

Chapter 2

Psychology: The Science

How Psychologists Do Research

Hypotheses/theories must be testable/falsifiable

- Freud posited that the first structure of personality to develop is the id. The selfish part of us. How can we test to see if I have an id inside me?
- Freud said we have an unconscious that we don't have access to but there are traumatic memories there. How can we verify that?
- Psychology only asks SOME types of questions. Ex: Homosexuality is wrong. How do you test that?

- Benjamin Rush (doctor – signed the declaration of independence)
 - He believed that yellow fever should be treated with vigorous blood letting. If the patient improved, "it was because his treatment worked". If the patient died, it was because the illness was too severe for any treatment to work.
 - No outcome could lead to the claim his treatment didn't work. Couldn't be falsified.
 - Psychoanalytic theory of autism dominated for decades (repressed masturbatory urges). Can't be verified scientifically these beliefs kept us from science based biological causes.

Types of Research: Case Studies

- A detailed description of a particular individual being studied or treated which may be used to formulate broader research hypotheses.
- More commonly used by clinicians; occasionally used by researchers.

Methods of Research: Case Studies

- | | |
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| <ul style="list-style-type: none"> ■ Advantages <ul style="list-style-type: none"> □ Enables intensive study of rare phenomenon □ May challenge the validity of theory □ Source of new ideas and hypotheses | <ul style="list-style-type: none"> ■ Disadvantages <ul style="list-style-type: none"> □ Poor method of determining cause-effect relations □ Generalizability questionable □ Researcher bias <ul style="list-style-type: none"> ■ Easy for us to see what we want to see |
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Many advances are discovered by accident

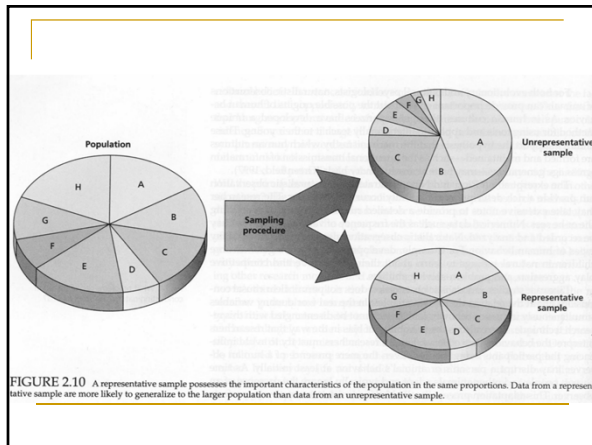
Observational Studies



- Researchers carefully and systematically observe and record behavior without interfering with behavior.
 - Naturalistic observation.
 - Purpose is to observe how people or animals behave in their natural environment.
 - Maybe you are interested in studying play style differences between boys and girls.
 - Monica Moore went to bars to observe behaviors of women when they were in "pick up" settings to see how those behaviors are different from non-pickup settings. I.e. What behaviors do women do when they want to flirt.
 - Laboratory observation.
 - Purpose is to observe people or animals in a more controlled setting.
 - Strange Situation to observe how young children react to mom leaving then and then returning.

Methods of Description Research (cont):
Survey Research

- Surveys are questionnaires and interviews that ask people about experiences, attitudes, or opinions.
- Population: All individuals that we are interested in drawing a conclusion about
- Important:
 - Random sampling
 - Representative sample: Accurately reflects important aspects of the population
 - If investigating attitudes toward gay marriage in the US, you'd want the percent of evangelicals in the US to be the same as that in the sample. Same with old folks.



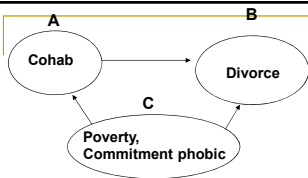
Methods of Research: Survey Research (cont)

- Major drawbacks to surveys:
 - Unrepresentative samples can lead to faulty generalizations
 - Surveys rely on participants' self-reports
 - "If you are surveying graduates of a alcohol treatment program, you can't trust them - they'll lie - they're alcoholics".
 - Data cannot be used to draw conclusions about cause-and-effect
 - If we find that those kids that report playing violent video games are also more likely to report getting into trouble - can we infer one causes the other?
 - Volunteer Bias - when the sample is different from the pop in an important way.

From a Focus on the Family Website

Relationship between cohabitation and divorce

- The census reports a 72 percent increase in the number of cohabiting couples since 1990. Unfortunately, research shows that cohabitation is correlated with greater likelihood of unhappiness and domestic violence in the relationship. Cohabiting couples report lower levels of satisfaction. If a cohabiting couple ultimately marries, they tend to report lower levels of marital satisfaction and a higher propensity to divorce in the relationship than married couples.
- Message is: Cohabitation leads to bad outcomes. Don't cohabit. Get married.
- Could there be a third variable?(can't commit? Age, poverty?)



