Tuesday May 10, 2011 Schedule for the Day

Am: Critical Reasoning

--Discussion of Today's Assignment on Sampling and Statistical Arguments

--Discussion of Today's Reading on Correlation and Causation.

--Video: Prisoner's of Silence.

--Discussion of video

Pm: Ethical Reasoning

--Virtue Ethics Revisited

Comments on Critical Reasoning Assignment for Friday, April 1

DIRECTIONS: The following passages describe situations in which a generalization is made on the basis of sample. For each case, reconstruct the argument. The premise(s) will report an observation of a sample. The conclusion will be a generalization about a larger population. If specific percentages are given, state the argument in the form:

> _(1)   x percent of P_1s (in the sample) are P_2s_
> _(likely) x percent of P_1s (in the population) are P_2s_

Criticize any faulty reasoning exhibited in the following passages, and, where appropriate, describe how a more appropriate sample might be obtained.

A2. A quality control engineer closely examines a random sample of automobiles produced on Tuesdays and Wednesdays at the Youngstown plant. He finds that only 3 percent of the cars in this sample are faulty, and concludes that only 3 percent of all the cars produced at this plant are faulty.

(1) 3 percent of (the randomly sampled) cars produced on Tuesdays and Wednesdays at the Youngstown plant are faulty.
(likely) 3 percent of all cars produced at the Youngstown plant are faulty.

The sampled cars may not be representative of those produced on other days: Friday, when workers are thinking about the weekend, and Monday, when they may be feeling the effect of too much weekend, are not sampled. A better sample could be drawn from random times during the week.

A4. The widely cited Harvard Medical Practice Study examined 31,429 records sampled from more than 2.5 million cases in New York hospitals. It found that about 1 percent of the cases involved adverse outcomes due to negligence. We should conclude that it is likely that about 1 percent of the doctors are guilty of malpractice.

(1) 1% of the cases involved adverse outcomes due to negligence
[according to the Harvard Medical Practice Study]
(likely) 1% of doctors are guilty of malpractice (negligence).

There is a shift in the unit of analysis from cases to doctors. A relatively few doctors could be responsible for the adverse outcomes. Alternatively, a larger percentage of doctors might be guilty of malpractice, if teams of doctors were all negligent in these 1% of cases.

A6. A student newspaper conducted a survey by asking students a series of questions. The survey was conducted at noon in front of the student center and involved 250 students out of a student body of 8,000. The interviewers were careful to get a sample with a racial, gender, and religious breakdown similar to that of the university as a whole. In the survey, 53 percent of the students interviewed said they opposed abortion. The newspaper presented the results of its survey in an article that was headlined "Majority of Student Body Opposes Abortion."

(1) 53 percent of the 250 students surveyed (said that they) oppose abortion. (likely) A majority (at least 50 percent of the 8,000 students in the student body) opposes abortion.

The sample is unrepresentative. It includes only students who are on campus at noon and who pass by the student center. Even though the racial, sexual, and religious pro-portions mirror the campus as a whole, there may be a difference of opinion between those who frequent the center and those who do not, and night students might be more conservative than those available at noon. A better sample might be obtained by calling random students from the university roster.

A8. A San Francisco area survey of randomly selected individuals seeking treatment for gout indicated that contrary to tradition, most gout sufferers are not addicts of rich gourmet food and beverages.

(1) Most of those randomly selected people who were being treated for gout in the San Francisco area were not addicted to rich gourmet food and beverages.
(likely) Most gout sufferers are not addicts of rich gourmet food and beverages.

The sample might not be representative of all gout sufferers. Something in food that is very common to the diet of San Franciscans that is not a gourmet food could tend also to cause gout. If most San Franciscans were not gourmets, the effect of this second cause would mask the effect of gourmet foods, that is, most gout suffers would not be gourmets, even though gout might be correlated with being a gourmet more broadly where this San Francisco diet item is not present.

A. 10 All bachelors are unhappy. They just interviewed the guys down at the Beta fraternity house and they turned out to be unhappy. They got the same results down at Bernie's Tavern.

(1) The (sample of?) guys down at the Beta fraternity house and Bernie's Tavern (who are bachelors) are all unhappy.
(likely) All bachelors are unhappy.

