

Chapter 2

The Research Enterprise in Psychology

Overview of Chapter 2

- Scientific approach
- Descriptive/correlational research
- Experimental design
- Descriptive and inferential statistics
- Research issues and ethics

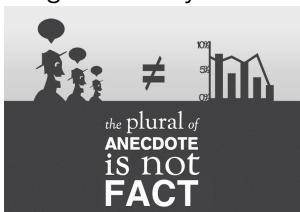
The Research Enterprise in Psychology



- Psychology is empirical
 - Could we use common sense instead?
- Opposites attract vs. Birds of a feather flock together
- Clothes make the man vs. You cannot judge a book by its cover

Why use the scientific method?

- Psychologists use the scientific approach
 - Assume events are governed by lawful order
 - Qualitative vs. quantitative research



Goals of the scientific enterprise

- 1) Measurement and Description
 - 2) Understanding and Prediction
 - 3) Application and Control

1) Measurement and Description

- Develop techniques to measure and describe behaviour
 - Examples
 - Emotion
 - Memory



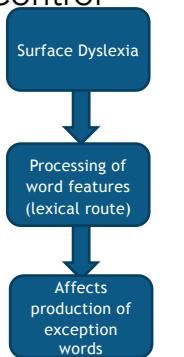
2) Understand and Predict

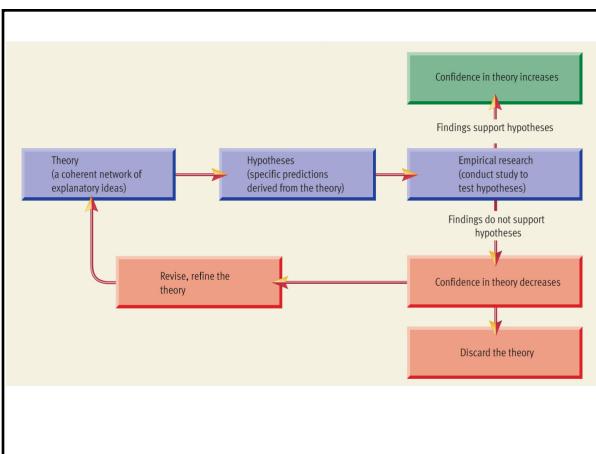
- **Hypothesis** = tentative statement about the relationship between two or more variables
- **Variables** = measurable conditions, events, or characteristics that are controlled or observed in a study



3) Application and Control

- Base research – building a foundation for other research
- **Theory** = system of interrelated ideas used to explain a set of observations





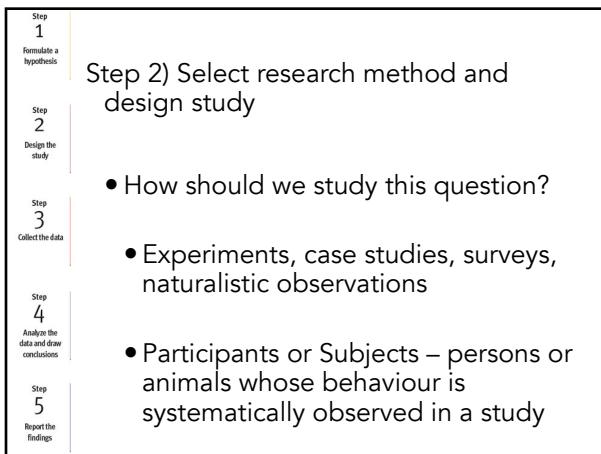
Can Fear Increase Sexual Attraction?

