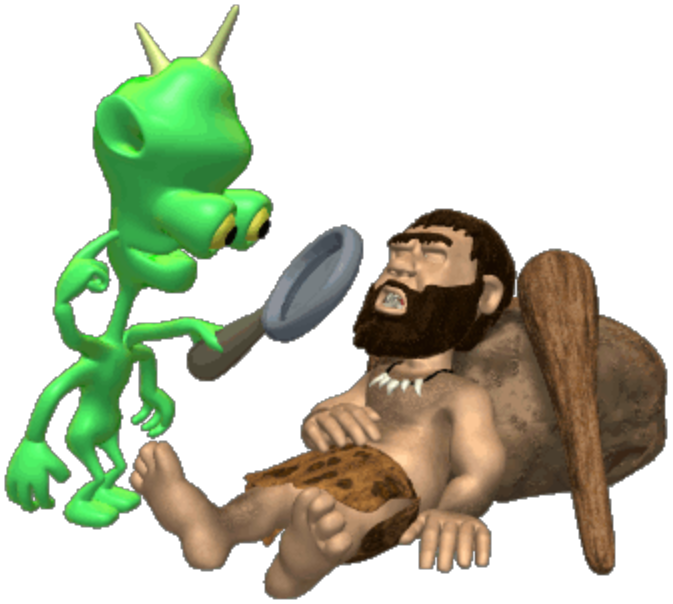
Research Methods



It is actually way more exciting than it sounds!!!!

Why is Research Important?

Psychology is the *scientific study of mental and behavior processes*.

Without doing research how would we learn about those mental and behavior processes?

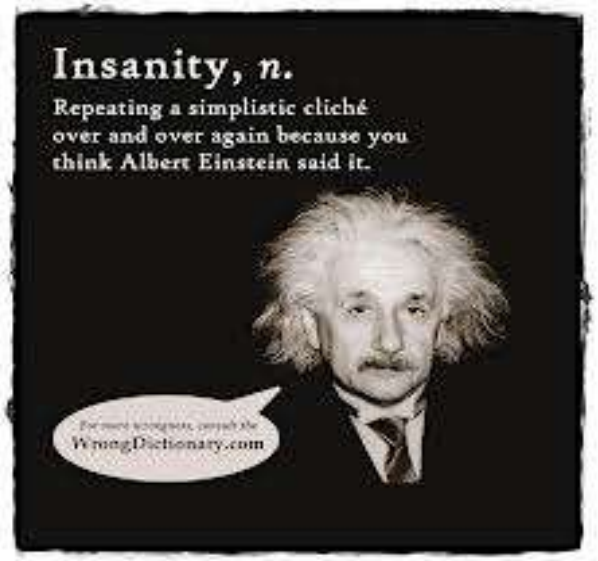
Research explains to us the why, how, what, when, and effectiveness behind things.

- Why does caffeine help you feel more energized?
- How would the banning of cellphones in school affect tardiness to class?
- What happens to a person's lungs when they smoke?
- When do children learn to lie?
- How effective is a medicine at curing depression?

These may not seem as though they are related to psychology; however, all of those examples deal with mental and/or behavior processes.

- "Imagination is more important than knowledge." - Albert Einstein

- "If we knew what it was we were doing, it would not be called research, would it?" - Albert Einstein



The Scientific Method

- In a simplified matter the scientific method is as follows:
  - 1. Ask a question
  - 2. Form an hypothesis
  - 3. Design an experiment
  - 4. Perform the experiment
  - 5. Analyze the data in order to evaluate the hypothesis
  - 6. Draw a conclusion and communicate the results.

Why do we have to learn this stuff?

Psychology is first and foremost a science.

Thus it is based in research.

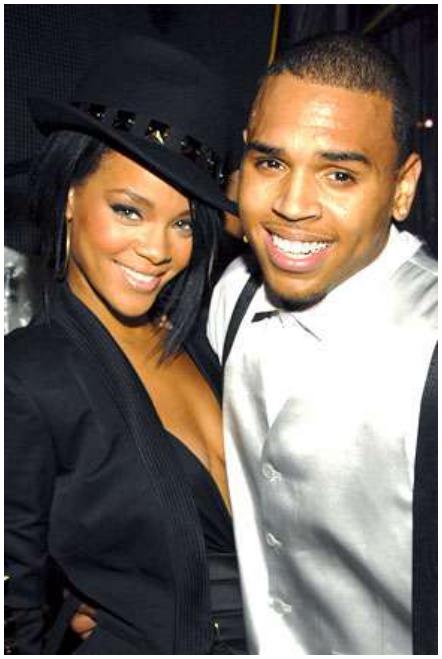
Before we delve into how to do research, you should be aware of three hurdles that tend to skew our logic.

Hindsight Bias

- The tendency to believe, after learning the outcome, that you knew it all along.

Monday Morning Quarterbacking!!!

After the Chris Brown/Rihanna incident….my typical high school girl said she knew Chris Brown was a violent guy!!! Did she really?



Overconfidence

- We tend to think we know more than we do.
- 82% of U.S. drivers consider themselves to be in the top 30% of their group in terms of safety.
- 81% of new business owners felt they had an excellent chance of their businesses succeeding. When asked about the success of their peers, the answer was only 39%. (Now that's overconfidence!!!)

The Barnum Effect

- It is the tendency for people to accept very general or vague characterizations of themselves and take them to be accurate.

Hawthorne Effect

- But even the control group may experience changes.
- Just the fact that you know you are in an experiment can cause change.

Whether the lights were brighter or dimmer, production went up in the Hawthorne electric plant.

Experimenter Bias

- Another confounding variable.
- Not a conscious act.
- Double-Blind Procedure.

Applied V. Basic Research

- Applied Research has clear, practical applications.
- YOU CAN USE IT!!!

Research on therapies for drug addicts has a clear purpose.

