

## 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?

### Purposes of Literature Review

- › Helps identify potential problems
  - Is operational definition appropriate and feasible?
  - What alternative explanations need to be controlled for?

### 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?



## Types of Information to Look For

- › 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?



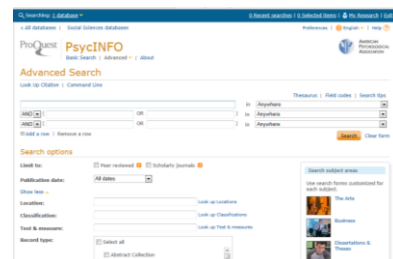
## Library Research Tools

- › 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

- › 1. 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



## Elements of A Good Hypothesis

- ▶ 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



## Elements of A Good Hypothesis

- ▶ 4. Positive
  - Must make 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



<i>Result of Replication</i>		
<i>Type of Replication</i>	Successful	Unsuccessful
<b>Exact</b>	• Supports the principle	• Damages the principle
<b>Conceptual</b>	• Supports and extends the principle	• Limits the principle

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

