Causal Comparative Research

Chapter 12

Purpose

- Attempts to determine the cause (reason) for preexisting differences in groups
- Alleged cause and effect have already occurred
- *Ex post facto* – after the fact
- Example – First graders who attended preschool have significantly higher levels of social adjustment than do those who did not attend preschool.

Similarities to Correlational Research

- Both lack manipulation
- Both require caution in interpreting results
- Both can support subsequent experimental research
Differences with Correlational Research

- Correlational
  - No attempt to understand cause and effect
  - Two or more variables
  - One group
- Causal comparative
  - Tentative attempts to understand cause and effect
  - At least one independent variable
  - Two or more groups

Comparison to Experimental Research

- Experimental
  - Group comparisons
  - Individuals randomly assigned to groups
  - Independent variable manipulated by the researcher
- Causal comparative
  - Group comparisons
  - Individuals already in groups before research begins
  - Independent variable not manipulated
    - Cannot - SES
    - Should not - ethics
    - Is not – intrusive

Examples of Non-Manipulable Independent Variables

- Organismic
  - Age, gender, ethnicity
- Ability
  - Intelligence, perceptual ability, musical aptitude
- Personality
  - Anxiety level, self-concept, learning style, aggression level
Examples of Non-Manipulable Independent Variables

- Family-Related
  - SES, environment, birth order
- School-Related
  - Preschool attendance, school size, per pupil expenditure, type of curriculum, teaching style

Design and Procedures

- Select two groups that differ on some independent variable
  - One group possesses some characteristic that the other does not (preschool or no preschool)
  - Each group possesses the characteristic but in differing amounts (public preschool, private Montessori)

Design and Procedures

- Randomly sample subjects from each of the two comparison groups
- Collect background information on subjects to determine the equality of the groups
- Compare groups on the dependent variable
Basic Causal Comparative Design

- Table 12.1, p. 341

Causal Comparative Weaknesses

- Lack of randomization in choosing population from which groups are taken
- Inability to manipulate independent variable
- Presence of extraneous variables – the groups may differ on some important variable other than the independent variable (e.g., introversion/extroversion in addition to preschool attendance)

Control of Extraneous Variables

- Matching
  - Participant in one group is paired with participant from other group who has the same or similar score on the extraneous variable. No match – participant removed

- Homogeneous Groups or Subgroups
  - Homogeneous group limits generalizability (e.g., only include introverts)
  - Form subgroups in each group that represent all levels of extraneous variable (e.g., range of introverts/extroverts)
Control of Extraneous Variables

- Analysis of covariance (ANCOVA)
  - If a difference is identified after the groups are formed, THEN
  - Statistically adjust scores on dependent variable for initial group differences on some extraneous variable (e.g., introversion/extroversion)

Data Analysis

- Descriptive statistics
  - Mean – average performance of group
  - Standard deviation – how spread out a set of scores is around mean

- Inferential statistics
  - Mean – Are the means of 2 groups significantly different?
  - Analysis of variance (ANOVA) - Are the means of 3 or more groups significantly different?
  - Chi-square – Does an event occur more frequently in one group than another?

Interpretation of Data

- Difficulty establishing cause and effect requires caution in interpreting results
- Causality and alternative explanations
  - Different causal variable (e.g., introversion/extroversion)
  - Order of causation (e.g., self-concept and reading achievement)