- Basic Research explores questions that you may be curious about, but not intended to be immediately used.

Studying how kissing changes when you get older is interesting…but that's about it.

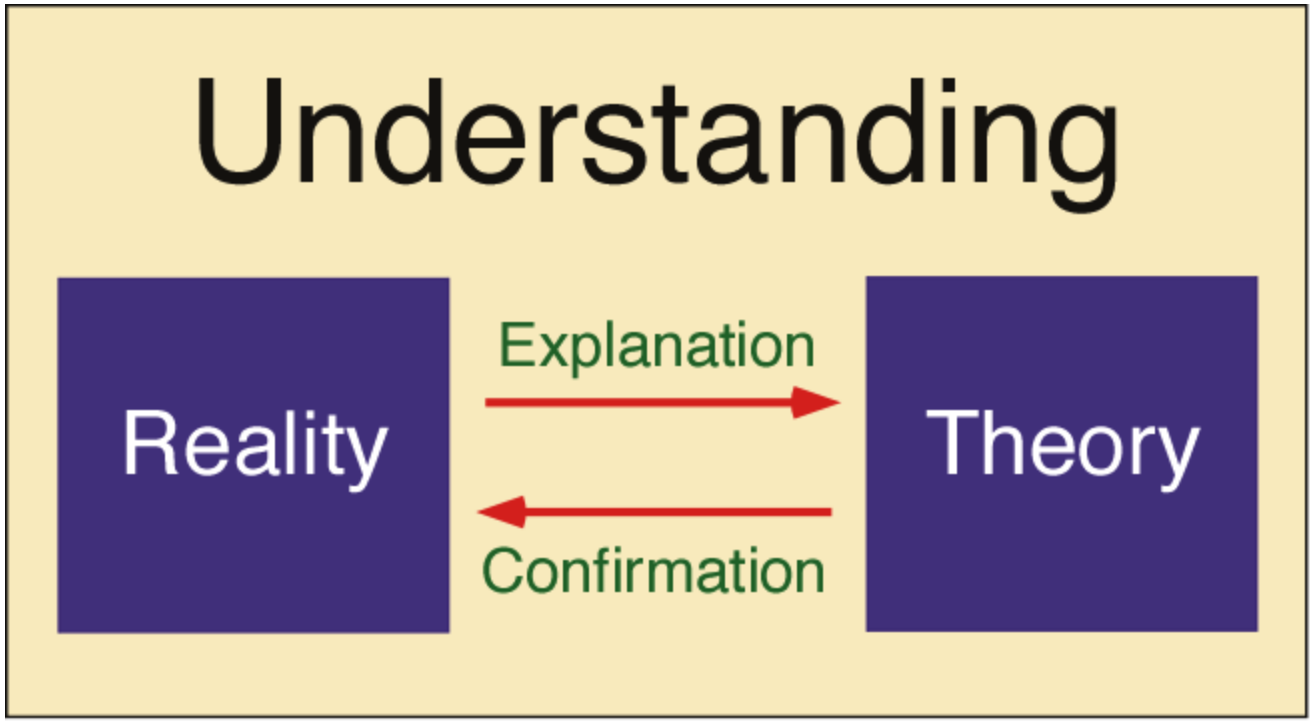
Terminology

Hypothesis

- **Hypothesis** – a prediction based on a theory
  - Tested to confirm or refute
  - Can be revised or abandoned
- Participating in class leads to better grades than not participating.

Theory

- **Theory**– tentative explanations of facts and relationships in science



Sampling

- Identify the population you want to study.
- The sample must be representative of the population you want to study.
- GET A RANDOM SAMPLE.
- Stratified Sampling- is the process of grouping members of the population into relatively homogeneous subgroups before sampling
- **Replication** of research removes most doubt

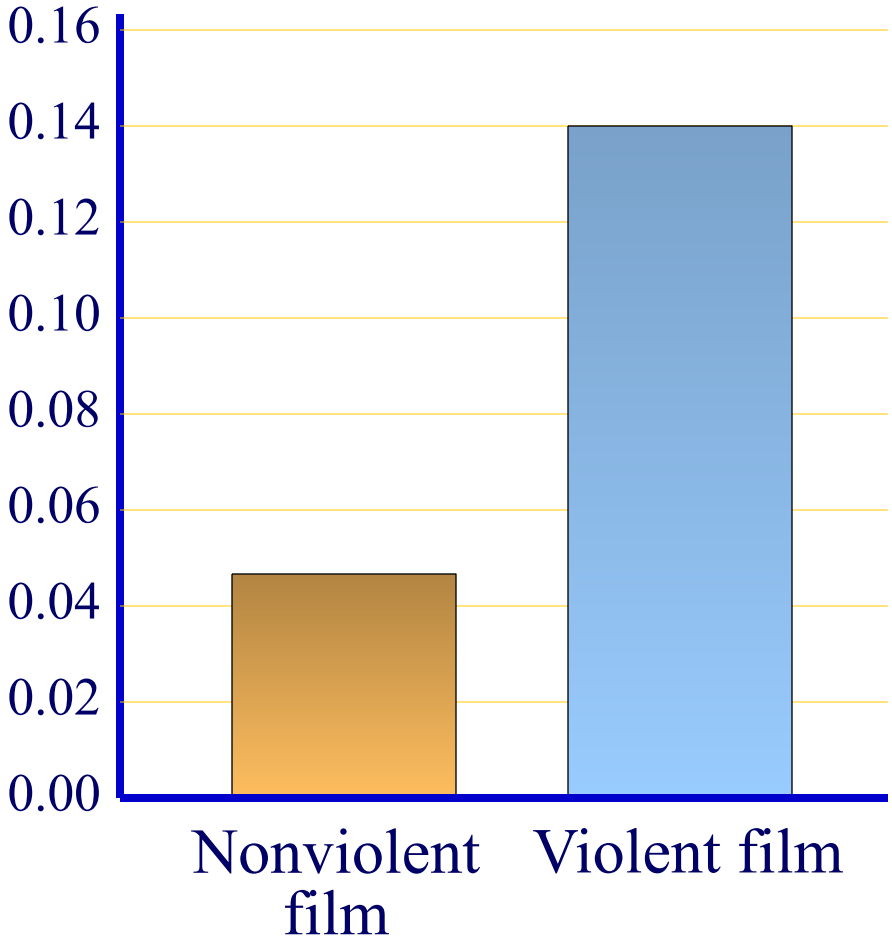
Random Assignment

- Once you have a random sample, randomly assigning them into two groups helps control for confounding variables.
- Experimental Group v. Control Group.
- Group Matching

