



Psychology @ FIC

Research Methods and Ethics
in Psychology

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Science/Empiricism

Goals of the Scientific Method:

- Description and Measurement
 - Understanding and Prediction
 - Application and Control
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- Types of Explanation □ Theories

Steps in the Scientific Process

1. Observation □ The art of looking
2. Develop hypothesis (if/then)
3. Test hypothesis using empirical method
 - **Design study** □ complexity, variability and reactivity
 - collect data
4. Analyze data & interpret findings
5. Findings support/refute theory?
6. Test again - (new?) hypotheses
 - Replications
 - Publication

Types of Research

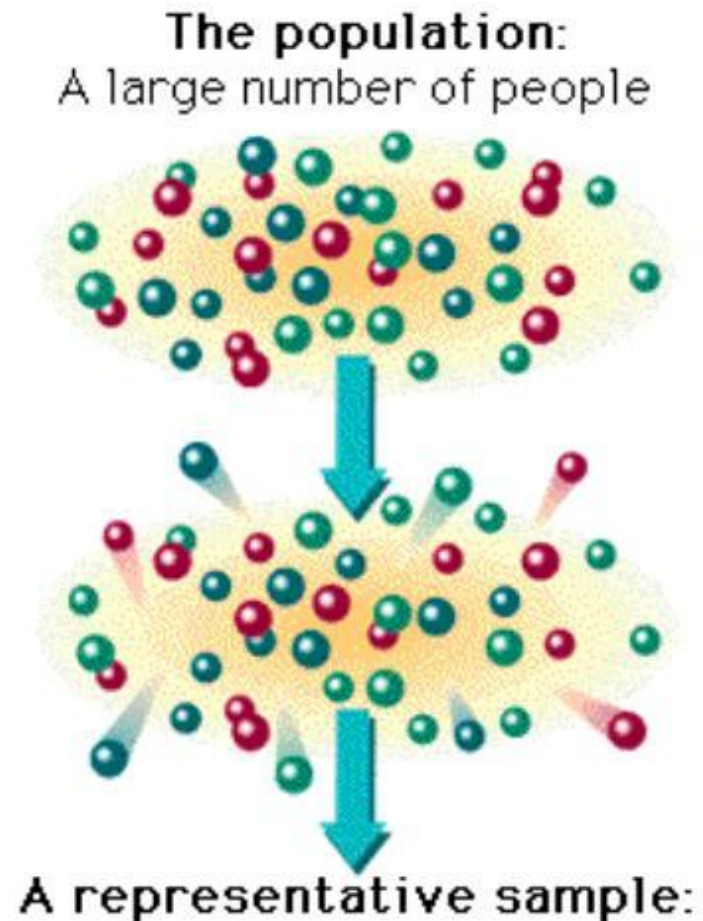
- Descriptive Research
 - Accurate & systematic measurement
 - Increases awareness of multiple variables
- Correlational/Non-experimental Research
 - Association between variables
 - Predict relations between variables
- Experimental Research
 - Establish **cause and effect** relations

Three Descriptive Approaches

- Naturalistic Observation
 - Observing others--people watchers?
- Case Study
 - One of, Case Study Research
- Surveys
 - Tools: Questionnaires or interviews

Random Sampling: Generalizability

Random sampling:
Pick people from
the population



Correlation

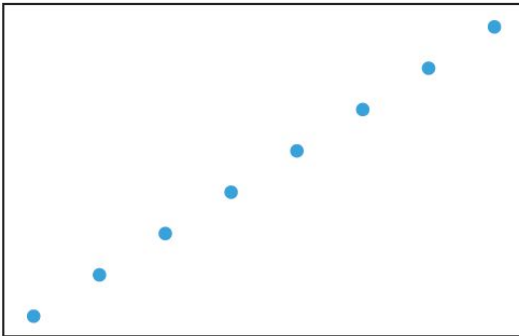
- ▣ **Correlation:** Two variables are said to be correlated when variations in the value of one variable are synchronized with variations in the value of the other
 - ▣ *Positive correlation:* both variables increase or decrease together
 - ▣ *Negative correlation:* as one variable increases, the other decreases

Correlation

- ▣ **Correlation coefficient:** Measure of the direction and strength of a correlation (r)
- ▣ **r ranges**
 - ❖ -1.0 (perfect negative correlation)
 - ❖ +1.0 (perfect positive correlation)
 - ❖ 0 as no correlation

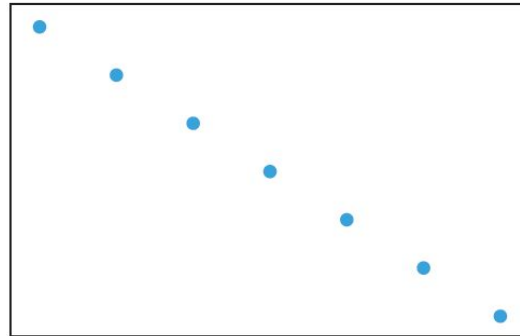
Let's take a closer look.

