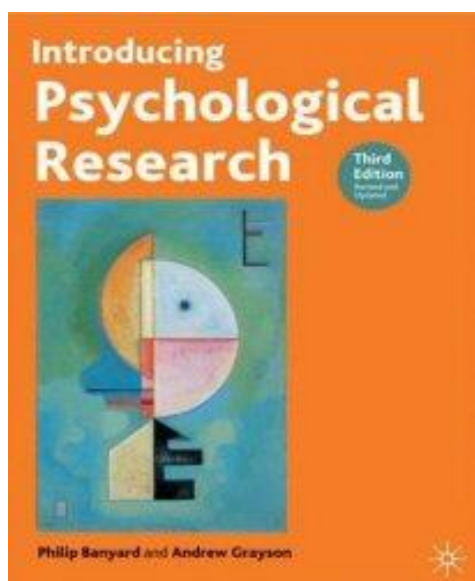


National 5 Psychology: Research



Experimental & Null Hypotheses

In psychology, we're trying to work out why things happen the way they do – particularly with human (and animal) behaviour. When we have observed behaviour we then make a guess about what is happening. This guess is called a hypothesis. It is usually stated in a way that is like a prediction.

So for example, look at the picture on the right.

1. We observe this little boy's behaviour
2. We ask why he is behaving like this
3. We guess why he's behaving like this
4. We then make a prediction about the reasons for his behaviour (a hypothesis)



SO we may say...

1. This little boy is behaving in an unusual way for a boy of his age
2. Why would a boy of that age make a sign he probably doesn't understand?
3. He is at a football match so something about that might be making him behave in that way.
4. A hypothesis would be that he is simply copying the behaviour of those around him.

There are **two** main types of hypothesis:

Experimental Hypothesis – this is also known as the **alternative hypothesis**. It is a statement which predicts behaviour.

In the case above, an experiment hypothesis would be “This boy's behaviour is affected by the behaviour of the adults around him” or “This boy is being aggressive because he is copying the aggression of those around him”. **In the experimental hypothesis we are saying that the DV is CAUSED by the changed IV.**

Null Hypothesis – this simply predicts that nothing is going on beyond what you would expect by chance. In the case above this could be “This boy's behaviour is not related to the behaviour of those around him”. **In the null hypothesis we are saying that the DV is NOT CAUSED by the changed IV.**

Activities:

1. Do the *music and memory* test. Once completed, write a suitable hypothesis for this.
2. For the following statements based on observations, come up with suitable Experimental and Null hypotheses.
 - a. Blonde hair often seems to be linked with stupidity.
 - b. Violent people seem to watch a lot of violent TV programmes.
 - c. People seem to be better-looking in other countries than here at home.
 - d. People seem to be much more relaxed on holiday than when at work.

One and Two-tailed Hypotheses

Psychologists have two ways of writing hypotheses.

The first is called the **one-tailed hypothesis**. This kind of hypothesis predicts that the outcome of an experiment *will* go in **one direction**. The direction could be up or down, more or less, increase or decrease, produce more or less and so on.

For example, using Skinner's Rat in the box experiment, here are some **one-tailed** hypotheses which might apply:

- Getting food will *increase* the number of times the rat presses a lever
- Getting an electric shock will *decrease* the number of times the rat presses the lever
- Rats will press levers *more often* when they get rewards
- Rats will press levers *less often* when they do not get rewards
- Lever-pressing rate will be *improved* by reward.

The second is called the **two-tailed hypothesis**. This kind of hypothesis predicts that the outcome of an experiment *could* go in **more than one direction**.

For example, using Skinner's rat again:

- Getting food will *affect* the number of times a rat presses a lever
- Getting an electric shock will *affect* the rate at which the rat presses a lever
- Rats pressing levers will be *linked* to rewards.

Notice that in the **two-tailed hypothesis**, we don't predict which "way" the outcome will go, just that there will be a link of some kind.

Activities:

1. Go through the following again, using your experimental hypotheses only, and for each one write a one-tailed and two-tailed hypothesis.
 - a. Blonde hair often seems to be linked with stupidity.
 - b. Violent people seem to watch a lot of violent TV programmes.
 - c. People seem to be better looking in other countries than here at home.
 - d. People seem to be much more relaxed on holiday than when at work.
2. Copy each of the following hypotheses out and for each one state whether it is **one** or **two-tailed** and **explain the reason for your choice**.
 - a. Hamsters will eat more seeds when stressed
 - b. Third year boys are affected by third year girls
 - c. Eating potatoes improves intelligence
 - d. Pizza decreases your concentration levels
 - e. Quality of sleep is affected by exam stress
 - f. Watching football increases your aggression levels
 - g. Playing computer games affects your health

Independent Variables and Dependent Variables

In psychology experiments are carried out. These are controlled ways of trying to turn our observations and hypotheses into evidence which we can then use in some way.