Formal Experiments

- Elements
  - **Experimental group** – exposed to independent variable or conditions expected to create change
  - **Control group** – presents normal behavior used for comparison

Fig. 2.6


0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Nonviolent film
Violent film

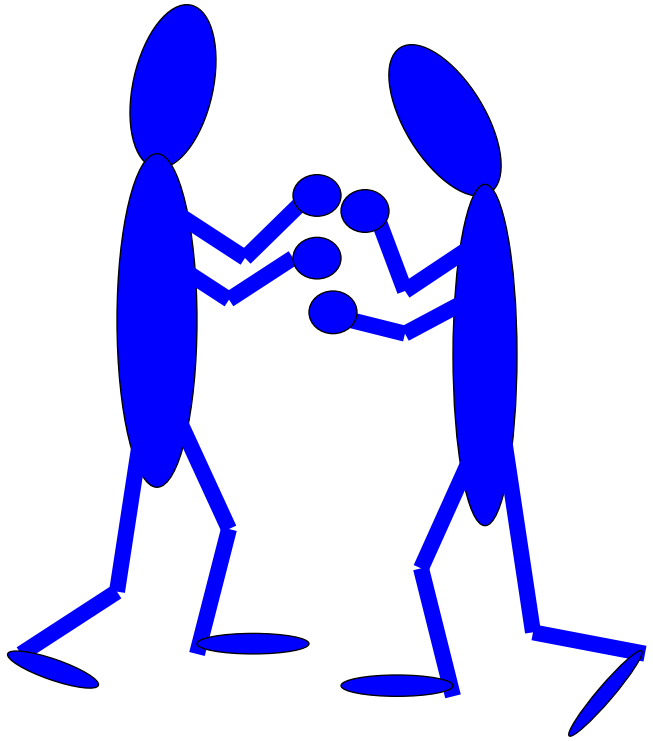
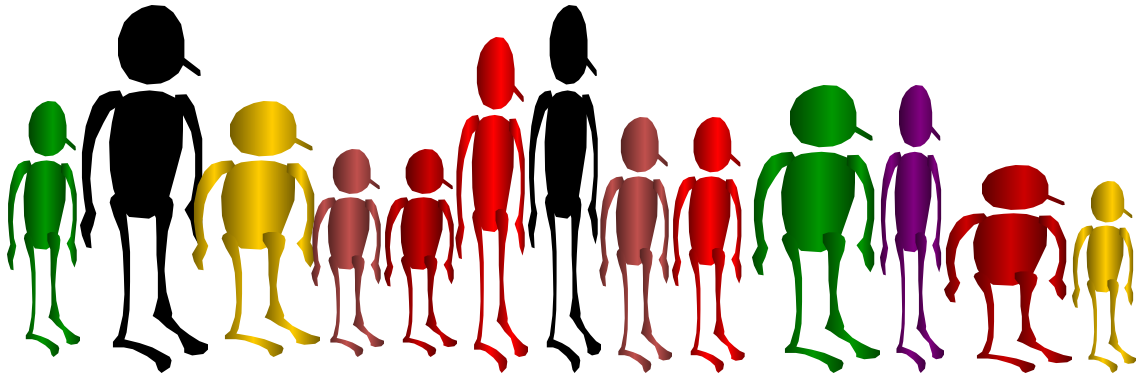
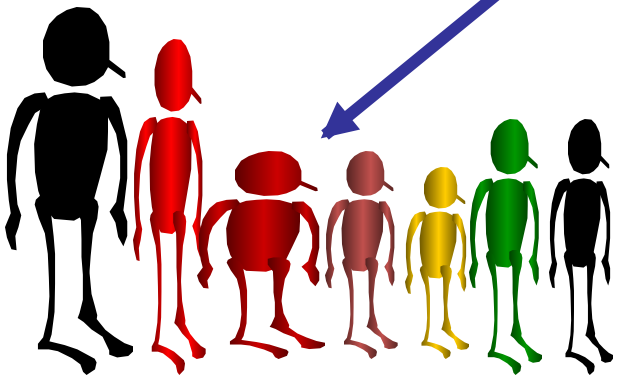


Fig. 2.7

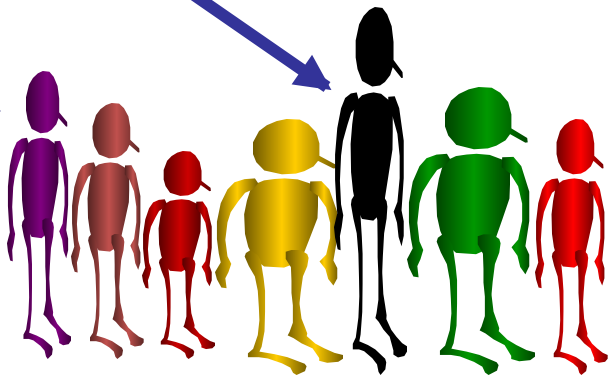


Full population of interest

Randomly assign into control and experimental groups



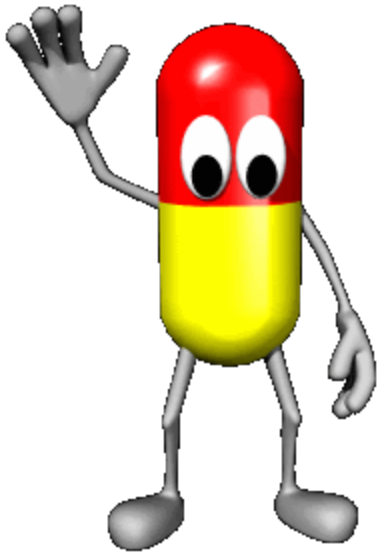
Experimental group: exposed to independent variable: view violent film



Control group: View nonviolent film

Independent Variable

- **Independent variable** – gets manipulated
- Whatever is being manipulated in the experiment.
- Hopefully the independent variable brings about change.



