

Psychological Research



Muhammad Asim



Importance of Psychological Research

- ✓ Research
the difference between facts (observable realities) and opinions.
- ✓ Psychologists use the *scientific method* to conduct research that confirms facts, and facts can be established only through the use of ***empirical research***.

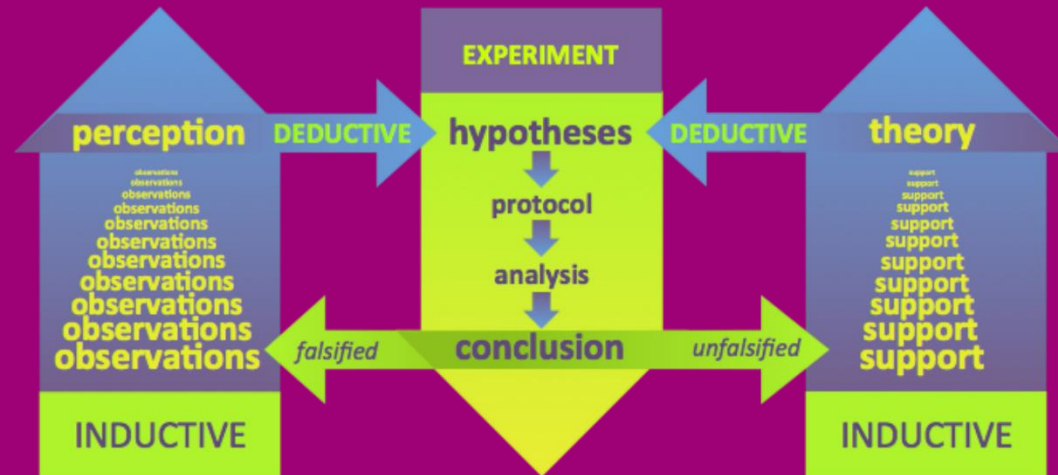
Steps in the Scientific Method

1. Identify the question
2. Form a hypothesis based on a developed theory (broad but well- developed explanation).

Steps in the Scientific Method CONTINUED

Inductive reasoning begins with a specific observation — (used to formulate hypothesis)

e.g., “Apples, bananas, and oranges are all fruit that grow on trees.” —that is used to make a broad generalization or assumption that may or may not be accurate—e.g., “All fruit must grow on trees.”



Deductive reasoning begins with a broad generalization about the world — (used to test hypothesis)

e.g., “All living things require energy to survive.” —that is tested and leads to a specific conclusion, or hypothesis—e.g., “Ducks are living things, so ducks must require energy to survive.”

Steps in the Scientific Method

CONTINUED

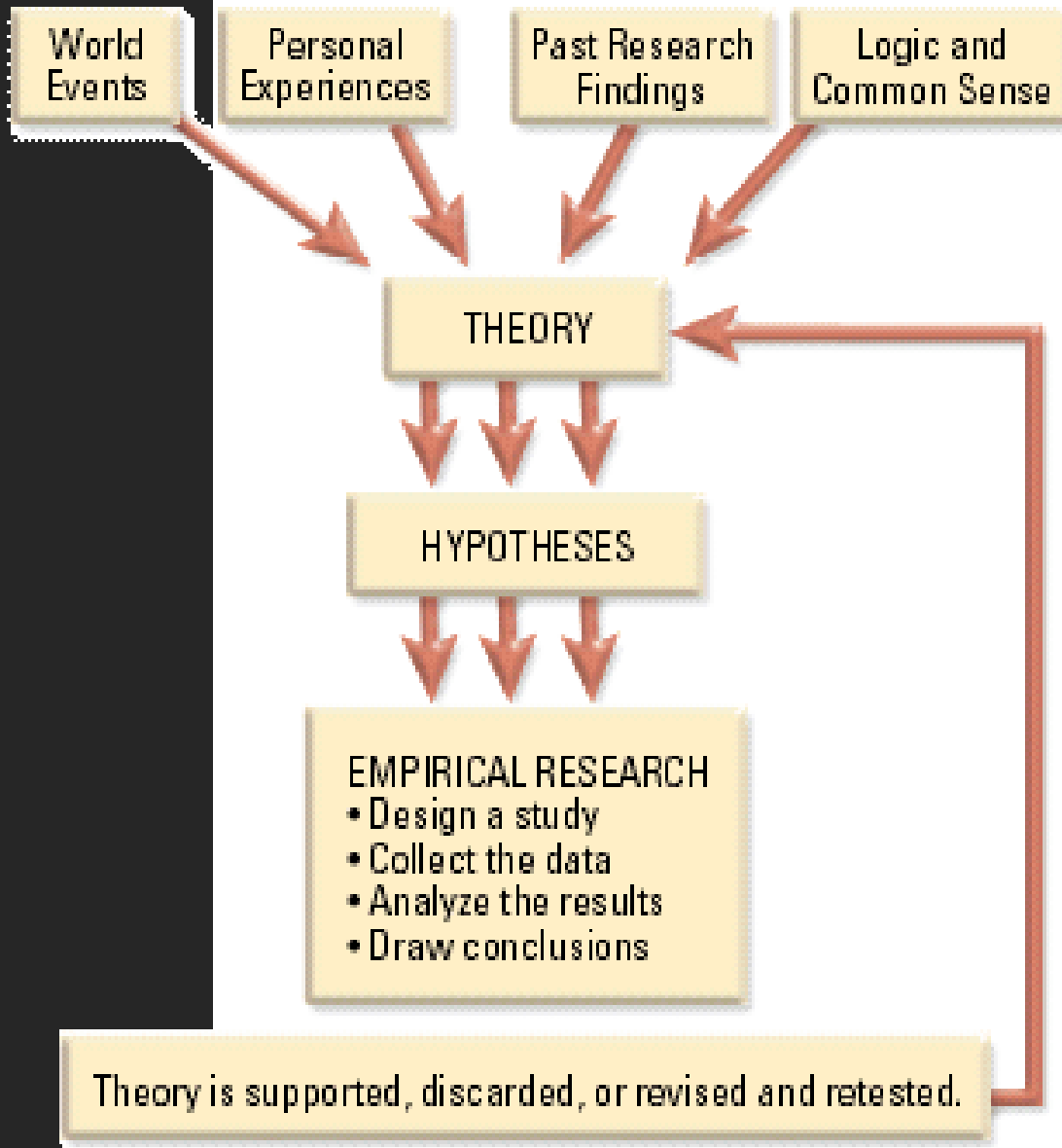
3. Test hypothesis.

