Principles of Quantitative Research

Answering Questions

- Quantitative Research attempts to answer questions by

  ascribing importance (significance) to numbers or sizes or reactions and results

Scientific Theory

- Self correcting: Prevailing wisdom requires constant re-evaluation when new evidence appears. Each discovery reveals a tiny piece of a giant puzzle.
- Science never proves anything, it just continues to add puzzle pieces to the big picture.

The Researcher

- The researcher's relationship with study participants can influence outcomes.
- The researcher is always concerned with how various factors (including the nature of the relationship) affect study results.

Infractions

- Sloppy thinking
- Poor planning
- Careless documentation
- Tainting responses with unacknowledged bias

Pluralist Approach

- Embrace qualitative and quantitative as best fits each particular situation
- Acknowledge the value of more than one method of knowing what we need to know

Pros of Quantitative Research?

- Clear interpretations
- Make sense of and organize perceptions
- Careful scrutiny (logical, sequential, controlled)
- Reduce researcher bias
- Results may be understood by individuals in other disciplines

Cons of Quantitative Research?

- Can not assist in understanding issues in which basic variables have not been identified or clarified
- Only 1 or 2 questions can be studied at a time, rather than the whole of an event or experience
- Complex issues (emotional response, personal values, etc.) can not always be reduced to numbers

Scientific Attitudes

- Empirical Verification through observation or experimentation
- Ruling out simple explanations prior to adopting complex ones
- Cause-Effect
- Probability of response
- Replication of response

Six Types

- Experimental
- Survey
- Meta-Analysis
- Quantitative Case Study
- Applied Behavior Analysis
- Longitudinal

Experimental Research

- Compare two or more groups that are similar except for one factor or variable
- Statistical analysis of data
- Conditions are highly controlled; variables are manipulated by the researcher

“The effects of” “The influence of…”

Survey Research

- Use set of predetermined questions
- Collect answers from representative sample
- Answers are categorized and analyzed so tendencies can be discerned

Meta-Analysis

- Numerous experimental studies with reported statistical analysis are compared
- Distinguishes trends
- Effect size (the influence of the independent variable on the dependent variable) can be compared

Case Study

- Also called single case design
- Describes numerically a specific case (can be group or individual)
- May test or generate hypotheses
- Results often presented with tables and graphs

Applied Behavior Analysis (ABA)

- One person
- Examine the individual's responses in different situations (conditions) across time
- Results are usually depicted with tables and graphs
- Conclusions based on data in these forms of presentation

Longitudinal

- Individual or group research conducted across time
- Few examples in MT literature
- Subject attrition is major problem
- Preserving confidentiality is also difficult
- Specific standardized tools may change over time

Hypothesis

- Hypothesis = an idea that will be tested through systematic investigation
- A researcher's prediction of what outcomes will occur
- More clearly stated in research of 10 years ago than now
- Fits experimental research, also called "Hypothesis Testing"

Independent Variable

- The variable that is controlled or manipulated by the researcher
- The variable that is thought to have some effect upon the dependent variable
- The one difference between the treatment (experimental) and control groups

Dependent Variable

- That which is measured
- The outcome
- That which is influenced or affected by the dependent variable

Reliability

- The ability of a measurement tool to yield consistent results over time or under similar conditions

Content Validity

- The extent to which the items on a testing tool (that being used to measure the dependent variable) reflect all of the facets being studied
- All aspects are sampled (e.g. aural skills final exam)

Criterion-Related Validity

- Also called
  Predictive Validity
- The extent to which a testing tool yields data that allow the researcher to make accurate predictions about the dependent variable

Construct Validity

- The extent to which the testing tool measures what it is supposed to measure
- Relationship between the items on the tool and the dependent variable
- Also relates to actual (physical) construction of a written tool (e.g. Dean's Survey) and how this impacts the accuracy of the results

Internal Validity

- Relates to the internal aspects of a study and their effect on the outcome:

  researcher planning and preparation

  judgment

  control for potential confounding variables

External Validity

- Relates to the extent to which findings can generalize beyond the actual study participants
- “How valid are these results for a different group of people, a different setting, or other conditions of testing, etc.?”

Objective Evaluation

- Rigorous
- Expository
- Time Consuming