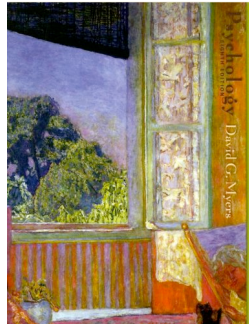


# Introductory Psychology

PSY 120000-003

Prof. Kipling Williams  
Purdue University  
Fall 2008

Teaching Assistants:  
Alvin Ty Law  
Jim Wirth



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## Going over the Syllabus

Go to: [www2.psych.purdue.edu/~kip](http://www2.psych.purdue.edu/~kip)

Click on Courses & Teaching tab at top of page

Click on PSY 120000 link under the 2008 Courses heading

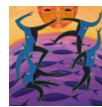
From here you can look at the constantly updated course information that includes announcements, a link to download a pdf version of the syllabus, the calendar, and the links to download pdf versions of the lectures.

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## This class website

- <http://www2.psych.purdue.edu/~kip/120/index.htm>

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## Thinking Critically with Psychological Science

### Chapter 1

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## Thinking Critically with Psychological Science

### The Need for Psychological Science

- The limits of Intuition and Common Sense
- The Scientific Attitude
- The Scientific Method

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## Thinking Critically ...

### Description

- The Case Study
- The Survey
- Naturalistic Observation

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## Thinking Critically ...

### Correlation

- Correlation and Causation
- Illusory Correlation
- Perceiving Order in Random Events

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## Thinking Critically ...

### Experimentation

- Exploring Cause and Effect
- Evaluating Therapies
- Independent and Dependent Variables

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## Thinking Critically ...

### Statistical Reasoning

- Describing Data
- Making Inferences

### FAQs About Psychology

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## Impression of Psychology

With hopes of satisfying curiosity, many people listen to talk-radio counselors and psychics to learn about others and themselves.



Dr. Crane (radio-shrink)



Psychic (Ball gazing)

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## The Need for Psychological Science

### Intuition & Common Sense

Many people believe that intuition and common sense are enough to bring forth answers regarding human nature.

Intuition and common sense may aid queries, but they are not free of error.

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## Limits of Intuition

Personal interviewers may rely too much on their "gut feelings" when meeting with job applicants.



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## Errors of Common Sense

Try this !

Fold a piece of paper (0.1 mm thick) 100 times.  
How thick will it be?

800,000,000,000,000 times the distance between  
the sun and the earth.

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## Hindsight Bias

**Hindsight Bias** is the “I-knew-it-all-along”  
phenomenon.

After learning the outcome of an event, many  
people believe they could have predicted that very  
outcome. We only knew the dot.com stocks would  
plummet after they actually did plummet.

*This is why you don't look at the answers  
before you commit yourself on practice tests.*

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## Overconfidence

Sometimes we think we  
know more than we  
actually know.

How long do you think it  
would take to unscramble  
these anagrams?

People said it would take  
about 10 seconds, yet on  
average they took about 3  
minutes (Goranson, 1978).

| Anagram |       |
|---------|-------|
| WREAT   | WATER |
| ETYRN   | ENTRY |
| GRABE   | BARGE |

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## Psychological Science<sup>1</sup>

- How can we differentiate between  
uninformed opinions and examined  
conclusions?
- The science of psychology helps make  
these examined conclusions, which leads  
to our understanding of how people *feel*,  
*think*, and *act* as they do!

<sup>1</sup>One of the premier journals in our field is also called **Psychological  
Science**. It's Editor is Robert Kail, Professor of Psychological  
Sciences, Purdue University!

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## The Scientific Attitude

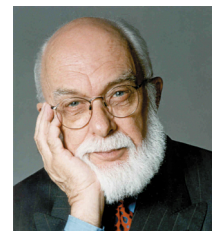
The scientific attitude is composed of **curiosity**  
(passion for exploration), **skepticism** (doubting  
and questioning) and **humility** (ability to accept  
responsibility when wrong).

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## Critical Thinking

Critical thinking does  
not accept arguments  
and conclusions blindly.

It examines  
assumptions, discerns  
hidden values,  
evaluates evidence and  
assesses conclusions.



