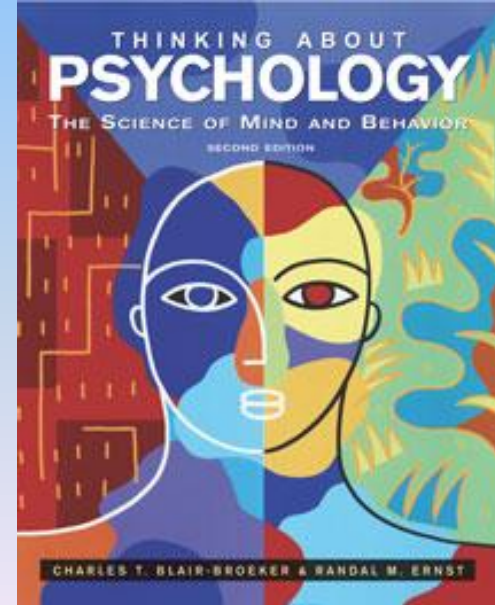


Thinking About Psychology: The Science of Mind and Behavior 2e

Charles T. Blair-Broeker
Randal M. Ernst



Methods Domain



Research and Statistics

Chapter



Module 04

Research Strategies

Module 2: Research Strategies

Why is Research Important?

Scientific Method

- Method of learning about the world through the application of critical thinking and tools such as observation, experimentation, and statistical analysis
- Through its use, psychology is thereby considered a science.

Research and Research Methodology

- Method of **asking questions** then **drawing logical supported conclusions**
- Researchers need to be able to determine if conclusions are reasonable or not (critical thinking).

Common Sense

- Conclusions based solely on personal experience and sensible logic
- Can lead to incorrect conclusions

Table 4.1

The Limits of Common Sense

Common sense leaves us unsure of the truth, but research helps us apply principles appropriately in different situations.

COMMON SENSE SAYS . . .

Opposites attract	and	Birds of a feather flock together
Out of sight, out of mind	and	Absence makes the heart grow fonder
Nothing ventured, nothing gained	and	A penny saved is a penny earned

Module 4: Research Strategies

Observation and Bias

Observation

- Gathering of information by simply watching subjects
- Can lead to bias

Confirmation Bias

- A tendency to search for information that confirms a preconception
- Means to lower confirmation bias
 - Objective observation
 - Critical thinking

Critical Thinking

- Thinking that does not blindly accept arguments or conclusions
- Questions the argument's or conclusion's validity

Participant Bias

- Tendency of research subjects to behave in a certain way because they know they are being observed or they believe they know what the researcher wants
- Can be reduced by naturalistic observation

Naturalistic Observation

- Observing and recording behavior in naturally occurring situations without manipulating or controlling the situation
- Method of observation where subjects are observed in their “natural” environment
- Subjects are not aware they are being watched
- Could use hidden cameras or two way mirrors

Module 4: Research Strategies

Case Studies

Case Study

- A research technique in which one person is studied in depth in the hope of revealing universal principles
- This technique is very open to bias
- Difficulty of applying data from one person to everyone

Module 4: Research Strategies

Correlation

Correlational Study

- A research project strategy that investigates the degree to which two variables are related to one another

How to Read a Correlation

Correlation
coefficient



$$r = +.37$$

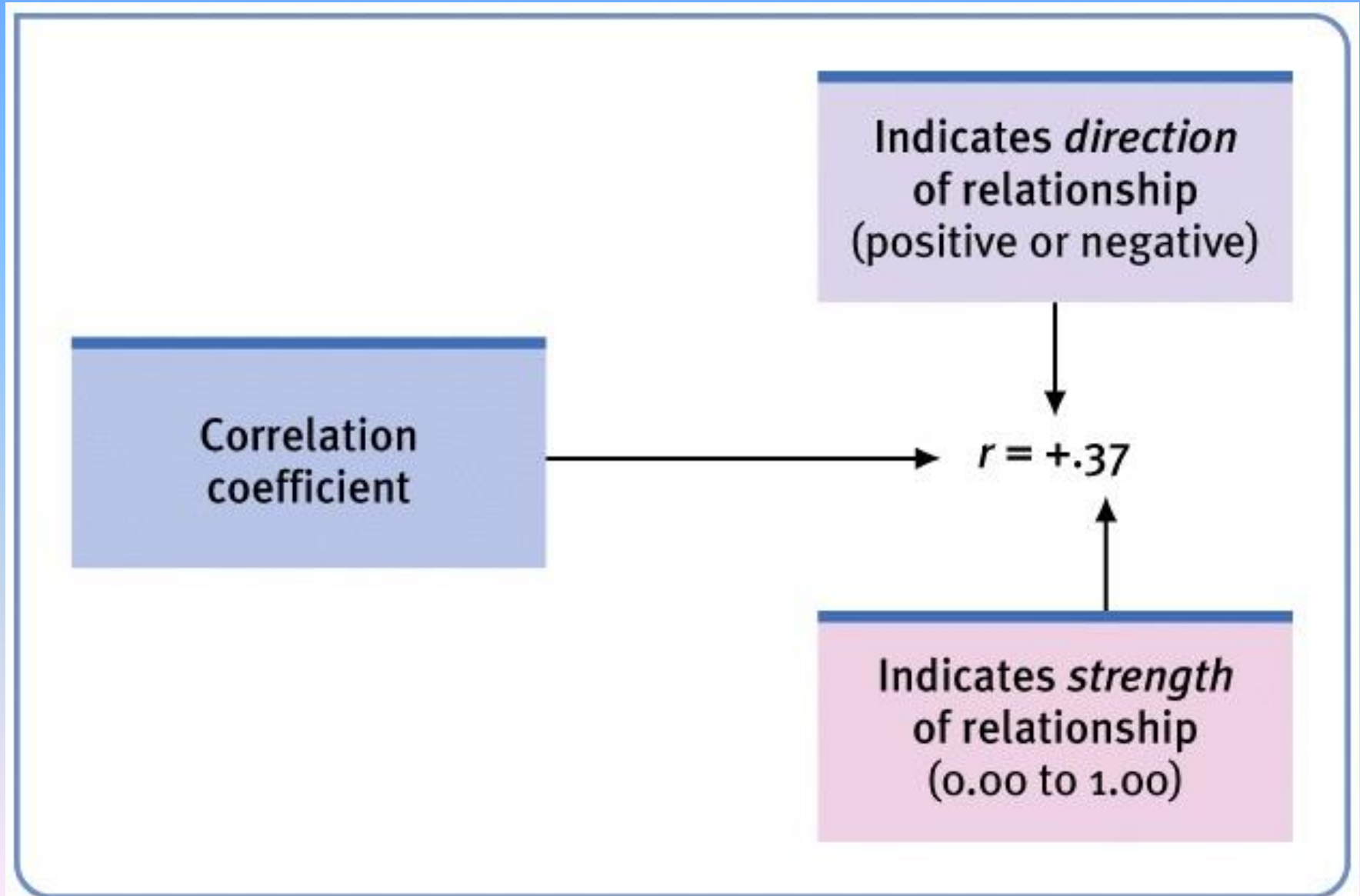
How to Read a Correlation

Correlation
coefficient

Indicates *direction*
of relationship
(positive or negative)

$r = +.37$

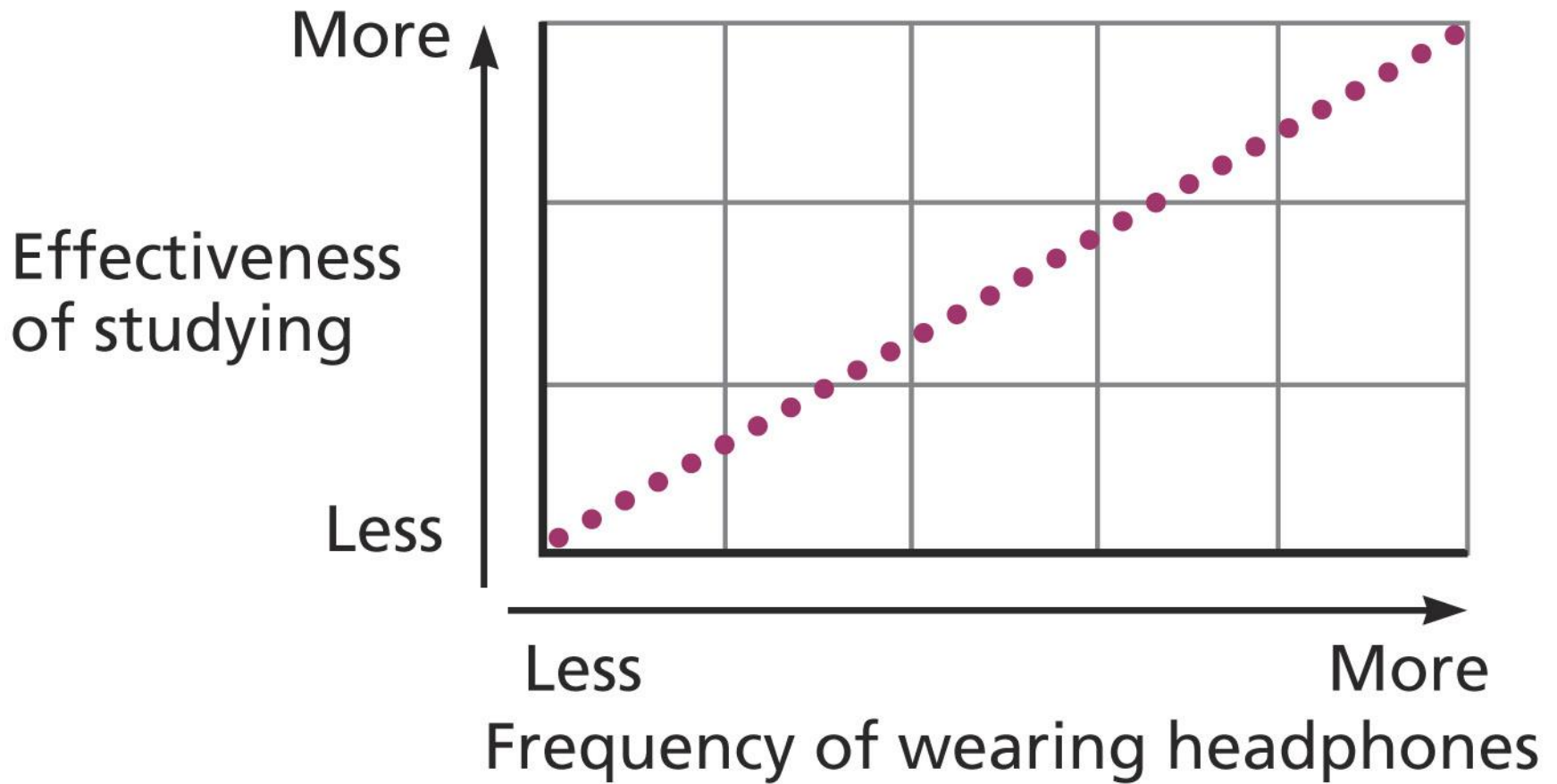
How to Read a Correlation



Positive Correlation

- As the value of one variable increases (or decreases) so does the value of the other variable.
- A perfect positive correlation is $+1.0$.
- The closer the correlation is to $+1.0$, the stronger the relationship.

