PSYC1024 – Clinical Perspectives on Anxiety, Mood and Stress

LECTURE 1 – WHAT IS SCIENCE?

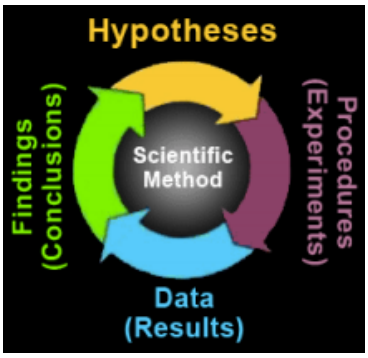
SCIENCE is a standardised approach of collecting and gathering information and answering simple and complex questions in a manner such that errors and biases are minimised

- It is a specific process
- It is a tool, a method to help us to understand the world and ourselves
- It minimises bias and error, but does not eradicate it, (it is a cultural affair).
- Science relies on observable data – to test out theories. Involves using the five senses.
- Hard sciences – natural sciences (more certain, less complex). Such as, biology, physics, mathematics and neuroscience.
- Soft sciences – social sciences (less certain, more complex). Such as, social psychology, clinical psychology, social sciences and economics.

WHAT DOES IT MEAN TO OPERATIONALISE SOMETHING?

- Some things are easier to define than others. The words harder to define are abstracts (e.g. love, depression, sadness) and the words that are easier to define are known as concrete terms.
- When we try to operationalise a concrete term, this means we are coming up with a definition that allows us to observe it, to measure I, to know exactly what it is. (E.g. height- the number of centimetres from the top to bottom of an object). We give it a very strict and specific definition.
- The purpose of these definitions is to allow us to measure a certain concept. That is what it means to operationalise something – to derive a system whereby objective tangible measurement is possible.
- Let us think again about how we might operationalise the abstract concepts mentioned before – that is, how would you design a system to measure the concepts in an objective and tangible manner?
- LOVE – The number and variety of ways to operationalise (measure) love is infinite.
    - This is because the concept is abstract. It only exists in so much as we have labelled it.
    - This does not mean we should not try to define it, measure it, study it – but it does mean there will be disagreement over what we accept as a good operationalisation of it – and the definition may change over time
    - STERNBERGER TRIANGULAR LOVE SCALE:
        - Love (abstract concept) has been operationalised as comprising three separate abstract concepts (Intimacy, Passion and Commitment).
        - Each of these is measured by a score on the questionnaire. The higher the score on the questionnaire the more love an individual is theorised to possess.
        - Here we can see that operationalisation can be driven largely by theory – this theory suggests that love is multifaceted.

PROCESS



1. Theory/ hypotheses (background)
2. Testing hypothesis (conduct experiment) / collecting data (experiments)
3. Analysing the data (checking results)
4. Interpreting the results
5. Re-formulating the hypothesis/ question

THEORY

- A theory is a set of principles that explains and predict certain phenomena
- A theory is constantly subject to testing, modification, and refutation as new evidence and ideas emerge
- To be "accepted" a theory must be well- substantiated (i.e. multiple experiments supporting the theory).
  - E.g. Global Warming:
    - Great Barrier reef change
    - Measurement of sea temperature
    - Melting ice caps
    - Rising sea levels
    - Measuring carbon dioxide in the air
  - These are different experiments whose evidence supports the theory of global warming. The more evidence that support a certain theory- the more accepted the theory becomes.

E.g. Attachment Theory

- Balby
  developed a theory of attachment that pertained to primates. Infants relied on a significant caregiver to provide them with protection as they grew up in their early years and they couldn't protect themselves.
- In most instances, this is the parent of the infant. He suggested that the behaviour of the infant and the behaviour of the parent could lead over time to the development of a certain type of attachment in the child.
- He suggested that there were 4 different types of attachments that could be formed in the infant:
  1. Secure attachment- type of attachment that is the most stable – associated with low levels of anxiety and low levels of avoidance of new situations in the infant.
  2. Resistant attachment
  3. Avoidant attachment
  4. Disorganised attachment
- Balby developed this theory which made several key predictions about the behaviour of infants which we might expect to observe.
- This theory has been supported over many decades, in studies with primates. M
- any studies have been carried out which show attachment which is a genuine phenomenon which seems to occur in primates.
- There have been developments of fine-tuned measurements of parent-child interactions and attachments, using what we call A Strange Situation test:
  - A mother and child will play together in a room.

