

# Chapter Two

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## Studying Behavior Scientifically

# Scientific Attitudes

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- Curiosity, skepticism, and open-mindedness are driving forces
  - Research ideas often come from observation
- Kitty Genovese murder
  - Prompted public outrage of “bystander apathy” in big cities
- Darley and Latane:
  - Diffusion of Responsibility: a psychological state in which each person feels decreased personal responsibility for intervening

# Steps in the Scientific Process

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- ☐ Identify a question of interest
  - News events, scientific articles, personal experiences, etc.
- ☐ Gather information and form a hypothesis
  - Hypothesis: a specific prediction about some phenomenon
    - ☐ Often an “if-then” statement
- ☐ Test hypothesis by conducting research

# Steps in the Scientific Process

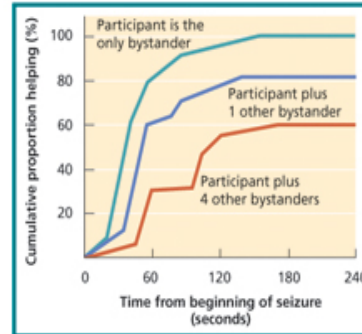
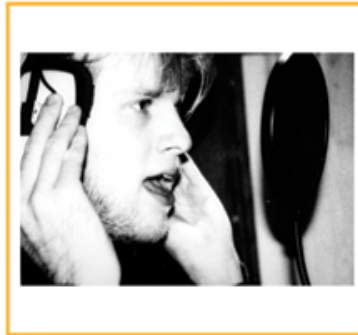
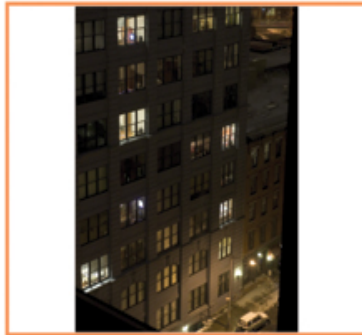
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- ❑ Analyze data, draw tentative conclusions, and report findings
- ❑ Build a body of knowledge
  - Theory: a set of formal statements that explains how and why certain events are related to one another

## USING THE SCIENTIFIC METHOD

### Examining bystander intervention:

Why during an emergency do people sometimes fail to help a victim in need, even when there is little or no personal risk? What factors increase or decrease the likelihood that a bystander will intervene?



#### STEP 1 IDENTIFY

##### Identify Question of Interest

Kitty Genovese is murdered. The attack lasts over 30 minutes. Neighbors failed even to call the police until it was too late. The public is shocked. Why did no one help?

#### STEP 2 HYPOTHESIZE

##### Gather Information and Form Hypothesis

A diffusion of responsibility may have occurred. **Hypothesis:** IF multiple bystanders are present, THEN each bystander's likelihood of intervening will decrease.

#### STEP 3 TEST

##### Test Hypothesis by Conducting Research

Conduct an experiment by creating an emergency in a controlled setting. Manipulate (control) the number of other bystanders that each participant believes to be present, and then measure whether and how quickly each participant helps the victim.

#### STEP 4 ANALYZE

##### Analyze Data, Draw Tentative Conclusions, and Report Findings

The data reveal that helping decreases as the perceived number of bystanders increases. The hypothesis is supported. (If the data are found not to support the hypothesis, revise hypothesis or procedures and retest.)

#### STEP 5 BUILD

##### Build a Body of Knowledge: Ask Further Questions; Conduct More Research; Develop and Test Theories

Additional experiments support the hypothesis. A theory of social impact is developed based on these and other findings. The theory is then tested directly by deriving new hypotheses and conducting new research.

