



Research Process in SOCIAL SCIENCE RESEARCH

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Research

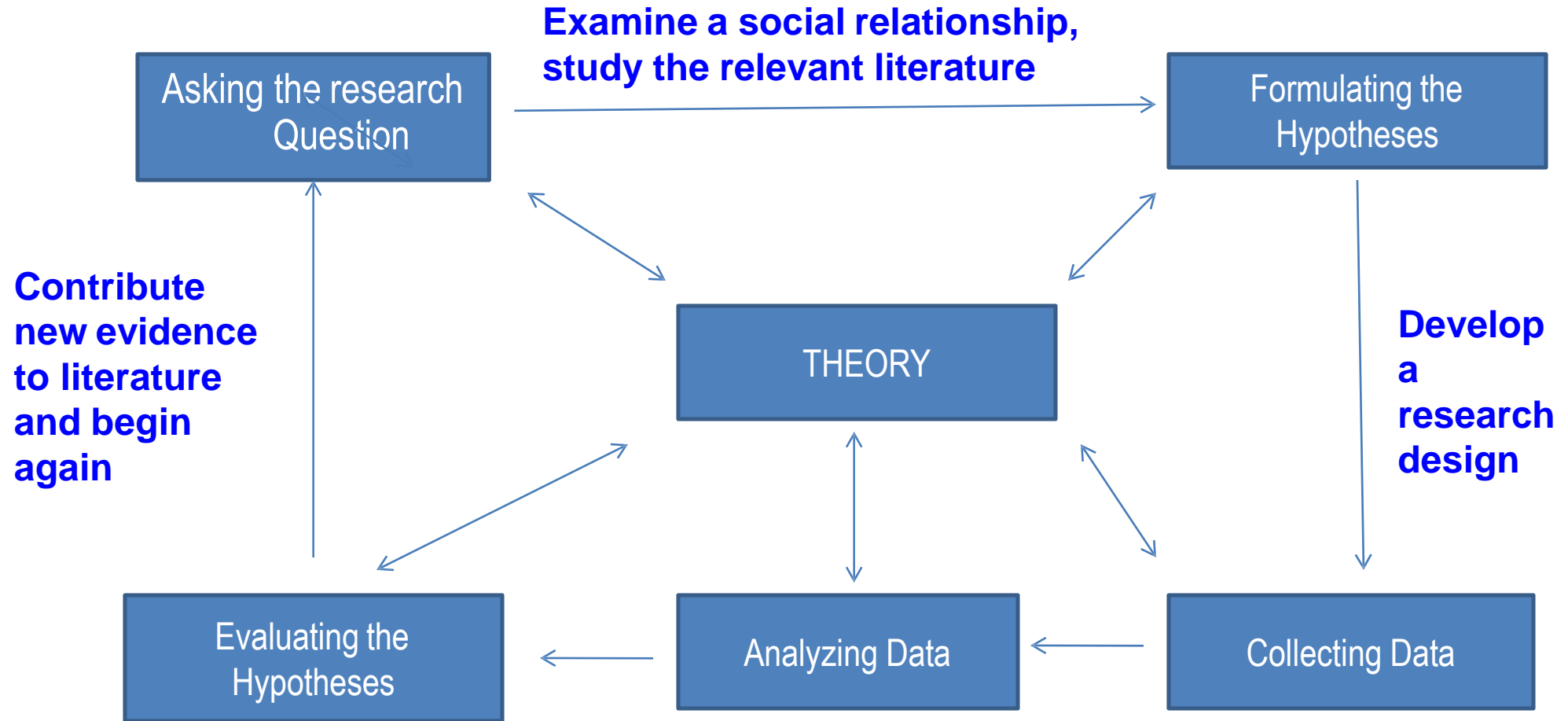
- Research-
 - organized set of activities
 - to find practical solution
 - for a realistic problem
 - supported by data

Research Process

- The research process
 - ongoing planning
 - searching
 - discovery
 - reflection
 - synthesis
 - revision and
 - Learning

