This makes it tough to tell if the yoga actually helps reduce the stress. What do we call these “other” variables that affect the response? This is an example of what type of situation?
7. 80 patients with ADD were selected to participate in a study for a new ADD drug. One group received a current popular ADD drug on the market and the other group received the new drug. The patients were given the treatments for 3 months and reported weekly for tests. Both the experimenter and the patients were unaware of which type of drug was being administered.
8. What type of experiment design is this?
9. Why did we randomly select the subjects to receive the new treatment?
10. In problem #2, what if we divided the 80 patients into 40 males and 40 females. What type of experiment design is this?
11. In problem #2, what if we took all 80 patients and gave them the existing drug for 3 months, then gave them the new drug for 3 months and compared the results of each patient. What type of experiment design is this?
12. We want to know if the time a soft drink sits on the shelf (1 month, 2 months, 3 months) affects its taste. We took three 2 liter bottle of Coke (all with the same expiration date) and put them on a shelf. After 1 month, we tasted bottle 1, after 2 months, bottle 2, etc.
13. Describe the treatment, subject, and response.
14. Suppose all students in Mr. Peters’ Stats class 1st period are given packages of Little Chocolate Donuts at the beginning of each class which they are encouraged to eat during the first five minutes of class. Students who attend all other Stats classes 1st period will not be given doughnuts. Unfortunately, any difference between Mr. Peters’ classes and other classes on the exams might be due to the fact that Mr. Peters is a more skillful teacher than the other teachers, rather than the doughnuts.
    1. This is an example of?
    2. Suppose that instead of giving the other classes no doughnuts, we give them packages of *fake* Little Chocolate Donuts, which look and taste just like the real ones. Suppose we find that all classes do better on their exams than ever before, despite the fact that the lectures, tests, etc. are all nearly identical to what they have been in the past. This could be an example of?
    3. Suppose we took all the classes and divided so that ½ of students received the real doughnuts and the other ½ received the “fake” doughnuts. We then compared the results of those students who ate the real doughnuts and the students who at the fake doughnuts. What type of design is this?
    4. Describe the explanatory and response variables.
15. A study compares the effect on college students of two different TV advertisements for spring break in Gulf Shores, Alabama. Call the ads "Ad #1" and "Ad #2." We want to know which ad makes more students want to visit Gulf Shores during spring break. The subjects are 90 students taking a course in hotel management. The design of the study looks like this:



* 1. The statistical name for this study design is?
  2. The method used to form the groups appears in the diagram above at the point marked "Question A." How do we assign the students to each group?
  3. What is Group 2's treatment (at the point marked "Question B" in the diagram)?
  4. The response variable should be named in the outline at (Question C). The response variable in this study is
  5. A weakness of this study is:
     1. This is an observational study, so we can't conclude that the ad viewed causes the response.
     2. The design is biased in favor of Ad #1.

(c) The double-blind technique was not used.

(d) Because the students all come from one course, the findings may not extend to all

college students.

(e) There is no placebo group.

1. Does using a cell phone while driving make an accident more likely? Researchers compared telephone company and police records to find 699 people who had cell phones and were also involved in an auto accident. Using phone billing records, they compared the frequency of accidents when cell phones were in use to the frequency when they were not in use.
   1. This study is: randomized comparative, experiment, simple random sample, observational
   2. The explanatory variable is:
   3. Give an example of a lurking variable in this study.
2. A report in a medical journal notes that the risk of developing Alzheimer’s disease among subjects who (voluntarily) regularly took ibuprofen (i.e Advil) was about half the risk among those who did not. Is this good evidence that ibuprofen prevents Alzheimer’s?
3. Ethical standards for randomized controlled clinical trials include:
   1. Not asking subjects to agree to participate without first informing them of the nature of the study and possible risks and benefits.
   2. Insuring the that each subject knows which treatment they will receive
   3. Allowing subjects to decide whether to be in the control group or not
   4. Never testing drugs which have not bee proven to be completely safe.

A car dealership wants to know if it can attract more customers by having a special giveaway for those that come into the dealership. The dealership wants to know if cash money or a tangible incentive (trip/ipod, etc.) will attract more customers. The dealer decides to test to see which method (cash or tangible) is more successful at getting customers to the dealership. The tangible incentive is equivalent to the cash amount. For instance, if the dealership gives away $2,000 in cash, then the tangible reward would be equivalent to $2,000 (a trip, TV, etc.)

1. What are the explanatory and response variables?
2. Design a randomize experiment the company could implement to test this theory? You can use a diagram to draw your design.