GCSE Psychology

Research methods

Student workbook

Name: ....

Teacher: ....

The Specification

The aim of this booklet is to provide you with practical activities to enhance your understanding of research methods in psychology. Once completed it will provide a valuable revision tool…so take care of it!! This unit is broken down into 3 subsections: planning, doing and analysing. See below

Planning: Before psychologists do research, there are certain planning decisions to make

Doing: Once planning is complete, the next stage is to conduct their research

Analysing: Once data has been collected, psychologists need to analyse it to draw conclusions

PLANNING	LEARNING OBJECTIVE	CHECK ( )
Hypotheses	• Write a null hypothesis. • Write an alternative hypothesis. • Write hypotheses to predict differences, correlations, or no patterns.	
Variables	• Identify independent variables and how they can be manipulated. • Identify dependent variables and how they can be measured. • Identify co-variables and how they can be measured. • Identify extraneous variables and how they can be controlled (including use of standardisation).	
Experimental Designs	• Define repeated measures design. • Define independent measures design. • Identify strengths and weaknesses of experimental designs.	
Populations and Sampling	• Outline target populations, sampling, and sample size with reference to representativeness and generalisability. • Describe sampling methods; random, opportunity, self-selected. • Apply the principles of sampling to scientific data. • Identify strengths and weaknesses of sampling methods.	

Ethical Guidelines	• Ethical issues:
	  - Lack of informed consent
	  - Protection of participants / psychological harm
	  - Deception.
	• Ways of dealing with ethical issues:
	  - Use of debriefing
	  - Right to withdraw
	  - Confidentiality.	

DOING	LEARNING OBJECTIVES	CHECK ( )
Experiments	• Define and design laboratory experiments. • Define and design field experiments. • Define and design natural experiments. • Identify strengths and weaknesses of different types of experiments.	
Interviews	• Define and write structured interviews. • Define and write unstructured interviews. • Identify strengths and weaknesses of different types of interviews.	
Questionnaires (Surveys)	• Define and write open questions. • Define and write closed questions. • Define and use rating scales. • Identify strengths and weaknesses of questionnaires (surveys).	
Observations	• Describe the difference between naturalistic and controlled observations. • Describe the difference between overt and covert observations. • Describe the difference between participant and non-participant observations. • Identify strengths and weaknesses of different types of observations.	
Case Studies	• Outline the use of qualitative data in case studies. • Outline the use of small sample sizes in case studies. • Identify the strengths and weaknesses of case studies.	
Correlations	• Outline the use of quantitative data in correlations. • Define and identify positive, negative, and zero correlations.	

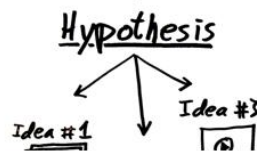| ANALYSING	LEARNING OBJECTIVES	CHECK ( )
Types of Data	• Describe the difference between quantitative and qualitative data. • Describe the difference between primary and secondary data. • Identify strengths and weaknesses of different types of data.	

Descriptive Statistics	• Calculate Measures of Central Tendency:
	  - Mode (including modal class)
	  - Median
	  - Mean.
	• Calculate range.
	• Use and interpret ratios, percentages, and fractions.
	• Write expressions in decimal and standard form.
	• Use and interpret decimal places and significant figures.
	• Describe and identify normal distributions.
	• Make estimations from data collected.	

Tables, Charts, and Graphs	• Use and interpret frequency tables (tally charts). • Use and interpret bar charts and pie charts. • Use and interpret histograms, line graphs, and scatter diagrams.	

Reliability and Validity	• Define types of reliability:
	  - Internal
	  - External
	  - Inter-rater.
	• Define types of validity:
	  - Ecological
	  - Population
	  - Construct.
	• Explain demand characteristics.
	• Explain observer effects.
	• Explain social desirability.	

Sources of bias	• Describe and identify gender bias. • Describe and identify cultural bias. • Describe and identify age bias. • Describe and identify experimenter bias. • Describe and identify observer bias. • Explain the presence of bias in questioning.	

Aims, Hypotheses & Variables

| How do psychologists think of things to research? **(aim)** | How do psychologists guess what they're going to find? **(hypothesis)** | What specific elements of the research do psychologists test? **(variables)** |

Aim

All research has an aim. This could be a personal interest, a concern in society, or it could be derived from other researchers' studies and theories. Research is sometimes done to solve a problem or improve a situation. It is important to ensure the aim is realistic in terms of *resources and is ethically acceptable*

Hypothesis

The aims then allow for the formulation of a **hypothesis (prediction)** which can be tested in order to find evidence for or against a **theory**. A hypothesis is a **clear, precise, testable** statement. It is a **prediction** made at the beginning of the study about what the researcher expects to find. It is written in the **future tense**. The aims are written in a **general** sense, whereas the hypothesis is much more **specific**. There are two kinds of hypothesis:

Null hypothesis

Alternate hypothesis

Directional
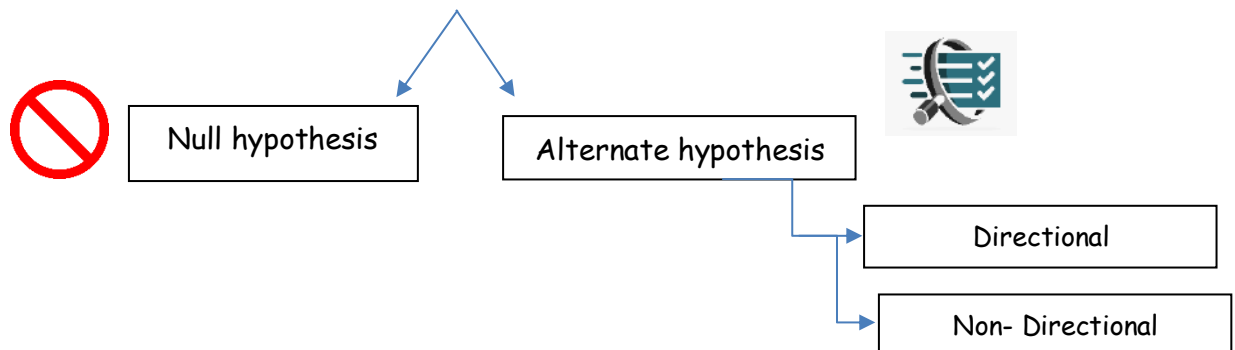
Non- Directional

1. A **NULL hypothesis** that states there will be no difference.
2. An **ALTERNATIVE hypothesis** that states there will be a difference, these can come in two forms:
   a) A **DIRECTIONAL hypothesis**, also known as a **one-tailed hypothesis**, predicts the direction in which results are expected to occur. For example, **more** words are recalled correctly from a list when using rehearsal as a memory improvement technique than when no memory improvement technique is used. In this case, we are predicting not only that there will be a **difference** between the number of words recalled, but that **more** will be recalled in one condition over another.
   b) A **NON-DIRECTIONAL hypothesis**, also known as **a two-tailed hypothesis**, does not predict the expected direction of the difference. For example, there is **a difference** in the number of words correctly recalled from a list when presented with background music than when no music is presented. This hypothesis still makes a prediction but doesn't state which condition will lead to better recall.
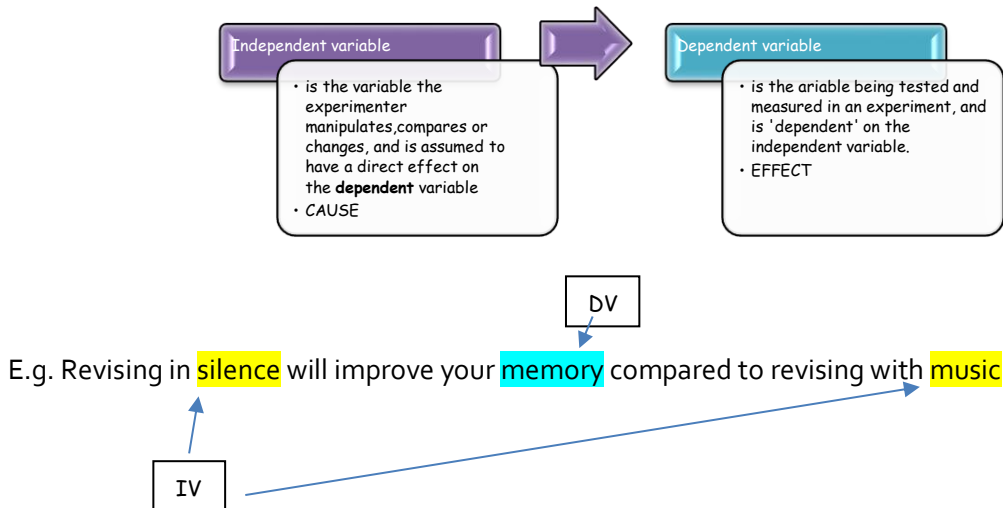
Task 1

In the table below, decide what type of hypothesis is stated. Be prepared to explain your answer.

Example	Null/alternative (directional/non-directional)
Psychology teachers prefer the taste of Coca-Cola to the taste of Pepsi.	
The consumption of daily fish oil supplements will have no effect on the concentration levels of children when completing schoolwork.	
Women solve jigsaw puzzles faster than men.	
There will be a difference between the number of attempts needed to learn a simple maze by a group of five rats and by One Direction.	
Women will be no more likely than men to wait for a green light to appear at a pedestrian crossing before crossing.	
There will be a difference between the scores of males and females on a standard IQ test.	
There will be no difference between the number of tomatoes produced by plants in grow bags and plants in the ground.	
Bulls will charge more often when presented with a red rag, than when presented with a blue rag.	
Children aged 5-10 are able to name more cartoon characters than teenagers aged 13-18.	

Variables

A variable is just something that can **change**, or **vary**. In an **experiment** the researcher is trying to find out whether a particular variable, the **independent variable** (**IV**) has an effect on a specific aspect of human behaviour or mental process, the **dependant variable** (**DV**).

Independent variable
- is the variable the experimenter manipulates, compares or changes, and is assumed to have a direct effect on the **dependent** variable
- CAUSE

Dependent variable
- is the ariable being tested and measured in an experiment, and is 'dependent' on the independent variable.
- EFFECT

DV

E.g. Revising in silence will improve your memory compared to revising with music

IV

Task 2

Complete the table below, identifying the IV & DV, the hypothesis type and any extraneous variables that could impact the study.

	IV	DV	Hypothesis type
There will be a difference in the hyperactivity levels of people who eat sweets and people who eat vegetables.			
There is a difference between how participants who listen to music rate their mood and how participants who sit in silence rate their mood.			
There is a difference in how many words are recalled if they are presented visually or acoustically.			