4. Draw conclusions.

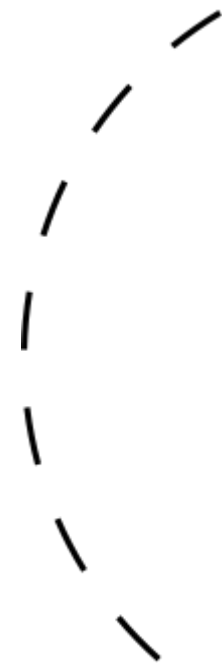
5. Report your results

- *replication?*
- same results
- demonstrate reliability of results?

Note: A scientific hypothesis is **falsifiable**—capable of being shown to be incorrect. Research's dependence on falsifiability allows for great confidence in the information that it produces.



The Scientific Method



Approaches to Research

What is a case (clinical) study

study of person, group, or situation in great detail.

The Case Study Recipe



Advantage:

tremendous amount of detail

Disadvantage:

cannot generalize (apply findings to the larger population as a whole)

Approaches to Research

CONTINUED

Naturalistic observation

watching animals or humans behave in their normal environment.

Major Advantage:

- Realistic picture of behavior.



Approaches to Research

Naturalistic observation

CONTINUED

Disadvantages:

- Difficult to set up and control.

Observer effect

tendency for people or animals to behave differently from normal when they know they are being observed.

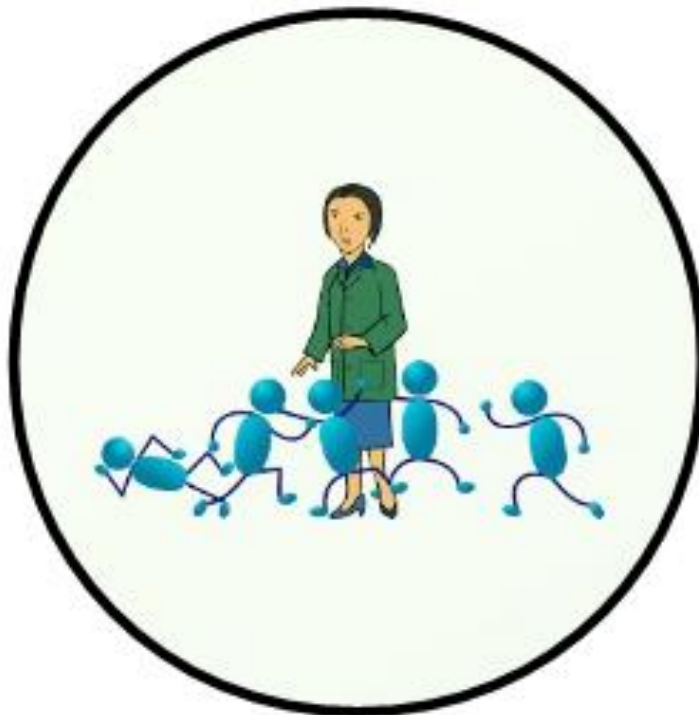
Participant observation

the observer becomes a participant in the group being observed (to reduce observer effect).

