Chapter Outline

- Defining Surveys and Experiments
- Components of a Survey Method Plan
  - The Survey Design
  - The Population and Sample
  - Instrumentation
  - Variables in the Study
  - Data Analysis and Interpretation
- Components of an Experimental Method Plan
  - Participants
  - Variables
  - Instrumentation and Materials
  - Experimental Procedures
  - Threats to Validity
  - The Procedure
  - Data Analysis
  - Interpreting Results
Defining Surveys

- Survey Design
  - To provide a quantitative description of trends, attitudes, or opinions of a population

- Components of a Survey Method Plan
  - The Survey Design
  - The Population and Sample
  - Instrumentation
  - Variables in the Study
  - Data Analysis and Interpretation
A Survey Method Plan

■ The Survey Design
  ■ Provide a rationale for using a survey
  ■ Indicate the type of survey design:
    ■ Cross-sectional (data collected at one point in time)
    ■ Longitudinal (data collected over time)

■ The Population and Sample
  ■ Specify the characteristics of the population (size, sampling frame)
  ■ Specify the sampling procedures
    ■ Single stage or multi-stage
    ■ Random or convenience
  ■ Use a sample size formula to determine the needed sample size
A Survey Method Plan

- Instrumentation
  - Provide detailed information about the survey instrument
    - How developed, Pilot testing
    - Sample items, Types of scores
  - Describe the validity and reliability scores of past and/or current uses of the instrument
    - **Validity**: whether one can draw meaning and useful inferences from scores on the instruments
    - **Reliability**: whether scores resulting from past use are internally consistent, have high test-retest correlations, and result from consistent scoring
  - Describe steps for administering survey and ensuring a high response rate
A Survey Method Plan

- Variables in the Study
  - Relate the variables to research questions and items on the instrument

- Data Analysis and Interpretation
  - Present the steps for analyzing the data
    - Step 1. Report response rate
    - Step 2. Determine response bias: the effect of nonresponses on survey estimates
    - Step 3. Conduct descriptive analyses
    - Step 4. Check instrument's scales
    - Step 5. Conduct inferential statistical analyses (see Table 8.3)
    - Step 6. Present and interpret results
### Table 8.3 Criteria for Choosing Select Statistical Tests

<table>
<thead>
<tr>
<th>Nature of Question</th>
<th># of Independent Variables</th>
<th># of Dependent Variables</th>
<th># of Control Variables</th>
<th>Type of Score Ind. / Dep. Variables</th>
<th>Distribution of Scores</th>
<th>Statistical Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group comparison</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>Categorical / Continuous</td>
<td>Normal</td>
<td>t-test</td>
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<td>Categorical / Continuous</td>
<td>Normal</td>
<td>Analysis of variance</td>
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<td>Group comparison</td>
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<td>Analysis of covariance</td>
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<tr>
<td>Group comparison</td>
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<td>1</td>
<td>0</td>
<td>Categorical / Continuous</td>
<td>Non-normal</td>
<td>Mann-Whitney U test</td>
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<tr>
<td>Association between groups</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>Categorical / Categorical</td>
<td>Non-normal</td>
<td>Chi-square</td>
</tr>
<tr>
<td>Relate variables</td>
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<td>1</td>
<td>0</td>
<td>Continuous / Continuous</td>
<td>Normal</td>
<td>Pearson product moment correlation</td>
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<tr>
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<td>0</td>
<td>Continuous / Continuous</td>
<td>Normal</td>
<td>Multiple regression</td>
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<tr>
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<td>1 or more</td>
<td>0</td>
<td>Categorical / Categorical</td>
<td>Non-normal</td>
<td>Spearman rank-order correlation</td>
</tr>
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</table>
Defining Experiments

- **Experimental Design**
  - To test the impact of a treatment on an outcome, controlling for other factors that might influence that outcome

- **Components of an Experimental Method Plan**
  - Participants
  - Variables
  - Instrumentation and Materials
  - Experimental Procedures
  - Threats to Validity
An Experimental Method Plan

- **Participants**
  - Describe the selection of participants
    - Random or convenience
  - Describe the assignment of participants to groups
    - Random or not; Consider matching participants
  - Describe the procedures for determining the number of participants per group

- **Variables**
  - Clarify the groups
  - Identify the independent variable(s), including the treatment variable
  - Identify the dependent variable(s), the outcomes
An Experimental Method Plan

- **Instrumentation and Materials**
  - Discuss instruments
    - development, items, and scales
    - reliability and validity reports of past uses
  - Thoroughly discuss materials used for the treatment

- **Experimental Procedures**
  - Identify the type of experiment
    - Pre-experimental, true experiment, quasi-experiment, and single-subject designs
  - Identify the type of comparisons: within-group or between-subject
  - Provide a visual model
    - X = treatment
    - O = observation
An Experimental Method Plan

- Consider Threats to Validity
  - **Threats to internal validity**: procedures, treatments, or experiences of the participants that threaten the researcher's ability to draw conclusions about cause and effect
  
  - **Threats to external validity**: characteristics of the sample, setting, or timing that threaten the researcher's ability to generalize the conclusions to a population
  
  - **Threats to statistical conclusion validity**: inadequate statistical power or violation of statistical assumptions that threaten the researcher's ability to draw statistical inferences
  
  - **Threats to construct validity**: inadequate definitions and measures of variables that threaten the researcher's ability to measure relevant constructs
Threats to Validity (Tables 8.5 & 8.6)

- Threats to Internal Validity
  - History
  - Maturation
  - Regression
  - Selection
  - Mortality
  - Diffusion of treatment
  - Compensatory/resentful demoralization
  - Compensatory rivalry
  - Testing
  - Instrumentation

- Threats to External Validity
  - Interaction of selection and treatment
  - Interaction of setting and treatment
  - Interaction of history and treatment
An Experimental Method Plan

The Procedure

- Describe in detail the procedure for conducting the experiment
- Procedures for pre-test post-test control group design
  - Measure dependent variable as a pre-test
  - Assign participants to matched pairs based on scores
  - Randomly assign one member of each pair to the control and experimental group
  - Expose experimental group to the treatment
  - Measure dependent variable as a post-test from both groups
  - Compare groups statistically
An Experimental Method Plan

- **Data Analysis**
  - Report descriptive statistics (e.g., means, standard deviations, ranges)
  - Conduct inferential statistical tests (e.g., $t$ test, ANOVA, ANCOVA, or MANOVA)
  - Use line graphs for single subject designs
  - Report confidence intervals and effect sizes in addition to statistical tests

- **Interpreting Results**
  - Discuss results, limitations, and implications
Chapter Eight: Quantitative Methods

RESEARCH DESIGN
Qualitative, Quantitative, and Mixed Methods Approaches
Third Edition
John W. Creswell