2.1 How We Think

Early History of How we Think

- Believed behaviour is based on rationalism (logic/reasoning)

Ebbinghaus: thought mind relied on rationalism

- **Rationalism:** Reason (not experience) is the key source to knowledge

Aristotle: Human thoughts, perceptions and emotions are product of heart rather than brain

- Heart is the center of our body
- Secondary organs: brain, lungs that existed to cool the blood and maintain a rational state of the mind

Flaw of Rationalism: How we think we act is different from how we behave

EX: Study shows 53% of people fail to notice a person changed midway through their conversation

EX: The door study: Person asking for directions is replaced by someone else. >50% of people giving directions did not notice → CHANGE BLINDNESS

2.2 the Scientific Method

Scientific Theories

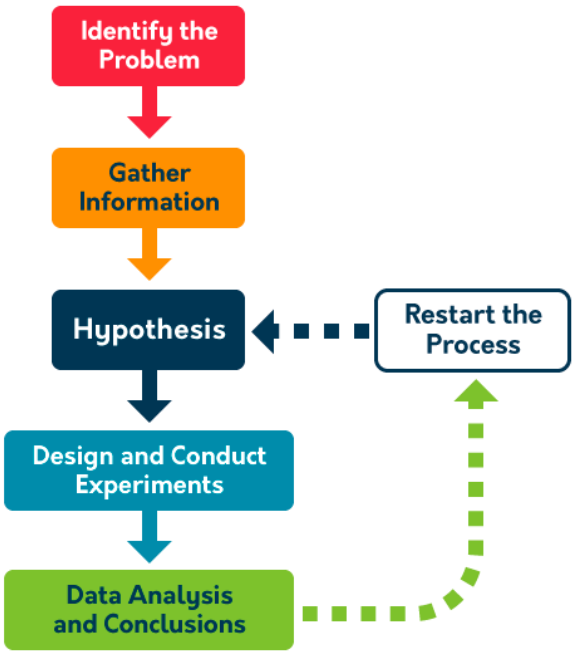
Researchers use experiment and observations to form scientific theories

Scientific theory: Rational explanations to describe/predict future behaviour

Scientific Method

1) Identify Problem
2) Gather info
    a) Compare previous scientific studies
3) Generate hypothesis
    a) Prediction of study outcome
4) Design and conduct experiment
    a) Observational/experimental
5) Analyze data and formulate conclusions
    a) Statistical analysis
6) Restart the process
    a) To build and strengthen evidence

Note: potential of bias exists at each step



EX: Prof and student-preparedness

1) *Problem:* Professor wants more students to come to class prepared with pre-class activities. The prof thinks students will be more prepared if she gives them more motivation
2) *Gathering info:* Review existing theories of behaviour.
    a) Database search of scientific articles
    b) Prof. finds a study indicating that 70-80% of students do not prepare for class due to not seeing link between pre-class readings and grades
    c) If reading is made part of student assessment = more motivation for completion
3) *Hypothesis:* Prof hypothesizes that students who complete graded assessment will be more prepared for class
4) *Design/conduct experiment:* Compare how assigning grades will impact likelihood of assignment completion
    a) Know: Number of readings students complete usually
    b) Group 1: pre-class quiz for course credit
    c) Group 2: No course credit for pre-class quiz
    d) Testing: How adding assessment will change reading completion
5) *Analyze data and formulate conclusions:* Make conclusions on data available
    a) Students who complete graded assessments = more prepared for class
    b) NOTE: conclusion does not *prove hypothesis.* We only find *supporting evidence not causation.* Always a possibility to refute.
6) *Restart*
    a) replicate (same process different subjects)
    b) Extend to other methods to motivate student behaviour

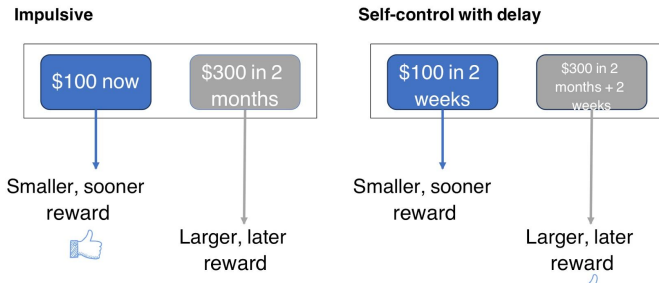
EX: Healthier food purchasing

1) Increasing healthful food shopping
2) Scientific literature: Low-income women want to buy more fruits/vegetables but struggle with prep time for dinner
3) Hypothesis: If grocery stores increase pre-prepared fruits and vegetables, consumption will increase
4) 2 groups of parents → digital shopping carts
    a) Group 1: All raw vegetables
    b) Group 2: Pre-cut and cooked vegetables
5) Examine whether preparing vegetables increased the rate of which parents chose to purchase vegetables compared to raw, unprepared options.

