RESEARCH IN PSYCHOLOGY

Methods and Application

BASIC RESEARCH VS. APPLIED RESEARCH

"There is nothing so practical as a good theory"

(Social Psychologist Kurt Lewis)

Basic

- Seeking knowledge for the sake of knowledge itself
- "pure" research
- I.E. How do children and adults differ in addictive tendencies?

Applied

- Studying psychological issues in order to apply the findings to help solve problems
- I.E. How can we predict addictive tendencies in adolescents to prevent adult addictions?

METHODS & PURPOSE

- **Case Studies**
  - Detailed description of a particular individual being studied/treated
    - Describe behavior
- **Observational Studies**
  - Naturalistic or lab created situations
    - Attempts to understand cause and effect
- **Tests**
  - Personality, aptitudes, interests, values, abilities, etc.
    - May help diagnose disorders

- **Surveys**
  - Interviews, telephone, Internet or with a questionnaire
    - Helps to make generalizations of a sample population
- **Correlation Studies**
  - Determines a relationship between two variables
    - Can be used to predict future behaviors because of existing patterns

- **Experiments**
  - An investigation in which a hypothesis is scientifically investigated
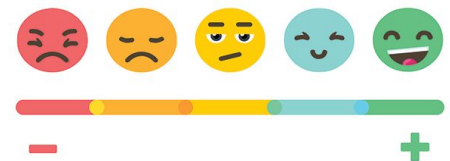   - Determine cause and effect

TABLE 2.1	Research Methods in Psychology: Advantages and Disadvantages	
METHOD	ADVANTAGES	DISADVANTAGES
Case study	Good source of hypotheses. Provides in-depth information on individuals. Unusual cases can shed light on situations or problems that are unethical or impractical to study in other ways.	Vital information may be missing, making the case hard to interpret. The person's memories may be selective or inaccurate. The individual may not be representative or typical.
Naturalistic observation	Allows description of behavior as it occurs in the natural environment. Often useful in first stages of a research program.	Allows researcher little or no control of the situation. Observations may be biased. Does not allow firm conclusions about cause and effect.
Laboratory observation	Allows more control than naturalistic observation. Allows use of sophisticated equipment.	Allows researcher only limited control of the situation. Observations may be biased. Does not allow firm conclusions about cause and effect. Behavior may differ from behavior in the natural environment.
Test	Yields information on personality traits, emotional states, aptitudes, abilities.	Difficult to construct tests that are valid and reliable.
Survey	Provides a large amount of information on large numbers of people.	If sample is nonrepresentative or biased, it may be impossible to generalize from the results. Responses may be inaccurate or untrue.
Correlational study	Shows whether two or more variables are related. Allows general predictions.	Does not permit identification of cause and effect.
Experiment	Allows researcher to control the situation. Permits researcher to identify cause and effect and to distinguish placebo effects from treatment effects.	Situation is artificial, and results may not generalize well to the real world. Sometimes difficult to avoid experimenter effects.

CORRELATIONAL VS. EXPERIMENTAL

Correlational Research

- Study that looks at consistent relationship between two things that are already occurring
- Results show:
  - Positive correlation
  - Negative correlation

Experimental Research

- A study that tests a hypothesis using controls and manipulation of variables
- Variables include:
  - Independent variable - The variable that is manipulated in an experiment
  - Dependent variable - The response of the participants to the manipulation

PARTNER WORK:
Research Methods

- Each person will write in their individual notebooks
- ....but work with a partner to come up with thoughts...

- Make a 3 column chart listing:
  - 1. definition of method
  - 2. advantages of using
  - 3. disadvantages of using

- <u>Methods:</u>
  - Case study
  - Naturalistic Observation
  - Lab Observation
  - Tests
  - Surveys
  - Correlational Study
  - Experiment

PARTNER WORK:
Experiment or correlation?