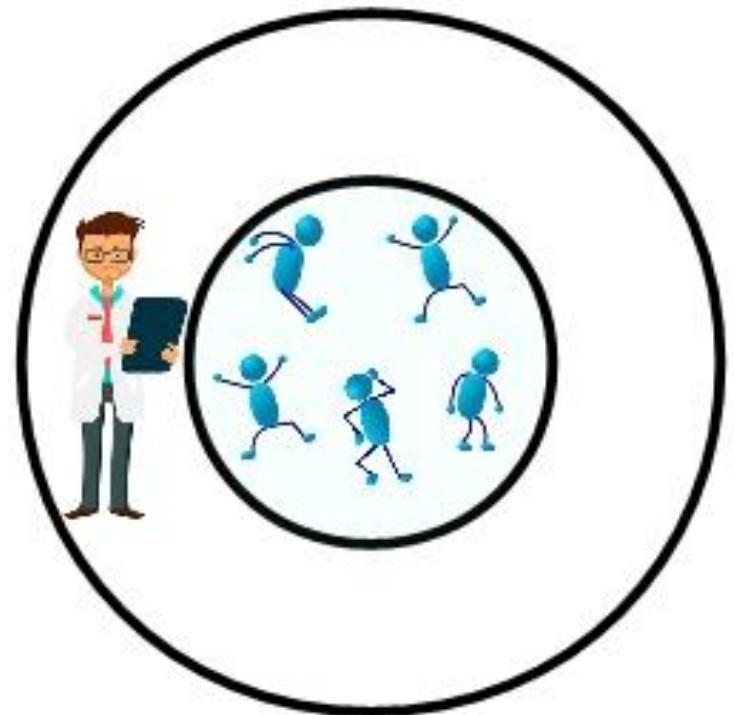
Approaches to Research

Naturalistic observation CONTINUED

Participant observation



Non-participant observation



Approaches to Research

(disadvantages)

CONTINUED

Naturalistic observation

Disadvantages:

- Observer bias - tendency for observers to see what they expect to see.
- *Blind observers* – people who do not know what the research question is (to reduce observer bias).



Approaches to Research

(disadvantages)

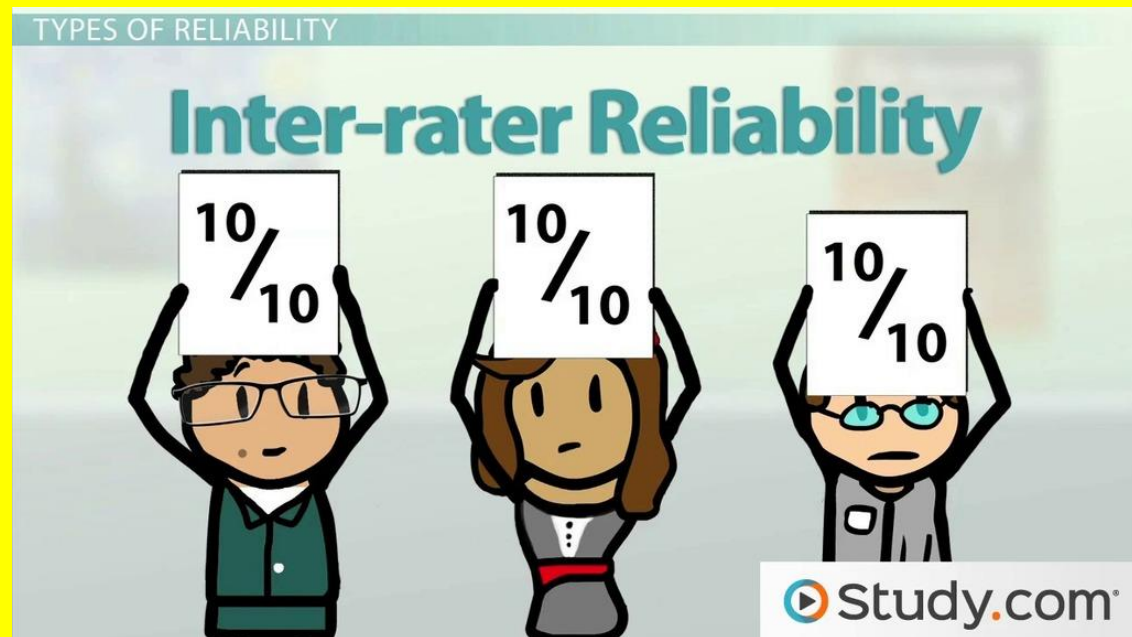
continued

Naturalistic observation

• Inter-rater reliability

the degree of agreement among raters (i.e. 2 teachers grading one paper)

it gives a score of how much homogeneity, or consensus, there is in the ratings given by judges



Approaches to Research

CONTINUED

Laboratory observation

research method which involves watching animals or humans behave in a laboratory setting.

Advantages:

- Control over environment.
- Allows use of specialized equipment.

