

Questions on lesson 1.4?

We will be having our concept mastery quiz shortly.

2.1

For Real?

Sample Surveys, Observational Studies, and Experiments

PG. 50 IN YOUR BOOK

PROBLEM 1 Survey Says



You can use data to help answer questions about the world. The specific question that you are trying to answer or the specific information that you are trying to gather is called a **characteristic of interest**.

For example, you can use data to help determine which drug is most effective, teenagers' favorite television program, or how often doctors wash their hands.

One way of collecting data is by using a *sample survey*.

A **sample survey poses one or more questions of interest to obtain sample data from a population**. Recall, a population represents all the possible data that are of interest in a survey, and a sample is a subset of data that is selected from the population.

A researcher wants to design a sample survey to determine the amount of time that U.S. teenagers between the ages of 16 to 18 spend online each day.

1. Identify the characteristic of interest in the sample survey.

I see how samples are especially useful when collecting data for large populations. Imaging trying to survey every young person in the U.S.!



2. Identify the population that the researcher is trying to measure by using a sample survey.

U.S. teenagers, 16-18 yrs. old

PG. 51 IN YOUR BOOK

When sample data are collected in order to describe a characteristic of interest, it is important that such a sample be as representative of the population as possible. One way to collect a representative sample is by using a *random sample*. A **random sample is a sample that is selected from the population in such a way that every member of the population has the same chance of being selected.** A **biased sample is a sample that is collected in a way that makes it unrepresentative of the population.**

PG. 52 IN YOUR BOOK

In an **observational study, data are gathered about a characteristic of the population by simply observing and describing events in their natural settings.** Recording the number of children who use the swings at a local park would be an example of a simple observational study.

PG. 53 IN YOUR BOOK

An **experiment gathers data on the effect of one or more treatments,** or experimental conditions, on the characteristic of interest. **Members of a sample, also known as experimental units,** are randomly assigned to a treatment group.

Researchers conducted an experiment to test the effectiveness of a new asthma drug. They collected data from a sample of 200 asthma patients. One hundred of the patients received a placebo treatment along with an inhaler. The other one hundred patients received the new drug along with an inhaler. Monthly blood and breathing tests were performed on all 200 patients to determine if the new drug was effective.

A placebo treatment is a treatment that is assumed to have no real effect on the characteristic of interest.



Confounding occurs when there are other possible reasons, called confounds, for the results to have occurred that were not identified prior to the study.

NOT IN YOUR BOOK

For Real?

Sample Surveys, Observational Studies, and Experiments

For problems 1 through 3, determine whether the given method of data collection is a sample survey, an observational study, or an experiment. Explain. Then identify the population, the sample, and the characteristic of interest.

1. A high school principal wants to determine whether students who work in groups in geometry class receive higher grades than students who do not work in groups. He directs 5 of the geometry classes to participate in group work and 5 of the geometry classes to complete their work individually.

experiment

2. You are curious about student interest in your school about doing volunteer work in the community. You ask 120 randomly selected students in your school whether they are interested in doing volunteer work in the community.

sample survey

3. A researcher wants to know whether female professional athletes are more prone to knee injuries than male professional athletes. She gathers data from 6 different sports organizations that have injury records for all of their male and female professional athletes.

observational study

ALSO NOT IN YOUR BOOK

4. You are organizing a survey to learn about the exercise habits of students in your school. You are interested to know the number of hours students spend exercising during an average week.
 - a. What is the population of interest?

 - b. How could a representative random sample be selected?

 - c. What is the characteristic of interest?

 - d. Give an example of a question that is unbiased for this survey.

5. A medical researcher wants to determine whether there is a connection between the frequency of migraine headaches in adults and changes in weather. The researcher collects data on 75 adults who experience migraine headaches that live in temperate climates and 75 adults who experience migraine headaches that live in climates with varying extremes.
 - a. What is the population of interest?

 - b. What is the sample?

 - c. How could confounding be avoided or addressed?

ALSO NOT IN YOUR BOOK

Explain how the sampling method is biased.

6. One hundred fish caught in a bass tournament are arranged from largest to smallest. The fish are then clustered into 5 groups so that the 20 largest are in the first group, the next 20 largest are in the second group, and so on. You randomly choose 10 fish from the last group to perform an experiment to analyze the lengths of the fish caught in the tournament.
7. A scientist is preparing an experiment in which he will analyze the bacteria levels in a lake. He walks to the edge of the lake and fills 40 vials with water to represent the water supply in the lake.
8. You want to analyze the fitness levels of runners after they run in a marathon by performing a blood test. There are 1000 runners in the marathon. You choose the first 25 runners that finish the marathon to represent the population of runners for your experiment.
9. You want to perform an experiment to determine the amount of money that Americans feel the government should be spending on public transit. You choose a random sample of 50 bus drivers and interview them to represent the population for your experiment.

Homework

Finish lesson 2.1