The Amazing Randi

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## Scientific Method

Psychologists, like all scientists, use the scientific method to construct theories that organize, summarize and simplify observations.

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## Theory

A **Theory** is an explanation that integrates principles and organizes and predicts behavior or events.

For example, low self-esteem contributes to depression.

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## Hypothesis

A **Hypothesis** is a testable prediction, often prompted by a theory, to enable us to accept, reject or revise the theory.

People with low self-esteem are apt to feel more depressed.

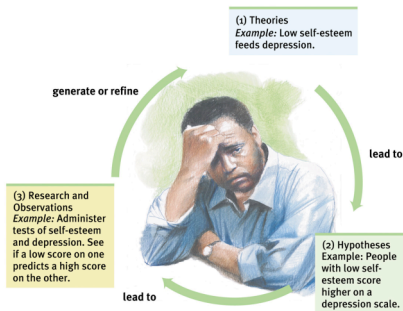
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## Research Observations

**Research** would require us to administer tests of self-esteem and depression. Individuals who score low on a self-esteem test and high on a depression test would confirm our hypothesis.

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## Research Process



## Description

### Case Study

A technique in which one person is studied in depth to reveal underlying behavioral principles.



Is language uniquely human?

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## Case Study

### Clinical Study

A clinical study is a form of case study in which the therapist investigates the problems associated with a client.



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## Survey

A technique for ascertaining the self-reported attitudes, opinions or behaviors of people usually done by questioning a representative, random sample of people.



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## Survey

### Wording Effect

Wording can change the results of a survey.

Q: Should cigarette ads and pornography be ~~forbidden~~ **limited** on television?

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## Survey

### False Consensus Effect

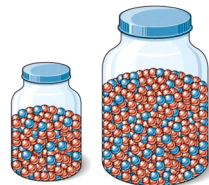
A tendency to overestimate the extent to which others share our beliefs and behaviors.

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## Survey

### Random Sampling

If each member of a population has an equal chance of inclusion into a sample, it is called a random sample (unbiased). If the survey sample is biased, its results are not valid.



The fastest way to know about the marble color ratio is to blindly transfer a few into a smaller jar and count them.

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## Naturalistic Observation

Observing and recording the behavior of animals in the wild and recording self-seating patterns in a multiracial school lunch room constitute naturalistic observation.



Courtesy of Chida Morelli

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## Descriptive Methods

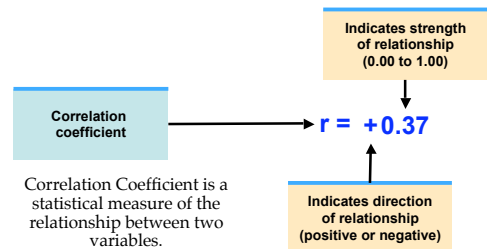
### Summary

Case studies, surveys, and naturalistic observation describe behaviors.

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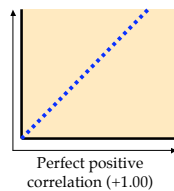
## Correlation

When one trait or behavior accompanies another, we say the two correlate.



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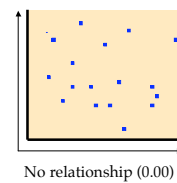
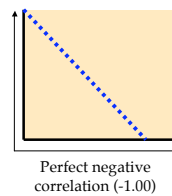
## Scatterplots



Scatterplot is a graph comprised of points that are generated by values of two variables. The slope of the points depicts the direction, while the amount of scatter depicts the strength of the relationship.

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## Scatterplots



The Scatterplot on the left shows a negative correlation, while the one on the right shows no relationship between the two variables.

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## Data

Data showing height and temperament in people.

