Introduction to Psychology Version 3 0 3rd edition Stangor Solutions Manual

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Introduction to Psychology Version 3 0 3rd edition Stangor Solutions Manual

Chapter 2
Psychological Science

1. Psychologists Use the Scientific Method to Guide Their Research

- Describe the principles of the scientific method and explain its importance in conducting and interpreting research.
- Differentiate laws from theories and explain how research hypotheses are developed and tested.
- Discuss the procedures that researchers use to ensure that their research with humans and with animals is ethical.

Section Outline

- **Basic research** is research that answers fundamental questions about behavior.
- **Applied research** is research that investigates issues that have implications for everyday life and provides solutions to everyday problems.
- *Peer review* is the process whereby research published in scientific journals is evaluated and improved by other scientists before it is published. Poor quality research, or research that presents misinterpreted results, is frequently rejected for publication as a result of peer review.
- All scientists use the **scientific method**, a set of rules, assumptions, and procedures used by scientists to conduct and evaluate research.
- The scientific method requires that data be collected and evaluated in an **objective** manner, i.e., free of individual bias or emotion.
- The scientific method ensures that conclusions reached by scientists are **empirical**, or based on the systematic collection and analysis of data.
- Scientific information is organized into general statements that can be applied across many situations.
    - **Laws** are very general principles that can be applied to all situations in a given area of study.
    - **Theories** are integrated sets of principles that explain and predict many, but not all, observed relationships within a given area of study.
- Theories have four important characteristics:
    - *General*—they are applicable to many different outcomes.
    - *Parsimonious*—they provide a simple explanation for the outcomes.
    - *Provide ideas for future research*—theories offer potential explanations for outcomes in other research domains which can be investigated further.
    - **Falsifiable**—the variables of interest can be adequately measured and the relationships between the variables that are predicted by the theory can be shown through research to be incorrect.
- A **research hypothesis** is a specific and falsifiable prediction about the relationship between or among two or more variables.
- A **variable** is any attribute that can assume different values among different people or across different times or places.
- **Conceptual variables** are abstract ideas that form the basis of research hypotheses.
- **Measured variables** are numerical representations of conceptual variables.
- An **operational definition** tells us how to turn a conceptual variable into a measured variable.

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- Researchers must consider the ethical implications of their research.
    - Prevent harm to the research participants.
    - Participants must be free to choose whether or not to participate. They cannot be coerced into participating, or continuing to participate after an experiment has begun.
    - Participant privacy must be protected.
    - **Deception** must be used with care. Research participants may be deceived when they are not fully informed about the nature of the research project *before* participating.
- All research institutions receiving federal funds to conduct research must have an **Institutional Review Board** (IRB), a panel of researchers, ethicists, and the general public, who will determine whether a research project safeguards or violates participants' rights to protection.
- **Informed consent** is given by the research participant when the participant is fully and completely informed of the research goals and procedures, and the participant's rights and protections, before the research is conducted.
- **Debriefing** is a procedure designed to fully explain the purposes and procedures of the research and remove any harmful aftereffects of participation.

Key Takeaways

- Psychologists use the scientific method to generate, accumulate, and report scientific knowledge.
- Basic research, which answers questions about behavior, and applied research, which finds solutions to everyday problems, inform each other and work together to advance science.
- Research reports describing scientific studies are published in scientific journals so that other scientists and laypersons may review the empirical findings.
- Organizing principles, including laws, theories and research hypotheses, give structure and uniformity to scientific methods.
- Concerns for conducting ethical research are paramount. Researchers assure that participants are given free choice to participate and that their privacy is protected. Informed consent and debriefing help provide humane treatment of participants.
- A cost-benefit analysis is used to determine what research should and should not be allowed to proceed.

Exercises

1. Design an experiment to test the research hypothesis "girls like the color pink more than boys do." Explain how you will convert your conceptual variables into measurable variables. What are the assumptions you are making in your experimental design? Explain the results of your experiment.
   Answer: Students can be divided into male and female groups and asked to answer questions about the color pink. The conceptual variable is "like the color pink." This can be converted into a measurable variable by counting the number of male and female students wearing pink items and dividing by the total number of male or female students to arrive at a ratio. Students can answer questions about their perceptions and feelings about the color pink on a scale of 1 to 5 and a final score can be obtained. Student answers will vary.

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2. Discuss whether the statement: "It is acceptable to deceive people when conducting psychological experiments." is ethically correct. Upon what ethical authority or principle did you base your argument? What are the consequences of accepting or rejecting this statement?
   Answer: Student answers will vary. Some will find that if no harm is done to the participant other than that they were misinformed as to the purpose of the study, deception is acceptable. Others will argue that deception itself is wrong, and should not be used by ethical researchers. Most students will likely use a Utilitarian argument that the greatest good for the greatest number should be considered paramount. Others will use a Kantian or Virtue-based argument that it is wrong to lie under any circumstances. Some researchers argue that certain types of human behavior cannot be accurately studied if participants are aware of the true nature of the study. If we accept the statement, we can gain this knowledge by deceiving the research participants. On the other hand, some researchers argue that we are doing harm by deceiving research participants, and that we must forego any knowledge that cannot be gained without deception.

2. Psychologists Use Descriptive, Correlational, and Experimental Research Designs to Understand Behavior

- Differentiate the goals of descriptive, correlational, and experimental research designs and explain the advantages and disadvantages of each.
- Explain the goals of descriptive research and the statistical techniques used to interpret it.
- Summarize the uses of correlational research and describe why correlational research cannot be used to infer causality.
- Review the procedures of experimental research and explain how it can be used to draw causal inferences.

Section Outline

- A **research design** is the specific method a researcher uses to collect, analyze, and interpret data.
- **Descriptive research** is research designed to provide a snapshot of the current state of affairs.
  - **Case studies** are descriptive records of one or more individual's experiences and behavior.
  - A **survey** is a descriptive study using a measure administered through either an interview or a written questionnaire to get a picture of the beliefs or behaviors of a sample of people of interest.
  - The people chosen to participate in survey research are known as the **sample**.
  - The sample are selected to be representative of all the people that the researcher wishes to know about, i.e., **the population**.
  - A type of descriptive study called **naturalistic observation** is research based on the observation of everyday events.
  - **Descriptive statistics** are numbers that summarize the distribution of scores on a measured variable.
  - A data distribution that is shaped like a bell is known as a **normal distribution**.
  - A distribution can be described in terms of its central tendency and its dispersion.
    - *Central tendency* is the point in the distribution around which the data are centered.