    - The mother will leave
    - new person will enter the room and they'll assess how the child reacts in that situation and how the child reacts when the mother re-enters the room.
    - We can evaluate the type of attachment the child has.
    - Has a strong predictive value of how that child will develop over time.
- There has been development of the evidence based on experimentation on the attachment theory in different contexts.
- People have, more recently, try to examine where in the brain these attachments are formed.
- This gives an idea that when individuals develop a specific theory what occurs is multiple different experiments in multiple different disciplines in psychology which seek to make predictions in the behaviour of animals, infants and adults in various contexts and methodologies, in different experimental paradigms.
- One theory can be used to predict an infinite number of phenomena occurring.
- A theory will come to be accepted if over a long period of time, many experiments come to support it. This doesn't mean that a theory will always be accepted.

WHAT IS A HYPOTHESIS?

- A hypothesis is a prediction based on a theory which the scientist is testing.
- A hypothesis is making a prediction that can be tested in the real world. The behaviour or outcome we are interested in must be measureable
- A hypothesis is not a question, it is a statement.
- All hypotheses must be ***testable, replicable and falsifiable*** (able to be shown incorrect)
    - **Falsifiability** is the possibility that an assertion can be shown false by an observation or experiment.
- If we think a theory is correct there are going to be potentially infinite numbers of ways to demonstrate evidence for it
- E.g. THEORY: The Earth revolves around the sun
  HYPTHOTHESIS: The sun will rise in the East every morning
- Why did various parts of the brain evolve in different parts of our development and what might those parts of the brain be implicated in. Do they influence our feelings, behaviour or thoughts? Is each specific part important for one process or do we require the whole entire brain to work as one in order to achieve thought, movement, behaviour and feeling.

TESTING THE HYPOTHESIS

What are the main types of experiments?

- True Experiment
- Correlational Study
- Quasi experimental Study
- Case Study

TRUE EXPERIEMENT

- These are conducted to test the theory and more specifically the hypothesis which are based on the theory and previous results.
- Experiments require variables:

- **Independent Variable:** A variable that the experimenter manipulates to examine its impact on the measured variable (i.e. the dependent variable)
- **Dependent Variable:** The measures outcome of a study, or the response of the subjects I the study
- **Confounding Variables:** Variables that have unwanted influence on the outcome of an experiment. One way to reduces these confounding variables I through random selection.

- **Random Selection:** Each subject of the sample has an equal likelihood of being chosen for the experimental group. Good source of confound if not controlled for. Good control for confounds. E.g. p utting names in a hat and drawing them out

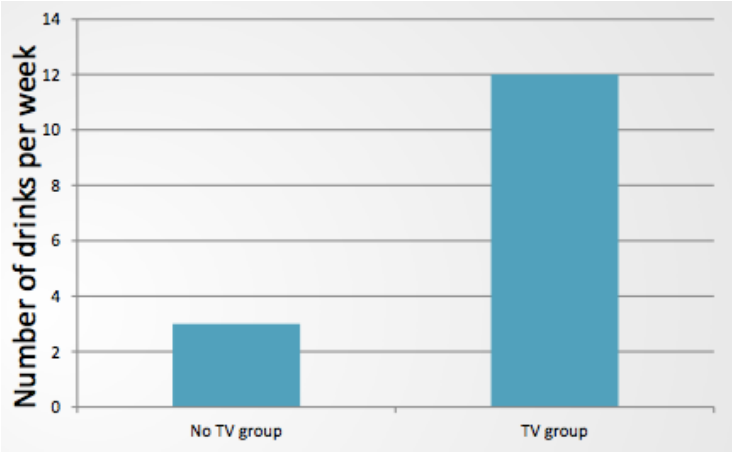
Example:
Theory: Watching television makes you an alcoholic
Hypothesis: Watching 4 hours of TV per day will make you drink more alcoholic drinks than if you watch no TV.

- This is a hypothesis because:
  - ➢ It is a prediction in a specific direction
  - ➢ It is measureable, replicable and falsifiable

Independent Variable: Amount of TV watched

- Condition One: 4 hours of TV per day in a week
- Condition Two: no TV in the week
  - ➢ This is a Control Variable. A control variable allows us to confer causation to a greater extent. We can infer the impact of watching TV because, all things being equal, we know that the impact of not watching TV is (we can compare)

Dependent Variable: Amount of alcohol consumed before and after the experiment manipulation. Measured: number of standard drinks per day. (Needs to be operationalised to allow for other researchers to replicate the experiment)
Example Data:



CORRELATIONAL STUDY
A correlation study is one where researchers try to show relationship (or correlation) between two variables. There are two important types of correlation: Positive and negative.