# Understanding Behavior

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- Hindsight (After-the-Fact): reasoning after a conclusion has been drawn
  - Most common method of understanding behavior
  - Limitation: past events can be explained in multiple ways
  - Strength: useful for providing insight and ideas for further scientific study

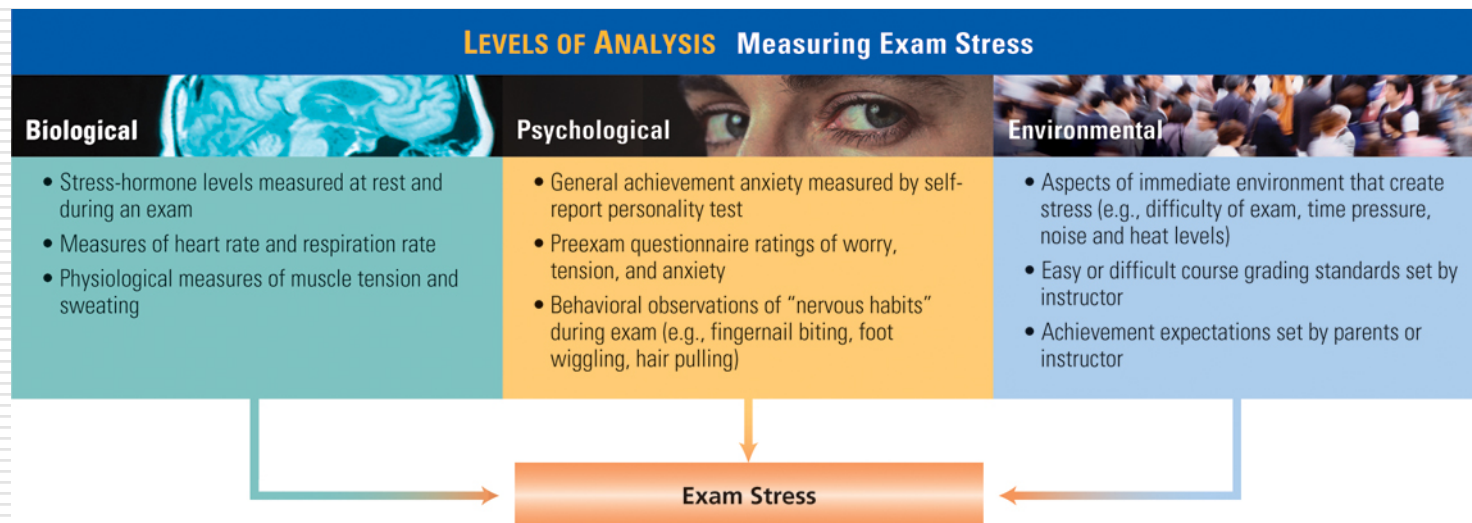
# Understanding Behavior

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- ❑ Prediction, control, and theory-building
- ❑ Characteristics of a good theory:
  - Organizes information in a meaningful way
  - Testable and generates new hypotheses
  - Supported by the findings of new research
  - Law of Parsimony: simpler is better
- ❑ Theories are not absolute truth

# Defining and Measuring Variables

- Variable: any characteristic or factor that can vary
- Operational Definition: defines a variable in terms of the specific procedures used to produce or measure it





# Defining and Measuring Variables

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- ❑ Self-report measures ask people to report on their own attitudes, feelings, and behaviors
  - Social Desirability Bias: the tendency to respond in a socially acceptable manner rather than according to how one truly feels or behaves
- ❑ Reports made by others (parents, teachers, friends)

# Defining and Measuring Variables

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- Measurement of overt (directly visible) behavior
  - Coding systems are developed to increase the reliability of measurements
- Unobtrusive measures record behavior in a way that keeps participants unaware that they are being observed
- Archival methods utilize records or documents that already exist

# Defining and Measuring Variables

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- Psychological tests
  - Personality tests
  - Intelligence tests
  - Neuropsychological tests
- Physiological measures
  - Heart rate, blood pressure, brain processes, etc.

