AQA Psychology AS-level

Research Methods

Detailed Notes

This work by PMT Education is licensed under CC BY-NC-ND 4.0

Part 1 — Research Methods

1.1. Experimental method

The **experimental method** involves a researcher **manipulating an independent variable (IV)** to measure its effect on a **dependent variable (DV)**. Other variables are controlled as far as possible to determine whether changes in the DV were **caused by the IV**.

There are four main types of experiment:

Type	Description	Strengths	Limitations	Example
Laboratory	An experiment conducted in a **controlled environment** where the researcher can carefully control extraneous variables.	**+ High control** – makes it easier to identify whether the IV caused changes in the DV. **+ Replicable** – standardised procedures can be repeated to check the findings.	**- Low ecological validity** – the controlled setting may be artificial and unlike real-life situations. **- Demand characteristics** – participants may guess the aim and change their behaviour.	A researcher tests whether **background noise (IV)** affects memory by asking participants to recall words in a controlled laboratory.
Field	An experiment conducted in a **natural environment**, while the researcher still **manipulates the IV** and measures the DV.	**+ High ecological validity** – behaviour is more likely to reflect real-life behaviour.	**- Less control** – extraneous variables are harder to control, making it more difficult to establish cause and effect. **Replication is more difficult** because the setting cannot be controlled as precisely.	A researcher changes the **music played in a supermarket (IV)** and measures how long customers spend shopping.

CC BY NC ND

Natural	An experiment where the **IV occurs naturally** and is not manipulated by the researcher. The researcher measures its effect on the DV.	+ Allows researchers to study **real-life events** that would be **impossible or unethical to manipulate**, such as natural disasters.	**- Low control** – other variables may differ between conditions, making it difficult to establish cause and effect. **- Difficult to replicate** because the event may be unpredictable or rare.	A researcher compares people's **stress levels before and after a natural disaster** such as an earthquake.
Quasi	An experiment where the IV is a **pre-existing characteristic or difference between people**, rather than something manipulated by the researcher, such as **age or gender**.	+ Can investigate variables that **cannot be ethically or practically manipulated**.	- Participants **cannot be randomly allocated** to conditions because the IV already exists. This makes it harder to establish that the IV **caused** differences in the DV.	A researcher compares **memory performance in younger and older adults**, where **age** is the IV.

CC BY NC ND

1.2. Observational Techniques

An **observation** involves systematically **watching and recording behaviour**. Researchers can vary **where the observation takes place**, whether participants **know they are being observed**, and whether the researcher **takes part in the situation**.

Type	Description	Strengths	Limitations	Example
Naturalistic	Behaviour is observed and recorded in the **setting where it would normally occur**.	**+ High ecological validity** – behaviour is more likely to reflect how people behave in everyday life.	**- Less control** over extraneous variables. **- Replication can be difficult** because the setting cannot be standardised.	Observing how children **play in a school playground**.
Controlled	Behaviour is observed and recorded in a **structured or controlled environment**, such as a laboratory.	**+ Greater control** over extraneous variables. **+ Easy to replicate** because the setting and procedure can be standardised.	**- Behaviour may be less natural,** reducing ecological validity. **- Demand characteristics** may occur if participants realise they are being observed for a particular purpose.	Observing how participants **interact with a stranger** in a laboratory setting.
Overt	Participants **know they are being observed** and their behaviour is being recorded.	**+ Ethically acceptable** because participants can give **informed consent**.	**- Participants may change** their behaviour because they **know they are being watched**, reducing the validity of the findings.	Telling students that their **classroom behaviour** is being observed during a lesson.

CC BY NC ND

Covert	Participants are **unaware that they are being observed** and their behaviour is recorded without their knowledge.	**+ Natural behaviour as** participants are less likely to change their behaviour	**- Ethical issues** because participants cannot give informed consent. There may also be concerns about **privacy**.	A researcher observes **customer behaviour in a public shop** without revealing that they are being studied.
Participant	The researcher **joins the group** they are observing and takes part in the situation.	**+ Can provide greater insight** into the behaviour and experiences of the group.	**- The researcher may become too involved and lose objectivity**. - **Hawthorne effect,** participants may also change their behaviour if they discover they are being observed	A researcher **joins a youth group** to observe how members interact with each other.
Non-participant	The researcher observes the group **without taking part** in the situation.	**+ The researcher can remain more objective** because they are separate from the group.	- **The researcher may have less insight** into the group's behaviour and experiences. **- Observer bias** may also influence how behaviour is recorded or interpreted.	A researcher watches a **classroom from the back** without taking part in the lesson.

CC BY NC ND

1.3. Self-report techniques

Self-report techniques involve asking participants to provide information about their **thoughts, feelings, experiences or behaviour**. The two main self-report techniques are **questionnaires** and **interviews**.

Questionnaires

A **questionnaire** is a set of written questions used to collect information from participants. There are two main types of question:

Type	Description	Example
Open questions	Participants can answer **in their own words**, with no fixed response options. This produces mainly **qualitative data**.	*"How does school make you feel?"*
Closed questions	Participants choose from a **fixed set of responses**, producing data that can usually be easily **categorised and quantified**.	*"How often do you feel stressed at school?"* **Never / Rarely / Sometimes / Often / Always**

Closed questions can include:

- **Likert scales** – participants indicate their level of **agreement** with a statement.
- **Rating scales** – participants select a value representing the **strength of their feeling or opinion**.
- **Fixed-choice questions** – participants select from a list of **provided options**.

Strengths of questionnaires

- **Quick and cost-effective** – large amounts of data can be collected from many participants relatively cheaply.
- **Easy to analyse** – particularly when using closed questions, as responses can be converted into **quantitative data**.
- **Anonymity** – participants may feel more comfortable giving honest answers, particularly about **sensitive topics**.
- **Standardised** – every participant receives the same questions, making responses easier to **compare**.

Limitations of questionnaires

- **Lack of detail** – closed questions can restrict participants from explaining their thoughts or experiences fully.
- **Response bias** – participants may not answer truthfully or carefully. For example, **social desirability bias** occurs when participants give answers that make them appear more socially acceptable.
- **Acquiescence bias** – participants may have a tendency to **agree with statements**, regardless of their actual opinion.
- **Validity** – if participants misunderstand a question or give socially desirable answers, the questionnaire may not accurately measure what it intends to measure.

Interviews

An **interview** is a self-report technique in which an **interviewer asks questions directly to an interviewee** to obtain information about their thoughts, feelings, experiences or behaviour. There are **two main types of interview**:

Interview type	Description	Strengths	Limitations
Structured	Uses a **set of predetermined questions**, asked in the **same order and usually in the same way** for every participant.	**+ Standardised** – all participants are asked the same questions. **+ Easy to compare** responses between participants. **+ Replicable** because the same interview schedule can be used again.	**- Limited depth** – participants can't develop their answers. **- Interviewer effects** may influence participants' responses. **- Social desirability bias** may cause participants to give socially acceptable answers.
Unstructured	Does not use a **fixed set of questions**. The conversation develops **naturally**, with follow-up questions based on the participant's responses.	**+ Produces rich, detailed information.** **+** Questions can be **adapted to the individual**, allowing interesting or unexpected responses to be explored.	**- Difficult to compare** responses as participants may be asked different questions. **- Difficult to analyse** due to large amounts of qualitative data. **- Requires a skilled interviewer,** increasing

		+ Provides greater insight into participants' experiences.	the possibility of interviewer bias. **- Social desirability bias** may still affect responses.

