Theory & Hypothesis

EDHE6530

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Overview

• Review our progress
• Theory and hypothesis
• Research questions and definition of terms
• In-class practice
• Research paper requirements
A Quick Review
NIH Ethical Principles

• Respect for persons
  – Autonomous agents
  – Informed consent
  – Diminished autonomy

• Beneficence
  – Risks and Benefits
  – Privacy and confidentiality

• Justice
  – Benefits and burdens for individuals and groups
Characters of good research questions?

- Clear
- Significant
- Feasible
- Ethical
- Relationship
Operational Definition

• How do you plan to **MEASURE** it?
• How do you plan to conduct the **EXPERIMENT** to study it?
Dissertation

• Chapter One: Introduction
• Chapter Two: Literature Review
• Chapter Three: Methodology
• Chapter Four: Results
• Chapter Five: Discussion and Implications
Dissertation Proposal

• Chapter One: Introduction
• Chapter Two: Literature Review
• Chapter Three: Methodology
• Chapter Four: Results
• Chapter Five: Discussion and Implications
Chapter One

• Introduction/problem statement
• Purpose of the study
• Conceptual framework or theoretical orientation
• Research questions and hypotheses
• Definition of terms
• Significance of the study
• Limitations, delimitations, and assumptions
• Organization of the Study
Step-by-Step Guide

1. Name your topic:
   – I am trying to learn about (working on, studying) ___________________

2. Add a question:
   – I am studying X because I want to find out who/what/when/where/whether/why/how ___________________

3. Motivate your readers:
   – I am studying X because Y in order to ___________________
Concept

- Abstraction from observed events
- General heading to simplify events
- Distillation of common characteristics
- Directly OBSERVABLE
Construct

• Used to summarize observations
• Provide explanations
• Higher level of abstractions
• Combines concepts
• Accounts for observed regularities and relationships
Variables

• Defined as a factor – things that varies
• Characteristic or condition that changes or has different values for different individuals
• Types of variables
  – Categorical
  – Dichotomous
  – Continuous
Dependent Variable

- Object of study
- Depends on/varies with independent variable
- Observed for changes to assess the effect of the treatment
- What is being **MEASURED**
- Abbreviated as DV
- Usually the last variable cited in the research question
Independent Variable

- Manipulated/change by the experimenter
- We study its effects
- Causative agent
- Occurs antecedent to the DV
- Experimental treatment
- Abbreviated as IV
- Predictions made FROM IV TO DV
- Usually the first variable cited
Limitations vs. Delimitations

• Limitations
  – Factors that potentially reduce a study’s validity and initial scope and that is out of the researcher’s control

• Delimitations
  – Factors and issues not of concern to the research or limitations imposed by the researcher
Assumptions

• Assumptions
  – Postulates, premises, and propositions that are accepted and assumed to be true for the purpose of the research.
Review Your Progress

1. Name your topic:
   - I am trying to learn about (working on, studying) ___________________

2. Add a question:
   - I am studying X because I want to find out who/what/when/where/whether/why/how ___________________

3. Motivate your readers:
   - I am studying X because Y in order to ___________________
Draft Your Research Questions

• I am studying [X] because [Y] in order to [Z]
• My research questions are:
  – What is the effect of [IV] on [DV] among [population]?
  – Is there a significant difference between [IV] and/versus [IV] on [DV] among [population]?
• My hypotheses are:
• Definition of Terms:
  – For the purpose of this study, [IV, DV] is defined as
Next Step

- General research questions
- Specific research questions
- Collecting data
- Definition of terms
- Research hypotheses

Literature Review

Analyzing data
Theory, Hypothesis, & Research Question
Theory

- Pulls together results of observations – help to organize and unify them
- Enable one to make general statements about variables and relationships among variables
- Provides information to make specific predictions of research outcomes
- Directs and promotes future research
Theory of Student Departure in Commuter Colleges and Universities

Figure 3.2
Theory of Student Departure in Commuter Colleges and Universities

- Student Entry Characteristics
  - Motivation
  - Control Issues
  - Self-Efficacy
  - Empathy
  - Affiliation Needs
  - Parental
  - Education
  - Anticipatory
  - Socialization

- External Environment
  - Finances
  - Support
  - Work
  - Family
  - Community

- Initial Institutional Commitment (IC-1)

- Internal Campus Environment
  - Academic Communities
    - Active Learning
    - Learning Communities
  - Institutional Environment
    - Cost
    - Institutional
    - Integrity
    - Institutional Commitment to Student Welfare