# Ethical Principles in Research

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- ❑ Ethics Code of the American Psychological Association:
  - *Beneficence*: seeking to benefit other people
  - *Responsibility*: performing professional duties with utmost care
  - *Integrity*: being honest and accurate
  - *Justice*: enhancing all people's access to the benefits of psychological knowledge
  - *Respect*: respecting people's dignity and rights to confidentiality and self-determination

# Ethical Principles in Research

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## ☐ Human Research Standards:

- Informed Consent: before people agree to participate in research, they should be informed about:

- ☐ Purpose and procedures

- ☐ Potential risks and benefits

- ☐ Right to decline participation and withdraw at any time without penalty

- ☐ Whether responses will be confidential and how privacy will be safeguarded

# Ethical Principles in Research

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- Deception can be used when no feasible alternative is available
  - Must be disclosed during debriefing
- Animal Research Standards:
  - Humane treatment
  - Importance of research must outweigh risks
  - Animal research is highly controversial

# Methods of Research

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- ☐ Descriptive research: seeks to identify how humans and other animals behave, particularly in natural settings
- ☐ Case studies: an in-depth analysis of an individual, group, or event
  - Advantages:
    - ☐ Researchers obtain in-depth, detailed information
    - ☐ New ideas or challenge existing theories
  - Limitations:
    - ☐ Cannot determine cause-effect relationships
    - ☐ Difficult to generalize findings
    - ☐ Lack of objectivity in gathering and interpreting data

# Methods of Research

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- ☐ Naturalistic observation: the researcher observes behavior as it occurs in a natural setting, and attempts to avoid influencing that behavior
- Habituation: the process in which people and other animals typically adapt to and ignore the presence of an observer as time passes
- Advantages:
  - ☐ Behavior can be observed in natural settings
- Limitations:
  - ☐ Cannot establish a causal relationship



# Methods of Research

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- Survey research: information about a topic is obtained by administering questionnaires or interviews to many people
  - A *population* consists of all the individuals that we are interested in drawing a conclusion about
  - A *sample* is a subset of individuals drawn from the larger population
    - A *representative sample* is one that reflects the important characteristics of the population

# Methods of Research

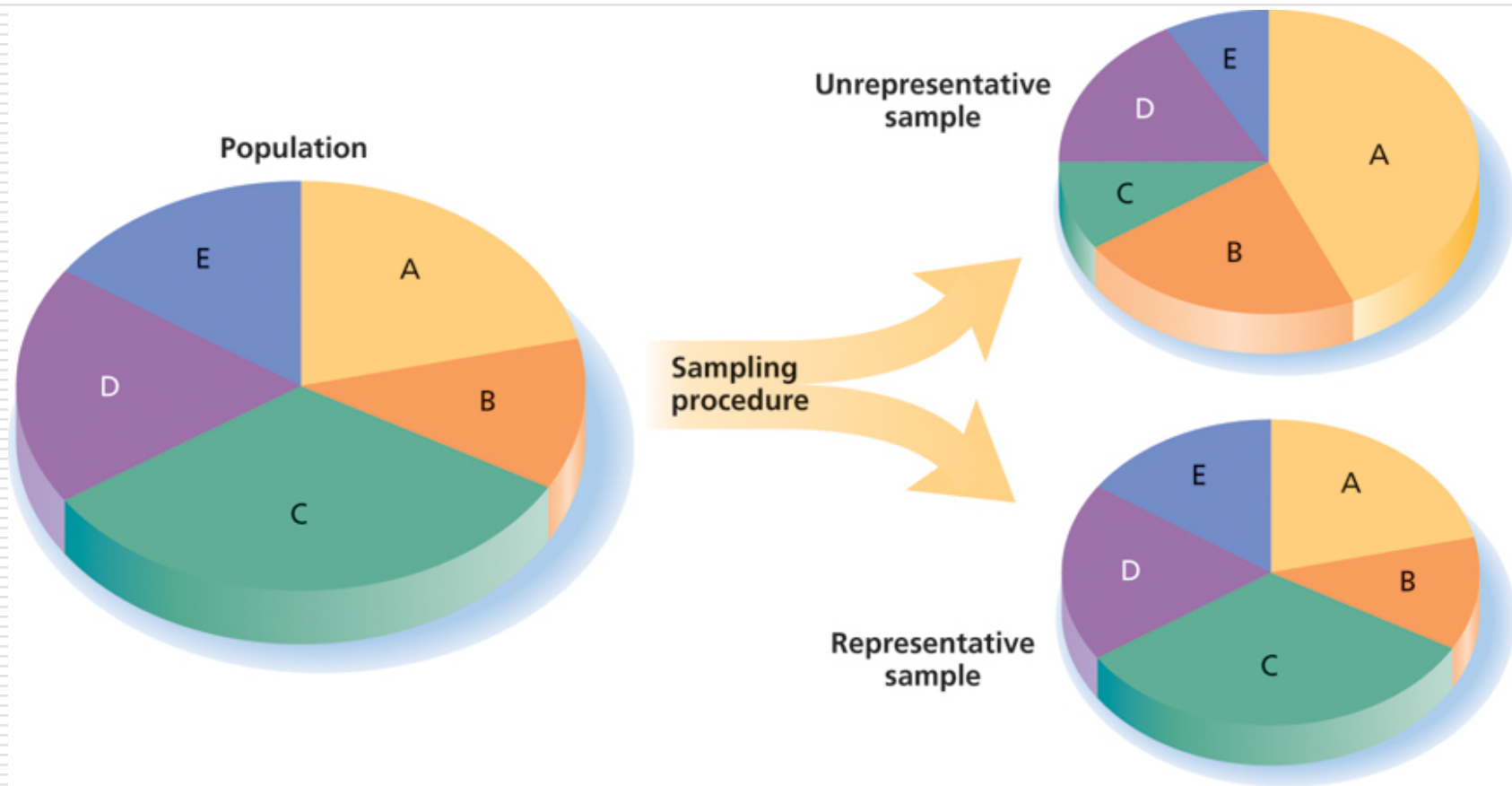
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## □ Types of Sampling:

