STAT 1350, 1/20 Discussion Questions

1. To study the security protocols at a major airport, ten passengers were randomly selected from each flight leaving the airport on a particular day and questioned about the security efforts they experienced while at the airport. This is an example of what kind of kind of sampling method?

Stratified sampling

2. A(n) _____ is a list of units from which a sample is chosen.

Sampling frame

3. To obtain faculty opinions on a particular issue, four departments were randomly selected from the university, and all faculty members in those departments were interviewed. This is an example of what kind of sampling?

Cluster Sampling

4. Increasing the size of a probability sample does what to the margin of error? How does this relate to variability?

reduces it because variability is reduced

5. Professional sample surveys use careful random samples, usually by randomly dialing telephone numbers, to come close to an SRS. But the results that a sample survey actually obtains may be strongly biased because of what kind(s) of errors?

Sampling errors like undercoverage since not all people have phones.

6. When we take a census, we do what?

Survey/measure every member of the population

7. One source of error in pre-election polls is that some people in the sample say they will vote, but they end up not voting. This is an example of what kind of error?

response error / non-sampling error

8. A simple random sample of people is collected and their blood pressures are measured by one of several lab assistants. One of the lab assistants incorrectly reads the blood pressure gauge and records erroneous data. What types of errors is present here?

processing error / non-sampling error / measurement error

9. Bias in sample results can result from what?

all types of errors: sampling errors & non-sampling errors

STAT 1350, 1/22 Discussion Questions

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 cell phone use in the period of the accident with cell phone use the same period on a previous day. Result: The risk of an accident was four times higher when using a cell phone.

1. What kind of study is this? observational study
2. What is the explanatory variable in this study? cell phone use while driving
3. An example of a lurking variable that might affect the results of this study is? weather (answers may vary)
4. Confounding often defeats attempts to show that one variable causes changes in another variable. What does confounding mean? How is this related to a lurking variable?

   confounding is the effect produced by a lurking variable making it difficult to establish causation
5. What are the three principles of experimental design?

   ① control effects of lurking variables
   ② randomize
   ③ use large enough sample size

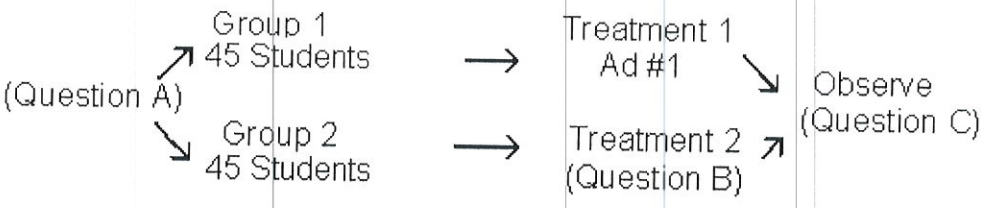
A newspaper article was headlined, "Marrying Young Can Be Beneficial." The article said that marriage is a good thing when it comes to cutting back on drinking and drugs. A University of Michigan Institute for Social Research study of 33,000 young adults showed that young, unmarried adults usually increased their alcohol, marijuana, and cocaine use when they left home, often to attend college. Those same people, however, decreased their drug and alcohol use when they got engaged or married. Couples who lived together but were not engaged or married showed no such drop in drug use.

6. The strongest reason for having reservations about the claim made in the first sentence of the quote is what?

   the people who got married weren't necessarily married young and they were older when they stopped drug use.
7. What is the explanatory variable in this study? What is the response variable?

   marriage (claimed) / drug use & alcohol use

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:



8. What is the statistical name for this study design? randomized comparative experimen

9. The method used to form the groups appears in the diagram above at the point marked "Question A." What method is appropriate here?

