OCTH 725
The Research Process

Sampling, Measurement, and Data Collection

Spring 2006

First - what's the Hypothesis?

- **A prediction, not an explanation**
- **Clear, brief, to the point**
- **Avoid:**
  - passive voice
  - colloquial phrasing or adjectives (highly; dramatically)
  - 'unmeasureable' outcomes (poor, good, adequate)
  - more than one prediction per hypothesis
  - cause-effect relations
  - If-Then: describe relation, then make prediction
    (not describe design, then restate question)

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Sampling

The process of devising a sample that is representative of the population in which you are interested.

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Probability Sampling

The likelihood of any one member of the population being selected is known

The caveats are:

1) ***Your assumption of this likelihood may be wrong***
2) ***Your ability to generalize your findings depends on how well the sample represents the population***

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Probability Sampling

- **Simple random sampling**
  - each member has an *equal* & *independent* chance of selection
- **Systematic sampling**
  - select every *k-th* element from the sample frame
- **Stratified sampling**
  - when members of the population are not equal to begin with (*i.e.*, race, education, SES)
- **Cluster sampling**
  - Units of individuals are selected rather than the individuals themselves

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Non-Probability Sampling

When the likelihood of selecting any one member of the population is not known

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Non-Probability Sampling

- **convenience sample**
  - relies on available participants for inclusion
- **quota sampling**
  - specifies desired characteristics & selects the appropriate ratios of population elements
- **purposive sampling**
  - Selects sample based on expert judgment of the how typical is the nature of the population elements
- **snowball sampling**
  - relies on informants to identify other relevant participants

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Sampling error

The difference between the characteristics of the sample and those of the population from which the sample was selected

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Measurement

The process of specifying and operationalizing a given concept

Pain
Health
Quality of Life
Function
Satisfaction

what are these and how would you measure them?

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Levels of measurement

- **nominal**
  - categories, mutually exclusive (gender, race, religion)
- **ordinal**
  - logically rank-ordered categories (excellent, fair, poor)
  - Note there are not 'in-between' values (apples, oranges)
- **Interval**
  - rank ordered & *equal* intervals (temperature, test grade)
- **Ratio**
  - a scale with a 'true zero' so that there are equal intervals (age, income, hospital days)

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Reliability

Is the test or measurement:

- ***Reliable?***
- ***Consistent?***
- ***Predictable?***

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Reliability criteria

1. **Test-Retest**
   - how stable a test is over time
2. **Parallel Forms**
   - different forms of the same test given to the same group yield similar measures
3. **Inter-rater**
   - consistency from rater to rater
4. **Internal consistency**
   - how unified are items in an assessment

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Validity

This is an estimate of the accuracy of a test

- ***Does the test measure what it is supposed to measure?***

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Validity

1. **Content**
   - Extent to which the test represents the universe of items from which it is drawn
2. **Criterion** (concurrent)
   - how well a test measures a specific criterion
3. **Predictive**
   - how well a test predicts a specific criterion
4. **Construct**
   - How well a test assesses an underlying construct (*eg.*, intelligence)

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Relationship of Reliability & Validity

- **Reliability is a necessary condition of validity**
- **By itself, reliability is not sufficient to guarantee validity**

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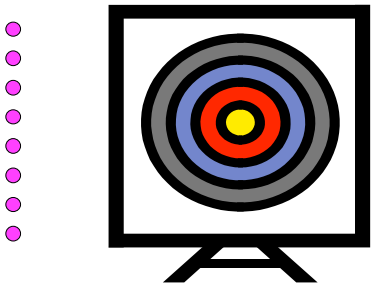
How reliable? How valid?



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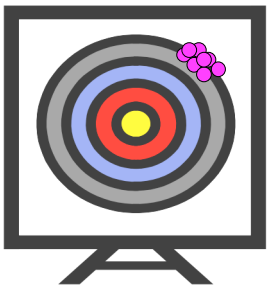
How reliable? How valid?



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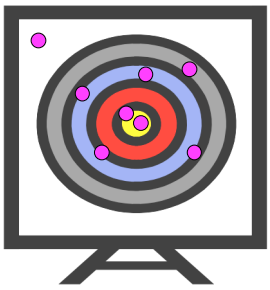
How reliable? How valid?



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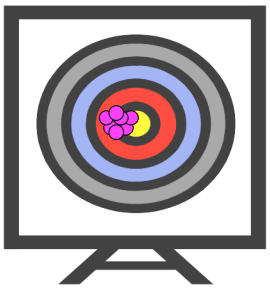
How reliable? How valid?



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Measurement considerations

- Is the measurement objective?
- Is the measurement subjective?
- Who is recording data?
- Where is the data being collected?

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Measurement considerations

- **Is the measurement objective?**
- **Is the measurement subjective?**
- **Who is recording data?**
- **Where is the data being collected?**

- **Others?**

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Types of measurement

- **interviews**
  - structured
  - unstructured
- **questionnaires**
  - self-report
  - report by another
- **tests** (function, intelligence, spelling, FIM)
- **observations**
  - duration
  - frequency
  - interval
  - continuous
- **physical measurements** (weight, height, strength)

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