

Psychology: Themes and Variations Second Canadian Edition

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Class 4

Research Methods in Psychology

Ways of Knowing

- Lots of different ways of knowing about something
 - Belief
 - Second-hand knowledge
 - Anecdotal information
 - Hearsay
 - Theory
 - Empirical observation
- Not all Empirically derived knowledge is scientific
 - Personal observations (subjective)

The Scientific Approach: A Search for Laws

- Basic assumption: events are governed by some lawful order
- Goals:
 - 1. Measurement and description
 - 2. Understanding and prediction
 - 3. Application and control

Steps in a Scientific Investigation

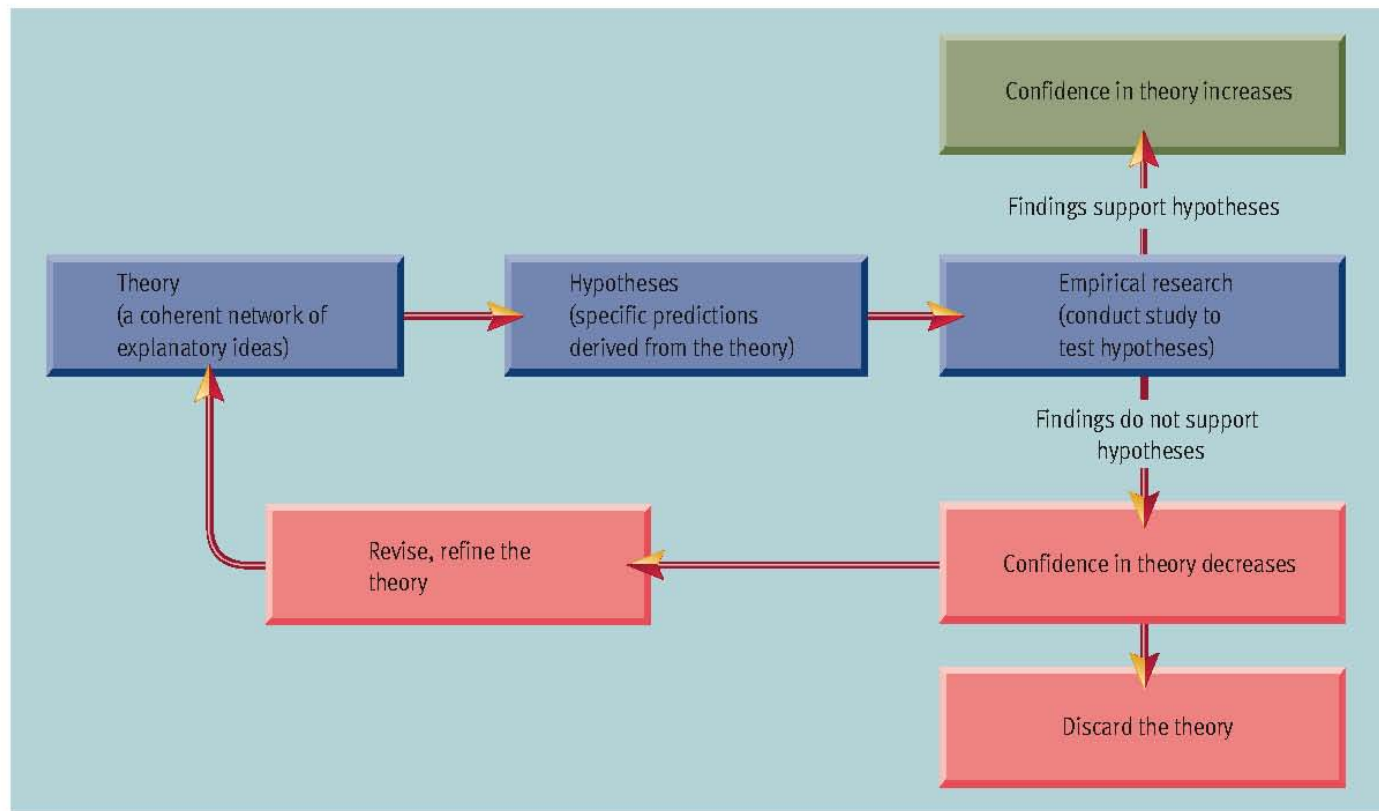
1. Formulate a testable hypothesis.
2. Select the research method and design the study.
3. Collect the data.
4. Analyze the data and draw conclusions.
5. Report the findings.

Theory Construction

Figure 2.1

Theory construction.

A good theory will generate a host of testable hypotheses. In a typical study, only one or a few of these hypotheses can be evaluated. If the evidence supports the hypotheses, our confidence in the theory they were derived from generally grows. If the evidence does not support the hypotheses, confidence in the theory decreases and revisions to the theory may be made to accommodate the new findings. If the hypotheses generated by a theory consistently fail to garner empirical support, the theory may be discarded altogether. Thus, theory construction and testing is a gradual process.