EX: Self-control marshmallow study - Walter Mitchell

1) People often behave more impulsive and engage in risky behaviour
2) Scientific research for impulsivity, self-control and delay discounting
3) Hypothesis: People who show self-control will choose the delayed gratification
4) Testing:

Design and Conduct Experiment



2.3 Descriptive Methods

Descriptive methods: Ways to capture or record a group to identify "what is", not "why"

- Naturalistic obs, case studies, participant obs, surveys

1. Naturalistic observation: observation of behaviour in natural environment

<u>Becoming a member of a group</u>

- Researcher interacts with population of interest
- Allows for research insights from participants' perspective
- May be subject to bias
- Observations may not be repeatable
- EX: Jane Goodall, Bronislaw Malinowski with Trobriand Island Tribe

EX: trying to observe animals in zoo vs natural habitat

- Lack of manipulation of environment
- Benefit: Help us generate new ideas of observed phenomenon
- Only way to observe behaviour ethically in extreme conditions (EX: natural disasters, inciting riot)
- *Ecologically valid:* Observations are a product of genuine reactions
- *Hawthorne effect:* Animal reactivity changes as they realise they are being observed
    - Hawthorne works factory: Wanted people to be more productive
        - Conducted several experiments to increase employee productivity (EX: amount of lighting in work env)
    - Reality: People were acting more productive after knowing they were being watched
- Disadvantages: Lack control over environment and factors impacting behaviour
    - EX: wallet being dropped → why circumstances made the person keep it?
    - Weakens conclusion drawn
    - Difficult to replicate experiment

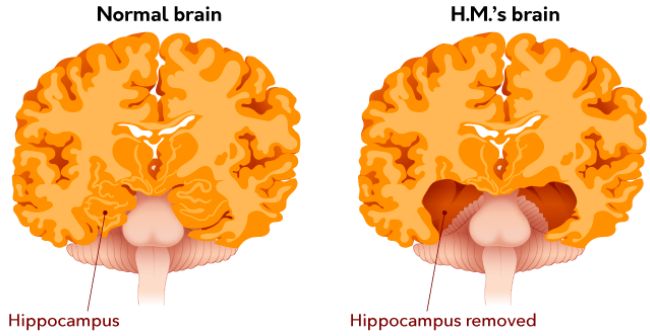
- Researcher bias
    - Different observations from same event
    - Researchers must share results for *Interrater reliability*

2. Case studies: in-depth analysis of unique circumstances

- Popular in medicine: clinicians observed unusual patient and attempt to investigate patient's condition to provide broader understanding
- Difficulty: generalize findings
    - Case studies focus on 1 person/group/event
    - 1 person's experience (anecdote) cannot be generalized to a population

EX: Phineas Gage

- EX: Henry Molaison in clinical neuroscience
    - seizures became progressively worse after hitting his head
    - By 20, he could no longer live a normal life
    - Bilateral ablation (surgical removal) of his ventral medial temporal lobes (hippocampus & entorhinal cortex) which was causing the seizures
    - Helped with seizures, but he lost his ability to form new memories
    - This case study allowed scientists to explore role of hippocampus in identification of memory types → episodic, semantic & procedural memory



Surveys: Efficient way to collect info and describe large patterns of behaviour

- Quick way to know state of opinions, perspectives and experiences
- EX: online surveys, mailed questionnaires, in-person interviews, phone interviews
- Surveys administered to smaller subset of population → **sample**
    - Sample must represent population
    - EX: course exam only given to top students vs struggling students
    - **Sampling error or bias:** Sample differs from population in meaningful ways, results cannot be applied to population
- **Response/return rate:** varies depending on size and motivation
    - Avg 30-50%
    - Not all participants respond genuinely

<u>Potential biases</u>

- **Wording effects:** Influence of language on people's response to survey questions