However, in order to be certain that any changes in the behaviour being measured are caused by the **manipulation** of the independent variable, everything else must be controlled by the researcher and kept **constant (standardised)**.

For example, in an experiment investigating the effect of noise (IV) on memory (DV) all other variables, called **extraneous variables (EV),** must be controlled, such as the time given to each participant to learn the material to be memorised, the testing room, temperature and the time of day the testing takes place. If they are not controlled for, they can affect the DV and therefore we cannot conclude that our results are reliable and valid.

Examples of extraneous variables:

Task 3

Complete the table below by identifying any potential extraneous variables and how you could ensure that they don't affect the DV.

Research Study	Extraneous Variable(s)	How could it be overcome?
An investigation into the effect of organisation on memory. A list of 50 items that could be bought at a supermarket were used. One group saw the words organised into categories such as fruit, dairy products and cleaning materials. The other group saw the same words presented randomly.		
An investigation into the effects of day care on aggression. A group of children who started day care before the age of two years were compared with a group of children who started after the age of two years. The researcher assessed each child and gave them an aggression score.		
An investigation into the effect of rewards in higher education. One college offered a £20.00 reward to its students for each AS level they achieved at grade A. A different college in the same area didn't give any monetary awards to its students for achieving an A grade.		

Hypothesis Writing

How do I write a fully operationalised hypothesis?

The general format for writing a Null hypothesis is:
"There will be a no difference in the [DV] by the participants [IV condition 1] compared to participants [IV condition 2]"

The general format for writing a non-directional hypothesis is:
"There will be a difference in the [DV] by the participants [IV condition 1] compared to participants [IV condition 2]"

The general format for writing a directional hypothesis is:
"The participants who [IV condition 1] will (more/less/higher/lower/greater/ fewer DV) compared to participants who [IV condition 2]"

Task 4

For each of the IV and DVs below:

- Create a null **AND** alternate hypothesis
- Remember you can choose directional (one-tailed) or non-directional (two tailed) for the alternate hypothesis.
- Ensure you operationalise the variables first.
- The first one has been done for you- can you identify the type of hypothesis it is and write the other version?

IV & DV	Hypothesis
drinking Red Bull or water performance on a memory test	The participants who drink 250ml of Red Bull 30 minutes before the memory test will recall more words correctly compared to the participants who drink 250ml of water before the memory test.
time spent sleeping mark obtained in an exam	
sad/happy comfort eating	

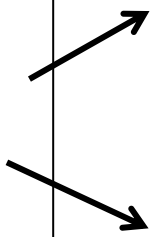|	
audience/no audience time taken to complete a maze	
marital status stress levels	
number of Facebook friends sociability	
alcohol reaction time	
gender athletic ability	

Experimental designs

What is an experimental design?

Experimental design describes the way participants are allocated to experimental groups (or conditions) of an investigation. There are two that you need to know for GCSE – independent group & repeated measures.
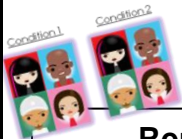
Condition 1   Condition 2
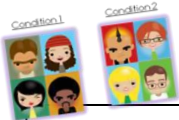
Independent Groups/Measures

What is it?

Strengths

Weaknesses

Condition 1   Condition 2

Repeated measures

What is it?

Strengths

Weaknesses

Key terms linked to experimental design:

Random allocation:	Counter balancing:	Order effects:
refers to the how experimenters divide participants into each experimental condition, to reduce any bias in the distribution of participant characteristics.	which means testing different participants in different orders. For example group A might complete condition 1 and then condition 2, whereas group b might complete condition 2 first and then condition 1.	Order effects can occur in a repeated measures design and refers to how the positioning of tasks influences the outcome e.g. practice effect or boredom effect on second task

For each of the experiments below, decide which design was used. Prepare to justify your answer.

1. In order to assess the effects of fatigue on reaction times, a researcher gave participants a target detection test in which they pressed a button every time a dot appeared on the screen and the reaction time was recorded. The participants did the test twice, once first thing in the morning and once last thing at night.

2. In order to assess the effect of organisation on recall, a researcher randomly assigned student volunteers to one of two conditions. In condition one participants attempted to recall a list of words that were organised into meaningful categories, whereas in condition two the participants attempted to recall the same words but randomly grouped together.

3. In order to assess the difference in reading comprehension between 7 and 9-years old, a researcher recruited a group of each from a local primary school. They were given the same passage of text to read and then asked a series of questions to assess their understanding.

4. In order to assess the effectiveness of two different ways of teaching reading, a group of 5-year-olds were recruited from a primary school. Their level of reading ability was assessed, and then they were taught using scheme 1 for 20 weeks. At the end of this period, their reading was reassessed, and a reading improvement score was calculated. They were then taught using scheme 2 for another 20 weeks and another reading improvement score was calculated at the end. The two reading improvement scores for each child were then compared.

Challenge yourself: Alton Towers have commissioned you to conduct research into whether rollercoasters or water rides are more exciting for visitors. How would you carry out a FIELD experiment using each design?

Independent groups	Repeated measures

Task 2

WHICH EXPERIMENTAL DESIGN: choose which design **would be best** for each study. For some there is **no choice,** for others you should decide which would be **most appropriate**. **Justify your choices.**

a) A study to see if there is a difference in the ability of grey and white rats in learning to run a maze.

b) A study to investigate whether a twin born first is more confident than a second-born twin.

c) A study to see if watching violent television programmes is likely to make children aggressive.

d) A study to investigate whether people are more likely to make a risky decision when they are in a group than when they are alone.

e) Research into finding a cure for fear of spiders, comparing a treatment group with a non-treatment group.

**f)** An investigation into whether people prefer gin & tonic or vodka & lime.

Peer assess!

In the space below, create four overviews of a study and allow your peer to guess which experimental design you are using.

Populations and sampling

After designing an excellent piece of psychological research, we need to recruit some participants to take part. Obviously we can't use everybody from our **target population** that we are interested in studying, so we need to select a sub-set of those people, known as a **sample**.
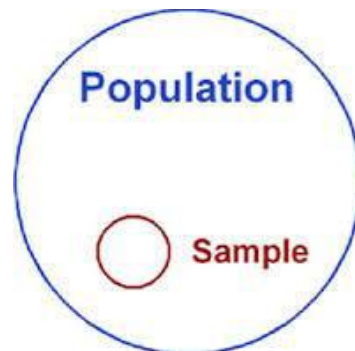
Ideally, the sample in any psychological study should be both **representative** and **generalisable**. Representative refers to the sample being an accurate cross-section of the target population. If someone uses a sample of only males, then it is unlikely to be very representative (unless the target population is exclusively male). An advantage of having a representative sample is that the results of the study will be generalisable. If our stress psychologist wants to apply their results to full-time employees, but recruits an unrepresentative sample made up mostly of part-time employees, then they will not be able to generalise the findings to full-time employees.

HINT

In order to increase the representativeness of a sample, it is easier to recruit a larger sample. Large samples are more likely to be representative of the target population.

Task 1

There are three ways of recruiting a sample that you need to know. Draw a line linking the sampling method with the correct definition below.

Random sampling	A sample selected by convenience, where the researcher recruits whoever is available at the time.
Opportunity sampling	A sample selected through volunteers, who usually respond to an advert.
Self-selected sampling (i.e volunteer sample)	A sample selected using chance, where every member of the target population has an equal chance of being selected.

Task 2

Next to the sentences below, state whether they could be used to recruit either a random (R), opportunity (O), or self-selected (S) sample.

- By putting the names of a target population 'into a hat' and drawing out the required number for the sample.
- Using family or friends because the researcher has regular contact with them.
- Using random number generator software and choosing people whose numbers correspond to those selected.
- Advertising for participants (e.g. in a magazine/newspaper, through posters on a university campus).
- Using people that are in the vicinity, for example, university students, work colleagues, or local residents.
- Posting a survey online to see who will respond.

Task 3

Use the hints below to complete the table of strengths and weaknesses of each sampling method. Make sure you expand on each hint so that you explain *why* it is a strength or weakness. Leave room in each box to add more when researching!

- Quick and easy.
- Bias.
- Effort required by the researcher.
- Small chance of unrepresentative sample.

Sampling Method	Strengths	Weaknesses
Opportunity		
Self-selected		
Random		

Ethical guidelines

The final part of planning research is arguably the most important. Psychologists are responsible for the welfare and protection of their participants. Recommendations are published by the British Psychological Society that outline the principles all psychologists must adhere to before they can be allowed to carry out their research. These are known as **ethical guidelines**.

In the UK the specific guidelines that need to be followed is written in the **British Psychological Society's Code of Ethics and Conduct**. Our stress psychologist looking at noise levels in the workplace must remember to plan their research so that participants are protected from psychological harm, are not being deceived by the researchers, and have given informed consent before taking part.

- Protection from **psychological harm** – As psychological research investigates human mind and behaviour, it is possible that the tasks participants complete during the experiment may cause harm to the participants. For example, our stress psychologist wants to purposely stress participants by making them work in noisy conditions, but this may distress the employees unnecessarily beyond the requirements of the study.

- **Deception** – Psychologists should not mislead participants. It is important that that participants are aware of what they will experience during the study, and that they do not leave the study believing they have done something they haven't. For example, our stress psychologist needs to make sure participants know that they are going to be placed in noisy conditions to test how this affects stress. However, sometimes it is necessary to deceive participants to avoid demand characteristics where they guess the aim of the research and change their behaviour.

- Lack of **informed consent** – All participants need to agree to take part, but in order to do this they need to be told exactly what is going to happen during the research (unless deception is justified). For example, our stress psychologist must tell potential participants that they will be required to complete tasks under noisy and silent conditions whilst their heart rate is being measured. However, sometimes people cannot give informed consent such as when being observed in a public place. There are also some people who are not capable of giving informed consent, such as children and vulnerable adults.

Task 1 :Define the following terms:

Ethical guidelines

British Psychological Society's Code of Ethics and Conduct

Psychological harm

Deception

Informed consent

Task 2

Luckily there are ways we can deal with potential ethical issues. Match the definitions below with the method used to minimise ethical breaches.

| Debriefing | | Participants are allowed to leave the study at any point, without penalty (e.g. if they are paid for participating). |

| Right to withdraw | | Participants are told what the study was about after it has finished, in case they were deceived beforehand. |

| Confidentiality | | All participant information is kept secret and their data is not identifiable as their own. |

Complete the table below by identifying any ethical issues that could arise from each research example, and which method you could use to deal with each issue.

