

Video 14 Causation

1. People who own more cars tend to live longer than people who own fewer cars. Why is this relationship not evidence that buying more cars increases life expectancy? Although we might see a strong association between two variables, that doesn't mean that there is a cause-and-effect relationship. Proving causation comes from hidden factors. They might not be apparent, but they lurk in the background, called lurking variables. In the people who own more cars live longer than people who own fewer cars, the lurking variable is the car buyer's affluence. Richer individuals own more cars and tend to live longer, probably because they have access to better medical care and healthier food. The cars don't have anything to do with it.

2. Heavy smokers are about 20 times more likely to get lung cancer than nonsmokers. Why isn't this link by itself good evidence that smoking causes lung cancer? Sometimes causation seems to be the reasonable explanation of the relationship between an explanatory variable and a response variable. But how do we know? Alone with the explanatory and response variable, doesn't allow enough evidence that smoking causes lung cancer. The best way is to conduct an experiment. An experiment imposes a treatment to observe its effects.

3. What is the difference between a retrospective study and a prospective study? Retrospective starts with an outcome of past behavior, whereas a prospective study looks ahead, following people with two opposite people groups, watching for new outcomes.

4. Why is a prospective study that compares a group of smokers with a similar group of nonsmokers not an experiment? It's not an experiment because people make their own choices about whether to smoke, rather than randomly assigned to take up the habit, but it still brings evidence of causation between smoking and lung cancer.

5. Why do experiments with animals add to the evidence that smoking causes cancer in humans? The labeling of causation was still premature of the correlation between the retrospective and prospective study. So, they turned to the lab for help. The experiments with animals bring up extra evidence for any lurking variables.