

Years of Employment is a quantitative variable which is a measurement of time. While the data values are reported to one decimal place, the variable is continuous because time is measured along an interval of values.

Annual Salary is a quantitative variable reported in the unit measurement of US dollars leading to a discrete data classification.

Both *Years of Employment* and *Annual Salary* are classified as ratio variables because they fit the criteria. These numeric values have measurement units of equal size. Additionally, a measurement of zero years or \$0 has a meaningful interpretation. Finally, a ratio of these variables results in a meaningful proportion; a person who is employed for ten years has worked at the company twice as long as a person with five years of employment.

2.4 Exercises

Basic Concepts

1. Describe the difference between structured and unstructured data. Give an example of each.
2. What is a significant benefit of structured data?
3. What is qualitative data? Give an example.
4. What is quantitative data? Give an example.
5. Which levels of measurement are associated with qualitative data? Which levels are associated with quantitative data?
6. What is the difference between discrete and continuous data?

Exercises

7. The results of a study investigating the nutritional status of mid-nineteenth century Americans were reported in “The Height and Weight of West Point Cadets: Dietary Changes in Antebellum America,” in the *Journal of Economic History*.⁷⁸ The data is based upon physical examination lists for West Point applicants from 1843 to 1894. Some of the information obtained from each cadet were his height, weight, the state from which the cadet was appointed, the occupation of the father, the income of the parents, and the type of home residence (city, town, or rural) of the cadet.
 - a. List the different variables measured on the cadets.
 - b. Which variables are quantitative and which are qualitative?
 - c. Give the levels of measurement for these variables.
 - d. Give an example of unstructured data that may appear in the student record of a 21st century West Point cadet.
8. The major television networks regularly conduct polls in order to ascertain the feelings of Americans on current political issues. In May of 1993, such a poll was conducted by ABC concerning United States involvement in Bosnia.⁷⁹ The respondent’s gender, political affiliation, and opinion (approve, disapprove, or no

opinion) on how President Clinton was handling the situation in Bosnia represented some of the information supplied by the respondent on the survey. Each respondent was also asked to rate the job that the news media had done (excellent, good, not so good, poor) in covering the situation in Bosnia.

- a. List the different variables measured on the respondents.
 - b. Which variables are quantitative and which are qualitative?
 - c. Give the levels of measurement for these variables.
 - d. What are some problems associated with collecting data in polls such as the one described in this exercise?
9. Identify the following variables as discrete or continuous.
- a. The number of doctors who wash their hands between patient visits.
 - b. The amount of liquid consumed by the average American each day.
 - c. The weight of a newborn baby at a local hospital.
 - d. The time it takes a person to react to a stimulus.
 - e. The number of voters who favor a particular candidate.
10. Identify the following variables as discrete or continuous.
- a. The number of on-time flights between 1 and 5 pm at the Hartsfield-Jackson International Airport in Atlanta.
 - b. The height of skyscrapers in New York City.
 - c. The price of General Electric's common stock.
 - d. The temperature of US cities.
 - e. The number of alcoholics who are men.
11. A researcher is studying the preferences of college students for different types of food. They survey a sample of 100 students and ask the following two questions:
- Write the number of times in the last month that you ate a lunch or supper from each of the following types of restaurants (dine in or take out):
 - _____ Asian (Chinese, sushi, pho, Thai, Indian, Korean, etc.)
 - _____ Italian (spaghetti, lasagna, pasta, pizza, calzone, etc.)
 - _____ Mexican (taco, burrito, enchilada, nachos, quesadilla, fajita, etc.)
 - _____ American (hamburger, hot dog, mac-n-cheese, fried chicken, barbecue, etc.)
 - Which one of the following is your favorite type of restaurant food? Mark with an X.
 - _____ Asian _____ Italian _____ Mexican _____ American
- a. Is the variable "number of times you ate Mexican restaurant food last month" qualitative or quantitative?
 - b. Is the variable "number of times you ate Mexican restaurant food last month" discrete, continuous, or neither?
 - c. Is the variable "favorite type of restaurant food" qualitative or quantitative?
 - d. Is the variable "favorite type of restaurant food" discrete, continuous, or neither?