

**3.38 Does oxygen help football players?** We often see players on the sidelines of a football game inhaling oxygen. Their coaches think this will speed their recovery. We might measure recovery from intense exercise as follows: Have a football player run 100 yards three times in quick succession. Then allow three minutes to rest before running 100 yards again. Time the final run. Because players vary greatly in speed, you plan a matched pairs experiment using 30 football players as subjects. Describe the design of such an experiment to investigate the effect of inhaling oxygen during the rest period. Why should each player's two trials be on different days? Use Table B at line 135 to decide which players will get oxygen on their first trial.

**3.56 What kind of sample?** In each of the following situations, identify the sample as either an SRS, a stratified random sample, a multistage random sample, or a voluntary response sample. Explain your answers.

- (a) There are seven sections of an introductory statistics course. A random sample of three sections is chosen, and then random samples of 8 students from each of these sections are chosen.
- (b) A student organization has 55 members. A table of random numbers is used to select a sample of 5.
- (c) An online poll asks people who visit this site to choose their favorite television show.
- (d) Separate random samples of male and female first-year college students in an introductory psychology course are selected to receive a one-week alternative instructional method.

**3.63 Interview residents of apartment complexes.** You are planning a report on apartment living in a college town. You decide to select 5 apartment complexes at random for in-depth interviews with residents. Select a simple random sample of 5 of the following apartment complexes. If you use Table B, start at line 126.

RESIDEN

Ashley Oaks	Country View	Mayfair Village
Bay Pointe	Country Villa	Nobb Hill
Beau Jardin	Crestview	Pemberly Courts
Bluffs	Del-Lynn	Peppermill
Brandon Place	Fairington	Pheasant Run
Briarwood	Fairway Knolls	Richfield
Brownstone	Fowler	Sagamore Ridge
Burberry	Franklin Park	Salem Courthouse
Cambridge	Georgetown	Village Manor
Chauncey Village	Greenacres	Waterford Court
Country Squire	Lahr House	Williamsburg

**3.43 Health benefits of bee pollen.** "Bee pollen is effective for combating fatigue, depression, cancer, and colon disorders." So says a website that offers the pollen for sale. We wonder if bee pollen really does prevent colon disorders. Here are two ways to study this question. Explain why the first design will produce more trustworthy data.

- (a) Find 400 women who do not have colon disorders. Randomly assign 200 to take bee pollen capsules and the other 200 to take placebo capsules that are identical in appearance. Follow both groups for 5 years.
- (b) Find 200 women who take bee pollen regularly. Match each with a woman of the same age, race, and occupation who does not take bee pollen. Follow both groups for 5 years.

**3.57 What's wrong?** Explain what is wrong in each of the following scenarios.

- (a) The population consists of all individuals selected in a simple random sample.
- (b) In a poll of an SRS of residents in a local community, respondents are asked to indicate the level of their concern about the dangers of dihydrogen monoxide, a substance that is a major component of acid rain and in its gaseous state can cause severe burns. (*Hint:* Ask a friend who is majoring in chemistry about this substance or search the Internet for information about it.)
- (c) Students in a class are asked to raise their hands if they have cheated on an exam one or more times within the past year.

**3.90 What's wrong?** State what is wrong in each of the following scenarios.

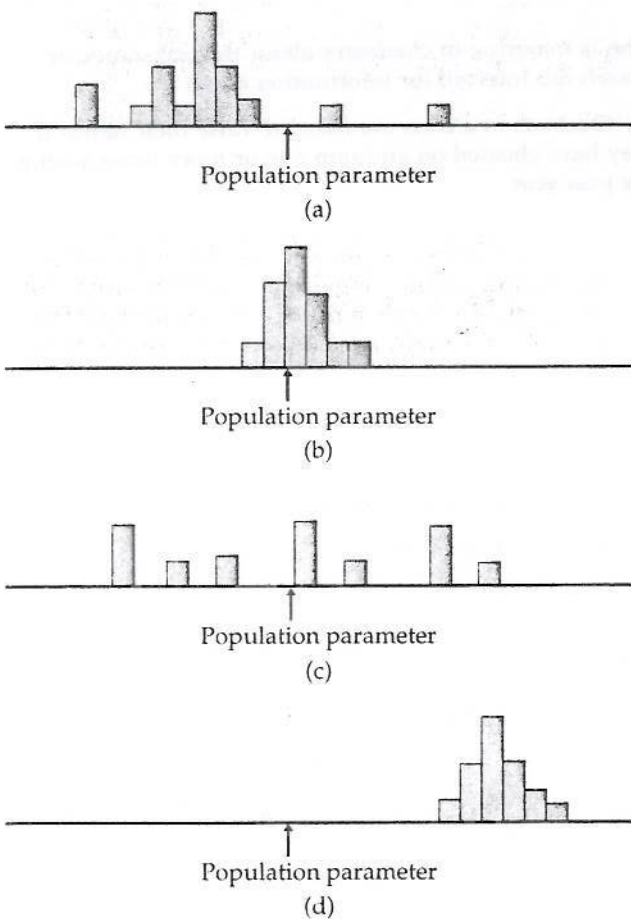
- (a) A parameter describes a sample.
- (b) Bias and variability are two names for the same thing.
- (c) Large samples are always better than small samples.
- (d) A sampling distribution is something generated by a computer.

**3.91 Describe the population and the sample.** For each of the following situations, describe the population and the sample.

- (a) A survey of 17,096 students in U.S. four-year colleges reported that 19.4% were binge drinkers.
- (b) In a study of work stress, 100 restaurant workers were asked about the impact of work stress on their personal lives.
- (c) A tract of forest has 584 longleaf pine trees. The diameters of 40 of these trees were measured.

**3.92 Bias and variability.** Figure 3.14 shows histograms of four sampling distributions of statistics intended to estimate the same parameter. Label each distribution

relative to the others as high or low bias and as high or low variability.



**FIGURE 3.14** Determine which of these sampling distributions displays high or low bias and high or low variability, for Exercise 3.92.