

- c. Describe a parameter of interest.
- d. Describe the statistic used to estimate the parameter in (c).

1.48 The American Community Survey www.census.gov/acs provides data every year about communities in the United States. Addresses are randomly selected and respondents are required to supply answers to a series of questions.

- a. Describe a variable for which data is collected.
- b. Is the variable categorical or numerical?
- c. If the variable is numerical, is it discrete or continuous?

1.49 Download and examine Zarca Interactive's *Association Salary Survey*, available on Zarca's "Sample Surveys, Online Survey Example, Sample Association Surveys, Sample Customer Service Survey" web page, www.zarca.com/Online-Survey-Resource/Sample-Surveys.html.

- a. Give an example of a categorical variable included in the survey.
- b. Give an example of a numerical variable included in the survey.

1.50 Three professors examined awareness of four widely disseminated retirement rules among employees at the University of Utah. These rules provide simple answers to questions about retirement planning (R. N. Mayer, C. D. Zick, and M. Glaittle, "Public Awareness of Retirement Planning Rules of Thumb," *Journal of Personal Finance*, 2011 10(1), 12–35). At the time

of the investigation, there were approximately 10,000 benefited employees, and 3,095 participated in the study. Demographic data collected on these 3,095 employees included gender, age (years), education level (years completed), marital status, household income (\$), and employment category.

- a. Describe the population of interest.
- b. Describe the sample that was collected.
- c. Indicate whether each of the demographic variables mentioned is categorical or numerical.

1.51 Social media provides an enormous amount of data about the activities and habits of people using social platforms like Facebook and Twitter. The belief is that mining that data provides a treasure trove for those who seek to quantify and predict future human behavior. A marketer is planning a survey of Internet users in the United States to determine social media usage. The objective of the survey is to gain insight on these three items: key social media platforms used, frequency of social media usage, and demographics of key social media platform users.

- a. For each of the three items listed, indicate whether the variables are categorical or numerical. If a variable is numerical, is it discrete or continuous?
- b. Develop five categorical questions for the survey.
- c. Develop five numerical questions for the survey.

CHAPTER

CASES

Managing Ashland MultiComm Services

Ashland MultiComm Services (AMS) provides high-quality telecommunications services in the Greater Ashland area. AMS traces its roots to a small company that redistributed the broadcast television signals from nearby major metropolitan areas but has evolved into a provider of a wide range of broadband services for residential customers.

AMS offers subscription-based services for digital cable television, local and long-distance telephone services, and high-speed Internet access. Recently, AMS has faced competition from other service providers as well as Internet-based, on demand streaming services that have caused many customers to "cut the cable" and drop their subscription to cable video services.

AMS management believes that a combination of increased promotional expenditures, adjustment in subscription fees, and improved customer service will allow AMS to successfully face these challenges. To help determine the proper mix of strategies to be taken, AMS management has decided to organize a research team to undertake a study.

The managers suggest that the research team examine the company's own historical data for number of subscribers, revenues, and subscription renewal rates for the past few years. They direct the team to examine year-to-date data as well, as

the managers suspect that some of the changes they have seen have been a relatively recent phenomena.

1. What type of data source would the company's own historical data be? Identify other possible data sources that the research team might use to examine the current marketplace for residential broadband services in a city such as Ashland.
2. What type of data collection techniques might the team employ?
3. In their suggestions and directions, the AMS managers have named a number of possible variables to study, but offered no operational definitions for those variables. What types of possible misunderstandings could arise if the team and managers do not first properly define each variable cited?

CardioGood Fitness

CardioGood Fitness is a developer of high-quality cardiovascular exercise equipment. Its products include treadmills, fitness bikes, elliptical machines, and e-glides. CardioGood Fitness looks to increase the sales of its treadmill products and has hired The AdRight Agency, a small advertising firm, to create and implement an advertising program. The AdRight Agency plans to identify particular market segments that are most likely to buy their clients' goods and services and then locate advertising outlets that will reach