

## Research Should Provide Evidence/Information About:

- To whom the results should \_\_\_\_\_
- Whether the results are intended to make a \_\_\_\_\_
- The degree to which we are measuring what we \_\_\_\_\_
- How \_\_\_\_\_ we are measuring what we intend to measure

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## Research Can't be "\_\_\_\_\_"

### Different Research Types Provide Different Degrees of \_\_\_\_\_ about their Results

The Amount of \_\_\_\_\_ Depends Upon:

1) Type of

- \_\_\_\_\_ usually provides less evidence, but can often examine
- Experimental research provides

2) Type of

- \_\_\_\_\_ is better than Non-\_\_\_\_\_

3) The ability to include

- \_\_\_\_\_ research often can use

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## Research Limitations

### Causation:

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_ (the IV has to \_\_\_\_\_ the DV)
- 3) \_\_\_\_\_ (third variables can't \_\_\_\_\_ both the

### Research can:

- Conclusively show
- Sometimes ignore
- Often show
- Conclusively show
- Conclusively show
- Provide reasonably good evidence for

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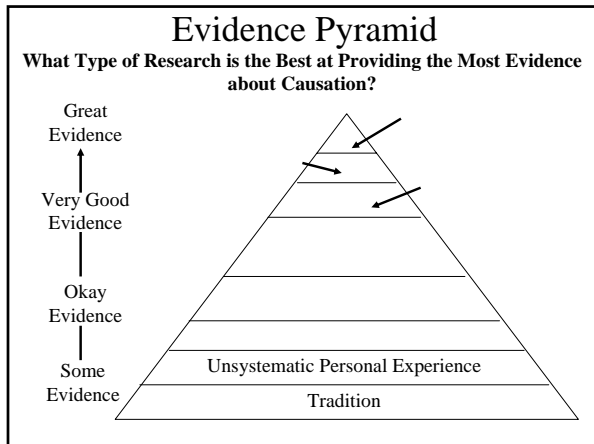
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### Research Limitations

**Generalization:**

- 1) The study has to include the population to which we
- 2) The sample has to closely represent this

**Research can:**

- Sometimes ignore #1 and #2 if we strongly believe that
- Almost never determine whether \_\_\_\_\_ unless we have a high
- Almost never determine whether #2 exists in

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### Evaluating Research

Sometimes it is difficult to determine whether a researcher/author intends to make a \_\_\_\_\_

For Example: Professor Smith wrote a book that claimed that adolescents who have good grades tend to commit less crime

- Was Professor Smith describing a positive or negative association between good grades and crime?
- Was Professor Smith describing a causal relationship? Why or Why not?

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## Evaluating Research

Sometimes it is difficult to determine whether a researcher/author intends to make a causal statement

Professor Smith wrote a book where she claimed that if we could decrease discrimination, the unemployment rate would go down

- Was Professor Smith describing a positive or negative association between discrimination and unemployment?
- Was Professor Smith describing a causal relationship? Why or Why not?

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## Evaluating Research

Adolescents who have good grades tend to commit less crime

- When Professor Smith discovered this relationship, she sampled 1000 high school seniors from Colorado who volunteered to participate in her research after being offered \$5 for doing so. The professor asked only two questions on her survey: what is your GPA and how many crimes have you committed in the last year.
- What was Professor Smith's sample? What was the population?
- Professor Jones read Professor Smith's findings and proclaimed that this definitely means that if we could only increase students' GPAs, crime would go down. Is Professor Jones correct? If we can't tell if he is correct or not, what could he or Professor Smith have done differently so that we could determine whether Professor Jones is correct?
- Should we assume that this finding applies to high school students in Texas?

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## Claiming Causation

Authors/Researchers sometimes speak about "\_\_\_\_\_ " even though there are other possibilities

For Example: Professor Smith analyzes existing GSS data and discovers a relationship between: (a) the belief that divorce should be easy to obtain and (b) actually being divorced (among surveyed individuals who have been married at least once).

Professor Smith says that he believes that this likely means that individuals who have attitudes more favorable to easy divorce are more likely to actually obtain a divorce.

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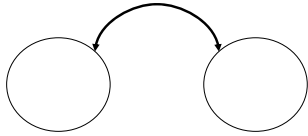
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This is a diagram of what Professor Smith found in his analysis of (cross-sectional) survey data:



This is a diagram of what Professor Smith suggests:



What other possibilities should Professor Smith note?

