

Chapter 2 Exam Prep: Data Collection & Design

Statypus Insight: The Foundation of Truth

Before we can calculate standard deviations or draw best-fit lines, we have to know where the data came from. Flawed data collection will ruin perfectly good math. On the exam, you will be asked to act as a statistical detective to figure out how a study was built.

Raw Exam Question 1:

Is the following statistical research an example of an Experiment or Observational Study? Explain your answer.

Can choosing the right music make wine taste better? This question was investigated by a researcher at a university in Edinburgh. Each of 250 volunteers was assigned at random to one of five rooms where they were asked to taste and rate a glass of wine. No music was playing in one of the rooms, and a different style of music was playing in each of the other four rooms. The researcher concluded that cabernet sauvignon is rated more highly when bold music is played than when no music is played.

Bill the Statypus says: Look for the “active hand.” Did the researcher just watch people drink wine and ask what music they were listening to? Or did the researcher actively change their environment?

Sally the Statypus says: Statypus Standard Alert! You cannot just write “Experiment” and get full points. To earn the points for the explanation, you must explicitly state the vocabulary. Mention that the researcher **assigned treatments** (the music rooms) to the subjects.

Your Turn (Write your answer exactly as you would on the test):

Raw Exam Question:

The student senate at a midwestern college with 15,000 students is interested in the proportion of students who favor a change in the grading system to allow for plus and minus grades (for example, B+, B, B-, rather than just B). Two hundred students are interviewed to determine their attitude toward this proposed change.

Exam Question 2:

- A. What is the population of interest?
- B. What constitutes the sample in this problem?
- C. Give examples of bias that could easily show up in this scenario.

Bill the Statypus says: Remember the scale! The **Population** is the huge, entire group we want to know the truth about. The **Sample** is the smaller group we actually managed to talk to. Be specific to the story!

Sally the Statypus says: For part C, think about the *method* of the interview. If the senate just stood outside the library, that is **Convenience Sampling**. If they sent an email survey, that creates **Voluntary Response Bias**. Pick a realistic flaw and explain why it would warp the results!

Your Turn (Answer A, B, and C):

 **Seneca the Statypus: The Poisoned Well**

Advanced math cannot fix poorly collected data. The most critical step in any statistical process happens before the first number is ever written down. If the foundation is biased, the entire house will lean.