

Stat 150 – Day 3 Data and Variables

The most fundamental principle of statistics is *variability*. Data vary, and variability abounds both in everyday life and in academic study.

A *variable* is any characteristic of a person or thing that can be assigned a number or a category. The person or thing to which the number or category is assigned, such as a student in our class, is called the *observational unit*. Variability refers to the phenomenon of a variable taking on different values or categories from observational unit to observational unit.

A *quantitative* variable is typically one that measures a numerical characteristic, while a *categorical* variable is one that simply records a category designation. *Binary* variables are categorical variables with only two possible categories.

Example 1: Variables on You

(a) Consider the students in this class as observational units. Classify each of the following variables as categorical or quantitative. If it is categorical, also indicate whether it is binary.

- How long you have slept in the past 24 hours

- Whether or not you have slept for at least 7 hours in the past 24 hours

- How many states you have visited

- Handedness (which hand you write with)

- Day of the week on which you were born

- Whether or not you have used a cell phone so far today

- Whether you prefer baths or showers

- How much time you spent on your most recent bath or shower

- Whether or not you have a facebook account

- How many facebook friends you have

(b) Is “average height” a legitimate variable, still considering you and your classmates as observational units? What about “percentage who have used a cell phone today”? Explain.

(c) If you were to record the average student height, or the percentage of students who have used a cell phone today, for all classes taught at your school, would those be legitimate variables? What would the observational units be in this case?

(d) What are the observational units in your time management study?

Example 2: Variables of State

Suppose that the observational units of interest are the fifty states. Identify which of the following are variables and which are not. Also classify the legitimate variables as categorical or quantitative.

- (a) Gender of the state's current governor
- (b) Number of states that have a female governor
- (c) Percentage of the state's residents over 65 years of age
- (d) Highest speed limit in the state
- (e) Whether or not the state's name contains one word
- (f) Average income of an adult resident of the state
- (g) How many states were settled before 1865
- (h) The number of states that you have been in
- (i) Whether or not you have been in the state