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        - *Dispersion* is the spread of the data around the central tendency.
        - The arithmetic average, or **arithmetic mean**, is the most commonly used measure of central tendency.
        - The **median** is the score in the center of the distribution, meaning that 50% of the scores are greater than the median and 50% of the scores are less than the median.
        - The **mode** represents the value that occurs most frequently in the distribution.
        - The **standard deviation** is the most commonly used measure of dispersion.
- **Correlational research** is research designed to discover relationships among variables and to allow the prediction of future events from present knowledge.
    - When there are two variables, one of them is called the *predictor variable* and the other the *outcome variable*.
    - A **scatter plot** is a visual image of the relationship between two variables.
    - When the association between the variables on the scatter plot can be easily approximated with a straight line, the variables are said to have a *linear relationship*.
        - When above-average values for one variable also tend to have above-average values for the other variable, the relationship is said to be *positive linear*.
        - When above-average values for one variable tend to have below-average values for the other variable, the relationship is said to be *negative linear*.
    - Relationships between variables that cannot be described with a straight line are known as *nonlinear relationships*.
    - When there is no relationship at all between the two variables, they are said to be *independent*.
    - Relationships that change in direction are called *curvilinear relationships*.
    - The **Pearson correlation coefficient** is the most common statistical measure of the strength of linear relationships among variables.
    - **Multiple regression** is a statistical technique that allows predicting a single outcome variable from more than one predictor variable.
    - Correlation **does not indicate cause and effect**.
    - A **common-causal variable** is a variable that is not part of the research hypothesis but that causes both the predictor and the outcome variable, producing the observed correlation between them.
    - A **spurious relationship** is a relationship between two variables in which a common-causal variable produces the relationship.
- **Experimental research** is research in which initial equivalence among research participants in more than one group is created, followed by a manipulation of a given experience for these groups and a measurement of the influence of the manipulation.
    - The **independent variable** in an experiment is the cause of the effect, the variable that is created (manipulated) by the experimenter.
    - The **dependent variable** in an experiment is a measured variable that is expected to be influenced by the experimental manipulation.
    - Experimental research is characterized by **random assignment to conditions**, a procedure in which the condition that each participant is assigned to is determined through a random process.
    - The disadvantages of experimental research include cost, the unlikelihood of encountering laboratory conditions in real life, and the inability to test hypotheses under extreme social conditions

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Key Takeaways

- Descriptive, correlational, and experimental research designs are used to collect and analyze data.
- Descriptive designs include case studies, surveys, and naturalistic observation. The goal of these designs is to get a picture of the current thoughts, feelings, or behaviors in a given group of people. Descriptive research is summarized using descriptive statistics.
- Correlational research designs measure two or more relevant variables and assess a relationship between or among them. The variables may be presented on a scatter plot to visually show the relationships. The Pearson Correlation Coefficient (r) is a measure of the strength of linear relationship between two variables.
- Common-causal variables may cause both the predictor and outcome variable in a correlational design, producing a spurious relationship. The possibility of common-causal variables makes it impossible to draw causal conclusions from correlational research designs.
- Experimental research involves the manipulation of an independent variable and the measurement of a dependent variable. Random assignment to conditions is normally used to create initial equivalence between the groups, allowing researchers to draw causal conclusions.

Exercises

1. Create a research survey using a scale of 1 to 5 to test the research hypothesis "chocolate candy makes people feel better." Select a sample population from your class or school and explain how you selected the sample. Provide descriptive statistics, and describe the distribution of your data. Is the hypothesis correct?
   Answer: Student examples will vary. Each should have a clear hypothesis using measured variables, a description of the sample population and how it was selected, and a number representing the central distribution and dispersion of the data.

2. Collect data from a sample population for their weight and height. Create a scatter plot and determine whether the relationship is linear or non linear. Determine whether there is a positive or negative correlation between weight and height.
   Answer: Students will create a graph with data points plotted on it. The relationship between weight and height should be positive and linear, but due to small sample sizes, students may find different relationships between weight and height than the one expected. Students should discuss the effect of small sample size on research results.

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3. You Can Be an Informed Consumer of Psychological Research

- Outline the four potential threats to the validity of research and discuss how they may make it difficult to accurately interpret research findings.
- Describe how confounding may reduce the internal validity of an experiment.
- Explain how generalization, replication, and meta-analyses are used to assess the external validity of research findings.

Section Outline

- **Construct validity** refers to the extent to which the variables used in the research adequately assess the conceptual variables they were designed to measure.
- **Reliability** refers to the consistency of a measured variable.
- **Statistical significance** refers to the confidence with which a scientist can conclude that data are not due to chance or random error.
- **Statistical conclusion validity** refers to the extent to which we can be certain that the researcher has drawn accurate conclusions about the statistical significance of the research.
- **Internal validity** refers to the extent to which we can trust the conclusions that have been drawn about the causal relationship between the independent and dependent variables.
- **Confounding variables** are variables other than the independent variable on which the participants in one experimental condition differ systematically from those in other conditions.
- **Experimenter bias is** a situation in which the experimenter subtly treats the research participants in the various experimental conditions differently, resulting in an invalid confirmation of the research hypothesis.
- In a **double-blind experiment**, both the researcher and the research participants are blind to who is receiving which treatment.
- For instance, in a double-blind trial of a drug, some participants are given the real drug and others are given a **placebo**: an uneffective medicine that is sometime given to some patients to allow comparing the psychological effect of taking a drug with the actual effect of the real drug.
- **External validity** refers to the extent to which the results of a research design can be generalized beyond the specific way the original experiment was conducted.
- **Generalization** refers to the extent to which relationships among conceptual variables can be demonstrated in a wide variety of people and a wide variety of manipulated or measured variables.
- The process of repeating previous research, which forms the basis of all scientific inquiry, is known as **replication**.
- A **meta-analysis** is a statistical technique that uses the results of existing studies to integrate and draw conclusions about those studies.

Key Takeaways

- Research is said to be valid when the conclusions drawn by the researcher are legitimate. Because all research has the potential to be invalid, no research ever "proves" a theory or research hypothesis.
- Construct validity, statistical conclusion validity, internal validity, and external validity are all types of validity that people who read and interpret research need to be aware of.
- Construct validity refers to the assurance that the measured variables adequately measure the conceptual variables.

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- Statistical conclusion validity refers to the assurance that inferences about statistical significance are appropriate.
- Internal validity refers to the assurance that the independent variable has caused the dependent variable. Internal validity is greater when confounding variables are reduced or eliminated.
- External validity is greater when effects can be replicated across different manipulations, measures, and populations. Scientists use meta-analyses to better understand the external validity of research.

