

SAT Evaluating Statistical Claims Worksheet

Name: _____ Date: _____

Circle one answer for each question. Use the blank space for calculations. A calculator is allowed.

- 1. A researcher randomly assigns 100 volunteers to two groups. One group drinks green tea every day for a month, and the other group drinks water. The researcher then compares the groups' blood pressure. What type of study is this?**

 - A. An observational study, because the volunteers were observed
 - B. A sample survey, because the volunteers were asked questions
 - C. An observational study, because the volunteers chose to take part
 - D. A randomized experiment, because the researcher assigned the drinks at random

- 2. A study of 500 adults found that dog owners walked more each day, on average, than people without dogs. The adults chose for themselves whether to own a dog. Which conclusion is best supported?**

 - A. Owning a dog causes people to walk more.
 - B. Walking more causes people to buy dogs.
 - C. Among these adults, owning a dog is associated with walking more.
 - D. All adults would walk more if they owned a dog.

- 3. A radio host asked listeners to call in and say whether they supported a new stadium. Of the 400 callers, 78% opposed it. Why is this result not a reliable estimate for all residents of the city?**

 - A. The callers chose to respond, so they may not represent the city's residents.
 - B. A sample of 400 callers is too small to estimate anything about a city.
 - C. Radio listeners are more likely to oppose stadiums than other residents are.
 - D. The host did not report the percent of callers who supported the stadium.

4. **To estimate the mean number of hours that students at a high school spend on homework each week, a teacher surveys the 28 students in her advanced calculus class. Why might this estimate be biased?**
- A. The sample has fewer than 30 students.
 - B. The teacher surveyed every student in the class instead of choosing some at random.
 - C. The survey asked about a whole week instead of a single day.
 - D. Students in an advanced class may not spend the same amount of time on homework as other students at the school.
5. **Across 50 towns, the number of public libraries is positively associated with the number of car thefts. Which is the most likely explanation?**
- A. Libraries cause car thefts.
 - B. Towns with more people tend to have both more libraries and more car thefts.
 - C. Car thefts cause towns to build more libraries.
 - D. The association must be due to a mistake in the data.
6. **Researchers surveyed a random sample of 1,000 adults in a state. Adults who reported sleeping more hours reported lower stress levels, on average. Which conclusion is best supported?**
- A. Among adults in the state, more sleep is associated with lower reported stress.
 - B. More sleep causes lower stress for adults in the state.
 - C. More sleep causes lower stress for all adults in the country.
 - D. No conclusion can be drawn about adults in the state, because the study was not an experiment.

7. A gym asked its members for volunteers and randomly assigned 60 volunteers to either a new workout plan or the standard plan. After 8 weeks, the new-plan group had a greater mean increase in strength. Which conclusion is best supported?
- A. The new plan causes a greater increase in strength for all adults.
 - B. The new plan causes a greater increase in strength for all members of the gym.
 - C. The new plan caused a greater increase in strength for the volunteers in the study.
 - D. No conclusion about cause can be drawn, because the participants were volunteers.
8. A company wants to find out whether a new feature in its app increases the time users spend in the app. Which study design would best allow the company to conclude that the feature causes a change?
- A. Compare users who choose to turn the feature on with users who don't.
 - B. Randomly assign users to a version of the app with the feature or a version without it, then compare their time in the app.
 - C. Ask users in a survey whether the feature makes them use the app more.
 - D. Compare users' time in the app in the month after the feature launched with the month before.

9.

Group	Number of plants	Mean yield (kilograms)
Fertilizer X	60	4.8
No fertilizer	60	3.9

A researcher randomly assigned 120 tomato plants in a greenhouse to two groups of 60. One group received fertilizer X, and the other received no fertilizer. The table shows the results. Which conclusion is best supported?

- A. Fertilizer X increases the yield of every tomato plant by 0.9 kilogram.
- B. Fertilizer X is associated with a greater yield, but it can't be said to cause one.
- C. Fertilizer X will increase the yield of any crop grown in any greenhouse.
- D. Fertilizer X caused a greater mean yield for plants like those in the study.