    - EX: British Gallup poll
        - ask ppl if Britain's nuclear weapons made them feel *safe* → 40% ppl agreed
        - ask ppl if Britain's nuclear weapons made them feel *safer* → 50% agreed
- **Response bias:** tendency for ppl to answer questions the way they think they are expected to
    - **Acquiescent response bias:** Tendency for ppl to agree with most items regardless of their opinion
    - **Socially desirable bias:** Respond in ways they think acceptable by others
        - EX: hesitate to admit illegal or immoral behaviour
- **Better-than-average effect (illusory superiority):** tendency to describe our own behaviour
    - EX: 94% of professors rated themselves above average to their peers
- **Volunteer bias:** Only motivated part of population participates in a survey
    - EX: Kensey sexual behaviour survey → people who volunteer did not represent entire American population

2.4 Research Ethics for Human Participants

- **Research ethics:** principles researchers follow in a research study

Tuskegee Syphilis Study

- Syphilus: contagious disease spread through sexual contact
- >600 African-Americans participated in a study with promise of free meals, medical treatment and burial insurance
    - Researchers mislead participants of actual purpose of study
    - Many deaths due to the injection of syphilis

Ethical Principles of Psychologists

1) **Beneficence and non-maleficence**
    a) Research strives to do good (beneficence) and not harm (maleficence) participants
    b) Protection of participant > pursuit of new knowledge
2) **Fidelity and Responsibility**
    a) Maintain trust
    b) Researchers need to be honest to participants
    c) Psychologists have responsibility to call-out and uphold moral standards
3) **Integrity**
    a) Engage in accurate, honest and non-biased practices
    b) Strive to communicate data accurately (no fabrication or falsification)
4) **Justice**
    a) Establish equality in research process
    b) Not excluding certain groups for reasons unrelated to study
    c) Inclusion criterion: participant attribute essential to research question (EX: age)

    d) **Exclusion criteria:** attributes that prevent participation (EX: adults in child study)
    e) **Eligibility criteria:** characteristics shared by all participants
5) **Respect for Rights and Dignity**
    a) Protect participants rights, privacy and welfare
    b) Data is confidential and anonymous
    c) Participants are not coerced into participating

<u>The Practice of Ethical Research</u>

- In the USA all studies must be approved by the IRB (Institutional Review Board).
- Ensures that
    - Proposed study will use sound research design
    - Risks associated with participation are minimized
    - Benefits outweigh risks
    - Participants can make an informed decision to participate in the study, and they can withdraw at any time
    - Safegaurds available to protect well-being of participants
    - All data will be kept confidential
- Researchers must obtain **informed consent**
    - Researchers must explain the purpose and the experimental procedures, rights of participants, etc.
    - Participants give permission to participate when all details and risks of study participation are known
    - EX: a patient with a history of anxiety would not want to take part in a study producing stress

CASE STUDY: Facebook Emotional Contagion Experiment

- **Emotional contagion:** Emotional states can be transferred from one person to another
- Researcher's changed the positive and negative information in 689,000 user's feeds
    - People who saw more positive events were more likely to create new positive posts of their own
- Participants were not given option to choose to participate, nor any details about confidentiality
    - Lack of informed consent

<u>Special Ethical considerations</u>

- **Vulnerable populations:** individuals that cannot provide informed consent

1) **Decision impairment:** Potential participant has limited capacity to provide informed consent.
    a) EX: children, mentally disabled
    b) Cannot understand their rights as a participants or the risks associated with participation
2) **Situational vulnerability**: Freedom of choice is compromised due to influence from another source.

a) EX: military personnel or prisoners may feel obligated to participate in fear of being punished
b) EX: people in economically disadvantaged situations may feel inclined to participate due to benefits like money or medical care

Respecting principle of justice: No person should be denied the benefits of participating in a research study