Cont'd

Research Process

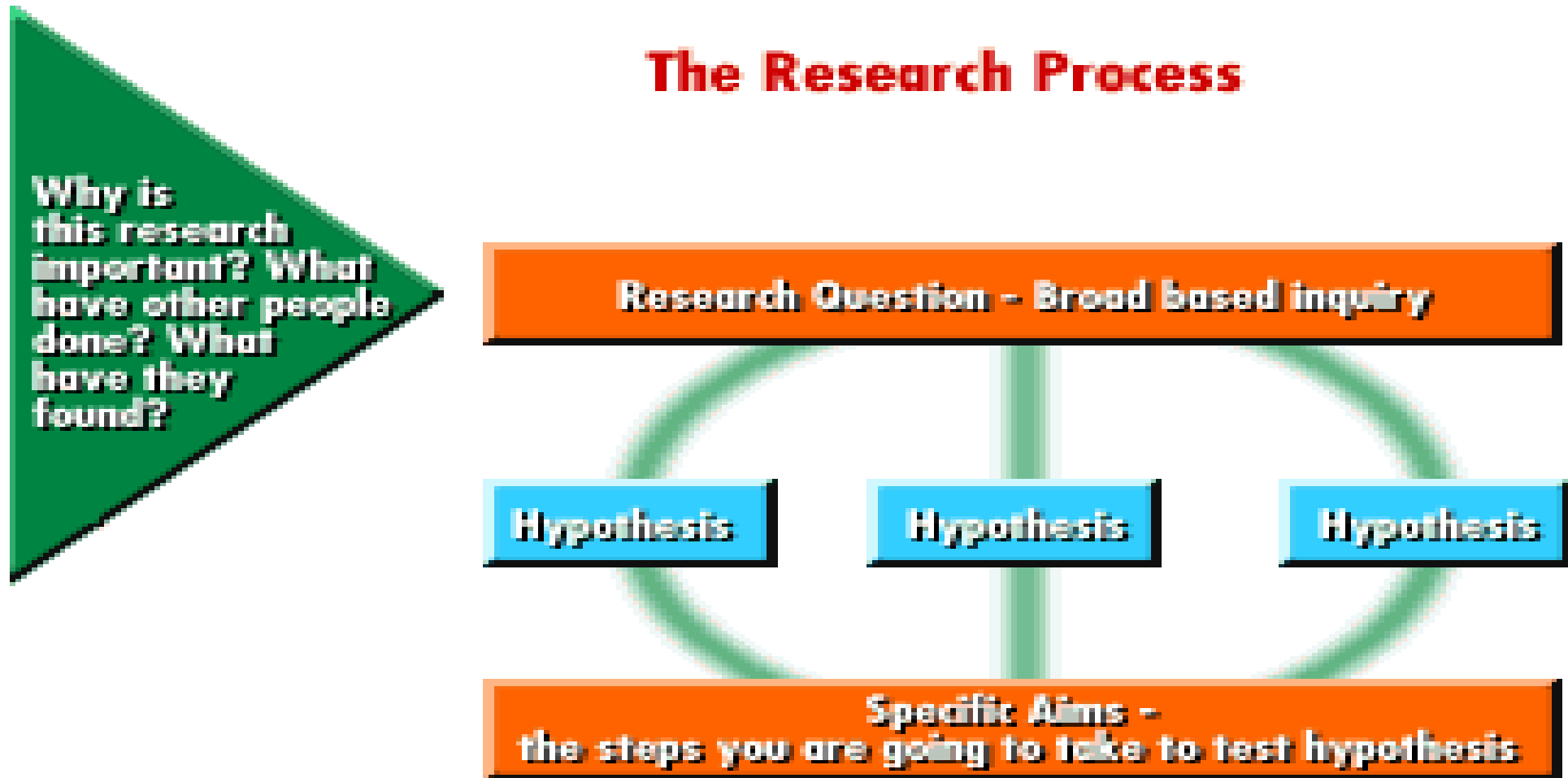


Research Question, Hypothesis and Specific Aim

- A Research Question is a statement that identifies the phenomenon to be studied
 - Eg: Are the researchers who utilize an online grant writing tutorial get higher priority scores on their next grant application than those who do not?
- A well-thought-out and focused research question leads directly into your hypothesis
 - Eg: Those researchers who utilize an online grant writing tutorial will have higher priority scores on their next grant application than those who do not.
- If you have good hypotheses, they will lead into your specific aims
- Specific aims are the steps you are going to take to test your hypotheses
 - Eg: Conduct a rigorous empirical evaluation of the online grant writing tutorial, comparing outcome and process measures from two groups—those with exposure to the tutorial and those without