Study Example	Ethical Issues	Method of dealing with issue
A psychologist wants to investigate the correlation between criminal behaviour and drug abuse.		
A psychologist plans an experiment to see if the amount of time children spend playing with toys affects their intelligence.		
A psychologist wants to measure the effect of a psychoactive drug MDMA on depression symptoms by comparing to a placebo.		

Peer assess!

In the space below, create four overviews of a study and allow your peer to think of ethical issues linked to these, and how they could deal with them.

Experiments

Once a psychologist has planned their research, taking into account their hypothesis, variables, experimental design, sampling method, and any ethical issues, they must then carry out their research.

The exact methods used to do research will depend on the issue that is being investigated, as well as whether the researcher wants to test for a difference or correlation.

Experiments

Experiments are a common method used by psychologists, mainly because they allow them to show cause and effect between their independent and dependent variables.

Task 1

There are three types of experiment that you need to learn about: **laboratory experiment**, **field experiment**, and **natural experiment**. Match these types of experiment to their definitions below.

Laboratory experiment	Where the researcher directly manipulates the IV within a realistic environment (e.g. school, hospital).

Field experiment	Where the researcher cannot directly manipulate the IV but can still measure its effect on the DV.

Natural experiment	Where the researcher directly manipulates the IV within a controlled environment.

Task 2

Our stress psychologist could easily carry out an experiment into noise levels and stress. Use the space below to outline how this could be done as a laboratory, field, and natural experiment.

Laboratory experiment

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Field experiment

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Natural experiment

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Task 3

Complete the table below, identifying whether the following examples are laboratory, field or natural experiments.

Example	Laboratory/Field/Natural
A psychologist tested the stress levels of the residents in a village after a volcano had erupted.	
A psychologist put up posters advertising for university students to take part in a study on reaction times. They had to press a button on a keyboard when an 'x' appeared on a screen.	
A psychologist recorded the number of people who didn't take their shopping receipt in a supermarket.	
A psychologist investigated the difference in IQ of children who had lived in an institution compared to those who were raised by their parents.	
A psychologist investigated how fast teachers reacted to the fire alarm depending on the pitch of the alarm.	

Task 4

There are both strengths and weaknesses to each type of experiment. Use the hints below to fill in the table.

- How realistic is the research setting?
- Is the experiment easy to replicate (do again)?
- Does the researcher have control over extraneous variables?
- Is the experiment more ethical than others?
- Is the experiment easy to standardise?
- Are participants aware they are being tested?

Experiment Type	Strengths	Weaknesses
Laboratory		
Field		
Natural		

HINT
Often a weakness of one type of experiment will lead you to a strength of another.

HINT
When evaluating experiments, make sure you are not simply being descriptive but are explaining why something is a strength or weakness e.g. don't simply say that a laboratory experiment takes place in a controlled environment, but say that this means it is easier to control extraneous variables.

Interviews

Interviews (and questionnaires) are both **self-report** methods, meaning that participants directly give information to the researcher. Interviews are typically done face-to-face but can also be conducted over the phone or video.

There are two types of interview that you need to know: **structured interviews** and **unstructured interviews**.

- Structured interviews – This is where the researcher decides the questions beforehand, and they will not change between participants. All participants are asked the same questions in the same order.

- Unstructured interviews – This is where the researcher does not have any pre-planned questions. This type of interview is more like a 'conversation' where the researcher's questions will depend on the participant's answers.

Task 1

Our stress psychologist could also conduct their research into noise levels and stress as an interview. Use the space below to plan a structured interview the psychologist could ask participants, consisting of 5 questions.

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Task 2

It should come as no surprise that there are also strengths and weaknesses of each type of interview. Complete the table below – but this time you don't have any hints!

Interview Type	Strengths	Weaknesses
Structured		
Unstructured		

Define the following key terms:
Experiment

Interview

Questionnaires

Questionnaires are a written self-report technique where participants are given a pre-set number of questions to respond to. They can be administered in person, by post, online, over the telephone, or to a group of participants simultaneously. Questionnaires can use open questions, closed questions or a mixture of both.

Personality Questionnaire

1. **How easy do you find it to make new friends? Circle one.**

   Very easy   Fairly easy   Fairly difficult   Very difficult

2. **Do you like being the centre of attention?**

   Yes/No

3. **Are you a worrier? Circle one. (1=not at all, 5=all the time)**

   1   2   3   4   5

4. **What would your ideal day out involve?**

   ....
   ....
   ....
   ....

5. **Do you enjoy being by yourself?**

   Always   Often   Sometimes   Rarely   Never

Closed questions – where there is a pre-determined set of answers to choose from

CLOSED

- e.g. 'Do you exercise?' may have set responses of 'yes/no', or 'I exercise 0/1/2/3+ times a week')

Open questions – where there is no restriction on how participants make their response

OPEN

- e.g. 'How does the sight of seeing dogs in a public place without a lead make you feel?'

Task 1

Look at the questions below and decide whether they are open or closed. Once complete, create the opposite type of question i.e. if the original question was closed, reword it to make an open question.

Question	Open/closed	Create the opposite
1. How would you describe your personality?		
2. Which do you prefer – Coca Cola or Pepsi?		
3. What do you think makes a good film?		
4. Why did you choose to study Psychology?		
5. Do you agree that Justin Bieber is evil?		

Task 2

Our stress psychologist thinks it would be much quicker and easier to carry out their research as a questionnaire. One downside to this is that now they cannot show cause and effect, but thinks it is more important to collect more participant responses. Use the space below to design a short questionnaire that could be used to investigate the relationship between noise levels and stress at work. Make sure you include at least 3 closed questions and 3 open questions…

📋 **Task 3**

What are the strengths and weaknesses of questionnaires?

- cross out the wrong underlined word to create an evaluation point
- circle the tick or the cross to state whether it is a strength or a weakness

✓	✗	closed questions produce qualitative/quantitative data which is easier to collate, analyse and display
✓	✗	in closed questions, respondents may be forced to select answers which represent/do not represent their real thoughts and feelings, leading to data which has lower/higher validity
✓	✗	open questions produce qualitative/quantitative data which can/does not provide unexpected answers and rich detail allowing/preventing researchers to gain new insights and greater information
✓	✗	open questions can be harder/easier to analyse due to the small/large number of possible answers, which can make it difficult/easy to make comparisons and draw conclusions
✓	✗	questionnaires are difficult/easy to repeat, meaning that data can be collected from a small/large number of people
✓	✗	an advantage/disadvantage of questionnaires over interviews is that respondents may feel more/less able to reveal personal information in a questionnaire than face to face
✓	✗	questionnaires are cost effective/ineffective as they can be distributed via the postal system and so can be completed with/without the researcher being present which reduces time and effort
✓	✗	the social desirability bias means that respondents may deliberately answer in a way which is socially acceptable/unacceptable
✓	✗	if a questionnaire is structured poorly, there may be leading questions/ participant effects causing respondents to answer in a particular way
✓	✗	only certain types of people fill in and return questionnaires, so there may be a sample bias/demand characteristics
✓	✗	questionnaires rely on a respondent's ability to report accurately, but an individual may not/may have sufficient insight into their own behaviour to be able to record it accurately
✓	✗	one of the biggest strengths/weaknesses of questionnaires is that different questions may be interpreted differently by different participants
✓	✗	a poorly constructed questionnaire might produce meaningless/meaningful data if the questions are too vague, as participants may provide random answers rather than leave it blank

Observations

An **observation** involves the researcher watching the behaviour of the participants. This can be achieved in many ways, each with associated strengths and weaknesses.

Overt or Covert

Overt

Definition

Strengths:

Weaknesses:

Covert

Definition

Strengths:

Weaknesses:

VS.

Participant or Non-Participant

Participant

Definition

Strengths:

Weaknesses:

Non-Participant

Definition

Problems

VS.

Naturalistic or controlled

Naturalistic

Definition

Strengths:

Weaknesses:

Controlled

Definition

Strengths:

Weaknesses:

VS.

A general problem with observations is **observer bias**. What does this mean?

_____

_____

_____

Task 1

Complete the table below by stating what type of observation would be most suitable for each research example.

Research Example	Type of Observation
a) A researcher secretly joins a religious cult to see if people are being brainwashed	*Covert participant naturalistic*
b) A researcher watches primary school children through a two-way mirror in a playroom to investigate co-operation	
c) A researcher secretly observes student behaviour by enrolling on an A Level course and pretending to be a mature student	
d) The head of a psychology department observes a GCSE class by watching a normal lesson, sitting at the back of the room	
e) A Head teacher observes a typical Year 8 Geography lesson. He sits with the students and takes part in the activities that they do, whilst writing down notes on his clipboard.	
f) A tribe agree for a researcher to observe the gender roles in their culture. The researcher joins the tribe and lives as they do for the duration of the observation.	

Case studies

Case studies involve the use of other methods such as interviews and observations. However, a key feature of case studies is that they always study a very small number of participants (maybe just a single participant). It is often necessary to carry out a case study when the group you wish to investigate are particularly small or rare, or if they are unusual in some way.

Task 1: Read the following case study about Phineas Gage

In 1848 Phineas Gage was working as a foreman on the construction of a railroad in the USA. Workers often used dynamite to blast away rock and clear a path for the railway. On 13 September, Gage was using a tamping iron (a long hollow cylinder of iron weighing more than 6 kilos) to compact explosive powder into the rock ready for a blast. The iron rod hit the rock, creating a spark that ignited the explosives. The rod was propelled through Gage's skull, entering through his left cheekbone and exiting through the top of his head. It was later found some 30 yards away from Gage, "smeared with blood and brain".

Despite his horrific injury, within minutes Gage was sitting up in a cart, conscious and recounting what had happened. He was taken back to his lodgings, where he was attended by Dr John Harlow. The doctor cleaned and dressed his wound, replacing fragments of the skull around the exit wound and making sure there were no fragments lodged in the brain by feeling inside Gage's head with his finger. Despite Harlow's efforts, the wound became infected and Gage fell into a semi-comatose state. His family did not expect him to survive: they even prepared his coffin. But Gage revived and later that year was well enough to return to his parents' home in New Hampshire.

It seems that physically, Gage made a good recovery, but his injury may have had a permanent impact on his mental condition. Although accounts from the time are often unreliable, many sources report that Gage's character altered dramatically after his accident.