Deception

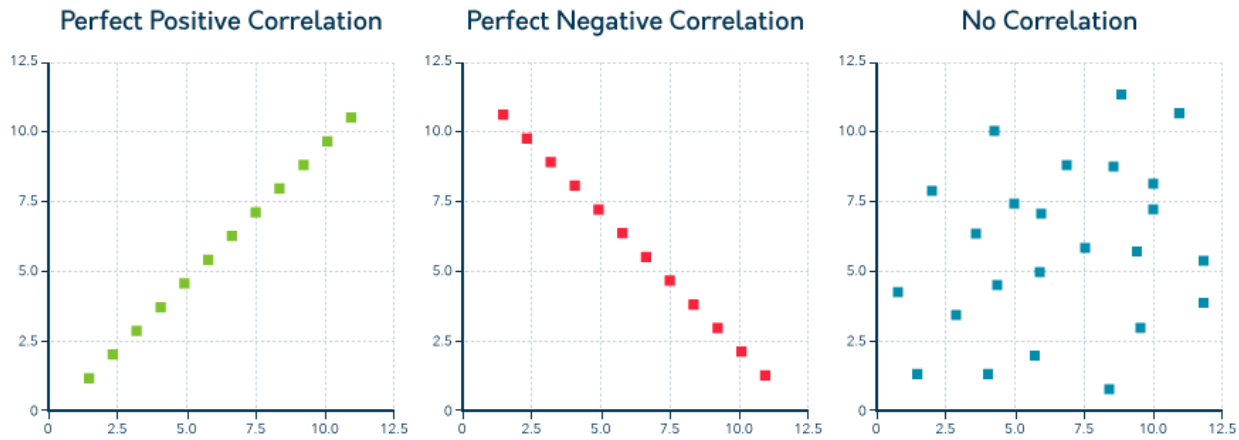
- Some researchers seek IRB approval to engage in participant **deception:** withholding information about purpose and procedure of study
- Informing patients of real research intent may influence their outcome
- Must meet 4 criteria
    - Researches poses no more than minimal risks
    - Deception does not affect the wellbeing of participants
    - Justification that using deception is the only way to address the study
    - **Debriefing**: After study is over, participants are provided with info about the deception and how participation contributes to research question.

Correlation

- Quantifies relationship by measuring strength between 2 variables
- Scatter Plot can be used to represent data

Direction of correlation

- Positively correlated: variables change in the same direction
    - EX; height and weight
- Negative correlation: an increase in one variable leads to a decrease in another
    - EX: using computers during lectures can hurt grades because you can get distracted
- Zero correlation: no apparent relationship
    - EX: vaccination in early life and the development of autism



Strength of correlation

- Correlation coefficient: +/- signs indicate direction, value represents magnitude
- Stronger correlation = closer to 1 = points closer to line of best fit

Correlation is not causation

- **Confounding variable:** a variable that can affect one or both variables measuring, inclufencing correlation coefficient
    - EX: eating ice cream and homicide rates are positively correlated with temperature

Hypothesis

- " If..then statement"
- Consistent with prior observations / existing theory
- Simple
- Specific
- Testable
- Falsifiable

Ex: playing violent video games makes people more aggressive

Operational definition: how researcher decides to measure a variable

Good hypothesis: *People that play violent video games will hit, kick, bite, or push others more frequently than people who do not play violent video games.*

Experimental Variables

- Independent variable: manupulated by experimenter and must contain 2 levels
    - EX: 2 groups play violent video games, video game type = I.V.
- Dependent variable: Experimenter counts or measures
    - EX: aggressive behaviour
- Extraneous variables/confounding: variables not focus of the study, may influence outcome if not controlled
    - EX: gender of people playing video games

Sample Selection

- Simple random sample: every individual has equal chance of participating
    - Advantage: approximates larger population
- Stratified random sample: Divides pop. by subgroups and randomly takes samples in proportion to population of interest
    - More careful, useful when there are identifiable subgroups
    - EX: 100 male and female → separate by gender and take equal number from each
- Non-random sample: not all individuals are equally likely to participate
    - **Convenience sample:** groups of individuals only selected due to pre-existing condition, or easy access to participate

Experimental/control groups

- Ex: testing psychological impact of drug
- Experimental group: group that receives treatment of drug
- controlled group: does not receive drug, treated same way
- **Placebo effect:** Power of mind to make us think something is having an effect
    - EX: white pill < blue pill < capsule < needle (most effective)
    - Placebo is felt even when you know its fake
    - *Placebo group:* using dummy treatments to control for expectations
        - EX: give a pill that contains no medicine or inject salt water

Central Tendency

- **Descriptive statistics:** mean, median mode
    - Describe data in the simplest way
    - Describing central tendency
    - Mean: impacted by outliers
- **inferential statistics:** inferences about causal relationship of variables
- Variability: measure the spread of data
- **Standard deviation:** most common method to explain deviation
- **Variance:** average of standard deviation, distance of each value from the mean