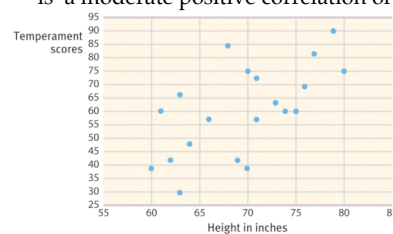
| HEIGHT AND TEMPERAMENT OF 20 MEN |                  |             |
|----------------------------------|------------------|-------------|
| Subject                          | Height in Inches | Temperament |
| 1                                | 80               | 75          |
| 2                                | 63               | 66          |
| 3                                | 61               | 60          |
| 4                                | 79               | 90          |
| 5                                | 74               | 60          |
| 6                                | 69               | 42          |
| 7                                | 62               | 42          |
| 8                                | 75               | 60          |
| 9                                | 77               | 81          |
| 10                               | 60               | 39          |

| HEIGHT AND TEMPERAMENT OF 20 MEN |                  |             |
|----------------------------------|------------------|-------------|
| Subject                          | Height in Inches | Temperament |
| 11                               | 64               | 48          |
| 12                               | 76               | 69          |
| 13                               | 71               | 72          |
| 14                               | 66               | 57          |
| 15                               | 73               | 63          |
| 16                               | 70               | 75          |
| 17                               | 63               | 30          |
| 18                               | 71               | 57          |
| 19                               | 68               | 84          |
| 20                               | 70               | 39          |

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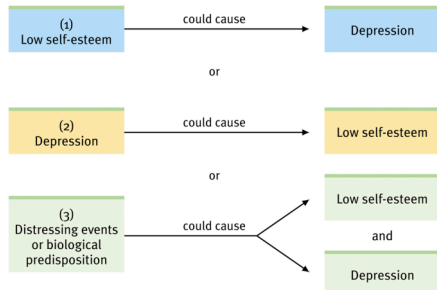
## Scatterplot

The Scatterplot below shows the relationship between height and temperament in people. There is a moderate positive correlation of +0.63.



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## Correlation and Causation



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## Illusory Correlation

The perception of a relationship where no relationship actually exists. Parents conceive children after adoption.

|              | Conceive               | Do not conceive        |
|--------------|------------------------|------------------------|
| Adopt        | Confirming evidence    | Disconfirming evidence |
| Do not adopt | Disconfirming evidence | Confirming evidence    |

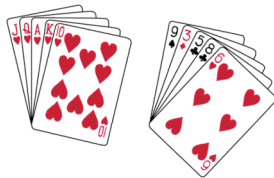


Michael Newman / iStockphoto.com

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## Order in Random Events

Given random data, we look for order and meaningful patterns.



Your chances of being dealt either of these hands is precisely the same: 1 in 2,598,960.

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## Order in Random Events

Given large numbers of random outcomes, a few are likely to express order.



Angelo and Maria Gallina won two California lottery games on the same day.

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## Experimentation

### Exploring Cause and Effect

Like other sciences, experimentation is the backbone of psychology research. Experiments isolate causes and their effects.

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## Exploring Cause & Effect

Many factors influence our behavior. Experiments (1) **manipulate** factors that interest us, while other factors are kept under (2) **control**.

Effects generated by manipulated factors isolate cause and effect relationships.

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## Independent Variable

An **Independent Variable** is a factor manipulated by the experimenter. The effect of the independent variable is the focus of the study.

For example, when examining the effects of breast feeding upon intelligence, type of feeding (breast feeding versus feeding a formula) is the independent variable.



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## Dependent Variable

A **Dependent Variable** is a factor that may change in response to an independent variable. In psychology, it is usually a behavior or a mental process.

For example, in our study on the effect of breast feeding upon intelligence, intelligence is the dependent variable.

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## Evaluating Therapies

### Double-blind Procedure

In evaluating drug therapies, patients and experimenter's assistants should remain unaware of which patients had the real treatment and which patients had the placebo treatment.

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## Evaluating Therapies

### Random Assignment

Assigning participants to experimental (Breast-fed) and control (formula-fed) conditions by random assignment minimizes pre-existing differences between the two groups.

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## Experimentation

A summary of steps during experimentation.

**Random assignment**  
(controlling for other variables such as parental intelligence and environment)



| Condition    | Independent variable | Dependent variable        |
|--------------|----------------------|---------------------------|
| Experimental | Breast milk          | Intelligence score, age 8 |
| Control      | Formula              | Intelligence score, age 8 |

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## Comparison

Below is a comparison of different research methods.

