

Introduction to Planning a Study Quiz

1. An observational study found that the amount of sleep an employee gets each night is associated with job performance. The correlation coefficient was found to be $r = 0.86$. A reader of the study concluded that more sleep causes employees to perform better. Why is such a conclusion not correct?
- (A) The correlation value should equal 1 for such a conclusion.
 - (B) The correlation value should be negative for such a conclusion.
 - (C) The sample was not representative of the population.
 - (D) Causation cannot be determined from an observational study. ✓
 - (E) The correlation value implies that less than 75% of the variability in job performance can be explained by sleep.

Answer D

Correct. The study was observational; causation can only be determined from an experiment.

2. A researcher conducted an experiment to study the effects of an herbal supplement on the duration of the common cold. From a sample of 50 people who had a cold, the researcher assigned 25 people to take the supplement each day. The other 25 people were asked to drink water each day and were not given the supplement. The researcher recorded the number of days the cold lasted for each person. What are the experimental units of the study?
- (A) All people with a cold
 - (B) The sample of 50 people who had a cold ✓
 - (C) The 25 people who were given the herbal supplement
 - (D) The 25 people who were asked to drink water and were not given the supplement
 - (E) The recorded number of days that the cold lasted for each person

Answer B

Correct. The experimental units are all the people who participated in the study.

3. A certain monthly magazine has both print and online subscribers. Print subscribers are people who pay to have the magazine physically delivered to them each month. Online subscribers are people who pay to have access to the electronic version of the magazine. The editors of the magazine want to study how online subscribers feel about the design of the electronic version, and they will gather data from a sample. Which of the following is a sample of the population of interest?

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- (A) 50 subscribers to the magazine
- (B) 50 print subscribers
- (C) 50 online subscribers
- (D) 50 people who buy a copy of the magazine at a newsstand
- (E) 50 people who find an article in the magazine while searching online

Answer C

Correct. The population of interest is subscribers to the electronic version of the magazine.

4. A researcher selects a simple random sample of 1,200 women who are students at Midwestern colleges in the United States to use for an observational study. Which of the following describes the population to which it would be most reasonable to generalize the results?
- (A) All students in the United States
 - (B) All college students in the United States
 - (C) All women who are students in the United States
 - (D) All students at Midwestern colleges in the United States
 - (E) All women who are students at Midwestern colleges in the United States

Answer E

Correct. Since this sample was taken from all women who are students at Midwestern colleges in the United States, generalizations can be made about all women who are students at Midwestern colleges in the United States.

5. Carla wants to investigate whether a person's political party affiliation causes the person to be more vocal about political issues. She plans to administer a survey to a large sample of people. Which of the following describes why the method of data collection used will prevent Carla from achieving her goal?
- (A) Surveys are not a valid method of collecting data.
 - (B) Causation cannot be determined from a survey.
 - (C) Political opinions are less likely to be voiced on a survey.
 - (D) Carla needs to administer the survey to the entire population to determine causation.
 - (E) Some surveys might not be returned, which could result in bias.

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Answer B

Correct. Causation is determined only through experiments, not observational studies, which includes surveys.

6. A city planner is investigating traffic congestion at a certain intersection. To collect data, a camera will record the number of cars that pass through the intersection at different hours of the day and on different days of the week. Which of the following best describes the type of investigation being conducted by the city planner?
- (A) The investigation is an experiment because the cars go through the intersection at random.
 - (B) The investigation is an experiment because the hours and the days are the treatments and the cars are the units.
 - (C) The investigation is an observational study because treatments are not imposed. ✓
 - (D) The investigation is an observational study because only a sample of cars can go through the intersection on any given day.
 - (E) The investigation is a sample survey because the cars that are recorded will inform the city planner about the population of cars on city roads.

Answer C

Correct. No treatments are imposed or assigned to the cars. The number of cars going through the intersection is observed.