The Methods of Psychology

General Psychology: Chapter 2

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Outline/Overview

- Psychological Research – Core concepts/broad types
- Research methodologies
- Ethics in research
- Statistical concepts in research

Psychological Research – core concepts

- Theory – A scientific theory is a logical explanation for all of the relevant data or facts scientists have observed regarding certain natural phenomena.
  - Must be testable and refutable
- Hypothesis – A statement that proposes the existence of a relationship between variables, typically as a tentative explanation for cause and effect, hypotheses are often designed to be tested by research.

Purposes/Broad Types of Psychological Research

- Basic Research – Research that tests theories or hypotheses
- Applied Research – Research to solve a problem
- Replication studies – Research conducted for the purpose of verifying previous findings

Essential characteristics of science

- Accuracy
- Objectivity
- Skepticism
- Open-mindedness

Research Methods

- Case study–provides very rich, detailed information, may not be applicable to other cases.
- Survey-provides descriptive information in which a sample is questioned about behaviors or attitudes
- Observational – subjects are observed as they go about their usual activities
- Correlational–statistical techniques to determine the degree of relationship between variables
- Experimental–precisely controlled conditions where subjects encounter specific stimuli, reactions are carefully measured

Survey research

- Survey – Collect descriptive information about behaviors or attitudes from a sample of people
- Sampling – samples
  - Representative
  - Random
  - Convenience
- Limits of the Survey Method
  - Observer bias
  - Observer effect (Hawthorne Effect)
  - Sampling biases

Observational research

- Collecting descriptive information where subjects are observed as they go about their usual activities
- Naturalistic observation – a natural setting such as the subject's home or school environment
- Ethical issues with participant observation?

Correlational research

- Correlational method – determine the degree and direction of relationship between variables
- Coefficient of correlation (Pearson "r" correlation coefficient) – statistic used to describe relationship between variables
- The correlation coefficient ranges from +1.00 to -1.00
  - Zero and near zero indicate no relationship.
- A negative correlation indicates that increases in one measure are associated with decreases in the other.
- Correlation does not mean causation.

Experimental Research

- Experimental research – conducted in controlled conditions where subjects are confronted with specific stimuli, and their reactions are carefully measured to discover relationships among variables.
- Independent and Dependent Variables
  - Independent variable (cause)
  - Dependent variable (effect)
- Experimental and Control Groups
  - Experimental group – active treatment
  - Control group – same conditions as experimental group except for the key factor
  - Random assignment important

Experiment Example

- A study on depression has 200 volunteers
  - Hypothesis is that 75 mg of Drug X will result in a 50% decrease in depressive symptoms.
  - Independent variable is 75 mg; the dependent variable is 50% decrease in depressive symptoms.
  - Experimental Group - 100 subjects receive 75 mg of Drug X.
  - Control Group - 100 subjects receive a placebo.
- If more subjects on Drug X experience a decrease in their depression, while only a small number of those on placebo also experience a decrease in depression (placebo effect) then the drug is successful.
- However, if a an equal number of subjects in the experimental and control group have a decrease in their depression, or if those on placebo outnumber those on Drug X who have a decrease in their depression, then the drug is unsuccessful.

Limitations

- The sample must be representative of the population.
  - The results are limited if not representative.
- Artificial nature of the laboratory or clinic setting
- People may respond differently in the lab or clinic.
- Not all questions can be answered by experimental investigation.

Ethics in Psychological Research

- Stanley Milgram's obedience studies - early 1960s.
  - Subjects told they were participating in a study of the effects of punishment on learning. (Deception was used.)
  - Goal - determine whether subjects would administer painful shocks to others merely because an authority figure instructed them.
- Stanford Prison Experiment
  - Conducted in the 1970s by Philip Zimbardo
  - Simulated a prison environment to study how incarceration influenced the behavior of healthy, well-adjusted people
- American Psychological Association Ethical Guidelines
  - Researchers avoid procedures that might harm human subjects.
  - Investigators need to obtain informed consent.
  - Right to refuse to participate at any time is respected.
  - Confidentiality must be maintained.

Statistical Concepts for Research

- Statistics – Mathematical methods for describing and interpreting data
- Two kinds of statistics: descriptive and inferential statistics
- Descriptive statistics – Mathematical and graphical methods for reducing data to readily understood form
- Measure of central tendency – In descriptive statistics, a value that describes central point of a distribution of scores includes the following:
  - Mean, Median, Mode

Descriptive Statistics

- Mean – arithmetic average
- Median – score that falls in the middle of a distribution
- Mode – most frequent value
- Normal Distribution – scores are distributed similarly on both sides of the middle value, bell-shaped curve when graphed.
- Skewed – In descriptive statistics, this term describes an unbalanced distribution of scores.
  - A right-skewed (also called *positively* skewed) distribution has some unusually high scores, but most scores tend to be low.
  - A left-skewed (also called *negatively* skewed) distribution has some unusually low score, but most scores tend to be high.

Descriptive Statistics

- Measure of variability – indicates whether scores are clustered closely around their average or widely spread out.
  - Range – the difference between the highest and lowest scores
  - Standard deviation – indicates the average distance of the scores from the mean score
- Percentile – indicating percentages of scores that lie below them
- Standard score – indicates how far a score deviates from the average in standard units

Statistical terminology

- Inferential statistics – using mathematical procedures to draw conclusions about the meaning of research data-making inferences to populations based on samples
- Operational definition – definition of variable in a study, such as a definition of obesity specifying a certain weight-height relationship
- Statistical significance – describes research results in which changes in the dependent variable can be attributed with a high level of confidence to the experimental condition (or independent variable) being manipulated by the researcher