random assignment

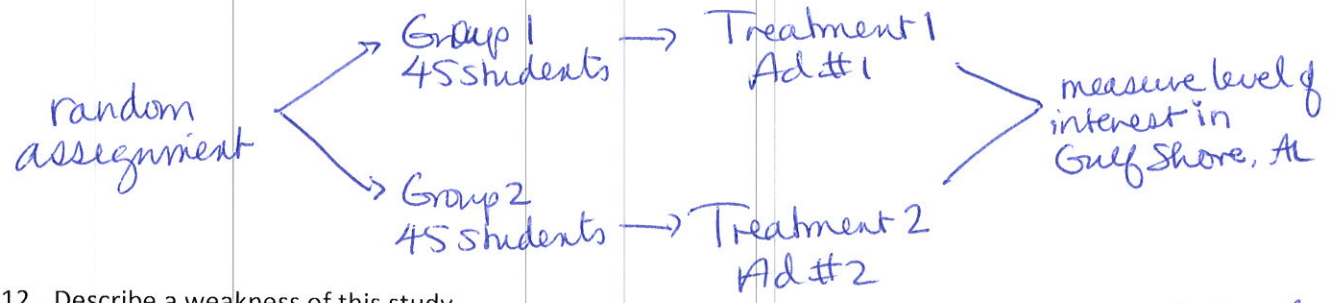
10. What is Group 2's treatment (at the point marked "Question B" in the diagram) according to the paragraph above?

Ad #2

11. The response variable should be named in the outline at "Question C." What is the response variable in this study?

level of interest in visiting Gulf Shores, Alabama

Use the information above to redraw the complete experiment diagram.



12. Describe a weakness of this study.

(answers will vary) cost, distance from location, previous familiarity

13. An important reason for the use of *randomization* in designing experiments is that it tends to do what?

reduce bias

14. If our study considers 15% to be a statistically significant amount, what does that mean?

it is a result unlikely to occur by chance

15. A study of a drug to prevent hair loss showed that 86% of the men who took it maintained or increased the amount of hair on their heads. But so did 42% of the men in the same study who took a placebo instead of the drug. What is this an example of?

(randomized) comparative experiment

STAT 1350, 1/27 Discussion Questions

Students in a large statistics class were randomly divided into two groups. The first group took the midterm exam with a symphony by Mozart playing in the background, while the second group took the exam with rock music playing. The scores of the two groups on the exam were compared.

1. The study design for this experiment is called what?

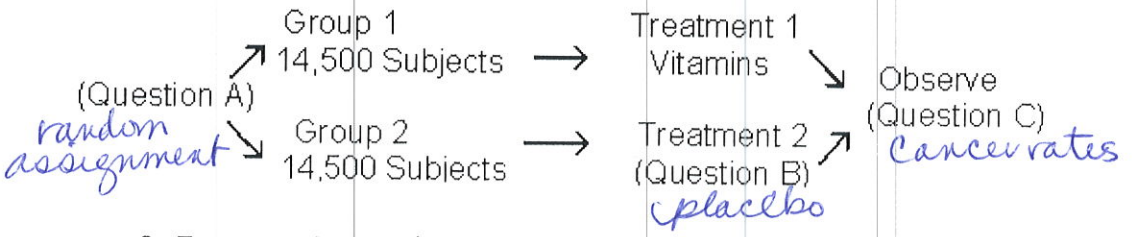
randomized comparative experiment

2. Why would this experiment not be considered double-blind?

no. student listening to Mozart knew it

Does taking large amounts of vitamins protect against cancer? To study this question, researchers enrolled 29,000 Finnish men, all smokers over the age of 50. Half of the men, selected at random, took vitamin supplements, and others took a dummy pill that has no active ingredient. The researchers followed all the men for eight years. At the end of the study, men in the vitamin group were no less likely to have cancer than men in the other group. This study cast doubt on the popular idea that taking lots of vitamins can reduce the risk of cancer.

The study design looked like this:



3. Treatment 2 was a dummy pill. Such a dummy treatment is called what?

placebo

4. In order to avoid unconscious bias, neither the subjects not the doctors who examined them knew whether a particular subject was taking vitamins or dummy pills. What is this called?

double blind

5. Give at least one weakness of this study.

age of men at start (could already have cancer or pre-cancer), all men, only Finns; compliance of taking vitamins

6. What are the keys to convincing experiments?

randomized, control, sufficient #s of subjects