Research Methods

This is what we will focus on in class
After reading and attending class, you should be able to do the following:
1. List various types of research methods and the strengths and weaknesses of each.
2. Choose the most appropriate research method for a given research question.
3. Design an experimental study to investigate a given research question
   • Write an hypothesis
   • Identify population and sample
   • Identify independent and dependent variables
   • Identify experimental and control groups
   • Discuss the APA ethical guidelines.
Research Methods

The **SCIENTIFIC METHOD** is the process of posing and answering questions using careful, controlled techniques that include systematic, orderly observation and the collection of data.
Scientific Inquiry

● Facts are what need to be explained
  - objective - viewable by others
  - based on direct observation
  - reasonable observers agree are true

● Theory is a set of ideas that
  - explains facts
  - makes predictions about new facts

● Hypothesis
  - prediction about new facts
  - can be verified or falsified

Descriptive Study

● Describes a set of facts
● Does not look for relationships between facts
● Does not predict what may influence the facts
● May or may not include numerical data
● Example: measure the % of new students from out-of-state each year since 1980
Types of Descriptive Studies

- Naturalistic Observation
- Case Study
- Surveys

Research Strategies...

Correlational Research
- seeks to identify whether an association or relationship between two factors exists.
- A correlation measures the degree of relationship between two variables
  - Correlations range from $-1.0$ to $1.0$
  - Positive correlation v. Negative correlation
Correlation vs. Causation

✝️ Correlation ≠ Causation

✝️ Bidirectional

✝️ Third variable could be cause
  • i.e. ice cream & crime rates

✝️ Experiments are the only way to establish cause and effect!

Suppose a study found that watching aggression on TV is correlated with aggressive behavior…3 possible correlations…
Experiments

- Direct way to test an hypothesis about a cause-effect relationship between factors
- Factors are called \textit{variables}
- One variable is controlled by the experimenter
  - e.g., democratic vs. authoritarian classroom
- The other is observed and measured
  - e.g., cooperative behavior among students

Experimental Variables

- \textbf{Independent variable}
  - the controlled factor in an experiment
  - hypothesized to cause an effect on another variable

- \textbf{Dependent variable}
  - the measured facts
  - hypothesized to be affected
Experimental Method

- Operational Definitions
  - Aggressive
  - Outgoing

- Experimental & Control Group
  - Or various treatment groups

Placebo Effect

Experimental Design

- Population V. Sample
  - Population refers to the entire group that you want to know about.
  - Sample is the smaller subset of the population that actually use in your study.

- Types of Samples
  - Random Sample
  - Representative Sample
  - Convenience Sample
**Ethics and Research**

The American Psychological Association have developed ethical guidelines for researchers.

- Freedom from harm
- Informed consent
- Use of deception
- Maintenance of privacy
- Debriefing

**Research Strategies**

**Comparing Research Methods**

<table>
<thead>
<tr>
<th>Research Method</th>
<th>Basic Purpose</th>
<th>How Conducted</th>
<th>What is Manipulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive</td>
<td>To observe and record behavior</td>
<td>Case studies, surveys, and naturalistic observations</td>
<td>Nothing</td>
</tr>
<tr>
<td>Correlational</td>
<td>To detect naturally occurring relationships; to assess how well one variable predicts</td>
<td>Computing statistical association, sometimes among survey responses</td>
<td>Nothing</td>
</tr>
<tr>
<td>Experimental</td>
<td>To explore cause and effect</td>
<td>Manipulating one or more factors and using random assignment to eliminate preexisting differences among subjects</td>
<td>Independent variable(s)</td>
</tr>
</tbody>
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