1.4. Correlations

A **correlation** is a **non-experimental research method** used to investigate the **relationship between two variables**, known as **co-variables**.

Researchers **measure both co-variables** and analyse the data to see whether there is a relationship between them. **Neither variable is manipulated** by the researcher.

Example: A researcher could investigate the relationship between **hours of sleep** and **memory test scores**. They would measure how much sleep participants get and their memory scores, then analyse whether the two variables are related.

Correlation Coefficients

A **correlation coefficient** is a numerical value that shows the **strength and direction** of the relationship between two co-variables.

Correlation coefficients range from **-1 to +1**.

- The **sign (+ or -)** shows the **direction** of the relationship.
- The **size of the number** shows the **strength** of the relationship.

Coefficient	**Meaning**
+1	Perfect **positive** correlation
+0.80	Strong **positive** correlation
+0.20	Weak **positive** correlation
0	**No correlation**
-0.20	Weak **negative** correlation
-0.80	Strong **negative** correlation
-1	Perfect **negative** correlation

The closer the coefficient is to **+1 or -1**, the **stronger** the relationship. The closer it is to **0**, the **weaker** the relationship.

CC BY NC ND

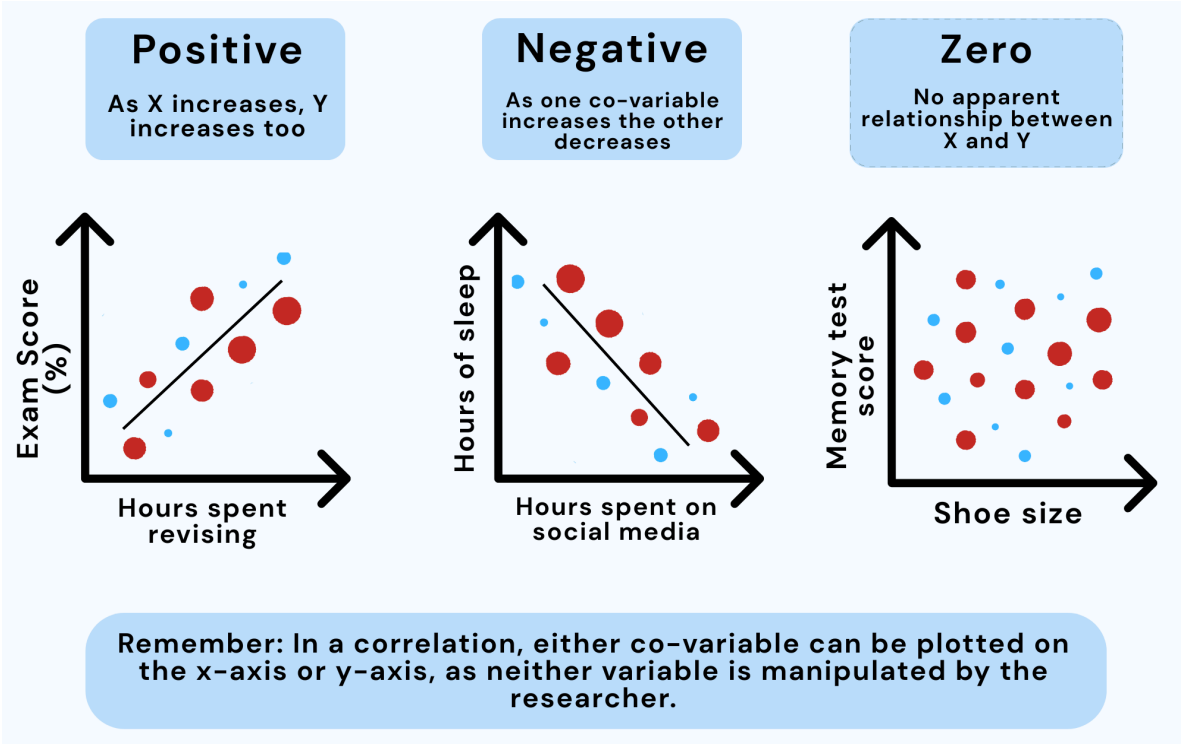
Types of Correlation

- **Positive correlation -** Both **co-variables increase together**. For example, the more hours a student spends **revising**, the higher their **test score** tends to be. The correlation coefficient is **above 0**.
- **Negative correlation -** As one **co-variable increases**, the other **decreases**. For example, **the more hours a student spends on social media, the fewer hours of sleep they get**. The correlation coefficient is **below 0**.
- **Zero correlation -** There is **no relationship** between the two co-variables. For example, **shoe size and test score** would be expected to have no correlation. The correlation coefficient is **0**.

Scattergrams

A **scattergram** is used to display the relationship between two **co-variables**. Each **dot represents a pair of scores** from one participant.

A **line of best fit** can be added to show the **overall direction of the relationship**. The **closer the points are to the line of best fit**, the **stronger** the correlation.



CC BY NC ND

Correlations VS Experiments

The main difference is **what the researcher does with the variables**.

Experiment

- The researcher **manipulates an IV** and measures its effect on a **DV**.
- This allows researchers to investigate **cause and effect**.

Correlation

- The researcher **measures two co-variables** and looks for a **relationship** between them.
- Neither variable is **manipulated**.
- Therefore, a correlation can show an **association**, but **not cause and effect**.

Example: A correlation may find that **stress and poor sleep** are related. However, this does not show that stress causes poor sleep. **Poor sleep could cause stress**, or a **third variable** could cause both.

Experiment → cause and effect
Correlation → association

Strengths	**Limitations**
Quick and economical – researchers only need to measure the two co-variables, rather than manipulate an IV and control other variables.	**Cannot establish cause and effect** – a correlation only shows an association between variables.
Useful starting point – identifying a relationship can lead to further research into why the relationship exists.	**Third-variable problem** – another variable may be responsible for the relationship between the co-variables.
Useful when experiments are unethical or impractical – researchers can investigate relationships without manipulating potentially harmful variables.	**Can be misinterpreted** – a correlation may be incorrectly reported as showing **causation**, particularly by the media.
Secondary data can be used – researchers can analyse data that has already been collected, saving time and money.	A correlation **does not explain why** two variables are related.

CC BY NC ND

Part 2 — Scientific Processes

2.1. Aims & Hypotheses

An **aim** is a **general statement** that explains the **purpose of a study**. It outlines **what the researcher intends to investigate**. Aims are often based on **psychological theories** or findings from **previous research**.

Example: *To investigate whether the amount of sleep a person gets affects their memory performance.*

Hypotheses

A **hypothesis** is a **precise, testable prediction** about the relationship between the variables being investigated.

The **alternative hypothesis (H_1)** predicts that there **will be a significant difference or relationship** between the variables being investigated.