- **UNIT 1.B - Foundations - Research Methods** → **Experimental Design** → **"experiment_or_correlation_key.docx"**

  ○ With a partner, discuss the scenarios/questions

  ○ Jot down your answers to each question

   ■ When finished, check the answer key - make modifications to your answers if appropriate

CORRELATIONS

- A correlation expresses a relationship between two variables without ascribing cause
  - Variable = anything that can change or vary

- **CORRELATION DOES NOT = CAUSATION!!!!!!**

- **Illusory correlations**
  - The perception of a relationship where none exists
  - <u>Ex</u>: We think that people who can't conceive are more likely to have their own baby after they adopt....only because those cases stand out in our mind...not a true trend vs. other cases where they didn't conceive after adoption

- Spurious correlations
 - things that seem to have a relationship but clearly do not

Illusory Correlations

- The perception of a relationship where none exists
- Why do we succumb to illusory correlations?
  - We are sensitive to dramatic events that seem linked together
- Examples:
  - Pregnant cravings and the gender of the child
  - Sugar and hyperactivity
  - Gay males and high voices
  - Wet hair and catching a cold virus
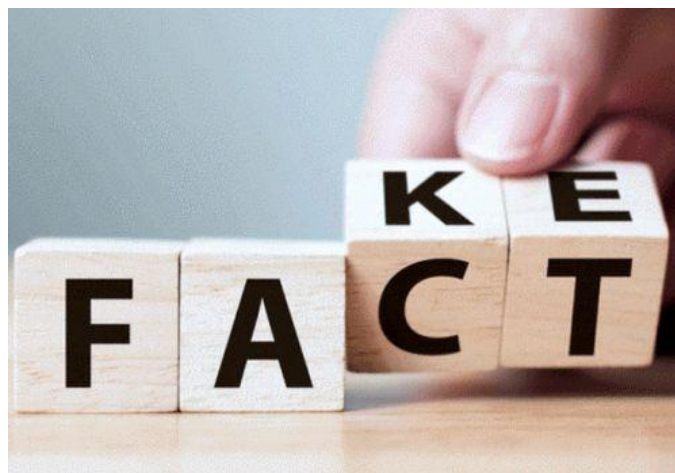
Spurious Correlations

Per capita consumption of mozzarella cheese (US) correlates with Civil engineering doctorates awarded (US)
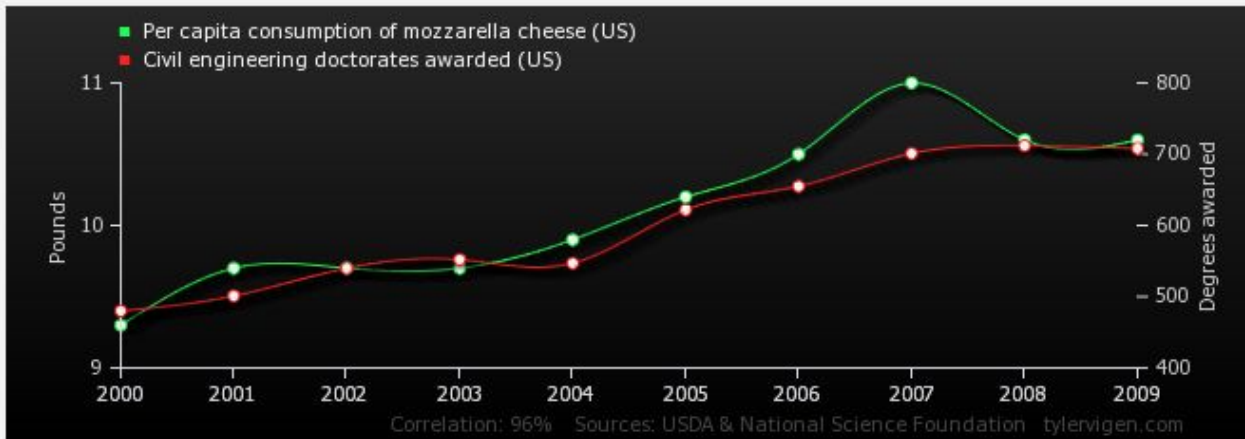
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Per capita consumption of mozzarella cheese (US) Pounds (USDA)	9.3	9.7	9.7	9.7	9.9	10.2	10.5	11	10.6	10.6
Civil engineering doctorates awarded (US) Degrees awarded (National Science Foundation)	480	501	540	552	547	622	655	701	712	708

Correlation: 0.958648

Permalink - Mark as interesting (787) - Not interesting (347)