Exercises

1. Collect data from a sample population for their weight and height. Create a scatter plot and determine whether the relationship is linear or nonlinear. Determine whether there is a positive or negative correlation between weight and height. Combine your results with that of your classmates to create a meta-analysis. Discuss how the results of the meta-analysis of the results compares to the results found by individual students.
   Answer: Students will create a graph with data points plotted on it. The relationship between weight and height should be positive and linear, but due to small sample sizes, students may find different relationships between weight and height than the one expected. However, the "meta-analysis" should result in a positive, linear relationship between weight and height.

2. Choose an online article about a psychology experiment and evaluate the validity of the claims made by the authors.
   Answer: Students should provide an answer that includes a discussion of the website source and its potential reason for publishing the study, any perceived author bias, the authors' credentials or professional standing, and links to original research articles.

3. Choose an article published in a psychology journal. Identify and discuss the potential threats to the validity of the research and how the authors countered those threats.
   Answer: Student answers will vary. Each answer should discuss the threats to construct validity, statistical conclusion validity, internal validity, and external validity. Authors' claims about measured variables should be examined, statistical analyses should be identified, potential confounding variables should be identified and the authors' efforts to avoid confounding should be discussed, and the appropriateness of generalizations made by the authors should be examined.

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Introduction to Psychology, v3.0

Charles Stangor

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CHAPTER 2
Psychological Science

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Psychological Science

- Psychologists Use the Scientific Method to Guide their Research
- Psychologists Use Descriptive, Correlational, and Experimental Research Designs to Understand Behavior
- You Can Be an Informed Consumer of Psychological Research

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Psychological Science

Basic Research

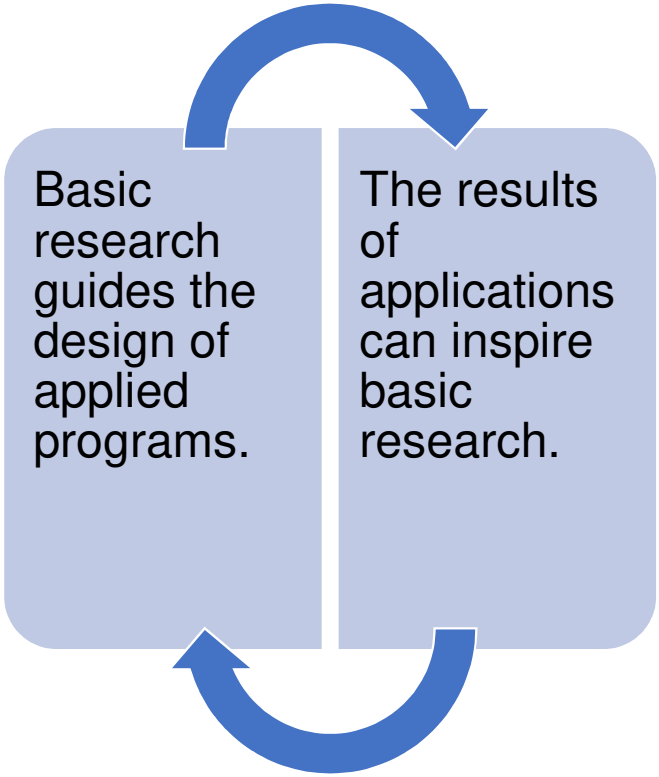
- Answers fundamental questions about behavior
  - e.g., how nerves conduct impulses from the skin to the brain

Applied Research

- Investigative issues with implications for everyday life; provides solutions to problems
  - e.g., which type of advertising campaign will reduce alcohol abuse

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Psychological Science



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Psychological Science

- The results of psychological research are communicated in reports published in scientific journals.
  - *Peer review* – the research reported in scientific journals has been screened, critiqued, and improved by scientists in the field

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The Scientific Method

Learning Objectives

1. Describe the principles of the scientific method, and explain its importance in conducting and interpreting research.
2. Differentiate laws from theories and explain how research hypotheses are developed and tested.
3. Discuss the procedures that researchers use to ensure that their research with humans and with animals is ethical.

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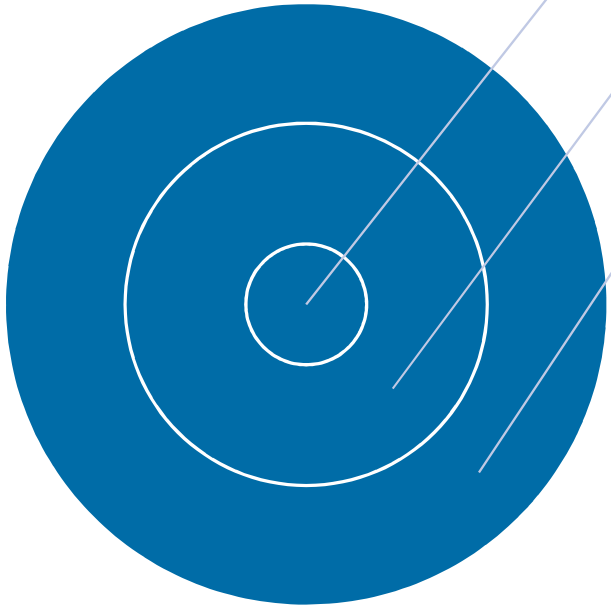
The Scientific Method

- Science is empirical and objective.
  - **Empirical:** based on the systematic collection and analysis of data
    - Data – information collected through formal observation and measurement
  - **Objective:** free from the personal bias of the scientist
- **Scientific method:** the set of assumptions, rules, and procedures scientists use to conduct research
- Replication – most research is designed to repeat, extend, or modify previous research findings

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The Scientific Method: Laws and Theories as Organizing Principles