Most experiments are really simple. We just change one thing and see what effect that change has. In an experiment, the **Independent Variable (IV)** is the thing we change.

For example, if you wanted to find out whether drinking orange juice concentration levels in class then we would give half the class a glass of orange juice first thing in the morning and the other half of the class nothing at all. We would then compare the two halves' concentration levels. If we found that one half had better concentration levels than the other then we could come to the conclusion that something must have caused that. If the only difference between the two groups was orange juice or not (the IV) then we can assume that orange juice affects behaviour.



In an experiment, the thing that we measure the outcome with is called the **Dependent Variable (DV)**. In the orange juice experiment above the thing we could measure would be concentration levels.

Activities:

1. Here's a list of possible hypotheses. For each one, explain what the IV and DV is likely to be.
 - a. Hippo intelligence is improved by farting
 - b. Potatoes affect your memory
 - c. Chocolate makes you happy
 - d. Eating haggis decreases your ability to ride a horse
 - e. Alien abductions increase after watching the X Files
 - f. Sunflower seeds affect hamster aggression levels
 - g. You will be more likely to pass a test if you have a runny nose
 - h. People wearing purple hoodies are less likely to pass their exams than people wearing school ties
 - i. Pupil X will behave better while sitting at the front of the class
2. Copy the following table, making sure the correct statements are under the correct headings.

Independent Variable (IV)	Dependent Variable (DV)
Changed by the experimenter	The thing in the experiment which is altered
The outcome of the experiment	Measured by the experimenter
The thing in the experiment which is different	The way in which you work out whether your IV has had an effect or not

Other Kinds of Variable

As well as the IV and DV, in psychology there are other kinds of variable which might affect the outcome of your research. These variables are called **Extraneous Variables (EV)**. They can be almost anything. The problem with them is that they might cause the DV instead of the IV which you the experimenter have changed.

For example, think again about the hypothesis “Drinking orange juice improves behaviour”. Let’s say that you find that the IV (orange juice) causes an improvement in behaviour (DV). Is orange juice the only possible explanation for the improvement in behaviour? What if one experiment is done on a Monday and another on a Friday? What if one experiment used first year pupils and the other third year pupils? What if one was carried out in June, just before the summer holiday and one was carried out in the cold dark months of winter? Probably the outcome of your experiment could have been linked to these and not orange juice at all. So these are **Extraneous Variables** (anything ‘outside’ the experiment which might affect the outcome).

Some extraneous variables are **unpredictable** things. These are called **random variables**. Someone setting the fire alarm off in the building that you are conducting your experiment would be an example of a random variable – you have not been able to plan for that happening. Imagine you’re doing an experiment and a hippo walks into the classroom where one group is doing the experiment. There’s not really any way you could have predicted that so it’s a random variable.

But there are some that can be **predicted**, and we call these **confounding variables**. Examples of things that could potentially become an EV and are easily controlled are temperature, time of day, instructions. On the other hand, imagine the temperature in room A is very hot and room B is very cold. You should have predicted that to stop that confounding variable mucking up your experiment.



To make sure that extraneous (random or confounding) variables do not affect the outcome of an experiment, psychologists make sure that there are controls in experiments. These can be quite complicated or quite simple.

One example of a control would be this: Imagine you were testing the effect of coffee on concentration levels. You would need to control the strength of the coffee your participants had so that the strength of the coffee doesn’t become an EV. If one group had really weak coffee and another really strong then the IV could become strength of coffee instead of coffee/no coffee.

EVs can be linked to participants, methods, procedures, design and environment.

Activities:

1. What does the term “extraneous variable” mean?
2. What is the difference between a random and confounding variable?
3. Think of your own example of a random and a confounding variable.
4. Choose an experiments/piece of research you have learned about so far and note as many possible extraneous variables as you can which might affect the outcome of your experiment.
5. A psychologist wants to investigate memory ability in S3 girls. He carries out an experiment into memory abilities in a classroom at JGHS. Half the group do the memory test in a Home Economics kitchen and the other half in an English classroom.
 - List as many **random** variables as you can for this experiment
 - List as many **confounding** variables as you can for this experiment
6. Explain what is meant by ***control of variables*** in an experiment.
7. For the following extraneous variables, state how you think the psychologist could **control** them and so minimise their effect on the outcome of the experiment.
 - a) Temperature
 - b) Social background of participants
 - c) Intelligence levels of participants
 - d) Previous experience of the participants
 - e) Effect of the time of day on an experiment
 - f) Different levels of nervousness in participants
 - g) Tiredness of participants

Quantitative and Qualitative Data

In psychology, research can be split into two main types:

Quantitative Research

This is research which can be **counted, numbered, weighed and/or measured**.