- Random Sampling: a procedure in which every member of the population has an equal probability of being chosen to participate in the survey
- Stratified Random Sampling: a procedure in which the population is divided into subgroups, and sample participants are chosen to correspond with the population percentages

# Methods of Research

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# Methods of Research

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## ☐ Survey Research (continued):

### ■ Advantages:

- ☐ Can collect large amounts of information quickly and inexpensively
- ☐ Can ask about an almost limitless variety of attitudes and behaviors

### ■ Limitations:

- ☐ Unrepresentative samples can produce distorted results
- ☐ Cannot indicate causation
- ☐ Self-reports can be biased

# Methods of Research

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- ❑ Correlational Research: three components:
  - Researcher measures one variable (X)
  - Researcher measures a second variable (Y)
  - Researcher statistically determines whether (X) and (Y) are related



# Methods of Research

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- ☐ Correlation does not equal causation
  - Some interpretive possibilities:
    - ☐ X caused Y
    - ☐ Y caused X
    - ☐ Both variables influenced each other
    - ☐ A third variable influenced both X and Y (spurious)

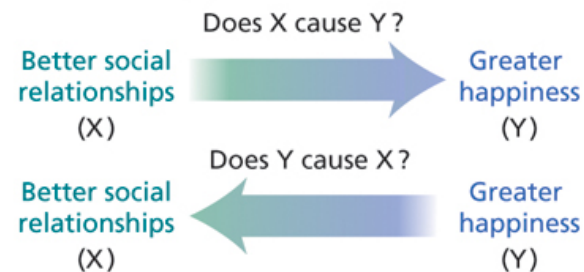
# Methods of Research

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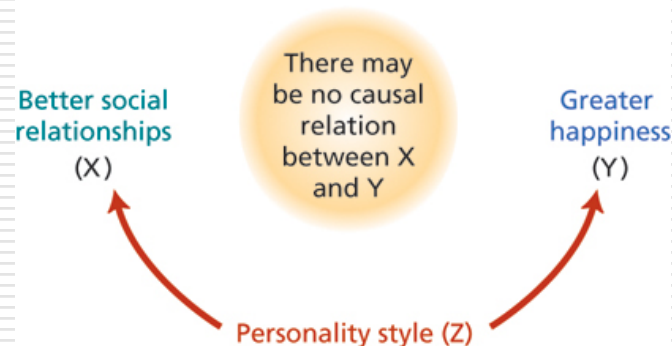
(a) Social relationships and happiness are correlated