Perfect positive correlation



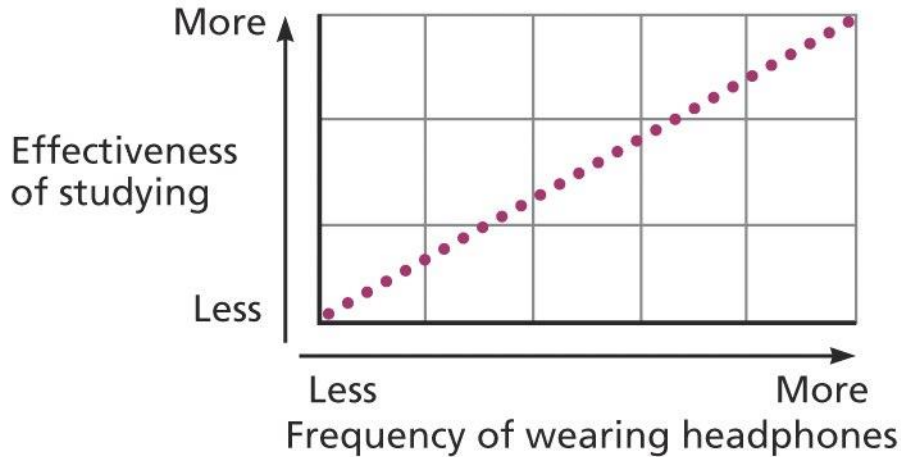
Negative Correlation

- As the value of one variable increases, the value of the other variable decreases.
- A perfect negative correlation is -1.0 .
- The closer the correlation is to -1.0 , the stronger the relationship.

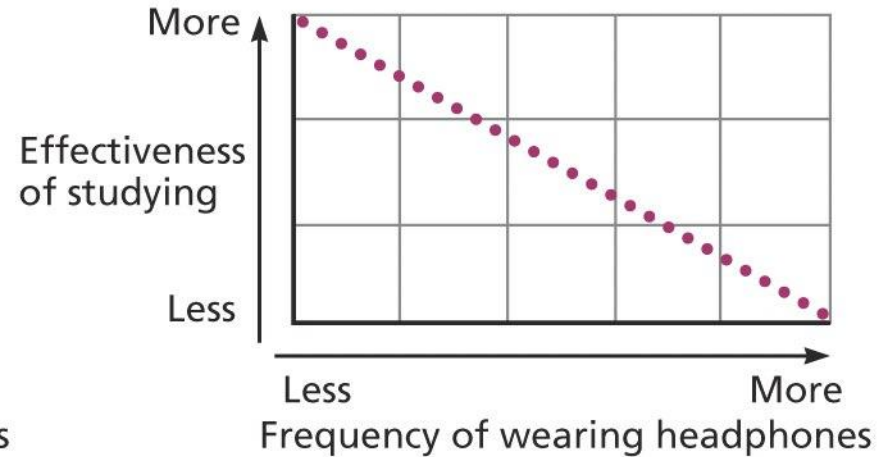
Zero Correlation

- There is no relationship whatsoever between the two variables.

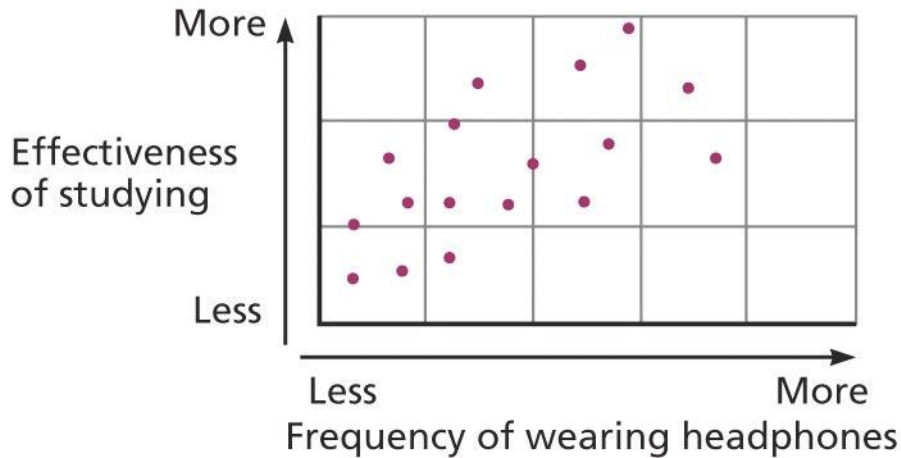
Perfect positive correlation



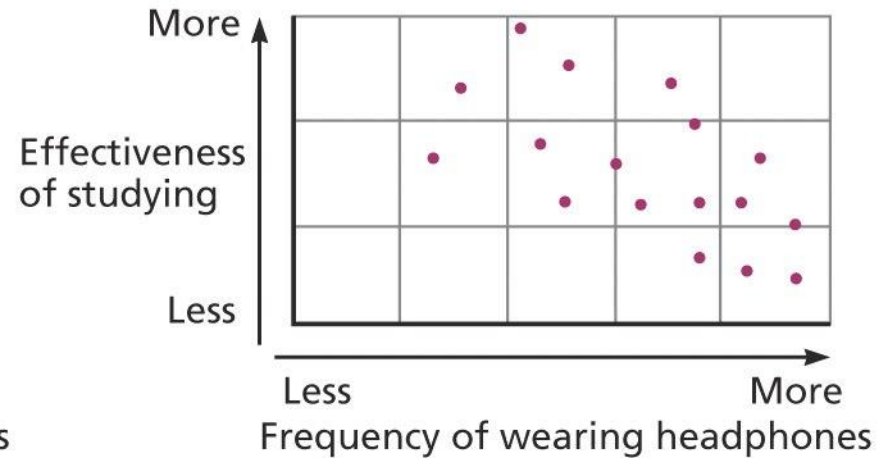
Perfect negative correlation



Moderate positive correlation



Moderate negative correlation



Correlational Study

- Important **NOT** to imply a cause and effect relationship between the variables
- Correlational study does not determine **why** the two variables are related--just that they are related.
- Correlational studies are helpful in making predictions.

