Critical Thinking and Reading
Lecture 15

I. CRITICAL THINKING
A. Introduction

- Critical thinking is the ability and willingness to assess claims and make objective judgments on the basis of well-supported reasons. (Wade and Tavris, pp.4-5)
  - It is the ability to look for flaws in arguments and resist claims that have no supporting evidence.
  - Critical thinking also fosters the ability to be creative and constructive to…
    - generate possible explanations for findings
    - think of implications
    - apply new knowledge to a broad range of personal and social problems.
  - Critical and creative thinking can not be separated.

I. CRITICAL THINKING
B. Guidelines

- **Ask questions; be willing to wonder.**
  - Always be on the lookout for questions that have not been answered in the textbooks, by the experts in the field or by the media. Be willing to ask "what's wrong here?' and/or "Why is this the way it is, and how did it come to be that way?"
- **Define the problem.**
  - An inadequate formulation of question can produce misleading or incomplete answers. Ask neutral questions that don't presuppose answers.

I. CRITICAL THINKING
B. Guidelines

- **Examine the evidence.**
  - Ask yourself, "What evidence supports or refutes this argument and its opposition?" Just because many people believe, including so-called experts, it doesn't make it so.
- **Analyze assumptions and biases.**
  - All of us are subject to biases, beliefs that prevent us from being impartial. Evaluate the assumptions and biases that lie behind arguments, including your own.

I. CRITICAL THINKING
B. Guidelines

- **Avoid emotional reasoning: "If I feel this way, it must be true.**
  - Passionate commitment to a view can motivate a person to think boldly without fear of what others will say, but when "gut feelings" replace clear thinking, the results can be disastrous.
- **Don't oversimplify.**
  - Look beyond the obvious, rest easy generalizations, reject either/or thinking. Don't argue by anecdote.

I. CRITICAL THINKING
B. Guidelines

- **Consider other interpretations.**
  - Formulate hypotheses that offer reasonable explanations of characteristics, behavior, and events.
- **Tolerate uncertainty.**
  - Sometimes the evidence merely allows us to draw tentative conclusions. Don't be afraid to say "I don't know." Don't demand "the " answer.

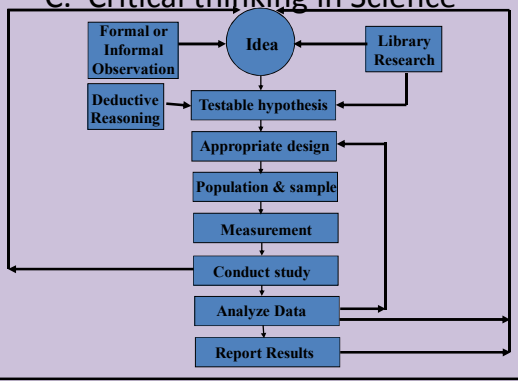
I. CRITICAL THINKING
C. Critical Thinking in Science

- Science depends as much on attitudes as it does on procedures.
  - Missing in other approaches to knowledge (method of authority, rational method) is a **skeptical attitude** about one's own and others' knowledge.
    - There is a good deal of preparatory intellectual activity to doing science..
      - Seeking out relevant information.
      - Defining problems objectively and reliably.
      - Rigorous and innovative testing.
  - But not all problems allow such preparatory activity, making them non-scientific problems.

I. CRITICAL THINKING
C. Critical thinking in Science

- **Scientific Method**
  - The scientific method involves steps.
    - **Observing a phenomenon**: See something of interest and watch all relevant ***variables***
    - **Formulate a tentative explanation**: Identify variables which might explain phenomenon.
    - **Research based on explanation**: Design research to orderly and systematically examine variables of interest and their *hypothesized* relationship to each other.
    - **Refine and retest explanations**: The consequence of the initial observations and explanations may lead to altering the hypothesis or the characteristics if the experimentation.

I. CRITICAL THINKING
C. Critical thinking in Science



II. CRITICALLY READING RESEARCH
A. Introduction

- Research papers have four sections
  - Introduction
    - General issues addressed by the paper.
    - Literature Review
      - Selective set of papers, operationalizations, design or other problems in previous research
    - Hypotheses
  - Methods
    - Participants
      - Sampling and assignment issues
    - Procedure
      - Outline and defense of operationalization, Specification of design.

