Research Methods (Psy 360)

Variables in Research

What We Will Cover in This Section

- Nature of variables.
- Measuring variables.
  - Reliability.
  - Validity.
- Measurement Modes.
- Issues.

What Does Variable Mean?

Any object or event that can take on more than one form or value.

Bewildering Use of *Variable*

- Experimental Research
  - Independent V.
  - Dependent V.
  - Confounding V.
- Correlational Research
  - Criterion V.
  - Predictor V.
  - Intervening V

- Measurement
  - Manifest V.
  - Hypothetical V.

Question?

Suppose you were asked to design a study to evaluate the impact of sleep deprivation on recall.

How would you assess recall?

Operational Definition

Defining a variable in terms of the techniques the researcher will use to measure or manipulate it.

Operationalizing

- Benefits
  - Removes vagueness
  - Aids in communication
  - Helps replication.

- Issues.
  - Rarely one way to define a variable.
  - Needs to be conceptually consistent with the underlying construct.
  - Leads to plethora of dissimilar research.

Psychological Measurement

Subjective vs. Objective

- Subjective

  Person-specific judgments of the degree or amount of something.

- Objective

  Impartial judgment of the degree or amount of something.

Why would objective measurement be better?

Reliability

- Definition.

  The consistency or stability in a behavioral measure.

- Measured by a correlation coefficient.

1. Test-Retest Reliability

Index of the consistency of scores over time.

2. Alternate Forms Reliability

Designed to assess the stability of the content of two forms of the same test.

3. Interrater Reliability

Index of the consistency between ratings given by two or more raters.

4. Internal Consistency

Index of how homogeneous (consistent) the individual items of a measure are.

Sweeney's Kool Kritical Konsepts Test

1. Demonstrate how to change the treads on a tank.
2. Recite two dramatic soliloquies from one of Shakespeare's historical dramas.
3. Play Mozart's piano concerto #24.
4. List and tell the purpose of the ten cranial nerves.

Why Stability is Important

1. Compromises the conclusions that can be reached.
2. Compromises statistical analyses.
3. Sets limits on the validity.
   - Of the measure.
   - Of the study.

Validity

The extent to which the operational definition of a variable reflects the true meaning of the underlying construct.

Are we measuring what we say we are measuring?

1. Face Validity

Does the measure look like it is measuring what you say it is measuring?

2. Content Validity

Does the measure adequately sample the relevant content of the domain being evaluated?

Model

Content Domain   **Test Content**

Content Validity
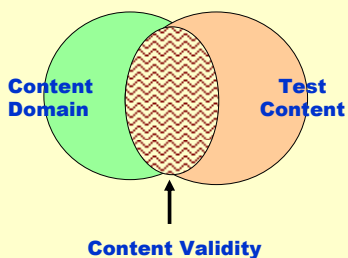
What Good is It?

Does the measure cover a representative sample of the skills, abilities, knowledge, and/or behaviors relevant to the construct being measured?

Criterion-Related Validity

Demonstrating that there is a relationship between a test (PREDICTOR) and some other measure (CRITERION).

Construct Validity

Demonstration that the test is measuring the hypothetical construct or trait that one claims it is measuring.
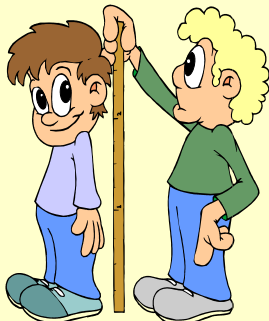

Measurement Modes

Self-Report

- Advantages
  - Direct.
  - Easy.

- Issues.
  - Accuracy.
  - Reactivity.
  - Expertise.

Behavioral Measures

- Advantages.
  - People may not be aware.
  - Automatic or unpremeditated behaviors.

- Issues.
  - Underlying causes.
  - Behavior may be situation specific.
  - Ethics.

Physiological Measures

- Advantages
  - Best for biological variables.
  - Precision.
  - Non-reactive.

- Issues
  - Obtrusive.
  - Is there a relationship between physiological state and psychological state?

General Measurement Issues

Manipulating Variables

- Effective Range
  - Ceiling Effect
    Measure is so easy that everyone does well.
  - Floor Effect
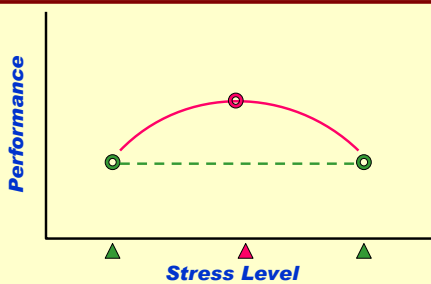   *Measure is so difficult that everyone does poorly.*

Manipulating Variables
How Many Levels?

Performance

Stress Level

Key Learning Points #1

1. Multiple operational definitions lead to diversity problems.
2. Understanding how variables are operationally defined is critical to understanding published research.
3. Assessing the reliability and validity of variables is important to assessing research.

Key Learning Points #2

4. It is better to have multiple measures of a variable from multiple modalities.
5. Understanding the potential for either subject or researcher reactivity is important for assessing the validity of research.

The End