There are two types of **alternative hypothesis (H_1)**:

Directional hypothesis (one-tailed)	**Non-directional hypothesis (two-tailed)**
Predicts the **direction** of the expected effect or relationship.	Predicts that there **will be an effect or relationship**, but **does not predict its direction**.
Used when previous research or psychological theory suggests the likely outcome.	**Used when** there is **little previous research** or the evidence is **contradictory**.
Example: *Participants who get **more sleep** will achieve **higher memory test scores** than participants who get less sleep.*	**Example:** *There will be a **difference** in memory test scores between participants who get different amounts of sleep.*

The **null hypothesis (H_0)** is the alternative to the alternative hypothesis. It predicts that there will be **no significant difference or relationship** between the variables.

CC BY NC ND

2.2. Sampling

The **population** is the **whole group of people** that the researcher is interested in studying.

A **sample** is a **smaller group of people selected from the population** to take part in the research.

Example: If a researcher wants to investigate the revision habits of **sixth-form students in the UK**, all sixth-form students in the UK are the **population**. The students actually selected to take part are the **sample**.

Researchers use different **sampling methods** to select their sample:

Sampling method	How it works	Strengths	Limitations
Opportunity	The researcher selects people who are **available and willing to take part** at the time the research is being conducted. For example, a researcher studying revision could approach students who are **in the school library** and ask them to participate.	**+ Quick,** easy and inexpensive.	**– Researcher bias,** the researcher selects people who are easiest to access, which may produce an unrepresentative sample.
Random	The researcher first creates a **sampling frame**, which is a list of everyone in the target population. Each person is given a **number**, and participants are then selected **entirely by chance**, using a random number generator, random number table or lottery method.	**+ Reduces researcher bias** because each person in the sampling frame has an **equal chance of being selected**.	**- Time-consuming** because a complete sampling frame is needed. **- Volunteer bias** may occur if selected people refuse to participate.
Systematic	The researcher creates a **sampling frame** and selects participants using a fixed numerical system. For example, they might select **every 10th person** on the list. A **random starting point** is usually chosen first to reduce bias.	**+ Reduces researcher bias** and is simple to carry out.	**- Can produce a biased sample** if there is a pattern in the sampling frame.

CC BY NC ND

Stratified	The researcher divides the **population into subgroups (strata)** based on relevant characteristics, such as **gender or age**. They calculate how many people are needed from each subgroup so the sample has the **same proportions as the population**. Participants are then selected **randomly from each stratum**.	**+ Produces a representative sample** because the proportions of relevant characteristics match those in the population	**- Time-consuming** because the researcher needs information about the population, must calculate the proportions and then select participants from each stratum.
Volunteer	The researcher **advertises the study** and people **choose for themselves** whether they want to participate. For example, a researcher could put an advert on a university noticeboard asking for volunteers for a memory study.	**+ Quick and easy to recruit.** Participants are generally **willing to take part** and may be more cooperative.	**- Volunteer bias** – people who choose to participate may have particular characteristics that make them different from the wider population.

Sampling Bias and Generalisation

Researchers usually cannot study **every member of the population**, so they select a **sample**. Ideally, the sample should be **representative of the population**, meaning the findings are more likely to **generalise to the wider population**.

However, the way participants are selected can introduce **sampling bias**. This can make the sample **unrepresentative**, limiting the **generalisability** of the findings.

Example: If a study on sixth-form students only samples students from **one London school**, the findings may not generalise to **all sixth-form students in the UK** because the sample may not represent the wider population.

2.3 Pilot Studies

A **pilot study** is a **small-scale version of an investigation carried out before the main study**. It is used to identify **problems with the procedure** so that they can be corrected before the full investigation.

For example, a researcher might pilot a questionnaire to check whether the questions are **clear and easy to understand**.

Piloting can help researchers:

- identify and fix **problems with the procedure**
- check that **instructions are clear**
- check that **equipment or materials work properly**
- estimate how long the investigation will take
- improve the **validity and reliability** of the final study
- save **time and money** by identifying problems before the main study

Example: Piloting a questionnaire

1. The researcher creates a questionnaire about **exam stress**.
2. They give it to a **small group of students** as a pilot study.
3. The students **complete the questionnaire**, allowing the researcher to see whether there are any problems.
4. **Problem identified:** Most students answer **"unsure"** to Question 3: *"How often do you feel psychologically overwhelmed by your academic responsibilities?"*
5. **Change made:** The researcher rewrites Question 3 to make it clearer: *"How often do you feel stressed because of your schoolwork?"*
6. The improved questionnaire is then used in the **main study.**

CC BY NC ND

2.4. Experimental Designs

Experimental design refers to **how participants are allocated to the different conditions of an experiment**. The three main designs are **independent groups, repeated measures and matched pairs**.

Design	How it works	Strengths	Limitations	Solution
Independent groups	Participants are **randomly allocated** to one condition of the IV, so each participant takes part in **only one condition**. **Different people in each condition**	**+ No order effects** because participants only complete one condition. **+ Requires fewer trials** per person than repeated measures.	**- Participant variables** may differ between groups and affect the DV. Requires more participants overall.	**Random allocation** gives each participant an equal chance of being placed in each condition, helping to balance participant variables.
Repeated measures	The **same participants take part in all conditions** of the IV. **Same people in every condition**	**+ Participant variables are controlled** because the same people take part in every condition. **+ Fewer participants are needed.**	**- Order effects** may occur, such as **fatigue, boredom or practice**, affecting performance in later conditions.	**Counterbalancing** : half of the participants complete the conditions in one order and the other half complete them in the **opposite order**.
Matched pairs	Participants are **matched in pairs** on important characteristics that could affect the DV. One person from each pair takes part in each condition. **Similar people split between conditions**	**+ Participant variables are controlled** because participants are matched. **+ No order effects** because each participant completes only one condition.	**- Time-consuming** to find and match participants. **- Difficult to match all relevant variables** that could affect the DV.	**Careful matching** on variables known to affect the DV.

CC BY NC ND

2.5. Observational Design

When conducting an observation, researchers need to decide **exactly what behaviour they are looking for and how they will record it**. This helps make observations **systematic and easier to analyse**.

Behavioural Categories

A **behavioural category** is a **specific, observable and measurable behaviour** that the researcher records during an observation. Researchers break broad **target behaviour** into smaller, clearly defined categories.

Example: If the target behaviour is **aggression**, behavioural categories could include:

- **Shouting**
- **Punching**
- **Swearing**

The categories should be **operationalised**, meaning it is clear exactly what counts as each behaviour.

They should also be **mutually exclusive**, meaning each behaviour should fit into **only one category**. For example, **smiling** and **grinning** would be too similar to use as separate categories.

Clear behavioural categories make it easier for different observers to **record the same behaviours consistently**, improving **inter-observer reliability**.

CC BY NC ND

Sampling Methods

Researchers cannot always record **every behaviour that occurs**, especially during a long observation. Sampling methods allow them to decide **when or what behaviour to record**.

Sampling method	How it works	Strengths	Limitations
Time sampling	The researcher records behaviour during **specific time periods** decided before the observation. For example, recording behaviour for **2 minutes every 10 minutes**.	**+ Less time-consuming** as it reduces the amount of behaviour that needs to be recorded.	**- The selected time periods may not be representative** of the person's behaviour throughout the whole observation.
Event sampling	The researcher records **every occurrence of a particular behaviour** during the observation.	**+ Useful for infrequent behaviours,** as the researcher waits for the specific behaviour to occur.	- **Difficult to record every occurrence accurately** especially if the behaviour occurs very frequently. **- Complex behaviours may also be oversimplified.**

CC BY NC ND

2.6. Questionnaire Construction

When designing a **questionnaire**, questions must be carefully written so participants **understand what is being asked** and can give accurate answers.