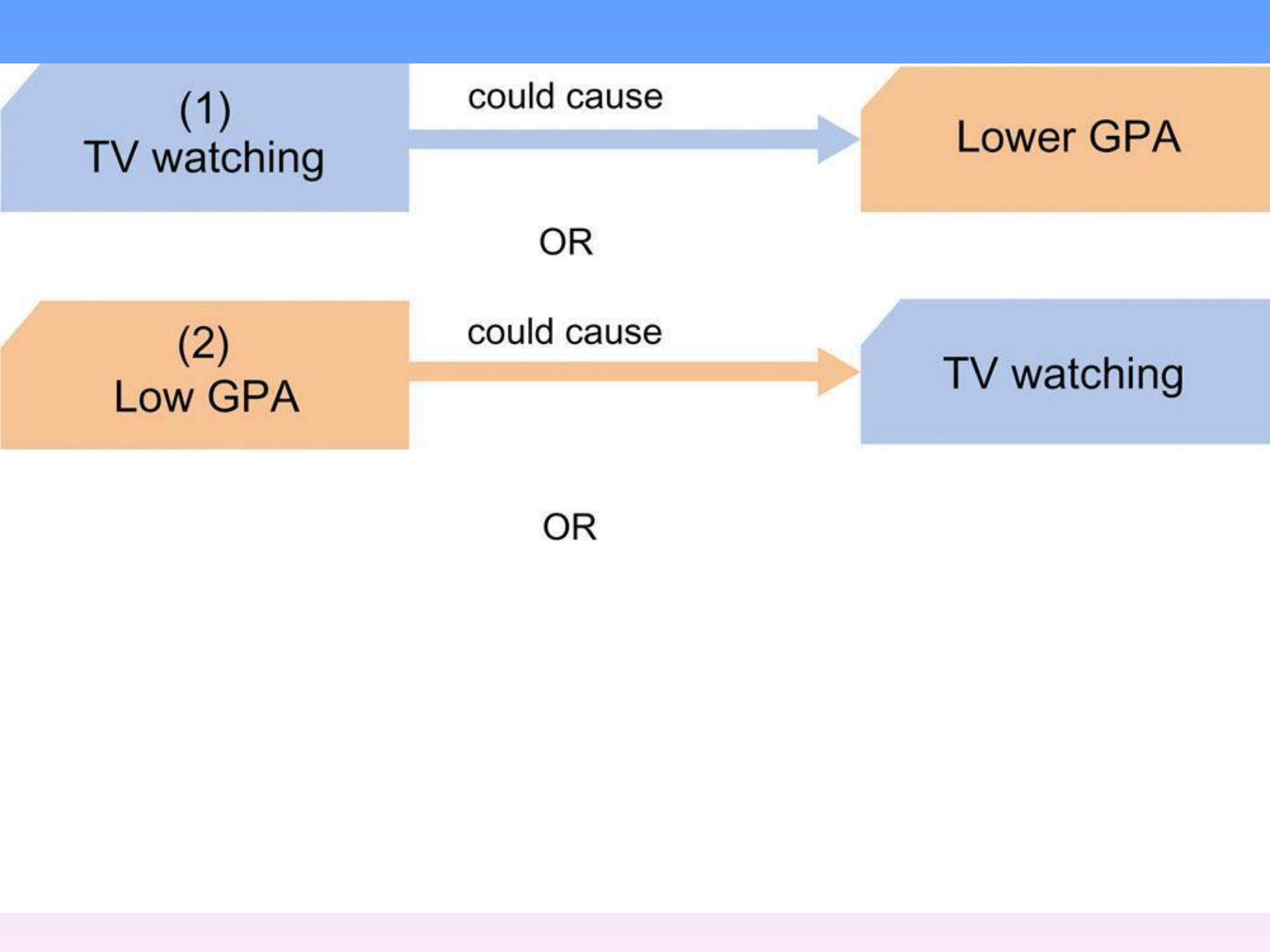
(1)
TV watching

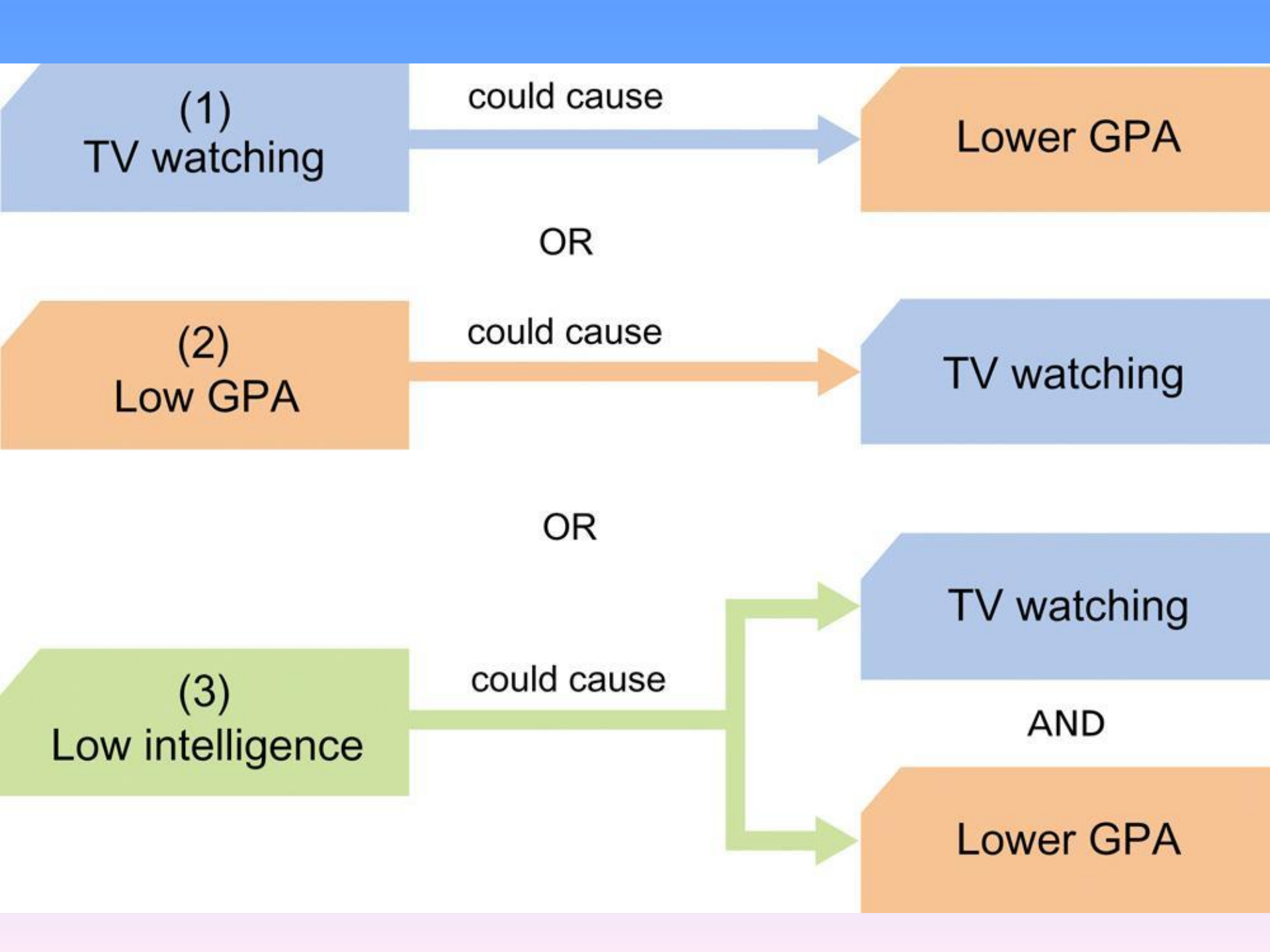
could cause



Lower GPA

OR





Module 4: Research Strategies

Surveys

Survey Method

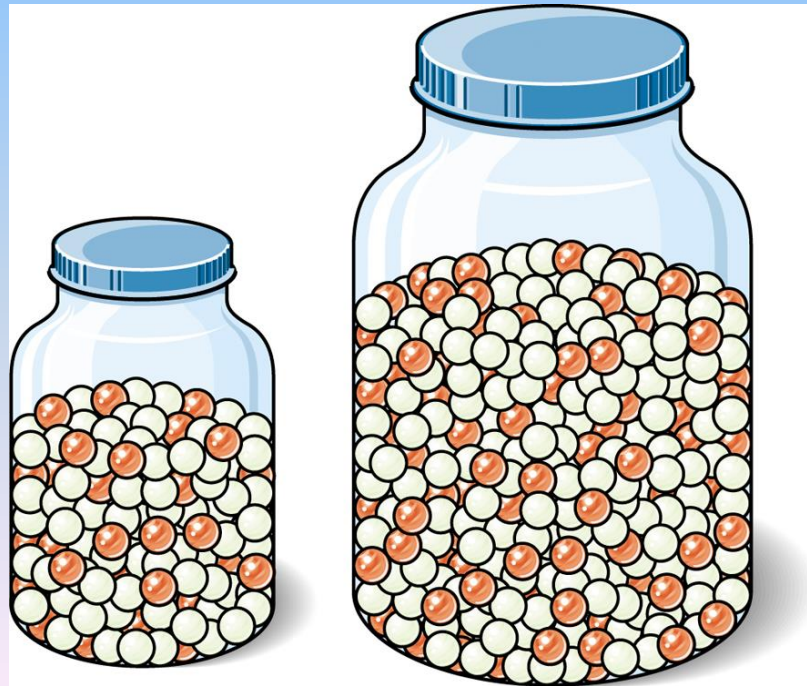
- A research technique that questions a sample of people to collect information about their attitudes or behaviors
- Research method that relies on self-reports; uses surveys, questionnaires, interviews.
- Usually a very efficient and inexpensive method



“How would you like me to answer that question? As a member of my ethnic group, educational class, income group, or religious category?”

Population

- The entire group of people about whom you would like to know something
- Total large group being studied from which a sample is drawn for a study



Random Sample

- A sample that fairly represents a population because each member of the population has an equal chance of being included
- If a sample is not random it is said to be biased.

Module 4: Research Strategies

Longitudinal and Cross-Sectional Studies

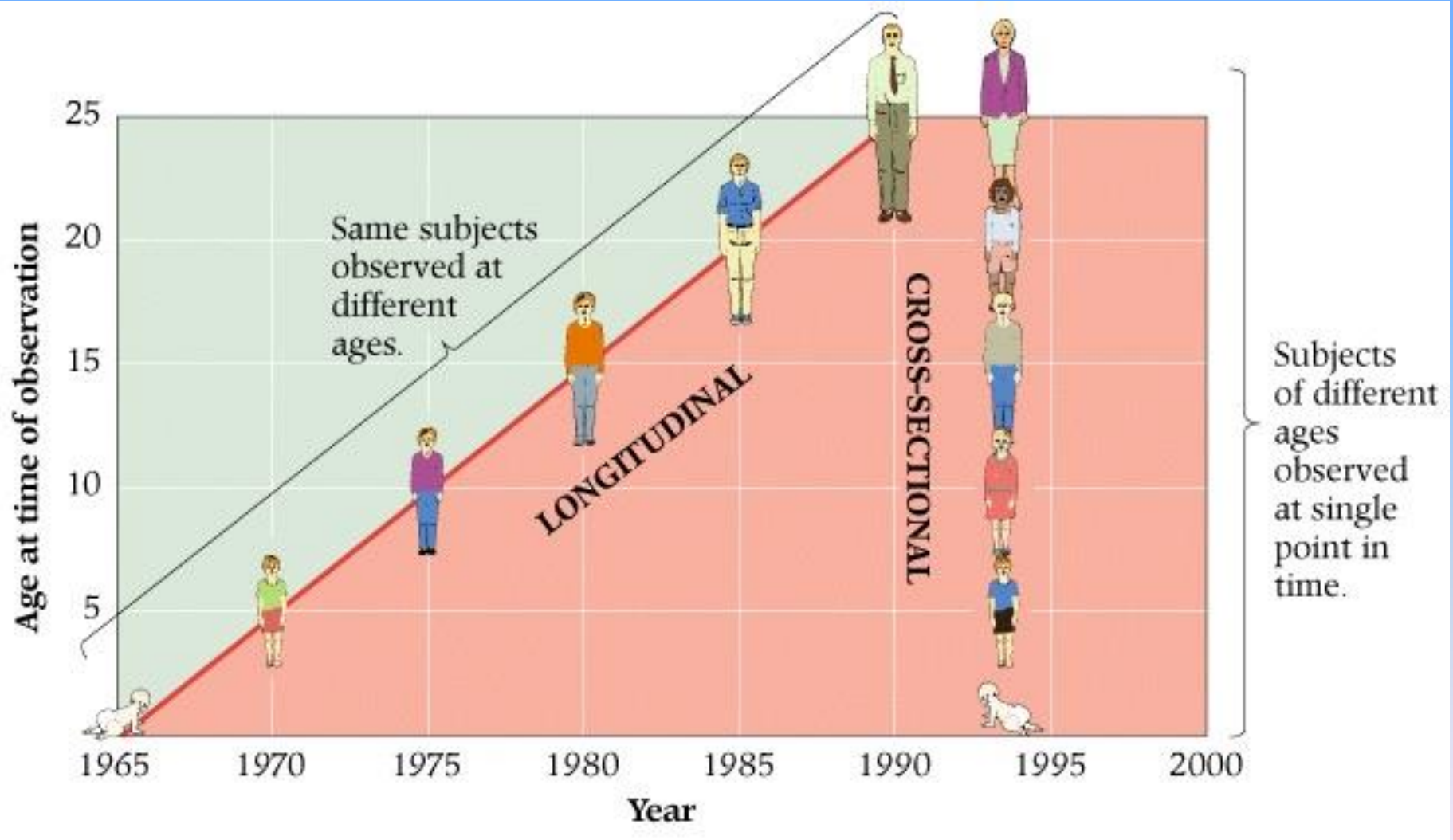
Longitudinal Study

- A research technique that follows the same group of individuals over a long period
- Can be very expensive and difficult to conduct

Cross-Sectional Study

- A research technique that compares individuals from different age groups at one time
- Study a number of subjects from different age groups and then compare the results
- Cheaper, easier than longitudinal studies, but group differences may be due to factors other than development.