Disadvantage:

- Artificial situation that may result in artificial behavior.



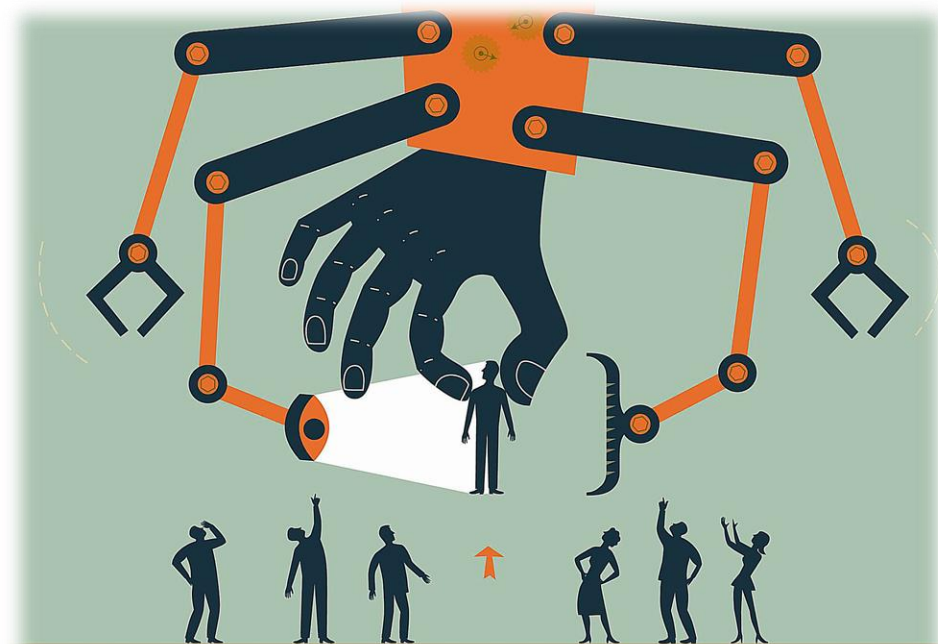
Approaches to Research



Surveys

a series of questions participants respond to about the topic under study

Given sample –
randomly selected sample
of subjects from a larger
population



Approaches to Research

Population - the entire group of individuals or objects in which the researcher is interested.

Advantages:

- Data from large numbers of people.
- Study covert behaviors.

Disadvantages:

- Have to ensure “representative” sample (or results will not be meaningful).
- People are not always accurate (courtesy bias).



Approaches to Research

Archival research

the use of existing records to answer various research questions.

Relies on looking at past records or data sets to look for interesting patterns or relationships.



Advantages:

Researchers never directly interact with participants, so control of setting not an issue.
Less investment of time and money.

Disadvantages:

With no control over data collected, research questions have to be tailored to existing data sets.
No guarantee of consistency between records from one source to another.

Approaches to Research

Longitudinal research—data-gathering is administered repeatedly to the same group of individuals over an extended period of time.

- E.g., a group of individuals may be surveyed about their smoking habits and effects at age 20, then again at age 30, then again at age 40

Advantage:

Same individuals are researched over time, so concern about differences that may exist between generations of participants is eliminated.

Disadvantages:

More investment of time and money—take years or decades to complete.

Participants may drop out of study over time (*attrition*).

Approaches to Research

CONTINU^{ed}

Cross-sectional research

method of research through which multiple segments of a population are compared at the same time

- E.g., A group of 20 year olds are compared to a group of 30 and 40 year olds at the same time to compare smoking habits and their effects.

Advantage:

Short-term investment—less time and money.

Disadvantage:

Limited by the differences that exist between the different generations (cohorts) of participants.



Correlational Research: Finding Relationships

Correlation

a measure of the relationship between two variables (e.g., smoking and weight gain).

Variable - anything that can change or vary.

Measures of two variables go into a mathematical formula and produce a correlation coefficient (r), which represents two things:

1. direction of the relationship (negative or positive)
 2. strength of the relationship
- Knowing the value of one variable allows researchers to predict the value of the other variable.