The damage to Gage's frontal cortex caused by the iron rod seems to have resulted in a loss of social inhibitions. The role of the frontal cortex in social cognition and decision making is now well-recognised; in the 19th century, however, neurologists were only just beginning to realise these connections. Gage's injuries provided some of the first evidence that the frontal cortex was involved in personality and behaviour.
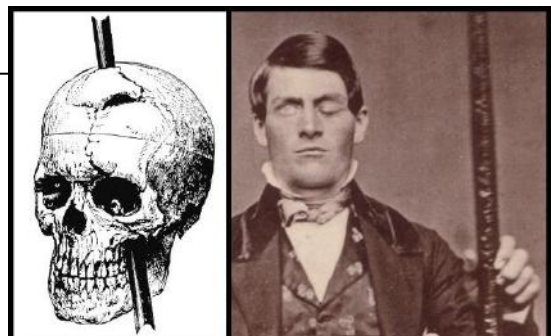
Task 2

Use the space below to list some individuals or groups of people who would be suitable for a case study.

- ……………………………………………………………………………………………………
- ……………………………………………………………………………………………………..
- ……………………………………………………………………………………………………..
- ……………………………………………………………………………………………………..

Task 3

Watch the video using this link https://www.youtube.com/watch?v=KkaXNvzE4pk and answer the questions below:

- ○ What was the patient known as?

- ○ Why is this?

- ○ What tests were conducted?

- ○ How was information gathered?

Strengths of using case studies	Weakness of using case studies
○ Rich, detailed insight can provide an insight on unusual, atypical behaviour. ○ May be preferred to more superficial forms of data collected (experiments or Q-aires) ○ Contributes to understanding of 'normal' functioning (by studying abnormal we learn about normal) ○ Generate hypotheses for future study and one single, contradictory instance may lead to revision of an entire theory	○ Generalisation is an issue due to small sample and unique situation. ○ Information in final report may be subjective as it is interpreted and selected by researcher. ○ Personal accounts from participant, family and friends may be inaccurate and prone to memory decay (especially if from childhood). ○ Overall low in validity because of the reasons above.

Task 4

Using the internet, research these famous case studies in Psychology and what they brought to Psychology.

David Reimer case

'Genie' case
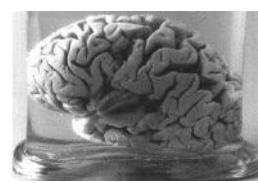
'Tan' case

Correlations

Correlations measure two co-variables to see if there is a **relationship** between them. Like case studies, correlations use other methods to collect data – mainly questionnaires and observations. However, unlike case studies, they use **quantitative data**. For example:

- Is there a correlation between number of crimes a father commits and number of crimes his son commits?
- Is there a correlation between social skills and mathematical ability?

The researcher will look to see if there is a **positive correlation** or a **negative correlation** (or **no correlation**).

- A **positive correlation** means that when one variable increases, so does the other.

E.g The hotter the weather, the more ice creams are sold.
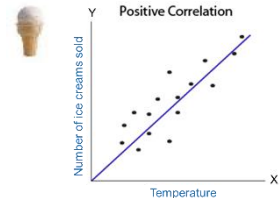
- A **negative correlation** means that when one variable increases, the other *decreases*.

E.g The warmer it is outside, the fewer layers of clothing one has to wear to be warm.
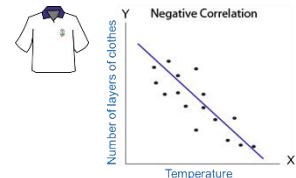
- A **zero correlation** means that there is no relationship between the two variables.

E.g There is no relationships between the number of years an student has spent outside of education and how successful they are in an Access course.

Task 1

What type of correlation do you think the following co-variables would show?

1. Temperature and amount of work completed in lesson
2. Amount of revision done and exam scores
3. No. of pets and reading ability
4. Amount of exercise and hours slept

Task 2: A psychologist investigated how many stressful incidents participants reported in a four week period and correlated this with a stress score. The higher the stress score, the more stress a participant was experiencing.

Plot the data from the study using a scatter diagram and decide what type of correlation is shown:

Participant	1	2	3	4	5	6	7	8	9	10
No. of stressful incidents	15	12	8	4	23	15	9	10	18	7
Stress score	12	10	5	7	19	14	3	8	20	5

Plot one variable on the x axis and the other on the y axis – it doesn't matter which way round. Each cross you plot will represent one participant.
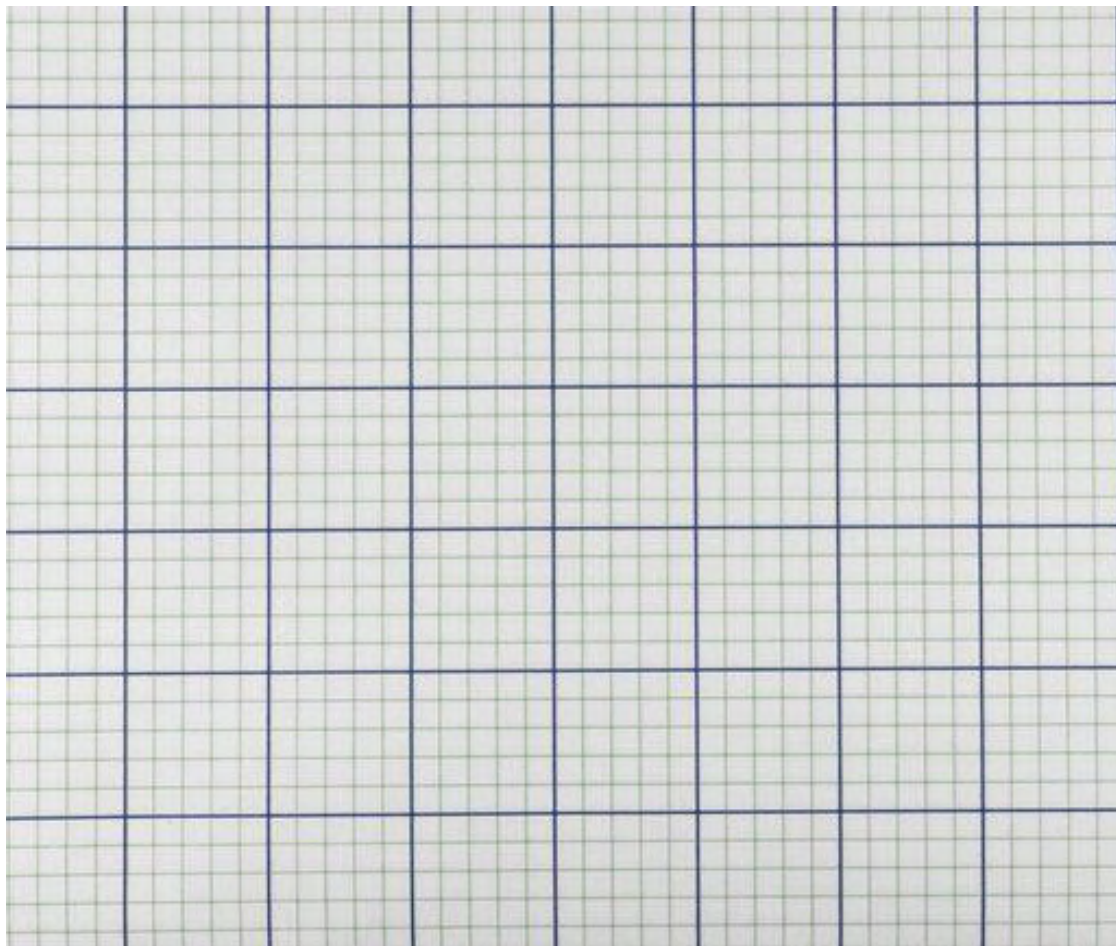
What type of correlation does this show? Contextualise this.

_____

_____

_____

Correlation coefficient

Correlations show the strength and direction of the relationship between the two co-variables. Both the strength and direction of a correlation is represented in a **correlation coefficient**. A correlation coefficient of +1 represents a perfect positive correlation, -1 would show a perfect negative correlation, and 0 would indicate no correlation at all. Sometimes correlation coefficients will be somewhere between, for example +0.85 shows a strong positive correlation, and -0.35 shows a weak negative correlation.

Strong Negative Correlation | Weak Negative Correlation | No Correlation | Weak Positive Correlation | Strong Positive Correlation
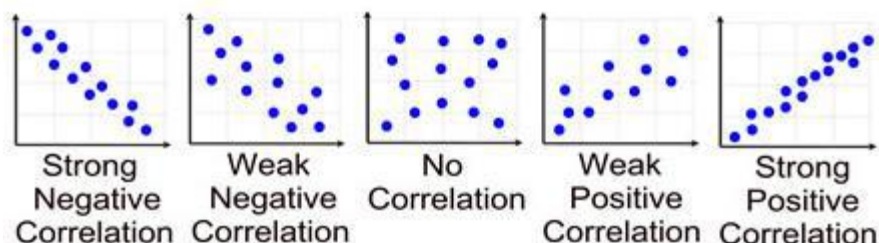
Task 3:

Match up the correlation coefficient on the left, with the correct interpretation on the right. One of them is done for you.

0.99		Strong negative correlation
-0.21		No correlation
-0.01		Weak positive correlation
0.55		Moderate positive correlation
0		No correlation
-1		Strong positive correlation
-0.62		Moderate negative correlation
0.34		Weak negative correlation
-0.8		Perfect negative correlation

Evaluating correlations

Task 4: Read the following evaluation points of correlations. Label them as *strengths* or *weaknesses.*

Correlations allow psychologists to carry out investigation on things that cannot be experimented on. For example, it would be unethical to manipulate people's hormones levels in an experiment to see if it gives them depression. However, it is possible to simply measure people's depression levels and then correlate these were their existing hormone levels.

Although correlations can inform us about the *relationship* between variables, it does not tell us which variable *causes* the other. Only experiments can do this reliably because they are able to control all other variables. For example, if a psychologist finds a positive correlation between depression levels and hormone levels, they cannot be sure whether depression affects hormone levels or whether hormone production affects depression.

Correlations need to use quantitative data, which can lead to a lack of *construct validity*. For example, although it might be *reliable* to measure hormone levels, some psychologists would argue that it is not valid to measure something complex like depression in terms of numbers.

Correlations have high levels of *ecological validity* compared with experiments as nothing is set up or manipulated.

Use the space below to make other evaluations points for correlations:

Types of data

Once a piece of research has been planned, and carried out, the psychologist must then analyse and interpret their results – otherwise all we would have is a bunch of meaningless numbers or interview transcripts! Another important part of analysing research is for the psychologist to acknowledge any drawback or weaknesses of their research, because as we have seen there are advantages and disadvantages to all methods.

Quantitative and qualitative data

There are two main types of data that can be collected from research.