The sample is not representative of all unmarried men. A sample with a broader range of ages, social systems, and cultural values would be better. The Beta fraternity might have been going through difficult times when the sample was taken, and Bernie's tavern might be patronized by unusually lonely bachelors.

DIRECTIONS: Which of the following arguments are acceptable? Sketch out your criticisms of those that you think are not. Use the information provided in the premises, or alternatively, make use of your own background knowledge to develop any appropriate counterarguments

(1) Most sexually active women who take birth control pills according to directions do not conceive.
(2) Edna is a sexually active woman who takes birth control pills according to directions.
(likely) Edna will not conceive.

This argument is acceptable.

4. *(1) Most incumbents are reelected in the United States if they decide to run.*
   (2) Mayor Armwrestler is an incumbent running for reelection who has long
   stood for increasing expenditures on social programs.

(likely) Mayor Armwrestler will be reelected.

Possible Counterargument:
(*1) Most incumbents who advocate increased spending on social programs are not
reelected.
(2) Mayor Armwrestler advocates increased spending on social programs.
 (likely) Mayor Armwrestler will not be reelected.

Study Links Alzheimer's To Childhood[26]

Hardship during childhood may contribute to Alzheimer's later, researchers say.

Early growth has far-reaching effects on many diseases, said study leader Victoria Moceri of the University of Washington in Seattle. Her team of researchers found that factors such as family size and location point to a role for childhood and teenage living conditions in the risk of getting Alzheimer's.

In the study, published Tuesday in the journal *Neurology*, researchers carefully matched 393 Alzheimer's patients with 377 healthy people the same age. All the participants were over 60; the average age was 79.

Compared with those who grew up in rural or urban areas, people from the suburbs had 45 percent of the chance of developing Alzheimer's.

"Living outside the city in the suburbs in the 1920s was associated with a better standard of living."

(1) A small percentage (comparatively) of people in the sample (770 people of age 60 and older) who grew up in the suburbs later developed Alzheimer's disease (likely) A small percentage (comparatively) of all people who grew up in suburbs later develop Alzheimer's disease.

The sample is of people who grew up in the first half of the 20th Century. This group might not be representative of the larger population—all people who grew up in any period of time. . It could be that there was some particular feature of suburban living, compared to urban and rural living, in the first half of the 20th Century that tended to protect people from Alzheimer's, but that was not typically present in suburban living in other periods. For example, there might have been comparatively less pollution in the suburbs in this period or comparatively lower population density.

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Main Argument

(1) Many people (comparatively) who avoided Alzheimers later in life grew up in the suburbs. **[FROM SAMPLING ARGUMENT]**

(2) Many people who grew up in the suburbs grew up in better living conditions. **[FROM LAST SENTENCE OF PASSAGE]**

(3) Many people who grew up in better living conditions faced less hardship in childhood.

(likely) Many people who avoided Alzheimers a later in life faced less hardship in childhood **[FROM TITLE AND FIRST SENTENCE]**