Hypothesis
specific prediction relating two variables

Theory
integrated explanation in a given domain

Law
general principle applying to all situations

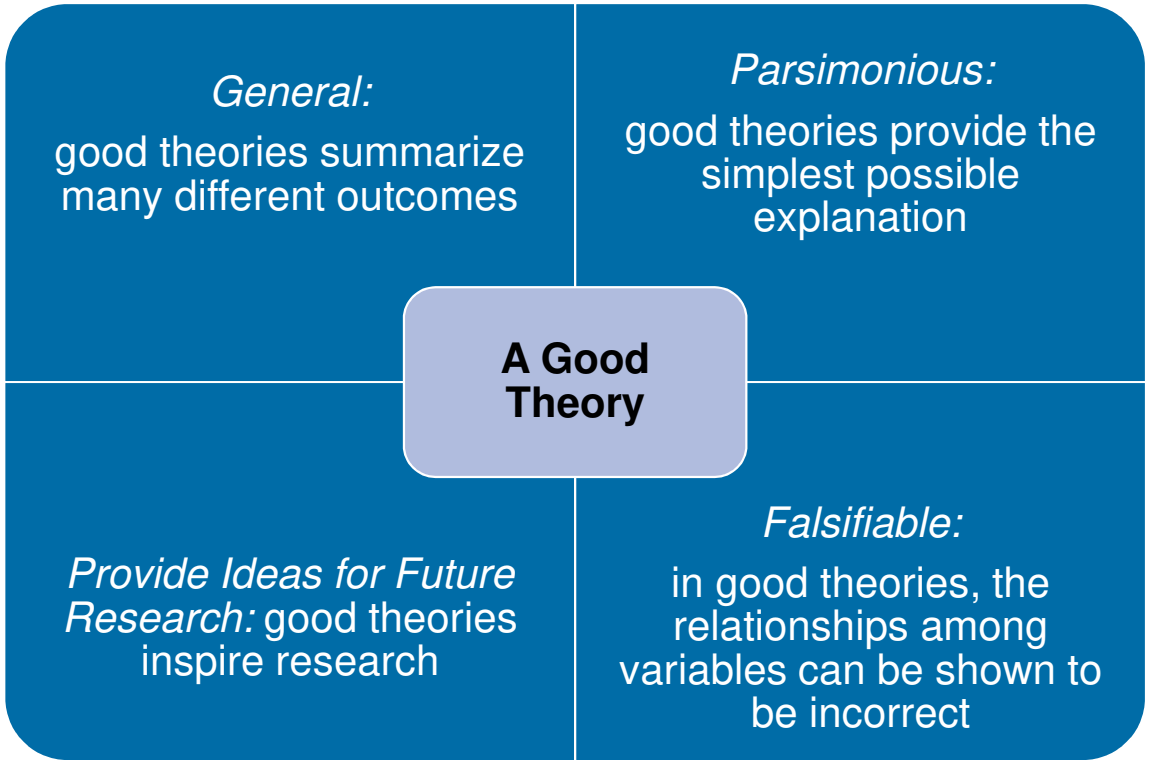
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The Scientific Method: Laws and Theories as Organizing Principles

- **Law:** principle so general it applies to all situations
  - Psychology has few laws – Weber's Law might be one example.
- **Theory:** an integrated set of principles that explains many but not all of the relationships in a given domain
  - Piaget's stage theory of cognitive development is one example.

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The Scientific Method: Laws and Theories as Organizing Principles



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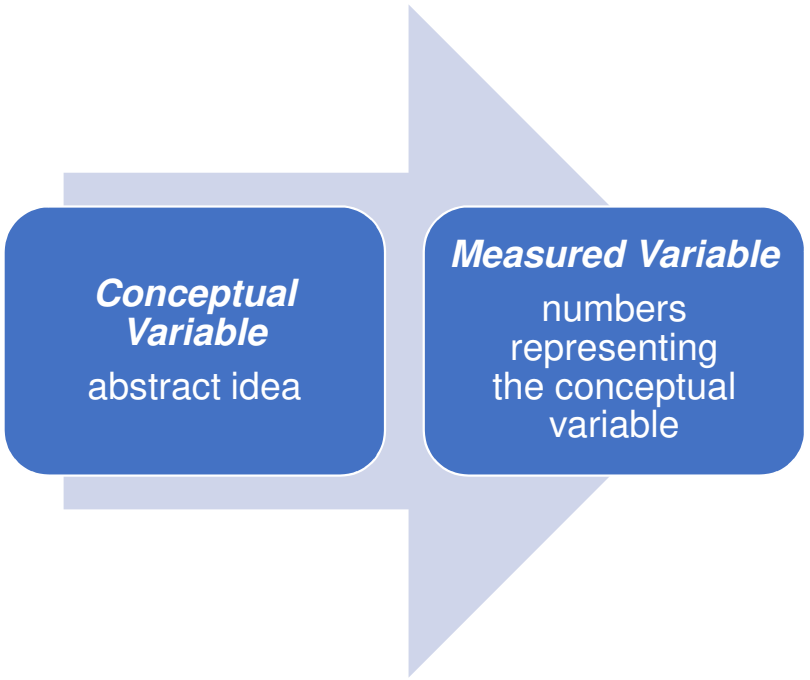
The Scientific Method: The Research Hypothesis

- **Research hypothesis:** a specific and falsifiable prediction regarding relationships among two or more variables
  - **Variable:** any attribute that can assume different values

- Example: "Participating in psychotherapy will reduce anxiety."

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The Scientific Method: The Research Hypothesis

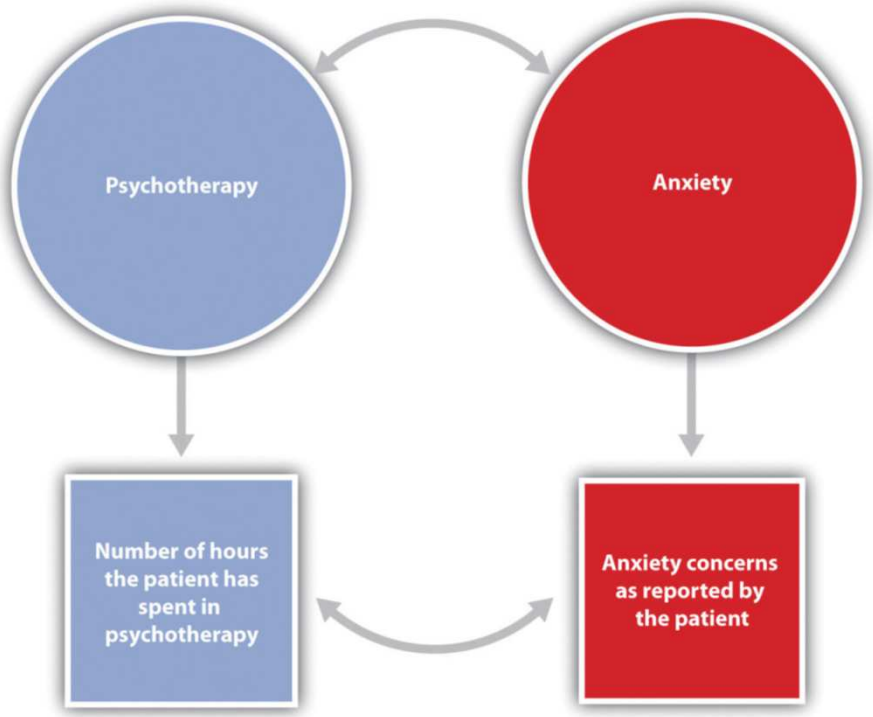


- **Operational definition:** precise statement of how a conceptual variable is translated into a measured variable

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The Scientific Method: The Research Hypothesis

- *Hypothesis*: more psychotherapy will be related to less reported anxiety.
- The conceptual variable of attending psychotherapy is operationalized using the number of hours of psychotherapy the client has completed.
- The conceptual variable of anxiety is operationalized using self-reported levels of anxiety.



