

1. At one time, Spotify had a total of 9,000 employees. The CEO wanted to send a survey to 300 of these employees to measure job satisfaction.
 - a. Describe a method for selecting a simple random sample of 300 employees.
 - b. What is the purpose of selecting a random sample?

2. An education research organization wants to conduct a survey of teachers to estimate their average annual salary. Identify the population to which the results can be generalized for each of the following samples.
 - a. A random sample of 100 teachers in the United States.
 - b. A random sample of 100 high school teachers in Michigan.
 - c. A random sample of 100 high school teachers at an education conference.
 - d. A voluntary response sample of 100 elementary school teachers in Michigan.
 - e. A convenience sample of 100 high school teachers at an education conference.

3. A recent study revealed that teens who spend the most time on social media (5 hours or more per day) are 40 percent more likely to report symptoms of depression than teens who spend the least amount of time on social media (1 hour or less per day).
- a. Is the study described an observational study or an experiment? Explain.
 - b. Can we conclude that more time spent on social media causes an increased risk of depression? Explain.
 - c. Suppose that 80 teens volunteered to participate in an experiment. Describe a process that would randomly assign the 80 teens to two treatment groups (5 hours or more per day and one hour or less per day).
4. A group of researchers used a random sample of 10,317 people in Wisconsin to investigate the connection between volunteering and mortality rates. They found that those people who did not volunteer had mortality rates more than double of those people who volunteered with motivations focused on helping others.
- a. What is the explanatory variable and the response variable?
 - b. Was a random sample used to collect the data? Was random assignment used?
 - c. What conclusion can be made from this study?
5. One of the responsibilities of astronauts on the International Space Station is to operate a robotic arm to perform tasks. Researchers wondered if administering a low-dose of caffeine and exposing the astronauts to blue-enriched white light would improve their robotic arm task performance. 16 volunteers were randomly assigned to several treatment groups (only caffeine, only white light, both caffeine and white light, no caffeine or white light). The researchers found that the group with both caffeine and white light had the highest scores for task performance.

What conclusion can be made from the study?

6. To investigate whether a strenuous exercise regimen would improve the strength of high school wrestlers, a wrestling coach selected a random sample of 30 wrestlers at Jefferson High School. The wrestlers were randomly assigned to one of two treatments, a strenuous exercise regimen and the current exercise regimen for wrestlers at Jefferson. At the end of 5 weeks, the strength of the wrestlers was measured. Based on the design of the experiment, which of the following is the largest population to which the results can be generalized?
- A) All students at Jefferson High School
 - B) All wrestlers in the experiment
 - C) All wrestlers at Jefferson High School
 - D) All athletes at Jefferson High School
7. In a study conducted in Costa Rica, investigators located and directly approached 46 black iguanas. Two types of “approach strategies” were randomly assigned. In one approach strategy, the investigator maintained eye contact with the iguana. In the second approach strategy, the investigator looked away from the iguana while approaching. The response variable measured was the distance of the investigator from the iguana when it decided to run away. Researchers found a significant difference in the mean approach distances for the two conditions. Which of the following gives the conclusion that should be made based on the results and provides the best explanation for the conclusion?
- A) It is **not** reasonable to conclude that the difference in mean approach distances was caused by the different approach strategies because this was not an experiment.
 - B) It is **not** reasonable to conclude that the difference in mean approach distances was caused by the different approach strategies because there was no control group.
 - C) It is **not** reasonable to conclude that the difference in mean approach distances was caused by the different approach strategies because the investigators were not randomly selected.
 - D) It **is** reasonable to conclude that the difference in mean approach distances was caused by the different approach strategies because of the random assignment of treatments.