Student Resource 7.1

Reading: Causation and Correlation

Imagine you read this headline on a news site: “Study shows strong link between fast food and obesity.” What exactly does this mean? Does fast food cause people to become obese? The headline doesn’t tell the whole story. The researchers may have found that fast food consumption over a period of time is correlated, or linked, to obesity, but this doesn’t mean that fast food causes the disease. Obesity is linked to many things, including diet, exercise, and genetics.

Correlation

Sometimes when we talk about a health determinant that causes a health outcome, what we really mean is a correlation, or an association.

When we say that a health determinant and a health outcome are correlated, we are saying that they have a statistical relationship. In other words, when one thing increases or decreases, the other thing increases or decreases.

Let’s look at the fast-food and obesity example. Researchers found that over time when people *increased* their consumption of fast food, the likelihood of them becoming obese also *increased*. That is a correlation.

|  |  |  |
| --- | --- | --- |
| Examples of Correlation | Correlation Key Phrase | Relationship |
| There is a relationship between exercise and low stress levels. | “relationship between” | Increase in exercise, decrease in stress |
| Eliminating saturated fat from the diet is associated with a lower risk for heart disease. | “associated with” | Decrease in saturated fat, decrease in risk for heart disease |
| People who ate unwashed fruit were found to have an increased risk of bacterial infections. | “were found to have” | Increase in unwashed fruit, increase in risk for infection |
| People who have alcoholic relatives are more likely to develop a problem with alcohol. | “more likely” | Increase rate of alcoholism in family, increase in risk for alcoholism in individual |
| Pedestrian accidents are less likely to occur in intersections where there are crosswalks. | “less likely” | Increase in crosswalks, decrease in accidents |
| Bullying is linked to teen suicide. | “linked to” | Increase in bullying, increase in risk for suicide |

Causation

Causation, or saying that something causes something else, is hard to determine. It requires particular types of rigorous research to prove causality.

For example, it may seem like common sense that the more fast food a person eats over time, the more likely it is that the person will struggle with weight issues, but researchers can’t say that fast food causes obesity. There are other things to consider. Were the people who ate fast food over a prolonged period of time exercising on a regular basis? Do they have a genetic predisposition to obesity? Did they have other physical problems? Did the work they do require them to be sedentary or active? Did they suffer from mental disorders that affect eating habits, such as depression? To prove causality, researchers must study two controlled groups of people that are similar in every way except for one variable, and that is very difficult to do. Even once causation has been determined, it still could be proven wrong.

|  |
| --- |
| Examples of Causation |
| Cigarette smoking can cause lung cancer. |
| Lyme disease is caused by a bacterium called *spirochete* and is spread by ticks. |
| Drunk driving causes an increase in fatal auto accidents. |
| The bacterium Chlamydia trachomatis causes chlamydia. |
| The mineral fiber asbestos found in some construction materials can cause lung cancer. |

Global health researchers and public health workers make great efforts to distinguish between causation and correlation. In their work, they strive to provide people with information that is as accurate as possible.