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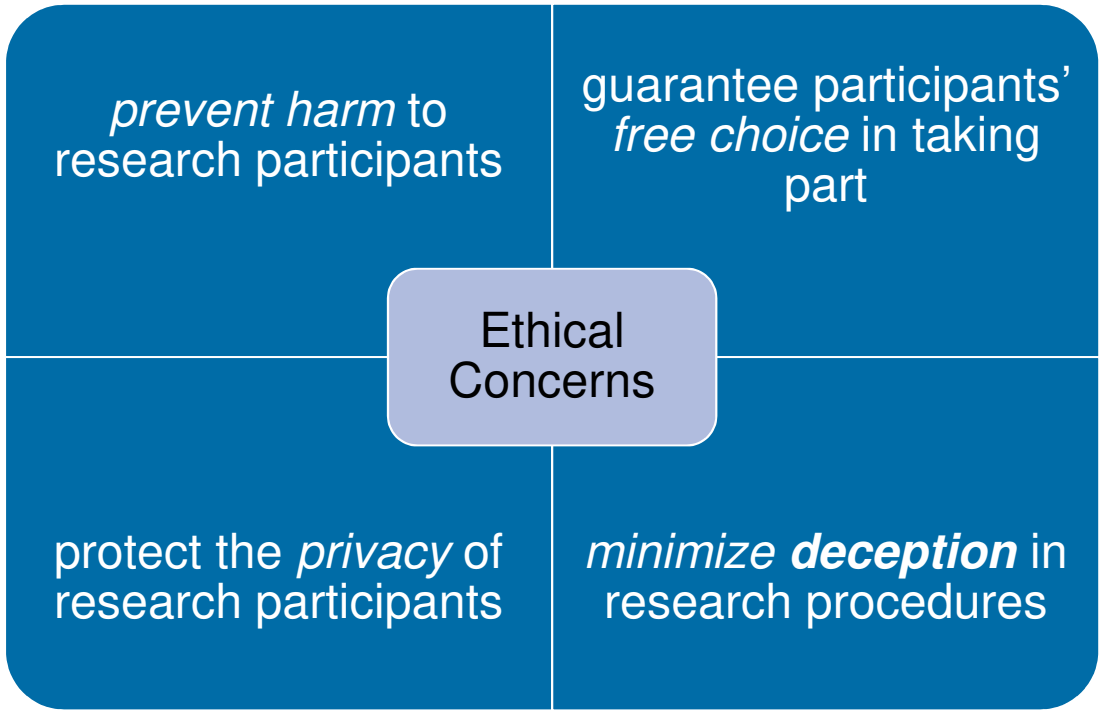
The Scientific Method: Conducting Ethical Research

- Psychological research may cause stress, harm, or inconvenience to participants.

- Before conducting research, psychologists must weigh such costs against the potential benefits of the research.

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The Scientific Method: Conducting Ethical Research



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The Scientific Method: Ensuring that Research Is Ethical

- At the university level, an Institutional Review Board (IRB) ensures that research using human participants meets ethical guidelines.
  - **Institutional Review Board:** committee consisting of at least 5 members whose goal is to determine the cost-benefit ratio of proposed research

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The Scientific Method: Ensuring that Research Is Ethical

Informed Consent

- Conducted before the participant begins a research session
- Explains the procedure of the research
- Informs the participant of her rights during the research

Debriefing

- Fully explains the purposes and procedures of the research
- Removes any harmful aftereffects of participation

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The Scientific Method: Research With Animals

- Basic principles have been developed to guide scientists in making ethical decisions about research with animals.

- Most scientists believe that there are sufficient benefits from animal research to justify such research, as long as the humane treatment of the animals are guaranteed.

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The Scientific Method

Key Takeaways

- Psychologists use the scientific method to generate, accumulate, and report scientific knowledge.
- Basic research, which answers questions about behavior, and applied research, which finds solutions to everyday problems, inform each other and work together to advance science.
- Research reports describing scientific studies are published in scientific journals so that other scientists and laypersons may review the empirical findings.

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The Scientific Method

Key Takeaways, continued

- Organizing principles, including laws, theories and research hypotheses give structure and uniformity to scientific methods.

- Concerns for conducting ethical research are paramount. Researchers assure that participants are given free choice to participate and that their privacy is protected. Informed consent and debriefing help provide humane treatment of participants.

- A cost–benefit analysis is used to determine which research should be allowed to proceed.

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Descriptive, Correlational, and Experimental Research Designs

Learning Objectives:

1. Differentiate the goals of descriptive, correlational, and experimental research designs, and explain the advantages and disadvantages of each.
2. Explain the goals of descriptive research and the statistical techniques used to interpret it.
3. Summarize the uses of correlational research and describe why correlational research cannot be used to infer causality.
4. Review the procedures of experimental research and explain how it can be used to draw causal inferences.