Principle	What it means	Example
Clear and unambiguous	Questions should have **one clear meaning** and be easy to understand.	*"How often do you feel anxious?"* rather than *"Do you regularly experience anxiety?"*
Avoid jargon	Avoid **technical or unfamiliar language** that participants may not understand.	Avoid *"Do you experience psychomotor agitation?"* with the general public.
Avoid leading questions	Questions should not **encourage a particular answer**.	Avoid *"Don't you agree that school causes stress?"*
Avoid double-barrelled questions	Do not ask **two things in one question**, as participants may have different answers to each part.	Avoid *"Do you enjoy school and get on with your teachers?"*
Avoid double negatives	Double negatives can **confuse participants** and lead to inaccurate answers.	Avoid *"Do you disagree that you don't enjoy school?"*
Use neutral wording	Questions should not suggest that one answer is **better or more acceptable**.	Avoid *"How helpful was the excellent therapy?"*

Response options should also be carefully designed. For closed questions, answer choices should be **clear, appropriate and non-overlapping** so participants can easily select the answer that best applies to them.

Good	Bad
How many hours do you revise each week?	*How many hours do you revise each week?*
0–2 hours 3–5 hours 6–8 hours 9–11 hours 12+ hours	0–5 hours 5–10 hours 10–15 hours 15+ hours
No overlap between options.	**5 and 10 hours overlap**, so participants may be unsure which option to choose.

CC BY NC ND

Design of Interviews

When designing an interview, researchers need to decide **what questions will be asked, how they will be asked and how the interview will be structured**. The design should make sure participants understand the questions and that the information collected is **relevant to the aim of the study**.

Design consideration	Structured interview	Unstructured interview
Preparing questions	A **fixed set of questions** is prepared before the interview.	The researcher prepares **general topics or areas** they want to investigate rather than a fixed list of questions.
Wording	Questions should use **standardised wording** so every participant is asked the same question.	Questions can be **adapted to the participant's responses** and phrased naturally.
Order	Questions are asked in a **pre-determined order**.	There is **no fixed order**; the conversation can develop naturally.
Follow-up questions	Follow-up questions are generally **not added**, as this would make interviews less standardised.	The researcher can ask **follow-up questions** to explore interesting or relevant answers in more detail.
Interviewer	The interviewer should follow the **same procedure** with each participant.	The interviewer needs to be able to **respond to and explore** the participant's answers appropriately.
Recording responses	Responses can be recorded in a **standardised way**, making them easier to compare.	Responses are likely to be **more varied and detailed**, so the researcher needs to decide how these will be recorded and analysed.

Piloting

Both **questionnaires and interviews can be piloted** before the main study. A small group can be used to identify **problems with the questions, wording or procedure**, allowing the researcher to make changes before collecting the main data. *See notes in section 2.3 for examples.*

CC BY NC ND

2.7. Variables

Variables are **anything that can change** in a study. Researchers identify and control variables to make sure the results are **valid**.

Variable	What it means	Sleep and memory example
Independent variable (IV)	The variable **manipulated by the researcher**.	**Hours of sleep:** 4 hours vs 8 hours
Dependent variable (DV)	The variable is measured to see whether it is affected by the IV.	**Memory test score:** marks out of 20
Extraneous variable	Any variable **other than the IV that could affect the DV**.	**Time of day**, test difficulty, caffeine intake

In **natural and quasi-experiments**, the IV is **not manipulated** by the researcher because it already exists naturally.

Extraneous Variables

An **extraneous variable** is **any variable other than the IV that could affect the DV**. Researchers try to **control extraneous variables** so they can be more confident that any change in the DV was caused by the IV.

Example: In a study investigating the effect of sleep on memory, researchers might control:

Extraneous variable	How it could affect the study
Test difficulty	A harder test could lower memory scores.
Time of day	Participants may perform better at certain times.
Caffeine intake	Caffeine could affect alertness and memory.

Operationalisation of Variables

Operationalisation means **clearly defining exactly how a variable will be measured or manipulated** so that it is **specific, observable and measurable**.

For example: Instead of simply saying *"Sleep affects memory"*, the researcher could operationalise the variables by stating:

- **IV:** Amount of sleep → **8 hours vs 4 hours**
- **DV:** Memory performance → **score out of 20 on a word recall test**

This could be written as a directional hypothesis:

> *Participants who receive **8 hours of sleep** will score **more marks out of 20 on a word recall test** than participants who receive **4 hours of sleep**.*

Why operationalise variables?

- **Replicability** – other researchers can repeat the study using the same procedures.
- **Consistency** – variables are measured or manipulated in the **same way** for all participants.
- **Testability** – the hypothesis becomes **clear and measurable**.

CC BY NC ND

2.8. Control

Researchers can use several methods to **control extraneous variables** and reduce their effects on the results.

Method	What it means	How it helps	Example
Randomisation	The **use of chance** when making decisions during a study to reduce **bias**. It can be used when deciding the **order of conditions**, arranging **materials or stimuli**, or making other decisions within the procedure.	Using chance reduces the likelihood that the **researcher's preferences or expectations** influence the study.	A researcher uses a **random number generator** to decide which condition each participant completes first.
Standardisation	Using the **same procedures and instructions** for every participant.	This controls differences in how the study is carried out, making it less likely that these differences will affect the **DV**.	Every participant receives the **same instructions**, completes the same task and has the **same amount of time** to complete it.
Random allocation	Assigning participants to different conditions **by chance**, giving each participant an **equal chance of being placed in each condition**.	This helps distribute **participant variables** between the groups, making the groups more comparable.	A **random number generator** assigns participants to either the **experimental or control condition**.
Counterbalancing	Used in **repeated measures designs**. Different participants complete the conditions in **different orders**.	Both groups complete **both conditions**, but reversing the order means that practice or fatigue is less likely to affect one condition more than the other.	**Group 1:** Condition A → **Condition B** **Group 2:** Condition B → **Condition A**

CC BY NC ND

Control groups	An **experimental group** is a group that **experiences the IV being investigated**. A **control group** does **not experience the IV** or receives a **standard comparison condition**. A **control group** provides a **baseline for comparison** with the experimental group.	Comparing the groups helps researchers determine whether a change in the **DV** is likely to have been caused by the **IV** rather than other factors.	**Caffeine and memory:** Experimental group receives a **caffeinated drink**; The control group receives a **decaffeinated drink**.

2.9. Demand Characteristics and Investigator Effects

Demand Characteristics

Demand characteristics are **cues from the researcher or research situation that allow participants to guess the aim of the investigation**. This may cause participants to **change their behaviour** rather than behaving naturally.

When participants enter an unfamiliar research situation, they may try to work out **what is expected of them**. This is known as **participant reactivity**.

Example: A participant realises that a study is investigating whether **stress affects performance** and deliberately tries harder because they think this is what the researcher wants.

Participants may respond in different ways:

- **Please-U effect** → the participant behaves in the way they think the **researcher wants** them to.
- **Screw-U effect** → the participant deliberately behaves in a way that **works against the aims of the study**, such as deliberately underperforming.