Suppose you hear the claim “most people turn right when they enter a supermarket”. So, you go to a supermarket and count the number of people who turn right, those who turn left, those who go straight ahead and those who turn round again and go home. This is Quantitative data.

So Quantitative research is where you can measure the outcome and compare different responses, behaviours etc.

Qualitative Research

Here, you don't measure anything. This type of research involves analysing evidence. This is sometimes done by using **content analysis**. Suppose you wanted to investigate whether a book was suitable for use with an S3 class. You would read through the book and ask yourself the following kinds of questions:

- Is the language “simple enough” for S3?
- Are there any words or images that would be unsuitable for S3?
- Would the content make sense for S3 pupils?

Qualitative research is often used in a **case study** where, for example, a person's diary or drawings might be used to work out something about their behaviour. Qualitative data could also be much more abstract things – like the pictures a person has on their wall or the clubs and societies they are a member of.

Activities:

1. For the following hypotheses, decide whether the data you will gather is likely to be qualitative or quantitative. **Explain your answer** (it could be both by the way!)
 - a. Blonde hair often seems to be linked with stupidity.
 - b. Violent people seem to watch a lot of violent TV programmes.
 - c. People seem to be better looking in other countries than here at home.
 - d. Hamsters will eat more seeds when stressed.
 - e. Third year boys are affected by third year girls.
 - f. Eating potatoes improves intelligence.
 - g. Pizza decreases your concentration levels.
 - h. Quality of sleep is affected by exam stress.
 - i. Watching football increases your aggression levels.
 - j. Playing computer games affects your health.
2. Imagine you looked through the jotter of the person sitting next to you. What kind of data would this be? Think of two further examples of each type of data that you could collect.

Reliability & Validity

These are two very important ideas in psychology and actually they are very simple. Remember that psychology is based on the idea of **observing** things and then coming up with **hypotheses** based on these. We then **test** these hypotheses and either **verify** them (supporting the alternative hypothesis) or **reject** them (supporting the null hypothesis).

But to make sure that we can talk confidently about our findings we need to make sure that our research (and therefore our findings) is both **reliable** and **valid**.

Reliability

Say you are measuring a room to lay a carpet. You use a fancy new laser measuring device. You find that the room is 12m by 12m. The next day you measure the same room again using the same tool just to double check. The room now measures 15m by 15m. Now your room can't have magically expanded overnight so... your measuring tool must be **unreliable**.

The same applies to psychology. Anything you use to test a hypothesis must be reliable. This means that it gives **more or less the same results over time**.

So, if you give a questionnaire out to a group of people on Monday and then the same questionnaire to the same group of people a week later you should get the same results. If not, the test is **unreliable**. This is called **test-retest reliability**.

Validity

Back to your room with the carpet... You want to measure the room and so you use a sound meter... not likely is it – because sound meters measure sound levels not the length or width of a room. A sound meter would be an **invalid** way to measure distances.

The same applies in psychology. If you were doing a test of people's memory there's no point in asking questions about their personality. You need to ask questions about their memory!

So, for a psychological procedure to be valid **it needs to measure the thing you intend to measure**. If it does not it is invalid and therefore useless. Another example – say you wanted to test someone's knowledge of Scottish history – you ask them twenty questions about Scottish history...but you ask the questions in Polish...obviously you're not testing someone's historical knowledge but their ability to read Polish and so your test is **invalid**.

Psychologists check validity by measuring their tests against similar tests which already exist and which are agreed to be valid.

Activities

1. Read the following statements and decide if they would be reliable and valid tests. If you think one isn't reliable/valid then suggest what a researcher would need to do to fix this in the last column.

Statement	Reliable?	Valid?	Changes
A spelling test on a Monday produces the same results with the same group on a Thursday.			
Questions are asked about how friendly you think you are to test your personality.			
Memory is tested by asking you to remember a list of 100 words.			
Musical ability is tested by asking you to draw a picture of a saxophone.			
Your ability to ride a horse is judged by your ability to play the violin.			
Someone is asked to run 100m to test if they would be a good swimmer.			

2. Match up the start of the sentence on the left with the correct ending on the right.

A test is reliable when	invalid.
A test is valid when	it measures what it is designed to measure.
A valid test of memory	test-retest reliability.
You can check a test's reliability using	it produces more or less the same results over time.
When something does not measure what you mean it to measure the test is probably	would ask you to remember things.

Sampling

Imagine you went for a blood test. And the doctor said “right, we’re going to take *all* of your blood for the test.” You’d probably faint. What the doctor does is take a **sample**. In that sample will be all the information that the doctor needs.