Quantitative data	– This type of data is numerical and can be gathered from questionnaires or experiments. Quantitative data can be raw scores from a questionnaire, or percentages of participants who completed certain tasks during an experiment. The good thing is that with quantitative data we can calculate patterns and trends.
Qualitative data	This type of data is descriptive and often comes in the form of words. Qualitative data is most often collected through interviews, but if a psychologist was to ask a toddler to draw a picture of how they felt after losing a game, this would count as qualitative data too. Qualitative data gives us much more depth and detail because it shows how the participants interpret and perceive events and the meaning they attach to them.

Task 1: Decide whether the following examples would produce qualitative or quantitative data.

	Quant or Qual?
Participants' reaction times on a driving simulator	
Recollection of a traumatic childhood event	
An interview of a students opinion on climate change	
An 'attitude to Jeremy Corbyn' questionnaire with a series of "yes/no" questions	
Scores on a maths test	
A verbal record of a school bullying incident	
A tally chart of how many times Southmoor students use TikTok in a day	
A recovering patient describes his experience of schizophrenia	

Task 2: Think about how crime is measured. Give some examples of how the government collect data about crime, and whether this would be quantitative or qualitative. **Use the space below.**

Evaluating quantitative and qualitative data

Task 3: Decide whether the following are **strengths** or **weaknesses** of **qualitative** or **quantitative** data.
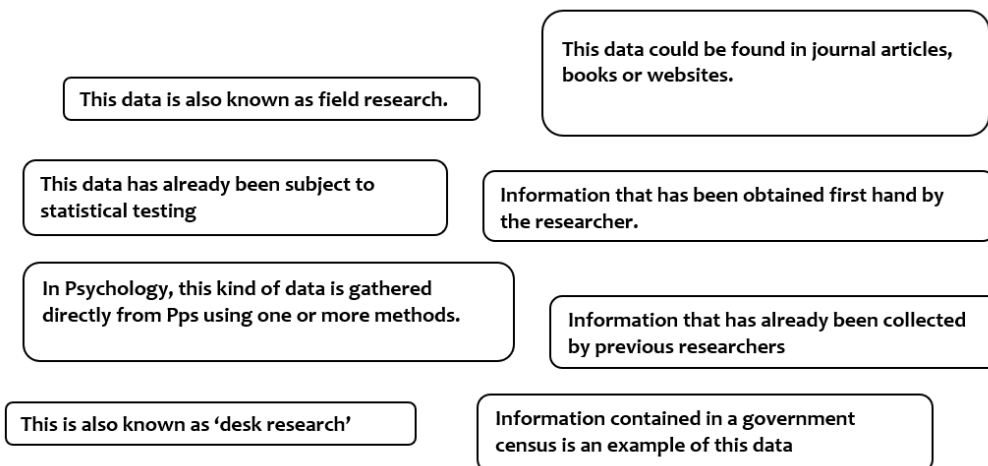
A.	It is easy to identify patterns and trends	**strength/weakness**	**qualitative/quantitative**
B.	It provides richer, more in-depth data that may make results more valid	**strength/weakness**	**qualitative/quantitative**
C.	Represents the complexity of human experience	**strength/weakness**	**qualitative/quantitative**
D.	Participants have freedom of expression	**strength/weakness**	**qualitative/quantitative**
E.	Easy to analyse as averages and ranges can be produced	**strength/weakness**	**qualitative/quantitative**
F.	Difficult to draw conclusions and detect patterns	**strength/weakness**	**qualitative/quantitative**
G.	Can be affected by subjective analysis = researcher bias	**strength/weakness**	**qualitative/quantitative**

Primary and secondary data

As well as quantitative and qualitive, there are two other types of data you need to know: **primary** and **secondary**.

Task 4: Using two coding strategies (e.g. colours or P/S), identify the characteristics of primary and secondary data

This data is also known as field research.	This data could be found in journal articles, books or websites.
This data has already been subject to statistical testing	Information that has been obtained first hand by the researcher.
In Psychology, this kind of data is gathered directly from Pps using one or more methods.	Information that has already been collected by previous researchers
This is also known as 'desk research'	Information contained in a government census is an example of this data

Task 4: Identify which of the examples are primary or secondary data

	Primary or secondary?
An experiment to see if males or females are more susceptible to visual illusions	
A comparison of crime statistics in inner city and rural areas to see if there is a difference	
An interview with people who have OCD about their experiences	
A researcher assesses how GCSE results of schools in her local area compare with national averages	

Task 5: Decide whether the following are **strengths** or **weaknesses** of **primary** or **secondary** data.

A.	The psychologist can trust the data and knows it has not been misinterpreted by someone else.	strength/weakness	Primary/secondary
B.	it saves time and money, and the psychologist may have access to data that they would not be able to collect otherwise.	strength/weakness	Primary/secondary
C.	It can be time consuming and expensive	strength/weakness	Primary/secondary
D.	The researcher may question the validity of the data if they try and use it for their own research	strength/weakness	Primary/secondary

Peer assess!

In the space below, create four overviews of a study and allow your peer to think about what type of data could be gathered i.e. quantitative vs qualitive, primary vs secondary.

Descriptive statistics

This is data that **summarises** trends or patterns (rather than just the raw data). It describes the information in more general terms so that we can make sense of it.

Measures of central tendency (averages) are a good example of this – if a teacher was looking at the scores of girls and boys in a maths test they would look at how each group did on *average*, rather than looking at the individual scores. This would help the information to make sense as the teacher might be able to see a pattern.

Task 1: Complete the table below

Measure of Central Tendency	Description of how to calculate it	Strength	Weakness
Mode			
Median			
Mean			

Task 2: Calculate the mean, median and mode for the following data sets.

	Mean	Median	Mode
2, 14, 5, 12, 7,2			
25, 53, 37, 17, 62, 93, 41, 27, 33, 19,19			
1.5, 1.7, 1.8, 1.9, 2.0, 2.0, 2.1, 2.2			
4, 5, 5, 7, 7, 7, 8, 9, 9, 10, 12, 12, 12, 12, 13			

Peer assess!

In the space below, create two sets of data and allow your peer to work out its mean, median and mode. Make sure you have the answers yourself to check!

Measures of dispersion (range) is also beneficial when describing our data, as it helps us to understand how spread out the data is. For example, when analysing maths scores is it important to see how many students had extremely low scores as well as extremely high scores. We measure the spread of scores using the range.

Task 3: Complete the table below

Measure of dispersion	Description of how to calculate it	Strength	Weakness
Range			

Task 4: Calculate the range for the following data sets.

	Range
12, 10, 8, 4, 18, 8	
1, 4, 5, 20, 22, 19	
10, 19, 21, 18, 22	
4, 5, 5, 7, 7, 7, 8, 9, 9, 10, 12, 12, 12, 12, 13	

Task 5: Exam questions:

1. A psychologist wanted to see if verbal fluency is affected by whether people think they are presenting information to a small group of people or to a large group of people. A stratified sample of 20 people was obtained from a company who employed 60 men and 40 women. The participants were told that they would be placed in a booth where they would read out an article to an audience, who would not be present, but would be able to hear them and would not be able to interact with them. In condition A: 10 participants were told the audience consisted of 5 listeners, and condition B: participants were told the audience consisted of 100 listeners. Each participant completed the study individually and the psychologist recorded each participant's presentation. The results of the study are given in **Table 1.**

Table 1: Mean number of verbal errors and range for both conditions

	Condition A (believed audience of 5 listeners)	Condition B (believed audience of 100 listeners)
Mean	11.1	17.2
Range	1.30	3.54

a) What conclusions might the psychologist draw from the data in **Table 1?** Refer to the means **and** ranges in your answer. (6 marks)

b) The psychologist used the range as a measure of dispersion in this study but found that one person in Condition A had made an exceptionally low number of verbal errors. Explain the effect this will have on the range and the weakness of this measure of dispersion. (3 marks)

2. A study investigated the map reading ability of males and females. Participants were score on their map reading ability with a higher score representing a stronger ability. Look at the table and answer the questions that follow:

Results Table of means and range for the map reading scores of male and female motorists.

	Map Reading Scores	
	Males	**Females**
Mean	15.4	5.25
Range	2.70	2.22

What do the mean **and** range values suggest about the male and female performances in the investigation? (4 marks)

Use this space for your workings for the exam questions above

Mathematical content
(other descriptive statistics)

As well as measures of central tendency (mean, median and mode) and measures of dispersion (range), there are other ways to describe data. As part of your GCSE maths, you should have already covered these – so don't worry! If you do get stuck, use the digital textbook to help you.

- Ratio
- Percentages
- Fractions
- Decimals
- Significant figures
- Standard form
- Estimations

Ratio

A ratio is how much of one thing there is compared to another thing. For example 8:10 means a ratio of 8 to 10. So, if there are 10 pieces of cake one person gets 8 and the other gets 2. Ratios can be simplified like fractions, so in this case both can by divided by 2 and is therefore simplified to 4:5

Part-to-whole-ratio is defined as the relationship between part of something and the whole of it. For instances if there are 10 apples and you get 3, this is said to be **3:10** which is a part-to-whole ratio.

Part-to-part ratio is defined as the comparison of one part to another part. For examples there may be 3 red apples and 7 green apples, this is said to be **3:7** which is a part-to-part ratio.

> **Examiner hint**
> Make sure your write your ration the right way around i.e the way it is presented in the question!

Task 1: Work out the ratios for the following studies

1. In a study involving 14 participants the number of participants who scored higher on a beep test after drinking an energy drink was 8. Show this in part-to-whole ratio form.
   [1 mark]

2. 120 participants took part in a study looking into facial expression recognition before and after alcohol. Results found that 92 participants showed a decrease in recognition time after taking alcohol. Show this in part-to-whole ratio form.

3. In the above study how many participants showed an increase and decrease? Show this in part-to-part ratio form.

4. In a psychology study 4 experimenters are required to run a study with 32 participants. How many experimenters will be required for 40 participants?

Percentages

Percent comes from the word 'per centum' meaning 100 - so percent literally means per 100. So, 1% is 1 in 100, 5% is 5 in 100 and so on. 100% means all.

To calculate percentages you need to divide by 100. So to find 32%, you divide 32 by 100 (32/100)

Here are some more examples.

To calculate 18% of 40   ⟶   18/100 = 0.18

                                       0.18 x 40 = 7.2

Examiner hint
You are allowed a calculator in the exam so make sure you have a scientific one to make percentages easier!

To calculate 45% of 70   ⟶   45/100 = 0.45

                                         0.45 x 70 = 31.50

Task 2: Work out the percentages for the following studies

1. If there were 120 participants in a study and 40 were in condition A, what percentage of participants was this? (Give your answer to 1dp).