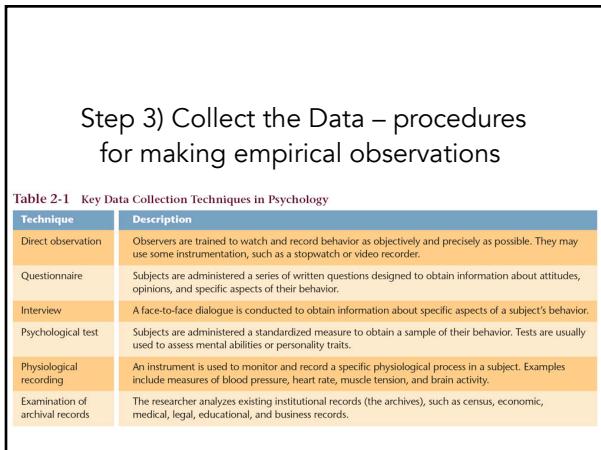
- Dutton & Aron (1974)
- Crossed one of two bridges
 - Experimental group – suspension bridge
 - Control group – low, solid, not fear-evoking
- Approached by either male or female confederate

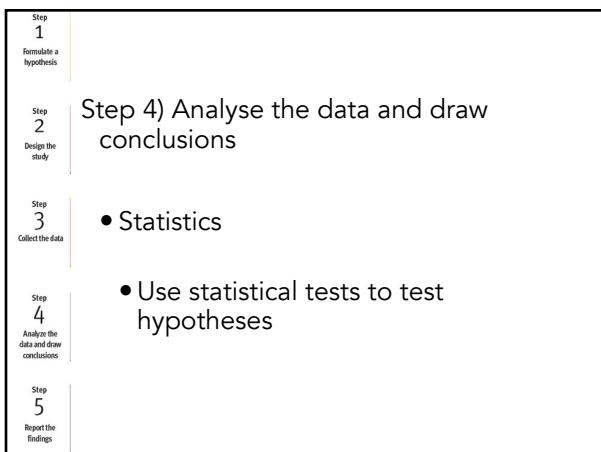


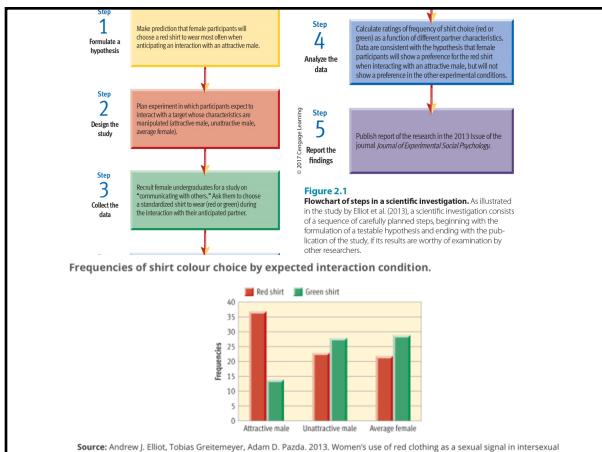
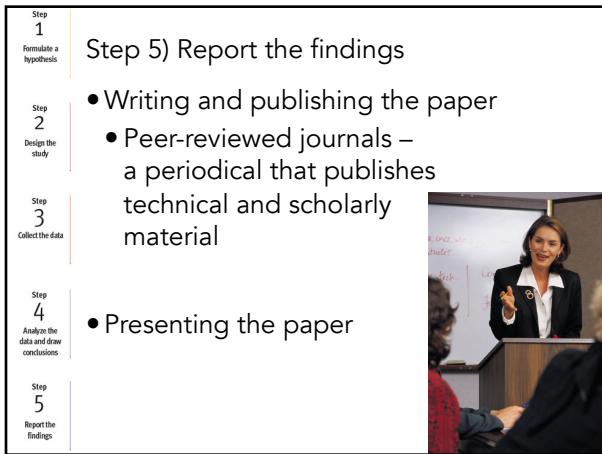
<http://www.tourismvancouver.com/listings/capilano-suspension-bridge-park/17604/>

Step 1 Formulate a hypothesis Step 2 Design the study Step 3 Collect the data Step 4 Analyze the data and draw conclusions Step 5 Report the findings	<h3>Steps in a scientific investigation</h3> <p>Step 1) Formulate a testable hypothesis</p> <ul style="list-style-type: none"> • Must be precise and variables clearly defined • Operational definition: describes the actions or operations that will be used to measure or control a variable
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Advantages of Scientific Method

- Scientific approach gives
 - Clarity and precision
 - Supposed to be relatively intolerant to errors
 - BUT – replication crisis

Research Methods

- Research methods = approaches to observe, measure, manipulate, and control variables in empirical studies
 - Experimental
 - Descriptive/correlational