It’s the same in psychology. When you want to carry out research it would be best if you could use every single person in the world – but that’s not possible so you use a sample. The important thing is that the sample must be **representative** of the group you’re investigating. The group you’re looking at is called the **target population** and the sample must be **representative of that target population**.

So, let’s say your target population is JGHS S1-S3 students. You work out that there are 140 S1 students, 70 male and 70 female; 150 S2 students, 60 male and 90 female; and 120 S3 students, 60 male and 60 female. You decide to use **10%** of that target population so your sample will be as follows:

S1 = 7 males and 7 females

S2 = 6 males and 9 females

S3 = 6 males and 6 females

Your target population could be anything at all – blonde girls, clever boys, tall middle aged men, people with musical ability etc. Your sample is a good one if it is a **good representation of the target population**.

Sampling Methods

There are also **methods** of sampling which psychologists use to make sure that the results of experiments are unbiased (‘twisted’ by having an unrepresentative sample).

Random Sampling – This is where every member of the target population has a chance of being selected for a sample. Everyone has an *equal* chance of being selected. It could be done by drawing names out of a hat or using a computer programme to randomly select names. A strength of this method is that it is the best way of ensuring a representative sample. However a weakness is that it is time-consuming and people chosen may not want to take part.

Opportunity Sampling – Here, you take advantage of a sample group which you have (e.g. you could use your S3 psychology class to represent all S3). The sample is chosen based on convenience. It can often lead to a biased sample but is often used because it is quick and easy to do. A strength is that it is the quickest method but it does suffer from possible bias – researchers may be unconsciously biased when they choose people.

Volunteer Sampling – This is where your sample has selected itself by volunteering to take part. People come forward of their own choice, perhaps responding to an advert or email request for participants. This is a simple way to get a large number of participants and you know for sure that they want to take part. However, people who come forward may not be representative of the population and tend to be more pro-social.

The **size** of your sample is very important. It should not be too small or too big. If it is too small then your results are likely to be invalid. If it is too large then your experiment will become too complicated and time-consuming.

Activities:

1. For the following target populations, work out what a good sample would be like by showing how you would arrive at the sample. The first one is done for you:

a. **Target population = Bank managers**

Sample: You would find out how many were male, and how many female. You might pick a particular age group. You then make up your sample using a % of males/females and a % of the age group you're looking at.

b. **Target population = JGHS Teachers**

c. **Target population = Musical people**

2. Copy and complete the following table writing the type of sampling to match **the correct definitions**.

Random sampling	Where you use the people you have available
Volunteer sampling	Where every person in target population has an equal chance of being chosen – maybe through names in a hat
Opportunity sampling	Where people choose to take part in an experiment.

3. Copy and complete:

Sampling is important in psychology. Your sample must be _____ of the target _____. The sample must not be too _____ or too _____. If your sample is _____ then you will not be able to apply what you find using it to the target group you are studying.

WORDS: large; representative; population; unrepresentative; small

4. Create a mind-map or bullet points of the different sampling techniques, *how* you would use each and then evaluate each method.

Bias in Psychological Research

Imagine you're auditioning for the X Factor. You are voted out by Simon Cowell. You discover that Simon fancies your closest competitor and you wonder just how unbiased he was in selecting her and rejecting you...

In psychology research has to be **unbiased** – this means fair, open and that all possibilities for influencing the outcome unfairly are removed. This means that we get an accurate and unbiased result of our experiment/research.

What kinds of bias?

Experimenter/researcher bias – This is where the experimenter influences the outcome of the experiment or research. This can be done **knowingly** so that the researcher gets the outcome he wants. This is a very serious issue for psychologists and everyone involved in research. It is very rare, but can happen. More often the experimenter can influence the outcome of an experiment and not know it. This can happen in the following ways:

- The experimenter might unconsciously choose an unrepresentative sample.
- The experimenter might present the experiment one way to a group and another way to a different group.
- Something about the experimenter might influence the participants without anyone even knowing it (e.g. if the experimenter is good looking!)

These biases apply to experiments but there are also other examples of researcher bias:

Interviewer bias – In an interview, the researcher might speak to an interviewee in a particular way or ask particular questions which influence the interviewees' responses.

Observer bias – An observer might miss something when observing, 'see it' in a particular way or even 'see only what he wants to see'.

Participant bias – This is sometimes called the Hawthorn effect after a study where factory workers worked harder because they knew they were being observed! Sometimes participants influence the outcome of an experiment because:

- They want to please the experimenter
- They have guessed what the research is about and try to match up with it (or mess it up!)
- They want to appear 'good' or 'right'. This is called **social desirability bias** and is where someone tries to appear socially acceptable. It even happens where they are anonymous!