Arguments that move from correlation (association) to Cause

Form of Argument

associated
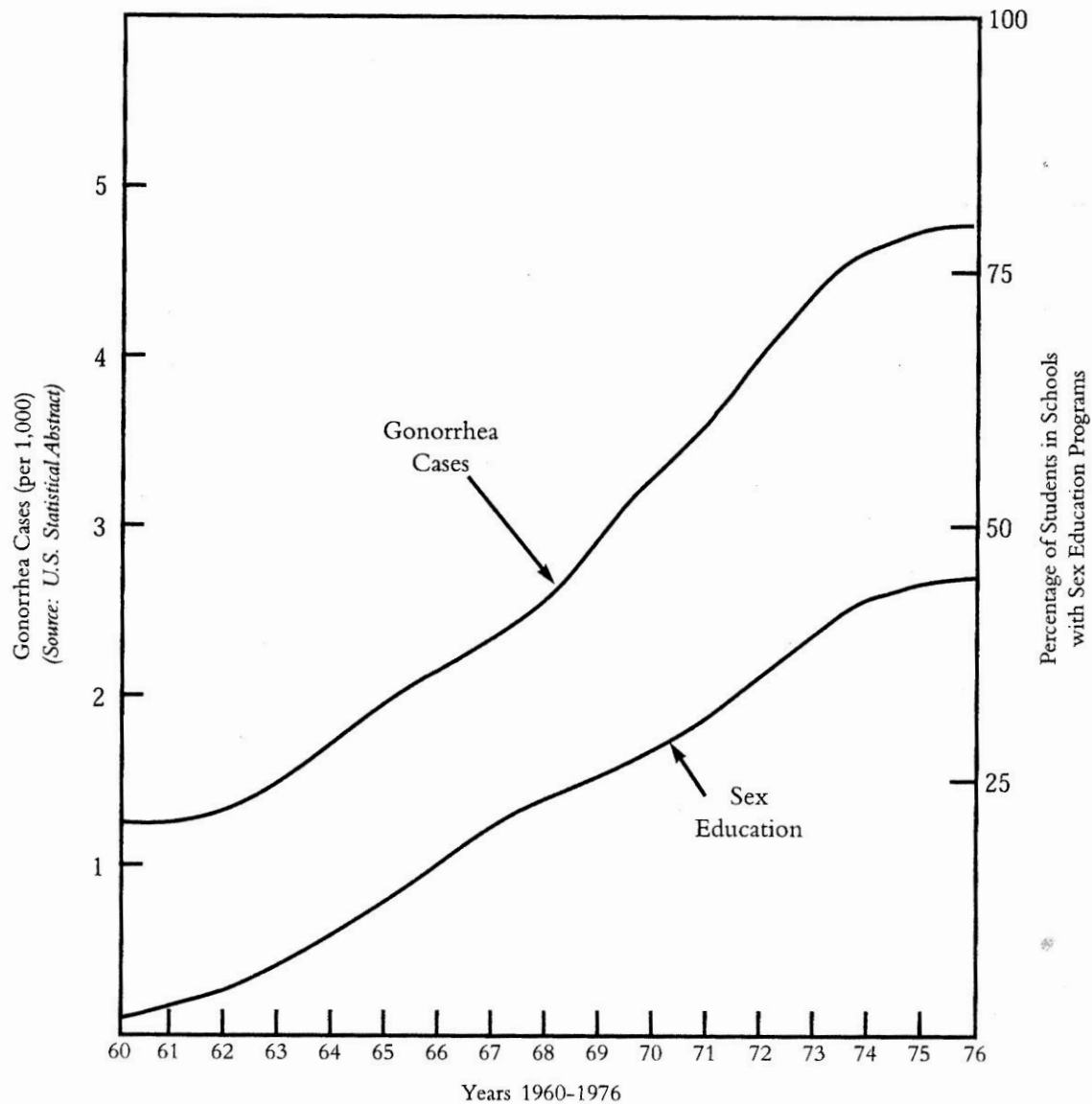
A is correlated with B

(likely) A causes B

Example

associated

Smoking is correlated with Heart Disease

(likely) Smoking causes heart disease

Figure 9.1 Rate of gonorrhea cases per 1,000 population (actual estimates) and percentage of students (largely fictional estimates) in high schools with sex education programs

Correlation Does *Not* Assure Causation

Even very strong correlations may not correspond to a real causal relationship.

Today's Session
1. **What makes for a Bad Causal Argument?**
2. **What makes for a good one?**

What makes for a Bad Causal Argument:
Five common criticism of Causal

Increase in Sex Ed classes is (positively) correlated (associated) with increased in gonorrhea

(likely) Increase in Sex Edu classes caused increase in gonorrhea

- **Coincidental**

- **Both effects of the same underlying cause**

- **Causal effect is genuine but insignificant**

- **Causal relation in the wrong direction**

- **Causal relation may be complex**

1. The Relationship May Be Just a Coincidence

We will see some strong correlations (or apparent associations) just by chance, even when the variables are not related in the population

1a. Coincidence (?)
Vaccines and Brain Damage

- A required whooping cough vaccine was blamed for seizures that caused brain damage
  - led to reduced production of vaccine (due to lawsuits)

- Study of 38,000 children found no evidence for the accusations (reported in *New York Times*)
  - "people confused association with cause-and-effect"
  - "virtually every kid received the vaccine...it was inevitable that, by chance, brain damage caused by other factors would occasionally occur in a recently vaccinated child"

Example 1b: In 1940 a psychologist conducted a study of the effect of propaganda on attitude toward a foreign government. He devised a test of attitude toward the German government and administered it to a group of American students . After reading German propaganda material for several months, the students were tested again to see if their attitudes had changed. Unfortunately, Germany attacked and conquered France while the experiment was in progress. There was a profound change of attitude toward the German government between test and retest. **Was the change in attitude caused by exposure to propaganda?**

2. Joint effect of a Common Cause

- Apparent Cause Divorce among men
- Apparent Effect : Percent abusing alcohol

◆ Both may result from an unhappy marriage.