(b) Bidirectionality problem



(c) Third-variable problem



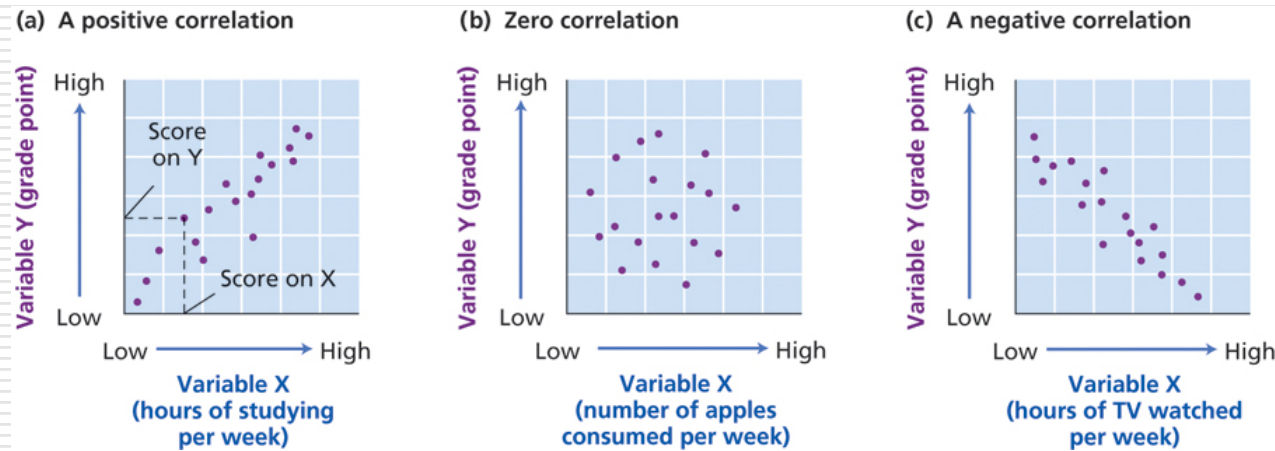
# Methods of Research

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- Correlation Coefficient: a statistic that indicates the direction and strength of the relation between two variables
  - Positive Correlation: higher scores on one variable are associated with higher scores on a second variable
  - Negative Correlation: higher scores on one variable are associated with lower scores on a second variable



# Methods of Research



- ❑ **Scatterplot:** a graph that shows the correlation between two variables
  - Direction of relationship: positive or negative
  - Strength of relationship: the closer the correlation coefficient gets to 1 (+ or -), the stronger the relationship

# Methods of Research

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- ❑ Correlational Research: Advantages
  - Can establish generalization outside the laboratory
  - Can generate ideas for further laboratory study
  - Allows the examination of variables that may not be practical or ethical to study in the laboratory
  - Allows researchers to make predictions