2. What percentage of participants (in Q1) was in condition B? (Give your answer to 1dp).
[2 marks]

3. A study has 35 participants in condition A, and 25 in condition B. What percentage of participants is in condition A? (Give your answer to 1dp).

4. Participant 22 scored 4 out of 10 on facial recognition test. Express participants 22's score as a percentage.

5. Participants' maths scores were recorded before and after eating chocolate. The scores were out of 50. The mean score for the condition before chocolate was 27 and after was 45. Calculate the percentage increase before and after chocolate.(Give your answer to 1dp)

To convert from a percentage to a decimal	To convert a decimal to a percentage
The easiest way to convert a percentage to a decimal is to follow this formula: Remove the % sign and divide the number by 100 and then move the decimal two places to the **left**. So, 75% = 0.7 5	The opposite applies when converting from decimal to a percentage. So the decimal is moved two places to the **right**. Add percentage sign. 0.125 = 1 2 . 5 %

Task 3: Convert the following percentages and decimals.

1. The percentage of participants that scored higher after taking a caffeine capsule was 46%. What is this in decimal form?

2. The percentage of participants that dropped out of an experiment was 17%. What is this in decimal form

3. In study looking at introverts and extroverts amongst male and female participants, 58% of participants were female, and 42% were males. How many participants were female in decimal form?

4. In the Milgram experiment, results showed that 65% of participants administered an electric shock of 450 volts to the learner. Show this result in decimal form.

Fractions and decimals

Converting a decimal to a fraction: Work out how many decimal places you have (for example 0.75 has two decimal places and 0.125 has three decimal places)

For two decimal places, divide by 100
For three decimal places divide by 1000

Find the lowest common denominator (the biggest number that can be divided equally into both parts of the fraction)

Once analysis of data starts to take place, decimal form is often used. It allows portions of whole numbers to be represented. Each digit after the decimal point is 1/10 the size of the one before.

For example:

0.9 = 9/10

0.09 = 9/100

0.009 = 9/1000

0.0009 = 9/10000

Task 4: Convert the following decimals and fractions

1. Express 0.05 as a fraction
2. Express 0.2 as a fraction
3. Express 0.14 as a fraction
4. Write 40% as a fraction

Examiner hint
A diagram to help you convert between fractions, decimals and percentages!

put over 100   x 100

$\frac{50}{100}$ = ½   **50%**   **0.5**

FRACTION   PERCENTAGE   DECIMAL

x top by 100, ÷ bottom   ÷ 100
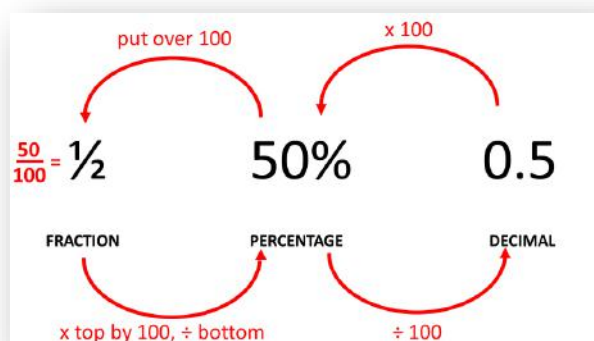
Significant figures

This is a way of **rounding** off a number so it is approximate but accurate, and it can be done before or after a decimal point. A S.F. is any number, other than a zero, however, once you find your first S.F., the others can include a zero- for example- 0.0000900000789 to 6 S.F. The first S.F. is any number **other than** a zero, and so this is the 9. The rest of the S.F. can now include zeros, and so 0.0000900000789 to 6 S.F. is 0.0000900000.

Task 5: Answer the following:

1. What is 7.942 to 2 significant figures?

2. What would you get if you wrote 0.0000058763 correct to 2 significant figures?

3. What is 12,458,963 to 2 significant figures?

4. What is 478,635 to 1 significant figure?

Standard form

This is a way of simplifying very small or vey large numbers, for example 125,000,000,000 or 0.00000000000657.

Converting a number to standard form:

In order to convert a number into standard from, the decimal point is placed after the first number that is NOT a 0 and then it is multiplied by 10 to the power of .... - this figure will be the number of figures after or before the original number, including those in decimals. For example 4000 in standard form would be 4 x 10^3, as 4 has 3 figures after it. 125,000,000 in standard form would be 1.25 (as the decimal point is placed after the first number that is NOT a 0) x 10^8, as the 1 has 8 figures after it.

10 can also be to the power of minus figures if the number is a decimal, for example in the case of 0.0000043, the standard form would be 4.3 (as the decimal point is placed after the first number that is NOT a 0) but 10 must be to the power of a negative figure to end up with this decimal figure. So in this case the standard form would be 4.3 x 10^{-6} as there are 6 figures **before** the first figure of 4.

Task 6: Test yourself:

- *A daily dose of an atypical antipsychotic drug contains 0.0004 grams of the active ingredient. What is this in standard form? _____*
- *The cortisol level in a participants bloodstream was measured as 0.00000461. What is this in standard form?_____*
- *1,567,000,000 _____*

Interpreting values in standard form:
In order to change a value from standard form to its original format you must firstly, work out the value of 10. For example 5.8 x 10^4. The value of 10 in this case is 10 x 10 x 10 x 10 which is 10,000, and then you multiply the figure (5.8) by this value, giving you 58,000. If 'the power of' is a negative, then your figure or 10 will have 4 zeros before it (with a decimal point being placed after the first zero), e.g. 0.00010. Therefore the standard form of 5.8 x 10^{-4}, will become   5.8 x 0.00010 = 0.00058.

What is 1.35 × 10^4 as an ordinary number? _____

What was 7.77 x 10^{-8} originally? _____

Estimations

These can be useful for researchers to save time conducting unnecessary calculations if on estimate there is no clear difference. It can also help a researcher decide early whether to continue with a piece of research if estimates show results may not be as expected.

Estimating for decimals will usually require you to round to the closest whole number, e.g. 7.78 to 8. Estimating for larger numbers will usually require you to round to the closest appropriate number, e.g. 29,175 to 30,000.

Task 7: Complete the following estimations

1. Estimate the total score from a study in which 185 participants completed a survey and the average score was 4.3. Show your working and check your answer.

2. Estimate the amount of time needed to process 130 participants when each participant procedure takes around 17 minutes. Show your working and check your answer.
[1 mark]

Exam practice!

1. In a study, 20 males and 20 females completed a map reading task and the researcher obtained the following

The mean map reading score for both groups together was 12.23. what percentage of the male group scored above the mean score and what percentage of the female group scored above the mean score? Show you calculations. (4 marks)

Male map reading scores	17, 20, 13, 12, 13, 11, 8, 17, 12, 15, 14, 18, 20, 17, 17, 15, 13, 10, 5, 9
Female map reading scores	12, 8, 10, 11, 4, 2, 11, 18, 17, 12, 13, 10, 3, 15, 11, 9, 10, 11, 16, 10

2. Twenty primary school teachers were sent to attend a training course on behaviour management run by an educational psychologist at a university. Before the training course, and again after training, the teachers were asked to rate how confident they were in managing difficult behaviour. The researcher compared the before and after scores to see how many would rate their confidence as 'better', 'worse' or 'the same'. The results are shown in **Table 1** below.

Table 1

	Confidence better	Confidence worse	Confidence same
No. of teachers	16	2	2

3. A researcher is investigating gender differences in classification of attachment. They conduct a study using Ainsworth's 'Strange Situation'. The results are shown in **Figure 1** below.

Figure 1 The proportions of boys and girls who are classified as securely attached
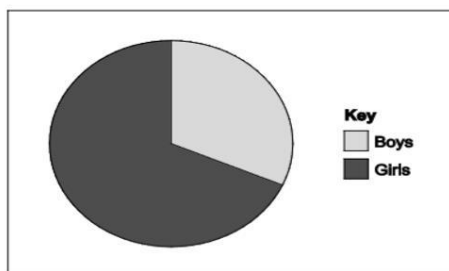
Using the information in **Figure 1**, estimate the percentage of **boys** and **girls** that are securely attached.

In a study, 150 children were classified as securely attached. Of these, 40% were boys. How many of the 150 children were girls? Show your workings.

Tables, chart and graphs

As well as describing data through percentages, fractions etc psychologists can also display their findings visually to see trends and patterns. Quantitative data can be represented visually using techniques such as tables, charts and graphs. Again, as part of your GCSE maths you find all of the below familiar. You must be able to draw and read from the following types:

- Frequency table (Tally chart)
- Bar chart
- Pie chart
- Line graph
- Scattergram (*you will cover this in correlations lesson*)
- Histogram

| <u>Type</u>	<u>What does it look like?</u>	<u>What is it best used for?</u>
Frequency table	A table to show students' preferred way of learning	A **frequency table** is also known as a tally chart. These are useful for recording raw data from observations, or summarising results.
Bar chart	A bar chart to show students' preferred way of learning	Data that is in categories or is discrete (I,e non-continuous) should be in presented as either a bar chart or pie chart. It is important to remember that pie charts must add up to 100%, whereas this is not necessary for bar charts.
Pie chart	A pie chart to show students' preferred way of learning	
Line graph	A line graph to show the number of words recalled in two conditions: with cues and without cues	A **line graph** is used for representing continuous data (when participants are given a score).
Scattergram		A scattergram should be used when you have paired numerical data.
Histogram	A histogram to show how many points students got in an exam	A **histogram** looks similar to a bar chart but is used to represent continuous data. We are able to group this continuous data into intervals (useful if we have a wide range of scores or variables):

Task 1:

Use the information above to suggest which type of table, chart, or graph would be most suitable for each research example.

Research Example	Type of Table, Chart, or Graph
A psychologist measures patients' depressive symptoms after different doses of various medications.	
A psychologist is recording the number of times children in different stages of cognitive development laugh at jokes.	
A psychologist has recorded the types of crimes committed by young offenders in the past year.	
A psychologist carried out a repeated measures experiment to test the number of items recalled using different memory techniques.	

Drawing graphs!

