

## Psych. 3101

### Lecture 2

Introduction to the Empirical Study of Human Behavior

Reading: Chapter 1: Introduction to Statistics

### We are all NAÏVE scientists of human behavior

- Hypotheses about how and why people behave the way they do, and we make predictions about what people will do
- Efforts to verify or critically examine our hypotheses
- Examples:
  - Cute guy/gal looked at me on bus
  - Jo spilled beer at the party
  - Will taking vitamin C help keep me from getting sick?
- Same processes as scientist

### Sources of Support in Naïve Science

- Speculation and logical analysis
  - your logic may be wrong
  - wishes & desires influence what is "logical"
- Authority or expertise
  - authorities can be wrong
- Personal observation
  - small, biased sample
  - not systematic

### What does the scientist of human behavior do differently?

1. Rely on numerous observations (a sample), define constructs in a measurable way, & quantify our uncertainty
2. Realize biased and false positive results are inevitable; study how to avoid or minimize them; replication; peer review

### Towards a Scientific Approach to the Study of Human Behavior

- Goal of Psychology (shared with other disciplines):
  - to understand human behavior (developing hypotheses and ultimately theories) supported through systematic observation (gathering empirical data)
- Typically done in a research study:
  - Experiments
  - Non-experiments (case-control; observational; surveys)

### Basic elements of an experimental study

- Theory that ties together multiple hypotheses
- Hypothesis about a population
- Sample (drawn from a population)
- Independent variable (IV) – manipulated
- Dependent variable (DV) – measured
- Controlled conditions – all other aspects except the IV are the same
- Conclusions about the hypothesis – using *inferential statistics* – drawn from measures of the DV in the sample
- Because everything was ~ identical except the IV, we can assume the IV *caused* the changes in the DV

### Example 1 - tipping

- Patrons in a buffet restaurant tip more when the server is assigned to introduce herself by name to a table compared to when she is assigned to not introduce herself to a table - Garrity & Degelman (1990)
  - hypothesis? sample? IV? DV? experiment?

### Example 2 – fear in ads

- A group of 72 undergraduate women were assigned to watch a strong fear inducing stun gun ad or low fear one. Those who watched the high fear ad were more likely to say they would buy a stun gun than those who were assigned to watch the low fear ad – LaTour, Snipes & Bliss (1996)
  - hypothesis? sample? IV? DV? experiment?

### Example 3 – social support & depression

- Investigators looked at 3,205 individuals visiting a primary care clinic in Boston. Those who had a smaller support network tended to be at higher risk for depression – Cohen & Wills (1985)
  - hypothesis? sample? IV? DV? experiment?

### Non-experimental studies

- Often, we are interested in studying constructs that are impossible or unethical to manipulate
  - obesity, number of friends, depression, gender, ethnicity, personality, etc.
- When we relate such variables ("quasi-independent variables") to DVs, it is impossible to make causal inferences.
- Why? Confounds.

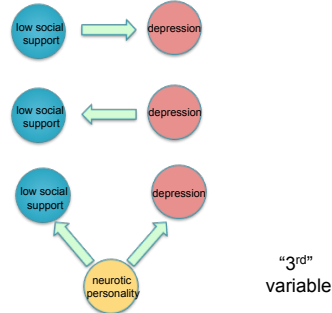
### Confounds in non-experimental studies



### Confounds in non-experimental studies



### Confounds in non-experimental studies



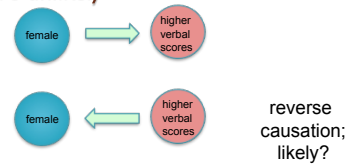
### "Correlation does not imply causation"

- Unfortunate wording
- Better: "association does not imply causation"

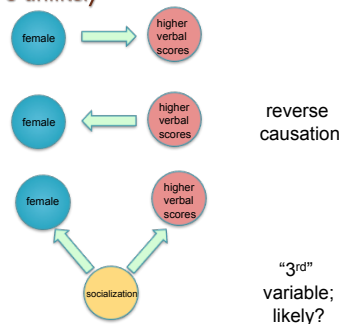
### Some confounds in non-experimental studies are unlikely



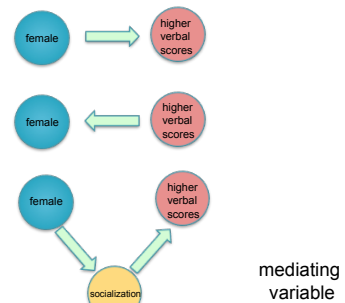
### Some confounds in non-experimental studies are unlikely



### Some confounds in non-experimental studies are unlikely



### Mediation – the link between X & Y



### Example 4 – nutrition and grades

- Investigators looked at 480 children in rural Pennsylvania. Those who ate a nutritious breakfast made higher grades than those who do not – Pollitt (1995)
  - hypothesis? sample? IV? DV? experiment?
  - can we make a causal inference? Why or why not?

### Example 5 – nutrition and grades

- Investigators randomly assigned 300 children to eat a nutritious breakfast and 300 to eat a low nutrition breakfast. Those eating the nutritious breakfast made higher grades than those randomly assigned to eat breakfast of low nutrition– Powell et al (1998)
  - hypothesis? sample? IV? DV? experiment?
  - can we make a causal inference? Why or why not?

Some variables of interest cannot be manipulated - OR - manipulations limit their external validity

- Hypothesis: Depression causes people to more accurately appraise their chances of success
- How to study this...
  - non-experimentally? Problems?
  - experimentally? Problems?
- For many topics in psychology, there is a trade-off between our ability to draw causal inference and a construct's external validity.

### External Validity

- Given a finding (often a causal inference from an experiment), how valid is that finding in the “real world?” How well does a finding translates from our sample in the lab to the population outside the lab?
- Examples:
  - experimental manipulation of depression
  - changing the temperature in a room
  - samples that are from college freshmen