

# *Internal and External Validity*

ScWk 240

Week 5 Slides (2<sup>nd</sup> Set)

# Defining Characteristics

- When research is designed to investigate cause and effect relationships (explanatory research) through the direct manipulation of an independent variable and control of extraneous variables. Review of Terms:
  - **Independent variable – the variable being manipulated**
  - **Dependent variable – the variable in which the effect of the manipulation of the independent variable is observed**
  - **Researcher manipulation and control – choice of treatments, choice of a research design, use of specific procedures, etc.**

# Selecting Your Research Question(s)

Consider using the **FINER** Framework

Is Your Research Question:

- **F**easible
- **I**nteresting
- **N**ovel
- **E**thical
- **R**elevant

# Manipulation in Research

## Manipulation

- The researcher's decisions related to what constitutes the *independent variable*
- Active and assigned variables
  - Active variables are those the researcher actively manipulates
    - Choice of an instructional strategy
    - A particular intervention approach
  - Assigned variables are those that cannot be manipulated by the researcher but are of interest:
    - Gender
    - Race

# Control in Research

## Control

- **The researcher's efforts to remove the influence of any *extraneous* variables that might have an effect on the dependent variable**
- **The goal is to be assured the only differences between groups is that related to the independent variable**
  - **Participant variables – characteristics of the subjects**
    - **Pre-existing functioning levels**
    - **Differences in attitudes**
  - **Environmental variables – characteristics of the context**
    - **Intervention materials**
    - **Differences in the time available for treatment between groups**

# Reliability

- **Implies that the same data would have been collected each time over repeated tests/ observations.**
- **Would a particular technique (or survey question) yield the same result each time?**
  - **“Did you go to your support group last week?” vs. “How many times have you been to these support groups in your life?”**
- **Reliability does not ensure accuracy.**
  - **Taken from Babbie, E.**

# External and Internal Validity

- **Internal Validity** – the degree to which the results are attributable to the independent variable and not some other rival explanation
- **External Validity** – the extent to which the results of a study can be generalized

# Threats to Internal and External Validity – Questions:

- Are the investigator's conclusions correct?
- Are the changes in the independent variable indeed responsible for the observed variation in the dependent variable?
- Might the variation in the dependent variable be attributable to other causes?

# Causal Inference

## Three conditions of causality:

1. Cause precedes the effect
2. Cause and effect must correlate
3. No third variable involved

# Correlations

**Relationships between variables can be either:**

- **Strong or weak**
- **Positive or negative**

**Strongest (perfect) positive correlation is +1**

**Strongest (perfect) negative correlation is -1**

***No correlation (unrelated variables) is 0***

**A weak positive relationship is 0.2**

**A weak negative relationship is -0.2**

# Internal Validity

## Internal Validity

- Confidence that changes in Dependent (DV) Variable are actually caused by the Independent Variable (IV)

❖ Validity (in measurement)

# Why is Internal Validity Important?

- We often conduct research in order to determine cause-and-effect relationships.
- Can we conclude that changes in the independent variable caused the observed changes in the dependent variable?
- Is the evidence for such a conclusion good or poor?
- If a study shows a high degree of internal validity then we can conclude we have strong evidence of causality.
- If a study has low internal validity, then we must conclude we have little or no evidence of causality

# Internal Validity (Cont.)

## Eight Threats to Internal Validity:

- Factors other than IV affects DV:

1. History

2. Maturation (passage of time)

3. Testing

4. Instrumentation

# Internal Validity (Cont.)

Eight Threats to Internal Validity (Cont.):

5. Statistical regression

6. Research reactivity

7. Selection biases

8. Attrition (experimental mortality)

# External Validity

- **Generalizability**
- **Representativeness of sample, setting and procedures**
- **Sampling and survey research**

# Threats to External Validity

- Pre-test treatment interaction
- Multiple treatment interference
- Selection treatment interaction
- Specificity of variables
  - Participants
  - Operational definition of the treatment
  - Operational definition of the dependent variable
  - Specific times
  - Specific circumstances
- Treatment diffusion and inconsistencies