Research Methods (P365)

Experimental Validity

What We Will Cover in This Section

- **Overview**
- **Internal Validity.**
- **External Validity.**
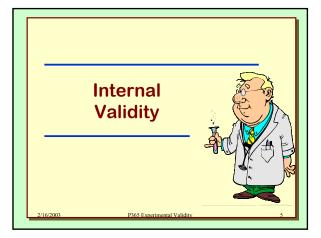- **Key Learning Points.**

Validity Revisited

- **In the context of measuring variables, validity implies that you are measuring what you say you are measuring.**
- **In the context of research methods, validity focuses on the extent that you can make appropriate inferences based on the research design and implementation.**

Traditional Experimental Design

Independent Variable	Dependent Variable
Group A	Common outcome measure.
Group B	

Internal Validity

Internal Validity

- **Refers to**
  The *accuracy* of the research in *determining* the *relationship* between the *independent* and *dependent* variables.
    - **Applies to experimental research.**
    - **Can I unambiguously conclude that the independent variable caused a change in the dependent variable.**

Confounding

Any variable other than the independent variable that could reasonably have caused changes in the dependent variable.

Confounding Variable: Example

	Independent Variable	Dependent Variable
Confounded by time of day.	Given orange juice in the morning	Alertness two hours later.
	Given distilled water in the evening	

Natural Confounding

The typical association of one variable with another.

- Race
- Gender
- Age
- Culture

Treatment Confounding

The independent variable is associated with some other variable for ONE condition.

- **Female experimenter in one condition and male in another.**
- **Cool Pepsi vs. warm Coke.**
- **Group A at 10:00, Group B at 12:00.**

Measurement Confounding

The measure assesses more than one construct (construct validity).

- **Depression is usually associated with anxiety, so any measures of depression will also assess anxiety.**
- **Leadership vs. assertiveness**
- **Verbal intelligence vs. Vocabulary**

Design Confounding

Typically caused by lack of an appropriate control group.

Common Threats to Internal Validity

1. **History.**
2. **Maturation.**
3. **Testing.**
4. **Instrument Decay.**
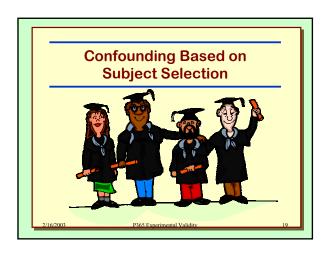5. **Statistical Regression.**

1. History

Any event that occurs between the first and second dependent measures that is not manipulated by the experimenter.
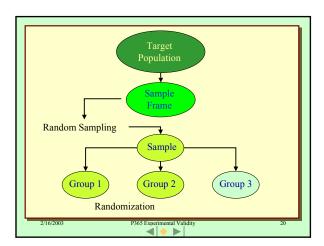
Pre-test	Treatment	Post-test
Pre-test	Delay	Post-test

2. Testing

Participation in the pre-test may cause changes in the person.

- Reactivity   - Memory

Pre-test	Treatment	Post-test
	Treatment	Post-test
Pre-test	Delay	Post-test

3. Maturation

Changes in the individual over time that are not associated with the independent variable.

Treatment	Delay	Post-test
Placebo	Delay	Post-test

4. Instrument Decay

Changes in the measuring instrument over time.

- **Observer gets bored.**
- **Test becomes obsolete.**
- **Machine wears out.**

Pre-test	Treatment	Post-test
	Treatment	Post-test

5. Statistical Regression

Occurs when participants are placed into groups based on extreme scores. Extreme scores tend to move(regress) toward the mean.

Pre-test	Treatment	Post-test
Pre-test	Delay	Post-test

Confounding Based on Subject Selection

Target Population

Sample Frame

Random Sampling

Sample

Group 1   Group 2   Group 3

Randomization

Key Assumption

In experimental research there is RANDOM SELECTION from the population (sample frame) and RANDOM ASSIGNMENT to treatment conditions.

Selection Bias

1. When participants are not randomly selected from the population, this limits generalizability (External Validity).
2. When participants in one condition differ in some way from those in another condition you have confounding (Internal Validity).
   - Non-random assignment
   - Pre-existing groups.
   - Differential mortality.

Reactivity

Measurement Reactivity

1. Evaluation apprehension.
   - Avoid feedback.
   - Watch labeling.
2. Novelty effects.
   - Give participants time to adjust.
3. Response bias.
   - Social desirability.
   - Negative or positive response bias.

Demand Characteristics

- *Cues in the research setting that allow the participant to form their own opinions about the research hypothesis.*
  - The Good participant.
  - The Negative participant.
  - The Apathetic participant.

Controlling for Demand Characteristics

1. Cue reduction.
2. Motivation.
   Reduce evaluation apprehension.
3. Separate the dependent variable from the study (unobtrusive).

Experimenter Reactivity

1. Biased observation.

2. Influencing participants' responses.

Reducing Experimenter Effects

1. **Rehearsal.**
2. **Monitoring.**
3. **Minimize experimenter influence.**
4. **Use double blind.**
5. **Minimize data snooping.**

External Validity

External Validity

The extent to which research results can apply to a wide range of situations.

Assessing External Validity

- **This is judgmental based on an assessment of all of the factors.**
  - Are field and laboratory results similar.
  - Are field conclusions similar to laboratory conclusions.
  - Does a phenomenon exist in both the laboratory and the field.

Key Learning Point

Internal validity is a prerequisite for external validity.

The End