Nonexperimental Research Designs and Survey Research

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Education 504

Research Design

- Research design deals with the ways in which data are gathered from subjects

Relationships in Nonexperimental Research

- All quantitative research that is not simply descriptive is interested in examining relationships
- A relationship or association is found when one variable varies systematically, either directly or indirectly with another
The Importance of Relationships

- They allow us to make preliminary identification of possible causes of educational outcomes
- They help identify things that need further investigation
- They allow for prediction from one variable to another

Descriptive Research

- Concerned with the current or past status of something
- Describes achievement, attitudes, behaviors, or other characteristics of a group of subjects
- Does not involve manipulation of independent variables

Uses of Descriptive Research

- Provide data for initial investigation of an area of study or phenomenon
- Examples of descriptive research questions include
  - How much do college students exercise?
  - What do teachers think about merit pay?
  - How do students spend their time during independent study?
Things to Consider When Evaluating Descriptive Studies

- When conducting descriptive studies, relationship conclusions are not warranted!
- Pay close attention to the nature of the subjects and the instruments (volunteers, circumstances under which data were collected, etc.)

Comparative Studies

- Examines the differences between two or more groups on one variable
- For example, Is there a difference between second- and third-graders' scores on a measure of self concept?

Comparative Studies

- Comparisons are based on descriptive data
- Existence of a relationship does not imply causation -- we can only say that a difference or relationship exists
Correlational Research

- Bivariate Correlational Studies
- Prediction Studies
- Multiple Regression Prediction Studies

Bivariate Correlational Studies

- In a *bivariate* study, researchers obtain scores from two variables for each subject, then use them to calculate a correlation coefficient.
- The term *bivariate* implies that the two variables are correlated (variables are selected because they are believed to be related).
- Subjects should be chosen to represent a wide range of performance on the variables, or the discovery of a relationship is unlikely.

Examples of Bivariate Correlational Studies

- Children of wealthier (variable #1), better educated (variable #2) parents earn higher salaries as adults.
- The weight of a three-year old is correlated to the child’s birth weight (variable #1) and the mother’s weight (variable #2) at the time of the child’s birth.
Prediction Studies

- Use correlation coefficients to show how one variable (the predictor variable) predicts another (the criterion variable)

Example of a Prediction Study

- Which high school applicants should be admitted to college?
- For example, assume that high school GPA (predictor) is a good predictor of college GPA (criterion)
- The predictor variable is determined before the criterion variable, and the data span a length of time (4 years of high school)

Multiple Regression Prediction Studies

- Suppose, in fact, that high school GPA is not the sole predictor of college GPA (which we believe to be the case)
- What might be other good predictors?
- All of these variables can contribute to the overall prediction in an equation that adds together the predictive power of each identified variable
Things to Keep in Mind

- Correlation does not imply causation
- Sample should be chosen carefully if data are to be extrapolated back to the population
- Practical significance and statistical significance are not the same animal
- Acceptable levels of correlation are situation specific
- To increase practical confidence levels, all results should be replicated
- All procedures should be clearly delineated

Causal Comparative Studies: Ex Post Facto Research

- Nonexperimental designs that are used to investigate causal relationships
- They examine whether one or more pre-existing conditions could possibly have caused subsequent differences in groups of subjects
- Researchers attempt to discover whether differences between groups have resulted in an observed difference in the independent variable

Examples of Ex Post Facto Studies

- What is the effect of day care on the social skills of children?
- What is the relationship between participation in extracurricular activities and self concept?
**Characteristics of Ex Post Facto Studies**

- There may be both “treatment” and “control” groups, however these will be existing, not assigned by the researcher.
- There is no manipulation of conditions.

**McMillan’s Tips…**

- Causal comparative studies should be used to investigate relationships when an experiment is not possible.
- The causal condition must have occurred *in the past*.
- Potential extraneous variables (PRH) should be identified and noted.
- Differences in groups should be controlled.
- Causal relationships should be noted with caution!

**Survey Research**

- Longitudinal Surveys
- Cross-Sectional Surveys
**Characteristics of Survey Research**

- In survey research, the researcher selects a sample of respondents and administers a questionnaire or conducts interviews to gather data, which are then used to describe the population.
- Surveys are used to learn about attitudes, beliefs, opinions, behaviors, to name a few.
- Surveys are often used because researchers can gather accurate information about a large number of people using a small sample.
- Thus we have both surveys as a research tool and survey research as a research design.

**Examples of Survey Research Topics**

- **Descriptive Studies**
  - *What is the average length of time teachers use to prepare lessons?*
- **Relationship Studies**
  - *Is there a relationship between teacher attitudes toward discipline and student satisfaction with the class?*
- **Explanatory Studies**
  - *Why are students in one school achieving better than similar students in another school?*

**Advantages of Survey Research**

- Versatility
- Efficiency
- Generalizability
- Cost effectiveness
- Small samples provide for reliable extrapolation of results
Longitudinal Surveys

- Studies in which the same group of subjects are studied over time
- Trend studies use the same population across time but use different samples from that population each time
- Cohort studies examine a specific group (same population) over time
- Panel studies are cohort studies that use the same sample each time

Cross-Sectional Surveys

- Attempt to simulate longitudinal data in a shorter time frame
- Data are gathered from multiple samples of the same population simultaneously
- May be used to study a phenomenon at one time or to gather data from multiple groups at the same time

A Note on Surveys...

- Need to know, in advance, how the data will be used rather than “fishing” for whatever’s out there
- Data collection methods may vary but they must be standardized
- Instructions should be clear
- Both the instructions and survey should be pilot tested
- Because a typical response rate to a mailed survey is only 40%-60%, follow ups should be conducted
- Nonrespondents may introduce bias