3. Apparent Cause is not the most important Contributor

- Apparent Cause: Possession of gun in home
- Apparent Effect Response: Occurrence of a homicide

◆ *tendency toward violence* may be another contributor

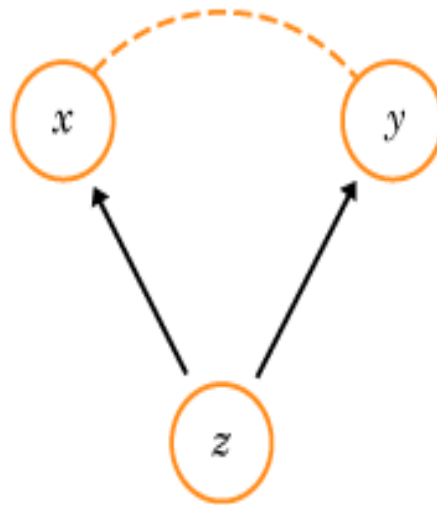## 4. Wrong direction: Apparent Effect is actually the cause

- Apparent Cause: Divorce among men

- Apparent Effect: Percent abusing alcohol

- Conclusion was that getting divorced caused alcohol abuse in men.

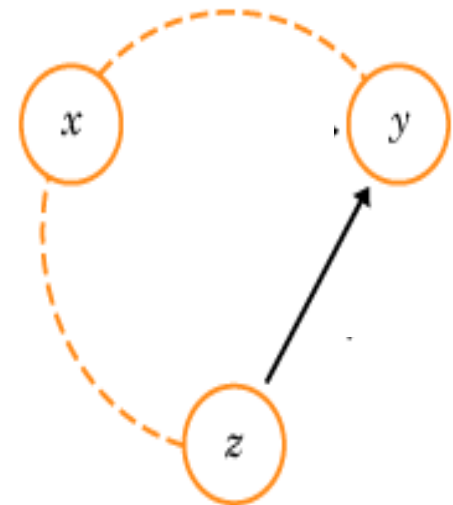 - ◆ Could it be that alcohol abuse caused divorce?

Full Fledged Cause
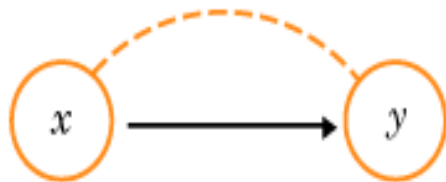
Joint Effect of Common Cause

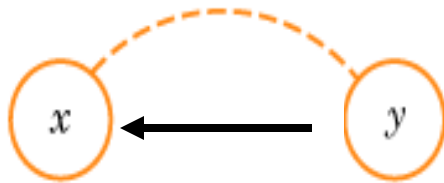Coincidental Correlation

(a) Causation
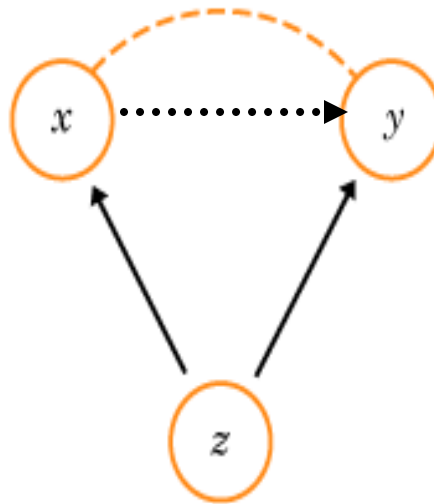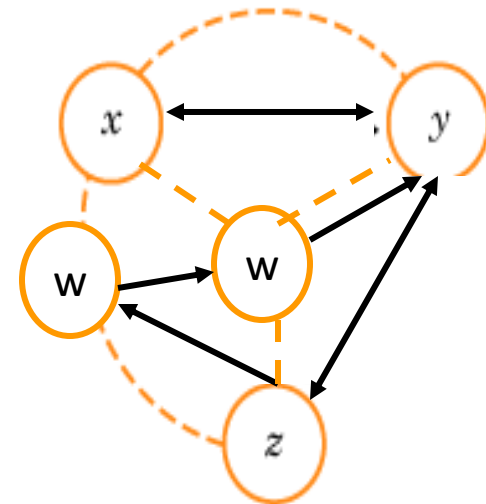
(b) Common response

