

Theory & Hypothesis

EDHE6530

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Overview

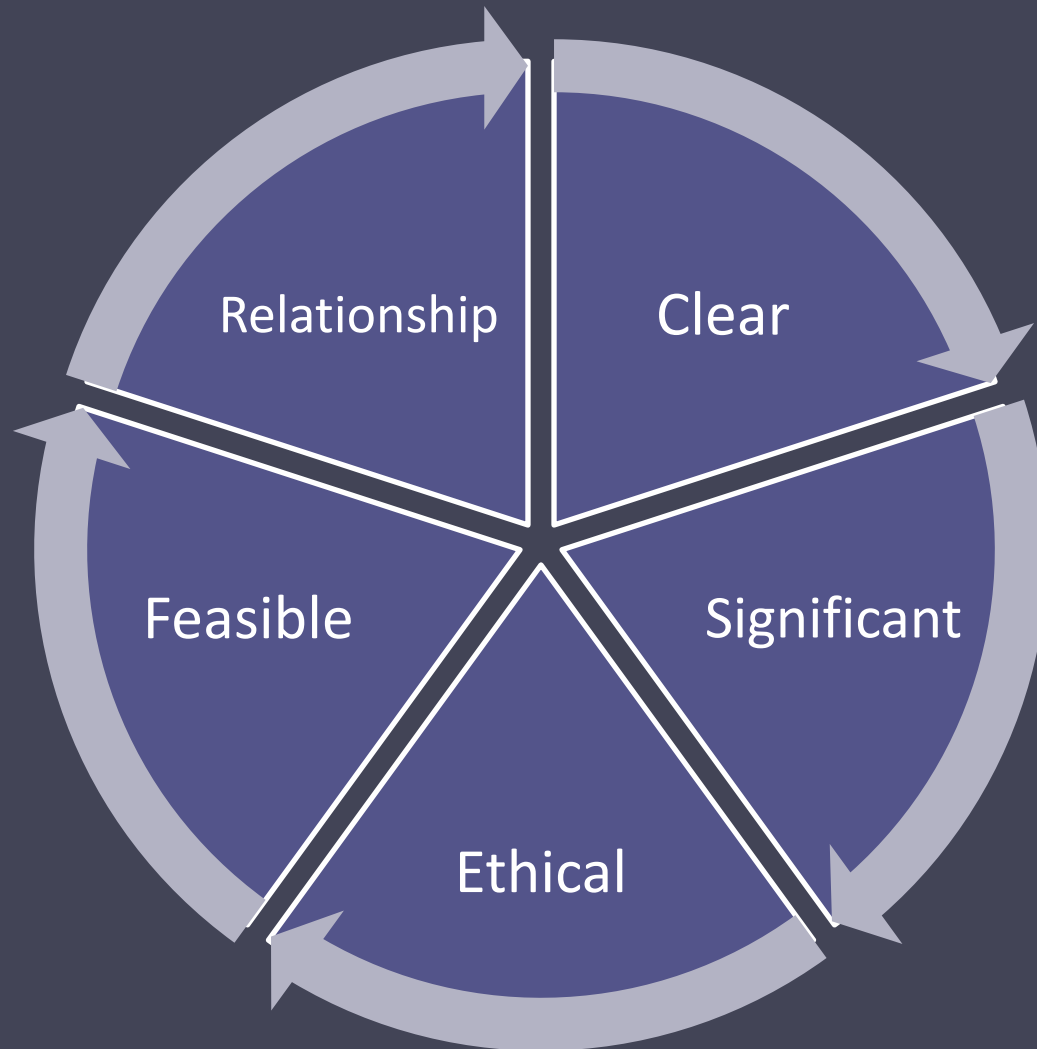
- Review our progress
- Theory and hypothesis
- Research questions and definition of terms
- In-class practice
- Research paper requirements

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?