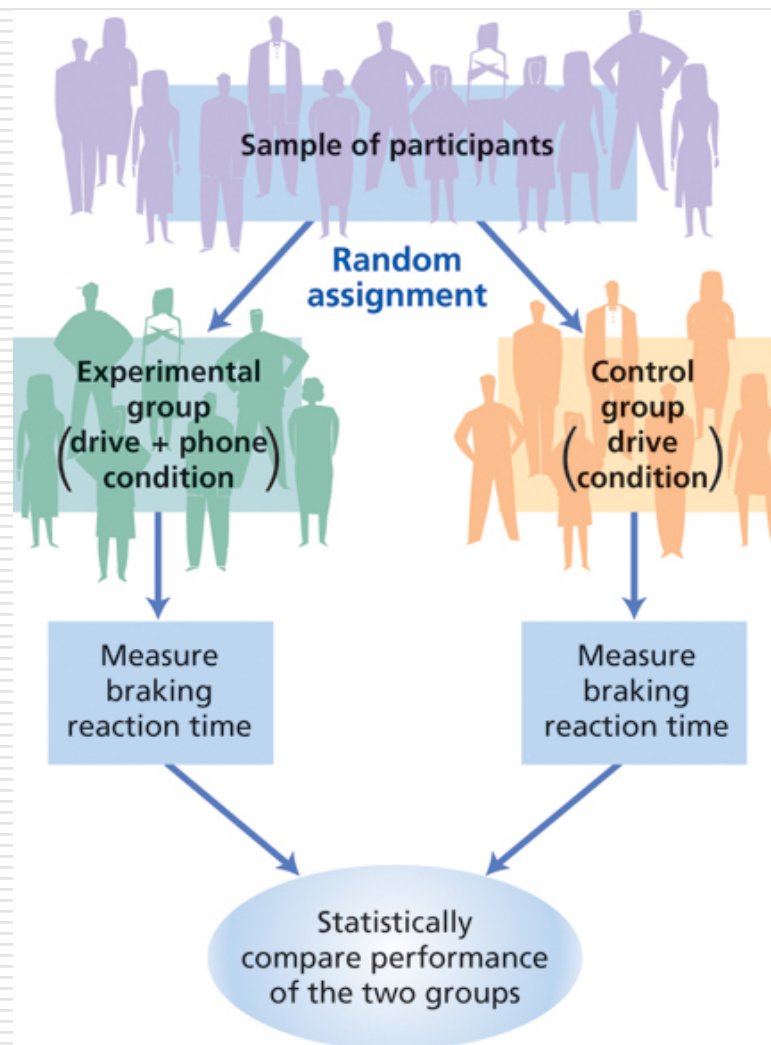
# Methods of Research

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- Experiments: three characteristics
  - Researcher manipulates (controls) one or more variables
  - Researcher measures whether this manipulation influences other variables
  - Researcher attempts to control extraneous factors that might influence the outcome of the experiment

# Methods of Research

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# Methods of Research

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- ❑ Independent Variable: the factor that is manipulated or controlled by the experimenter
- ❑ Dependent Variable: the factor that is measured by the experimenter and that may be influenced by the independent variable
- ❑ Experimental Group: the group that receives a treatment or an active level of the IV
- ❑ Control Group: the group that is not exposed to the treatment or receives a zero-level of the IV

# Methods of Research

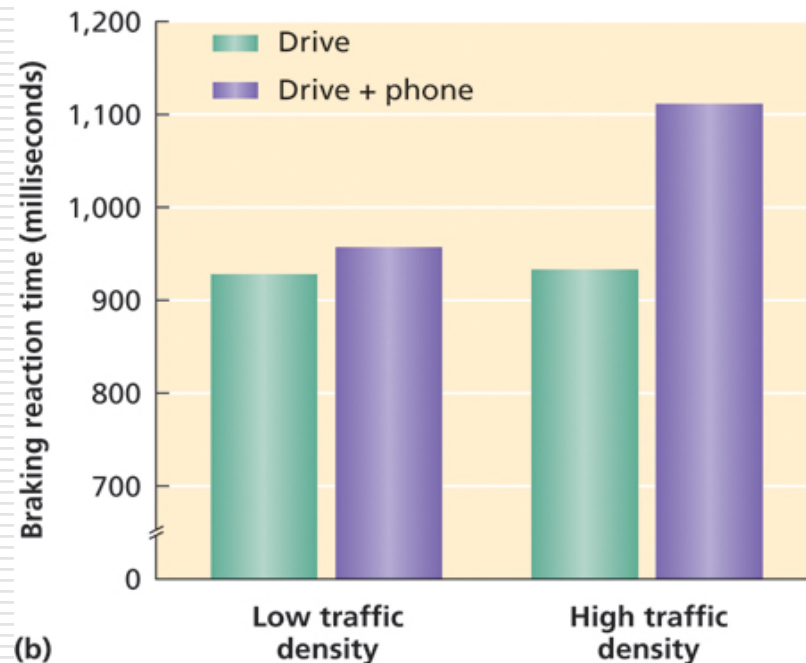
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- ❑ Random Assignment: each participant has an equal likelihood of being assigned to any one group within an experiment
  - Groups are equal (in general, on average)
- ❑ Alternately, all participants could be exposed to all conditions of the independent variable
  - Counterbalancing: a procedure in which the order of conditions is varied so that no condition has an overall advantage relative to the others

