Formulating a Research Question

Sources of Research Ideas

- Nonsystematic Sources
  - Include those occurrences that give us the illusion that a research idea has dropped out of the sky.
  - Inspiration
    - ideas that pop into one’s mind from (seemingly) nowhere
    - usually comes more easily after working on a particular problem for some time.
  - Serendipity
    - look for one phenomenon but find another.
    - Pavlov
    - Skinner
    - Inequity Aversion
      - (Brosnan & de Waal, 2003)
      - MacDonald (1994)

Formulating Research Hypotheses

- It is important to ask yourself
  - do I want to do this research?
  - can I do this research?
- Assessing feasibility
  - Are the necessary resources available?
  - Do you have access to
    - the study population of interest?
    - special equipment, if needed?
  - Is there enough time to conduct the study?

To Formulate the Question

- General topic must be narrowed down to a specific question
  - Broad concepts must be divided into more specific aspects of question
Example: Attention Deficit Disorder (ADD)

› What aspect of this disorder interests you?
  ◦ Its biological basis?
  ◦ How adults cope with ADD in the workplace?
  ◦ How ADD affects school-based learning?
› What other factors affect how ADD influences people’s lives?
  ◦ Other personality variables?
  ◦ Availability of social support?
  ◦ Severity of ADD?

Characteristics of a Good Research Question

› Does it have the potential to expand our knowledge base?
› Is it well grounded in the current literature?
› Can clear operational definitions be developed?
  ◦ Do these definitions lead to clear hypotheses?

Characteristics of a Good Research Question

› Is the question important?
  ◦ Will the answer allow us to understand current behavior and predict future behavior?
  ◦ Will the results facilitate the design of interventions to alleviate the problem?

Research Questions as Theory Testing

› Questions that test competing theories provide more information than questions that test a single theory
› Within a single theory, questions that test specific propositions provide more useful information
  ◦ If proposition shown to be incorrect, theory is incorrect
Are these good research questions? Why or why not?

- Why do some parents engage in infanticide?
- There is a gender difference in learning abilities and academic interests, with men favoring mathematics and women favoring verbal skills
- A regular program of exercise improves school performance
- Owning pets increases well being
- There are cultural differences in cognitive development

**Purposes of Literature Review**

- Provides a scientific context for the research
  - Helps put question into context
  - Leads to a focus on important theoretical, practical, and methodological issues
- Ensures you are not duplicating effort
  - Is there a need for further research on this topic?

**Types of Information to Look For**

- All relevant theories
  - Allows possible test of competing theories
  - May help explain findings inconsistent with predictions
- How previous researchers have addressed question
  - Shows whether your idea is novel
  - Avoids unproductive duplication
  - Provides information about what still needs to be done
Types of Information to Look For

- Method
  - How was prior research carried out?
  - What operational definitions worked well?
  - What population characteristics should be considered?
  - What problems can and should be avoided?

- Data analysis
  - Can you analyze the data in a way that answers your question?
  - What do you need to learn about the appropriate data analysis techniques?

Library Research Tools

- Focused research should be based on scholarly sources, such as
  - PsycINFO
  - PsycArticles
  - Academic Search Premier (EBSCOhost)
- Important to choose appropriate search terms

Data Base

- http://library.oakland.edu/
Library Research Tools

- Citation searches
  Allow you to find out who has cited past research articles
  Scopus
  Google Scholar
  Web of Science: Social Science Citation Index

Formulating Hypotheses

- Research hypothesis: A statement about the expected relationship between two variables
  - Example: A 10-week social skills training program will result in improved social skills for children with ADD
  - Specifies that the training program will increase social skills for children with ADD

Formulating Hypotheses

- Statistical hypothesis: Research hypothesis is restated in statistical terms
  - Hypothesis is compared to results of appropriate statistical test
    E.G.
    Children with ADD who complete a 10-week training program will have higher social skills scores at the end of the training period than children with ADD who completed a placebo training program

Elements of A Good Hypothesis

- Logical
  - Should be logical conclusion of logical argument
  - Know basic facts, theories, predictions and methods that make up knowledge base for your topic area
  - Logical argument
    - provides rationale or justification for your hypothesis
    - establishes connection between your research and previous research results
Elements of A Good Hypothesis

2. Testable
   - Must be possible to observe and measure all of the variables involved
   - Must involve real events and individuals, can not involve hypotheticals
     - The world would be a better place if JFK had not been assassinated

3. Refutable/Falsifiable
   - Must be possible to obtain results that contradict your hypothesis
   - NOT hypotheses involving moral or religious issues, value judgments, hypothetical situations etc.
     - E.g. Only good people get into heaven

4. Positive
   - Must make a positive statement about existence of something – usually existence of a relationship, difference, or treatment effect
   - Fail to find convincing evidence vs. stating that relationship does not exist
     - There are no red swans in the world
     - Showing absence of effect is not same as showing effect does not exist

Replication Research

- Exact replication: A new study that reproduces the conditions of the original research as precisely as possible
  - Less valued form of replication
  - Important because protects against Type I error
  - More likely to be published if results show problems in original research
Replication Research

- Conceptual replication: A new study that tests the same hypothesis as a previous study, but uses different procedures, population, operational definitions, or setting.
- Tests the generalizability of findings.

<table>
<thead>
<tr>
<th>Result of Replication</th>
<th>Successful</th>
<th>Unsuccessful</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Replication</strong></td>
<td><strong>Supports the principle</strong></td>
<td><strong>Limits the principle</strong></td>
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<tr>
<td><strong>Exact</strong></td>
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<td></td>
<td><strong>Supports and extends the principle</strong></td>
<td><strong>Limits the principle</strong></td>
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Adapted from Rosenthal & Rosnow, 2008

Considerations in Conducting Replication Research

- Important replications test major hypotheses add new information about hypotheses test generalizability can address suspected problem with original study alternative explanation for original result

Considerations in Conducting Replication Research

- Overduplication of well-established effects may be unnecessary
- Do so only if plausible alternative explanation exists important area of generalization needs to be addressed
Designing Useful Applied Research

- Is the research population studied appropriate?
- Does it represent people found in applied setting of interest to practitioners?
  - Studies of college students usually less useful
- Is the research setting appropriate?
  - Was study conducted in setting to which it is to be applied?
  - Laboratory research may be viewed as irrelevant to applied setting

Biased Assumptions in the Formulation of Research Questions

- Assuming that studying one group will tell us about other groups
- Assuming that what is actually a general problem applies only to one group
- Conceptualizing a general topic in terms associated more with one group than another

Ways to Avoid Bias

- Be aware that the problem of bias exists
- Ask reviewers of your work to look for bias
- While reviewing the literature, look for indicators of bias
- Consider the limitations of your proposed research design
- Remember that biased research produces invalid results