The Experimental Method

- What is an experiment? How is it different from other methods?
  - Purpose: to demonstrate causation, that A ---> B
    - What are the requirements to demonstrate causality?
      - Correlation
      - Order. A must precede B.
      - Control over other variables
    - Extraneous variables and alternative explanations
      - Definitions
      - Examples

The Experimental Method

- How are experiments different from other types of research?
  - Manipulated independent variable
  - Control of organismic variables either by
    - Random assignment of units of analysis to conditions of the independent variable, or by
    - Assignment of each unit to all conditions, with controls on order of presentation
  - Control of other variables by holding them constant
    - What are extraneous variables?
      - Can explain the findings of a study without resorting to the hypothesis.
      - Lead to an alternative explanation of the findings from the one you had .
  - "In an airtight experiment, there is only one rival hypothesis: chance."

The Experimental Method

- Strengths and weakneses of experiments
  - Strengths
    - Control
    - Ability to demonstrate causality
  - Weaknesses
    - Artificiality
    - Lack of external validity
- The field experiment – in many ways the best of both worlds.
  - Still lacking in external validity
  - Cannot get at complex interactions

The Experimental Method

- Within vs. Between subject experiments
  - Within has
    - complete control of all organismic variables
    - Possibility of one condition to influence others, possible "on stage' and "demand" effects
  - Between has
    - Less chance of subjects "catching on"
    - Higher error rates
- Comparing the correlational and experimental methods. example: testing the hypothesis that people with low self-esteem will be more attracted to an accepting other
  - Correlational: measure self-esteem, observe response when other expresses interest
  - Experimental: manipulated self-esteem, then do the same

The Experiment Exercise

- How do you do a between-subjects experiment? Doob & Gross as example
  - Devise a "set-up", including a cover story if needed
  - Construct independent variable and way to assign subjects to categories
  - Figure out how to measure the dependent variable
- A student example: the waitress and the mints
  - Set-up
  - Independent variable and random assignment
  - Dependent variable
- Walk through instructions for experiment exercise
- Further examples of past student experiments

Internal Validity

- What is internal validity and why do we care?
  - Definition: extent to which one can be confident that the results as reported support the causal hypothesis being tested (Quotes from Campbell & Stanley, 1966)
    - "Internal validity is the basic minimum without which any experiment is uninterpretable: Did in fact the experimental treatments maqke a difference in the experimental instance?"
    - More generally, are the variables that appear to be causally related REALLY causally related, or is the apparent relationship spurious?
  - Why should we care? Discuss.
  - What's the difference between internal and external validity?
    - External validity asks the question of generalizability: to what populations, settings, treatment variables, and measurement variables can this effect be generalized.
  - Internal and external validity are often at odds. Why?

Internal Validity

- Campbell and Stanley: types of pre-experiments, experiments, and quasi-experiments
  - Pre-experiments

X O Or O X O

  - True experiments: random assignment to conditions

X O Or O X O

— O O - O

  - Quasi-experiments – same as experiments, except with no random assignment to conditions

Internal Validity

- An example of a quasi-experiment: jobs for at risk youth in Milwaukee
  - Describe study
    - Purpose of study
    - Initial design
    - How it turned out
  - What is the problem?
  - Possible extraneous variables?

Internal Validity

- Threats to internal validity (from Schutt)
  - Selection bias and differential attrition (mortality)
  - Endogenous change
    - Testing
    - Maturation
    - Regression
  - History/external events
  - Contamination: control/experimental group cross-effects
  - Treatment misidentification
    - Experimenter expectancies / social desirability
    - Placebo effect
    - Hawthorne effect / "on stage" effect
    - Conceptual --> operational link not effectively made

Internal Validity

- Using these terms, what are the problems with pre-experiments?

X O Or O X O

- What are the problems with quasi-experiments?

X O Or O X O

— O O - O

(Without random assignment to conditions)

- Why are experiments OK?

The Darley and Batson Experiment

- Design
  - Sample
  - Is this a between- or a within-subjects experiment?
  - "Set-up"
  - Measurement
    - Independent variables
    - Dependent variable
  - Findings
    - What is an interaction effect?
  - Threats to internal validity

The Goldberg Experiment

- Design
  - Sample
  - Is this a between- or a within-subjects experiment?
  - "Set-up"
  - Measurement
    - Independent variables
    - Dependent variable
  - Findings
  - Threats to internal validity

The Goldstein and Arms Study

- Design
  - Sample
  - Is this a between- or a within-subjects experiment?
  - "Set-up"
  - Measurement
    - Independent variables
    - Dependent variable
  - Findings
  - Threats to internal validity
  - Is this an experiment? Why or why not?