- Academic Integration

- Subsequent Institutional Commitment (IC-2)

- Persistence

Source: Adapted from Braxton, Hirschy, & McClendon (2004).
Figure 2.2. A General Causal Model for Assessing the Effects of Differential Environments on Student Learning and Cognitive Development

Structural/Organizational Characteristics Of Institutions
- Enrollment
- Faculty-student Ratio
- Selectivity
- % Residential

Interactions With Agents Of Socialization
- Faculty
- Peers

Student Background/Precollege Traits
- Aptitude
- Achievement
- Personality
- Aspiration
- Ethnicity

Institutional Environment

Quality Of Student Effort

Learning And Cognitive Development

Integrated Model of Contemporary College Learning Outcomes

Developmental Foundations of Learning Outcomes

Hypothesis

• A prediction about possible study outcomes
• Prediction about how the manipulation of the independent variable (IV) will affect dependent variable (DV)
• Derived from theory
Hypothesis sets forth an anticipated relationship between two or more variables
Examples

• A positive relationship exists between student efforts and learning outcomes
• The dropout rate is higher for low SES student than for high SES students
• A positive relationship exists between living in residence hall and first year retention
Good Hypothesis must be...

• Clearly stated
• Testable
• Comes from research question
Draft Your Research Questions

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• My research questions are:
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Purposes of Hypothesis

• A tentative explanation of phenomena
• A relationship, testable statement
• Direction to research
Developing Hypotheses

• Deduction
• Induction
Deduction

• General to specific
• Based on presumed relationships between variables
• Begins with theories
Induction

• Specific to general
• Begins with specific observations
• Combines observations to produce a general statement – hypothesis
• Exploratory studies
A hypothesis is...

• Based solely on data
• Rejected or fail to reject
• Never proven true or false
• Supported or not supported
Types of Hypotheses

• Null Hypothesis
• Research Hypothesis
  – Directional
  – Nondirectional
Null Hypothesis

• Empirical investigations involve statistical tests
• No relationship – No difference
• Negates expectation
• Observed differences by chance
• Statistics determine probability that null is true
Null Hypothesis Examples

• Participating in new student orientation has *no effect* on student achievement

• There will be *no difference* between boys and girls in math achievement at the middle school level
More Examples

• There will be *no difference* in the retention rate between Caucasians and African-Americans

• Obese people *do not eat* more than people who are not obese
Research Hypotheses

• Advantages
  – Forces thinking about outcomes
  – Predictions based on evidence and theory

• Disadvantages
  – May lead to bias
  – May prevent noticing other phenomena, results in tunnel vision
Directional Research Hypotheses

• Specific direction MADE about study outcome
• Assumes what will happen in study
Directional Examples

• Individuals who smoke will have a **HIGHER** incidence of respiratory illnesses than individuals who do not smoke.

• Students who spend more time working off campus will be **LESS** engaged on campus activities.
More examples

• A combination of reading readiness training and programmed reading instruction will be \textit{MORE} effective in teaching reading than normal classroom instruction in sight reading.
Nondirectional Research Hypotheses

• Specific prediction **NOT MADE** about study outcomes

• Assumes that a difference will be present, but does not place a direction on difference
Nondirectional Examples

• Individuals whose meals consist of items from all the basic food groups will have a different body fat content than individuals who are vegetarians.

• The IQs of boys enrolled in the preschool intervention program will be different from the IQs of girls in the preschool intervention program.
More examples

• The attitudes of teachers who attended the At-Risk workshop will be different from the attitude of teachers who did not attend the At-Risk workshop.
Nondirectional hypothesis ≠ Null Hypothesis
Example

• **Research Questions:** What is the effect of an online teaching workshop on the attitude of teachers toward online teaching?

• **Research Hypothesis:** Teacher’s attitudes toward online teaching will improve as a result of attending a workshop on online teaching.

• **Null Hypothesis:** There will be no difference in teacher’s attitudes toward online teaching measured before and after a workshop on online teaching.
Example 2

• **Research Questions:** Is there a difference in first year retention rates between students who attended early and late orientation sessions?

• **Research Hypothesis:** Students who attend early orientation sessions will have a higher first year retention rate.

• **Null Hypothesis:** There will be no difference in first year retention rates between students who attend early and late orientation sessions.
In class activities

• Construct your own directional research hypotheses and null hypotheses and share with the class

• Construct your own nondirectional research hypotheses and null hypotheses and share with the class
Draft Your Research Questions

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• My research questions are:
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Research Paper Requirements