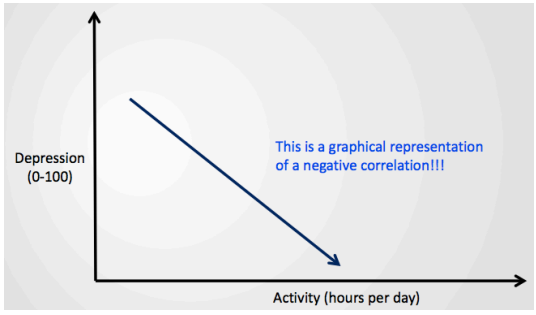
- Only have dependent variables
- Only observing – not manipulating anything

- If one measure increases so does another (***Positive Correlation***). Positive associations can be stronger and weaker. E.g. Time spent awake and tiredness levels.
- If one measure increases and the other decreases (***Negative Correlation***). Negative associations may be stronger or weaker. E.g. time spent asleep and tiredness levels
- ***Perfect Positive Correlation:*** Means that an increase in one event is always matched by an equal increase in a second event. This type of correlation is almost never observed in research settings.
- ***Zero Correlation:*** is when there is no relationship between the occurrence of one event and the occurrence of a second event. This type of correlation is often observed in research.

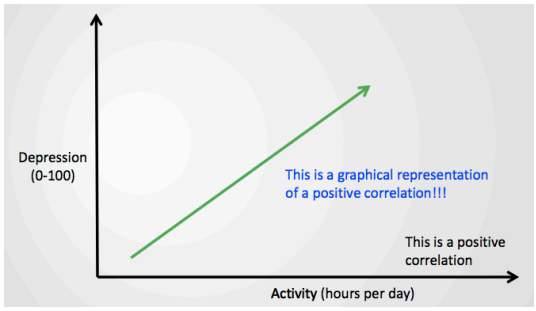
Example:
Theory: Being inactive causes depression
Hypothesis: the fewer hours you spend per week being active the greater your depression will be
Dependent Variable: we measure variables and see if they are correlated.

- We will measure how many hours per day people are not active (behaviour). Operationalise = number of hours
- We will measure how depressed people are (self-report questionnaire). Operationalise = Score (0-100) on self-report questionnaire

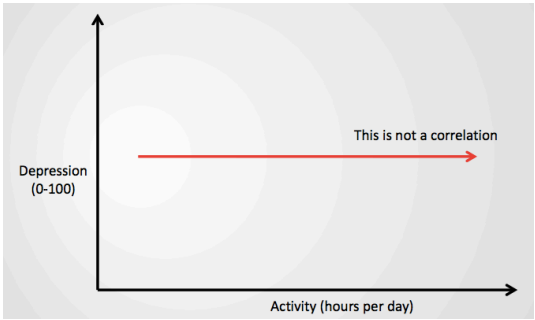
Negative Correlation: Depression and Activity
As the amount of depression decreases the amount of activity increases; OR as the amount of activity increases, depression increases (negative correlation).



Positive Correlation: Depression and Activity
As the amount of depression increases the amount of activity increases (a positive correlation) – This finding does not support the hypothesis – We may want to reformulate our theory.



No correlation:
Depression remains the same no matter how much activity people engage in (no correlation) – Reformulate theory.



Factors Impacting Error and Bias in Correlational Research:
The fewer participants we have (in any type of study) the less valid our study findings become. The less likely it is we will observe an effect, the less likely it is our findings are representative of what might be observed in the 'real world'

CORRELATION DOES NOT EQUAL CAUSATION

- A number of different explanations for why a correlation is occurring: perhaps a third variable influences the correlation
- Variable A causes variable B. (Perhaps Variable C causes both A and B)

CORRELATION DOES NOT EQUAL CAUSATION

- Perhaps we are wrong about implying the direction of causality
- Variable A causes B to occur OR perhaps B causes A
- Example: A causes B: Having lots of books causes children to be good readers
    - C causes A and B (Intelligent parents cause children to be good readers via genetics AND the parents buy many books)
    - B causes A (Children who are good readers have more books because they ask for them – because they are already good readers)

