Quantitative/Categorical

Some data are numbers representing counts or measurements (such as a height of 60 inches or an IQ of 135), whereas others are attributes (such as eye color of green or brown) that are not counts or measurements. The terms *quantitative data* and *categorical data* distinguish between these types.

DEFINITIONS

Quantitative (or **numerical**) **data** consist of *numbers* representing counts or measurements.

Categorical (or **qualitative** or **attribute**) **data** consist of names or labels that are not numbers representing counts or measurements.

CAUTION Categorical data are sometimes coded with numbers, but those numbers are actually a different way to express names. Although such numbers might appear to be quantitative, they are actually categorical data. See the third part of Example 2.

Example 2   Quantitative/Categorical

1. **Quantitative Data:** The ages (in years) of survey respondents
2. **Categorical Data as Labels:** The political party affiliations (Democrat, Republican, Independent, other) of survey respondents
3. **Categorical Data as Numbers:** The numbers 12, 74, 77, 76, 73, 78, 88, 19, 9, 23, and 25 were sewn on the jerseys of the starting offense for the New Orleans Saints when they won a recent Super Bowl. Those numbers are substitutes for names. They don't measure or count anything, so they are categorical data.

Include Units of Measurement With quantitative data, it is important to use the appropriate units of measurement, such as dollars, hours, feet, or meters. We should carefully observe information given about the units of measurement, such as "all amounts are in *thousands of dollars*," "all times are in *hundredths of a second*," or "all units are in *kilograms.*" Ignoring such units of measurement can be very costly. NASA lost its $125 million Mars Climate Orbiter when the orbiter crashed because the controlling software had acceleration data in *English* units, but they were incorrectly assumed to be in *metric* units.

Discrete/Continuous

Quantitative data can be further described by distinguishing between *discrete* and *continuous* types.

DEFINITIONS

Discrete data result when the data values are quantitative and the number of values is finite or "countable." (If there are infinitely many values, the collection of values is countable if it is possible to count them individually, such as the number of tosses of a coin before getting tails.)

Continuous (numerical) data result from infinitely many possible quantitative values, where the collection of values is not countable. (That is, it is impossible to count the individual items because at least some of them are on a continuous scale, such as the lengths from 0 cm to 12 cm.)

Statistics for Online Dating

The four founders of the online dating site OkCupid are mathematicians who use methods of statistics to analyze results from their website. The chief executive officer of OkCupid has been quoted as saying, "We're not psychologists. We're math guys" (from "Looking for a Date? A Site Suggests You Check the Data," by Jenna Worthman, *New York Times*). The OkCupid website is unique in its use of methods of statistics to match people more effectively.

By analyzing the photos and responses of 7000 users, analysts at OkCupid found that when creating a profile photo, men should not look directly at the camera, and they should not smile. For women, the appearance of being interesting produces much better results than the appearance of being sexy. They found that brevity is good for the first posted message; the ideal length of the first posted message is 40 words—about what a typical person can type in one minute.