Longitudinal/Cross Sectional Study



Module 4: Research Strategies

Experiments: Hypotheses and Operational Definitions

Experiment

- A research method in which the researcher manipulates and controls certain variable to observe the effects on other variables

Hypothesis

- A testable prediction of the outcome of the experiment or research

Operational Definitions

- An explanation of the exact procedures used to make a variable specific and measurable for research purposes
- A specification of the exact procedures used to make a variable measurable
- In evaluating others' research, first determine if you agree with the researchers' operational definitions.

Module 4: Research Strategies

Experiments: Independent and Dependent Variables

Independent Variable

- The variable that the researcher will actively manipulate and, if the hypothesis is correct, that will cause a change in the dependent variable
- The experimental variable which causes something to happen
- The “cause variable”
- The variable manipulated by the experimenter

Dependent Variable

- The variable that should show the effect of the independent variable
- The “effect variable”
- The outcome of the experiment
- The variable being measured

Module 4: Research Strategies

Experiments: Groups, Random Assignment, and Confounding Variables

Experimental Group

- The participants in an experiment who are exposed to the independent variable
- Also called the experimental condition
- The group being studied and compared to the control group

Control Group

- The participants in an experiment who are not exposed to the independent variable
- Results are compared to those of the experimental group
- Also called the control condition

Experimental Design



All study
hall students



Experimental Design



All study
hall students

40 students
randomly
selected



Experimental Design

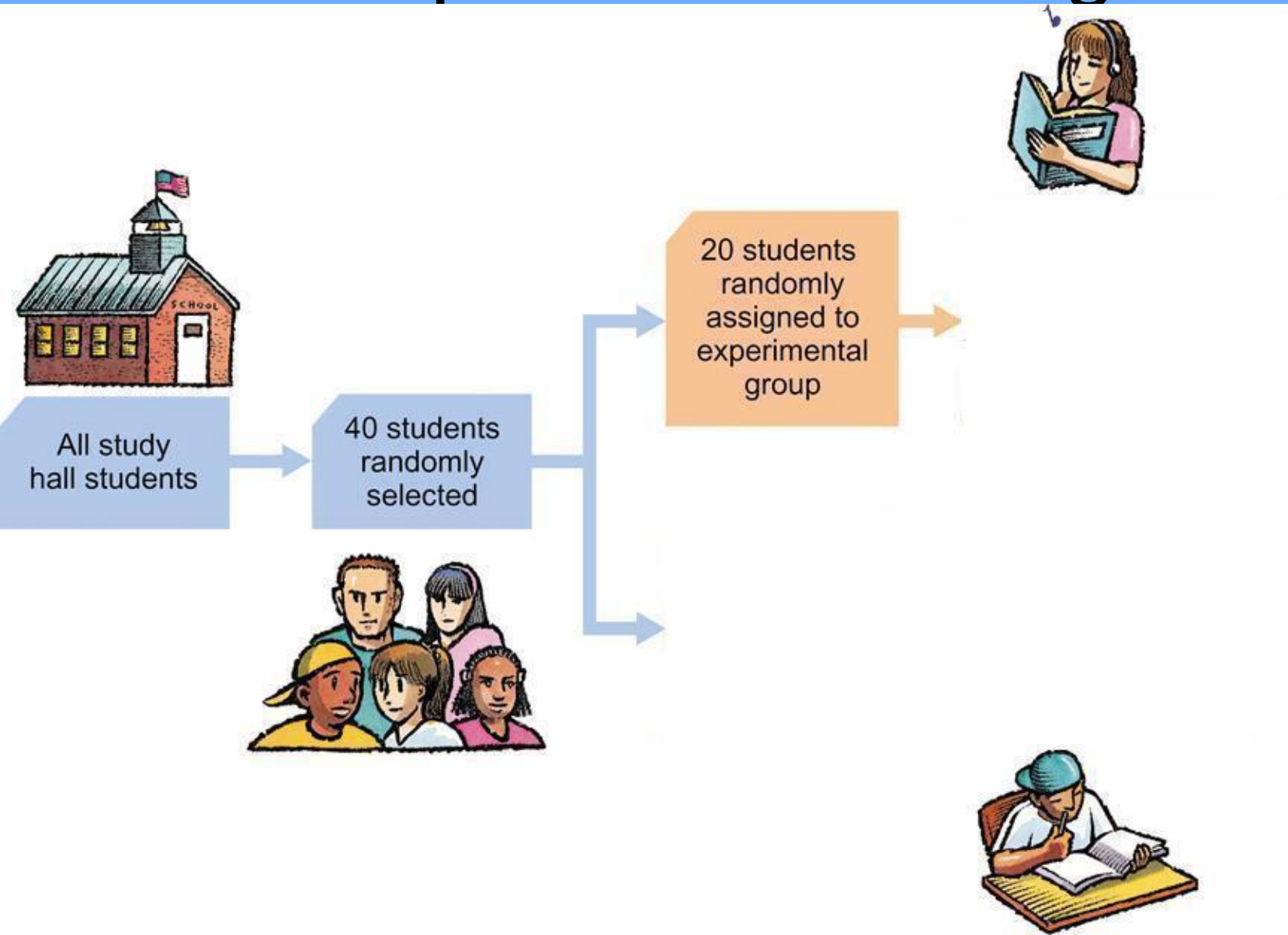


All study
hall students

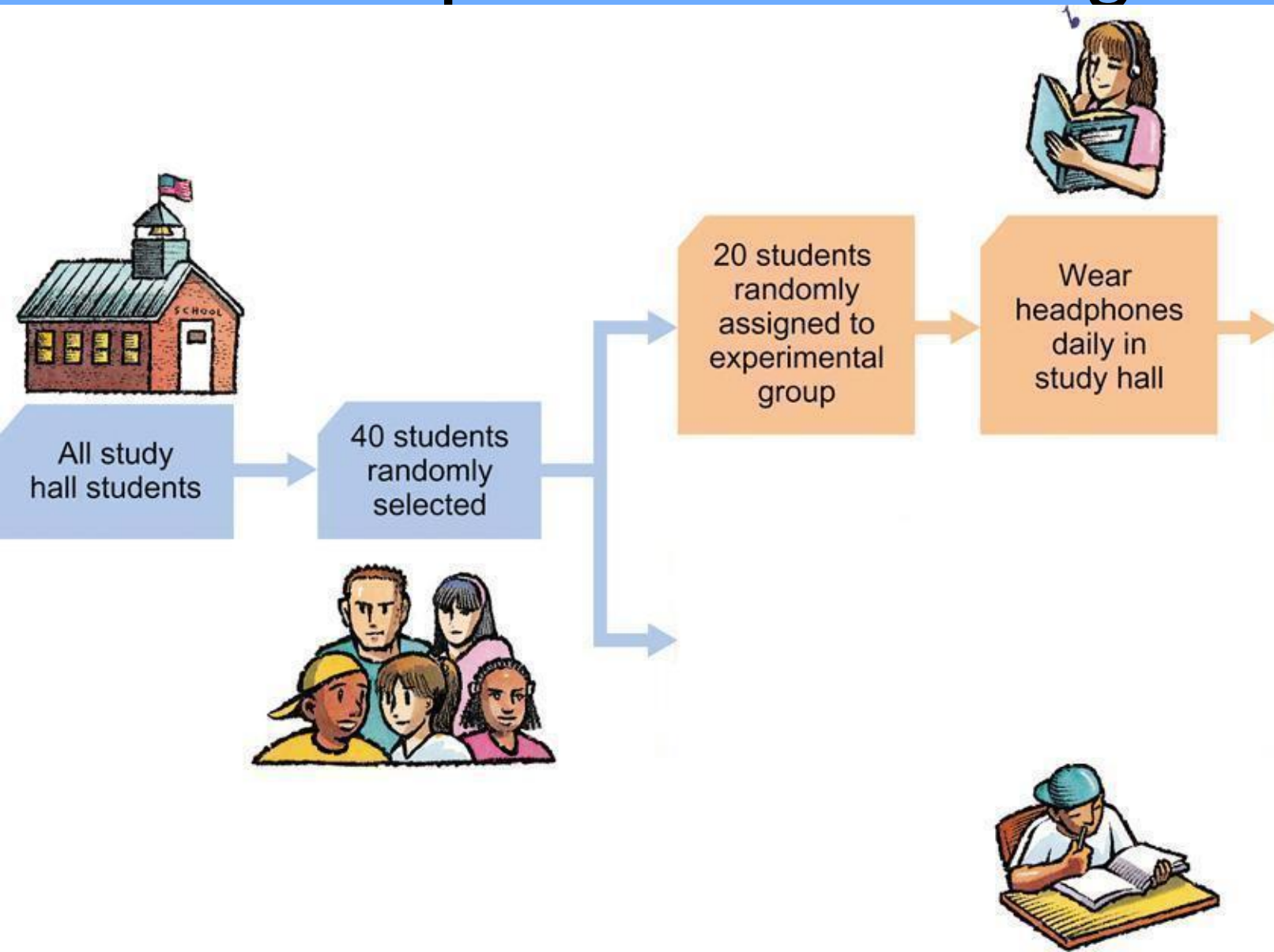
40 students
randomly
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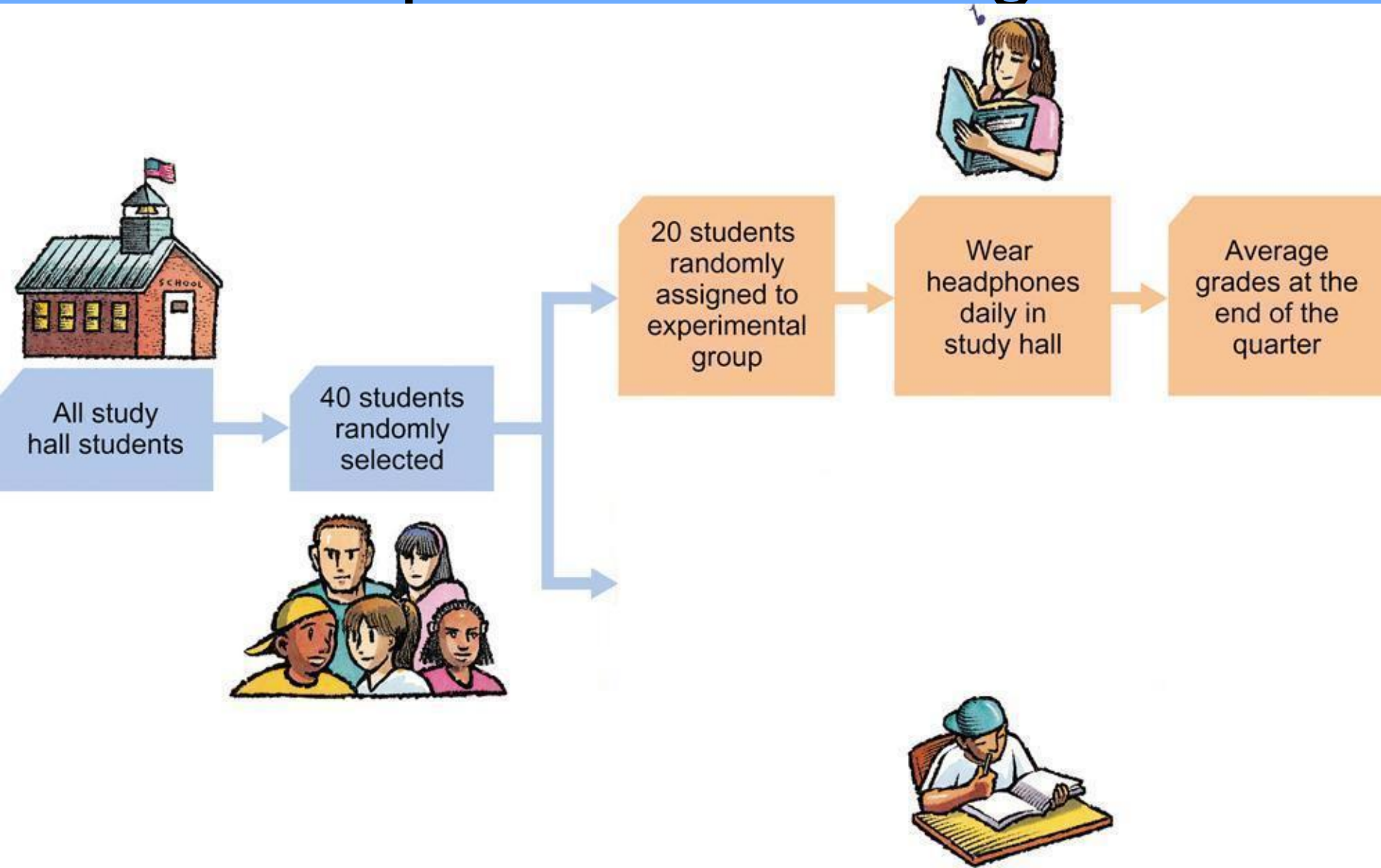
Experimental Design