- Does Cohab lead directly to divorce?
- Could Poverty be a third variable that influences both A and B?

Other Examples of Correlational Studies

- Beware of "third variable problem"
If you postpone "age of first drink", does that reduce risk of heavy adult drinking?

A
B

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    graph LR
      A((Age of First Drink)) --> B((Heavy Adult Drinking))
      C((Impulsiveness, or Sensation Seeking)) --> A
      C --> B
    
```

- Does age of first drink directly cause heavy adult drinking?
- Could the personality traits like impulsiveness or wanting a lot of stimulation and excitement (sensation seeking) cause both “beginning drinking at a young age” AND “heavy adult drinking”?

A
B

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    graph LR
      A((Breast Augmentation)) --> B((Suicide))
      C((Low Self Esteem Body Image Dissatisfaction)) --> A
      C --> B
    
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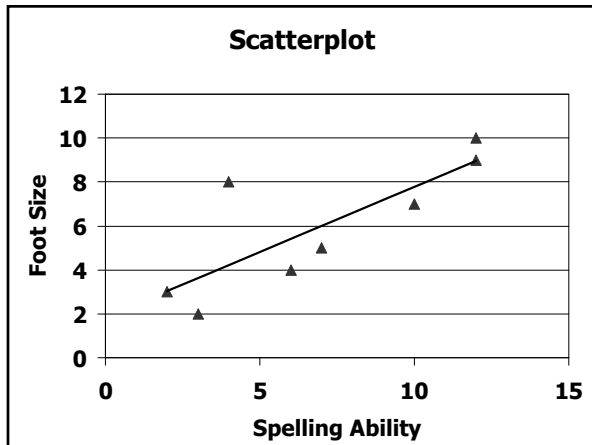
- From a peer reviewed article 2007: Across the six studies, the suicide rate of women who received cosmetic breast implants is approximately twice the expected rate based on estimates of the general population.
- Does breast augmentation cause suicide?
- Could low self esteem/body image issues lead some women to both get breast augmentation AND then also cause depression?

Methods of Research: Correlational Research

- Problems with correlational research
 - Which causes which?
 - Third variable problem
 - Correlation does not demonstrate causation!

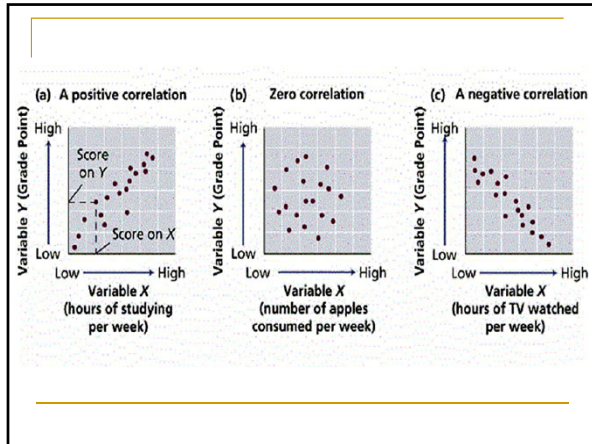
Is There a Relationship Between These Variables?

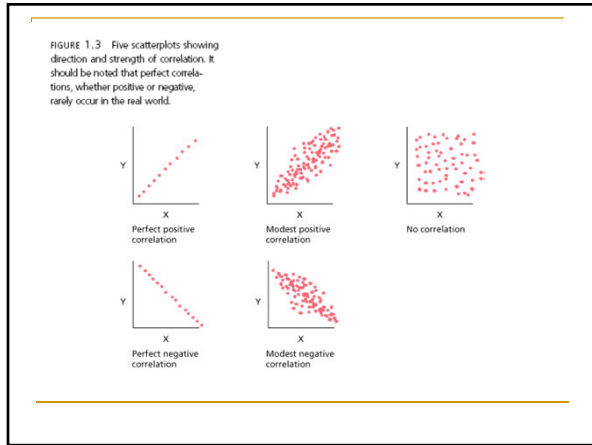
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3	2
5	7
7	10
2	3
10	12
4	6
8	4

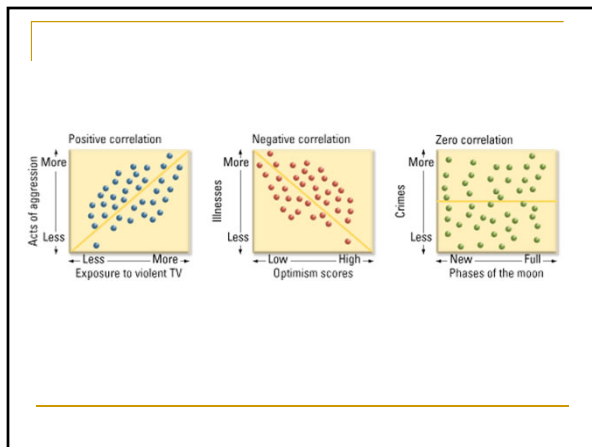


Methods of Research: Correlational Research

- **Positive Correlation:**
 - Higher scores on one variable are associated with **higher** scores on the other variable
 - Conversely, lower scores are associated with lower scores on the other variable
 - Range from +.01 to +1.00
- **Negative Correlation**
 - Higher scores on one variable are associated with **lower** scores on a second variable
 - Range from -.01 to -1.00







Illusory Correlation

- You believe there is a correlation when there isn't one.

Empirical part of Psychology helps us answer questions!

And We want to find "causal relationships"

1. Does violent video games make you aggressive?
2. Does smoking lead to lung cancer?

i.e. Does "A" affect (influence/change) "B"?

Best Way to Demonstrate Causal Relationships is Through the Experimental Method.
Logic of the Experimental Method

1. Start with 2 groups, equal on all relevant variables
2. Do something to make them different.
3. Measure them
4. If they are different, we conclude that it must be a result of what we did.

Define: a Confound, operational definition.

I hypothesize the room brightness has a causal effect on typing speed.

- Make 2 groups: Left side of class types in bright room. Other side types in dim room.
 - Problem?
- Where was random assignment to groups?