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

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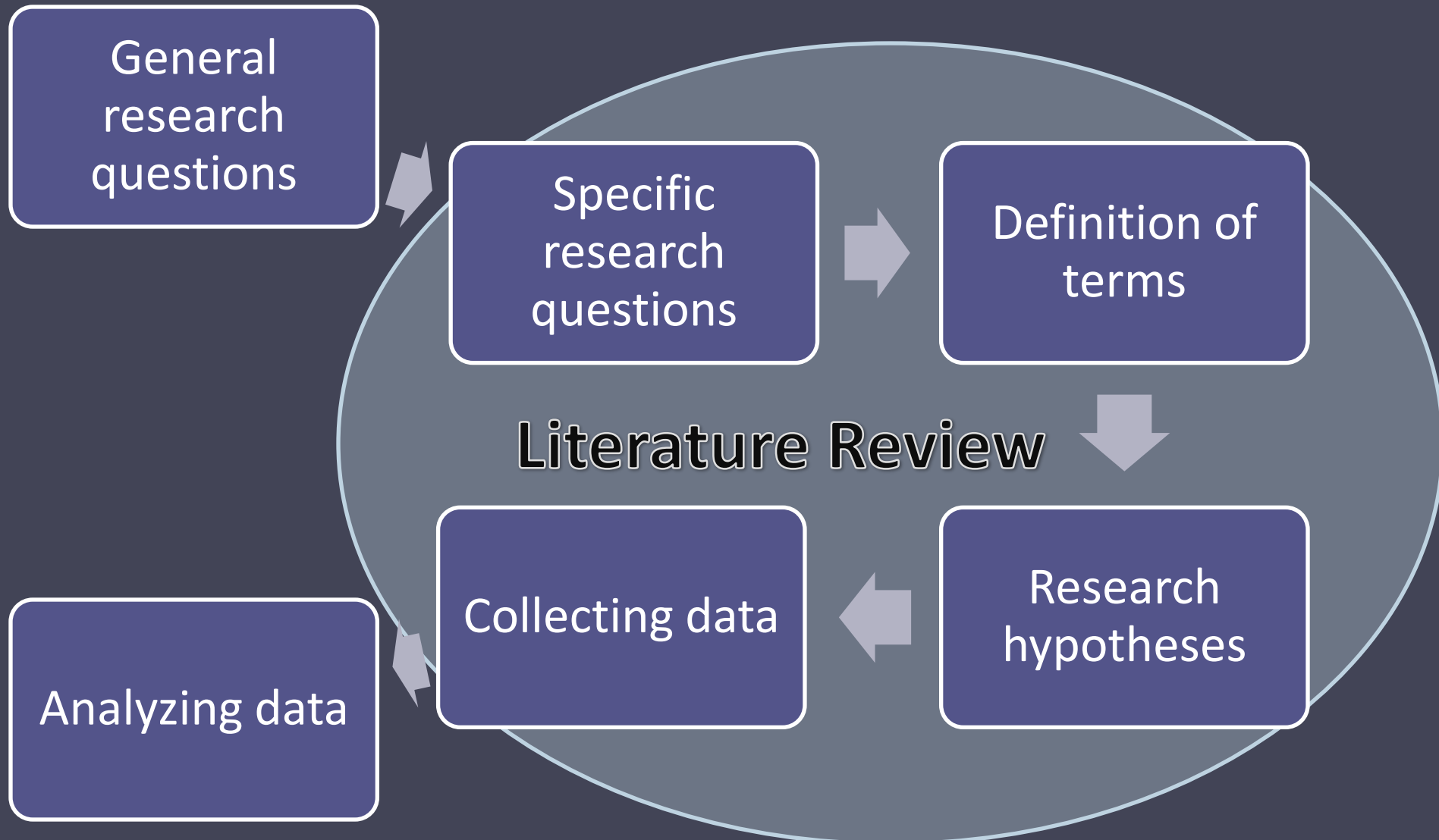
3. Motivate your readers:

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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