Effect on research: Demand characteristics can reduce the **validity** of findings because participants may not behave naturally. The results may reflect their **reaction to the research situation** rather than the effect of the **IV**.

Investigator Effects

Investigator effects are **unwanted influences of the researcher on participants or the results of an investigation**, whether the influence is **conscious or unconscious**.

The researcher can influence the study through their:

- **Behaviour**
- **Appearance**
- **Expectations**
- **Interactions with participants**

They can also influence the study through decisions made when **designing or carrying out the research**.

Example: If a researcher expects participants in the experimental condition to perform better, they may unintentionally give them **more encouragement or clearer instructions**.

CC BY NC ND

2.10. Ethics

Ethics are the principles that guide researchers to make sure psychological research is **fair, safe and respectful to participants**.

The **British Psychological Society (BPS) Code of Ethics and Conduct** gives psychologists guidelines for carrying out research responsibly. Researchers should consider **ethical issues when designing and carrying out a study** and take steps to deal with any problems that could affect participants.

Ethical issue	What it means	How it can be dealt with
Informed consent	Participants should agree to take part after receiving enough information to make an **informed decision**. However, researchers may not reveal the true aim because this could cause **demand characteristics**.	**Prior general consent:** Participants agree to take part in a range of studies, some of which may involve deception. **Presumptive consent:** A similar group is asked whether they would consent, and this is used to judge whether the actual participants would agree. **Retrospective consent:** Participants are asked for consent **after** taking part and can decide whether their data can be used.
Deception	Participants are **deliberately misled** or information is withheld. It may be necessary if knowing the true aim would cause demand characteristics, but it should not expose participants to unacceptable harm.	**Debriefing:** After the study, participants are told the **true aim and nature** of the research. They should have the opportunity to ask questions and can request that their data is withdrawn where possible.
Protection from harm	Participants should be protected from **physical and psychological harm**. The risk should not be greater than what they would normally experience in everyday life.	Researchers should assess potential risks before the study and stop the study if participants become distressed. An **ethical review** should consider whether the benefits of the research justify the potential risks.

CC BY NC ND

Privacy	Participants have the right to control information about themselves and how much of their **private life** is observed. This can be difficult in **naturalistic or covert observations**.	Researchers should avoid observing private behaviour without good justification and should consider whether participants could reasonably expect to be observed in that situation.
Confidentiality	Participants have the right to have their **personal information protected** and not disclosed without permission.	Researchers can remove identifying information, use **numbers or initials instead of names**, and store data securely so individuals cannot easily be identified.
Right to withdraw	Participants should be able to **leave the study at any point** without giving a reason.	Participants should be informed of their right to withdraw during the **briefing** and reminded again during the **debriefing**. Where possible, they should also be able to request the removal of their data.

CC BY NC ND

2.11. The Role of Peer Review

Peer review is the **assessment of scientific research by experts in the same field**. It is used to check that research is **good quality, valid and suitable for publication**.

Before research is published in an academic journal, it is usually assessed by **other psychologists or experts who have knowledge of the same area of research**. They examine the research to identify **strengths, weaknesses, errors or problems** with the methodology, analysis and conclusions.

The reviewers then provide **feedback to the researcher** and may recommend that the research is:

- **Accepted** for publication
- **Revised** before it can be published
- **Rejected** if there are serious problems with the research

Peer review therefore acts as a **quality-control process** within psychology. It helps ensure that research is **checked by other experts before it becomes part of the scientific evidence base**.

Main purposes of peer review

- To decide which research is **worthwhile**, helping organisations decide where **research funding** should be allocated.
- To **check the quality and validity of research** before it is published.
- To identify possible **errors, weaknesses or improvements** that could be made to the research.
- To help prevent **fraudulent or poor-quality research** from being published.

AO3 - EVALUATION

1. **It improves the quality of published research.** Research is checked by **experts in the same field** before publication. Reviewers can identify weaknesses in the **methodology, analysis or conclusions** and suggest improvements. This means researchers can correct problems before their findings become part of the scientific literature, increasing the **quality and credibility of psychological research**.

2. **Peer review can be affected by reviewer bias.** Reviewers are usually anonymous, which can protect them from pressure, but this can also allow them to **disadvantage researchers they disagree with or compete against**. This may be particularly problematic when researchers are competing for **research funding**. One solution is **open reviewing**, where the reviewer's identity is known. This may make reviewers more accountable and reduce the opportunity for personal bias.

3. **Publication bias can distort the evidence base.** Journals may be more likely to publish research with **interesting, significant or positive findings** because these are more likely to attract attention. Research that finds no significant effect may be less likely to be published, creating the **file-drawer problem**, where studies with negative or non-significant findings remain unpublished. This means psychologists may get a **misleading picture of the evidence** because they are seeing mainly the studies that produced interesting results.

CC BY NC ND

4. **Peer review may discourage new ideas.** Reviewers are often experts who are familiar with **established theories and accepted explanations**. They may therefore be more likely to favour research that supports existing ideas and reject research that challenges them. This could **slow scientific progress**, as new or controversial explanations may take longer to become accepted.

5. **Peer review cannot completely prevent fraudulent research.** Even research that has been peer reviewed can contain serious problems. **Wakefield (1998)** published research claiming a link between the **MMR vaccine and autism**, which was later found to have serious ethical and methodological problems and was eventually retracted. This shows that peer review is useful for **quality control**, but it cannot guarantee that all published research is accurate or honest.

CC BY NC ND

2.12. The Implications of Psychological Research for the Economy

Economic implications refers to how psychological research can affect a country's **financial wellbeing**, particularly through **employment, productivity, healthcare costs and the use of public money**.

Psychological research can benefit the economy when it helps people to **stay healthy, return to work and work more effectively**. For example, research can lead to more effective treatments for mental health problems, reducing **sickness absence** and allowing people to remain economically active. Research can also help organisations and governments use **resources more efficiently**, reducing unnecessary costs.

Examples across the course:

Topic	Psychological research	Economic implication
Clinical Psychology	**Soomro et al. (2009)** reviewed drug treatments for OCD and found that **SSRIs were more effective than placebo** in reducing OCD symptoms.	Effective drug treatment can reduce the severity of OCD, allowing people to **function more effectively and return to employment**. This can reduce the economic cost of **sickness absence** and reduce the need for long-term healthcare support.
Biopsychology	Research into **neurotransmitters** has shown that abnormalities in systems such as **serotonin and dopamine** are associated with psychological disorders. This has contributed to the development of drug treatments that alter neurotransmitter activity.	Effective medication can **reduce symptoms and hospitalisation**, meaning fewer resources need to be spent on long-term care. If patients can return to work, this also **increases productivity and reduces sickness absence**.
Memory	**Geiselman et al. (1984)** found that the **cognitive interview** produced more correct information from eyewitnesses than a standard police interview.	More accurate eyewitness evidence can make criminal investigations **more efficient**, reducing the time and resources spent investigating incorrect leads and potentially reducing the costs associated with **wrongful convictions**.

CC BY NC ND

Social Influence	Research into **minority influence** shows that consistent minorities can influence the majority and contribute to **social change**.	This can be applied to campaigns designed to change behaviour, such as **anti-smoking or environmental campaigns**. Successful behaviour change can reduce costs to services such as the **NHS** and improve productivity.
Clinical Psychology	Research into **CBT** has demonstrated that psychological treatments can reduce symptoms of disorders such as depression.	Treating depression can reduce **sickness absence and unemployment**, allowing people to return to work and contribute to the economy rather than requiring continued healthcare or welfare support.