# Methods of Research

Traffic Density (independent variable #2)	Cell-Phone Use (independent variable #1)	
	Drive	Drive + phone
Low traffic density	 Drive in low traffic density	 Drive + phone in low traffic density
High traffic density	 Drive in high traffic density	 Drive + phone in high traffic density

(a)



(b)

# Threats to Validity

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- ❑ Internal Validity: the degree to which an experiment supports clear causal conclusions
  - Confounding Variables: two variables are intertwined in such a way that we cannot determine which one has influenced a dependent variable

	Group 1	Group 2	Group 3
<b>IV (Music Type)</b>	New-Age	Country	Rock
<b>Confound (Volume)</b>	Low	Moderate	High



# Threats to Validity

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- ❑ Placebo: a substance that has no pharmacological effect
  - Placebo Effect: people receiving a treatment show a change in behavior because of their expectations, not because the treatment itself had any specific benefit



# Threats to Validity

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- Experimenter Expectancy Effects: the subtle and unintentional ways researchers influence their participants to respond in a manner that is consistent with the researcher's hypothesis
- *Double-Blind Procedure*: both the participant and experimenter are kept blind as to which experimental condition the participant is in
  - Minimizes both placebo effects and experimenter expectancy effects

# Threats to Validity

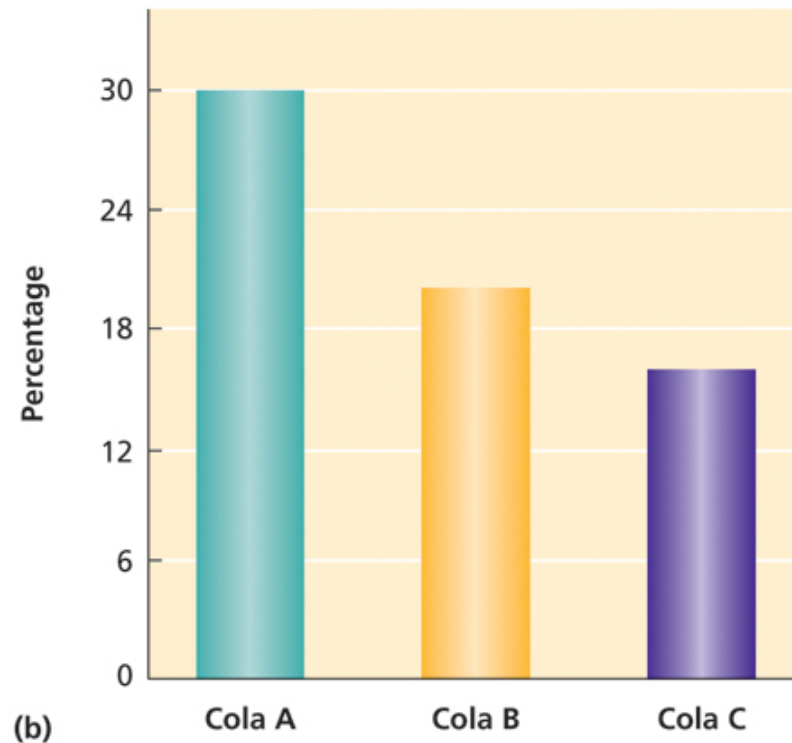
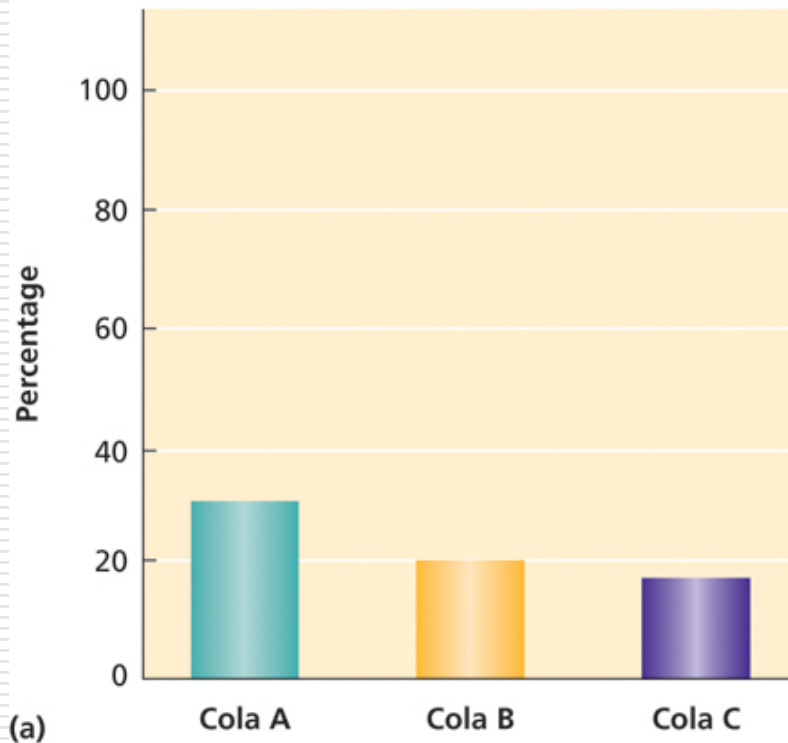
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- External Validity: the degree to which the results of a study can be generalized to other populations, settings, and conditions
  - *Replication*: the process of repeating a study to determine whether the original findings can be duplicated
    - Cross-cultural replication