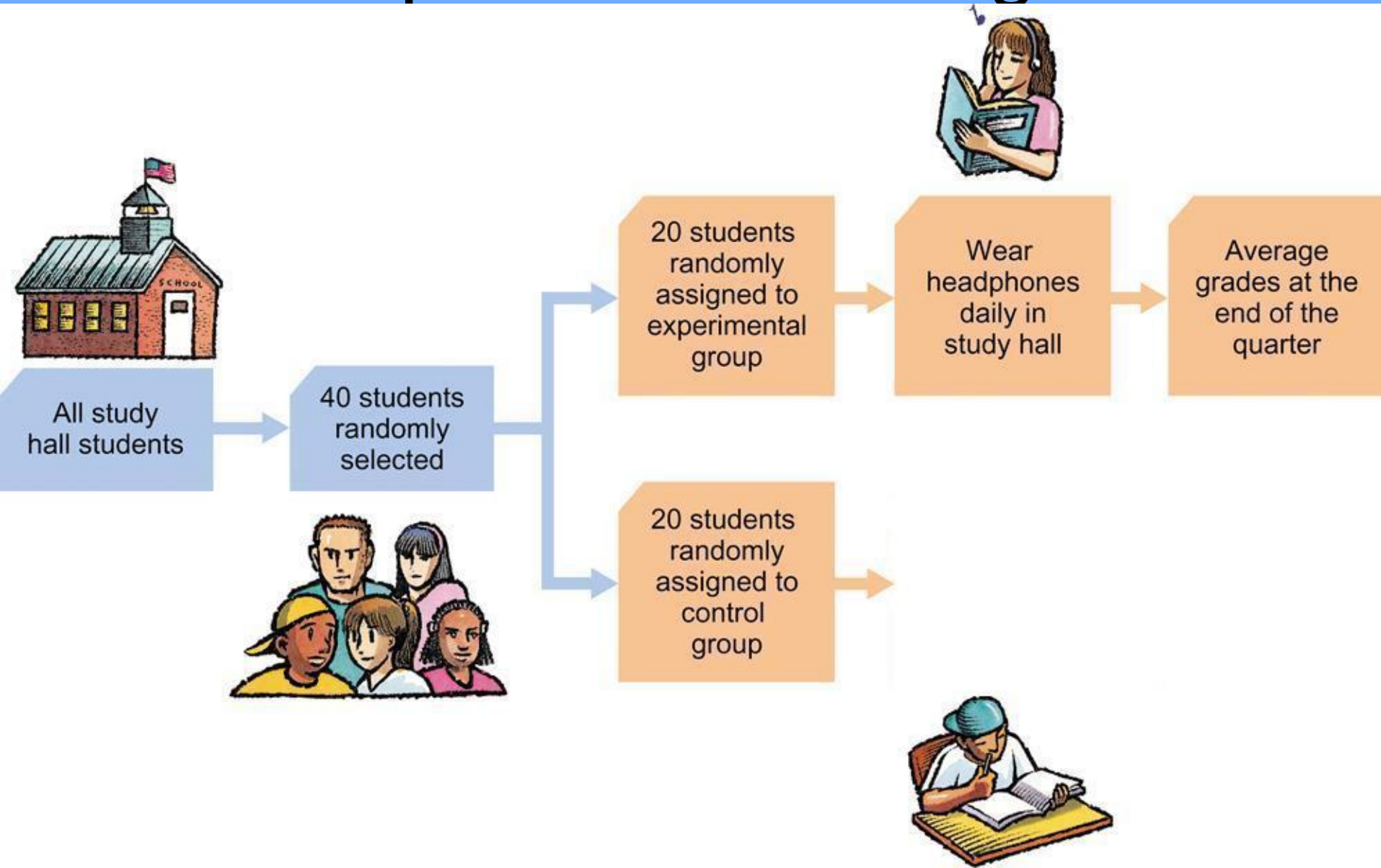
Experimental Design



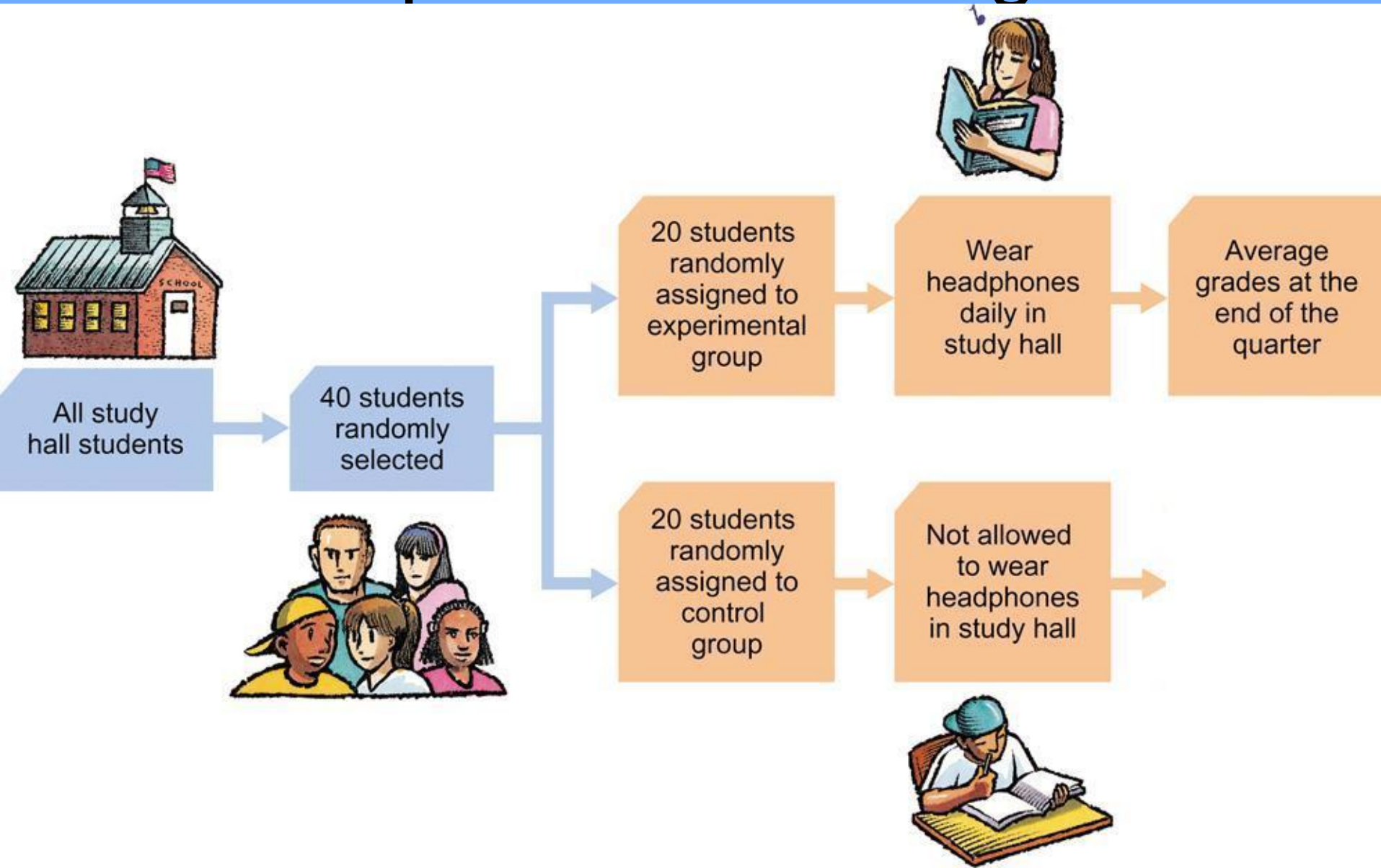
Experimental Design



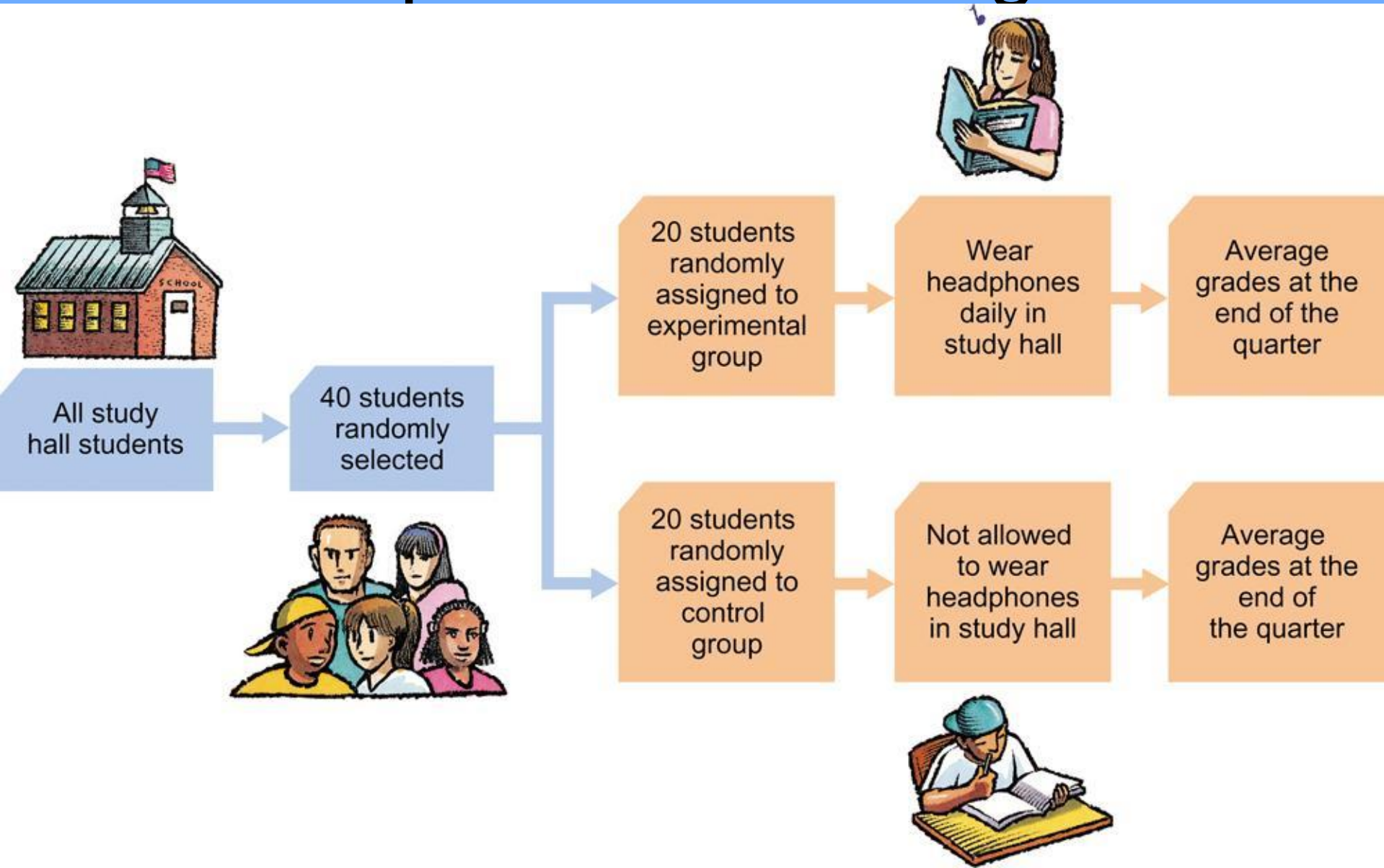
Experimental Design



Experimental Design



Experimental Design



Confounding Variables

- Variables, other than the independent variable, which could inadvertently influence the dependent variable
- These variables should be controlled for in order to draw a true, cause-effect relationship in the experiment.
- Many confounding variables can be eliminated through random assignment.

Random Assignment