Spurious Correlations

Per capita consumption of cheese (US)
correlates with
Number of people who died by becoming tangled in their bedsheets
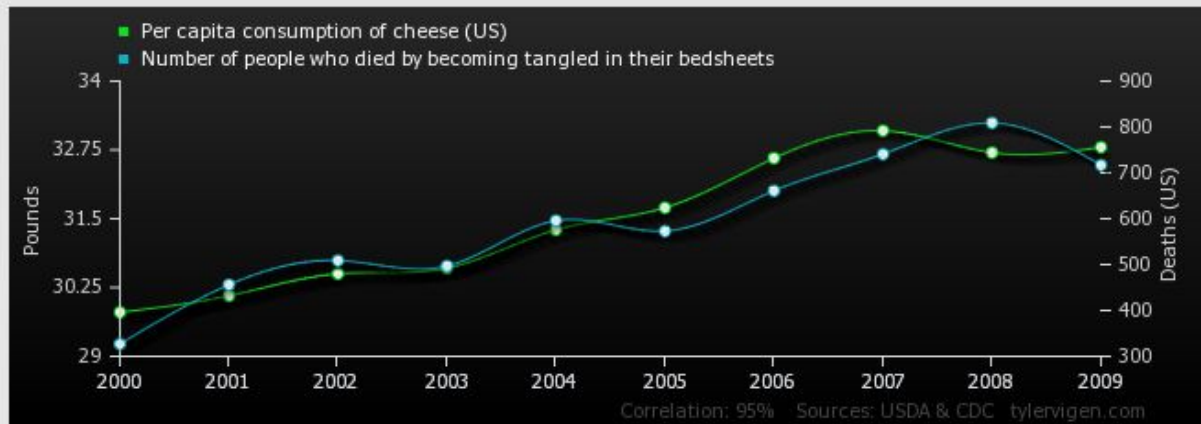
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Per capita consumption of cheese (US) Pounds (USDA)	29.8	30.1	30.5	30.6	31.3	31.7	32.6	33.1	32.7	32.8
Number of people who died by becoming tangled in their bedsheets Deaths (US) (CDC)	327	456	509	497	596	573	661	741	809	717

Correlation: 0.947091

Permalink - Mark as interesting (1,760) - Not interesting (418)

Spurious Correlations

Age of Miss America
correlates with
Murders by steam, hot vapours and hot objects

- Age of Miss America
- Murders by steam, hot vapours and hot objects

Correlation: 87%   Sources: Wikipedia & CDC   tylervigen.com
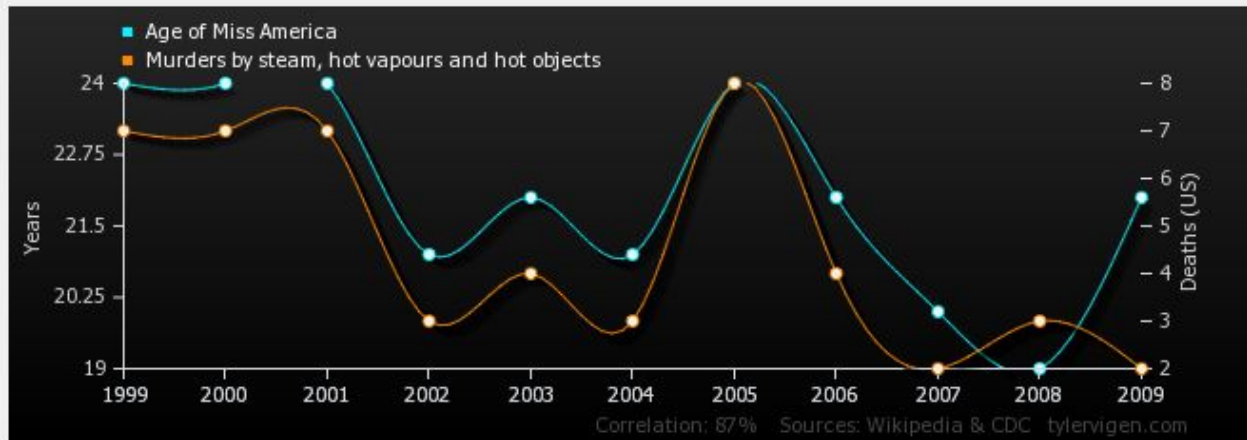
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Age of Miss America Years (Wikipedia)	24	24	24	21	22	21	24	22	20	19	22
Murders by steam, hot vapours and hot objects Deaths (US) (CDC)	7	7	7	3	4	3	8	4	2	3	2

Correlation: 0.870127

Permalink - Mark as interesting (946) - Not interesting (355)