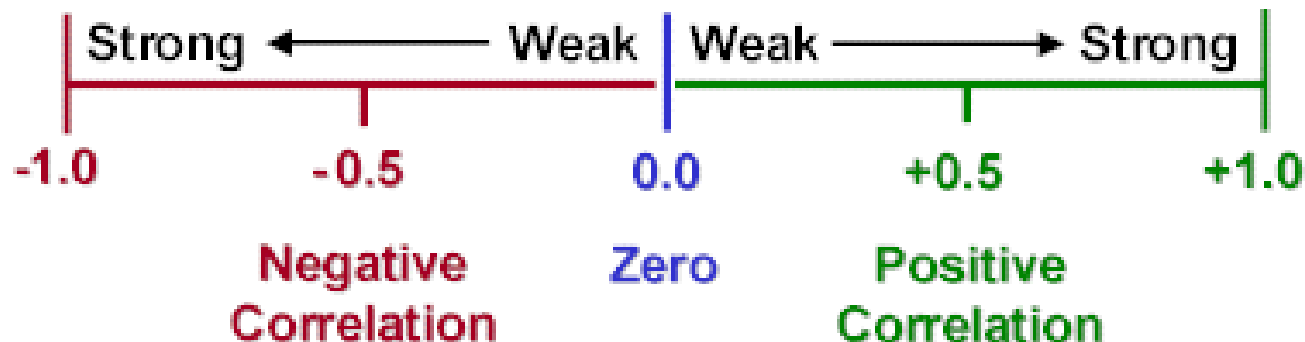
Correlational Research: Finding Relationships

Correlation coefficient ranges from -1.00 to $+1.00$.
Closer to 1.00 or -1.00 , the stronger the relationship between the variables.

No correlation = 0.0 .

Perfect correlation = -1.00 OR $+1.00$.

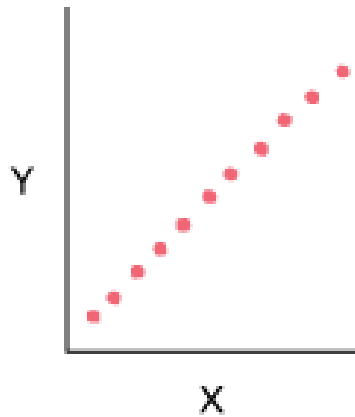
Correlation Coefficient
Shows Strength & Direction of Correlation



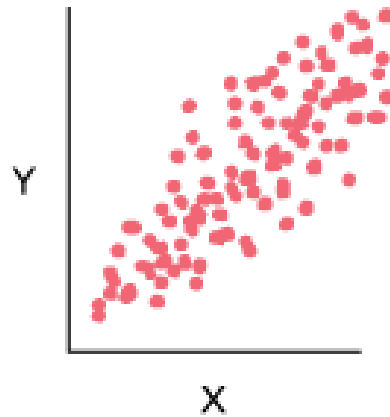
Correlational Research: Finding Relationships

Positive correlation – variables are related in the same direction.

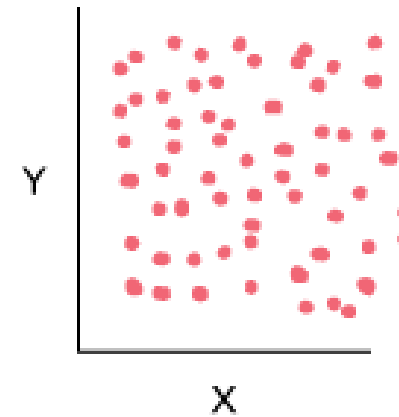
As one increases, the other increases; as one decreases, the other decreases—e.g., As eating increases, weight increases.



Perfect positive correlation



Modest positive correlation

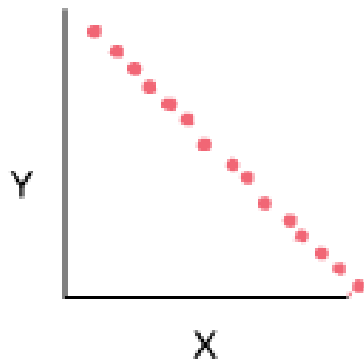


No correlation

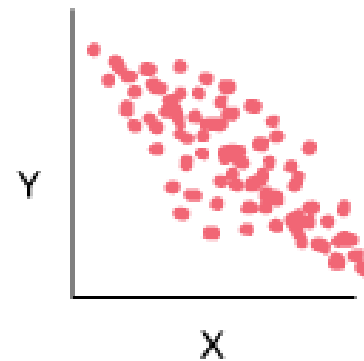
Correlational Research: Finding Relationships

Negative correlation – variables are related in opposite direction.

As one increases, the other decreases—e.g., As exercise increases, weight decreases.



Perfect negative correlation



Modest negative correlation

CORRELATION DOES **NOT** PROVE CAUSATION!!!

The Experiment: Analyzing Cause-and-Effect Relationships

Experiment

a deliberate manipulation of a variable to see if corresponding changes in behavior result, allowing the determination of cause-and-effect relationships.