(c) Confounding

— — — Correlation, association

⟶ Causation

Apparent Cause
in Wrong Direction

Genuine but
Insignificant Cause

Complex causal
Relation

Correlation Does *Not* logically Imply Causation

Even very strong correlations may not correspond to a real causal relationship.

What makes for a bad one?

What makes for a Bad Causal Argument:
Five common criticism of Causal

Increase in Sex Ed classes is (positively) correlated (associated) with increased in gonorrhea

(likely) Increase in Sex Edu classes caused increase in gonorrhea

- **Coincidental**
  (A new strain of gonorrhea happened to emerge)

- **Both effects of the same underlying cause**
  (Increased sexual activity caused both)

- **Causal effect is genuine but insignificant**

  (Sex Ed classes encouraged risky sex for only a few)

- **Causal relation in the wrong direction**

  (Increase in gonorrhea caused introduction of more Sex Ed)

- **Causal relation may be complex**
  (Sex Ed caused changes in attitude that lead to increased sexual activity that lead to increased gonorrhea, but increased SDTs might have simultaneously caused more sex Ed courses to be introduced)
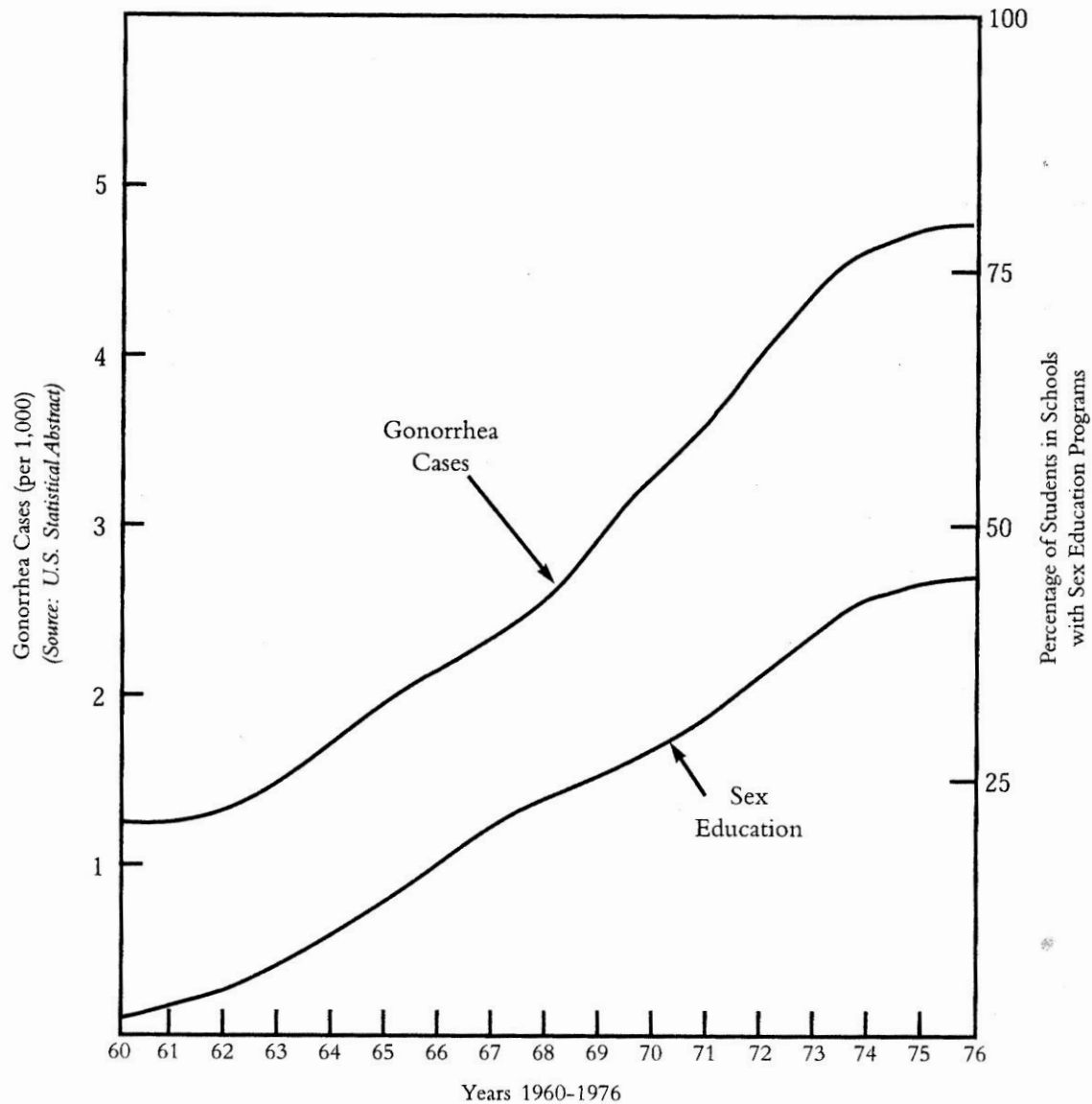
Time Series suggests possible relateness