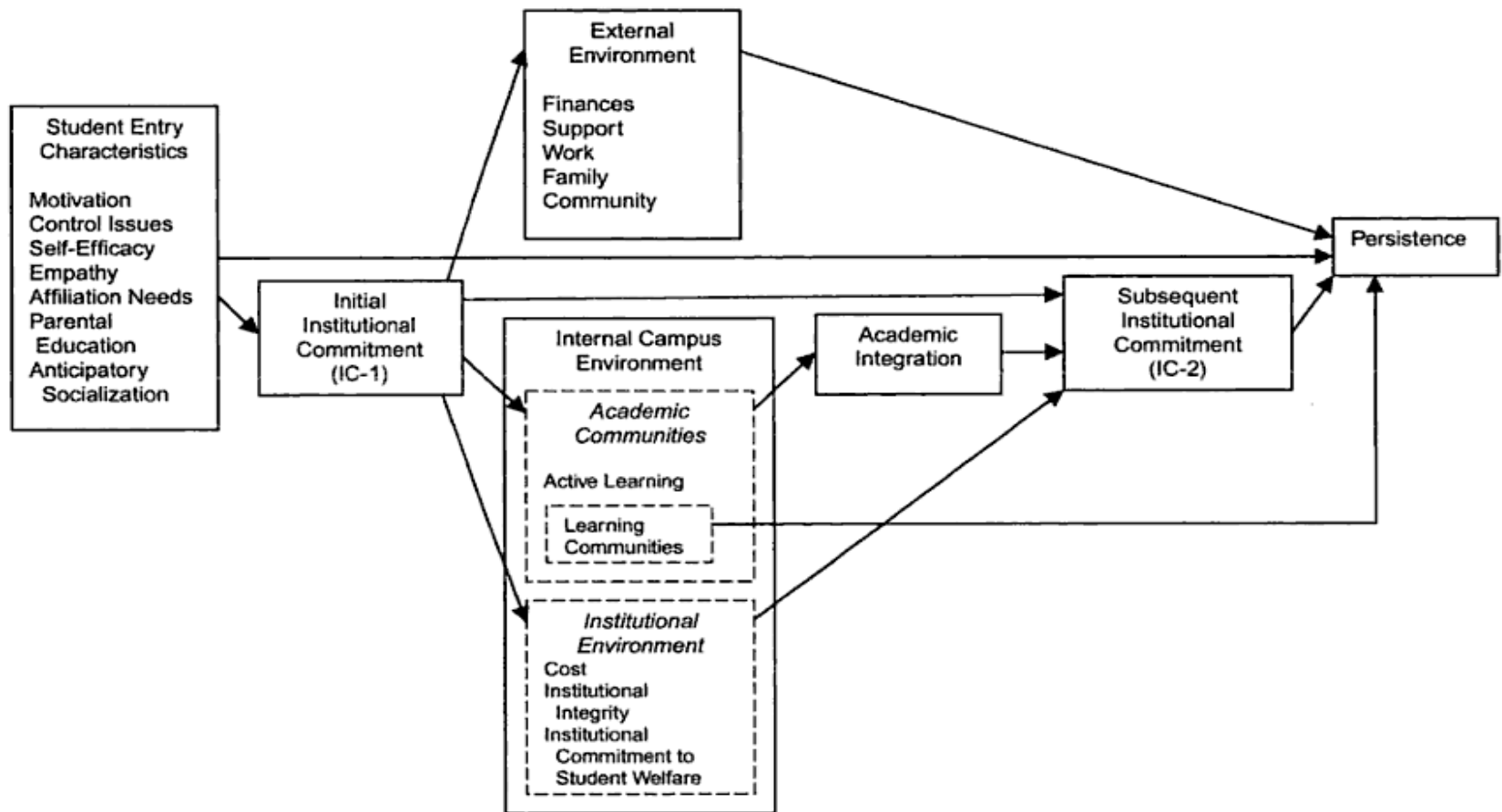
Theory, Hypothesis, & Research Question

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

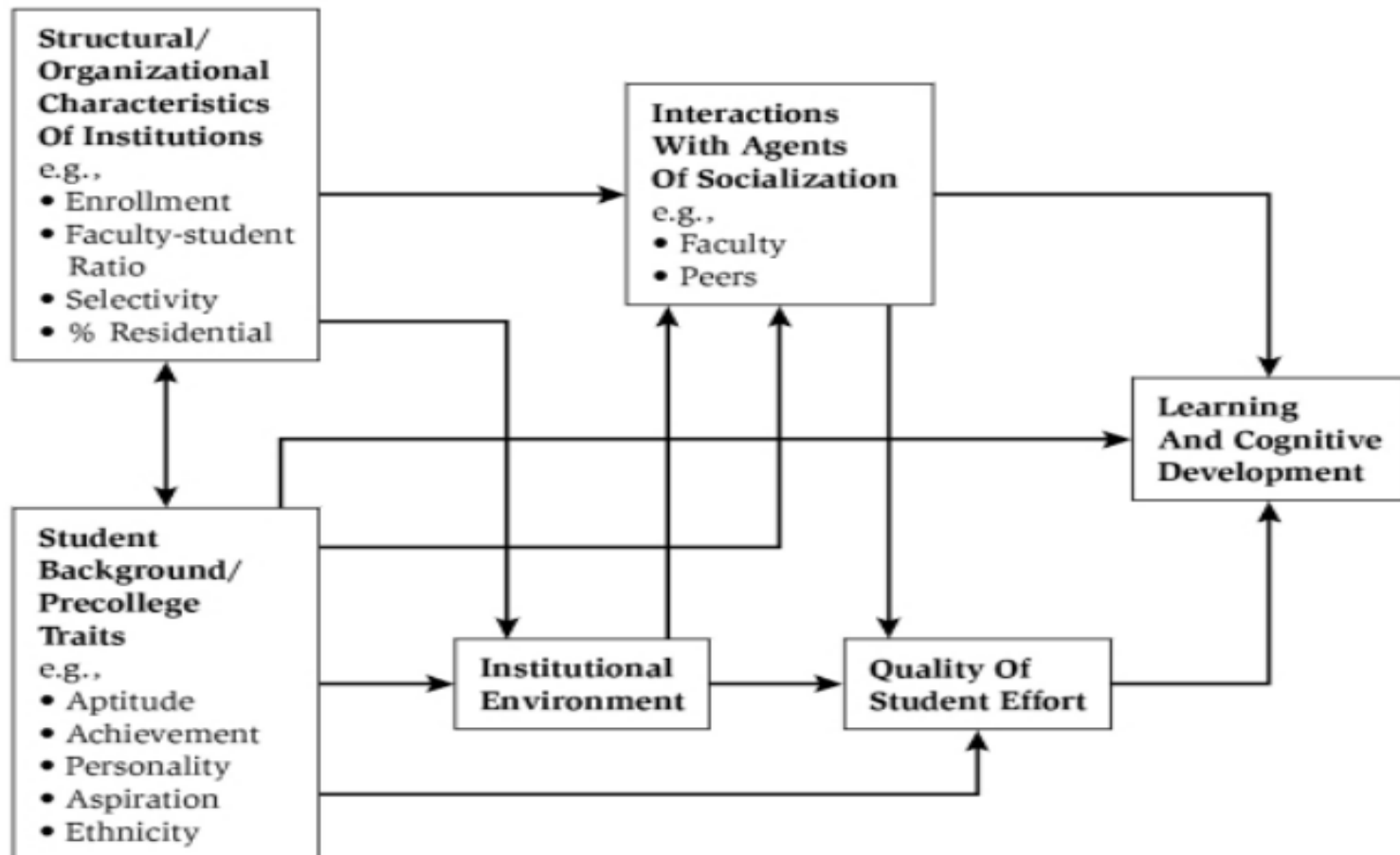
Figure 3.2
Theory of Student Departure in Commuter Colleges and Universities



Source: Adapted from Braxton, Hirschy, & McClendon (2004).

