Chapter 9

Nonexperimental Research: Descriptive and Correlational Methods

Neil J. Salkind

CHAPTER OBJECTIVES – STUDENTS SHOULD BE ABLE TO:

- Explain the purpose and use of descriptive and correlational studies.
- Discuss the development and use of surveys.
- Explain the different types of tools used in survey research.
- List the “Ten Commandments” of interviewing.
- Summarize how to conduct survey research.
- Discuss how to verify the validity of survey research.
- Outline the pros and cons in survey research.
CHAPTER OBJECTIVES – STUDENTS SHOULD BE ABLE TO:

- Define correlational research and discuss how correlations assess the degree to which variables are related.
- Discuss scattergram data and what the correlation coefficient means.
- Compute the Pearson product moment correlation coefficient.
- Explain the difference between a coefficient of determination and a coefficient of alienation.
CHAPTER OVERVIEW

- Descriptive Research
- Correlational Research
NONEXPERIMENTAL RESEARCH

- Descriptive Research
- Correlational Research Methods
DESCRIPTIVE RESEARCH
DESCRIPTIVE RESEARCH

- Asks about the characteristics of a phenomenon
- Does not include treatment or control groups
DESCRPTIVE RESEARCH

- Survey Research
- Correlational Studies—relationships between variables are characterized
SURVEY RESEARCH

- Examines the frequency and relationships between psychological and sociological variables
- Assesses constructs such as attitudes, beliefs, prejudices, etc.
INTERVIEWS

- Basic tool of survey
- Face sheet—neutral background information
  - Helps establish rapport with interviewee
  - Establishes data characteristics
- Two types of questions
  - Structured questions require an explicit answer
  - Open-ended questions allow the interviewee to elaborate
INTerviews

**Advantages**
- Flexibility in collecting data
- Interviewer can set tone and agenda

**Disadvantages**
- Expensive
- Lack anonymity, so responses might not be honest
- Lack standardized questions
DEVELOPING AN INTERVIEW

- Describe goals of project
- Select appropriate sample
- Develop interview questions
- Train interviewers
- Conduct interviews
TEN COMMANDMENTS OF INTERVIEWING

1. Do not begin the interview cold.
2. Remember that you are there to get information.
3. Be direct.
4. Dress appropriately.
5. Find a quiet place to conduct the interview.
6. If your interviewee doesn’t give a satisfactory answer the first time, don’t give up.
7. Use a tape recorder.
8. Make the interviewee a part of the interview.
10. Thank interviewees for their help, and ask for questions.

HOW TO DO SURVEY RESEARCH

The general (flow) plan
1. Clarify the objectives
2. Identify a sample
3. Define a method
   • How will the questions be structured?
   • How will the sample be defined?
   • How will the data be collected?
   • What types of questions will be asked?
4. Coding and scoring
Advantages
- Permits good generalization
- Efficient data collection
- Can yield very accurate results

Disadvantages
- Bias
  - Interviewer bias
  - Interviewee bias
- Non-response
CORRELATIONAL RESEARCH
CORRELATIONAL RESEARCH STUDIES

- Describe a linear relationship between variables
- Do not imply a cause-and-effect relationship
- Do imply that variables share something in common
CORRELATION COEFFICIENT

- Expresses degree of linear relatedness between two variables
- Varies between $-1.00$ and $+1.00$
- Strength of relationship is
  - Indicated by absolute value of coefficient
  - Stronger as shared variance increases
# Two Types of Correlation

<table>
<thead>
<tr>
<th>If X...</th>
<th>And Y...</th>
<th>The correlation is</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increases in value</td>
<td>Increases in value</td>
<td>Positive or direct</td>
<td>The taller one gets (X), the more one weighs (Y).</td>
</tr>
<tr>
<td>Decreases in value</td>
<td>Decreases in value</td>
<td>Positive or direct</td>
<td>The fewer mistakes one makes (X), the fewer hours of remedial work (Y) one participates in.</td>
</tr>
<tr>
<td>Increases in value</td>
<td>Decreases in value</td>
<td>Negative or inverse</td>
<td>The better one behaves (X), the fewer in-class suspensions (Y) one has.</td>
</tr>
<tr>
<td>Decreases in value</td>
<td>Increases in value</td>
<td>Negative or inverse</td>
<td>The less time one spends studying (X), the more errors one makes on the test (Y).</td>
</tr>
</tbody>
</table>
WHAT CORRELATION COEFFICIENTS LOOK LIKE