Figure 9.1 Rate of gonorrhea cases per 1,000 population (actual estimates) and percentage of students (largely fictional estimates) in high schools with sex education programs
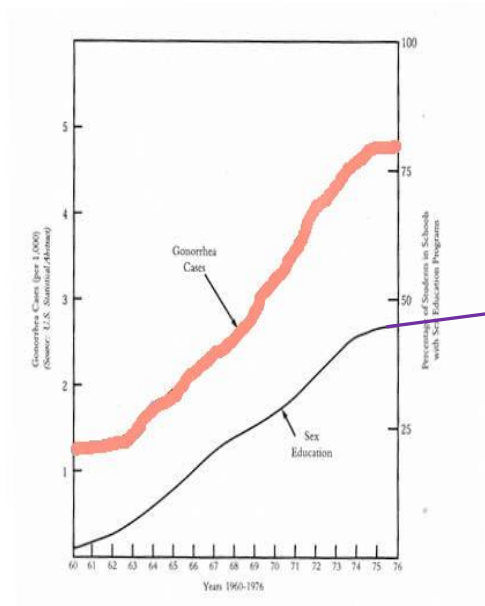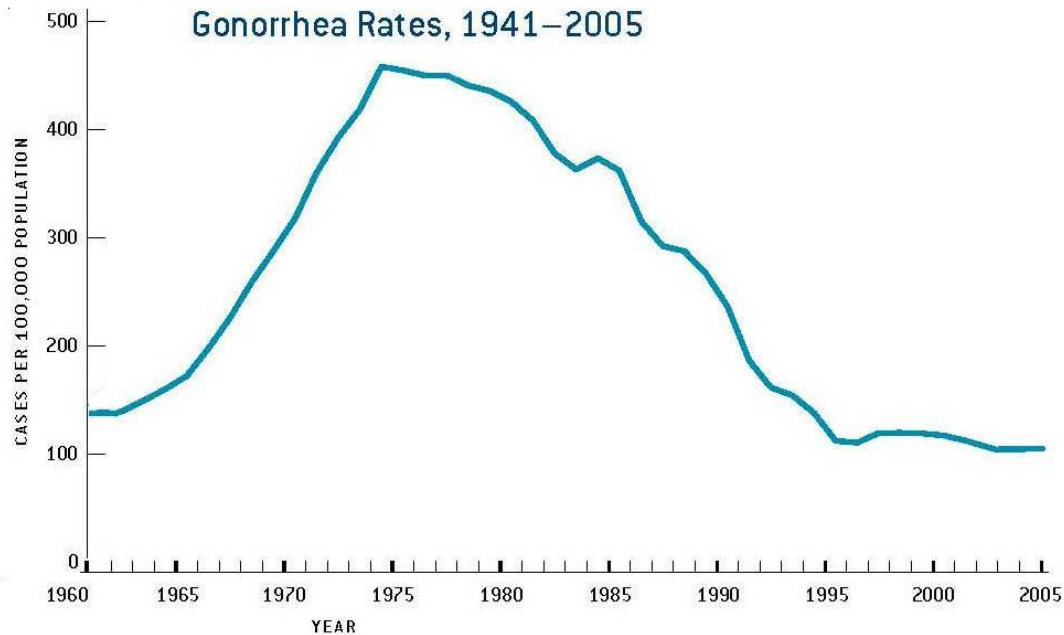
Figure 9.1 Rate of gonorrhea cases per 1,000 population (actual estimates) and percentage of students (largely fictional estimates) in high schools with sex education programs