If there is a drug in an experiment, the drug is almost always the independent variable.

Dependent Variable

The dependent variable would be the effect of the drug.

- **Dependent variable** – amount of change
- Whatever is being measured in the experiment.
- It is dependent on the independent variable.

Beware of Confounding Variables

If I wanted to prove that smoking causes heart issues, what are some confounding variables?

- The object of an experiment is to prove that A causes B.
- A confounding variable is anything that could cause change in B, that is not A.

Lifestyle and family history may also effect the heart.

Other Confounding Variables

- **Placebo control**
  - **Placebo effect**: provides no active effect
  - Use in identical conditions for control and experimental groups

- **Blind experiment**
  - Researchers blind to group membership of participants to rule out **experimenter bias**

- **Strongest experiments** – double blind
  - Researchers and participants kept blind

Experimenter Bias

- Another confounding variable.
- Not a conscious act.
- Double-Blind Procedure.

Correlational

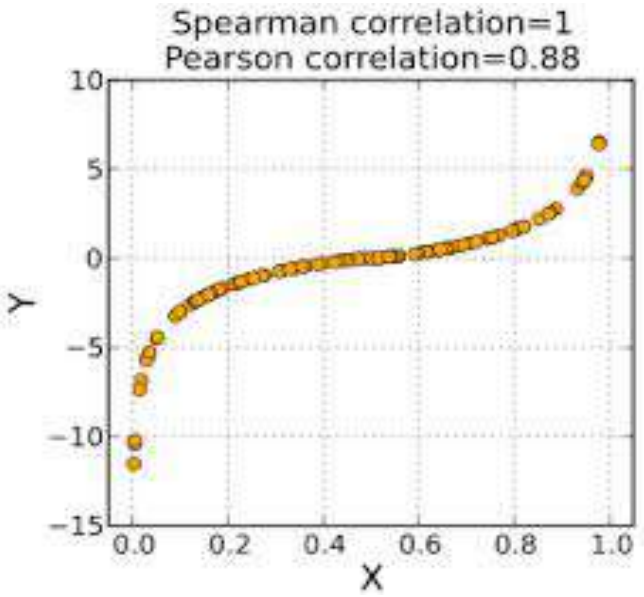
- Correlation expresses a relationship between two variable.
- Does not show causation.

As more ice cream is eaten, more people are murdered.

Does ice cream cause murder, or murder cause people to eat ice cream?

Correlational Method

- **Correlational method**: measure two variables for statistical relationship
- **Variable**: anything that can be assigned a numerical value
- Uses **quantitative measures**



Types of Correlation

Positive Correlation

- The variables go in the SAME direction.

Studying and grades hopefully has a positive correlation.

Negative Correlation

- The variables go in opposite directions.

Heroin use and grades probably has a negative correlation.

Research Methods

- **Correlational Studies**
  - **Correlation coefficient**
    - Measures each variable
    - Indicates strength (0 to 1) and direction (negative or positive) of relationship
  - Correlation does not mean causation

Correlation Coefficient

- A number that measures the strength of a relationship.
- Range is from -1 to +1
- The relationship gets weaker the closer you get to zero.

Which is a stronger correlation?