II. CRITICALLY READING RESEARCH
A. Introduction

- Research papers have four sections
  - Results
    - Presentation of the numbers
    - Outline of statistical treatment of data and results.
  - Discussion
    - Statement of hypothesis confirmation
    - Connection of results to previous literature
      - Support of previous findings
      - Disagreement with previous findings
    - Speculation
      - Beyond the data but not too far
    - Limitations
      - Next best study.

II. CRITICALLY READING RESEARCH
B. Down and Dirty

- Research papers are written at a mid-level of informativeness.
- To evaluate some information you will need to get down and dirty with the paper.
  - Work through exactly was done.
    - The procedure is just a overall description. Truly imagine you are a subject in the experiment. What are you doing and thinking?
  - Figure out what the numbers exactly mean
    - Make sure you can identify the concept operationally associated with each number
    - Understand exactly what was done to the number to arrive at the conclusions

II. CRITICALLY READING RESEARCH
C. Broad and General

- To evaluate some information you will need to get broad and general with the paper.
  - What were the authors up to in writing the paper.
    - What were the their goals and intentions for the project.
    - To assess intentions, ask why they framed the project they way that they did
  - What decisions and assumptions were made
    - Where operationalizations adequate?
    - What were the design decisions (Correlation v Causal)?
    - Limitations of decisions (Generalizability vs. Control)?
    - Assessing the coherence the hypotheses, procedures, results, and discussion.

III. EVALUTING RESEARH
A. Internal Valdity

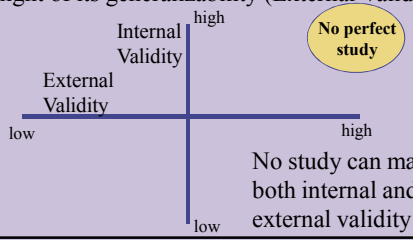
- **Assessing a Study**
- All studies can be evaluated on two dimensions which address the adequacy of the conclusion, given the procedure of the study.
- **Internal Validity**: The extent to which the design of a study adequately tests its hypothesis. Poor tests of hypotheses may result from…
  - poor operationalization of the variables.
  - lack of validity or reliability of the measures.
  - the presence of extraneous variables.

III. EVALUTING RESEARH
A. External Valdity

- The second dimension is External Validity.
- **External Validity**: The extent to which you can feel sure that the results obtain can generalize to other subjects…
  - who are in other research settings
  - who are measured using other instruments
  - who are studied by other experimenters.
  - who are living at other times.
  - etc.

III. EVALUTING RESEARH
C. No Perfect Study

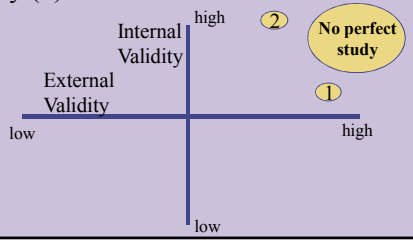
- The two evaluative dimensions are independent of each other. Each assesses the conclusions...
  - in light of the study's procedures (Internal Validity).
  - in light of its generalizability (External Validity).



No study can maximize both internal and external validity

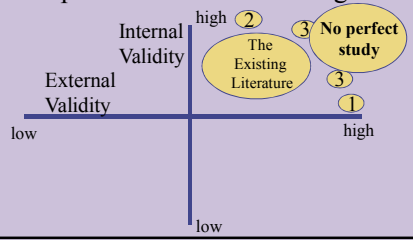
III. EVALUTING RESEARH
C. No Perfect Study

- An excellent correlational study at best maximizes external validity (1) and an excellent experimental study at best maximizes internal validity (2).



III. EVALUTING RESEARH
D. The Next Best Study

- The next best study can maximize external validity at the expense of internal validity (1). vice versa (2), both (within limits, 3), or any other improvement of the existing literature.



III. CRITICALLY READING RESEARCH
E. Amsel; Thomson & Zamboanga

- Prepare answers to the following questions
  - Broad and General
    - Describe similarities and differences in what motivated Amsel and Thomson & Zamboanga to study college psychology students.
      - What role did student learning play in each study and was it addressed in similar ways?
  - Down and Dirty
    - Describe the research design each used (case study, correlational, or experimental) and what is known generally about the limits of the each design.
      - How are the limits of the design addressed (or controlled for) in each study?
      - How might these limits impact the results of the study?