

Section 5.1: Introduction

Objective: Recognize types of data.

The term “statistics” emerged around the 18th century due to the need of governments to collect demographic and economic data. Nowadays, some of the fields that use statistics include finance, economics, actuarial science, biostatistics, etc.

Definition. Statistics is the art and science of collecting, analyzing, presenting, and interpreting data. It provides tools for predicting and forecasting the use of data through statistical models.

What are Data?

Data are observations that have been collected. Examples include measurements, income levels, or responses to survey questions. Any set of data contains information about some group of individuals or things. The information is organized in variables.

A **variable** is a characteristic of an individual or some thing.

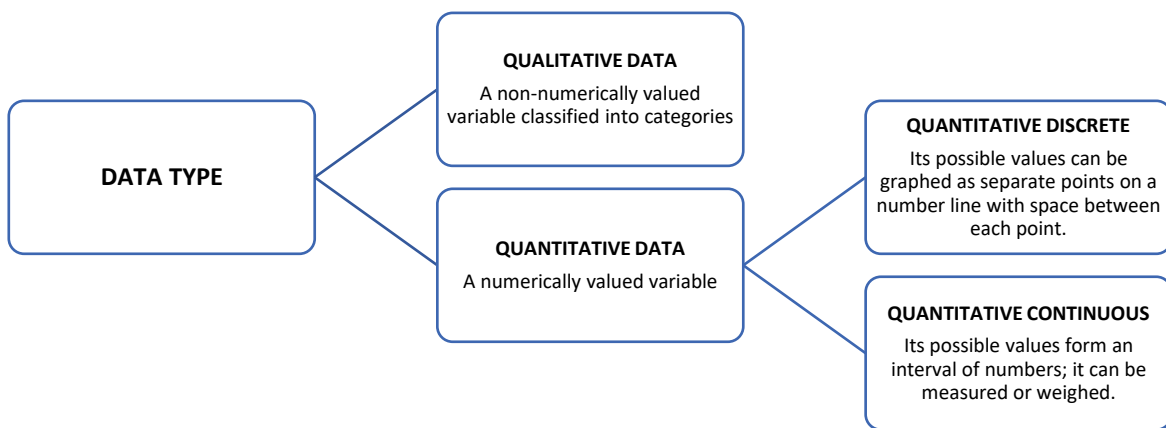


Figure 1 Data type classification

Example 1. Eye color



An eye clinic collected the eye color of their patients. Eye color is classified as qualitative data because eye color consists of values that are categories (such as brown, blue, green, hazel, and black).

Example 2. People's Height



The variable “heights of people” takes on an infinite number of possible values. It is classified as quantitative continuous data. Even though a person's height might be 5'8", it is really 5.68241231... feet. It is impossible to measure a length exactly!

Example 3. Household Size



The variable number of people in a household takes on a finite number of values. These possible values are 1, 2, 3, ... which can be plotted on a number line as points with space between each point. Thus, number of people in a household is classified as quantitative discrete data.

Example 4.

The table below contains data organized by variables about a small group of CCBC students. The variables are: Student Name, Gender, No. of classes completed, GPA, Student ID. We would like to identify the data type (variable) presented in each column as either qualitative, quantitative discrete, or quantitative continuous.

Name	Gender	No. of classes completed	GPA	Student ID
Tim	Male	4	3.25	800567230
Joy	Female	9	3.75	800213457
Brad	Male	6	4.00	800120985
Alice	Female	5	3.90	800900521
Michael	Male	10	3.81	800749541

Students' name, as well as students' gender, takes on values that are categories. The data in both of these cases are classified as qualitative.

The variable “number of classes completed” per student is finite. Its possible values are 0, 1, 2, 3, ...; these can be plotted on a number line as points with space between each point. Thus, the data in these cases are classified as quantitative discrete.

GPA can take an infinite number of possible values in the interval 0.0 to 4.0. So, these data are classified as quantitative continuous.

Although the variable Student ID consists of numbers, the numbers are used as labels. Thus these data are classified as qualitative.

5.1 Practice

You plan to purchase a car and you have your mind set on a few car characteristics (variables). Determine if these variables are either *quantitative discrete*, *quantitative continuous*, or *qualitative*.

- 1) Your car budget limits
- 2) Car Make
- 3) Number of cylinders
- 4) Car Model
- 5) The braking distance measured on a scale from 100 ft. to 200 ft

It is Orioles opening season game day. Determine if the following variables are either *quantitative discrete*, *quantitative continuous*, or *qualitative*.

- 6) The high temperature of the day.
- 7) Birth country of the players.
- 8) Number of home runs during the game.
- 9) Shirt numbers on athletes uniforms.

10) The table below provides information of some specifications for five smartphones. Identify the type of data presented in each column as either *qualitative*, *quantitative discrete*, or *quantitative continuous*.

Rank	Smartphone	Weight (oz)	Touch ID	Battery (talk time in min.)
1	Apple iPhone 6S	5.04	Yes	840
2	Apple iPhone 6S Plus	6.77	Yes	1440
3	Samsung Galaxy S7	5.37	Yes	1680
4	Sony Xperia Z	5.15	No	840
5	LG G5	5.57	No	1320

11) The table below provides information of some specifications for five breakfast cereals. Identify the type of data presented in each column as either *qualitative*, *quantitative discrete*, or *quantitative continuous*.

Cereal Name	Cereal Brand	Calories (per cup)	Sugar (per cup)	Gluten Free
Special K	Kellogg	110	9g	No
Cheerios	General Mills	100	1g	Yes
Oats and Honey	Cascadian Farm	260	14g	No
Corn Flakes	Millville	100	2g	No
Rice Chex	General Mills	100	2g	Yes

12) Below is a small survey about driving history. Identify the type of data being collected with each survey question as either *qualitative*, *quantitative discrete*, or *quantitative continuous*.

- a. How old are you?
- b. What is your gender?
- c. Have you taken a driver's education course?
- d. What is the fastest speed you have driven an automobile?
- e. How many speeding tickets have you received in your lifetime?

13) You have decided to collect some data on your Netflix account. Identify the type of data you are collecting as either *qualitative*, *quantitative discrete*, or *quantitative continuous*.

- a. The genre of the film.
- b. The length (in minutes) of the film.
- c. The number of family members that have access to the account.

5.1 Answers

- 1) Quantitative continuous
- 2) Qualitative
- 3) Quantitative discrete
- 4) Qualitative
- 5) Quantitative continuous
- 6) Quantitative continuous
- 7) Qualitative
- 8) Quantitative discrete
- 9) Qualitative
- 10) Qualitative data: Rank, Smartphone name, Touch ID.
Quantitative continuous: Weight, Battery talk time
- 11) Qualitative data: Cereal Name, Cereal Brand, Gluten Free
Quantitative continuous: Calories (per cup), Sugar (per cup)
- 12)
 - a. Quantitative continuous
 - b. Qualitative
 - c. Qualitative
 - d. Quantitative continuous
 - e. Quantitative discrete
- 13)
 - a. Qualitative
 - b. Quantitative continuous
 - c. Quantitative discrete