- -.13 or +.38
- -.72 or +.59
- -.91 or +.04

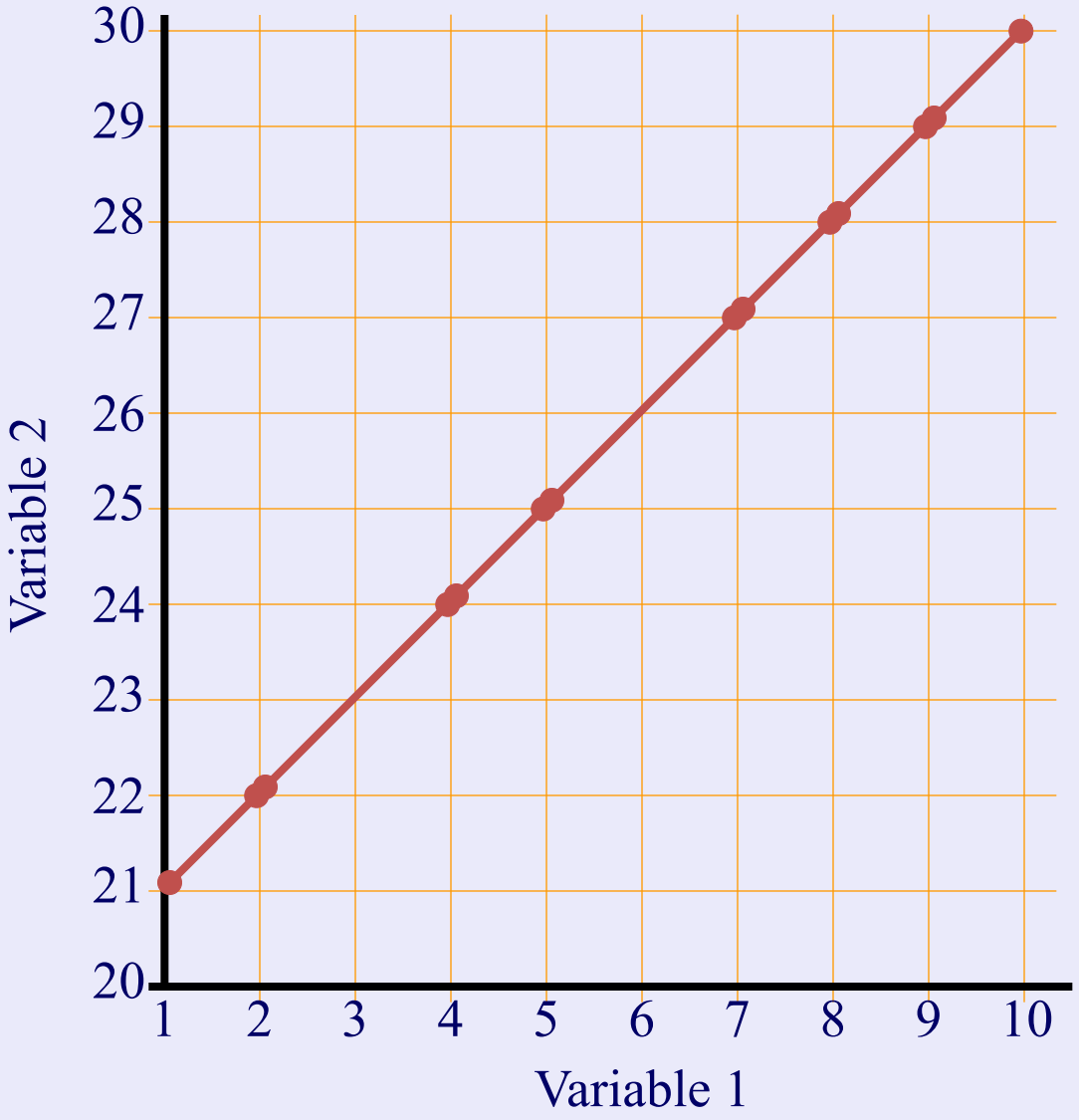


Fig. 2.2

Hypothetical data illustrating a correlation coefficient of +1.00

Positive correlation

Fig. 2.3

Hypothetical data illustrating a correlation coefficient of -1.00

Negative Correlation

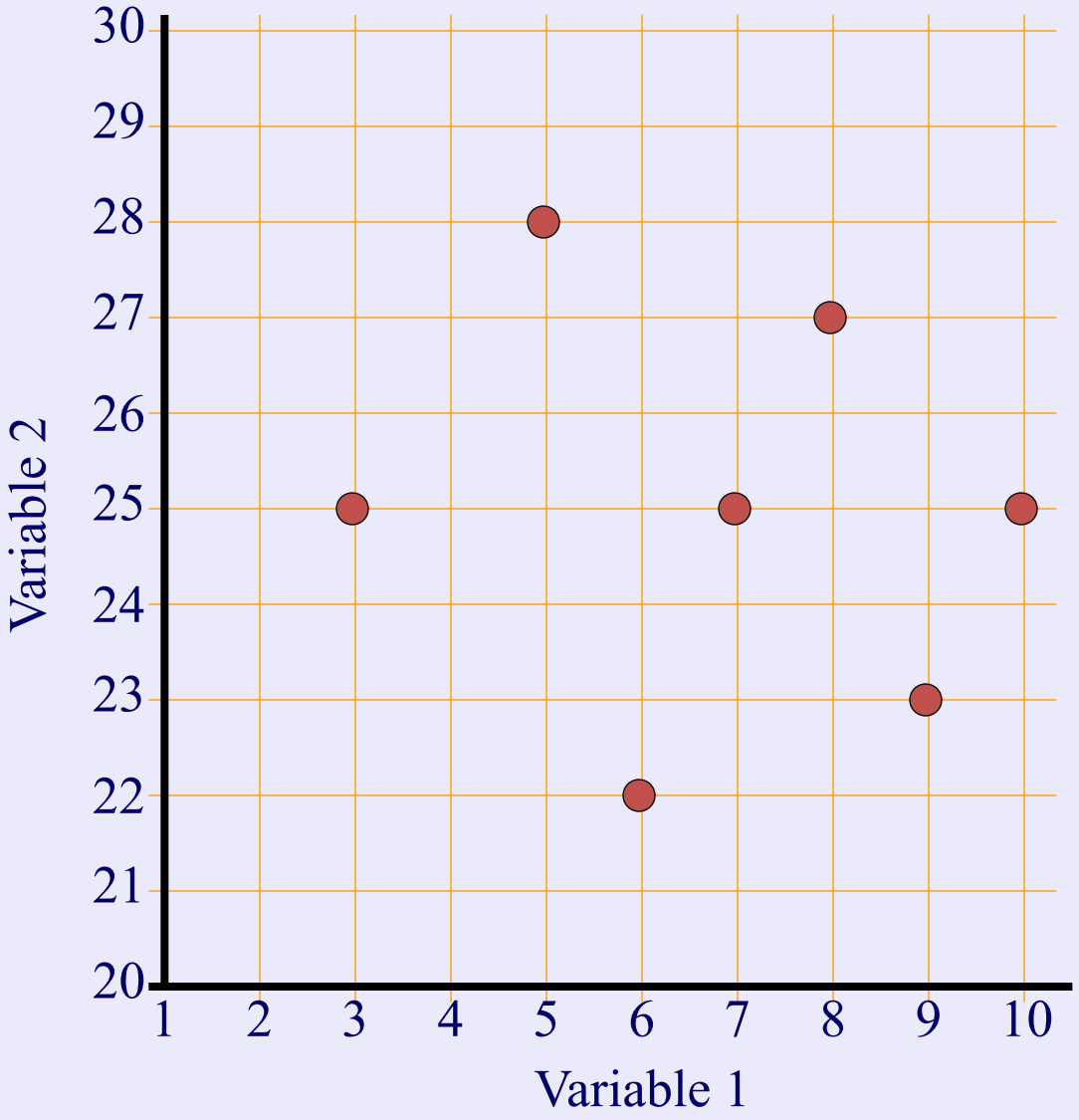


Fig. 2.4

Hypothetical data illustrating a correlation coefficient of zero

No correlation

Just describes sets of data.