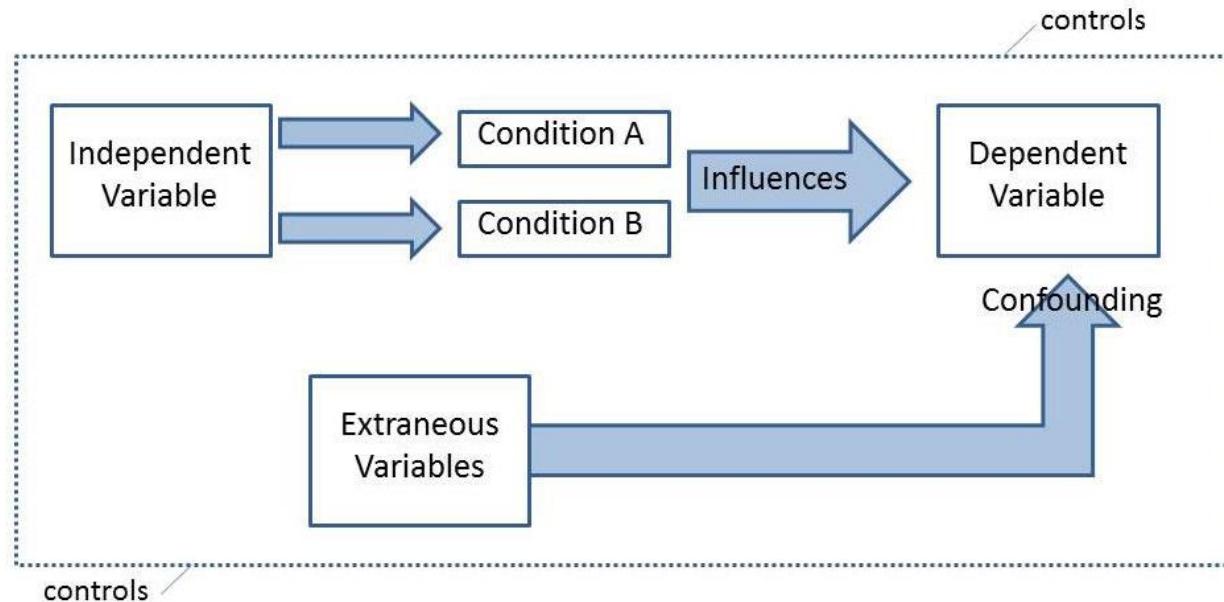
Operational definition

definition of a variable of interest that allows it to be directly measured.

The Experiment: Analyzing Cause-and-Effect Relationships

Independent variable (IV) - variable in an experiment that is manipulated by the experimenter.

Dependent variable (DV) - variable in an experiment that represents the measurable response or behavior of the subjects in the experiment.



Independent variable

The variable the researcher changes.

Application of fertilizer 'x' in this experiment

vs

Dependent variable

Variable affected by change in independent variable

- Plant growth
- No. of leaves,
- No. of fruits etc in this experiment.



www.majordifferences.com

Effect of Bio-fertilizer 'x' on Plant growth

The Experiment: Analyzing Cause-and-Effect Relationships

Experimental group

subjects in an experiment who are subjected to the independent variable.

Control group

subjects in an experiment who are not subjected to the independent variable and who may receive a “placebo” treatment (controls for confounding variables).

Effect of Bio-fertilizer ‘x’ on Plant growth

Experimental group

Bio-fertilizer ‘x’ is sprayed



Control group

Bio-fertilizer ‘x’ is not sprayed



www.majordifferences.com

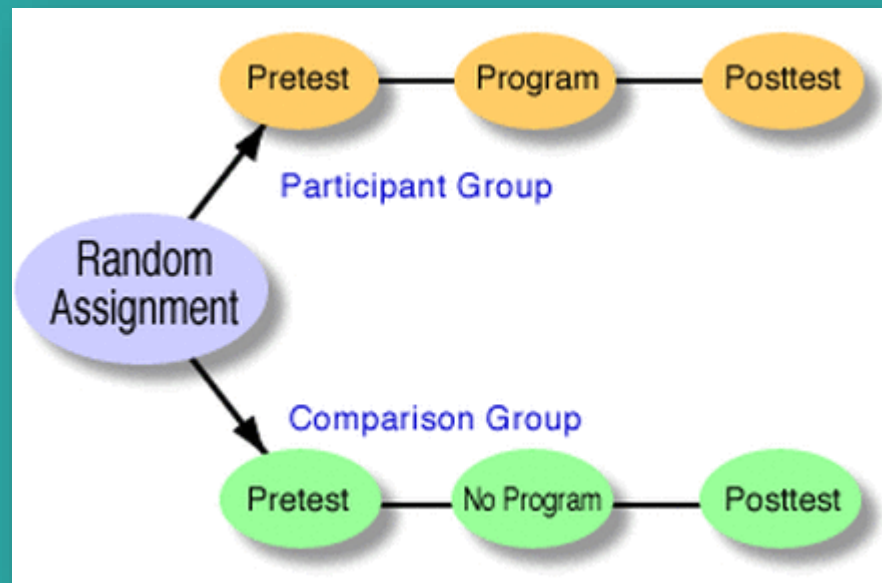
A good control group is identical to the experimental group in all way except for the difference in the experimental condition (here, application of bio-fertilizer ‘x’)