- Pearson product moment correlation
  - $r_{xy}$
  - Correlation between variables $x$ and $y$
- Scattergram representation
  1. Set up $x$ and $y$ axes
  2. Represent one variable on $x$ axis and one on $y$ axis
  3. Plot each pair of $x$ and $y$ coordinates
When points are closer to a straight line, the correlation becomes stronger.
As slope of line approaches 45°, correlation becomes stronger.
COMPUTING THE PEARSON CORRELATION COEFFICIENT

\[ r_{xy} = \frac{n \Sigma XY - \Sigma X \Sigma Y}{\sqrt{[n \Sigma X^2 - (\Sigma X)^2][n \Sigma Y^2 - (\Sigma Y)^2]}} \]

Where

- \( r_{xy} \) = the correlation coefficient between X and Y
- \( \Sigma \) = the summation sign
- \( n \) = the size of the sample
- \( X \) = the individual’s score on the X variable
- \( Y \) = the individual’s score on the Y variable
- \( XY \) = the product of each X score times its corresponding Y score
- \( X^2 \) = the individual X score, squared
- \( Y^2 \) = the individual Y score, squared
AN EXAMPLE OF MORE THAN TWO VARIABLES

<table>
<thead>
<tr>
<th></th>
<th>Grade</th>
<th>Reading</th>
<th>Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>1.00</td>
<td>.321</td>
<td>.039</td>
</tr>
<tr>
<td>Reading</td>
<td>.321</td>
<td>1.00</td>
<td>.605</td>
</tr>
<tr>
<td>Math</td>
<td>.039</td>
<td>.605</td>
<td>1.00</td>
</tr>
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</table>
INTERPRETING THE PEARSON CORRELATION COEFFICIENT

- “Eyeball” method

<table>
<thead>
<tr>
<th>Correlations between</th>
<th>Are said to be</th>
</tr>
</thead>
<tbody>
<tr>
<td>± .8 and 1.0</td>
<td>Very strong</td>
</tr>
<tr>
<td>± .6 and .8</td>
<td>Strong</td>
</tr>
<tr>
<td>± .4 and .6</td>
<td>Moderate</td>
</tr>
<tr>
<td>± .2 and .4</td>
<td>Weak</td>
</tr>
<tr>
<td>± 0 and .2</td>
<td>Very weak</td>
</tr>
</tbody>
</table>
INTERPRETING THE PEARSON CORRELATION COEFFICIENT

- Coefficient of determination
  - Squared value of correlation coefficient
  - Proportion of variance in one variable explained by variance in the other

- Coefficient of alienation
  - 1 – coefficient of determination
  - Proportion of variance in one variable unexplained by variance in the other
The increase in the proportion of variance explained is not linear.

<table>
<thead>
<tr>
<th>If $r_{xy}$ Is</th>
<th>And $r_{xy}^2$ Is</th>
<th>Then the Change From</th>
<th>Is</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td>0.04</td>
<td>0.1 to 0.2</td>
<td>3%</td>
</tr>
<tr>
<td>0.3</td>
<td>0.09</td>
<td>0.2 to 0.3</td>
<td>5%</td>
</tr>
<tr>
<td>0.4</td>
<td>0.16</td>
<td>0.3 to 0.4</td>
<td>7%</td>
</tr>
<tr>
<td>0.5</td>
<td>0.25</td>
<td>0.4 to 0.5</td>
<td>9%</td>
</tr>
<tr>
<td>0.6</td>
<td>0.36</td>
<td>0.5 to 0.6</td>
<td>11%</td>
</tr>
<tr>
<td>0.7</td>
<td>0.49</td>
<td>0.6 to 0.7</td>
<td>13%</td>
</tr>
<tr>
<td>0.8</td>
<td>0.64</td>
<td>0.7 to 0.8</td>
<td>15%</td>
</tr>
<tr>
<td>0.9</td>
<td>0.81</td>
<td>0.8 to 0.9</td>
<td>17%</td>
</tr>
</tbody>
</table>
HAVE WE MET THE OBJECTIVES? CAN YOU:

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