- **Descriptive studies**
  - Simplest method of scientific inquiry
  - Describe behavior and mental processes
  - Most widely used
    - **Survey method** – ask people's opinions
    - **Naturalistic observation** – watch, describe
  - All have advantages and disadvantages

Survey Method

Most common type of study in psychology

Measures correlation

Cheap and fast

Need a good random sample

Low-response rate

Naturalistic Observation

- Watch subjects in their natural environment.
- Do not manipulate the environment.
- The good is that there is Hawthorne effect.
- The bad is that we can never really show cause and effect.

Case Studies

- A detailed picture of one or a few subjects studied in depth in the hope of revealing universal principles
- Tells us a great story…but is just descriptive research.
- Does not even give us correlation data.

The ideal case study is John and Kate. Really interesting, but what does it tell us about families in general?

The Time Dimension

- Cross-Sectional Study – A study based on observations representing a single point in time, a cross section of a population.
- A technique that **compares individuals from different age groups at one time**.

- ***Cross***-sectional = looks at people a***cross*** different age groups

- For our experiment we could gather a group of people of all different ages and see if age may play a role in who develops heartburn after eating pepperoni pizza.

Longitudinal Study

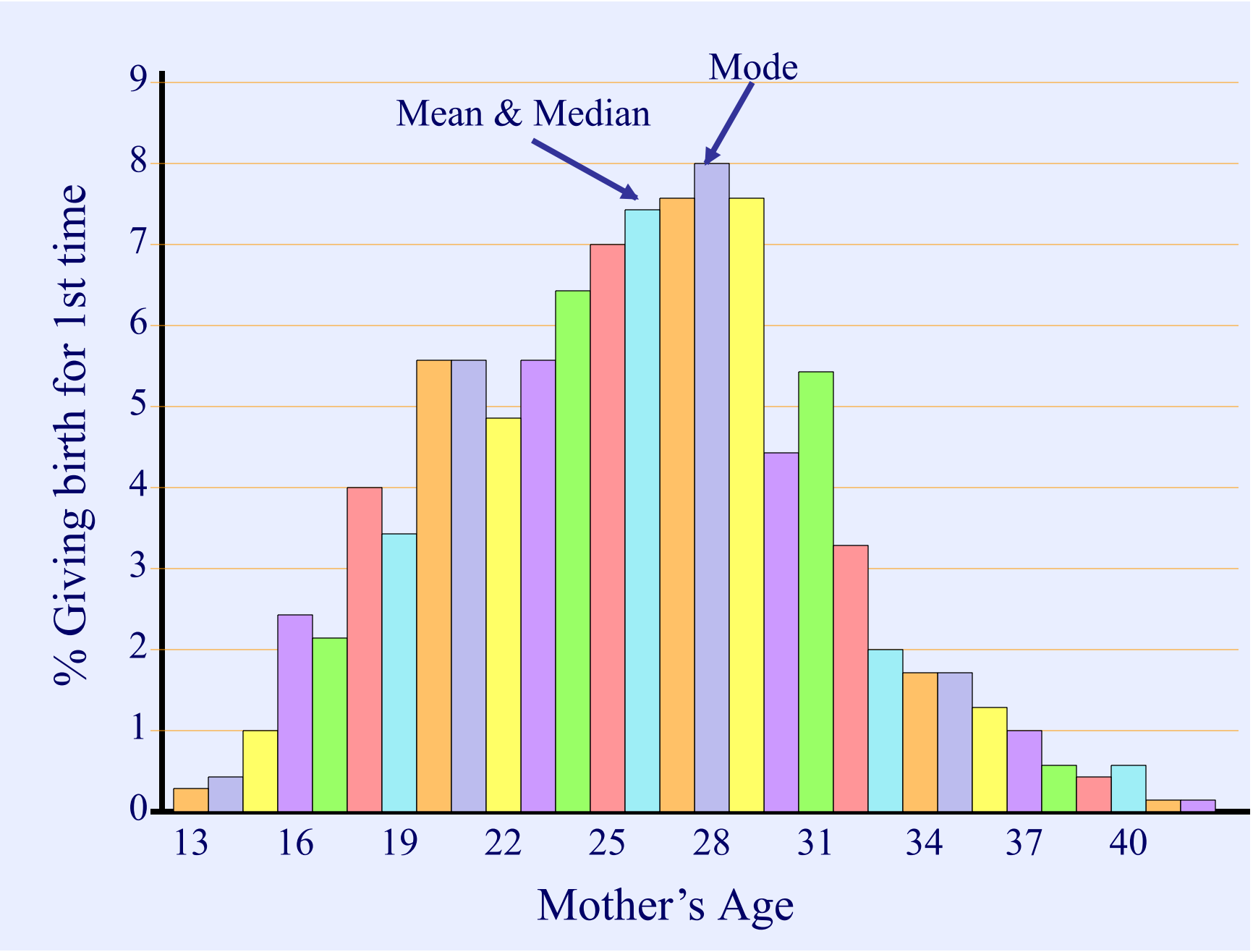
- A technique that **studies the same group of people over a long period of time.**

- ***LONG***tudinal = a ***long*** period of time

- Used largely in *developmental* psychology. Allows for researchers to see how people develop over time.

Describing and Interpreting Data

- **Descriptive statistics –** summarized data for large groups of participants
  - **Mean**: average
  - **Median**: midpoint in rank-ordered data
  - **Mode**: score appearing most often
  - **Normal distribution**: bell-shaped curve
  - **Standard deviation**: degree to which scores in ordered distribution are spread out


Mode
Mean & Median
9
8
7
6
5
4
3
2
1
0
% Giving birth for 1st time
13
16
19
22
25
28
31
34
37
40
Mother's Age

Central Tendency

- Mean, Median and Mode.
- Watch out for extreme scores or outliers.