Spurious Correlations

Divorce rate in Maine
correlates with
Per capita consumption of margarine (US)
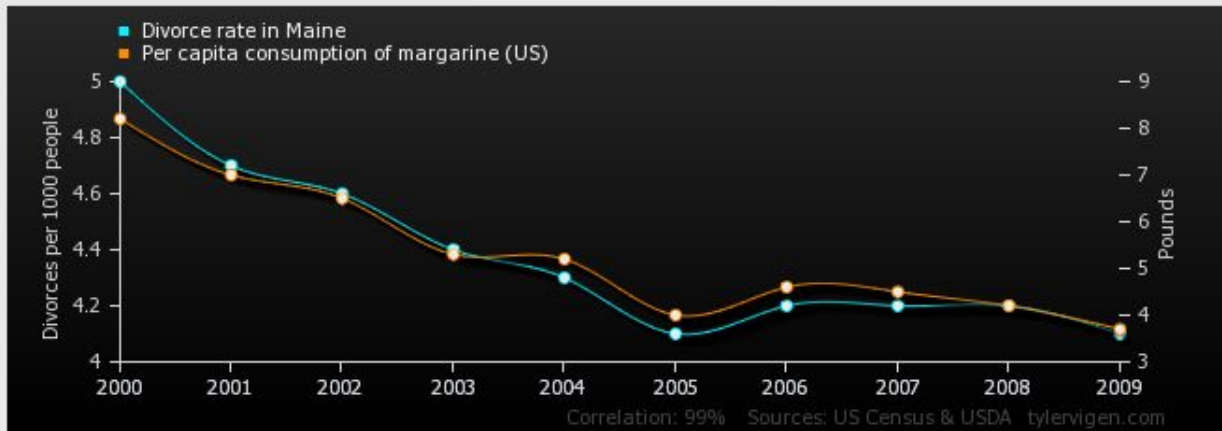
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Divorce rate in Maine Divorces per 1000 people (US Census)	5	4.7	4.6	4.4	4.3	4.1	4.2	4.2	4.2	4.1
Per capita consumption of margarine (US) Pounds (USDA)	8.2	7	6.5	5.3	5.2	4	4.6	4.5	4.2	3.7

Correlation: 0.992558

Permalink - Mark as interesting (1,565) - Not interesting (367)

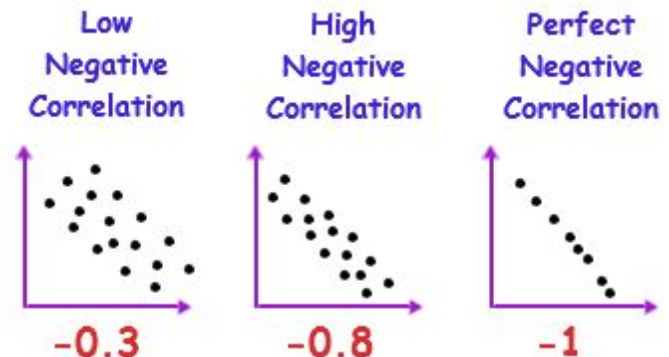# WHAT'S WRONG WITH THIS AD?

DIRECTIONAL RELATIONSHIPS

Positive Correlation

- The presence of one thing "predicts" the **presence** of the other
- As one thing goes "up," so does the other
- Examples?
  - GPA and SAT score
  - Education and salary
  - Depression and suicide
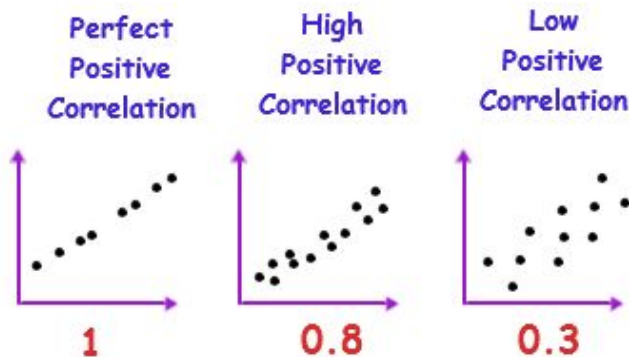
Negative Correlation

- The presence of one thing "predicts" the **absence** of the other
- As one thing goes "up," the other goes "down"
- Examples?
  - The weight of a car and miles per gallon
  - School achievement and days absent from school
 - Vaccinations and illness

Perfect Positive Correlation — 1

High Positive Correlation — 0.8

Low Positive Correlation — 0.3

Low Negative Correlation — -0.3

High Negative Correlation — -0.8

Perfect Negative Correlation — -1

CORRELATION COEFFICIENT

- Number used to designate the strength & direction of a correlational relationship

    - *Represented by the letter* **r**

- Ranges from [-1] to [+1]