3. Data Handling and Analysis

3.1. Quantitative and Qualitative data

Type and description	Data collection techniques	Strengths	Limitations
Qualitative data – data presented in **words or other non-numerical forms**, such as participants' opinions, experiences and descriptions.	**Open questions**, **unstructured interviews** and observations where detailed descriptions of behaviour are recorded.	**+ Rich and detailed data** – provides a deeper understanding of participants' **thoughts, feelings and experiences**. **+ Validity** – participants can explain their views in their own words, giving a more accurate representation of what they think or feel. **+ Unexpected findings can emerge** – researchers may discover new themes or ideas that were not anticipated before the study.	**– Time-consuming to analyse** – responses must be organised and interpreted, making analysis slower than quantitative data. **– Difficult to compare responses** – participants may give different answers, making it harder to identify patterns or make direct comparisons. **– Researcher bias** – analysing and interpreting qualitative data can be **subjective**, so researchers may interpret the same responses differently.
Quantitative data – data presented in **numerical form**, such as scores, frequencies, measurements and percentages.	**Closed questions**, **structured observations** using behavioural categories, and numerical measurements in **experiments**.	**+ Can be analysed using statistical tests** and presented using **graphs and tables**. **+ Easy to compare and identify patterns** **+ More objective** – numerical data is generally **less open to interpretation**,	**– Less depth and detail** – numerical data may not provide a detailed understanding of participants' **thoughts, feelings and experiences**. **– Does not explain why** – numerical data shows **what** participants responded to, but may

CC BY NC ND

		reducing researcher bias.	not explain the reasons behind their responses. **– Can oversimplify complex behaviour** – reducing thoughts, feelings or behaviours to **numbers** may leave out important detail and context.

CC BY NC ND

3.2. Primary and Secondary data

Type and description	Strengths	Limitations
Primary data – information **collected first-hand by the researcher** specifically for their investigation.	**+ Can be tailored to the research aims** – researchers can collect the **exact information needed** for the investigation. **+ Greater control over data collection** – the researcher can choose **how, when and under what conditions** the data is collected.	**– Time-consuming** – collecting primary data can take a significant amount of **time and effort**. **– Expensive** – collecting large amounts of data or **recruiting participants** can be costly.
Secondary data – information that has been **collected by someone else** but is used by a researcher for their own investigation. It is sometimes referred to as **desk research**.	**+ Quick and inexpensive** – the researcher does not have to **collect the data themselves**, saving time and money. **+ Access to large amounts of existing data** – researchers can use data that has already been collected, allowing them to study **large samples or datasets**.	**– May be outdated or incomplete** – existing data may no longer accurately reflect the population being studied. **– May not meet the research aims** – the data was collected for a different purpose, so it may not contain **exactly the information the researcher needs**. **– Less control over data quality and collection**
Meta-analysis – a method of analysing **secondary data** by statistically combining findings from **multiple studies investigating the same topic** to produce an **overall conclusion**.	**+ Combines evidence from many studies** – provides a **larger overall evidence base** than an individual study. **+ Increases confidence in findings** when results are **consistent across studies**, as similar findings are less likely to be due to chance. **+ Identifies overall patterns** – combining results can reveal **patterns or trends** that may not be clear in individual studies.	**– Publication bias** – studies with **non-significant or negative findings** are less likely to be published (**file-drawer problem**). This can make the overall evidence appear **more positive than it really is**. **– Depends on the quality and comparability of included studies** – if the studies have **poor methodology** or use very different methods/measures, the conclusions of the meta-analysis may be unreliable.

CC BY NC ND

3.3. Descriptive Statistics

Descriptive statistics are numerical methods used to **summarise and describe data**. They include measures of **central tendency**, measures of **dispersion**, percentages and correlations. Data can also be presented visually using **tables and graphs**.

Measures of central tendency

Measures of central tendency describe the **typical or central value** within a set of data.

Measure	Calculation method	Strengths	Limitations
Mean – the arithmetic average of a set of scores. - Useful for **interval-level data.**	**Add all the scores together and divide by the number of scores.** **For example:** **Scores -4, 6, 7, 8, 10** **Mean = (4 + 6 + 7 + 8 + 10) ÷ 5 = 7**	**+ Uses all values** in the dataset. **+ Precise measure** of the average.	**- Affected by extreme scores (outliers)**, which can make the mean unrepresentative of the typical score.
Median – the **middle score** when data is arranged in order from lowest to highest. - Useful for **ordinal data**.	Arrange scores in order and identify the **middle value**. If there are two middle values, calculate their mean.	**+ Not affected by extreme scores.** **+ Easy to calculate and interpret.**	**- Does not take the exact value** of every score into account **- Can be less sensitive** than the mean.
Mode – the score that occurs **most frequently**. - Useful for **nominal data**.	Count how often each score occurs and identify the **most frequent score**.	**+ Easy to identify.**	**– There may be more than one mode.** **– Some datasets may have no mode.** **– Does not use all the data.**

CC BY NC ND

Measures of dispersion

Measures of dispersion describe **how spread out or varied the scores are** within a dataset.

Measure	Calculation method	Strengths	Limitations
Range – the difference between the **highest and lowest scores**.	**Highest score − lowest score**	**+ Quick and easy to calculate.** **+ Gives an indication of how spread out the data is**, showing the difference between the **highest and lowest scores**	**- Only uses the highest and lowest scores.** **- Strongly affected by extreme values.**
Standard deviation (SD) – a measure of how much scores **vary around the mean**.	Measures how far each score is from the **mean**. The differences are squared, added together, divided by the number of scores, and the **square root** is taken.	**+ Uses all scores** in the dataset. **+ Useful for comparing the spread of different datasets**, as a smaller standard deviation indicates scores are more closely clustered around the mean. **+ Provides a more precise measure of dispersion** because it considers how **all scores vary around the mean**.	**– More difficult to calculate and interpret than the range.** **– Can be affected by extreme scores**

i. Calculating Standard Deviation

$$s = \sqrt{\frac{\sum(X-\bar{X})^2}{n-1}}$$

Where:

- s = standard deviation
- **x** = each individual score
- **x̄** = mean
- **n** = number of scores

Steps:

1. **Calculate the mean ($\bar{x}$)** of all the scores.
2. **Subtract the mean from each score** to find how far each score is from the mean.
3. **Square each difference** to remove negative values.
4. **Add all the squared differences together**.
5. **Divide by the number of scores minus 1 (n-1)**.
6. **Take the square root** of the answer.

Example

Scores: **2, 4, 6, 8, 10**

1. **Mean:** (2 + 4 + 6 + 8 + 10) ÷ 5 = **6**
2. **Subtract mean from each score:** 2 − 6 = **−4**, 4 − 6 = **−2**, 6 − 6 = **0**, 8 − 6 = **2**, 10 − 6 = **4**
3. **Square each answer:** 16, 4, 0, 4, 16
4. **Add:** 16 + 4 + 0 + 4 + 16 = **40**
5. **Divide by (n-1):** 40 ÷ (5-1) = **10**
6. **Square root:** √10 = **3.16**

Standard deviation = 3.16

ii. Calculating percentages

A **percentage** expresses a value as a **proportion out of 100**.