Let's look at the salaries of the employees at Dunder Mifflen Paper in Scranton:

$25,000-Pam
$25,000- Kevin
$25,000- Angela
$100,000- Andy
$100,000- Dwight
$200,000- Jim
$300,000- Michael

The median salary looks good at $100,000.
The mean salary also looks good at about $110,000.
But the mode salary is only $25,000.
Maybe not the best place to work.
Then again living in Scranton is kind of cheap.

Other measures of variability

Range: distance from highest to lowest scores.

Standard Deviation: the variance of scores around the mean.

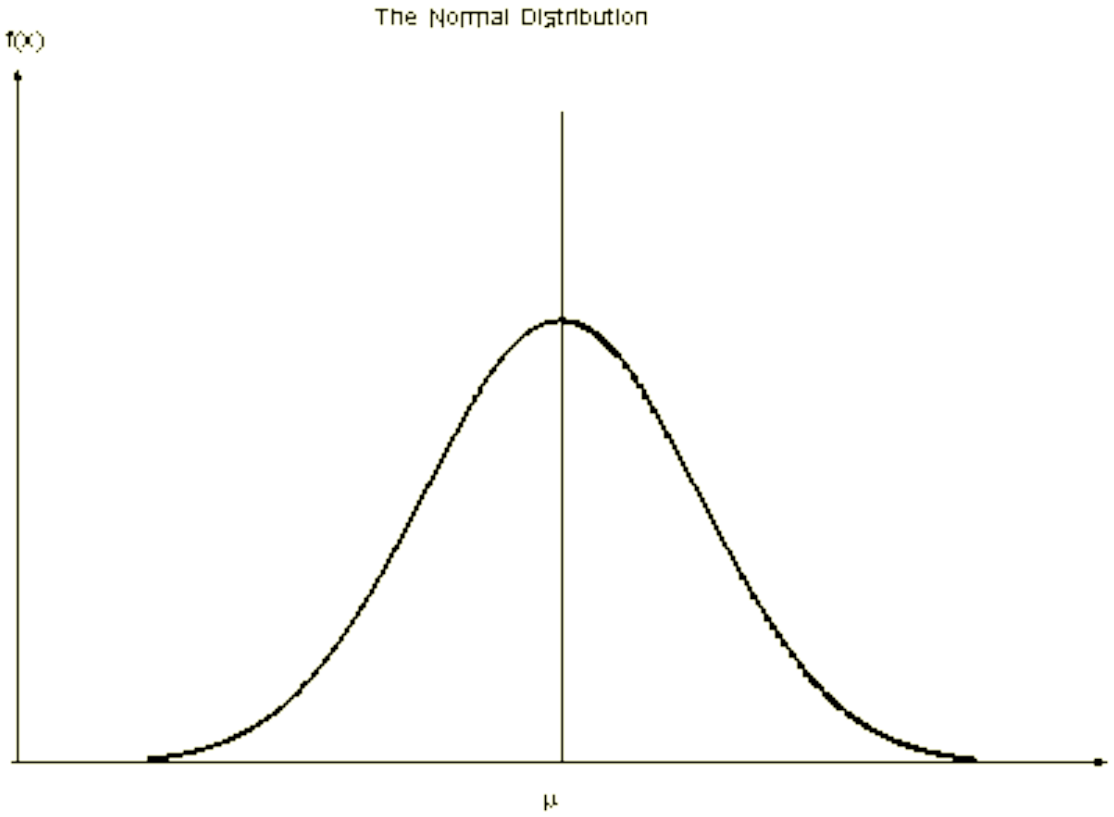
The higher the variance or SD, the more spread out the distribution is.

Do scientists want a big or small SD?

Shaq and Kobe may both score 30 ppg (same mean). But their SDs are very different.

Normal Distribution

- In a normal distribution, the mean, median and mode are all the same.



Distributions

- Outliers skew distributions.
- If group has one high score, the curve has a positive skew (contains more low scores)
- If a group has a low outlier, the curve has a negative skew (contains more high scores)

