



The Science of Psychology

Module 2
Psychology's Scientific Method



Module Objectives

- ψ Why is Psychology a Science?
- ψ What is the scientific method?
- ψ Why should I believe what researchers say?
- ψ How do Psychologist's design a study?
 - Types of research



Scientific psychology has four basic goals:

to describe, explain, predict, and change behavior and mental processes

Psychology as a Science

ψ Psychologists must engage in careful systematic observation when studying behavior and mental processes


- Systematic observation is setting up our study so that we eliminate or reduce *bias*.

“We must keep our minds open but not so open that our brain falls out.”

(Oberg, 1995)

Why can't scientists base their research off of casual, everyday observations?

(AKA, *People watching*)




Unfortunately, casual observation is subject to bias that can distort information

We tend to notice the behavior that fits our stereotypes

ψ Skepticism combines two opposing attitudes:


- an openness to new ideas combined with a willingness to subject these claims to scrutiny.



Why is Research Conducted?


ψ The purpose of scientific research is to create new knowledge.


- This knowledge is applied in all areas of society to provide solutions.



How Do Scientists Collect and Evaluate Evidence?

The *Scientific Method* is how Psychologists gain knowledge about the mind and behavior





Scientific Method in Psychology

Ψ Step 1: Before research begins, a problem must be identified.

- Observe some *phenomenon*...and want to know why it exists.

Ψ Phenomena that psychologists study are called a *variables* (anything that can change).



Ψ Why are more students enrolling in community colleges than in previous years?



Ψ The answer to such questions are called *theories*.


- Theories seek to *explain* why things have happened, and they can be used to make *predictions* about future observations

Make a Prediction!

Ψ Step 2: Develop a *testable hypothesis*, or a specific prediction about how one factor is related to another.

Ψ Drinking excessive amounts of caffeine before the exam will increase my score...how can we make this testable?

What is a testable hypothesis for this nursery rhyme?



The illustration shows a green hillside with a winding path. At the top of the hill is a small house with a chimney. A path leads down the hill. In the foreground, two children are lying on the path, having fallen. One child is wearing a purple dress and the other is wearing a pink dress. A small red flower is visible on the grass to the right. The sky is light blue with some clouds.

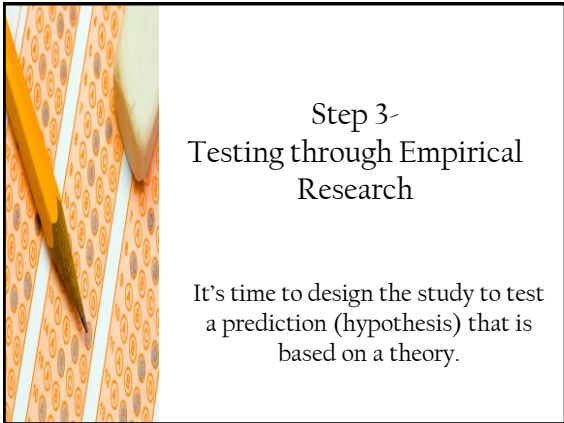
What is your Hypothesis?

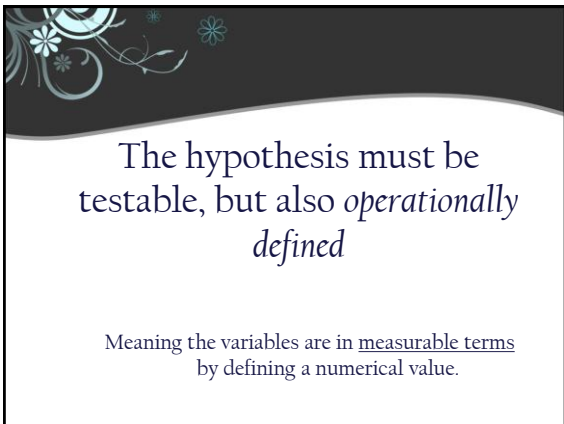
Ψ What could help us understand why Jack and Jill fell down the hill?


Ψ Perhaps we could *hypothesize* that fetching water causes falls.

- There is a correlation or a relationship between the terrain and the likelihood of falling.










Get into groups of 3-4 and
Operationally define the
following

- Sadness
- Creativity



Examples of
Operational Definitions

- ψ Aggressive behavior – the number of times a child punches a punching bag over the course of one hour
- ψ Happiness – the number of times a person smiles while watching a Disney movie
- ψ Intelligence – a score on an IQ test
- ψ Anxiety – the number of pencils a student brings to an exam

Was my prediction correct?
Step 4 - Drawing Conclusions

- ψ Researchers draw conclusions about the results of the study. Did the information support or oppose their hypothesis?
- ψ Don't forget...this information **MUST** be *replicated* to be accepted as valid.

Evaluating the theory

ψ If the information produced in a study supports the original hypothesis it is published in the scientific community in *peer-reviewed journals*.

- The scientific community continues to debate the issue further.



What's Next?