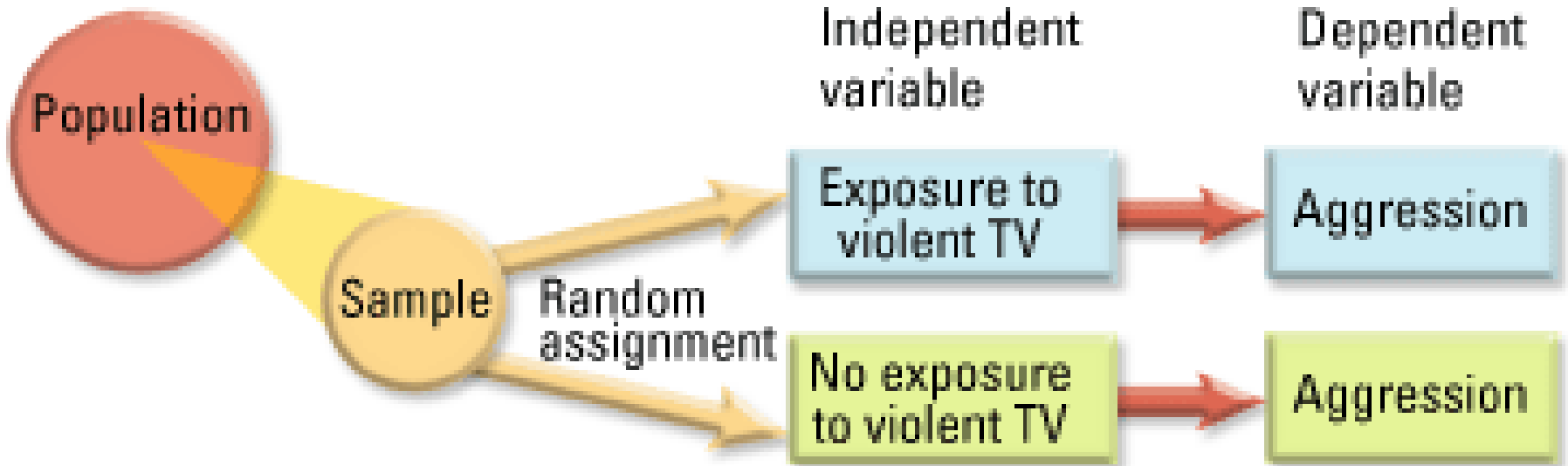
The Experiment: Analyzing Cause-and-Effect Relationships

Random assignment

assigning subjects to the experimental or control groups randomly

- each subject has an equal chance of being in either group



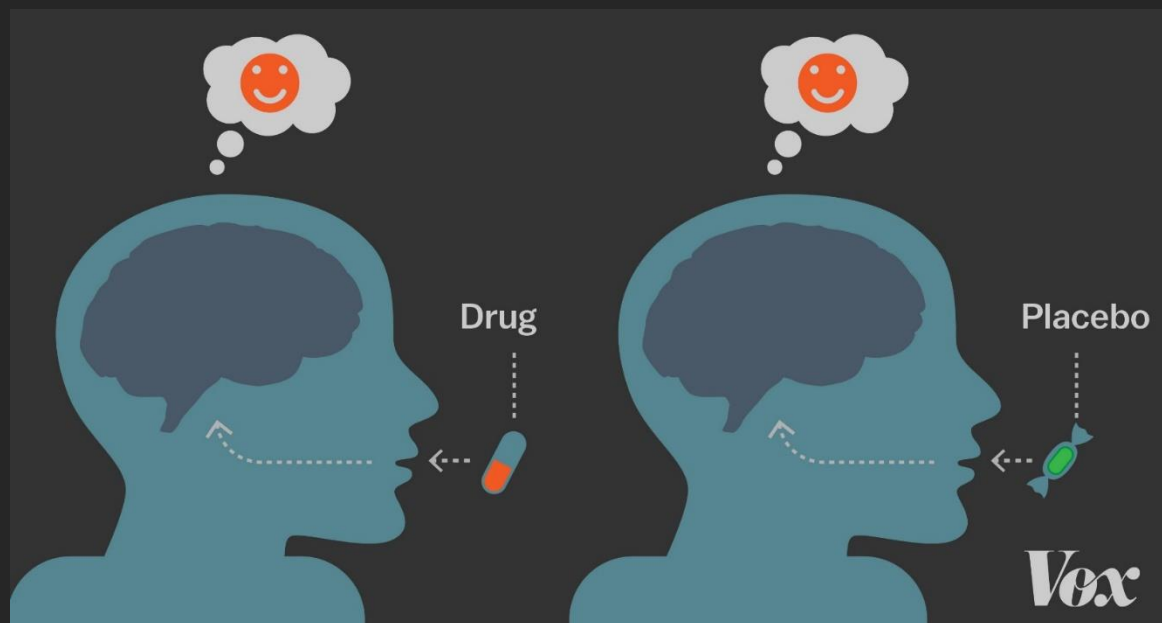


The Experiment

Placebo effect

the phenomenon in which the expectations of the participants in a study can influence their behavior.