The Scientific Method: Terminology

- Operational definitions are used to clarify precisely what is meant by each variable
 - Ex. Intelligence is whatever is measured by the Intelligence test
 - Good operational definitions are critical for doing good science
- Participants or subjects are the organisms whose behaviour is systematically observed in a study
- Data collection techniques allow for empirical observation and measurement
- The nature of the question dictates what will be the appropriate subject and technique.

The Scientific Method: Terminology

- Statistics are used to analyze data and decide whether hypotheses were supported
- Findings are shared through reports at scientific meetings and in scientific journals – periodicals that publish technical and scholarly material
 - Advantages of the scientific method: clarity of communication and relative intolerance of error
 - Replication and convergence
- Research methods: general strategies for conducting scientific studies

Experimental Research: Looking for Causes

- Experiment = manipulation of one variable under controlled conditions so that resulting changes in another variable can be observed
 - Detection of cause-and-effect relationships
- Independent variable (IV) = variable manipulated
- Dependent variable (DV) = variable affected by manipulation
 - How does X affect Y?
 - X= Independent Variable, and Y= Dependent Variable

Experimental and Control Groups: The Logic of the Scientific Method

- Experimental group – subjects who receive or are exposed to the independent variable
- Control group – subject who are identical to the experimental group in every way, except that they do not receive the IV
 - Logic:
 - Two groups alike in all respects (random assignment)
 - Manipulate independent variable for one group only
 - Resulting differences in the two groups must be due to the independent variable
- Extraneous and confounding variables must be identified and controlled

Experimental Designs: Variations

- Expose a single group to two different conditions
 - Reduces extraneous variables
 - Ex. Before and after a treatment
- Manipulate more than one independent variable
 - Allows for study of interactions between variables
 - May require more than one control group
- Use more than one dependent variable
 - Obtains a more complete picture of effect of the independent variable