# Analyzing and Interpreting Data

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Percentage of people in taste test who prefer each cola



# Analyzing and Interpreting Data

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- ❑ Descriptive Statistics: statistics summarize and describe the characteristics of a set (or distribution) of data
- ❑ Measures of Central Tendency:
  - Mode: the most frequently occurring score in a distribution
  - Median: the point that divides a distribution of scores in half when those scores are arranged in order from lowest to highest
  - Mean: the arithmetic average of a set of scores

# Analyzing and Interpreting Data

**TABLE 2.3** Salaries of 10 Consultants at Honest Al's Consulting Firm

Consultant	Annual Salary	
1. Al's brother	\$263,000	Mode, most frequent score
2. Al's sister	263,000	
3. Johnson	30,500	
4. Rodriguez	29,500	
5. Jones	29,000	Median, middle score \$28,500
6. Chen	28,000	
7. Brown	27,500	
8. Carter	27,000	
9. Mullins	26,500	
10. Watson	26,000	

$$\text{Mean (average salary)} = \frac{\$750,000}{10 \text{ scores}} = \$75,000$$

# Analyzing and Interpreting Data

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- Measures of Variability: statistics that capture the degree of variation, or spread, in a distribution of scores
  - Range: the difference between the highest and lowest scores in a distribution
  - Standard Deviation: takes into account how much each score in a distribution differs from the mean

# Analyzing and Interpreting Data

**TABLE 2.4 Annual Salaries of Ten Consultants at Two Consulting Firms**

<b>Honest Al's Firm</b>		<b>Claire's Firm</b>
\$263,000		\$81,000
263,000		78,000
30,500		76,000
29,500		76,000
29,000		76,000
28,000		75,000
27,500		73,000
27,000		73,000
26,500		72,000
26,000		70,000
\$75,000	Mean	\$75,000
\$237,000	Range	\$11,000
\$94,009	Standard deviation	\$3,000



# Analyzing and Interpreting Data

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- *Inferential Statistics* tell us how confident we can be in making inferences about a population based on findings obtained from a sample
  - *Statistical significance* means that it is very unlikely that a particular finding occurred by chance alone
- Meta-Analysis: a statistical procedure for combining the results of different studies that examine the same topic