- 10. A researcher selected 200 students at random from a university. Half were randomly assigned to study with flashcards and half to reread their notes. The flashcard group had a higher mean score on a vocabulary test. Which conclusion is best supported?**
- A. For students at the university, studying with flashcards causes higher mean vocabulary scores than rereading notes.
 - B. For all college students, studying with flashcards causes higher mean vocabulary scores than rereading notes.
 - C. Studying with flashcards is associated with higher scores, but no cause can be shown.
 - D. Every student at the university would score higher by studying with flashcards.
- 11. A school district mailed a survey to 1,000 randomly selected parents. Only 150 parents returned it, and 90% of them approved of a new school schedule. What is the main problem with using this result to estimate the percent of all parents in the district who approve?**
- A. The district should have selected the parents by grade level.
 - B. The survey was mailed instead of emailed.
 - C. The parents who returned the survey may differ from those who didn't.
 - D. A sample of 1,000 parents is too large.
- 12. A random sample of 400 juniors at a large high school was studied. The juniors who chose to take a test-prep course had a higher mean score on the state math test than the juniors who didn't. Which conclusion is best supported?**
- A. Taking the course causes higher scores for juniors at the school.
 - B. Among juniors at the school, taking the course is associated with higher scores.
 - C. Taking the course causes higher scores for all high school juniors.
 - D. No conclusion can be drawn, because the sample was random.

Answer key

1 D · 2 C · 3 A · 4 D · 5 B · 6 A · 7 C · 8 B · 9 D · 10 A · 11 C · 12 B

1. D: A randomized experiment, because the researcher assigned the drinks at random

The researcher decided at random who drank tea and who drank water. Assigning a treatment at random makes this an experiment, even though the participants were volunteers.

2. C: Among these adults, owning a dog is associated with walking more.

Nobody was assigned to own a dog, so this is an observational study. It can show an association but not a cause; people who already liked walking may have been more likely to get dogs.

3. A: The callers chose to respond, so they may not represent the city's residents.

Only that show's listeners could call, and the ones who did chose to. A self-selected sample can't be assumed to represent all residents. Choice C may or may not be true; nothing in the survey shows it.

4. D: Students in an advanced class may not spend the same amount of time on homework as other students at the school.

The sample comes from one advanced class, not from all students at the school. Those students may have more or less homework than the school's typical student. Surveying more students from the same class, or a random few of them, would not fix that.

5. B: Towns with more people tend to have both more libraries and more car thefts.

Population affects both counts: a larger town tends to have more libraries and more thefts. The association doesn't show that either one causes the other.

6. A: Among adults in the state, more sleep is associated with lower reported stress.

The random sample lets the association apply to all adults in the state. But the researchers didn't assign anyone an amount of sleep, so the study can't show that sleep causes lower stress.

7. C: The new plan caused a greater increase in strength for the volunteers in the study.

Random assignment supports a cause-and-effect conclusion. The volunteers weren't selected at random from the gym's members, so the result applies only to people like those in the study. Choice D confuses random assignment with random selection.

8. B: Randomly assign users to a version of the app with the feature or a version without it, then compare their time in the app.

Random assignment makes the two groups alike except for the feature, so a difference in time can be credited to the feature. In choice A, users who turn the feature on may already use the app more.

9. D: Fertilizer X caused a greater mean yield for plants like those in the study.

The plants were randomly assigned, so the fertilizer can be credited with the greater mean yield, $4.8 - 3.9 = 0.9$ kilogram more. That is a difference in means, not a gain for every plant (choice A), and it applies only to plants like the ones studied (choice C).

10. A: For students at the university, studying with flashcards causes higher mean vocabulary scores than rereading notes.

Random selection from the university lets the result apply to its students, and random assignment supports a cause. The study sampled only one university, so it doesn't cover all college students (choice B), and a higher mean doesn't mean every student would improve (choice D).

11. C: The parents who returned the survey may differ from those who didn't.

The 1,000 parents were chosen at random, but only 15% answered. The parents who took the time to respond may feel differently about the schedule than the 850 who didn't, so the 90% may not reflect all parents.

12. B: Among juniors at the school, taking the course is associated with higher scores.

The random sample lets the association apply to juniors at the school. But students chose whether to take the course, and those students may differ in other ways, such as how much they studied, so the study can't show that the course caused the higher scores.