Part A: Below you will find some statistics of crime in the Sunderland area in May 2021. Complete the tasks.
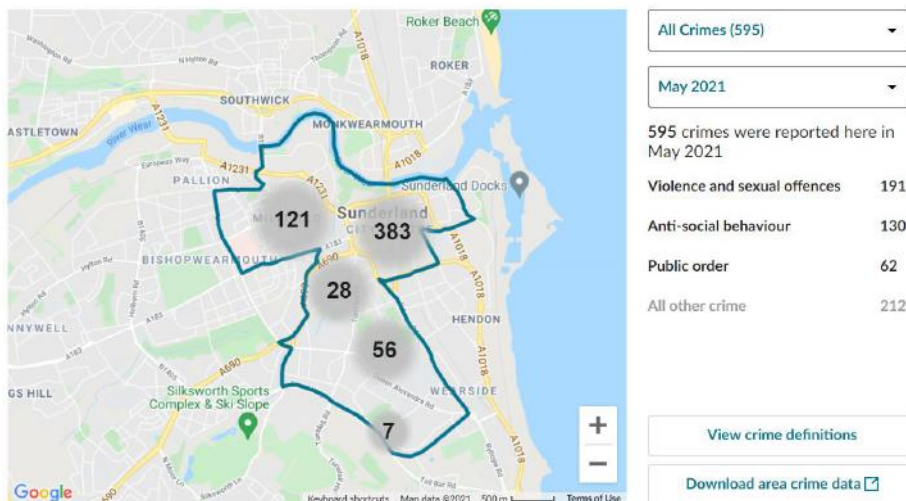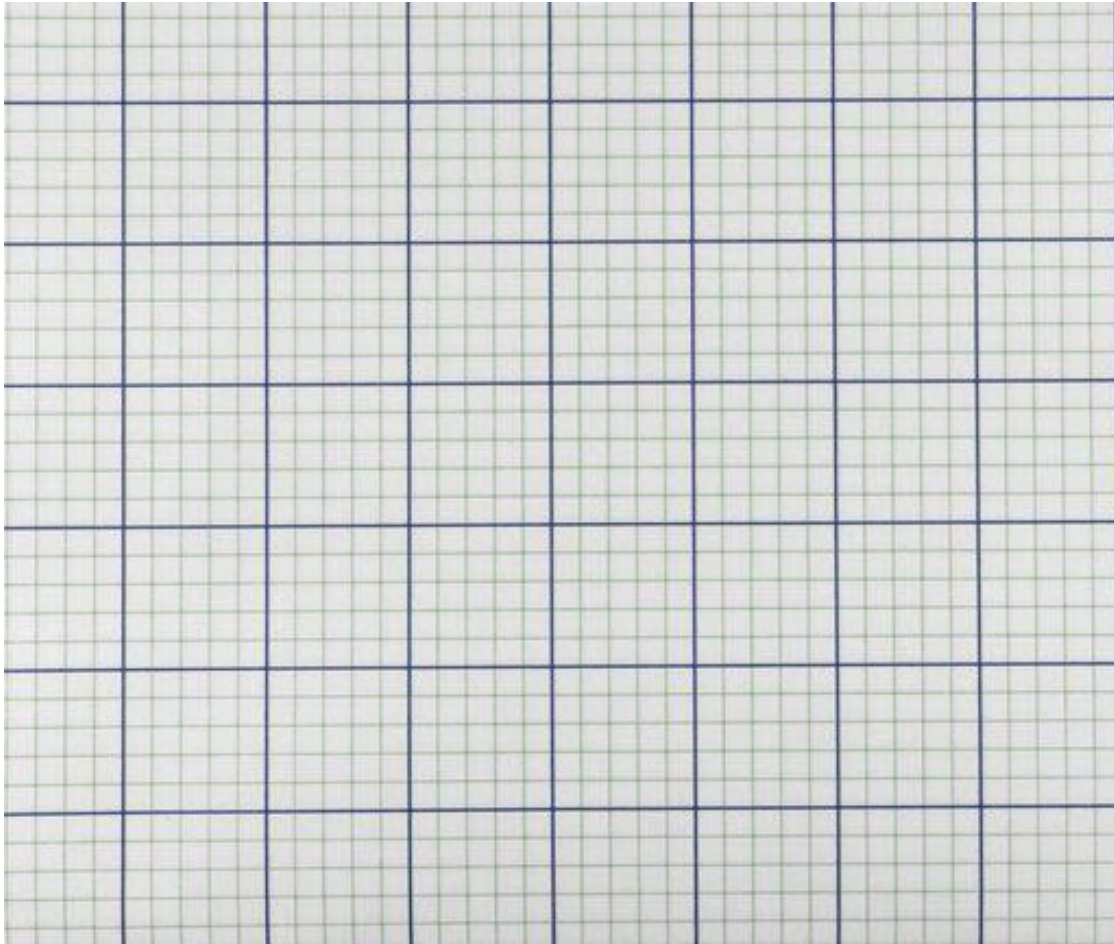

Part A Tasks:

1. Using the data above, create a **frequency table** of the crimes in Sunderland in May 2021
2. Using the data above, create a **bar chart** of the crimes in Sunderland in May 2021
3. Using the data above, create a **pie chart** of the crimes in Sunderland in May 2021

(Frequency table here)

(Bar chart here)

**(Pie chart here)** – you will need a protractor

Part B: Below you will find some statistics of crime in the Sunderland area over a 12 month period. Complete the tasks.

| Month		Total
Jun 2020		94
Jul 2020		63
Aug 2020		48
Sep 2020		35
Oct 2020		27
Nov 2020		39
Dec 2020		47
Jan 2021		39
Feb 2021		37
Mar 2021		51
Apr 2021		68
May 2021		52

Part B Tasks:

1. Using the data above, create a **Line graph** of the crimes in Sunderland over a 12 month period.
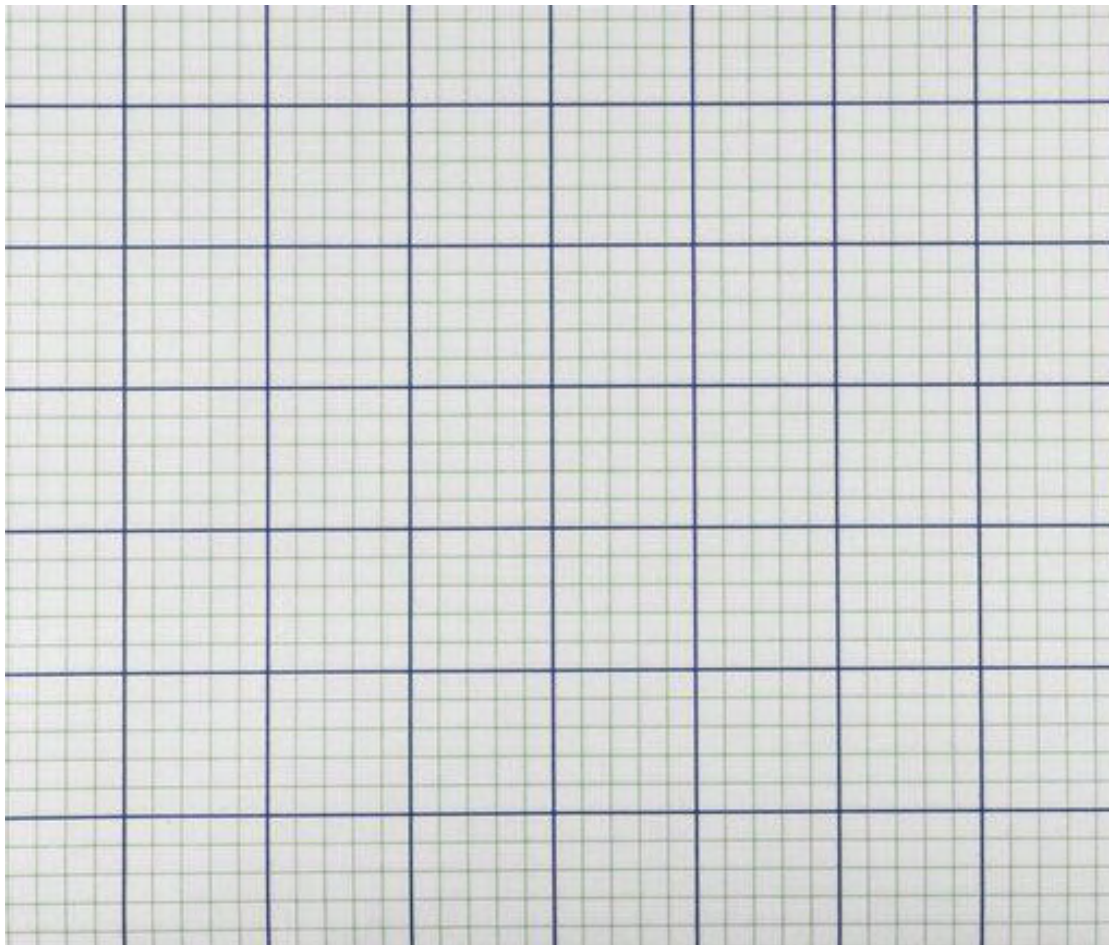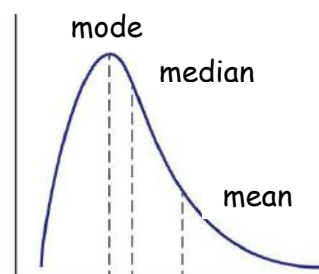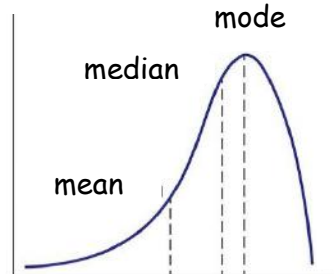
Distributions

A distribution shows how data is distributed, or spread out across the range. There are some variables, when measured in terms of frequency, that form a bell shaped curve which is called a normal distribution. E.g. Weight, IQ. The height of students would form a symmetrical distribution, with the majority of students falling around the middle area of the curve and few people at the extreme ends. The **mean, median and mode,** all fall on the same mid-point (line) of the curve.

mean
median
mode

Frequency (%)

50

25

0

100   200   300

Body Weight (lbs.)
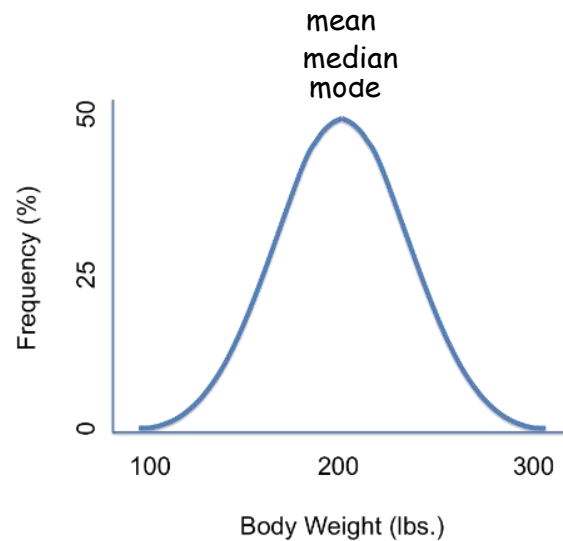
Some data does not form this symmetrical pattern, and instead produces a **skewed** distribution, which leans to one side or the other.

