Example 1:
(a) How many outgoing calls have you made on your cell phone so far today?

(b) Do you think every student in class today has made the same number of calls?

(c) What are some possible explanations for differing responses?

Example:

+ Time awake
+ # of friends’ class schedule
+ # of texts

Definition: Data are the values measured or categories recorded on individual entities of interest. These individual entities on which data are recorded are called observational units. The recorded characteristics of the observational units are the variables of interest.

One of the overarching goals in Statistics is to explain variability. If everybody was the same, we wouldn't need Statistics and the world wouldn't be very interesting!

(d) Identify the observational units and variable in question (a).

Variable = # of calls
Observational units = students

Definition: Some variables are quantitative, taking numerical values on which ordinary arithmetic operations make sense. Other variables are categorical, taking category designations. (If there are only two designations, the variable is also called binary.)

(f) Identify each of the following variables as quantitative or categorical

Number of calls made so far today: Quantitative
Whether call was incoming or outgoing: Categorical & binary
Area code to which you made your first call: Categorical
Time when received first call today: Time slots → scale of time since 6 → quant
How many of you have not made at least one call: Not a variable
Whether women make more cell phone calls than men: Not a variable
Gender
Number of calls

(g) Is there an “observational unit” for which the last two items would be variables?

Definition: A research question often looks for patterns in a variable or compares a variable across different groups or looks for a relationship between variables.

(h) Identify a research question that could be posed using one or more of the variables in (f).

Definition: A statistic is a number that we can calculate from the data we observe that summarizes the variable of interest.

(h) Identify a statistic that would summarize “number of calls made” by students in class today.

(i) Identify a statistic that would summarize “number made at least one call” by students today.

(j) Suppose the observational unit is a cell phone call. Identify some variables we could measure on different calls.

To Turn In: With a partner, on a separate sheet of paper, identify the observational units and the variable(s) for the following research questions. Also classify the variables as quantitative or categorical. Submit your answers on a separate sheet of paper with both your names on it.

a) How much did an average American consumer spend on Christmas presents in 2013?

b) Do college students who pull all-nighters tend to have lower grade point averages than those who do not pull all-nighters? (Hint: Identify two variables)

c) Is the price of a house related to its size? (Hint: identify two variables)

d) A 2013 study in the journal Nature Communications examined whether subjects deprived of sleep had stronger impulses for junk food in the part of their brain that governs motivation to eat.

e) In a 2012 study in the journal Neurobiology of Learning and Memory, researchers split 36 college-aged students into three groups. Each group learned a memory task, pairing words on a screen with a sound. Afterward, one group had 60 minutes to nap, another 10 minutes. The final group didn't sleep.