- A procedure for creating groups that allows the researcher to control for individual differences among research participants.
- Assigning participants to the control and experimental groups by chance
- Each participant should have an equal chance of being assigned into either group.

Confounding Variable

- In an experiment, a variable other than the independent variable that could produce a change in the dependent variable
- The variable “confounds” the results

Module 4: Research Strategies

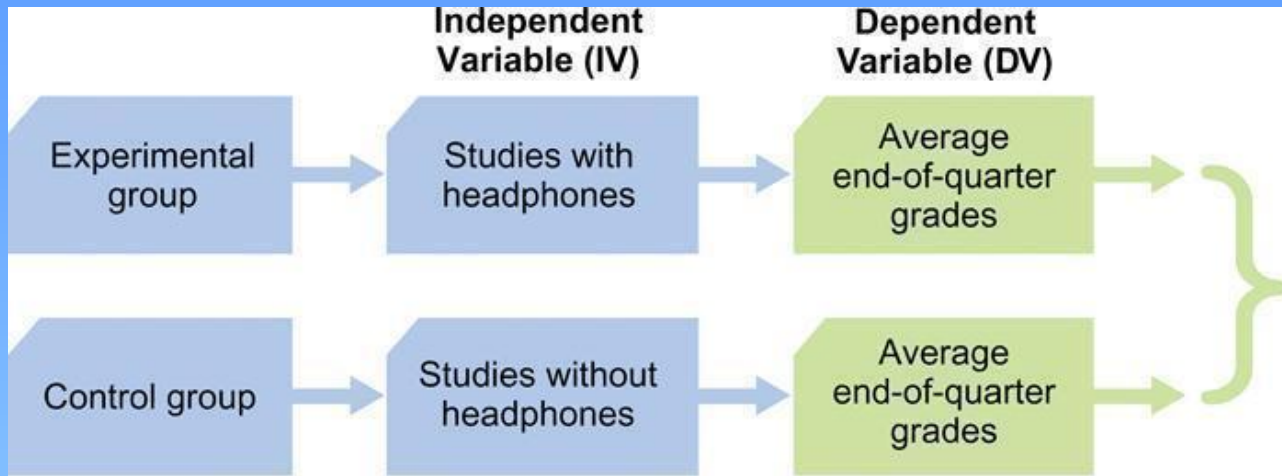
Experiments: Control for Other Confounding Variables

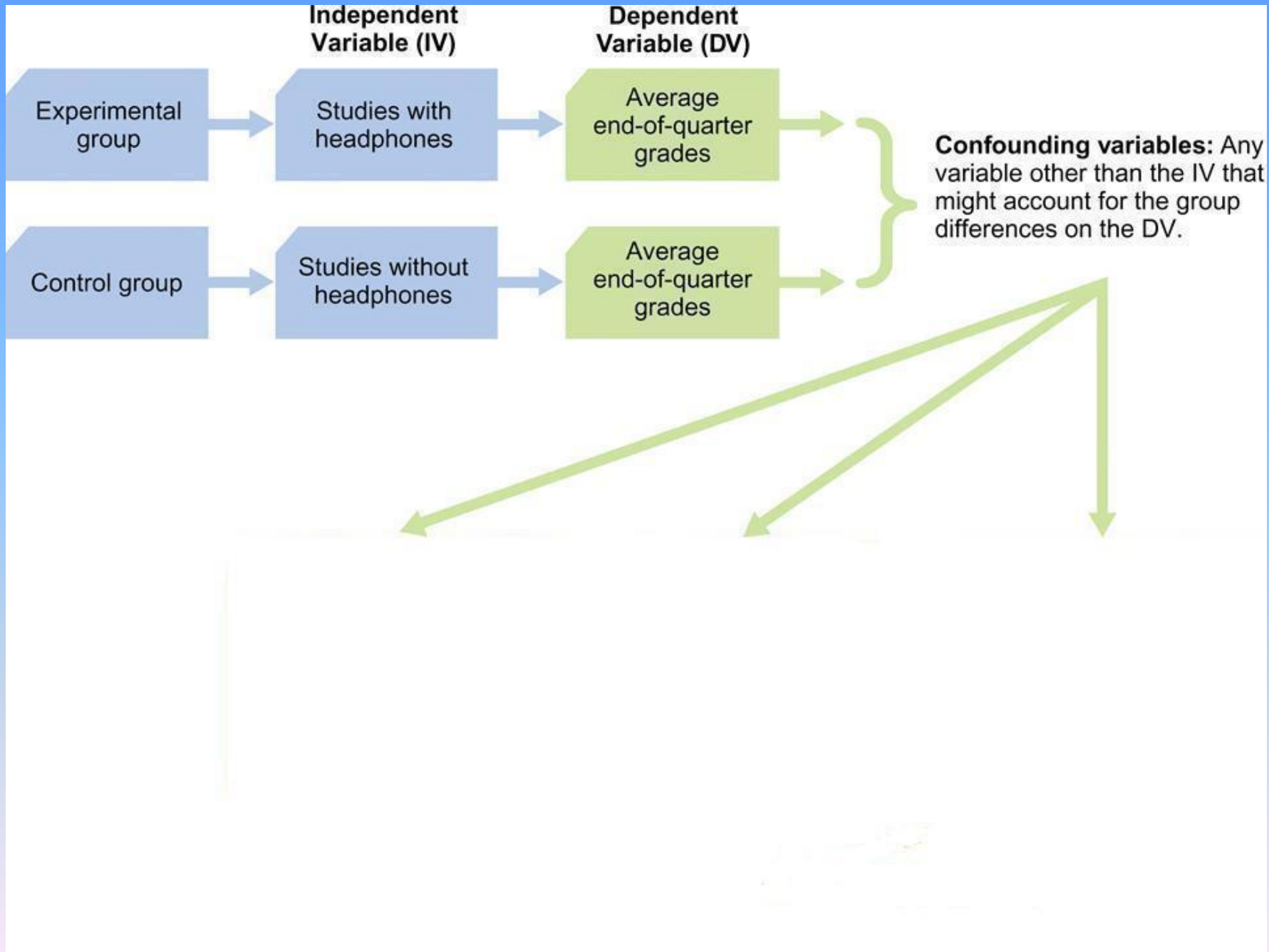
Confounding Variables: Environmental Differences