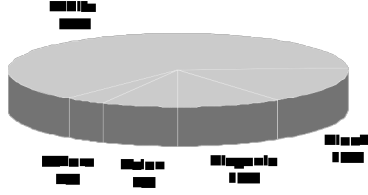
| COMPARING RESEARCH METHODS |   |   |                             |   |
|----------------------------|---|---|-----------------------------|---|
| Research Method            | Basic Purpose   | How Conducted   | What is Manipulated         | Weaknesses  |
| Descriptive                | To observe and record behavior  | Do case studies, surveys, or naturalistic observations            | Nothing                     | No control of variables; single cases may be misleading   |
| Correlational              | To detect naturally occurring relationships; to assess how well one variable predicts another | Compute statistical association, sometimes among survey responses | Nothing                     | Does not specify cause and effect   |
| Experimental               | To explore cause and effect   | Manipulate one or more factors; use random assignment             | The independent variable(s) | Sometimes not feasible; results may not generalize to other contexts; not ethical to manipulate certain variables |

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## Statistical Reasoning

Statistical procedures analyze and interpret data allowing us to see what the unaided eye misses.

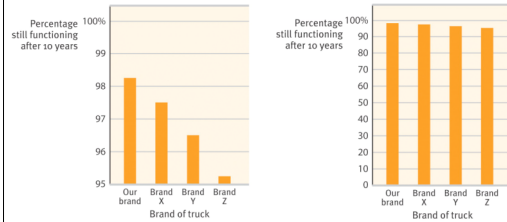


Composition of ethnicity in urban locales

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## Describing Data

A meaningful description of data is important in research. Misrepresentation may lead to incorrect conclusions.



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## Measures of Central Tendency

**Mode:** The most frequently occurring score in a distribution.

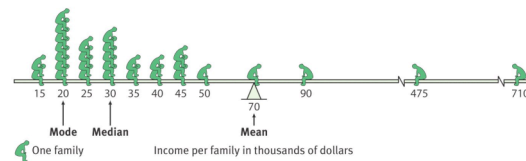
**Mean:** The arithmetic average of scores in a distribution obtained by adding the scores and then dividing by the number of scores that were added together.

**Median:** The middle score in a rank-ordered distribution.

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## Measures of Central Tendency

A Skewed Distribution

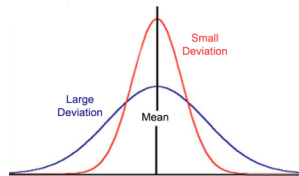


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## Measures of Variation

**Range:** The difference between the highest and lowest scores in a distribution.

**Standard Deviation:** A computed measure of how much scores vary around the mean.



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## Standard Deviation

### STANDARD DEVIATION IS MUCH MORE INFORMATIVE THAN MEAN ALONE

Note that the test scores in Class A and Class B have the same mean (80), but very different standard deviations, which tell us more about how the students in each class are really faring.

| Test Scores in Class A  |                         |  | Test Scores in Class B  |                         |   |
|---|-------------------------|--|---|-------------------------|---|
| Score   | Deviation From the Mean | Squared Deviation                            | Score   | Deviation From the Mean | Squared Deviation                             |
| 72  | -8                      | 64   | 60  | -20                     | 400   |
| 74  | -6                      | 36   | 66  | -14                     | 196   |
| 77  | -3                      | 9  | 70  | -10                     | 100   |
| 79  | -1                      | 1  | 70  | -10                     | 100   |
| 82  | +2                      | 4  | 90  | +10                     | 100   |
| 84  | +4                      | 16   | 90  | +10                     | 100   |
| 85  | +5                      | 25   | 100   | +20                     | 400   |
| 87  | +7                      | 49   | 100   | +20                     | 400   |
| <b>Total: 640</b>   |                         | <b>Sum of (deviations)<sup>2</sup> = 204</b> | <b>Total: 640</b>   |                         | <b>Sum of (deviations)<sup>2</sup> = 2000</b> |
| Mean = 640 ÷ 8 = 80   |                         |  | Mean = 640 ÷ 8 = 80   |                         |   |
| Standard deviation = $\sqrt{\frac{\text{Sum of (deviations)}^2}{\text{Number of scores}}} = \sqrt{\frac{204}{8}} = 5.0$ |                         |  | Standard deviation = $\sqrt{\frac{\text{Sum of (deviations)}^2}{\text{Number of scores}}} = \sqrt{\frac{2000}{8}} = 15.8$ |                         |   |

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## Making Inferences

A statistical statement of how frequently an obtained result occurred by experimental manipulation or by chance.