- **-1 is a perfect Negative relationship**

- **+1 is a perfect Positive relationship**
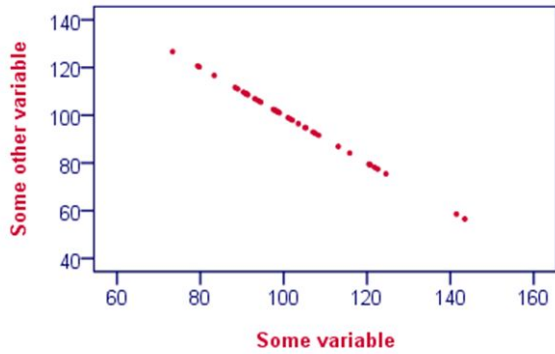
- **0 is the weakest relationship**
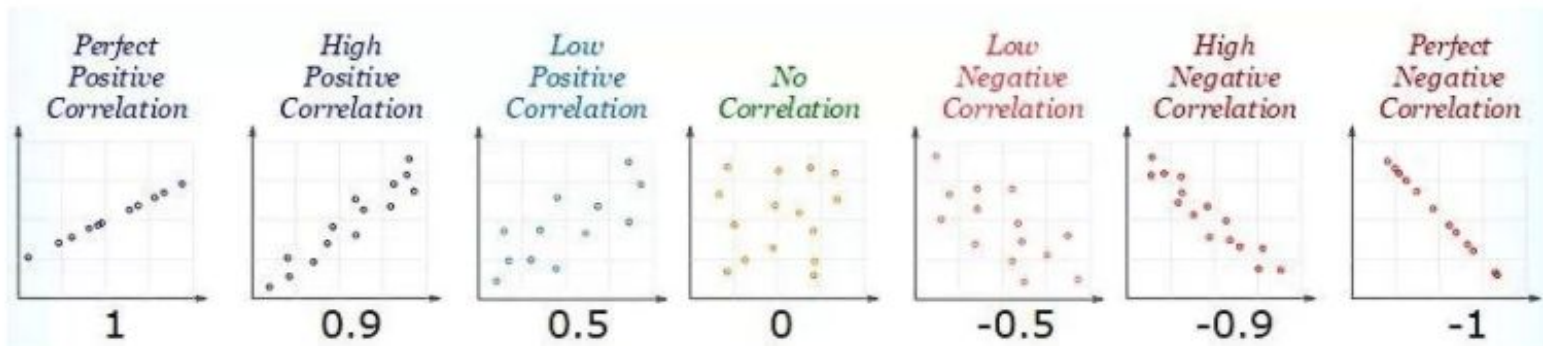
VISUALIZING A CORRELATION

- Must be graphed using a scatter plot

- The line of best fit, or regression line, is drawn through the middle in a way that minimizes its space from as many points as possible

- The closer the points to the line, the more perfect the correlational relationship
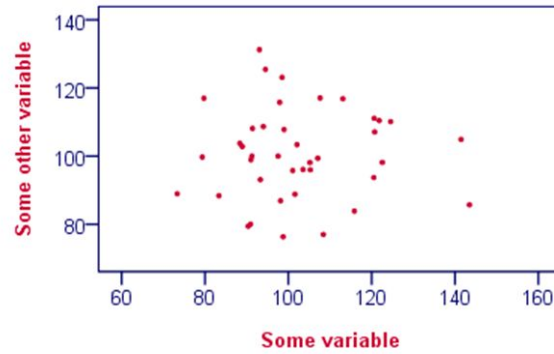 - (Coefficient closer to +1 or -1)
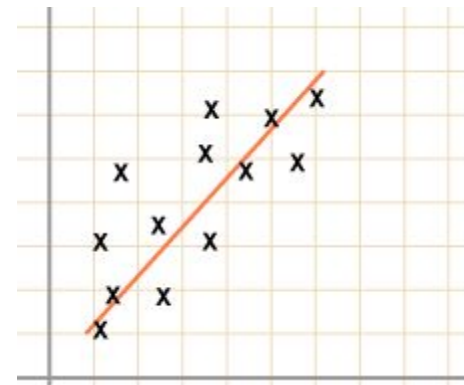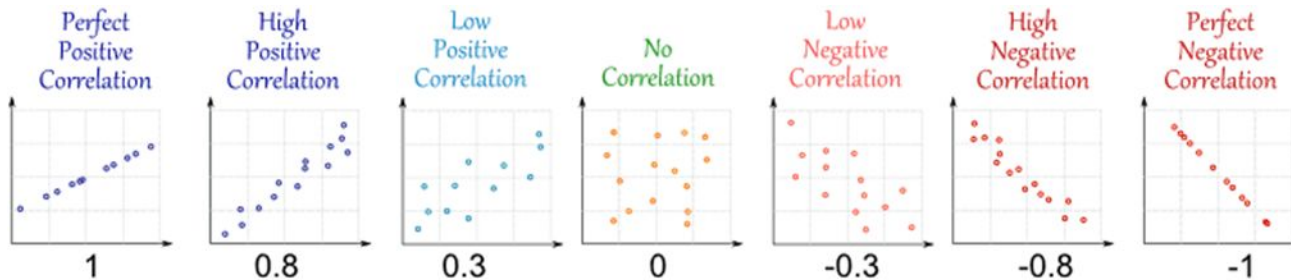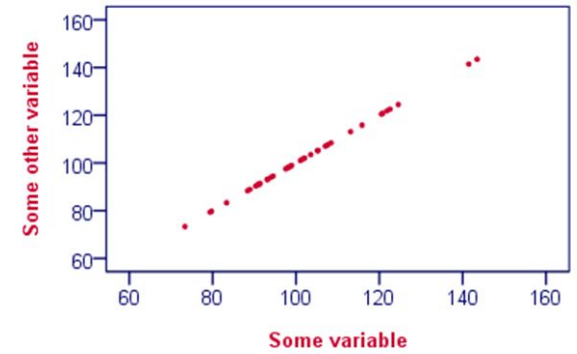
CORRELATION COEFFICIENT

