

Statistical Studies: Sources of Variability

III.C Student Activity Sheet 10: Statistical Bias in Research Studies and Polls



Statistical bias in experimental studies can result from several factors. Look back at your notes about statistical bias and see which sources you think could apply to experimental studies. List your ideas below.

Experimental studies can suffer from nonrepresentative samples and undercoverage, as discussed in Student Activity Sheet 9. Often these problems cannot be fixed.

1. What are some reasons for deliberately using a nonrepresentative sample in an experimental study? What problems could result?
2. Rather than spending a great deal of time and money to ensure a representative sample, researchers often use the techniques listed below to try to eliminate any statistical bias introduced by the sampling method. Discuss how each method can reduce sampling method bias and thus increase the accuracy of a study's results.
 - a. Random assignment of treatments
 - b. Blind/double-blind studies
 - c. Use of control groups
 - d. Replication

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3. Some of the same issues (nonrepresentative samples, undercoverage, replication) affect observational studies. Other issues discussed (response bias, wording of questions) can also specifically affect these studies. What problem could be occurring in each study described?
 - a. Jade is so tired of sales calls that she refuses to answer the phone if she does not recognize the name or number on the Caller ID.
 - b. Serena knows the caller will probably keep calling, so she answers the phone. If the call's subject is an opinion poll, she politely tells the surveyor that she does not want to participate.
 - c. DeShawn does not worry about sales calls since his family uses cell phones and no longer has a land line.
 - d. At the mall, an older man is interviewing people about their consumer spending habits. Maria does not want to tell him she just bought a swimsuit, so she says her shopping bag contains a new shirt.
 - e. Mrs. Gibbs normally gets a hamburger for lunch. When she notices that someone who looks like a nurse is sitting in the corner writing down what each person orders, Mrs. Gibbs orders a salad with fat-free dressing.
 - f. The local television station runs a viewer poll on the nightly news: "Call us or log on to our website to give your opinion about the new skate park."
4. Several television shows have a survey component in which viewers call in and vote for their favorite singer/dancer/entertainer/competitor. Discuss the issues you perceive with this method.
5. Some shows have viewers vote for the contestant whom they want to leave the show. Discuss the issues you perceive with this method.
6. **REFLECTION:** What suggestions do you have for improving call-in or online polls or contests?

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7. **EXTENSION:** Discuss with your partner(s) where in the research cycle is statistical bias most likely to occur. Suggest at least two strategies for avoiding bias and minimizing variability in your project.