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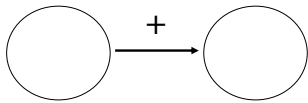
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What other possibilities should Professor Smith note?



\_\_\_\_\_ causes the \_\_\_\_\_  
(temporal order can be \_\_\_\_\_)

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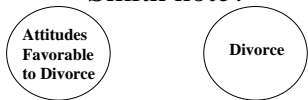
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What other possibilities should Professor Smith note?



A \_\_\_\_\_ variable \_\_\_\_\_ – if someone changes their attitudes about divorce they will \_\_\_\_\_

For example:.

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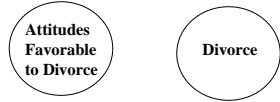
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What other possibilities should Professor Smith note?



A \_\_\_\_\_ variable is \_\_\_\_\_ with the \_\_\_\_\_. Changing attitudes will

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### Claiming Causation

Professor Smith want to know whether female professors are discriminated against in regards to salary in College Station, Texas. Professor Smith realizes that more experienced professors make more than do less experienced professors and that females tend to have fewer years of employment. Therefore, when Prof. Smith's analyzes existing data from Texas A&M and Blinn College Professor Smith controls for time-of-employment.

After controlling for time of employment, Professor Smith finds that female professors in College Station make less money than do male professors in College Station.

Professor Smith says that this likely means that female professors experience pay discrimination – in other words, female professors make less simply because they are female. Are there other possibilities?

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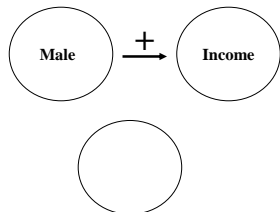
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### Diagramming Professor Smith's Conclusion



Professor Smith concludes that female professors make less than male professors even after controlling for seniority. According to Professor Smith, this likely means that they are making less only because they are female.

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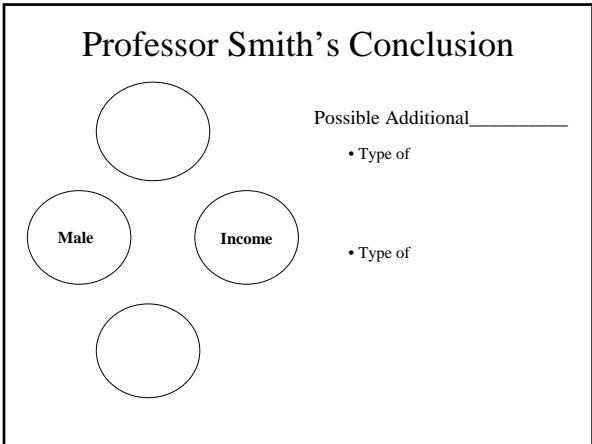
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### Validity and Reliability

We Can't Form Strong Conclusions without  
Validity and Reliability

Validity – Is the researcher measuring

Reliability – Is the measurement

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### Validity and Reliability

A measurement doesn't have to be \_\_\_\_\_  
reliable and valid to be useful, but ...

Better reliability and validity

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### Validity

Is the researcher measuring what he or she \_\_\_\_\_?

Silly example: Can you use a clock to measure

Realistic example: Could a methods professor use the following question to measure a student's knowledge of research methods or statistics?

Question 1 – In what year was the first “double-blind experiment” conducted?

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### Reliability

Does the measurement keep

Silly example: If a clock is off by 10 minutes, can you still use it to measure time?

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### Reliability

Does the measurement keep

But, if the clock reports a (very) different time everyday at exactly noon, can you still use it?

Could a measure (instrument) be valid without some degree of \_\_\_\_\_?

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## Reliability

Does the measurement keep

Survey Example:

Question 1 – Taxes should be lowered – agree or disagree?

Question 2 – Taxes should be raised – agree or disagree?

If these questions are “reliable,” then

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## Validity and Reliability

For example, if a clock is off, but always within 10 minutes of the correct time, we could use it for most common purposes dealing with time

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## Validity and Reliability

Could we use a tape measure to determine the age of a child?

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**Validity and Reliability**

Could we use a thermometer to measure time?

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**Validity and Reliability**

Could we use a clock to measure rainfall?

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