Descriptive/correlational research

- Used when a researcher cannot manipulate the variables under study
- Describe patterns of behaviour and discover relationships between variables
 - BUT cannot imply causation

1) Naturalistic observation

- Observe without intervening



- Levine and Norenzayan (1999)



- Wansink and van Ittersum (2003)

- Observe without intervening
 - Pro
 - *Less artificial*
 - Con
 - *Difficult to be unobtrusive*

2) Case studies



- Investigation of one subject
 - Patterns across case studies
 - Psychological disorders
- Pro
 - *Compelling*
- Con
 - *Might not be representative*

3) Surveys



- Questionnaires gathering information
 - Background and behaviour
 - Polls
- Pros and cons

- Pros
 - *Difficult to observe behaviours*
 - *Lots of data*

- Cons
 - *Depends on self-report*
 - *Social desirability bias*
 - *Response set*
 - *Halo effect*
 - *Poorly worded questions*



Descriptive/ correlational research

- We can ask questions not possible with experiments

- No cause and effect
 - The link between aggressiveness and violent television?



Experimental research



- **Experiment** = Manipulate a variable to observe changes in a second variable
 - Detection of cause and effect relationships

- **Independent variable (IV)** = variable that is manipulated or controlled
- **Dependent variable (DV)** = variable that is measured and thought to be affected by IV
 - *How does X affect Y?*

- **Experimental group** – receives special treatment with respect to IV
- **Control group** – does not receive special treatment with respect to IV

- **Extraneous variables** = Differences between groups that could contaminate results
- Note: Groups cannot be identical

- **Confound** - Occurs when variables are linked together, so difficult to separate their specific effects
- Example: Testing two reading enhancement programs

Variations in Experimental Design

- Single group – more than one condition (within subjects design)
- More than one dependent variable
- More than one independent variable
 - Interactions between variables

The diagram illustrates four experimental conditions arranged in a 2x2 grid. The vertical axis is labeled 'Room temperature' with 'Normal' at the top and 'High' at the bottom. The horizontal axis is labeled 'Distracting music' with 'Present' on the left and 'Absent' on the right.
 - Top-left (Normal, Present): A man sits at a desk with a laptop, with a speaker icon above him labeled 'Present'.
 - Top-right (Normal, Absent): A woman sits at a desk with a laptop, with a speaker icon above her labeled 'Absent'.
 - Bottom-left (High, Present): A woman sits at a desk with a laptop, with a speaker icon above her labeled 'Present'. Wavy lines from the speaker indicate sound.
 - Bottom-right (High, Absent): A man sits at a desk with a laptop, with a speaker icon above him labeled 'Absent'.

Experimental research

- Advantages
 - Can draw cause and effect conclusions
 - Disadvantages
 - Artificial nature
 - Ethical limitations
 - Practical limitations (Unable to manipulate some lvs)

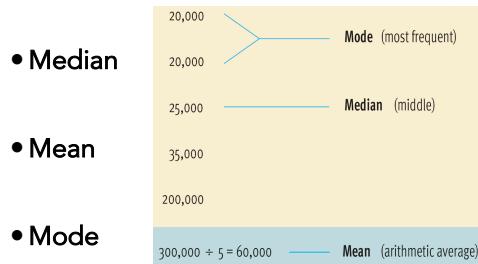
Statistics and research

- Statistics – using mathematics to organise, summarise, and interpret data
 - Everyday
 - Descriptive statistics
 - Inferential statistics



Descriptive statistics

- Measures of **central tendency** = typical or average score in a distribution



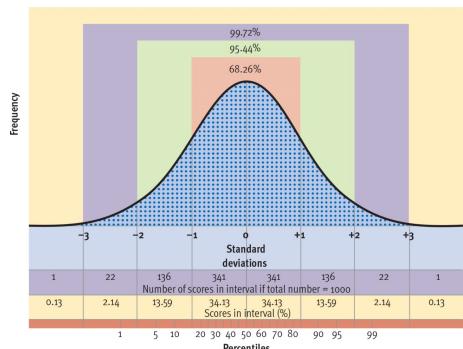
- **Variability** = how much scores vary from each other and from the mean