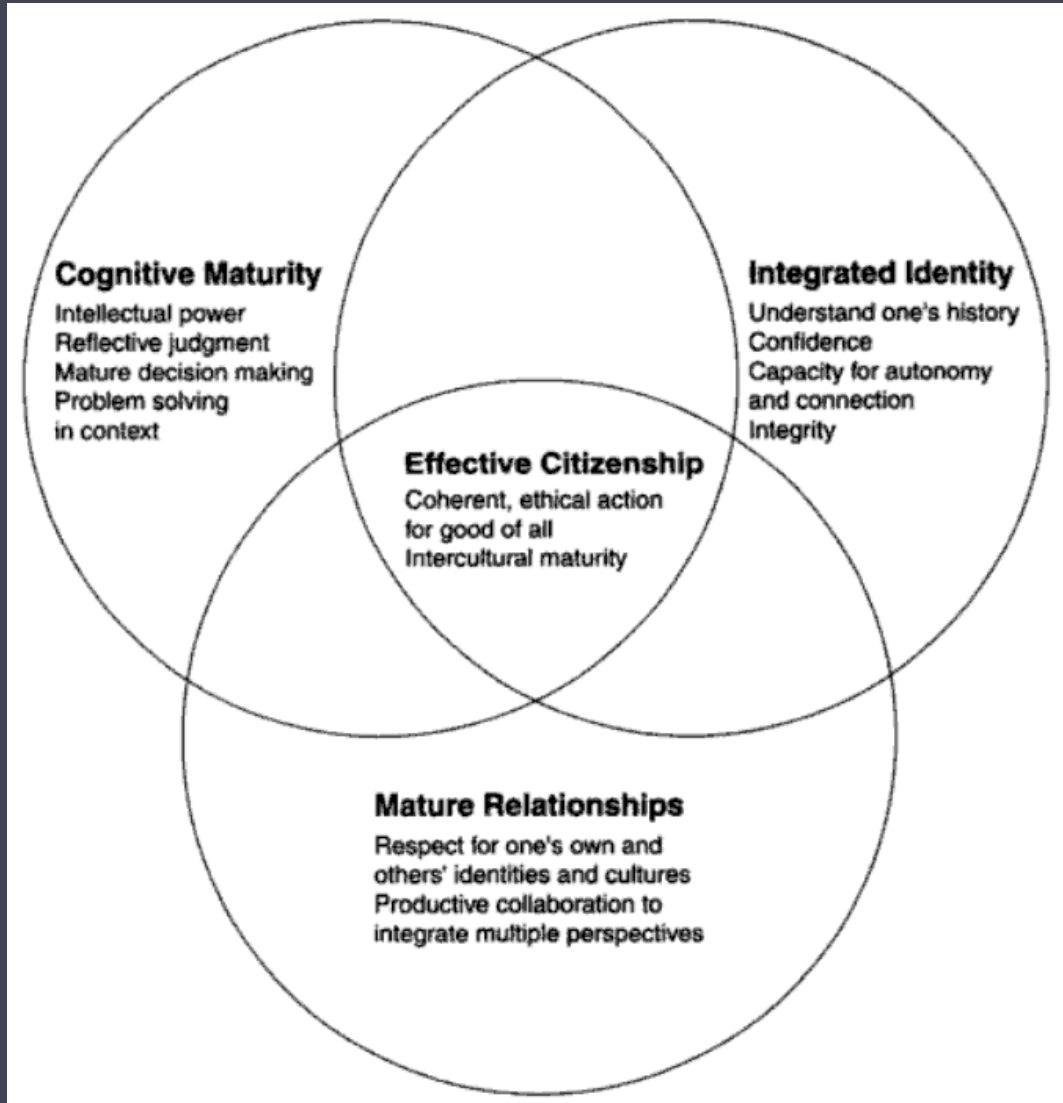
Another Example

Figure 2.2. A General Causal Model for Assessing the Effects of Differential Environments on Student Learning and Cognitive Development



