Nonexperimental Research Designs and Survey Research

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Education 604
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 is 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