Note: True experiments allow for greater confidence in interpretations of the data with regard to causality

QUASI-EXPERIEMENTAL STUDY

- These are studies in which a variable of interest, the independent variable, is manipulated by the experimenter.
- Research where subjects are selected based on a pre-existing condition. E.g. depression, anxiety. We cannot give these people conditions for ethical reasons.
- However, we still need to study the effects of various manipulation on individuals with these disorders. In order to understand the causes and maintaining factors of the disorder.
- Quasi experimental studies are different from true experiments in that there is no random selection of experiments- we are producing a confounding variable.
- Many experiments in abnormal psychology are quasi experimental
- **Quasi Experiments** still involve random allocation to experimental conditions as much as possible for confounding variables – but not random selection.
- Quasi Experimental studies are like true experiments without random selection (restricted inferences to wider population)
- What do you need to do to accommodate for the loss of random selection?
    - Measure potential confounding variables (e.g., age, sex, intelligence, socio-economic status, health). There are a potential infinite number of confounds, making this a difficult process
- Identical twin studies allow for a quasi-experimental investigation of the role of nature and nurture on various psychological processes, abnormal behaviours, mental illnesses. These studies are quasi-experimental because the twins are selected (not at random)

CASE STUDIES

- Investigate one individual case and write a report on it
- **Advantages:**
  - You get a lot of information
  - Information is often both qualitative (not easily quantified) and quantitative (observable and measurable)
    - E.g., tell me about your experience as a refugee
- **Disadvantages:**
  - Is it representative or just a one off finding?
  - Considered less scientific (not relying upon sound statistical principles)

WHAT FACTORS RESULT IN POOR SCIENCE BEING CONDUCTED?

Errors occurring when conducting/designing the experiment → This issue speaks to validity.

Validity is the extent to which a concept, conclusion or measurement is well-founded and corresponds accurately to the real world. Basically, is what we are concluding from our experiment valid based on what we have done (i.e. how we have conducted and designed the experiment)

- **Not enough constants in the experiment** → Remember a constant is a factor that is the same between groups
  - E.g. Research Question: Does studying impact on exam performance?
    Dependent variable: Score on university examination (score: 0-100)
    Independent variable: Amount of time spent studying (8 vs. 1 hour p. week)
    - Imagine two scenarios:
      A) In addition to allocating people to two conditions, researchers allow one group to sleep more, socialise less (drink less), and to cheat on the examinations
      B) Researchers ensure that both groups sleep the same amount, socialise the same amount, and do not cheat
    - Which of the two scenarios represents poorer science?
    - Why can we not conclude anything about amount of time studying from Scenario A?
  - The more constants you take into account the better your science is; conversely the less constants you take into account the poorer your science is.
- **Inappropriate Control Group**
  - Without a control group you are not truly manipulating anything
  - Without a decent control you cannot answer your research question
  - E.g. Research Question: Does alcohol impair driving ability?
    Dependent variable: Score on driving test (score: 1-5)
    Independent variable: Amount of alcohol in system (see scenarios)
    - Imagine two scenarios:
      A) Researchers design a study such that there are two groups of people who are allowed to drink – one is allowed to drink a lot and the other a little
      B) Researchers design a study such that there are two groups – one group is allowed to drink and the other is not allowed to drink at all
    - Which of the two scenarios represents poorer science?
    - Why is Scenario B better suited to answer our research question

- Good science should have appropriate control groups to address a research question

- **Bias**
  - Bias is a subjective (i.e. not objective) opinion about anything (person, group, idea, thing) about whether it is good or bad, which importantly influences how you interact, respond and deal with it
  - Bias is like prejudice
  - Bias is always one sided (science is open minded)
  - Different types of bias include:
    - ***Personal bias:*** A scientific finding that occurs in the context of an individual or group of researchers attempting to manipulate or report (or not report) the outcome in a way which suits their bias
    - ***Measurement bias***
    - ***Sampling bias:*** When you have an unrepresentative sample – findings cannot be applied to the general population. Have an appropriate number of people.
  - The more bias in a piece of scientific research the poor it is
  - Bias makes data untrustworthy
  - Bias makes data inaccurate/non-representative of the real world
  - Bias represents a huge problem for science – as consumers of science you should be on the lookout for it! Bias occurs often in news, magazines, talk shows. People present one set of data in a particular way regardless of its validity in order to support their view