

1.4: Random Sampling and Bias

Random Sampling

1. Explain what it means for a sample to be representative of a population.

2. Suppose that Chaffey is thinking of ways to raise money. The administration is considering offering reserved parking spots for a fee of \$80. The college wants to know the percentage of students who would support this fee. One way to do this is to conduct a campus wide survey called a _____. Is this reasonable? Why or why not? Recall that the student population at Chaffey is almost 20,000.

3. Read each of the following ways to sample students at Chaffey and decide whether the sample produced would be representative of the population from 2. Explain why or why not.
 - a. Choose three 7:30 am classes at random and survey all of the students in each class.

 - b. Put a poll on the front page of the college website. A poll is an opinion survey. Use the students who answer the poll as the sample.

 - c. Talk to students as they enter the library.

When we sample, our goal is for every member of the population to have the same chance of being selected. We would like to avoid selection bias, which is when a sample differs from the population in some way so that some individuals are more likely to be selected than others. To avoid selection bias, we could use a _____ in which all samples of a given size have the same chance of being chosen.

4. A **voluntary response sample** is one in which the participants are self-selected. Each member chooses to participate. Another biased sample is a **convenience sample** in which sampling does not use random selection but instead uses an available or convenient group to form the sample. Categorize a, b, and c from question 3. into one of these samples or state neither.

The college has a list of all registered students. In order to produce a **simple random sample**, a number can be assigned to each individual on the list. One can produce a random integer list that has the desired number of data values. The individuals corresponding to those numbers could be emailed a survey or contacted by the college.

What are three other types of random sampling?

- 1.
- 2.
- 3.

Bias

If the results of a sample are not representative of a population, then the sample has bias. There are three sources of bias in sampling:

1. Sampling bias - _____ means that the technique used to obtain the samples individuals tends to favor one part of the population over another. Any convenience sample has sampling bias because the individuals are not chosen through random sampling.
2. Nonresponse bias - _____ exists when individuals selected to be in the sample who do not respond to the survey have different opinions from those who do. It can occur when individuals selected for the sample do not want to respond or can not be contacted.
 - a. Write two reasons why a recipient of a survey might not want to respond
 - i. _____
 - ii. _____
3. Response bias - _____ exists when the answers on a survey do not reflect the true feelings of the respondent.
 - a. For example, an interviewer who does not elicit trust with an individual may get responses that are not honest.
 - b. Some survey questions result in responses that are not complete truths. People can over or underestimate their own abilities.
 - c. The way a question is worded can lead to unintended responses. The phrasing may influence the response of an individual.
 - d. The arrangement of words or questions in a survey can influence the response of an individual.

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