How to deal with bias: Most experimenter bias is dealt with through **standardisation procedures**. This is where the words used or actions of an experimenter are carefully controlled so they are the **same** for all participants. In experiments most participant bias is dealt with by trying to make sure that the participants can't guess what the experiment is about (or don't know they're being experimented upon) or through keeping their responses confidential. In interviews and questionnaires, participant bias is dealt with through things like keeping the participants anonymous and sometimes building in 'lie detection' questions!

Activities:

1. In your own words, explain why it is important to avoid **bias** during psychology research.
2. Here are some statements which describe a kind of bias which might happen during a piece of psychology research. Copy the statements and link each one to **one kind of bias**.
 - Where an experimenter chooses only clever people to be in the experiment.
 - Where an experimenter speaks in a friendly way to one group and an angry way to another.
 - Where an experimenter distracts participants because she's really good looking.
 - Where an interviewer suggests a possible answer to someone they're interviewing.
 - Where someone taking part in an experiment tries to please the experimenter.
 - Where a researcher sees only what he wants to see while watching someone.

Experimenter bias	Interviewer bias
Observer bias	Participant bias

3. Sometimes certain research in psychology is more likely to have problems with bias than others. For each of the following statements explain what problems there might be. The first one is done for you.

Research	Possible Bias Problem
A questionnaire about attitudes to different racial groups.	<i>Participant bias – people might not answer the questionnaire truthfully because they wouldn't want to be thought of as racist (social desirability bias)</i>
A male researcher interviewing women about personal issues	
An experiment which asks people to rate their child's intelligence levels.	
An experiment which monitors what people watch on TV.	

The Experimental Method of Research

1. Lab Experiments

In psychology, as in other sciences, we sometimes “do” research in laboratories. In psychology a lab is any environment used for an experiment where the experimenter tries to **control** as many **variables** as possible.

So, your classroom could be a lab and so could the games hall in PE and the dining hall and so on. As long as the experimenter controls the IV and tries to control as many extraneous variables as possible it can be called a lab.

So the main feature of a lab experiment is that it is **highly controlled**.

One way to do this is by using **standardised instructions**. These are instructions which are agreed by the experimenters before the experiment. It is very important that every participant in the lab experiment is given the same instructions.

Another way to do this is by using **standardised procedures**. This means that every participant follows the same procedure throughout the experiment. The aim is to make sure that everyone has the same experience of the changes to the IV so that we can measure the DV correctly.

Lab experiments are widely used in psychology because of this **high level of control** – because we can see clearly if the IV has affected the DV. So lab experiments are best at showing that the effect (DV) has come about because of the cause (IV) and NOT because of the influence of some EV (random or confounding...revise!)

Another good feature of a lab experiment is that because it's so controlled, you can write down in excellent detail what you did and why you did it. So a lab experiment is easy to **replicate** and this helps check the findings.

Strengths

- It is highly **controlled** by the experimenter
- It shows that the DV has probably been **caused** by the change to the IV
- It is easy to **replicate** and so check the findings

Weaknesses

- A lab is an **artificial environment**. It may frighten you or make you nervous and so you might not perform as well as you would in the real world.
- A lab experiment might ask you to do something **artificial** – like remember silly words or something. This doesn't tell us much about how you would behave in the real world.

All of this means that the lab experiment's greatest weakness is that it has **low ecological validity (low mundane realism)**. This means that what you find out in the lab experiment CANNOT automatically be **applied (generalised)** to the real world.

Activities:

1. Jumbo jet simulators are used to train and assess airline pilots. This could be as part of a lab experiment examining how pilots cope with stress levels. Using your knowledge of lab experiments, give TWO reasons why using a flight simulator would be a good idea and TWO reasons why it is not.
2. Copy the following table, matching the word or phrase on the left with **the correct definition on the right**.

Replication	Making sure that all participants have the same experience during the experiment.
Standardised procedure	Tasks in lab experiments can be these and this means that they might not produce reliable results.
High level of control	The idea that what happens in a lab experiment might not happen in the real world.
Low ecological validity	The idea that a lab experiment can be repeated exactly over and over again.
Artificial	The main feature and strength of a lab experiment.

3. Outline the main strengths and weaknesses of a lab experiment.
4. Often lab experiments are carried out using children. Write out as many reasons as you can why you think what we find out about children in lab experiments might not be very reliable. Why might it have **low ecological validity**? See who can come up with the most reasons.
5. Think about the research studies that we have discussed in class so far. Identify one real lab experiment and how you know that it would be classified as a lab experiment.

