Scientific Methods in Sociology

Why do research?
To demonstrate that sociology is a science!
sociology would like to have the same academic standing as other sciences like biology, chemistry, astronomy, etc. (Remember???)
How do sociologists do this research?

1. Use the **scientific method**
   - Step 1 - Observation
   - Step 2 - Description
   - Step 3 - Control
   - Step 4 - Replication

2. Collect a **database** of sociological research
• Sociologists engage in **hypothesis testing**….when the hypothesis is supported or rejected….this help to build theory….which encourages more hypothesis testing…..etc.

• Control and replication are critical in the true experiment
• How do we know if a theory is a good (useful) theory?
  – Are they parsimonious? (Does it rely on the fewest and simplest assumptions?)
  – Do the theories lead to useful predictions?
    • The case of Clever Hans.
      – Are there explanations that are more parsimonious?
    • How about ESP (extrasensory perception)?
      – May rely on shoddy research methods, lack of replicibility, and the lack of parsimony)
Conducting Research

- Sociologists use operational definitions to help define concepts of interest in terms of what it does or how we can produce it.

- **Sampling** procedures are typically used because it is not practical or even possible to study all of the subjects in a population. There are different types of samples, too.
  - **Convenience** (uses a convenient sample)
  - **Representative** (accurately reflects the population as a whole)
  - **Random** (each participant has an equal chance of being in any group)
  - **Cross-cultural** (improve external validity and appears to look like the culture under study)
• One major problem with most types of research is bias.
  – **Experimenter bias** (is the tendency for the researcher to distort the procedures or results of an experiment, based on the expected outcome of the study.
  – **Subject bias** (is the tendency for the subject to distort or perform in a manner that is out of the usual and may distort the outcome of the study. Sometimes this is called the *Hawthorne Effect*.
  – **Bias** can be controlled through the use of:
    • **Blinding** procedures are used to conceal the hypotheses of the experiment from the subject (**single blind**) or from the subject and experimenter (**double blind**) study.
Research Designs

• Naturalistic Observations
  – Explore a population under natural or near natural conditions.
    • Are there any problems with this type of experimental design?
    • Jane Goodall & Diane Fosse are examples of naturalistic observation in biology.
    • A social psychologist observing the behavior of people shopping at a mall.
    • This approach uses only steps one and two of the scientific method.
• **Case Histories**
  – These are a thorough description of the (unusual) person or condition under study.
    • Are there any problems with this type of experimental design?
    • Ann O., a patient of Sigmund Freud, is a good example of the case history.
    • Can also be used as a behavioral treatment design (ABAB)
    • This approach uses only steps one and two of the scientific method.
• **Surveys**
  – These designs study of the prevalence of a certain *attitude, belief, or behavior* based on a person’s response to specific pre-determined questions. An example might be responding to a telephone survey or to the *Gallup Poll*.
  – Each survey must use an adequate sample and carefully determine which questions to be used.
    • Are there any problems with this type of experimental design?
    • This approach uses only steps one and two of the scientific method.
• **Correlational Studies**
  – These studies investigate the relationship between two variables that are outside of the experimenter’s control.
    • **Correlational Coefficients** are an estimate of the strength and direction of the relationship of these two variables and range from -1.0 to +1.0.
    • It is important to remember the correlation does NOT imply causation!
    • Are there any problems with this type of experimental design?
    • This is NOT really an experimental design. Rather, it is a statistical manipulation.
    • It is an example of *fishing* the data.
• The **True Experiment**
  – In these studies, the experimenter manipulates at least one **variable** while measuring at least one other variable.
  
  • The **Independent Variable (IV)** is the variables that is **manipulated**.
  
  • The **Dependent Variable (DV)** are the variables that is being **measured** or for which some **outcome** is expected.
  
  • The **Extraneous Variable (EV)** is the variables that are **minimized** so that the results are due to the manipulation as opposed to some other factor.

Let’s do an example of a simple experiment.
• IV
  – Alcohol (no alcohol/alcohol)
  – Expectation (told they aren’t/told they are)
• DV
  – Any measurement (reaction time, memory, etc.
    • Memory recall of a 20-word list before and after the IV
• EV
  – Any condition or state that might effect the outcome of our study, such as?
<table>
<thead>
<tr>
<th>Alcohol</th>
<th>Expectation</th>
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<tbody>
<tr>
<td>No</td>
<td>No</td>
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<tr>
<td>Yes</td>
<td>Yes</td>
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- Alcohol: No
- Expectation: No
In each true experiment there are:

- **Experimental Groups** who receive the treatment that the study is designed to test.
- **Control Group** who is treated identically to the experimental group with the exception of the experimental treatment.
- Subjects are assigned to groups by **random assignment**.
- This design uses ALL four steps of the scientific method!
What happens if you have intact groups like with populations of individuals?

This is not a true experiment. It is called a quasi-experiment.

One must be careful about making claims outside of the groups that are studied in the quasi-experiment.

This kind of research is done all of the time!
Four Major Concerns with human research and in clinical practice

1. **Informed Consent** – Explaining the potential risks to participants
   - Tuskegee Experiments

2. Research is **voluntary** – the subject has the right to stop at any time
   - Tuskegee Experiments

3. The subject’s participation is kept **confidential**.
   - Release of information occurs only with the subject’s written consent
   - Human rights/Human subjects committee…Institutional review boards

4. Subjects must be **debriefed** – that is, told about the nature of the research when it concludes.
   - Obedience to Authority – Stanley Milgram
Measuring and Analyzing Data (very briefly)

Descriptive Statistics are the mathematical summaries of research results.

- **Measures of central scores** in a normal distribution
  - **Mean** is the sum of all of the scores divided by the total number of scores
  - **Median** is the middle score in a distribution
  - **Mode** is the most frequently occurring score
• **Measures of variation in a normal distribution**
  – How do scores vary around the measures of central scores?
    • **Range** is the span of scores from the highest to the lowest
    • **Standard deviation** is the measurement of the amount of variation that is typical among the scores in the normal distribution and provides a useful measure of comparing scores on two different tests.
• **Inferential Statistics** make statements about given set of scores.

• Trend in sociology toward **Qualitative Research**
  – The long interview with few subjects
  – Look at a problem in the words of subjects who experience it to glean the essence of the problem and guide research.