 - Can't let subjects "self-select" themselves to groups

- | Left side | Right Side |
|----------------|-------------|
| ■ Bright light | ■ Low light |
| ■ Quiet | ■ Noisy |
| ■ Cool | ■ Hot |
| ■ 8:00 AM | ■ 5:00 PM |

Problems?
(confounding variables)

Random Assignment

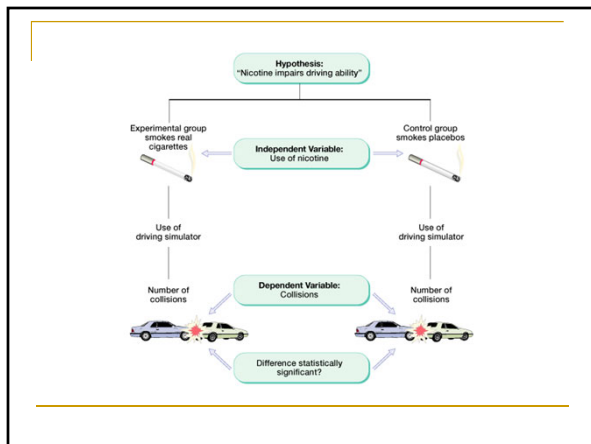
- For experiments to have experimental and control groups composed of similar subjects, random assignment should be used.
- Each individual participating in the study has the same probability as any other of being assigned to a given group.
- If we don't randomly assign subjects to groups, the groups may not be equal at the start.

Methods of Research: Experimentation

- An experiment has three essential characteristics:
 - The researcher manipulates one variable
 - The researcher measures whether this variable produces changes in another variable
 - The researcher attempts to control for other factors that might influence the results

Methods of Research: Experimentation

- Independent variables
 - **Manipulated** by the experimenter
- Dependent variables
 - Measured by the experimenter and influenced by the independent variable



What's a Control Group?

- In an experiment, a comparison condition in which subjects are not exposed to the same treatment as in the experimental condition.
- In some experiments, the control group is given a placebo which is an inactive substance or fake treatment.
- | | |
|---------------------------|--|
| <u>Experimental Group</u> | <u>Control Group</u> |
| ■ Gets Drug | ■ Gets Placebo |
| ■ Expects drug to help | ■ Can't tell control group it's only a placebo |

Single and Double Blind

- In the example on previous slide, I would want the subjects to be blind. i.e. they don't know if they are getting the drug or a placebo.
- Further suppose the researcher also knows who is in which group and his job is to measure depression by judging from talking to subjects how depressed they are. Problem? The researcher that is measuring depression should also be blind.

Using Statistics to help us judge if group differences are real

- Assume group 1 (bright lite) types 39.4 wpm and group 2 (dim light) types 37.5 wpm. If I had good "control", can I conclude lighting has a causal effect on typing speed?
 - What if there is actually no effect of light on typing speed, could these differences have occurred? i.e. could this difference have occurred by chance?
- Statistics give us the probability that the difference we see could be due to chance. If that probability is less than 5%, we agree to believe it is real.

More Considerations

- When we measure “constructs”, like depression, the measuring instrument needs:
 - Reliability aka consistency.
 - Inter-rater: maybe I have 10 judges rate depression level by watching videotape of subjects. This reliability is high if all tend to agree on what they see.
 - Test-retest: Maybe I use a questionnaire. The scores from the questionnaire given to people at time 1 should be similar to the scores given to people 2 weeks later.
 - Suppose my depression questionnaire isn't really measuring depression but sadness instead. It lacks validity.