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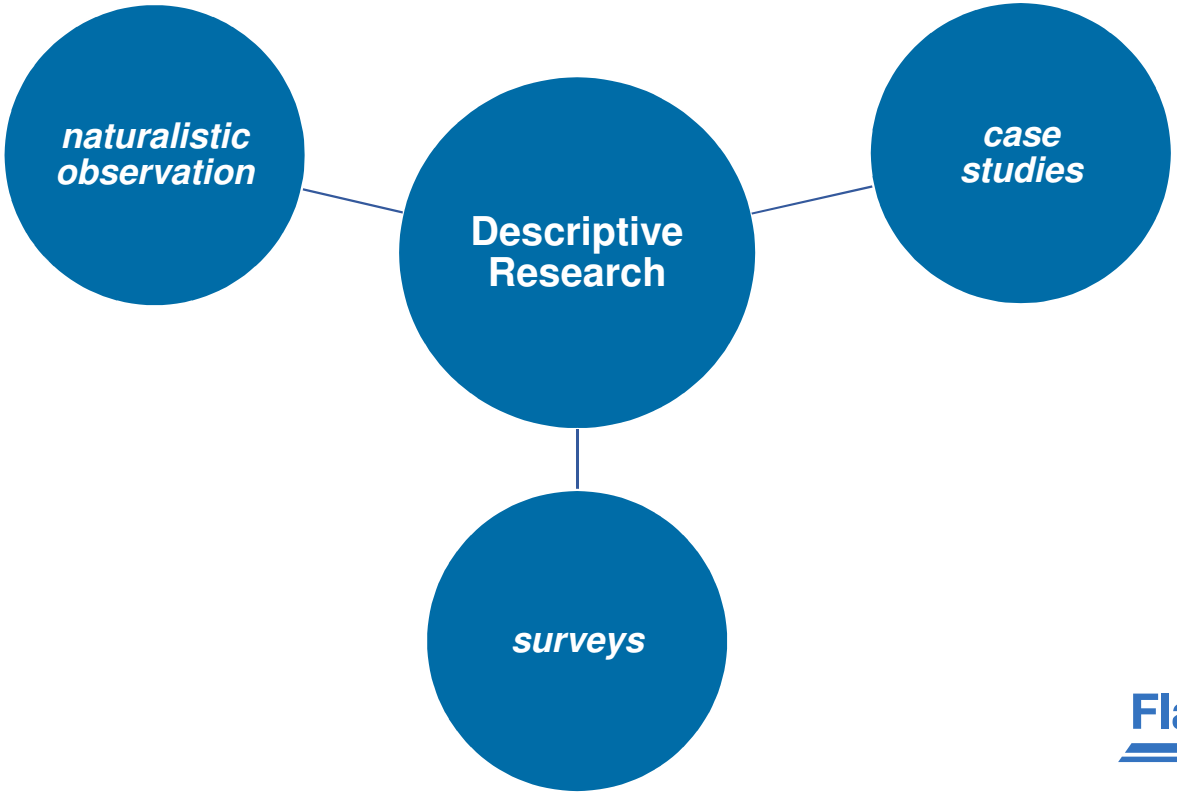
Descriptive, Correlational, and Experimental Research Designs

Research Design	Goal	Advantages	Disadvantages
Descriptive	to depict the current state of affairs	provides a detailed picture; inspires further research	does not assess relationships among variables
Correlational	to assess relationships among variables	allows predictions	does not allow cause-and-effect conclusions
Experimental	to assess the effect of manipulations on a dependent variable	allows cause-and-effect conclusions	some variables cannot be manipulated

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Descriptive, Correlational, and Experimental Research Designs

Descriptive Research



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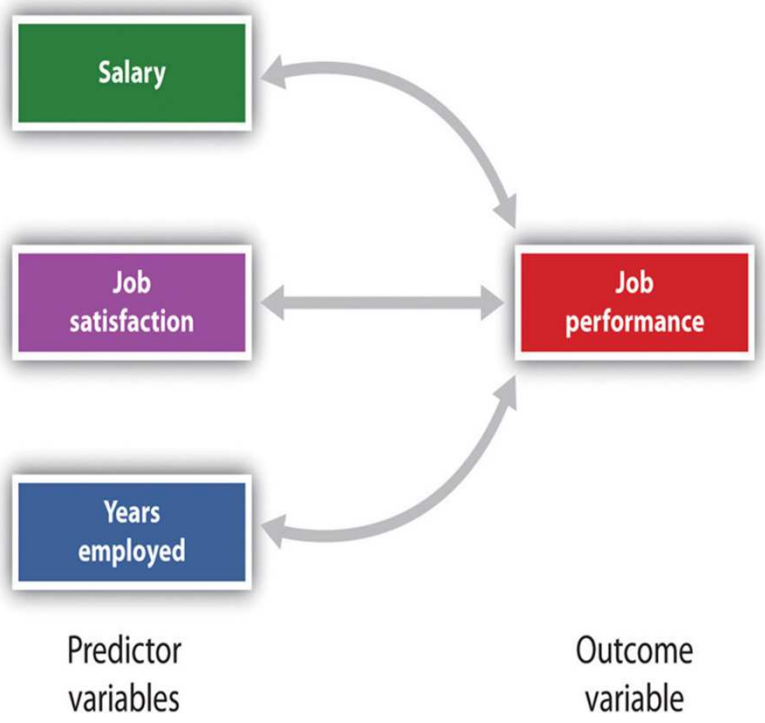
Descriptive, Correlational, and Experimental Research Designs

Correlational Research

- **Pearson correlation coefficient *(r):*** most common statistical measure of the strength of linear relationships among variables
- *r* ranges from -1.00 to +1.00
  - positive values indicate positive linear relationships; negative values indicate negative linear relationships
  - the absolute value indicates the strength of the relationship

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Descriptive, Correlational, and Experimental Research Designs



Correlational Research

- **Multiple regression:** statistical technique based on correlation coefficients that allows the prediction of an outcome variable from more than one predictor variable.

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Descriptive, Correlational, and Experimental Research Designs

Correlational Research

- Correlational research does not allow causal conclusions.
- A positive correlation between the number of violent TV shows children watch and scores on a measure of aggressive play can mean:
  1. Violent TV leads to aggressive behavior
  2. Aggressive behavior leads to watching violent TV
  3. Viewing violent TV and aggressive behavior mutually influence each other
  4. A third variable (e.g., parenting style) leads both to viewing violent TV and behaving aggressively

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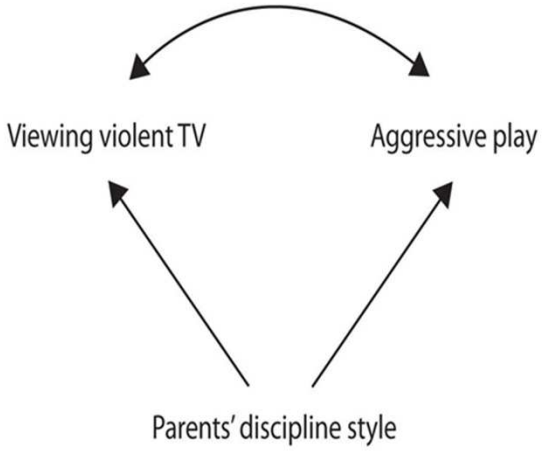
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Descriptive, Correlational, and Experimental Research Designs