To calculate a percentage:

- **Percentage = (number in the category ÷ total number) × 100**
- For example, if **30 out of 50 students** preferred online learning:
- **(30 ÷ 50) × 100 = 60%**

CC BY NC ND

3.4. Presentation and Display of Quantitative data

Quantitative data can be presented in different ways to make the **patterns, differences and relationships** in the data easier to understand.

Tables

Tables are used to **organise and summarise numerical data** so that results can be easily compared.

Tables can be used to present **nominal, ordinal or interval data**, depending on what is being measured. They are particularly useful for presenting **summary statistics**, such as the mean, median, mode, frequency and percentages, so that results can be easily compared.

A brief description may be provided alongside or below the table to **highlight the main pattern in the data**.

Example:

Descriptive statistic	4 hours of sleep (Condition A)	8 hours of sleep (Condition B)
Mean	12	17
Median	12	17
Mode	11	18

The table shows that participants who slept for **8 hours generally had higher memory scores** than those who slept for **4 hours**.

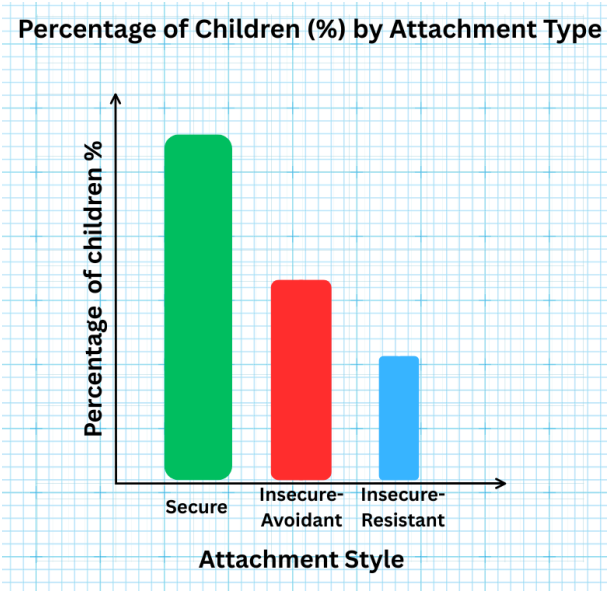
CC BY NC ND

Bar charts

Bar charts are used to display **discrete data**, where scores belong to **separate categories**. This includes **nominal data**, where categories have no meaningful order, such as **type of attachment**. They can also be used to display **ordinal categories**.

The **x-axis** shows the **categories or conditions**, while the **y-axis** shows a **numerical measure**, such as the **number of participants, frequency, percentage or mean score**. The **height of each bar** represents the value for that category, making it easy to **compare different groups or conditions**.

The bars **do not touch** because the categories are **separate from one another**. This distinguishes a bar chart from a **histogram**, where the bars touch because the data represents continuous measurements.



CC BY NC ND

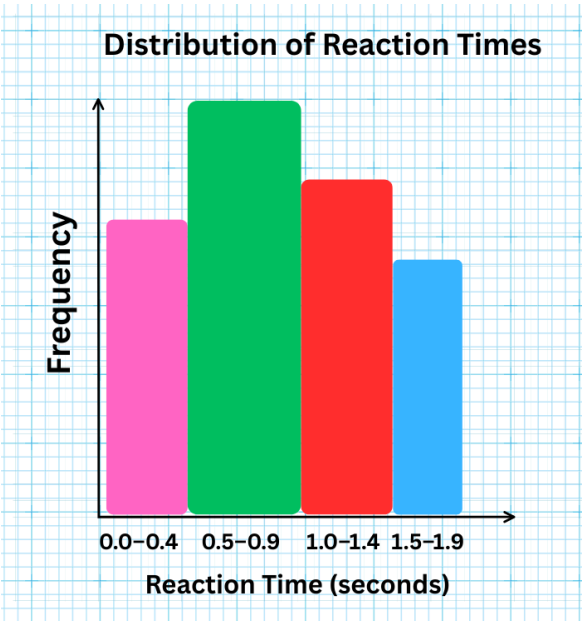
Histograms

Histograms are used to display **continuous data**, where there can be **many possible values between two points**. For example, **height** can be 160 cm, 160.5 cm, 160.51 cm, and so on.

This is usually **interval data**, where the **differences between scores are equal and meaningful**.

The **x-axis** shows the continuous data divided into **intervals (class intervals)**, while the **y-axis** shows the **frequency**, which is the **number of scores that fall within each interval**.

The bars **touch each other** because the intervals are **continuous**, meaning there are **no gaps between the values**.



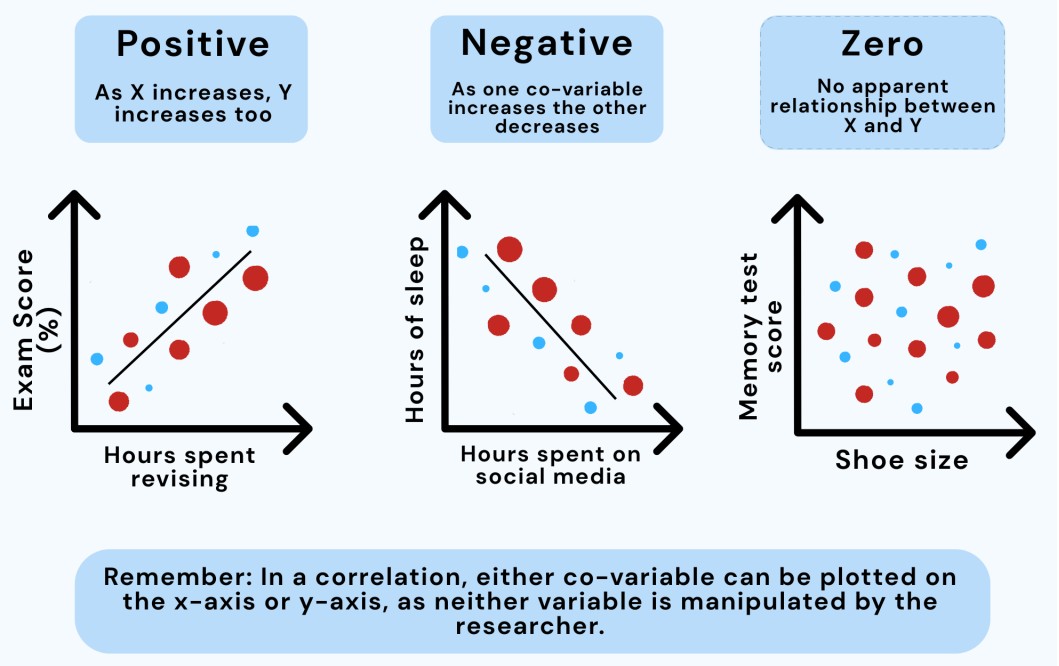
CC BY NC ND

Scattergrams

Scattergrams are used to show the **relationship between two co-variables**, rather than differences between conditions. The co-variables can be measured using **ordinal or interval data**.