2. Field Experiments

So, you've tested your pilot's ability to handle an aeroplane in a crisis by using a flight simulator – and he does it well. However, a very big question remains...would he do as well in a **real situation**? To test this, you'd have to **use** a real situation.

The problem with **lab experiments** are that they are **low in ecological validity** which means because they are artificial settings or tasks, you might not get the same result in a real situation (or a more **natural environment** than a lab). So psychologists have got round this problem by using the **field experiment**. In short, a field experiment takes place in any **real-life situation or setting**.

In the field experiment, the IV is still controlled/manipulated by the experimenter. The **level** of control is **lower** than in a lab experiment. This is because you're out in the real world where...anything can happen.

For example, say you want to test whether people will help someone who collapses on a train. The only way to find this out would be to get someone to collapse on a train and then observe what happens – but you'd have no control over who was on the train or whether it was running late and so on. So, although your ecological validity is much higher because it's in the real world, your **level of control** is much lower.

There's another problem too. Sometimes, in a field experiment, the people taking part don't know what they're taking part. We call such participants **naïve participants**. This is a problem because:

- You haven't asked their **permission** to use them in a psychology experiment
- You might cause some **problem** for them (or even your experimenter).

For example, say you get the experimenter to collapse on a train to see who helps. One of the naïve participants might get a real fright and collapse himself! Or they might not help and then feel really bad about themselves afterwards once they think about it later. Or...your experimenter might be jumped by someone on the train and end up being hurt.

However, because as psychologists we want to learn about **real behaviours** in the **real world** we sometimes have to use the real world as in the field experiment. We can still say that the changed IV **caused** the DV though this is **less certain** than it is in the lab experiment. One final problem is that a field experiment is a lot **harder to replicate** than a lab. This is because in a field experiment you could never **exactly recreate** the same real-world conditions.

Activities:

1. The following are either features of the lab experiment of the field experiment or of both. Copy the table into your jotter and put each statement in one of the three columns.

Lab Experiment ONLY	Lab AND Field Experiment	Field Experiment ONLY

- a. Takes place in a highly controlled environment
- b. Takes place in a real world setting
- c. Takes place in an artificial environment
- d. The IV is controlled by the experimenter
- e. Has high ecological validity
- f. Has low ecological validity
- g. May use participants without their permission
- h. Is easy to replicate
- i. Is not easy to generalise to the real world
- j. Has a high level of control over extraneous variables

3. Natural Experiments

Sometimes it is difficult to put together any kind of experiment either in the lab or in the field. This could be for all sorts of reasons. There are times when psychologists take advantage of a **naturally occurring change** to study its effects on behaviour.

All this means is that the IV is **changed by someone else** for some reason and the psychologist just wanders in and uses the changed IV to measure its effect on the DV.

For example, let's say that a hospital had visiting hours from 9am to 10am, 2pm to 3pm and 6pm to 8pm every day. Someone in the hospital decides to change that by adding on an extra visiting hour to each period. The new visiting hours become 9am-11am, 2pm-4pm and 6pm-9pm. This means that the IV has been changed by the hospital. The IV is therefore three extra hours of visiting time a day.

Now, a psychologist could come in and find out what effect this has had on a variety of things and so could test hypotheses as such:

- Longer visiting hours will reduce patient recovery times
- Longer visiting hours will affect patient recovery times
- Longer visiting hours will increase nurse stress levels
- Longer visiting hours will affect the work of medical staff

The psychologists could test these hypotheses through using **non-experimental methods** such as **questionnaires, surveys, interviews, observing people** working or collecting data such as the time it takes a sample group of patients to recover (and compare this with times for a matched groups before the change was introduced).

So, in a natural/quasi experiment, an experimenter is simply comparing a before and after set of data. That is, before and after an IV has changed naturally.

The **strengths** of natural/quasi experiments are that they are very **high in ecological validity**. Like field experiments, they happen in a natural environment so your conclusions should be easy to **generalise** to the real world. Also, because the experimenter has changed nothing (and no-one needs to know that they're in any kind of experiment) there should be very few (if any) experimenter or participant **bias** effects.

However, there are **weaknesses**. First is that the experimenter has **very little control** over **extraneous variables**. Also the whole thing might be impossible to **replicate**. Finally, there could be **ethical problems** associated with people not knowing they are being studied (more about that later on).

Activities:

1. Copy and complete these tables by matching the start of the sentence on the left with a suitable ending on the right.

The difference between a natural experiment and a field experiment is	a quasi experiment.
A natural experiment usually takes place in	a natural setting.
Natural experiments are closer to	manipulated by someone other than the experimenter.
In a natural experiment the IV is	field experiments than to lab experiments.
Another name for a natural experiment is	the IV is not changed by the experimenter but is a naturally occurring change.