*If it skews to the left it is known as a negative skew*

mode
median
mean

mode
median
mean

If it skews to the left it is known as a positive skew

Question practice:

A psychologist devised a memory test and tested 200 participants. The results are shown in the distribution graph shown in **Figure 1**.
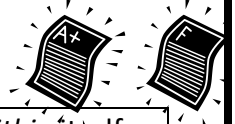
a)The psychologist decides to modify the memory test so that it will produce a more normal distribution. Briefly explain how he might achieve this. (4 marks)

(a) Negatively skewed

Mode
Median

Number of Participant.

X

Memory Test Score

Reliability and validity
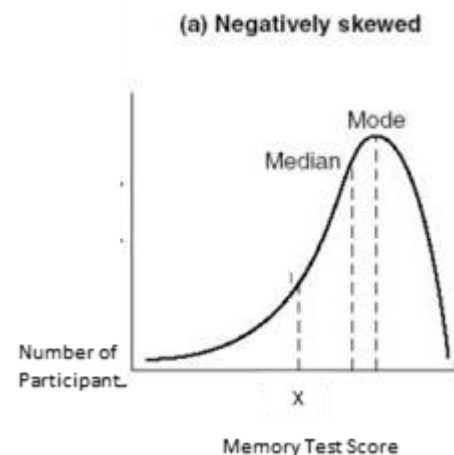
The final chapters of this Research Methods topic are all about evaluating research. You will often be required to outline the method or results of the core studies you look at, but most often it is more important to be able to criticise and discuss the strengths and weakness of how the research was designed and carried out.

Reliability is whether the results are <u>consistent.</u> If a study was carried out lots of times and each time found different results, it would not be very reliable.

Internal reliability	measures how consistent something like a questionnaire or test is *within* itself. For example, if an IQ test has easier questions at the start and harder questions at the end then this test does *not* have internal reliability. A test would have good IR if the questions were of similar difficulty and score them similarly on all questions
External reliability	refers to consistency across *time or situations*. For example, a measuring ruler has very high external reliability; if a researcher measured the height of the same adult on two different occasions, they would get the same result. If a psychological measure (e.g. IQ test) gave the same score to the same person on two different occasions then it would also have high external reliability.
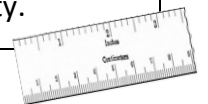
Unreliable results may also be down to the psychologists different perspectives on what is being studied. For example, if a psychologist wanted to measure levels of aggression in children at breaktime, they might believe that hitting is aggressive but swearing is not.
A good way to get round this is to have more than one researcher involved in a study. If the researchers <u>agree</u> on what is found, then the results have **inter-rater reliability**. This means that more than one person agrees that something has happened, so the results are more likely to be reliable.

Remember!!! Psychological measures are not as precise as physical measures e.g. rulers or clocks, and so similar scores on two separate occasions are enough to amount to external reliability. Also, if you gave the same test to the same participant twice, their score may change due to practice, boredom, demand characteristics ETC and so this must be taken into account when assessing external reliability.

Study Hint: The word 'reliability' is used outside of psychology and has the same kind of meaning. For example, a student who is reliable will consistently get their work done, but an unreliable car might not always start. Therefore, we trust the student but not the car!

Validity refers to how accurate and truthful research is – and does it measure what it sets out to measure. For example, if you wanted to measure a persons IQ, you wouldn't give them a Disney Princess quiz.

Task 1:
There are three types of validity you need to know: **ecological validity**, **construct validity**, and **population validity**. Match these types of validity to the definitions below:

Ecological validity		How far a research setting reflects real life.
Construct validity		How far a variable is measured accurately.
Population validity		How far a sample reflects the population.

Task 2: Read the study below and fill in the table

A psychologist conducted an investigation into the **halo effect,** the idea that the more attractive a defendant is perceived the less likely they will be found guilty by the Jury. There were 40 participants aged between 18-24, all white, from Kennington in London who took part in the experiment and watched a video of a **mock trial** for one hour. The trial documented the case of **Mrs Jones, who was accused of stealing £5000** from the bank safe where she worked. In one condition, 20 participants saw an **attractive Mrs Jones in the video,** while in a second condition the other half saw an unattractive Mrs Jones. Apart from the defendant all other aspects of the video were the same. The participants were asked to write down their answer individually without discussion on a piece of paper and place this in a collection box when decisions of guilt or innocence from both groups would then be calculated. It was found that only 50% of participants in the attractive condition said Mrs Jones was guilty, while 80% of participants in the unattractive condition said Mrs Jones was guilty.

Does this study have internal validity?	
Does this study have ecological validity?	
Does this study have population validity?	

Task 3: The below table shows potential threats to validity, and it is important that you know each key term, its description and how to deal with it. Complete the table below.

Issue	Description	How to deal with it
Demand Characteristics	Participants guess the aim, behave differently, to help/hinder, please you/screw you effect	
Observer effect	Participants behave differently as they know they are being watched (may exaggerate/stop behaviour)	
Social Desirability	Response on self report measures are based on what they think would be more socially acceptable	

Task 3: As a psychologist, how would you deal with each of the following issues to increase validity? Briefly outline your plans for the research:

1. You want to carry out an experiment to investigate how different people will help a stranger in need. However, you are concerned about the effect of **demand characteristics.**

2. You want to carry out an observation of the way that teachers deal with disruptive behaviour in the classroom. However, you are concerned about the **observer effect**.

3. You want to carry out a survey to ask teenagers about their use of social media in relation to bullying. However, you are concerned about the issue of **social desirability.**

Sources of bias

The most common weakness of psychological research is **bias**. This is because quite often it is difficult to recruit a truly representative sample, and also the researchers themselves are not impartial and objective but biased and subjective

Task 1: Match the sources of bias below to the correct definitions.

| Gender bias | | To favour certain age groups over others. |

| Cultural bias | | To favour one psychological theory over another. |

| Age bias | | To favour one gender over another. |

| Experimenter bias | | To favour particular cultures over others. |

| Observer bias | | To phrase a question to favour a particular view. |

| Questioning bias | | To interpret/record a behaviour to favour a certain view. |

Task 2: Complete the table below identifying the type of bias present, and how you could deal with it to improve validity as a researcher.

Example	Type of bias	How would you overcome it?
To have a sample containing only women but then generalising the results to both sexes.		
To design a memory experiment where the content is targeted at a teenage audience		
To assume that mental health problems are universal, after only studying a sample of British people.		
To measure a variable (aggression) in a way that is going to give results that supports a particular theory (e.g. that children from single parent families are more aggressive)		
To rate an offenders body language as defensive because there is an assumption that she has something to hide.		
To ask a question lie "Don't you think you need more sleep?" that suggests a particular response.		

END OF TOPIC

Now is the time to go through the checklist at the start of this booklet, making sure you understand each learning objective and are able to demonstrate this through the various tasks and activities throughout the booklet.

Application of research methods to units in Psychology
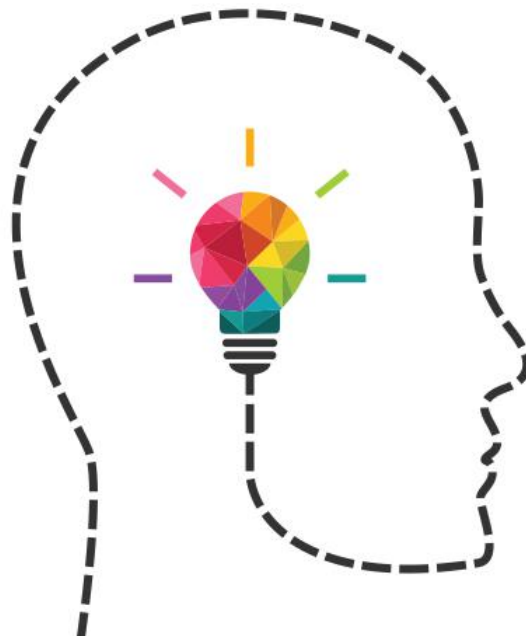
It is important to be able to apply your research methods knowledge to core studies. The next few pages encourage you to think about how you could apply different research methods terms to studies in the specification.

Core Study	Variables (Iv & Dv)	Experimental Design	Experimental Method(s) – i.e type
Cooper & Mackie (1986)			
Heaven (1996)			
Piaget (1952)			
Blackwell et al. (2007)			
Daniel et al. (1991)			
Tandoc et al. (2015)			

Core Study	Sampling Method	Bias
Cooper & Mackie (1986)		
Heaven (1996)		
Piaget (1952)		
Blackwell et al. (2007)		
Daniel et al. (1991)		
Tandoc et al. (2015)		

Complete the table below by stating whether each of the core studies you have learnt about show high or low amounts of validity.

Core Study	Ecological Validity	Construct Validity	Population Validity
Cooper & Mackie (1986)			
Heaven (1996)			
Piaget (1952)			
Blackwell et al. (2007)			
Daniel et al. (1991)			
Tandoc et al. (2015)			

Core Study	Source of Bias
Cooper & Mackie (1986)	
Heaven (1996)	
Piaget (1952)	
Blackwell et al. (2007)	
Daniel et al. (1991)	
Tandoc et al. (2015)	

Glossary

Age bias	
Alternative hypothesis	
Bar chart	
Bias	
Case study	
Cause and effect	
Closed questions	
Co-variable	
Confidentiality	
Consent	
Construct validity	
Control	
Control group	
Controlled observation	

Correlation	
Correlation coefficient	
Covert observation	
Cross-sectional study	
Debriefing	
Deception	
Demand characteristics	
Dependent variable	
Ecological validity	
Ethics	
Experiment	
Experimental design	
Experimenter bias	
External reliability	
Extraneous variable	
Field experiment	

Gender bias	
Generalisability	
Histogram	
Hypothesis	
Independent groups design	
Independent variable	
Inter-rater reliability	
Internal reliability	
Interview	
Lab experiment	
Line graph	
Mean	
Measure of central tendency	
Median	
Mode	
Natural experiment	

Negative correlation	
Non-participant observation	
Normal distribution	
Null hypothesis	
Observer bias	
Observer effect	
Open questions	
Opportunity sample	
Overt observation	
Participant observation	
Pie chart	
Population validity	
Positive correlation	
Primary data	
Qualitative data	
Quantitative data	

Random sample	
Range	
Reliability	
Repeated measures design	
Right to withdraw	
Sample	
Sampling method	
Scatter diagram	
Secondary data	
Self-report	
Self-selected sample	
Skewed distribution	
Social desirability	
Standardisation	
Structured interview	
Target population	

Unstructured interview	
Validity	
Zero correlation	