Each **point** represents the **paired scores of one participant** on the two co-variables. For example, one participant's **hours of sleep** and **memory test score** would be represented by one point. Either co-variable can be placed on either axis because **neither variable is being manipulated as an IV**. The **x-axis** shows one co-variable and the **y-axis** shows the other.

A scattergram can show a **positive, negative or zero correlation**, depending on the pattern of the points.



Revision Tip: Exam questions may ask you to **draw an appropriate diagram** to display quantitative data. These can be worth **6 marks**, so make sure you have **correctly labelled axes, operationalised variables, an appropriate scale and an accurate diagram**.

CC BY NC ND

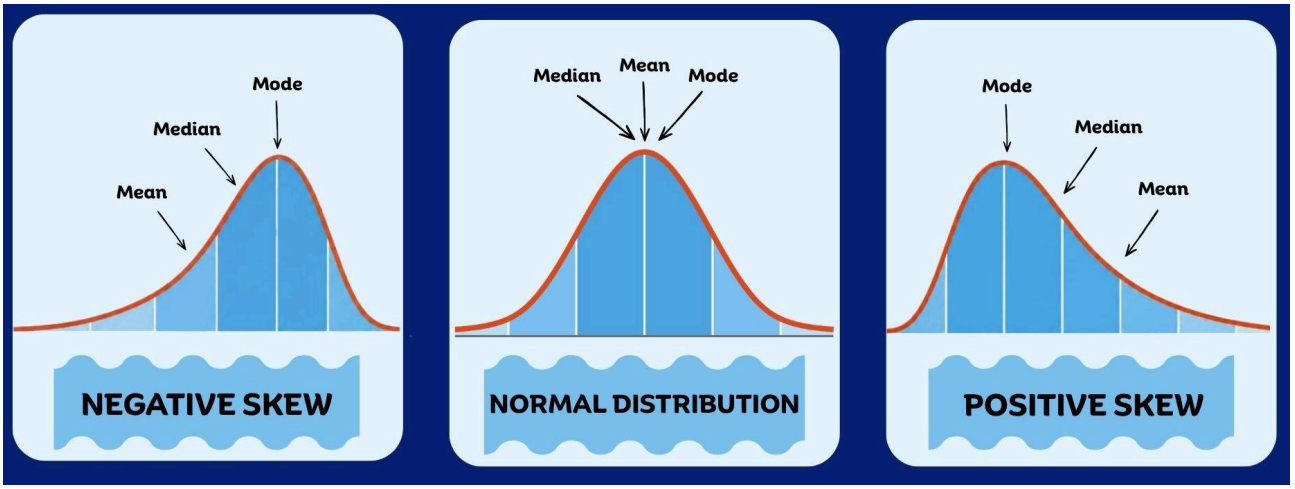
3.5. Distributions

A **distribution** shows how scores are **spread across a set of data**. The shape of a distribution can be **normal** or **skewed**.

Normal distribution is a **symmetrical, bell-shaped distribution** where scores are evenly distributed around the centre. In a normal distribution, the **mean, median and mode are all approximately equal**.

A **skewed distribution** is **not symmetrical**, with scores concentrated more towards one end and a **long tail** extending towards the other. There are two types:

- **Positive skew (right skew)** – most scores are concentrated towards the **left/lower end**, while a small number of higher scores create a **long tail to the right**. The **mean is greater than the median**, which is greater than the mode.
- **Negative skew (left skew)** – most scores are concentrated towards the **right/higher end**, while a small number of lower scores create a **long tail to the left**. The **mean is less than the median**, which is less than the mode.



3.6. Introduction to Statistical Testing: The Sign test

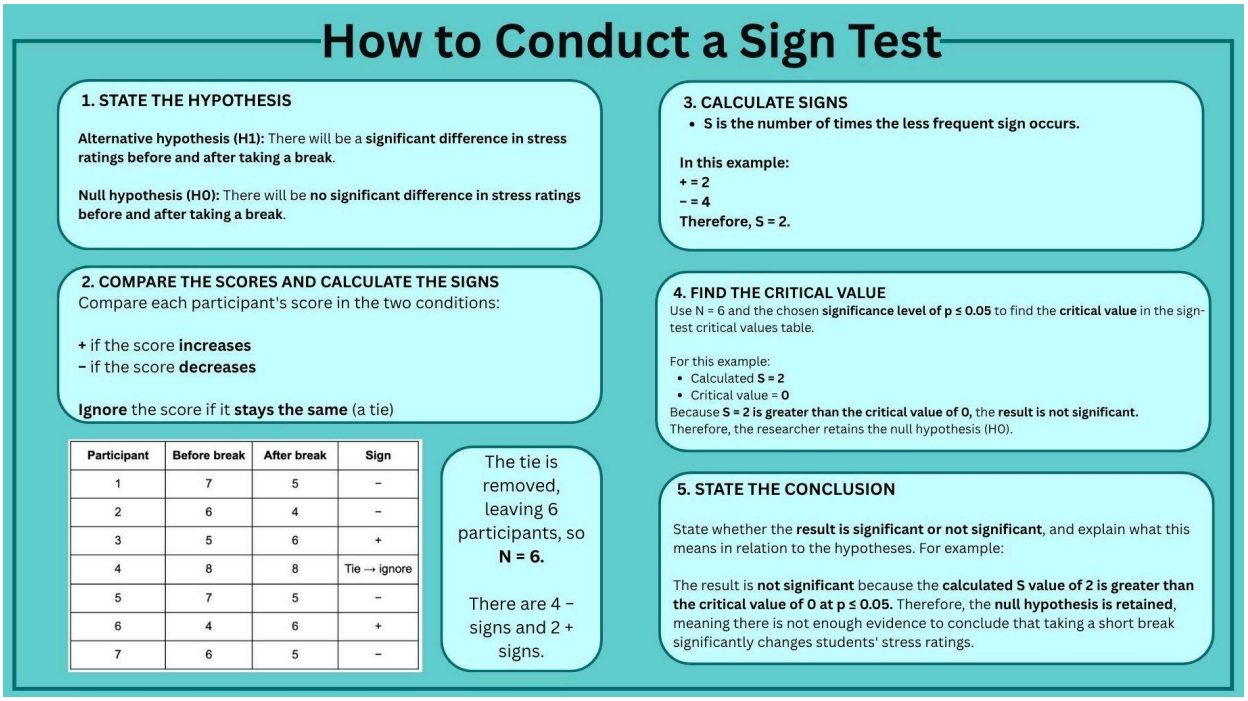
Statistical testing allows psychologists to decide whether a difference or relationship found in their data is **statistically significant** or whether it could have occurred **by chance**.

A result is **statistically significant** when the probability of getting the result by chance is sufficiently low. In A-level Psychology, the usual significance level is **$p \leq 0.05$**, meaning there is a **5% or less probability that the results occurred by chance**, assuming the null hypothesis is true.

Sign Test

The **sign test** is used to test whether there is a **significant difference between two related conditions** when the data is **ordinal**.

Example: A researcher wants to investigate whether taking a short break affects students' **stress levels**. The same students rate their stress **before and after** taking a break.



Revision tip: The **sign test is the only statistical test you may be asked to actually complete in the exam**. You need to **know the steps involved in conducting the sign test**, but you will be given **all the relevant information needed to carry it out**, including the **critical value table**. Therefore, **you do not need to memorise the critical values**.

CC BY NC ND