2. For each of the following, explain whether you think it is a natural experiment or not. Give ONE reason for your answer.

- a. TV is introduced on an Island by the government of that Island
- b. A school changes the book it uses to teach psychology
- c. A psychology experiment gets two groups to complete two questionnaires
- d. An animal is trained by a psychologist to press a lever
- e. A football team sets up an area of the stadium for families only

3. Copy the following table and tick the boxes which apply to a natural experiment only.

	Applies?
Is where the IV is a naturally occurring change	
Happens in a lab	
Is low in ecological validity	
Happens in a natural environment	
Is where the experimenter has little control over EVs	
Is easy to replicate	

The Non-Experimental Method of Research

1. Surveys/Questionnaires

This, and interviews and case studies are called **non-experimental** methods of research.

Surveys are ways of finding things out in psychology. A survey can be written, done online, on paper, or can be carried out by an interviewer. Surveys ask people questions which they respond to and so the data we gather from them is **self-responding data**.

Of course, this might mean that people will not be completely truthful in their answers (participant bias). Also, the way that questions are asked might mean respondents give one answer rather than another (a form of experimenter bias).

Surveys usually have two types of questions. **Closed** questions have a **limited range** of answers like yes, no or maybe. Closed questions can also use **scales** like the Likert Scale where you state if you agree strongly, agree, disagree etc. These can also use a range of numbers to show what you think. For example, "how many hours a week do you watch TV?" might be answered by circling 1-2 or 3-4 or 50-60!

Open questions are questions with an **unlimited** range of answers. Good surveys usually have a mixture of open and closed questions.

Because people have to agree to take part in surveys, they are usually **volunteer samples**. The trouble with a volunteer sample (as you know) is that it is made up of people who want to do the research so the responses might be biased.

Also, in surveys, people might demonstrate **Social Desirability Bias** – where they give answers that make them look good.

The features of a **good survey** are:

- The questions are **clear** and can be **easily understood**
- The questions **make sense** to the person answering them
- The questions are phrased in such a way that the answers to them can be easily **compared** as far as possible
- The questions should not suggest an answer (**leading questions**)
- The questions should not be too **personal**
- The questions should not ask for information which is too **private** or **upsetting** in any way.

Strengths of a Survey

- ✓ They gather a **lot of data** very **cheaply**
- ✓ If there are lots of closed questions they are easy to **compare**
- ✓ You can use the same survey again and again with different groups or over time (**longitudinal**). This means they are highly **replicable**

Weaknesses of a Survey

- ✗ The questions need to be **valid** and **reliable**
- ✗ If they are not well designed the answers given might not make sense
- ✗ People might lie or bend the truth in their answers so they look good

Activities:

1. Complete the following survey. Then answer the questions which follow.

1. Are you enjoying Psychology so far? (circle one)	Yes No Not sure yet
2. How difficult to you find Psychology so far? (circle one)	Very difficult Very easy 1 2 3 4 5 6 7 8 9 10
3. How could your learning about Psychology be improved?	
4. Are you finding Psychology interesting?	Yes No Not sure yet
5. How well do you think you are getting on in Psychology?	Very well Very badly 1 2 3 4 5 6 7 8 9 10
6. Do you think your psychology teacher is doing a good job?	Yes No Not sure yet
7. What have been the most interesting things in the course so far?	
8. Do you have a dog?	Yes No
9. Any other comments?	

- a. Which questions were open questions? How do you know?
 - b. Which questions were closed questions? How do you know?
 - c. Which questions were scale questions? How do you know?
 - d. Were any of the questions unclear? Explain.
 - e. Were there any leading questions? Explain.
 - f. Which question was invalid? Why?
 - g. Would the results of this survey be answered honestly? Explain why/why not.
 - h. Was this survey a good way for your teacher to find out how the course is going?
2. Create your own 10 question survey about anything you like. Include a mixture of open and closed questions and follow the information about “features of a good survey” on the previous page. Give your questionnaire to 5 people and then work out what their answers are telling you about your chosen area of research.

2. Interviews

Sometimes the best way to gather data in psychology is by doing an **interview**. An interview is a **conversation with a purpose**.

Interviews are usually carried out **face to face** where the **interviewer** asks the **interviewee** a series of questions. This can also be done by phone. The purpose of the interview is to find out more detailed information about a topic.

Interviews can be **structured**. This means that the questions are **set before** the interview and are **not changed** during the interview. This means that all interviewees are asked the same questions in the same way (**standardised**). This is good because it means the data can be analysed more easily across all the interviewees. Anyone can carry out a structured interview.

Interviews can also be **semi-structured**. This means that there will be some questions prepared before the interview, but that interviewer might also ask **additional unstructured** questions. You need to have some skills to carry out this kind of interview.