Indicate whether these passages contain a faulty move from correlation to cause. If so, state your criticism. If you are claiming that a correlation might be due to an X-factor, say what this X-factor might be, and explain how it could account for the correlation.

1. Texting while driving has been correlated with traffic accidents. So texting while driving causes traffic accidents.

   Texting might contribute to some traffic accidents. But a possible X-factor is the prevalence of texting among the young, who are relatively inexperienced drivers and tend to be less careful.

2. Staying happy and positive can help ward off heart disease, a new study has suggested...The new research showed that people who are usually happy, **enthusiastic** and content are less likely to develop heart disease than those who tend not to be happy.

   Being happy, enthusiastic and content as well as good heart health might result from a healthier life style including significant exercise; both unhappiness and heart disease might both result from some underlying condition such as significant stress with no power to relieve it;

3. **Study Links Homicide with TV Use**

The correlation between widespread television viewing by children and subsequent (lagged) increase in violence is quite suggestive. It gains credibility by being found differentially in U.S. white and black populations as well as with the more recent introduction of TV into South Africa.

Nevertheless, increased TV exposure and conditions that produce subsequent tendency toward violence might be joint effects of an underlying cause. Increases in work hours by both parents might lead to lack of parental discipline and also increase in TV viewing, as well as a sub-sequent tendency toward violent behavior by young males.

Correlation Does *Not* Assure Causation

Even very strong correlations may not correspond to a real causal relationship.

Today's Session
1. **What makes for a Bad Causal Argument?**
2. **What makes for a good one?**

But some Correlations are Causes

- Apparent Cause: pollen count from grasses
- Apparent Effect: percentage of people suffering from allergy symptoms

- Apparent Cause: amount of food eaten
- Apparent Effect: hunger level

Evidence of Causation

- A properly conducted experiment establishes the connection

Prisoners of Silence Video

A TV documentary about issues surrounding facilitated communication as a technique used to help autistic and other developmentally disabled people.

Pay special attention to

(1) Any empirical theories that might be involved in the controversy about facilitated communication

(2) Any issues of causation and experimentation that are relevant to the controversy

Evidence of Causation

- A properly conducted experiment establishes the connection
- Other considerations:
  - A reasonable explanation for a cause and effect exists
  - The connection happens in repeated trials
  - The connection happens under varying conditions
  - Potential confounding factors are ruled out
  - Alleged cause precedes the effect in time

Table II. Correct Subject Responses for Three Levels of Support and Two Facilitator Knowledge Conditions

| Subject	No help		Medium support		Full support	
	Aware	Unaware	Aware	Unaware	Aware	Unaware
1	0	0	0	0	2	0
2	0	0	0	0	6	0
3	0	0	3	0	8	0
4	0	0	0	0	6	0
5	0	0	0	0	1	0
6	0	0	0	0	7	0
7	0	0	0	0	0	0
8	0	0	0	0	7	0
9	0	0	0	0	12	0
10	0	0	0	0	10	0
Totals	0	0	3	0	59	0

Example Experimental Results

Model of a "good experiment"