Types of Psychological research

Types of Psychological Research

- Experimental Research
- Descriptive Methods
- Correlational Research
- Biological Research


Descriptive Research describes events or phenomenon that already exist.

This type of research can reveal important information about people's behaviors and attitudes.

This research method is used to observe and record behavior without producing an explanation

Naturalistic Observation

ψ A systematic observation what many people do under natural conditions, without interference.



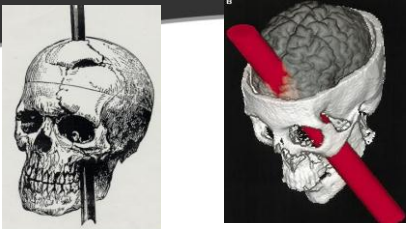
Case Study

- ψ An in-depth look at a single (unusual) individual.
- ψ Case studies provide dramatic, detailed information about a person's life, but their generalizability is limited.

Example of a Case Study Phineas Gage




- ψ On September 13, 1848 an accidental explosion blew a tamping iron through his head. The tamping iron was 3 ½ feet long and weighed 13 pounds. The tamping iron went in under his left cheek bone and completely out through the top of his head, landing about 25 to 30 yards behind him.

Phineas Gage (1848)... Yes he LIVED!



Most of the front part of the left side of his brain was destroyed. Afterwards he experienced serious personality changes and his friends reported that he was "no longer Phineas."

* Ask questions...






Ψ Surveys examines more people in less depth.

- A survey presents a standard set of questions, or *items*, to obtain people's self-reported attitudes or beliefs about a topic.

Ψ Although these a be a great way of collecting data, they must be properly constructed.

Limitations



Ψ People tend to answer the questions to make them look good, rather than provide how they really feel about the topic.

Ψ Or they simply lie...

Correlational Studies

Ψ Research that examines the relationships between variables by making predictions.

- The purpose is to examine whether and how two variables change together.

Ψ Correlation indicates the strength and direction of a relationship.

- It allows for prediction of one variable based on the other variable

The strength of the relationship is measured by a *correlation coefficient* which ranges from $+1$ to -1

- +1: perfect positive correlation (perfect relationship)
- 0: no correlation (no relationship)
- 1: perfect negative correlation (perfect relationship)

(a) Positive Correlation (b) Negative Correlation (c) Zero Correlation

ψ In a positive correlation, the two factors move (or vary) in the same direction.

ψ In a negative correlation, the two factors vary in opposite directions—that is, as one factor increases, the other factor decreases.

ψ Sometimes there is no relationship between two variables—a zero correlation.

Name that Correlation!

- ψ The more you party, the lower your test grade.
Negative correlation
- ψ The more you study, the higher your test grade
Positive correlation
- ψ The amount of time a college student studies and their height in inches
NO (Zero) correlation

“Correlation is not causation!”

- ψ Just because there is a correlation between two variables does not mean that one variable causes another.
- ψ The relationship could be the result of another variable that was not studied (*third-variable problem*)

Experimental Research

This is the ONLY research design that can examine a single factor's effect on a particular behavior



Experimental Method

- ψ A study in which the investigator manipulates at least one variable while measuring at least one other variable.
- Determines a cause and effect relationship between variables and should involve random assignment of participants.

Experimental Design

Ψ Variables are a condition or characteristic that is subject to change.

Ψ There are two types of variables in every study:

- Independent variable:

- Factor that is manipulated

- Dependent variable:

- Behavior/variable that is measured

Variables

Ψ Independent Variable is the variable is purposefully manipulated by the experimenter to see what changes happen.

- This is done to see how the other variables will be effected.

What will happen if...?

Ψ Dependent Variable is the behavior that is measured because it is expected to change.

- *Outcome or effect*

Ψ **If I move all of my front row students to the back, what will happen?**

Identify the Variable
Independent and Dependent?

ψ Developmental psychologists want to know if exposing children to differing amounts of public television improves their reading skills.

ψ IV- the amount of public television watched
ψ DV- change in reading skills

Name the Variables!

ψ A clinical psychologist is interested in how heart rate is affected by viewing a violent film as opposed to a nonviolent film

ψ IV- film type (violent or nonviolent)
ψ DV- change in heart rate

Try another one

ψ Cognitive psychologists are interested in what types of diagrams are easiest for people to remember

ψ IV- Types of Diagrams
ψ DV- Effect on memory

OK, Last One...

ψ An industrial/organizational psychologist tests to see if wearing name tags makes employees happier with their work

ψ IV- Wearing name tags

ψ DV- Happiness at work


Who will you study?

ψ Participants in a study are individuals in an experiment whose behaviors are observed.

- The sample
- All have something in common which is based on what the researcher is testing

Participants are randomly assigned to one of two groups:

1. The Control Group- (Comparison group)
 - This group does not receive the independent variable
 - It does not receive the treatment
2. The Experimental Group- receives new treatment
 - This group "receives" the independent variable

 Next Class...

ψ Biopsychology

- How is the nervous system organized?
- How do “brain chemicals” influence our behavior?
