

## Ch. 2: The Research Enterprise in Psychology

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### I. Scientific Method

- a. Defining the problem
- b. Formulating a hypothesis
  1. A possible explanation for an observed set of facts
  2. Scientist generates testable predictions from the hypothesis
  3. Must be falsifiable
- c. Testing w/ experimentation
  1. Use of controlled experiment which allow researchers to isolate and test the effects of a single factor, called a **variable**
  2. Independent variable (IV): condition that is varied
  3. Dependent variable: condition that responds to changes in the IV
  4. Experimental group: exposed to changes in the IV
  5. Control group: not exposed to changes in the IV
- d. Making & Recording Observations
- e. Analyzing & Drawing Conclusions
  1. Experimental data can provide evidence to support, modify, or reject a hypothesis
- f. Reporting Observations
  1. Report findings in scientific journals
  2. Journals use peer review
- g. Scientific Law
  1. Statement that describes a phenomenon that is always true, ex Law of Gravity
- h. Theory
  1. Explanations that apply to a broad range of phenomenon & are supported by much experimental evidence, ex. Germ Theory of Disease

### II. Types of Scientific Reasoning

- a. Deductive Reasoning
  1. Reasoning from general theory to specific cases
  2. The conclusion logical follows the premises
  3. The conclusions has to be true if the premises are true
  4. Main use of deductive reasoning
    - A. Used to generate testable predictions from a hypothesis
    - B. Producing specific, ex. Using Mendel's Law of Heredity to predict eye color of offspring
- b. Inductive Reasoning
  1. Reasoning process in which conclusion is drawn from specific cases
  2. The premises (facts & observations) provide good reasons for accepting the conclusion
  3. It is possible that the premises (specific fact) are true while the conclusion is false, since there is no logical movement from premises to conclusion
  4. Uses of Inductive
    - A. Generating hypothesis
    - B. Discovering relationships
    - C. Essential for scientific discovery

### III. Descriptive/Correlational Research

- a. Researchers only describe patters of behavior and discover links or associations between variables
- b. Researcher cannot manipulate the variables under study and hence cannot be used to find cause & effect relationship between variables
- c. Types of Descriptive
  1. Naturalistic Observation
    - A. Researcher carries out observations of behavior without intervening directly with the subjects
    - B. Behavior is allowed to occur naturally in its natural environment

- C. Behavior can be studied under less artificial conditions than in experiments
- 2. Case-Studies
  - A. An in-depth investigation of an individual
  - B. Include interviewing the subject or people close to the subject, direct observation, examination of records, and psychological testing
  - C. Tend to be highly subjective
- 3. Surveys
  - A. Researchers use questioners or interviews to gather info about specific aspects of participants behavior
  - B. Can collect data on attitudes and opinions from a large # of participants
  - C. A problem is that they depend on self reported data which may not be an accurate description of a person's behavior due to people lying on surveys (giving the answer that would be socially correct one instead of their own)

#### IV. Statistics and Research

- a. Statistics is the use of mathematics to organize, summarize, and interpret numerical data
- b. Central Tendency: A typical or average score
  - 1. Median: score that falls in the center of a distribution of scores
  - 2. Mean: The arithmetic average of the scores in a distribution
  - 3. Mode: most frequent score in a distribution
- c. Variability
  - 1. Refers to how much the scores in a data set vary from each other and from the mean. The standard deviation is an index of the amount of variability in a set of data
- d. Correlation
  - 1. Exists when two variables are related to each other
  - 2. The correlation coefficient is a numerical index of degree of relationship between two variables
  - 3. A + correlation indicates that two variables co-vary in the same direction
  - 4. A – correlation indicates that two variables co-vary inversely to one another
  - 5. The size of a coefficient indicates the strength of an association between two variables. Can vary between 0 and +1 & between 0 and -1
  - 6. A coefficient near 0 indicates no relationship between variables, while near +1 or -1 indicates a strong relationship
  - 7. Correlation is not the same as causation