

ie: _____

Day 3
HW

Biased or Unbiased Survey Questions

For the following examples, determine whether the survey sample is biased or unbiased. Explain your answers.

1. Question: What is your favorite sport? Sample is chosen from people attending a soccer game. *biased*
2. Question: What is your favorite soft drink? Sample is chosen by picking names out of a telephone book. *Unbiased*
3. Question: Should more money be put into athletic programs or music programs at school? Sample is chosen from students in the band program. *biased*
4. Question: What is your favorite vacation destination? Sample is chosen by asking every student in the class. *Unbiased*

Tell whether the question is potentially biased. Explain your answer. If the question is potentially biased, rewrite it so that it is not.

5. *B* Don't you agree that the voting age should be lowered to 16 because ~~many 16-year-olds are responsible and informed?~~
6. *B* Do you think the city should ~~risk an increase in pollution by~~ allowing expansion of the Northern Industrial Park?
7. *3* In a survey about Americans' interest in soccer, the first 25 people admitted to a high school soccer game were asked, "How interested are you in the world's most popular sport, soccer?" *neutral location*
8. *B* Don't you agree that the school needs a new baseball field more than a new science lab?
9. *B* Would you pay even higher concert ticket prices to finance a new arena?
10. *UB* The budget of the Wake County Public School System is short of funds. Should taxes be raised in order for this district to fund extra-curricular sports programs? *way prog. are funded*
11. *B* ~~Due to diminishing resources,~~ should a law be made to require people to recycle?
12. You want to determine whether to serve hamburgers or pizza at a soccer team party.
 - a) Write a survey question that would likely produce biased results. *prefer pizza or burgers*
 - b) Write a survey question that would likely produce unbiased results. *prefer pizza or burgers*
13. *B* You want to find students' opinions on the current attendance policy. Give two ways that your sample for the survey might be selected. The first must be an example of a biased sample and the second must be an example of an unbiased sample. Thoroughly explain your answers.
14. Two toothpaste manufacturers each claim that 4 out of every 5 dentists use their brand exclusively. Both manufacturers can support their claims with survey results. Explain how this is possible. *used diff. set of dentists*

Experimental Study

In an experimental study, the researcher takes measurements, or surveys, the sample population. The researcher then manipulates the sample population in some manner. After the manipulation, the researcher re-measures, or re-surveys, using the same procedures to determine if the manipulation possibly changed the measurements.

During a "controlled" experiment, the researcher will separate the sample population into groups with one group established as the control group. All groups will be manipulated in some manner, except for the control group which will remain the same.

An example of an experimental study:

A group of students is interested in knowing if the number of times they can sink a basketball is related to the color of the basketball. The students shoot a series of baskets and record their success using a regulation colored basketball. They then switch to a blue colored basketball and shoot the same series of baskets. A statistical analysis is performed.

Observational Study

In an observational study, the sample population being studied is measured, or surveyed, as it is. The researcher does not influence the population in any way or attempt to intervene in the study. There is no experimental manipulation. Instead, data is simply gathered and correlations are investigated.

An example of an observational study:

A group of students is interested in knowing if there is a correlation between attending an SAT Prep class and scores achieved on the SAT Examination. The students use a survey to collect their data from both students who took an SAT Prep class and those that did not take an SAT Prep class. A statistical analysis is performed.

Observational or Experimental

Identify each of the following as observational or experimental.

1. Compare the grades on a final math test of 25 students who use calculators and 25 students who do not use calculators. The students decide which group they are in.
2. Compare voter satisfaction levels between people assigned to use either paper ballots or touchscreen machines.
3. Determine if people who take vitamin C every day are less likely to get colds.
4. Determine which brands of orange juice people prefer. The people are randomly chosen at the supermarket and are asked to taste both brands without knowing which brand they are drinking.
5. A Stat 113 instructor announces a study session to be held the night before a test. The instructor lists the students who attended the session and compares their scores to the remaining Stat 113 students' scores.
6. To determine whether a review session will improve his students' test scores, a Stat 113 instructor divides his class into two groups. He then requires one group to attend a study session and compares the test results of each group.

Observational Study or Experiment?

For each situation, determine whether the research conducted is an observational study or an experiment. Explain your reasoning.

- O 1. The muscles of men aged 40 - 50 were 40% to 50% stronger after they participated in a 10 week, high-intensity, resistance training program twice a week.
- O 2. Among a group of women aged 65 and older who were tracked for several years, those who had a vitamin B₁₂ deficiency were twice as likely to suffer severe depression as those who did not.
- E 3. Forty volunteers suffering from insomnia were divided into two groups. The first group was assigned to a special no-desserts diet while the other continued desserts as usual. Half of the people in these groups were randomly assigned to an exercise program, while the others did not exercise. Those who ate no desserts and engaged in exercise showed the most improvement.
- E * 4. Some gardens prefer to use nonchemical methods to control insect pests in their gardens. Researchers have designed two kinds of traps and want to know which design will be more effective. They randomly choose 10 locations in a large garden and place one of each kind of trap at each location. After a week, they count the number of bugs in each trap.
- O 5. In 2001, a report in the *Journal of the American Cancer Institute* indicated that women who work nights have a 60% greater risk of developing breast cancer. Researchers based these findings on the work histories of 763 women with breast cancer and 741 women without the disease.
- E 6. Scientists at a major pharmaceutical firm investigated the effectiveness of an herbal compound to treat the common cold. They exposed each subject to a cold virus, and then gave him or her either the herbal compound or a sugar solution known to have no effect. Several days later, they assessed the patient's condition, using a cold severity scale of 0 to 5.
- E 7. To research the effects of dietary patterns on blood pressure in 459 subjects, subjects were randomly assigned to three groups and had their meals prepared by dietitians. Those who were fed a diet low in fat and cholesterol lowered their systolic blood pressure by an average of 6.7 points when compared with subjects fed a control diet.
- E 8. Some people who race greyhounds give the dogs large doses of vitamin C in the belief that the dogs will run faster. Investigators at the University of Florida tried three different diets in random order on each of five racing greyhounds. They were surprised to find that when the dogs ate high amounts of vitamin C, they ran more slowly.