Correlation Coefficient = -1

Some other variable

Some variable

Correlation Coefficient = 0

Some other variable

Some variable

Correlation Coefficient = 1

Some other variable

Some variable

Perfect Positive Correlation — 1

High Positive Correlation — 0.8

Low Positive Correlation — 0.3

No Correlation — 0

Low Negative Correlation — -0.3

High Negative Correlation — -0.8

Perfect Negative Correlation — -1

GAME TIME!

● As a class……[guess the correlation coefficient](#)

RESEARCH TERMS

- **Participants**

- **Operational definitions** – yearbook activity (next slide)

- **Independent variables**
  - The thing you manipulate

- **Dependent variables**
  - The thing affected by the independent variable
  - It "depends" on the independent variable

- **Confounding variables (book said "Extraneous")**
  - Other factors (beside the independent variable) that could affect the dependent variable
    - *Participant-relevant – controlled by random assignment*
    - *Situation-relevant – controlled by equivalent environments*
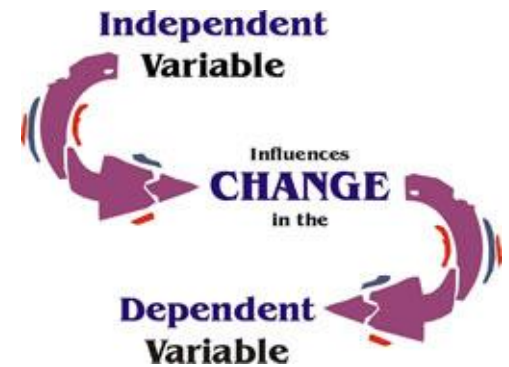
Operational Definitions

- Do women smile more than men?

  - Importance of operational definitions!

PARTNER WORK:
Variable Practice

- **<u>UNIT 1.B - Foundations - Research Methods</u> → Experimental Design → "ind._and_dep._variable_worksheet.pdf"**

  ○ With a partner, identify the independent variable and dependent variable(s) in the experiments

RESEARCH TERMS (CONTINUED)

- **Experimental group**
  - Group exposed to the independent variable that is manipulated….exposed to the "treatment"
- **Control group**
  - Group NOT exposed to treatment. Serves as a comparison to the experimental group
- **Valid**
  - Does the study measure what you aim to measure?
  - Like….Hand length a measure of intelligence (not valid)
- **Reliable**
  - If the study was done again, would you get the same results?
    - Things like operational definitions are important for reliability

Samples drawn from some aspect of nature

↓ ↓

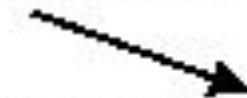| **Experimental Group** (Variable being tested is present) | **Control Group** (Variable being tested is absent) |

↓ ↓

Results compiled   **Results compiled**

Test results compared and analyzed

↓

Experimental design and results reported, as well as the conclusions drawn from them

