

These questions reinforce the following concepts: observational unit, variables, scales of measurement, roles for variables

1. A sociologist assembles data consisting of the poverty rate, per capita income, serious crime rate and teen birth rate for the 50 states in the United States.
 - (a) Identify the variables in this data set as qualitative or quantitative. **They are all quantitative.**
 - (b) What is the observational unit in this data set? **Each of the 50 states.**

2. For each of the variables, decide if it is qualitative, quantitative or neither.
 - (a) Number of text messages a person sends in a day. **Quantitative**
 - (b) Length of forearm (in cm.). **Quantitative**
 - (c) Whether a person believes in love at first sight. **Qualitative**
 - (d) Social security number. **Neither**

3. An article in Seattle Times headlined:

Walking and texting? Watch out, you could have an accident

appeared on January 16, 2010. An excerpt from the article is shown below.

Sometimes, pedestrians using phones do not notice objects or people right in front of them, even a clown riding a unicycle. That was the finding of a recent study at Western Washington University in Bellingham by a psychology professor, Ira Hyman, and his students.

One student dressed as a clown and unicycled around a central square on campus. About half the people walking in the square by themselves said they had seen the clown; the number was slightly higher for people walking in pairs. But only 25 percent of people talking on a cellphone said they had, Hyman said.

He said the term commonly applied to such preoccupation is "inattention blindness," meaning a person can be looking at an object but fail to register it or process what it is.

Particularly fascinating, Hyman said, is that people walking in pairs were more than twice as likely to see the clown as were people talking on a cellphone, suggesting that the act of having a conversation is not the cause of inattention blindness.

- (a) The relationship between two variables is under study here. What are they? Are they quantitative or qualitative? What is the observational unit?

The first variable is walking condition: walking in pairs, walking alone, walking while using a cell phone. This variable is qualitative.

The second variable is whether they saw the clown: yes/no. This variable is also qualitative.

The observational units are pedestrians crossing the square during the experiment.

- (b) In a study of the relationship between variables, one variable is usually called the response and the other an explanatory variable. Which of the variables mentioned in the previous part is the response and which is explanatory?

Response: whether they saw the clown.

Eplanatory: walking condition.

- (c) Can we conclude that talking/texting on a cell phone *causes* inattentional blindness? Or can you think of an alternate explanation for not seeing the clown?

Although there is association, we cannot infer causality from that due to the nature of the experiment. In particular, people who choose to use their cell phones may be inherently un-observant. That is to say, these people may not have seen the clown even if they were walking without a cell phone. There is no way to tease this out given the naturalistic aspect of this study.

Did you know? Not all studies of relationships between variables involve a response and explanatory variable. When a woman made the claim at an afternoon tea party in Cambridge that she could always tell whether the milk was added before or after the tea was poured in the cup, Sir Ronald Fisher (a famous statistician) conducted an impromptu experiment to test her claim. She was given eight cups of tea, in four of which milk was added first. The order of presenting the cups to her was random.

- The observational unit is each of the eight tea cups.
- For each cup, two variables were recorded: whether milk was poured first (yes/no) and whether the lady guessed correctly (yes/no).
- Each variable represents an outcome and is therefore more appropriately thought of as a response.