VIEWPOINT

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COMMON THINKING TRAPS: CORRELATION AND CAUSATION

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Author's Note: There are a number of hot-button issues mentioned in this article. In general, except where noted, I'm not indicating a preference for any explanation, nor am I intending to start a debate on any of these issues. These are merely examples of alternatives that can be used to illustrate the main point of the article.

People who have been beaten as children are more likely to beat their own children. Therefore, being beaten as a child makes the child more likely to grow up and become a child beater himself.

This thinking trap is an incredibly widespread problem that shows up daily in media reports. A is correlated with B, so therefore A must have caused B.

If there is a correlation between A and B, there are multiple possibilities:

- A may cause B.
- B may cause A.
- A third factor C may cause both A and B.
- A and B may influence each other in some kind of reinforcing relationship.
- It might be a coincidence that A and B are correlated.
- Some combination of the above.

Some of them can be ruled out in certain cases. Beating your child cannot have been the cause of your having been beaten as a child, so the second possibility (B causes A) can be ruled out in that example.

Similar to the child-beating example, children of smokers are more likely to become smokers. Therefore, smoking causes your children to become smokers themselves. That kind of narrative sounds plausible, and we hear it all the time. The implication is that children are learning these behaviors from their parents. While that is certainly plausible, another just as plausible explanation is that children are genetically inheriting these tendencies from their parents. The genetic explanation for both violence and smoking has a lot of supporting evidence from adoption studies.

Socioeconomic class is correlated with all kinds of things, therefore socioeconomic class must be the cause of all those things. A classic example is crime. Poor people commit more crimes, therefore the cause of some crime is poverty. Maybe, but then maybe something else is causing both crime and poverty. Some argue for exactly that, and it seems that your preferred explanation depends upon your politics.

Children whose parents read to them do better in school. Therefore, reading to your child helps him or her do better in school. Maybe a third factor, such as a genetic trait for academic talent, causes you both to do better in school and to be more likely to read to your children. It seems likely that academically talented parents and educated parents are more likely to read to their children. They also gave their children some of their academic genes, and that could be the explanation.

Children in music programs do better in math, therefore, you should enroll your child in music programs so they will do better in math. Maybe, but then maybe the same trait makes one both good at music (and thus more likely to participate) and good at math. There is a correlation between being in a high school orchestra and being Asian. If you want to become Asian, should you join the orchestra?

There is a correlation between ice cream sales and drowning incidents. Neither is likely the cause of the other. Instead, a third factor is likely increasing both—summer.

Marijuana is the gateway drug to more dangerous drugs. We are told this all the time, and it is proven by the fact that those who smoke marijuana in their youth are more likely to take more dangerous drugs later on. This plausible-sounding explanation ignores the just as plausible explanation that someone with a personality or genetic tendency to take drugs is more likely to both smoke marijuana as a youth and take other drugs as they get older. What caused them to be a drug user when they are older might be the same thing causing them to smoke marijuana when they are younger.

Here is one of my favorite examples, because it got a lot of attention and seemed so scientifically acceptable. A correlation was discovered between young children sleeping with a light on in their bedroom and development of nearsightedness. It was implied that leaving a light on in your child's room leads to nearsightedness. It turns out that the likely cause of this effect is that nearsighted parents transmit their nearsighted genes to their children, and those same half-blind parents are more likely to leave the light on in their child's room, possibly so the parents themselves can see better.

A properly controlled experiment can tease out likely causes, but much of what you hear in the media is not the

TEAM TIP

Causal loop diagrams can be a useful tool for testing whether the relationship between factors is based on causation or correlation.

result of carefully controlled experiments. It is the result of people, often with an agenda, looking for correlations. We don't conduct controlled experiments on child beating and youth drug use.

The key lesson here is to not just automatically assume that, because the media reports that people who do A are more likely to experience B, A is actually causing B. It pays to be skeptical of media reports, books, and gurus when they imply correlation indicates a casual link. This is especially true if it sounds like something that was just dug out of data or surveys and not the subject of proper experiments. If you care about the issue, you should look deeper into the studies.

Stephen Mills writes "The Rat Race Trap" blog, which covers "tools to improve your mind and escape the trap." This article is reprinted from the blog with permission.