- **Single-blind study**- subjects do not know if they are in the experimental or the control group (reduces placebo effect).



The Experiment

Experimenter bias (effect) –

the experimenter's expectations for a study unintentionally influences the results of the study



- Double-blind study - neither the experimenter nor the subjects knows if the subjects are in the experimental or control group (reduces placebo effect and experimenter effect).

Interpreting and Reporting Experimental Findings

Statistical analysis



a procedure that determines whether or not meaningful differences exist between the experimental and control groups in an experiment.

If a difference is found but it is due to chance, then it is not considered to be meaningful.

What does Statistically Significant mean?

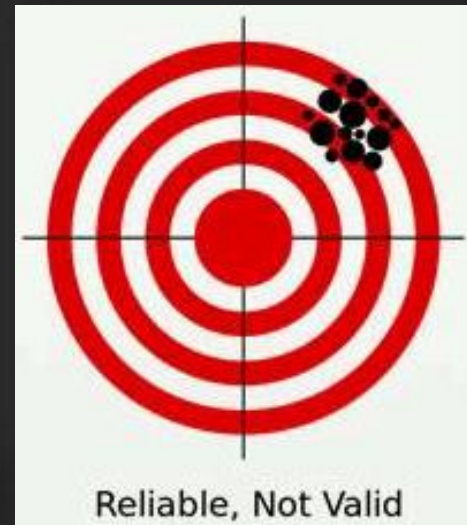
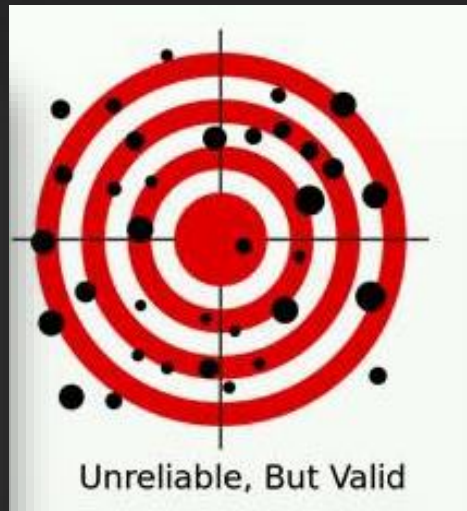
the likelihood that a relationship between two or more variables is caused by something other than random chance

Interpreting and Reporting Experimental Findings

CONTINUED

Once a study has been conducted, researchers may choose to replicate it using different samples to determine reliability and validity.

- **Reliability** – the ability to consistently produce a given result
- **Validity** – the extent to which a given instrument or tool accurately measures what it's supposed to measure



Ethics in Psychological Research

Ethics committees

groups of psychologists or other professionals who look over each proposed research study and judge it according to its safety and consideration for the participants in the study.

Also referred to as the Institutional Review Board (IRB)



Ethics in Psychological Research

CONTINUED

Common ethical guidelines:

Rights and well-being of participants must be weighed against the study's value to science.

Participants must be allowed to make an informed decision about participation (**informed consent**).

Deception – purposefully misleading participants - must be justified.

Participants may withdraw from the study at any time.

Participants must be protected from risks or told explicitly of risks. Investigator must **debrief** participants, telling the true nature of the study and expectations of results.

Data must remain confidential.

Undesirable consequences for the participant must be removed.

Ethics in Psychological Research

CONTINUED

Animal Research

answers questions we could never do with human research.

Focus is on avoiding exposing them to *unnecessary* pain or suffering.

Animals are used in approximately 7% of psychological studies.



These rabbits are part of a drug-testing study. Their bodies are enclosed in the metal cases to prevent movement during the test. What steps might the researchers using these animals take to treat the animals ethically?

Critical Thinking

CONTINUED

Critical thinking - making reasoned judgments about claims.

Four Basic Criteria:

1. There are very few “truths” that do not need to be subjected to testing.
2. All evidence is not equal in quality.
3. Just because someone is considered to be an authority or to have a lot of expertise does not make everything that person claims automatically true.
4. Critical thinking requires an open mind.

Pseudopsychologies: Is it real?

▶ **Pseudopsychologies** - systems of explaining human behavior that are not based on or consistent with scientific evidence



◦ **Phrenology** – reading bumps on the skull

◦ **Palmistry** – reading palms



◦ **Graphology** – analysis of personality through handwriting

*Here is a little work
which fulfils a long felt
desire of my part to offer
to the English and Amer-
ican public a summary
of my work. This has only
been done previously
by a translation, not
long out of print, of one
of my earliest books.
It has been improved
by putting in a few lines
on the German system a
student of graphology
upon whose judgment I
can depend; and who, in*