Chapter 9: Comparing Two Groups

Section 9.5: How Can We Adjust for Effects of Other Variables?

Learning Objectives

1. A Practically Significant Difference
2. Control Variable
3. Can An Association Be Explained by a Third Variable?

Learning Objective 1: A Practically Significant Difference

- **When we find a practically significant difference between two groups, can we identify a reason for the difference?**
- **Warning: An association may be due to a lurking variable not measured in the study**

Learning Objective 2: Control Variable

- **In a previous example, we saw that teenagers who watch more TV have a tendency later in life to commit more aggressive acts**
- **Could there be a lurking variable that influences this association?**

Learning Objective 2: Control Variable

- **Perhaps teenagers who watch more TV tend to attain lower educational levels and perhaps lower education tends to be associated with higher levels of aggression**

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Learning Objective 2: Control Variable

- **We need to measure *potential lurking variables* and use them in the statistical analysis**
- **If we thought that education was a *potential lurking variable* we would want to measure it**
- **Including a potential lurking variable in the study changes it from a *bivariate* study to a *multivariate* study**
- **A variable that is held constant in a multivariate analysis is called a *control variable***

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Learning Objective 2: Control Variable

For example, for those who attended college who watched TV less than 1 hour per day, 2% committed an aggressive act.

	Educational Level		
TV Watching	Less than High school	High school	College
Less than 1 hour per day	8%	4%	2%
At least 1 hour per day	30%	20%	10%

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Learning Objective 2: Control Variable

- **This analysis uses three variables:**
  - **Response variable: Whether the subject has committed aggressive acts**
  - **Explanatory variable: Level of TV watching**
  - ***Control variable*: Educational level**

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Learning Objective 3: Can An Association Be Explained by a Third Variable?

- **Treat the third variable as a control variable**
- **Conduct the ordinary bivariate analysis while holding that control variable constant at fixed values (multivariate analysis)**
- **Whatever association occurs cannot be due to the effect of the control variable**

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Learning Objective 3: Can An Association Be Explained by a Third Variable?

- **At each educational level, the percentage committing an aggressive act is higher for those who watched more TV**
- **For this hypothetical data, the association observed between TV watching and aggressive acts was not because of education**

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