GROUPING PARTICIPANTS: EXPERIMENTAL DESIGN

- **Within-Subjects Design**
  - Compares subjects to themselves
  - Same people are exposed to independent variable and not
    - They are their own control
  - **Ex:** *Group takes a memory test without music playing. The next day the same group takes a memory test with music playing and results are compared (like a before and after)*

- **Between-Subjects Design**
  - MOST COMMON
  - 2 groups
    - 1 group is control
    - 1 group is experimental group

SAMPLING

- **Sampling**
 - Process in which participants are selected for a study

- **Goal**:
  - For the sample population to be representative of a larger population

- **Random selection vs. random assignment** ⬅
  - **Random Selection**: every person in a population has an equal chance of being selected for the experiment/test/survey/etc. (best done by computer)
  - **Random Assignment**: (only for experiments) Participants have equal chance of being put into experimental or control group
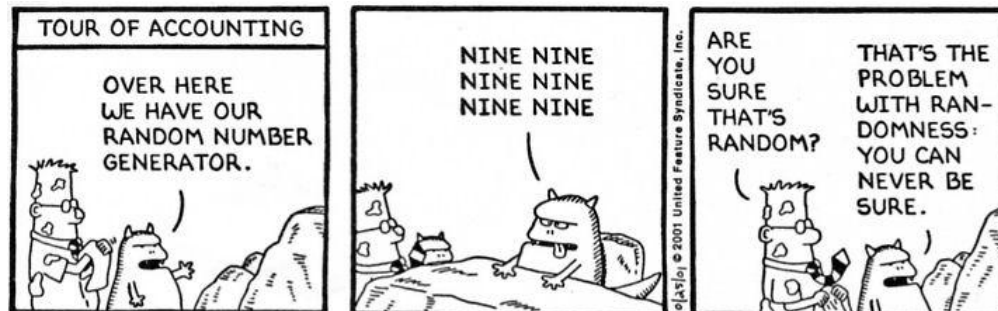
RANDOM ASSIGNMENT

- Basketball team activity

  - Want to do an experiment – 2 different methods of basketball training...which one is better?

  - What if all the tall people are on one team?

    - Participant – relevant confounding variable....would skew the results.

  - How do we make sure it's even? Random Assignment?

  - Count off 1-2....then line up tallest to shortest

DOUBLE/SINGLE BLIND STUDIES

- **Single Blind Study**

  - Participants don't know if they are in the control group or the experimental group

    - Placebos can be used to prevent this when using medicine

- **Double Blind Study**

  - Neither the participants or researchers know who is in which group

    - Participants usually coded some way

    - Researchers see results but don't know which group participant was from

  - Helps prevent experimenter bias

# "EFFECTS" AND BIASES

- **Biases**
  - <u>Observer bias</u> – what experimenter expects to see, can change how s/he sees the behaviors being watched
    - More specifically – <u>confirmation bias</u>: tendency to notice only things that agree with your view or hypothesis

- <u>Order effects</u>
    - Participants may get *better* at a repetitive task of an experiment because they are "practicing" with each trial
    - Participants may get *worse* at a repetitive task of an experiment because they get fatigued

DEMAND CHARACTERISTICS

- **Demand Characteristics (Participant bias)**
  - the clues in an experiment that lead the participants to think they know what the researcher is looking for (e.g. experimenter's body language).

- **Hawthorne Effect**
  - Participants behavior changes because they know they are being observed. Usually performance increases.

- **Placebo Effect**
  - The improvement of a patient or "cure" because of the perceived benefits of a treatment (even if the pill/injection/cream/etc. is fake.)

