



Psychology as a Science

- In this lecture we will discuss:
 - science - a method for understanding
 - limits of common sense
 - methods of science
 - description
 - correlation
 - experimentation
 - sources of error and bias in research



Science vs. Common Sense

- Common sense and intuition often tell us about psychology
 - common sense may tell us - “out of sight, out of mind”
 - or common sense may say the opposite - “absence makes the heart grow fonder”
- Common sense can be inconsistent and based on hindsight



Science vs. Common Sense

- Science helps build explanations that are consistent and predictive rather than conflicting and postdictive (hindsight)
- Science is based on
 - knowledge of facts
 - developing theories
 - testing hypotheses
 - public and repeatable procedures (replication is essential!)



Scientific Inquiry

- Facts are what need to be explained
 - objective - viewable by others
 - based on direct observation
 - reasonable observers agree are true
- Theory is a set of ideas that
 - explains facts
 - makes predictions about new facts
- Hypothesis
 - prediction about new facts
 - can be verified or falsified



Methods in Psychology

- Setting - field vs. laboratory
- Research designs
 - descriptive
 - correlational
 - experimental





Research Settings

■ Laboratory

- a setting designed for research
- provide uniform conditions for all subjects
- permits elimination of irrelevant factors
- may seem artificial

■ Field research

- behavior observed in real-world setting
- poor control over conditions
- measures may be more representative of reality





Descriptive Study

- Describes a set of facts
- Does not look for relationships between facts
- Does not predict what may influence the facts
- May or may not include numerical data
- Example: measure the % of new students from out-of-state each year since 1980



Types of Descriptive Studies

- Naturalistic Observation
- Case Study
- Surveys



Correlational Study

- Collects a set of facts organized into two or more categories
 - measure amount of TV violence watched per/day
 - measure children's aggressive behavior
- Examine the relation between categories
- Correlation reveals relationships among facts
 - e.g., Children who watch more violence on TV behave more aggressively.



Correlational Study

- Correlation cannot prove causation
 - Does watching violence on TV cause children to behave aggressively?
 - Does behaving aggressively cause children to watch more violence on TV?
- May be an unmeasured common factor
 - e.g., lack of parental involvement leads children to behave more aggressively AND to watch more violence on TV.



Correlation Coefficient

- Measures whether two variables change in a related way
 - Correlations range from -1.0 to 1.0
 - Positive correlation
 - Negative correlation



Experiments

- Direct way to test an hypothesis about a cause-effect relationship between factors
- Factors are called *variables*
- One variable is controlled by the experimenter
 - e.g., democratic vs. authoritarian classroom
- The other is observed and measured
 - e.g., cooperative behavior among students



Experimental Variables

- Independent variable

- the controlled factor in an experiment
- hypothesized to cause an effect on another variable

- Dependent variable

- the measured facts
- hypothesized to be affected



Experimental Design

- Population V. Sample

- Population refers to the entire group that you want to know about.
- Sample is the smaller subset of the population that actually use in your study.

- Types of Samples

- Random
- Representative Sample
- Convenience Sample



Experimental Design

- Random sample - every member of the population being studied should have an equal chance of being selected for the study
- Random assignment - every subject in the study should have an equal chance of being placed in either the experimental or control group
- Randomization helps avoid bias in results

Research Strategies

Comparing Research Methods

Research Method	Basic Purpose	How Conducted	What is Manipulated
Descriptive	To observe and record behavior	Case studies, surveys, and naturalistic observations	Nothing
Correlational	To detect naturally occurring relationships; to assess how well one variable predicts	Computing statistical association, sometimes among survey responses	Nothing
Experimental	To explore cause and effect	Manipulating one or more factors and using random assignment to eliminate preexisting differences among subjects	Independent variable(s)



Sources of Bias

- Biased sample - when the members of a sample differ in a systematic way from the larger population the researcher is interested in
- Example
 - interested in all voters
 - contact by telephone
 - biased sample - lower economic groups may not own telephones



Sources of Bias

- **Observer-expectancy effect**
 - researcher has expectations that influence measurements
 - Confirmation bias
- **Subject-expectancy effect**
 - subject knows design and tries to produce expected result
 - Halo effect
- **Blinding**
 - minimize expectancy by removing knowledge about experimental conditions



Blinding

- Single-blind study
 - when subjects are kept uninformed as to the treatment they are receiving
- Double-blind study
 - when both subjects and experimenter are kept uninformed about aspects of the study that could lead to differential expectations

Ethical Issues in Psychological Research



- Right to privacy
- Informed consent
 - use of deception
- Freedom from harm
- Debriefing
- Animal rights
 - Is there justification for discomfort or harm a research procedure may produce?
- APA publishes ethical guidelines