Correlational Research

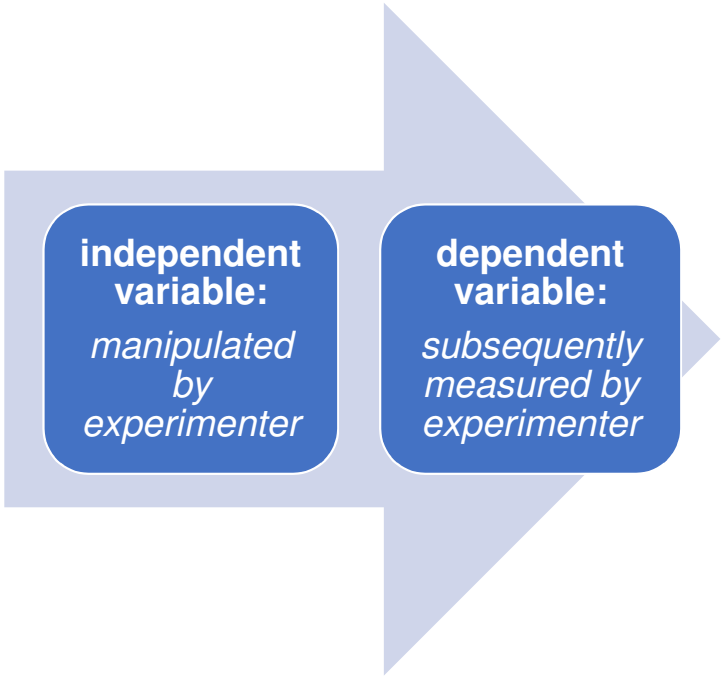
- **Common-causal variables:** not part of the research hypothesis, but cause both the predictor and the outcome and therefore produce the observed correlation

- **Spurious relationship:** a relationship between two variables that is explained away by the influence of a common-causal variable



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Descriptive, Correlational, and Experimental Research Designs

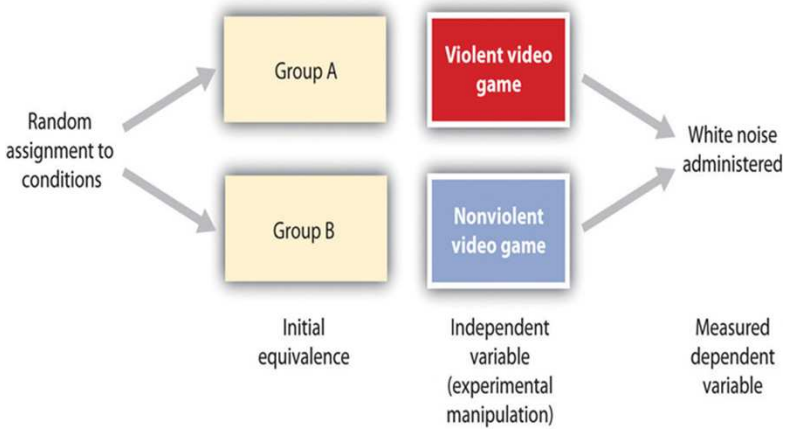


Experimental Research

- Experimental research allows more definite cause-and-effect conclusions.
- The variables of interest are called the independent and dependent variables.

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Descriptive, Correlational, and Experimental Research Designs



Experimental Research

- Two advantages of the experimental research design are:
  - the independent variable (the experimental manipulation) occurs prior to the measured dependent variable
  - the creation of initial equivalence between the conditions of the experiment (in this case by using random assignment to conditions)

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Descriptive, Correlational, and Experimental Research Designs

Key Takeaways

- Descriptive, correlational and experimental research designs are used to collect and analyze data.
- Descriptive designs include case studies, surveys, and naturalistic observation. These designs give a picture of the current thoughts, feelings or behaviors in a group of people. Descriptive research is summarized using descriptive statistics.
- Correlational designs measure two or more variables and assess relationships between or among them. The variables may be presented on a scatterplot to show the relationships. The Pearson Correlation Coefficient (*r*) is a measure of the strength of the linear relationship between two variables.

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Descriptive, Correlational, and Experimental Research Designs

Key Takeaways, continued

- Common-causal variables may cause both the predictor and outcome variable in a correlational design, producing a spurious relationship and making it impossible to draw causal conclusions.

- Experimental research involves the manipulation of an independent variable and the measurement of a dependent variable. Random assignment to conditions is normally used to create initial equivalence between the groups, allowing researchers to draw causal conclusions.

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You Can Be An Informed Consumer of Psychological Research

Learning Objectives:

1. Outline the four potential threats to the validity of research and discuss how they may make it difficult to accurately interpret research findings.
2. Describe how confounding may reduce the internal validity of an experiment.
3. Explain how generalization, replication, and meta-analyses are used to assess the external validity of research findings.

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Threats to the Validity of Research
Threats to construct validity The measured variables or experimental manipulations may not relate to the conceptual variable of interest.
Threats to statistical conclusion validity Statistical tests were not completed, or the tests were incorrectly interpreted
Threats to internal validity The dependent variable may have been caused by a confounding variable, rather than by the independent variable.
Threats to external validity The observed effects may be found only under limited conditions, or only among specific groups of people.

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- **Construct validity:** the extent to which the variables used in the research adequately assess the conceptual variables they were designed to measure
  - Construct validity requires that measures be **reliable**, or consistent.

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- **Statistical conclusion validity:** the extent to which the researcher has drawn appropriate statistical inferences about the data
  - **statistical significance:** the confidence with which a researcher can conclude that the data do not reflect chance or random error