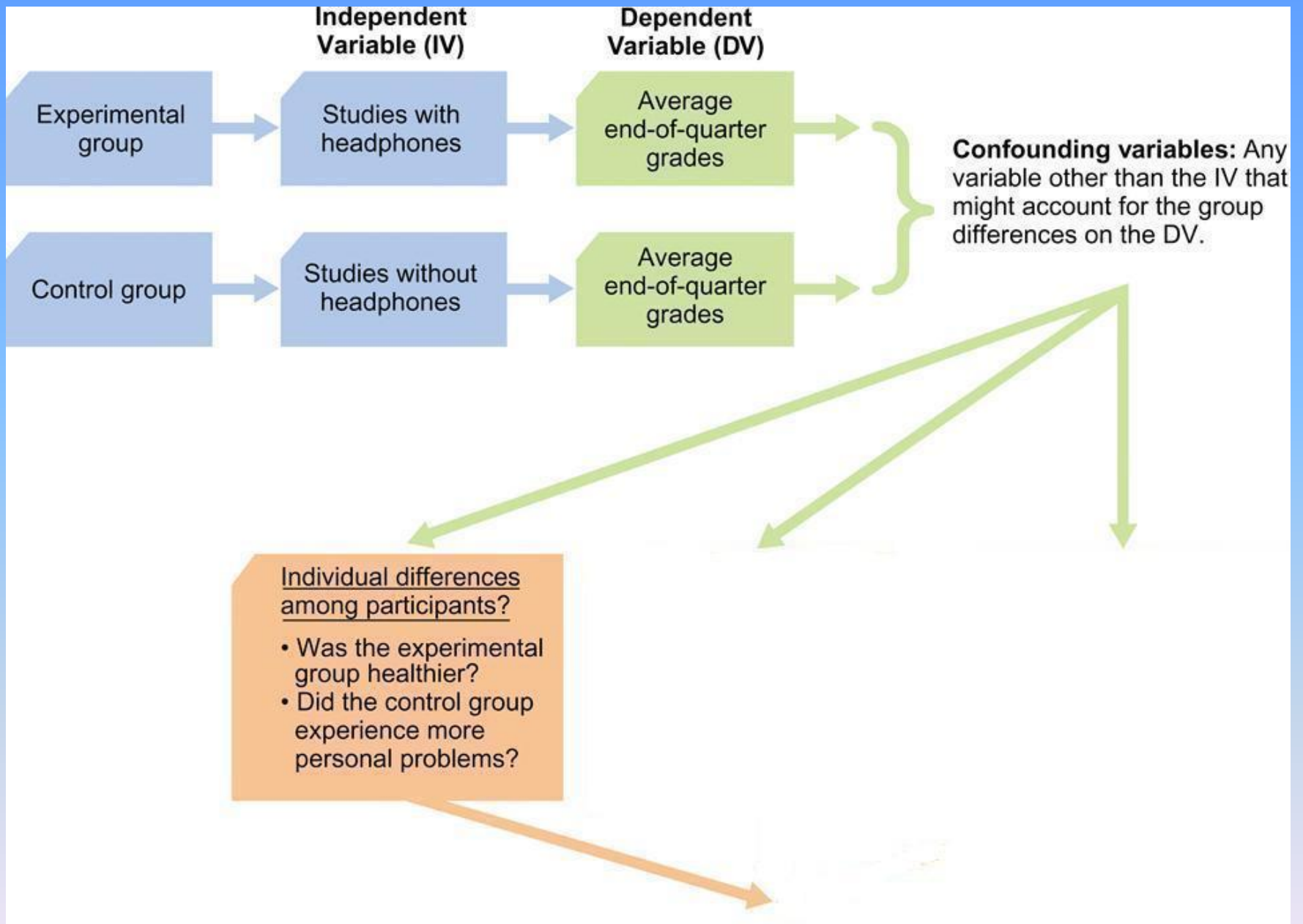
- Any differences in the experiment's conditions--between the experimental and control groups
- Differences include temperature, lighting, noise levels, distractions, etc.
- Ideally, there should be a minimum of environmental differences between the two groups.

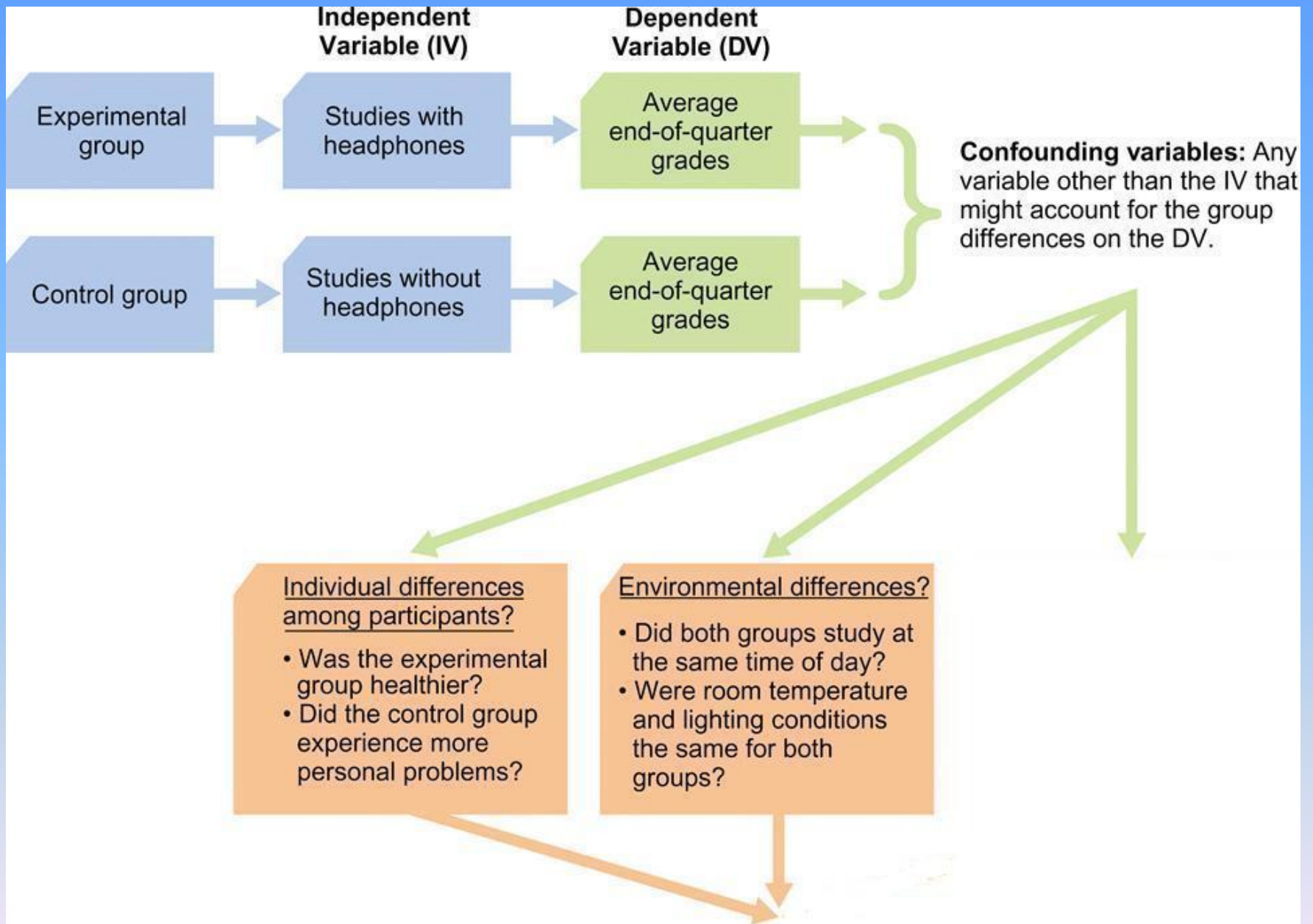
Confounding Variables: Expectation Effects

