



1. Explain what the difference between descriptive statistics and inferential statistics.

The difference between the two methods is that descriptive statistics is limited to only the data being summarized, whereas inferential statistics applies to a larger population than those observed

2. Explain the difference between a survey and a census.

A survey is based on results from a (representative) sample, or subset, of the population, while a census is based on results from the entire population.

3. What is the name of a study that the purpose is to determine whether a treatment causes a change in the variable of study (i.e. clinical trial)?

- a. Observational Study
- b. Randomized Experiment**
- c. Census
- d. Sample Survey
- e. More than one of the above

4. Lauren wants to determine what the average house price is for single family homes in Los Angeles, California. She randomly selects 50 single family homes in Los Angeles and looks up the most recent value for each of these 50 homes. What is the sample in this study?

- a. All residents of Los Angeles, California
- b. All single-family homeowners in Los Angeles, California
- c. All single-family homes in Los Angeles, California**
- d. The 50 selected homes in Los Angeles, California
- e. The homeowners of the 50 selected homes in Los Angeles, California

5. Which of the following is an example of a self-selected sample?

- a. Researcher splits their population into a group of a males and a separate group of females; she takes a random sample of 25 males and a separate random sample of 25 females
- b. Radio asks people listening to call in and say whether or not they want a new stoplight at a busy intersection
- c. Student asks 15 classmates to answer a survey about university fees
- d. Researcher at a major university randomly selects 50 students to participate in a survey. She sends the survey to the 50 selected students via email and 45 of them return the survey. – this error is called no-response
- e. More than one of the above**



6. In what type of study would you generally know the value of the parameter?

- a. Experiment
- b. Census**
- c. Sample Survey
- d. All of the Above

7. “What is the average age of people in Salt Lake City?”

Population: All people living in Salt Lake City.

Sample: 10 people picked randomly from all people living in Salt Lake City.

Is the sample representative?

Yes

8. Consider the list below of different sampling methods. Which of these sampling methods are not biased sampling methods?

- | | |
|-----------------------|------------------------------|
| a. 1 only | 1. Simple Random Sample |
| b. 3 and 4 | 2. Convenience Sample |
| c. 1, 3, and 4 | 3. Cluster Sample |
| d. 2 and 5 | 4. Stratified Sample |
| e. 2, 3, 4, and 5 | 5. Voluntary Response Sample |

9. Jim is conducting a health survey of residents of the Brazos Valley. He asks participants their age, height, weight, type of insurance, marital status, income, number of people living in their household, and number of days they were sick in the last month. How many of his variables were qualitative and how many of his variables were quantitative?

- a. 2 qualitative and 6 quantitative**
- b. 3 qualitative and 5 quantitative
- c. 4 qualitative and 4 quantitative
- d. 5 qualitative and 3 quantitative
- e. 6 qualitative and 2 quantitative



10. A study published in the Journal of Personality and Social Psychology asked a group of 200 randomly sampled participants recruited online using Amazon’s Mechanical Turk to evaluate how they felt about various subjects, such as camping, health care, architecture, taxidermy, crossword puzzles, and Japan in order to measure their attitude towards mostly independent stimuli. Then, they presented the participants with information about a new product: a microwave oven. This microwave oven does not exist, but the participants didn’t know this, and were given three positive and three negative fake reviews.

People who reacted positively to the subjects on the dispositional attitude measurement also tended to react positively to the microwave oven, and those who reacted negatively tended to react negatively to it. Researchers concluded that “some people tend to like things, whereas others tend to dislike things, and a more thorough understanding of this tendency will lead to a more thorough understanding of the psychology of attitudes.” (Hepler and Albarracín, 2013)

- a. What are the cases?
- b. What is (are) the response variable(s) in this study?
- c. What is (are) the explanatory variable(s) in this study?
- d. Does the study employ random sampling? Explain. How could they have obtained participants?
- e. Is this an observational study or an experiment? Explain your reasoning.
- f. Can we establish a causal link between the explanatory and response variables?
- g. Can the results of the study be generalized to the population at large?

- (a) The cases are 200 randomly sampled men and women.
- (b) The response variable is attitude towards a fictional microwave oven.
- (c) The explanatory variable is dispositional attitude.
- (d) Yes, the cases are sampled randomly, recruited online using Amazon’s Mechanical Turk.
- (e) This is an observational study since there is no random assignment to treatments.
- (f) No, we cannot establish a causal link between the explanatory and response variables since the study is observational.
- (g) Yes, the results of the study can be generalized to the population at large since the sample is random.

11. In a public health study on the effects of consumption of fruits and vegetables on psychological well-being in young adults, participants were randomly assigned to three groups: (1) diet-as-usual, (2) an ecological momentary intervention involving text message reminders to increase their fruits and vegetable consumption plus a voucher to purchase them, or (3) a fruit and vegetable intervention in which participants were given two additional daily servings of fresh fruits and vegetables to consume on top of their normal diet.



Participants were asked to take a nightly survey on their smartphones. Participants were student volunteers at the University of Otago, New Zealand. At the end of the 14-day study, only participants in the third group showed improvements to their psychological well-being across the 14-days relative to the other groups. (Conner et al., 2017)

- a. What type of study is this?
- b. Identify the explanatory and response variables.
- c. Comment on whether the results of the study can be generalized to the population.
- d. Comment on whether the results of the study can be used to establish causal relationships.
- e. A newspaper article reporting on the study states, “The results of this study provide proof that giving young adults fresh fruits and vegetables to eat can have psychological benefits, even over a brief period of time.” How would you suggest revising this statement so that it can be supported by the study?

- (a) Randomized controlled experiment.
(b) Explanatory: treatment group (categorical, with 3 levels). Response variable: Psychological well-being.
(c) No, because the participants were volunteers.
(d) Yes, because it was an experiment.
(e) The statement should say “evidence” instead of “proof”.