

# Research Methods

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**Before we start....**

- ▶ Within research methods, there are three very important concepts that should be of constant concern to you.

A) Validity  
B) Reliability  
C) Sampling

\* Dart Board Example\*

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# Experimental Research

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## Experimental Research

- ▶ Claim Formats
  - Experiments rely primarily on predictive (causal claims)
  - Causal claims are hypotheses that rely on both independent and dependent variables and provide directionality
- ▶ Causal Arguments
  - The major goal of experimental research is to create causal arguments
  - in order to create an argument for a claim, three criteria must be met

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## Experimental Research

- 1) Manipulation of the independent variable occurs before the change in the dependent variable
- 2) Change in the independent variable must be correlated with change in the dependent variable
- 3) Observed effects on the dependent variable can only be explained by the manipulation of the independent variable

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## Elements to Create Experimental Control

- ▶ As mentioned previously the major benefit of experimental research is the ability to manipulate all of the variables of interest
- ▶ Using various techniques, researchers hope to
  - 1) effectively manipulate the independent variable (manipulation checks)
  - 2) control for alternative explanations for its effects on the dependent variables.
- ▶ Several elements are used to accomplish this:
  - 1) Comparison Groups (treatment vs. control groups)
  - 2) Random Assignment
  - 3) Pre-testing

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## Types of Experimental Designs

- ▶ A research design is influenced by the presence or absence of these elements (comparison groups, pre-testing, and random assignment).
- ▶ Absence of elements results in weaker experimental research
- ▶ Specifically, the support for the causal claims is weaker
- ▶ There are three basic types of research design that range from weak to strong with regard to their ability to support the claim

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## Experimental Design Key

- ▶ The following slides will attempt to give you graphical representation of different designs.
- ▶ Here are a couple of symbols that will be used:

X = the introduction of the manipulation  
O (x) = observation or measurement of the dependent variable  
R = randomization (concerning assignment of participants)

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## Types of Experimental Designs (cont.)

- ▶ 1) Pre-experimental design
    - All of these lack many of the elements described previously
    - Below are three main types ordered from weakest to strongest
- 1) One-shot case studies (ex post facto design)  
X O1
  - 2) One-group pretest-posttest design  
O1 X O2
  - 3) Static-group comparison design  
X O1  
O2

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## Types of Experimental Designs (cont.)

- ▶ 2) Quasi-experimental design
  - These research designs are stronger in providing evidence for the claims.
  - However they are still missing at least one element of experimental control (usually randomization)
  - There are two basic design types

1) Time series design  
 O1 O2 O3 X O4 O5 O6

2) nonequivalent control group design  
 O1 X O2  
 O3 O4

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## Types of Experimental Designs (cont.)

- ▶ 3) True experimental design
  - These designs represent the strongest form of research design
  - They must possess at least two of the elements and often contain all three.
  - There are three basic designs

1) pretest-posttest control group design

R O1 X O2  
 R O3 O4

2) posttest-only control group

R X O1  
 O2

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3) Solomon four group design

R O1 X O2  
 R O3 O4  
 R X O5  
 R O6

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## Threats to Validity in Experimental Research

- ▶ The presence or absence of the experimental control conditions, influence the research design that is used
- ▶ Based on the research design that is chosen, there are concerns for validity that exist
- ▶ You will remember that Validity refers to “the accuracy or truthfulness of the tests for claims”
- ▶ Validity threats can occur both internally and externally.

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## Threats to Internal Validity

- ▶ Internal Validity: “the ability of a study to accurately assess the hypothesized relationship between the independent and dependent variables.”
- ▶ Within experimental research one of the major threats is *confounding variables*
- ▶ These refer to: “factors that potentially rival your independent variable as the cause of the effects on your dependent variables.”
- ▶ These *confounding variables* concerning internal validity can be categorized into two categories:
  - 1) Time progression effects
  - 2) Reactivity effects

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## Threats to Internal Validity (cont.)

- ▶ 1) Time Progression Effects: refers to confounding variables that exist due to the experimental design occurring over a period of time (use of pretest/posttest)
  - 1) History: occurrence of external event
  - 2) Maturation: change in the subjects
    - 3) Mortality: drop out rate
  - 4) Statistical Regression: extreme representation of DV
  - 5) Testing: participant sensitivity to measures
  - 6) Instrumentation: change in measures between pretest and posttest

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## Threats to Internal Validity (cont.)

- ▶ 2) **Reactivity Effects:** refers to confounding variables that exist due to participants' reaction/response to a specific aspect of the experimental design.
  - 1) **Selection:** nonrandom selection
  - 2) **Treatment Effect:** contamination of control group by treatment group
  - 3) **Compensatory Behavior:** control group becomes aware of difference in treatment
  - 4) **Researcher Attributes:** Characteristics of the researcher influencing subject behavior
  - 5) **Demand Characteristics:** knowledge of experimental goal by subjects
  - 6) **Evaluation Apprehension:** impression management by subjects towards researcher

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## Threats to External Validity

- ▶ External validity: "how accurately the findings from one study can be generalized to a different setting or population."
- ▶ Within external validity concerns, *confounding variables* can occur in two basic categories

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## Threats to External Validity (cont.)

- ▶ 1) **Sample Representation**
  - sample does not represent the population (biased)
- ▶ 2) **Setting Appropriateness**
  - sample results are biased due to the location (setting) if the research.

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# Survey Research

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## Survey Research (cont.)

- ▶ Types of survey research
  - Cross-sectional
  - Longitudinal
- ▶ There are two ways in which we gather *survey research*
  - Survey Interviews
  - Survey Questionnaires

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## Survey Interviews

- ▶ Types of interviews
  - Face to Face
  - Focus Group
  - Mall Intercepts
  - Telephone Interviews

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## Types of Interview Formats

- ▶ Structured
- ▶ Semi-structured
- ▶ Unstructured

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## Problems with Interviews

- ▶ While interview formats have several benefits, there are problems that you should be familiar with
  - 1) Group effects
  - 2) Polarization effect
  - 3) Member domination
  - 4) Impact of sensitive topics

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## Survey Questionnaires

- ▶ As with interviews, every aspect of the questionnaire requires important consideration, and every choice has advantages and disadvantages
- ▶ As we have mentioned before several factors are important with questionnaires:

*Format*  
*Clarity*
- ▶ However, beyond the overall format of the questionnaire, special consideration must be made regarding the actual questions themselves.

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## Types of Survey Questions

- ▶ Open ended format
- ▶ Closed ended format
  - Roster method
  - Free recall technique
  - Filter questions
  - Contingency questions

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## Problems to Avoid

- ▶ There are several problems that researchers should try and avoid when using questionnaires
  - A) Order effects
  - B) Leading questions
  - C) Double barreled questions
  - D) Vagueness
  - E) Negative Items
  - F) Reading/Grammar Level
  - G) Confusing Phrasing

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## Survey Research Reliability and Validity

- ▶ Ways to increase reliability and validity
  - Internal validity (ability of the survey to correctly test the claims):  
*Item response rate*
  - External validity (ability to generalize the results of the survey):  
*Total response rate*

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