- **Pygmalion Effect**
  - The researchers' expectations are unknowingly projected onto participants. The participants behave in a way that matches those expectations.
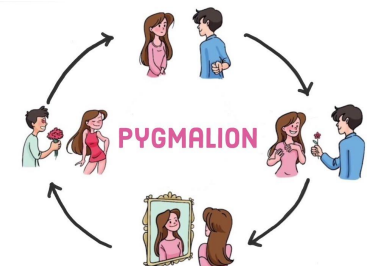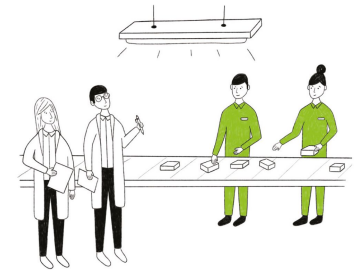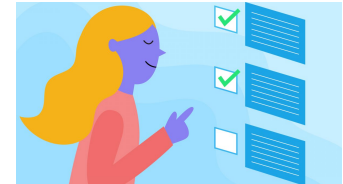
PLACEBO EFFECT
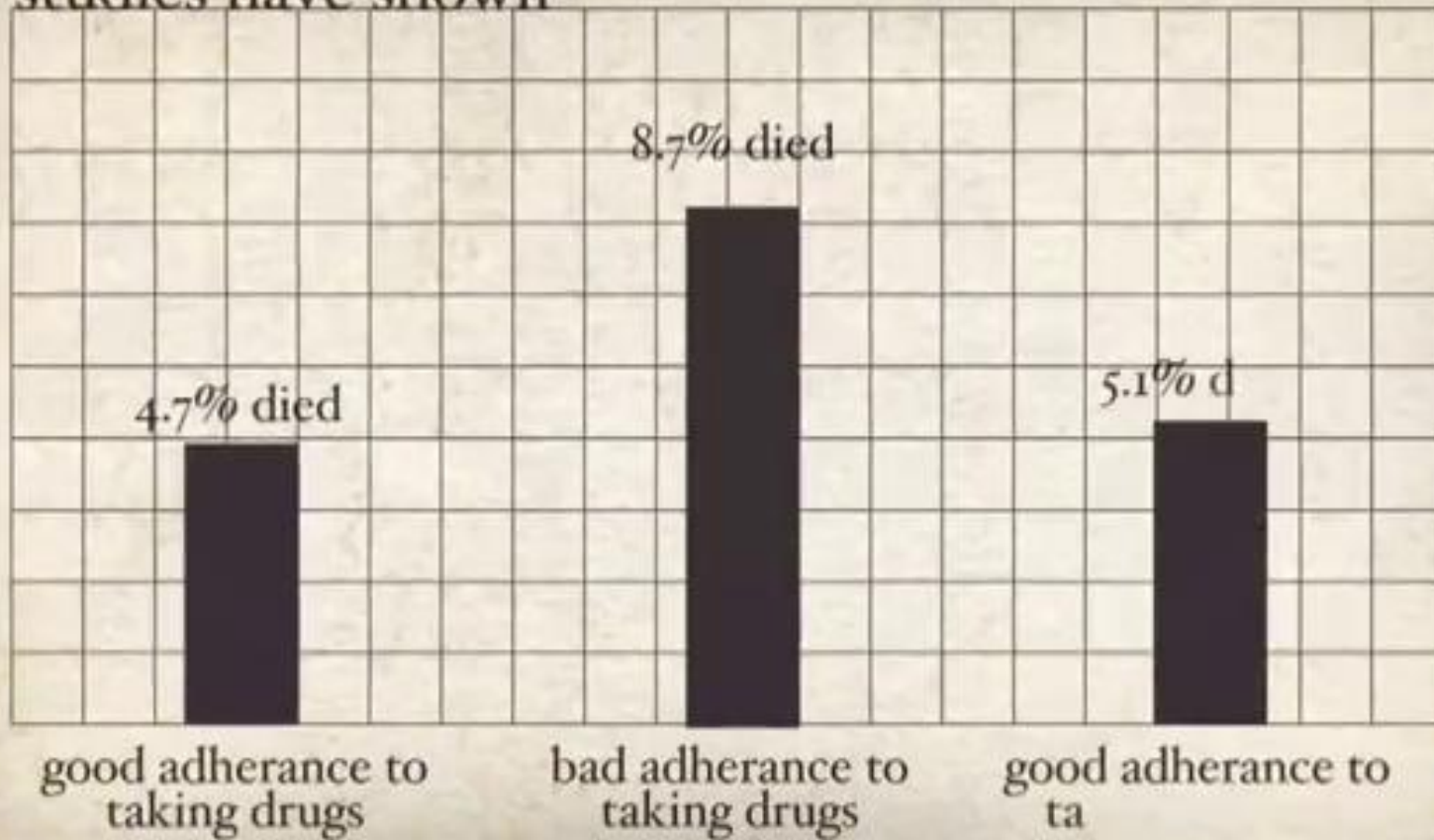
"PLACEBO" AD

THE NEW YORKER

PYGMALION EFFECT

STUDY SUMMARY REVIEW

- Clever Hans the horse

- Rosenthal's college students with "intelligent" rats

- How do the following terms relate to the Rosenthal study summary?

  - Pygmalion effect/ self-fulfilling prophecy
  - Random assignment
  - Double blind study (if the teachers were like the researchers)
  - Control group vs. experimental group
  - Applied research