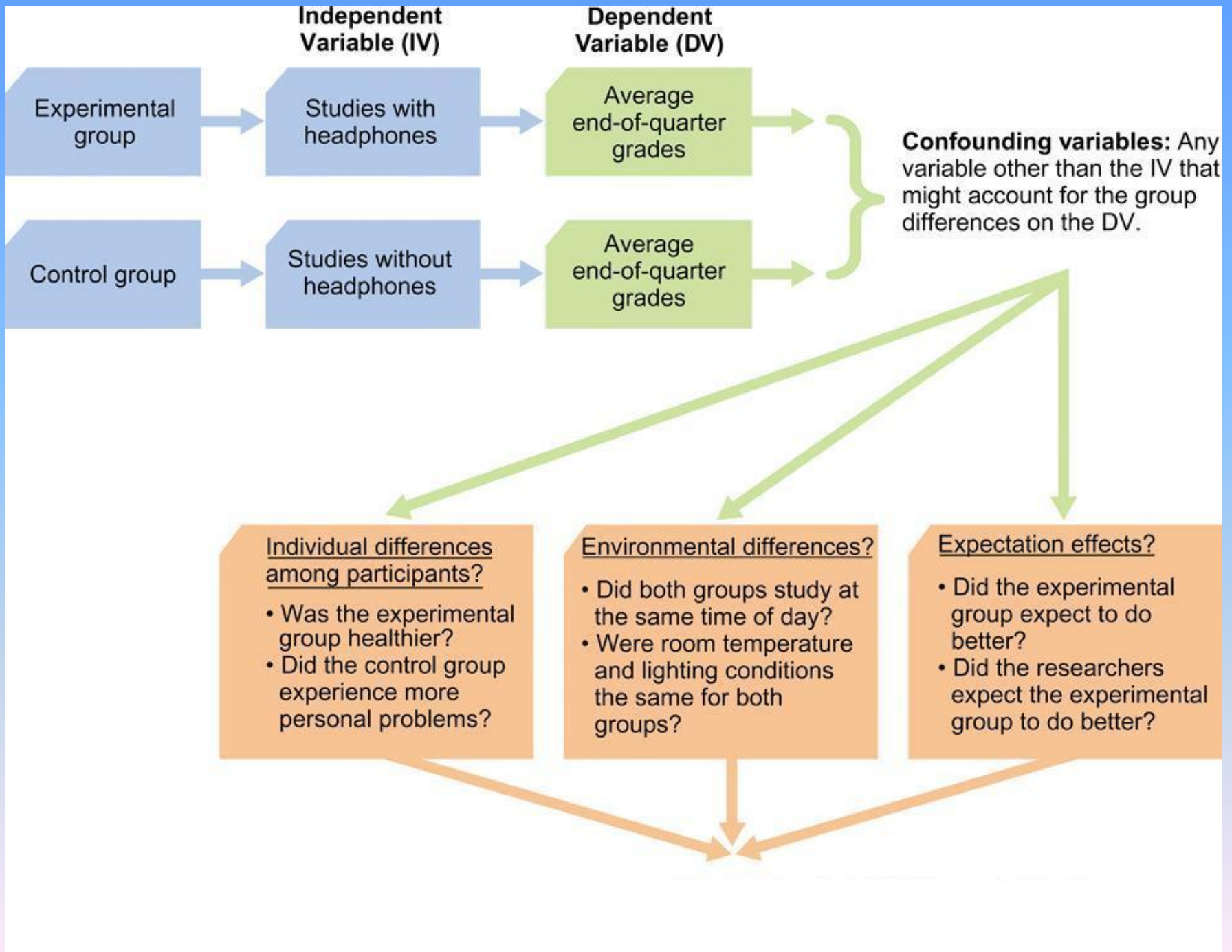
- Any changes in an experiment's results due to the subject anticipating certain outcomes to the experiment

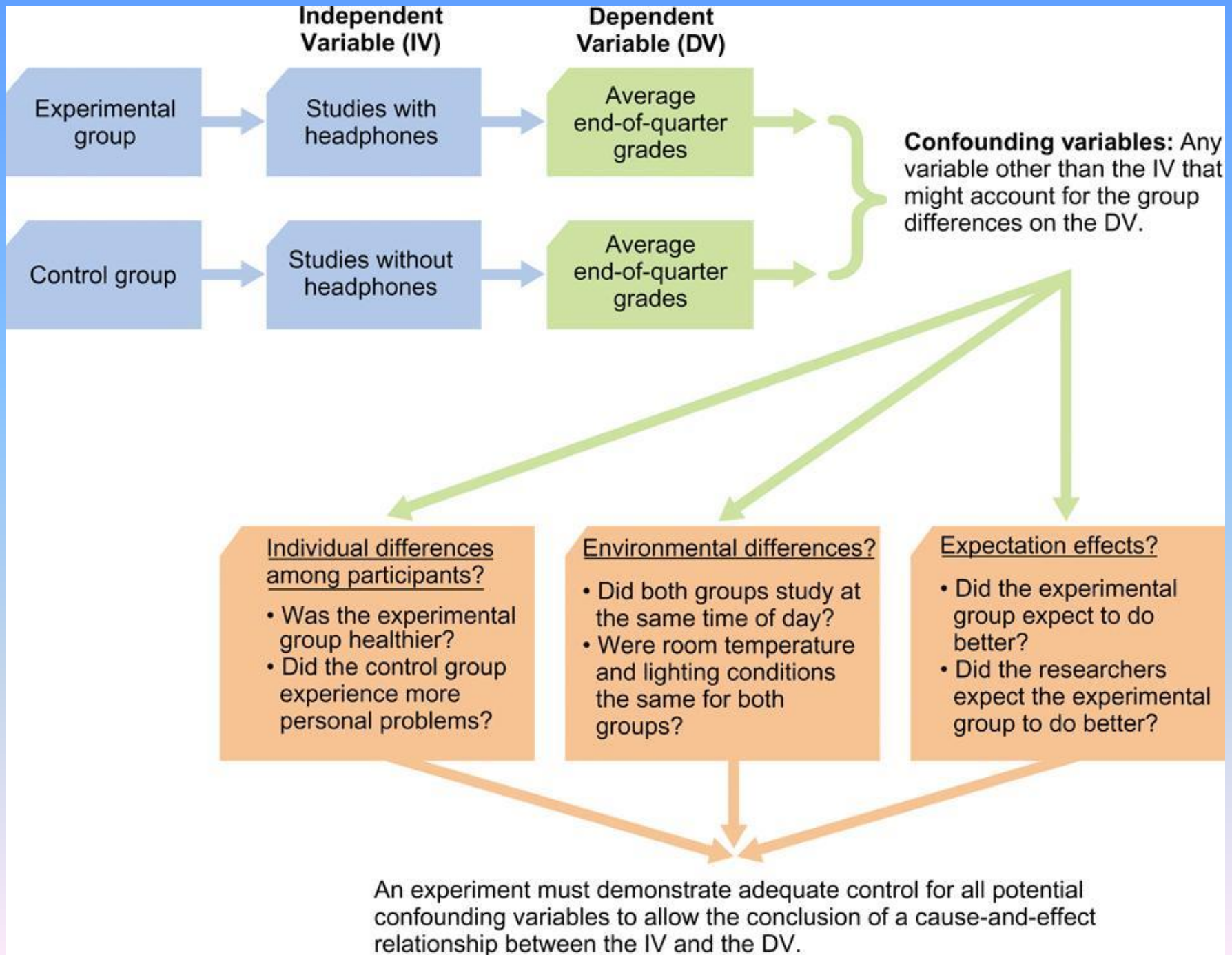












Blind procedure

- An experimental procedure where the research participants are ignorant (blind) to the expected outcome of the experiment
- Sometimes called single blind procedure

Double Blind Procedure

- A research procedure in which both the data collectors and the research participants do not know the expected outcome of the experiment.
- Both groups are ignorant (blind) to the experiment's purpose or expected results

Placebo

- A non-active substance or condition administered instead of a drug or active agent
- Many times an inactive pill that has no known effect
- Given to the control group

Module 4: Research Strategies

Experiments: Data Analysis

Statistically Significant

- Possibility that the differences in results between the experimental and control groups could have occurred by chance is no more than 5 percent
- Must be at least 95% certain the differences between the groups is due to the independent variable

Module 4: Research Strategies

Experiments: Replication

Replication

- To repeat the essence of a research study to see whether the results can be reliably reproduced
- Repeating the experiment to determine if similar results are found
- If so, the research is considered reliable.

The Experiment Step by Step

Table 4.2

The Experiments Step By Step

The Experiment Step by Step

Table 4.2

The Experiments Step By Step

1. Develop the *hypothesis*.

The Experiment Step by Step

Table 4.2

The Experiments Step By Step

1. Develop the *hypothesis*.
2. Create *operational definitions* for the *independent variable (IV)* and *dependent variable (DV)*.

The Experiment Step by Step

Table 4.2

The Experiments Step By Step

1. Develop the *hypothesis*.
2. Create *operational definitions* for the *independent variable (IV)* and *dependent variable (DV)*.
3. *Randomly select* a sample of participants from the population.

The Experiment Step by Step

Table 4.2

The Experiments Step By Step

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Table 4.2

The Experiments Step By Step

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5. Expose the experimental group, but not the control group, to the IV. If necessary, use a *placebo* with the control group to balance expectations.

The Experiment Step by Step

Table 4.2

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6. Control for other *confounding variables* by using a *double-blind procedure* and treating both groups the same except for exposure to the IV.

The Experiment Step by Step

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7. Learn the effect of the IV by measuring the DV for both groups.

The Experiment Step by Step

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The Experiments Step By Step

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6. Control for other *confounding variables* by using a *double-blind procedure* and treating both groups the same except for exposure to the IV.
7. Learn the effect of the IV by measuring the DV for both groups.
8. Use *statistical analysis* to discover whether the difference in the DV between the two groups is likely to have been caused by the manipulation of the IV.

Module 4: Research Strategies

Research Ethics

Module 4: Research Strategies

Ethics: Human Research (Four Basic Principles)

1. Informed Consent

- Participants must be informed, in advance, about:
 - the general nature of the research, and
 - any potential risk.
 - Participants must have the right to refuse participation or withdraw at any time.

2. Right to be Protected from Harm and Discomfort

- Studies involving harm or discomfort may be conducted only under certain circumstances, and only with the informed consent of the participants.

3. Right of Confidentiality

- Individual data about research participants should never be discussed or released.

4. Right to Debriefing

- Participants have a right to receive a complete explanation of the research at the end of the study.
- This is extremely important if the research involves deception.

4 Guidelines

- 1. Informed *Consent*
- 2. Right to be *protected* from *Harm* and *Discomfort*
- 3. Right of *Confidentiality*
- 4. Right to *Debriefing*

Module 4: Research Strategies

Ethics: Animal Research

Reasons for Animal Research

- Interest in animal behavior as a topic of study
- Data from animal studies may apply to humans.
- Easier to do some type of studies (genetics) due to the shorter life span of animals

Reasons for Animal Research

- Easier to exercise more control over experiments with animals as compared to humans
- Procedures that are not ethical to perform on humans may be considered acceptable when performed on animals

Are Animal Studies Ethical?

- Should laboratory animals such as rats, pigeons, and monkeys be used in research, particularly when the research involves painful or damaging procedures, such as brain surgery, electrode implants, and pain studies?
- Should limitations be more strict on studies using humanlike animals, such as chimpanzees? Should there be an outright ban on all animal research?

Care of Animals used in Research

- Animals used in research must:
 - Have decent living conditions (clean housing with adequate ventilation)
 - Have appropriate food
 - Be well cared for



Is it Worth it?

- The APA directs researchers to weigh any discomfort caused animals against the value of the information sought in the research.
- In other words, is the information that might be gained worth what is being done to the animals in order to obtain it?
- You will act as members of the **Institutional Animal Care and Use Committee (IACUC)**. You must decide if each case of animal research should be approved.

The End