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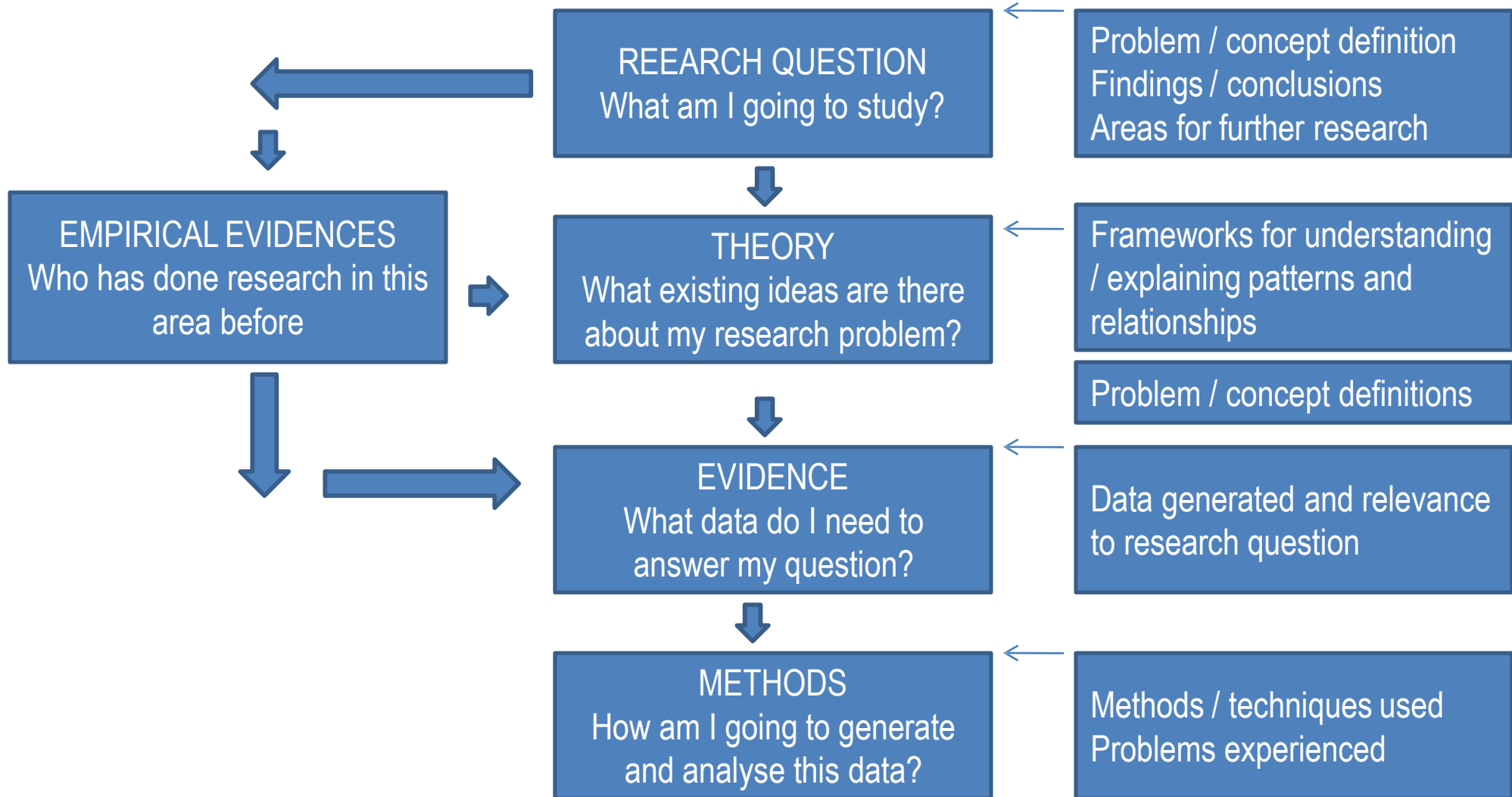
Research Question, Hypothesis and Specific Aim



The Role of Theory in Research

- Theory is a model or framework for observation and understanding
- Theory is a generalised statement that asserts a connection between two or more types of phenomena – any generalised explanatory principle.
- Theory is a system of interconnected abstractions or ideas that condenses and organises knowledge about the world.
- Theory explains and predicts the relationship between variables.