1. Have a control (comparison) group

2. Random Assignment to one or the other

Two conditions

  Facilitator knows

  Facilitator doesn't know
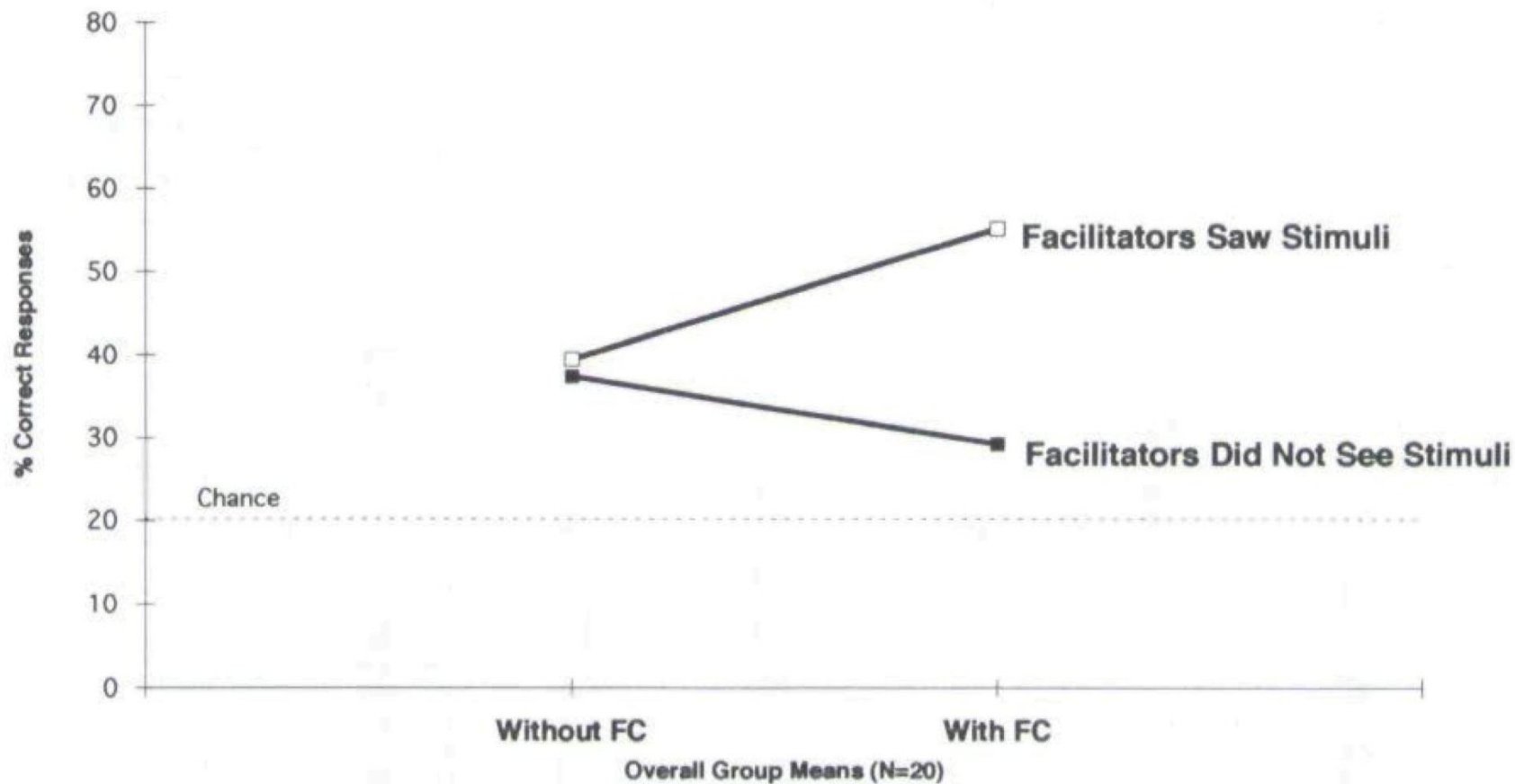
Fig. 1. Setwork design. Group data illustrating the interaction effect of the use of facilitated communication and facilitator knowledge on performance.

Scores in this method were the percentage of trials on which students pointed to the one of five pictures (or words) which corresponded to the picture (or word) which had been shown previously. Scores were computed separately for each of the four conditions (FC/informed, FC/not informed, no FC/informed, no FC/not informed) and are shown in Figure 1, across participants. A 2 × 2 ANOVA indicated that the interaction was significant, $F(1, 76) = 6.36, p = .0138$, with performance in the FC/informed condition significantly greater than in the other three conditions, which did not differ.

That's All Folks