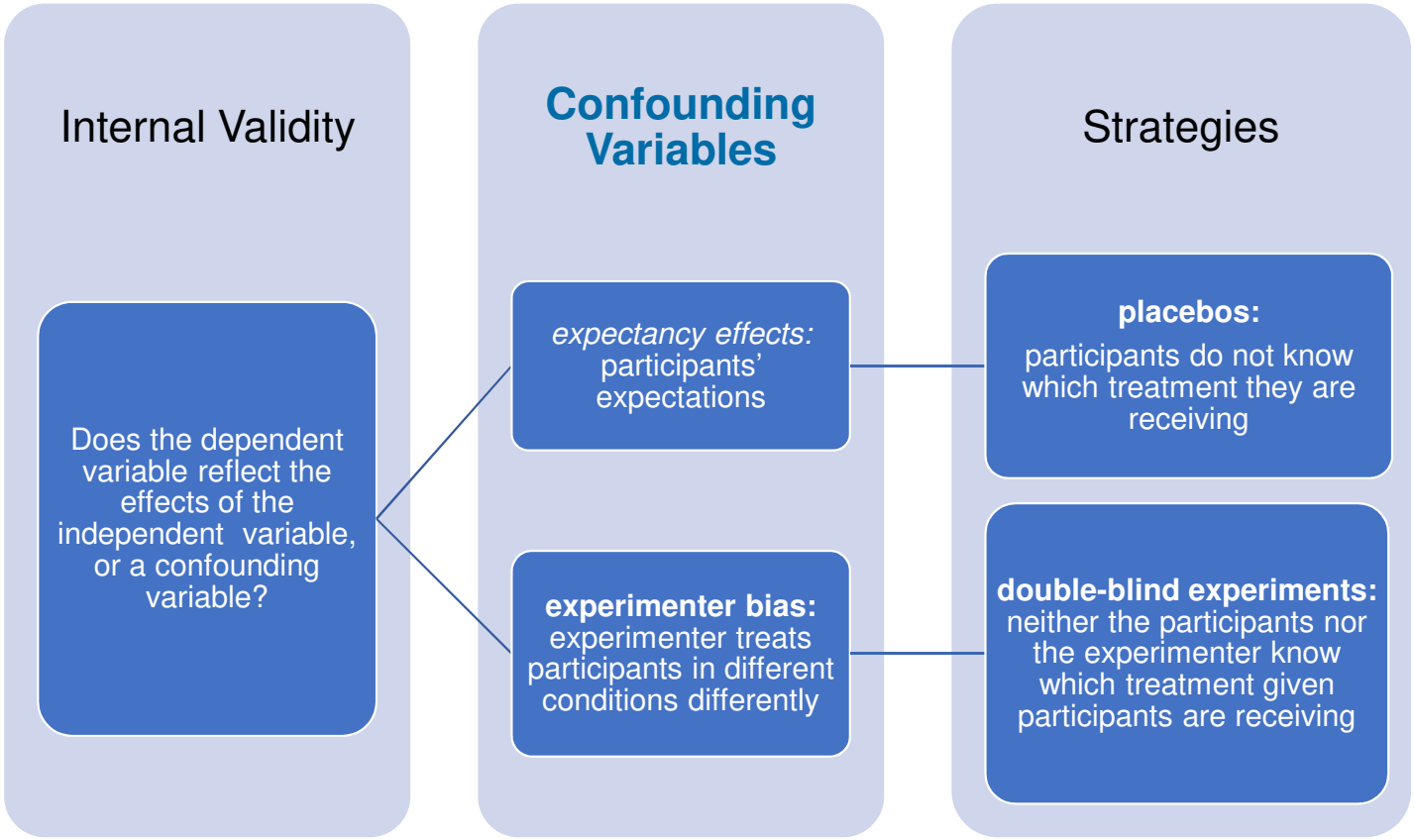
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- **Internal validity:** extent to which we can trust the conclusions that have been drawn about the causal relationship between the independent and dependent variables

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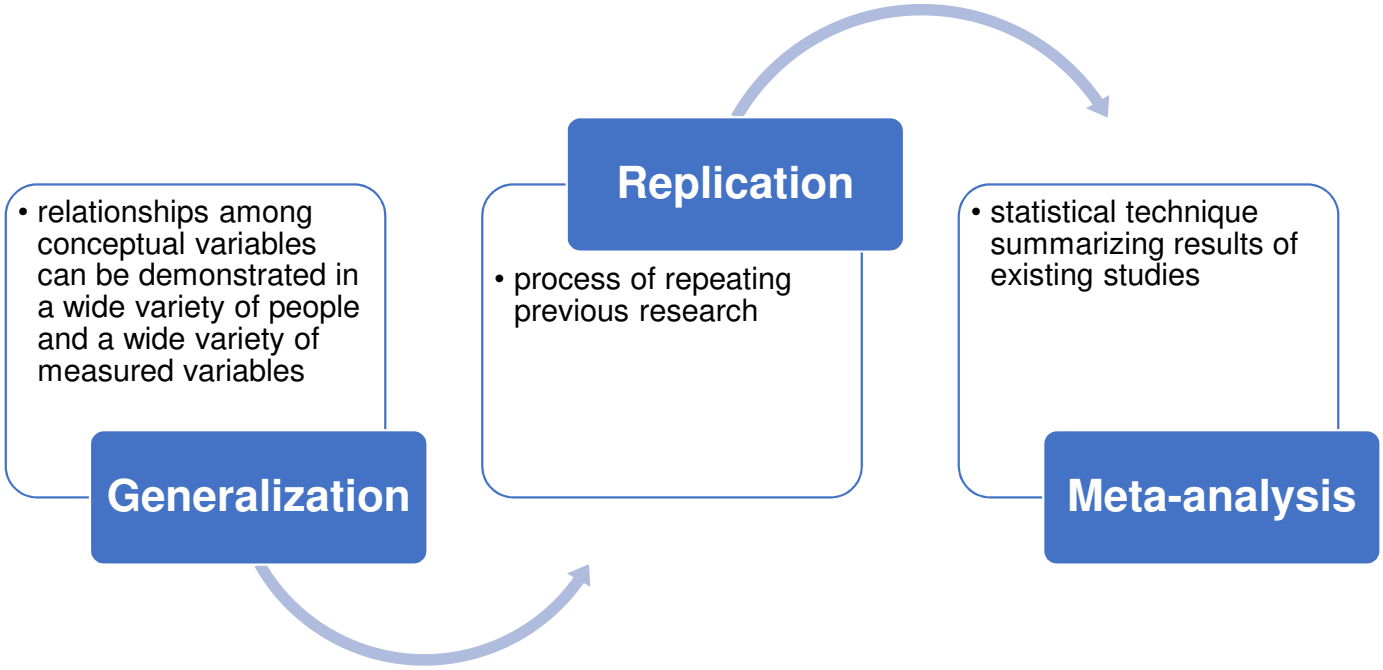
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- **External validity:** extent to which the results of research can be generalized beyond the specific way the original experiment was conducted

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Key Takeaways

- Research is said to be valid when the conclusions drawn by the researcher are legitimate. Because all research has the potential to be invalid, no research ever "proves" a theory or research hypothesis.

- Construct validity, statistical conclusion validity, internal validity, and external validity are all types of validity that people who read and interpret research need to be aware of.

- Construct validity refers to the assurance that the measured variables adequately measure the conceptual variables.

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Key Takeaways, continued

- Statistical conclusion validity refers to the assurance that inferences about statistical significance are appropriate.

- Internal validity refers to the assurance that the independent variable has caused the dependent variable. Internal validity is greater when confounding variables are reduced or eliminated.

- External validity is greater when effects can be replicated across different manipulations, measures and populations. Scientists use meta-analyses to better understand the external validity of research.

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