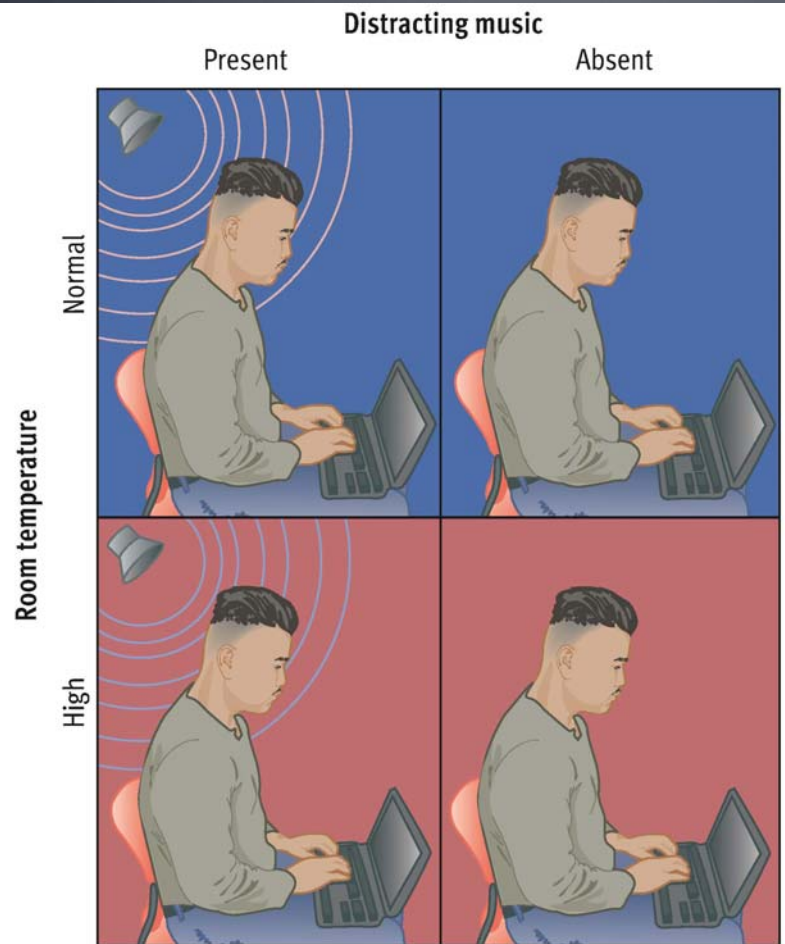


Figure 2.2

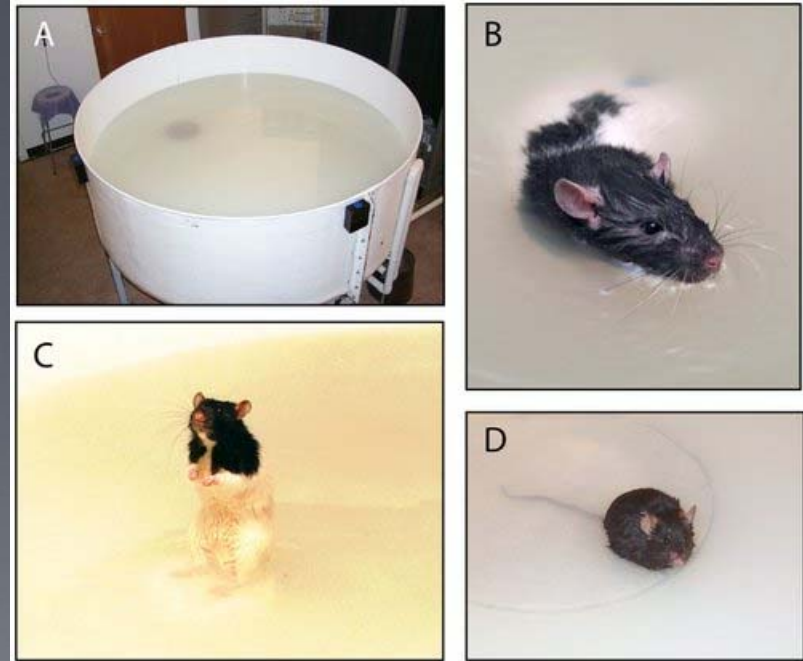
Manipulation of two independent variables in an experiment. As this example shows, when two independent variables are manipulated in a single experiment, the researcher has to compare four groups of subjects (or conditions) instead of the usual two. The main advantage of this procedure is that it allows an experimenter to see whether two variables interact.



Experiments in Physiological Psychology

Animal Behavior

- Does the IV (drug, disease, toxin, etc.) change their behavior?
- Morris Water Maze - swimming memory maze



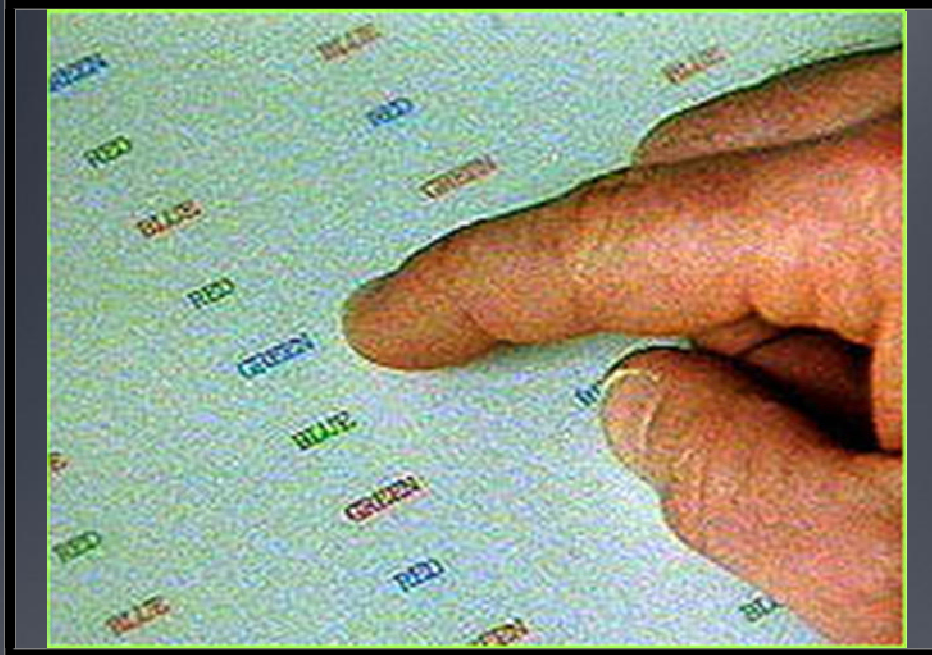
Knock-Out Mice Can Be Designed

- The mouse genome is now known
- Specific genes can be “knocked out”
 - Ob/ob mouse doesn't have leptin
- You can study how obesity occurs by studying what is different about genetically obese mice



Wild type

Ob/ob KO



Experiments in Cognitive Psychology

Stroop Interference Task

- Cognitive task designed to study mental flexibility, unconscious processing, etc.
- Takes advantage of our ability to read words more quickly and automatically than we can name colors.
- The cognitive mechanism involved in this task is called **directed attention**, you have to manage your attention, inhibit or stop one response in order to say or do something else.
- <http://www.snre.umich.edu/eplab/demos/sto/stroopdesc.html>
- PstkTrek 3.0 CD-ROM

Blue

Red

Green

Yellow



Blue

Red

Green

Yellow