The Role of Theory in Research



Relationship between Theory and Research

- **Theory -**

- provides basic concepts and directs us to the important questions.
- suggests ways for us to make sense of research data.
- enables us to connect a single study to the immense base of knowledge to which other researchers contribute.
- helps a researcher see the forest instead of just a single tree.
- increases a researcher's awareness of interconnections and of the broader significance of data.

The Role of Hypothesis in Research

- A proposition is a statement about observable phenomena (concepts) that may be judged as true or false.
- When a proposition is formulated for empirical testing, we call it a hypothesis.
- Hypotheses are tentative answers to research questions
- The hypothesis that the experimental treatment has no effect is called the null hypothesis (Denoted as H_0); The one that has effect is called the alternate hypothesis (Denoted as H_1)
 - It guides the direction of the study.
 - It identifies facts that are relevant and those that are not.
 - It suggests which form of research design is likely to be most appropriate.
 - It provides a framework for organizing the conclusions that result

Research Design

- The blueprint/roadmap that will guide the research.
- The test for the quality of a study's research design is the study's conclusion validity.
 - Internal-Whether the research findings accurately reflect the research variables.
 - External Validity – Generalizability of the findings to the intended/appropriate population/setting

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Research Design

- Experimental Designs:
 - True Experimental Studies
 - Pre-experimental Studies
 - Quasi-Experimental Studies
- Non-Experimental Designs:
 - Expost Facto/Correlational/differential Studies
 - The design of choice in social sciences since the phenomenon under study is usually not reproducible in a laboratory setting
 - Researcher has little or no control over study's indep., dep. and the numerous potential confounding variables
 - Generally, higher external validity, lower internal validity

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Research Design

- How do you achieve internal and external validity?
- By effectively controlling 3 types of variances:
 - Variance of the INDEPENDENT & DEPENDENT variables (Systematic Variance)
 - Variability of potential NUISANCE/EXTRANEIOUS/ CONFOUNDING variables (Confounding Variance)
 - Variance attributable to ERROR IN MEASUREMENT-instrument/response error (Error Variance)

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Research Design

- Guiding principle for effective control of variances (or effective research design) is:
- The MAXMINCON Principle
 - MAXimize Systematic Variance
 - MINimize Error Variance (Conduct validity and reliability tests)
 - CONTROL Variance of Nuisance/Extraneous/ Exogenous/Confounding variables

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Research Design

- Effective research Design-
 - Adequate (full range of) variability in values of research variables,
 - Precise and accurate measurement,
 - Identifying and controlling the effects of confounding variables, and
 - Appropriate subject selection

Data and Data Collection

- Fundamentally--2 types of data
 - Quantitative – Numbers, tests, counting, measuring
 - Qualitative – Words, images, observations, conversations, photographs
- Data Collection Techniques
 - Observations
 - Tests
 - Surveys
 - Document analysis(the research literature)

Analysis of Data

- Descriptive statistics
 - Used to describe what's going on in our data
 - Central Tendency(Mean, Median,Mode)
 - Dispersion (Range, Standard Deviation)
- Inferential statistics
 - Used to make inferences from our data to more general conditions
 - t-test, ANOVA, MANOVA, ANACOVA, Regression analysis, Correlation, etc

Evaluating the Hypotheses

- State hypotheses
 - H_0 : Reading to young children will decrease or not change IQ scores.
 - H_1 : Reading to young children will increase IQ scores.
- Set criterion for rejecting H_0
 - $\alpha = .05$, level of significance ($z_{CV} = +1.645$)
 - critical value for area = .05
- Compute statistics(p value)
- Interpret Results
 - Is *p value* in the critical region?
 - yes
 - reject H_0 , accept H_1
 - These data suggest that reading to young children does increase IQ.