

Chapter 5

Correlation and Causation Birth Control by the Toaster Method

Correlation and Causation: Birth Control by the Toaster Method

What we need to ask: Is the nature of the relationship relevant to what we are trying to find?

It is important to recognize that although 2 variables might be associated they might not have a causal relationship

Do Not Assume Correlation is Evidence of Causation in Every Instance

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- Taiwan, large study of contraceptive usage by researchers
- Collected environmental and behavioral variables
- Data showed one variable most strongly related to contraceptive use
The number of electrical appliances in the home (the single best predictor in the study)
- The nature of the relationship is more relevant than the strength of the variable
This makes us aware that 2 may be associated without having a causal relationship
- Other variables like SES relate to both and can be linked to contraceptive use and amount of electrical appliances in a home
- **POINT:** "No matter how strong the correlation is between the number of toasters and contraceptive use, the relationship does not indicate a causal connection. The presence of a correlation does not necessarily imply causation."
Limitations of correlational evidence are not always easy to recognize

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- 2 Problems that prevent the drawing of a causal inference
Third Variable Problem (can result from selection bias)
Directionality Problem
- **Third-Variable Problem:**
"The fact that the correlation between 2 variables may not indicate a direct causal path between them but may arise because both variables are related to a third variable that has not even been measured."
- A correlation may coincide well with the hypothesis or causal relationship
- There is another variable that is as plausible to the hypothesis or causal relationship
- Correlations can be misleading so research tests may be done to rule in favor of or against

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- **Examples:**
- Handing out toasters in High School will reduce teen pregnancy
Probably not, but having enough money to pay for contraception can
(and if you can buy contraception devices you probably have a toaster ☺)
- Pellagra (disease which includes dizziness, lethargy, running sores, vomiting, and severe diarrhea breaks out in the South of United States)
- Researchers and physicians thought to be raw sewage in unsanitary conditions (plausible)
- Goldberger challenged the raw sewage hypothesis
He hypothesized inadequate vs. balanced
- Why would Goldberger's hypothesis seem more valid?

He tested his hypothesis and that of the physicians and other researcher's hypothesis of raw sewage

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- -He and his volunteers ingested excrement and injected other bodily fluids from infected individuals and did not become ill themselves; ruling out the raw sewage and unsanitary conditions
- -He had two groups with different diets (five months) to test his hypothesis of inadequate diet and Pellagra
- -Group A: High carbohydrate diet/low protein
 - -Became ill with Pellagra
- -Group B: More balanced diets
 - -No signs of the disease
- -Goldberger's Hypothesis and Controlled Manipulation of Critical Variables proved more valid (empirical evidence) than simply observing the correlation as in the raw sewage hypothesis or in the toasters/electrical appliances impact on contraceptive usage (sometimes called spurious correlations)

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- Correlation is good for prediction more than causation
 - Multiple regression, partial correlation and path analysis are designs used to extinguish The Third-Variable Problem
- Permits correlation between 2 variables to be recalculated after the influence of other variables are reduced or dismissed but do not always reduce the magnitude of the original correlation