Three Kinds of Correlations



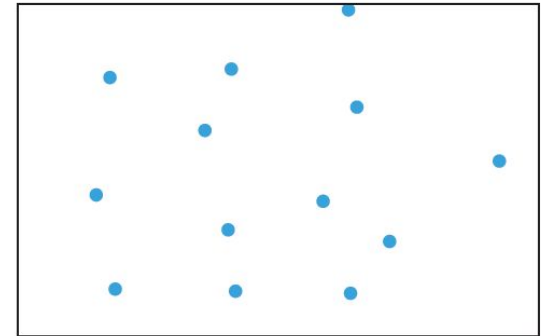
$$r = 1$$

(a) Perfect Positive Correlation



$$r = -1$$

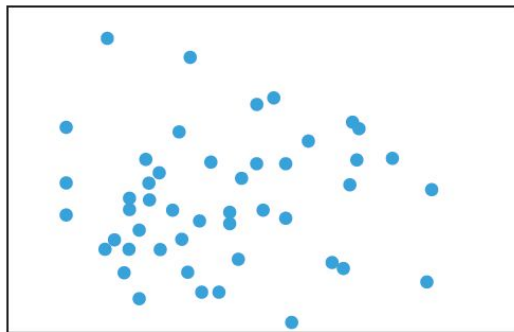
(b) Perfect Negative Correlation



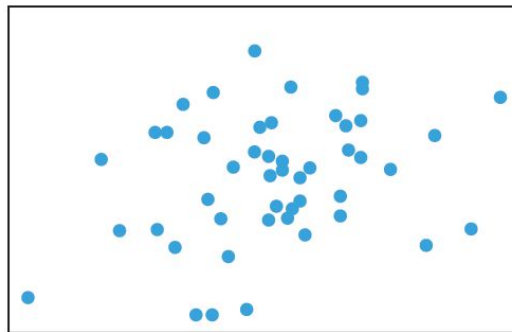
$$r = 0$$

(c) No Correlation

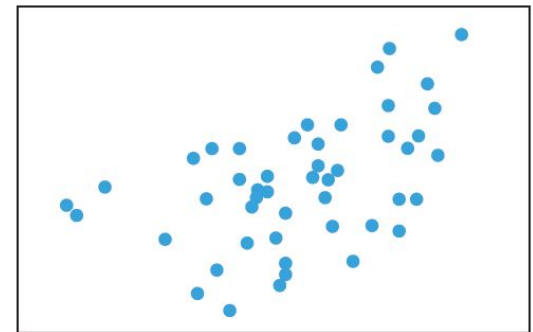
Positive Correlations of Different Strengths



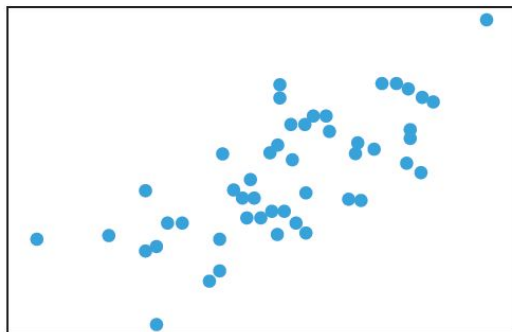
$r = .0$



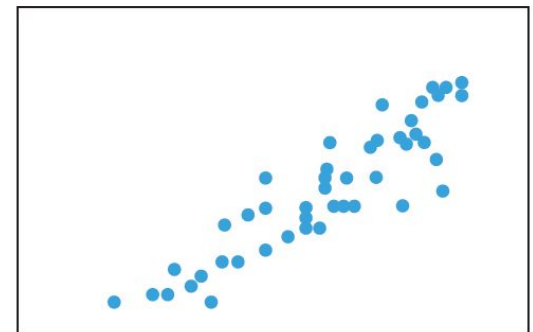
$r = .30$



$r = .50$



$r = .70$



$r = .90$

▲ **Figure 2.8 Positive Correlations of Different Strengths** These graphs illustrate different degrees of positive correlation between two variables. When there are few exceptions to the rule $X = Y$, then the correlation is strong and r is closer to 1. When there are many exceptions to this rule, the correlation is weak and r is closer to 0.