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## Making Inferences

When is an Observed Difference Reliable?

- Representative samples are better than biased samples.
- Less variable observations are more reliable than more variable ones.
- More cases are better than fewer cases.

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## Making Inferences

When is a Difference Significant?

When sample averages are reliable and the difference between them is relatively large, we say the difference has statistical significance.

For psychologists this difference is measured through alpha level set at 5 percent.

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## FAQ

Q1. Can laboratory experiments illuminate everyday life?

**Answer:** Artificial laboratory conditions are created to study behavior in simplistic terms. The goal is to find underlying principles that govern behavior.

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## FAQ

Q2. Does behavior depend on one's culture?

**Answer:** Even when specific attitudes and behaviors vary across cultures, as they often do, the underlying processes are much the same.



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## FAQ

Q3. Does behavior vary with gender?

**Answer:** Yes. Biology determines our sex, and culture further bends the genders. However, in many ways woman and man are similarly human.

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## FAQ

Q4. Why do psychologists study animals?

**Answer:** Studying animals gives us the understanding of many behaviors that may have common biology across animals and humans.



D. Shapiro, © Wildlife Conservation Society

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## FAQ

Q5. Is it ethical to experiment on animals?

**Answer:** Yes. To gain insights to devastating and fatal diseases. All researchers who deal with animal research are required to follow ethical guidelines in caring for these animals.

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## FAQ

Q6. Is it ethical to experiment on people?

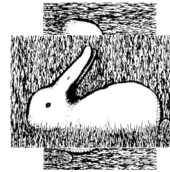
**Answer:** Yes. Experiments that do not involve any kind of physical or psychological harm beyond normal levels encountered in daily life may be carried out.

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## FAQ

Q7. Is psychology free of value judgments?

**Answer:** No. Psychology emerges from people who subscribe to a set of values and judgments.



© Roger Shepard

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## FAQ

Q8. Is psychology potentially dangerous?

**Answer:** It can be, but it is not. The purpose of psychology is to help humanity with problems such as war, hunger, prejudice, crime, family dysfunction, etc.

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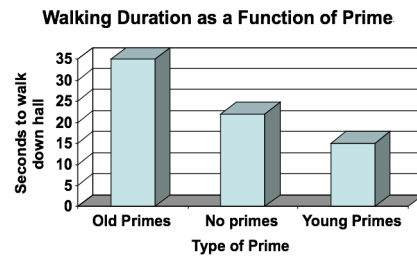
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## Example 1

- Individuals primed with “old people concepts” are more likely to walk slower than those who are not primed with “old people concepts.”
- Independent variable
  - Operationally define “old people concepts”
- Dependent variable
  - Operationally define “walking speed.”

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## Example 1: Graph



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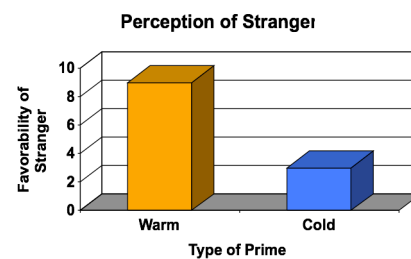
## Example 2

- Temperature (among a few other concepts like size and distance) is a fundamental facet of human understanding and perception. It permeates everything.
- People primed with warm will construe a more favorable person perception of a stranger than if they are primed with cold
- Independent variable
  - Operationally define “warm” and “cold”
- Dependent variable
  - Operationally define “person perception.”



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## Example 2: Graph



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## Example 3

- Students get better grades if they sit near the front of the classroom
- Independent variable
- Predictor variable
- Dependent variable

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