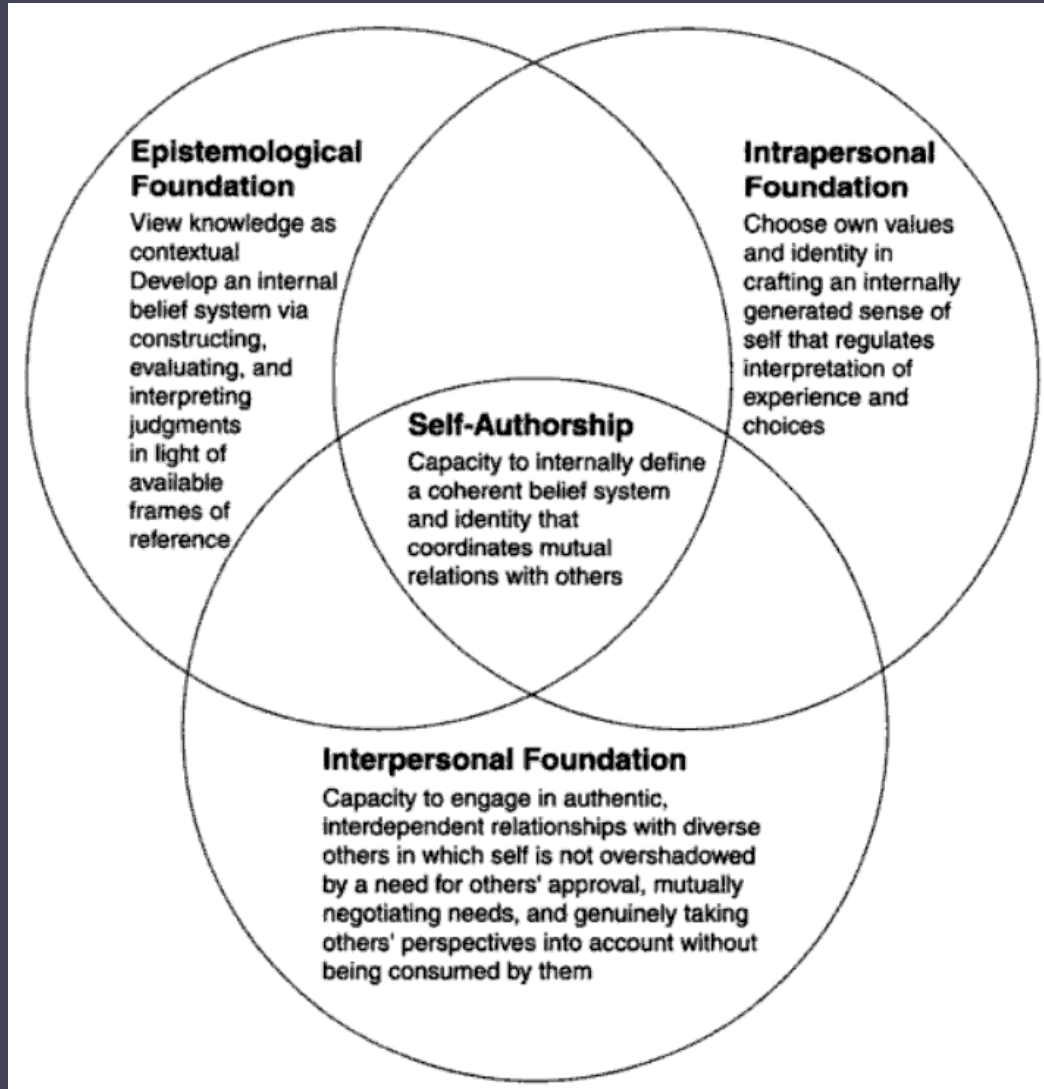
Source: Pascarella, 1985, p. 10. Copyright © 1985 Agathon Press, Inc., with kind permission of Kluwer Academic Publishers.

Integrated Model of Contemporary College Learning Outcomes



Baxter Magolda, M. B., & King, P. M. (Eds.). (2004). *Learning partnerships: Theory and models of practice to educate for self-authorship*. Sterling, VA: Stylus

Developmental Foundations of Learning Outcomes



Baxter Magolda, M. B., & King, P. M. (Eds.). (2004). *Learning partnerships: Theory and models of practice to educate for self-authorship*. Sterling, VA: Stylus.

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

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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 **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

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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

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Research Paper Requirements