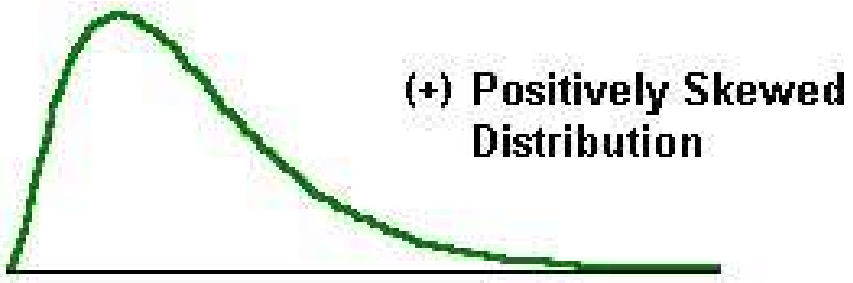
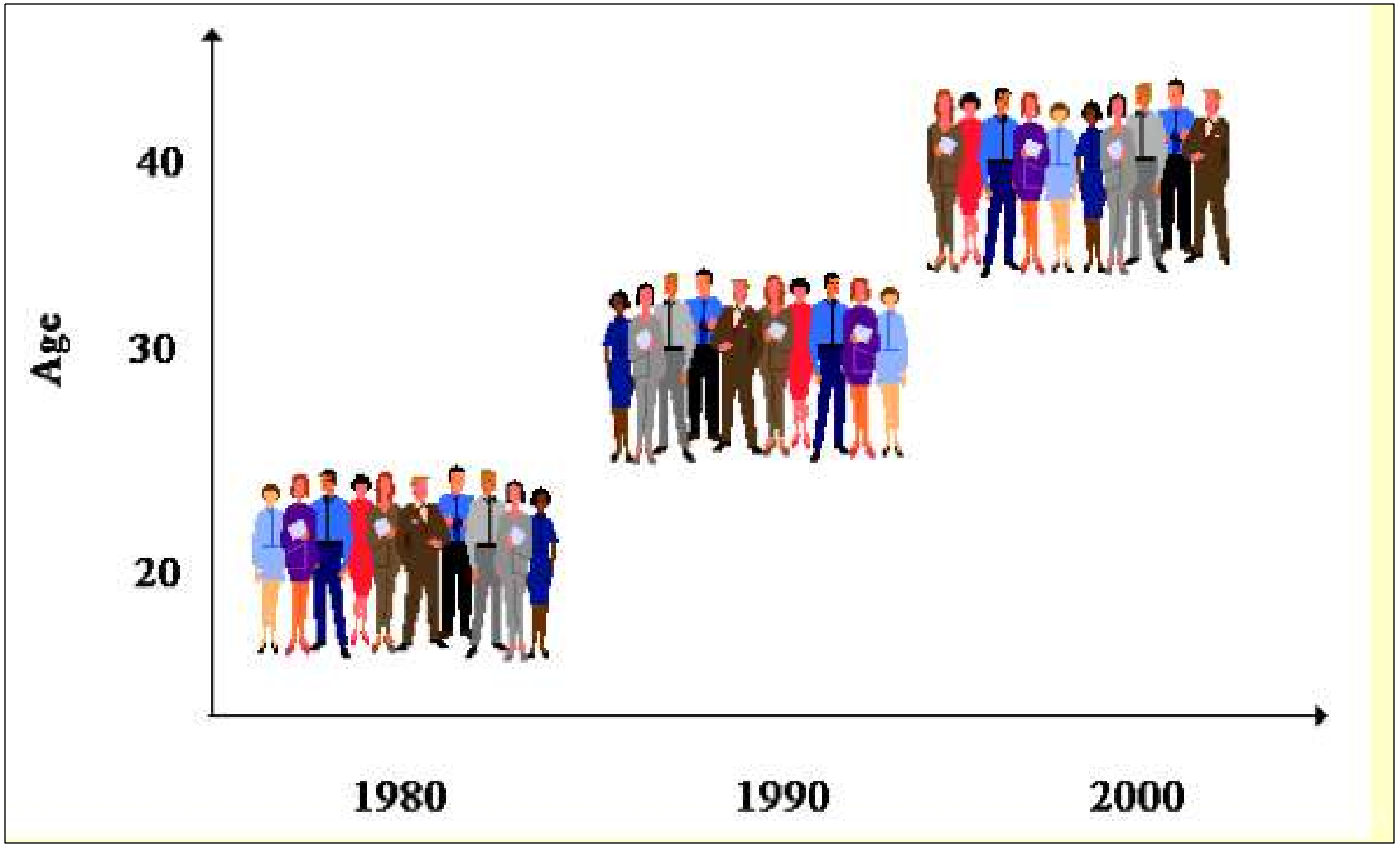


Figure 4.5



- Comparing Types of Longitudinal Studies, Example: Religious Affiliation
  - Trend Study – looks at shifts in religious affiliation over time.
  - Cohort Study – follows shifts in religious affiliation among those born during the Depression.
  - Panel Study – follows the shifts in religious affiliation among a specific group of people over time.

APA Ethical Guidelines for Research

- IRB- Internal Review Board
- Both for humans and animals.

Ethical Principles of Research

- Ethics in research with human participants
  - Freedom from coercion
  - Informed consent
  - Adequate debriefing
  - Confidentiality

"Your doctor will be here in a minute, I'm a placebo."

Animal Research

- Ethics of research with nonhuman animals
  - Health
  - Clear purpose
  - Treated in a humane way
  - Acquire animals legally
  - Least amount of suffering possible (Necessity)

The Research Proposal

- Elements of a Research Proposal
  1. Problem or Objective
  2. Literature Review
  3. Subjects for Study
  4. Measurement
  5. Data Collection Methods
  6. Analysis
  7. Schedule
  8. Budget
  9. Institutional Review Board

QUIZ

1. Social researchers tend to choose _____ as their units of analysis.

A. social interactions
B. social artifacts
C. groups
D. individuals
E. aggregates

ANSWER: D.

Social researchers tend to choose individuals as their units of analysis.

2. Scientific inquiry comes down to

A. making observations.
B. interpreting what you have observed.
C. both of the above
D. none of the above

ANSWER: C.

Scientific inquiry comes down to making observation and interpreting what you have observed.

3. A _____ is an empirical relationship between two variables such that changes in one are associated with changes in the other.

A. nomothetic explanation
B. regression analysis
C. correlation
D. spurious relationship

ANSWER: C.

A correlation is an empirical relationship between two variables such that changes in one are associated with changes in the other.

4.Which of these are among the purposes of research?

A. exploration
B. description
C. explanation
D. All of the above

ANSWER: D.

Exploration, description, and explanation are all among the purposes of research.

5. What do social researchers means when they say there is a causal relationship between education and racial tolerance?

A. There is a statistical correlation between the two variables.

B. A person's educational level occurred before their current level of tolerance.

C. There is no third variable that can explain away the observed correlation.

D. all of these choices

E. none of the these choices

ANSWER: D.

When social researchers say there is a casual relationship between education and racial tolerance they mean: there is a statistical correlation between the two variables, a person's educational level occurred before their current level of tolerance, and there is no third variable that can explain away the observed correlation.

7. A _____ represents a condition that, if present, guarantees the effect in question.

A. hypothesis
B. sufficient cause
C. practical issue
D. necessary cause
E. dependent variable

ANSWER: B.

A sufficient cause represents a condition that, if present, guarantees the effect in question.