Speed (kilometres per hour)	
Set A Perfection Boulevard	Set B Wild Street
35	21
34	37
33	50
37	28
38	42
40	37
36	39
33	25
34	23
30	48
35	35
2.87	10.39

Range = 30 to 40 Range = 21 to 50

Mean Standard deviation

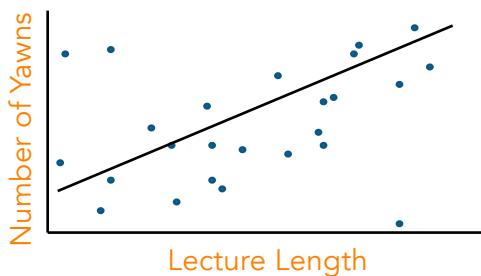
- **Standard deviation** indexes amount of variability



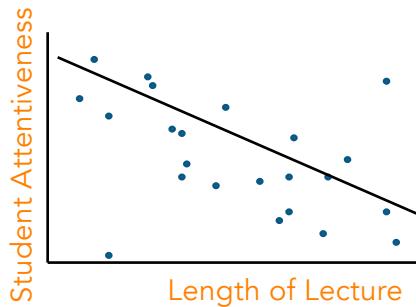
The normal distribution – a symmetrical, bell-shaped curve

- **Correlation** exists when two variables are related
- **Correlation coefficient** = numerical index of degree of relationship between 2 variables
 - Varies from 0 to 1 (STRENGTH)
 - Positive or Negative (DIRECTION)

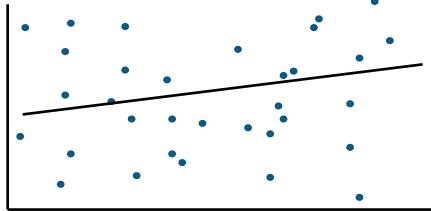
- Positive correlation
- Co-vary in same direction



- Negative correlation
- Co-vary in opposite directions



- Weak (or no) relationship



Examples of correlations

Consider:
Positive or negative correlation?
How should we interpret these results?

Minutes Exercise

Times Your Heart Was Broken

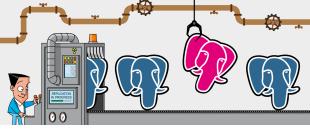
Correlation – Prediction, not Causation

- High school GPA correlated with first year college GPA
- 2 variables might be highly correlated, but not causally related
 - Foot size and vocabulary

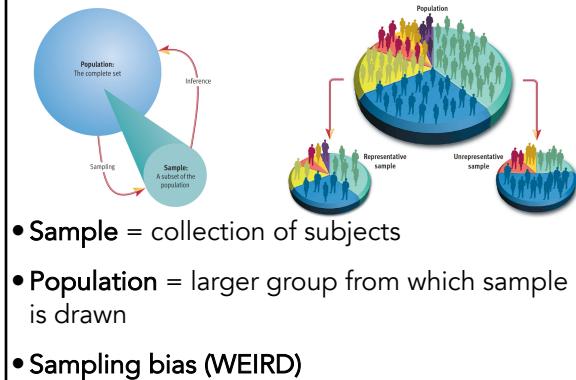
Inferential statistics

- Interpret data and draw conclusions
- Testing the hypothesis: Are the results due to chance?
- **Statistical significance** – probability that observed results are due to chance is very low (less than 5 chances in 100 = .05 level)

Evaluating Research

- Replication – can the results be duplicated? 
- Meta-analysis = a study of many other studies
- Combines the statistical results of many studies asking the same questions

Sample Representativeness



Experimenter Bias

- Expectations influence results
 - Rosenthal and Fode (1973)
 - Double-blind procedure



- **Placebo effects** – a participant's expectations lead them to experience a positive change though they receive empty, or ineffectual treatment



- Nocebo effects

Ethics in Psychological Research



- The question of Deception – is it worth it?
 - Stanley Milgram's obedience study

Ethics in Psychological Research

- The question of Animal Research
 - Led CPA and APA to develop ethical standards – human and animal subjects must be treated with dignity