Experiments: Logic & Definition

- A research method in which the investigator **manipulates** a variable under **controlled conditions** and observes whether any changes occur in a second variable

Variables: IV and DV

- Independent Variable: Manipulated
 - Called that because we vary it independently of the other factors - to see if it has an effect on the other variable of interest
- Dependent Variable: Measured
 - Called that because it is hoped that it will vary as a result of the impact of the independent variable

Elements of an Experiment

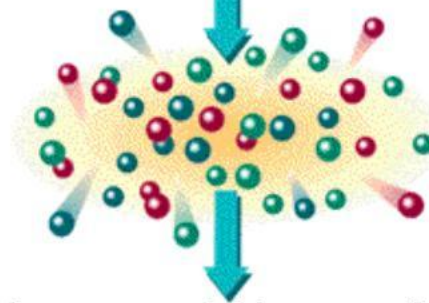
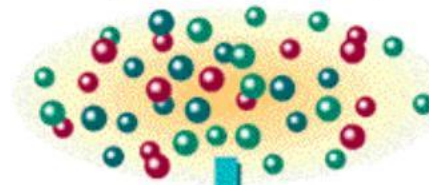
- Other Variables
 - Extraneous
 - Confounding
- Experimental Group
- Control Group
- Random Assignment (*Random Sampling?*)
 - VERY IMPORTANT

Random Assignment: Equivalent Groups

Random sampling:

Pick people from
the population

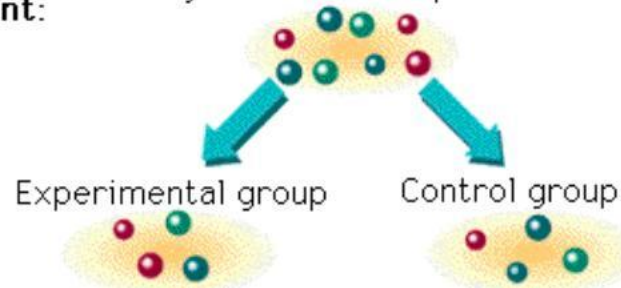
The population:
A large number of people



A representative sample:
Subjects for the experiment

Random assignment:

Assign subjects
to groups



Elements for Inferring Causation

- Random assignment
 - Equivalent groups
- Control of all other factors
 - Operational definitions
- Temporally ordered
 - I.V. → D.V.

Limitations of Experiments

- Sampling bias
 - Limits generalizability
 - Experimenter Bias
 - Placebo Effects
 - Demand Characteristics

- Lab to Life?

Statistics

- Why?
- Central Tendency
 - mean
 - median
 - mode
- Variability
- Inferential Statistics
- Statistical Significance

Brief History of Ethics

- The Nuremberg Code
 - 1948
- The Tuskegee Experiment
 - 1932 – 1972
 - US Public Health Service
- Development of APA Code of Ethics
 - first published in 1953

Ethics – Humans in Research

Designing an Ethical Study

- obtaining informed consent
 - deception
- allowing subjects to withdraw
- data confidentiality
- debriefing subjects
 - dehoaxing
 - desensitizing

Ethics

- Animals in Research
 - protection through regulations
- what have we learned from animals?
 - Examples: - Roger Sperry's work on split-brain
 - Biofeedback
 - Schanberg's work with newborn rats

Summary

- Question □ hypothesis (prediction)
- Choose a research method, design the study
 - Descriptive?
 - Correlational/Non-experimental?
 - Experimental?
- Need to consider
 - IV, DV □ operational definitions
 - Limitations of chosen method
 - Ethics

Focus questions:

- What is the scientific method?
- Why can theories be proven wrong but not right?
- What makes human beings especially difficult to study?
- What are the properties of a good operational definition?

- How do people respond when they know they're being observed?
- Why is it important for subjects to be "blind"?
- Why is it important for experimenters to be "blind"?
- What are the two major kinds of descriptive statistics?
- What are two measures of variability?
- How can we tell if two variables are correlated?

- What's the difference between a positive and a negative correlation?
- How can correlations be measured?
- What does it mean for a correlation to be strong?
- Why can't we use natural correlations to infer causality?
- What is third-variable correlation?

- What are the main features of an experiment?
- Why can't we allow people to select the condition of the experiment in which they will participate?
- Why is random assignment so useful and important?
- What is the difference between a population and a sample?
- What is good about random sampling?
- What are the three features of ethical research?
- What are psychologists expected to do when they report the results of their research?