Finally, interviews can be **unstructured**. This means that there are no questions prepared at the start and all questions are asked as the interview proceeds. You need to be a skilled interviewer to do this.

Interviews, like surveys, can also contain **open** and **closed** questions.

Strengths of Interviews:

- ✓ When it is structured you can easily **compare** different responses
- ✓ When it is structured you can repeat it over and over again (**replicate**)
- ✓ When it is unstructured you can respond well to the individual interviewee's ideas and develop the question to suit the interviewee

Weaknesses of Interviews:

- ✗ When it is structured it might not be asking the 'right' questions and you can't vary your questions according to the interviewee
- ✗ When it is unstructured it is more difficult to **compare** different interviews

All interviews can be heavily influenced by **interviewer bias** because who they do the interview and how they do it might affect the outcome of the interview.

Interviews can also be affected by **participant bias**. In an interview, a person might tell lies (or bend the truth) to look good.

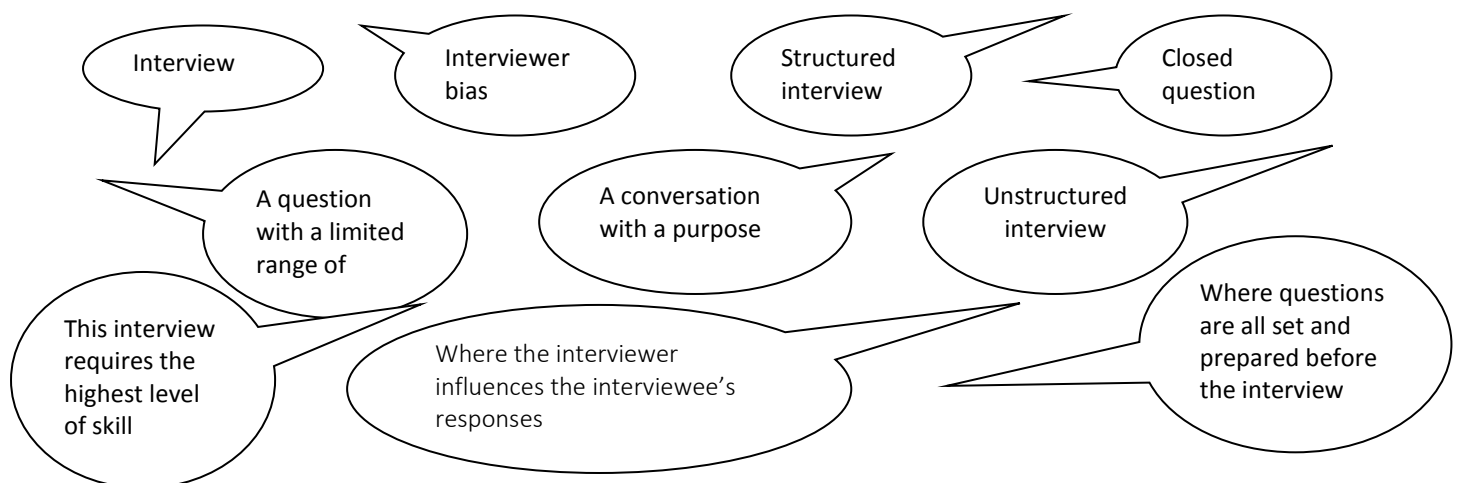
Interviews are often used in **clinical settings** where people discuss mental health issues. They are also used as ways to select and recruit people for **jobs**.

Activities:

1. Interviews usually contain open and closed questions. Copy the following questions and write whether they are open or closed.

- a. Are you male?
- b. How many holidays do you take every year?
- c. How do you feel about your family?
- d. What age are you?
- e. How would you describe your personality?
- f. Are you an outgoing person?

2. Copy the following speech balloons into your jotter and match up the statements and definitions by drawing them side by side and colour code them.



3. You have been asked to prepare a structured interview asking people about their **TV viewing habits**. Design four closed questions and four open questions for such an interview. Then use your questions to interview TWO people in the class. Finally compare your findings. How easy were they to analyse?

4. Interviewers overcome possible interviewer bias in a number of ways. Two of these are stated below. For each one, explain how you think this would solve any interviewer bias problems.

- a. Two interviewers carry out the interview
- b. The interview is recorded in some way (video or audio)

HOMEWORK

Have a look on YouTube and see if you can find an example of an interview in psychology. Alternatively, watch the TV news and watch an interview being done. Then answer the following:

- What was the aim of this interview?
- What open and closed questions were used?
- Did this appear to be structured, semi-structured or unstructured interview?

3. Observations

Observation is another major research method that can be used either on its own or in combination with other methods. Most experiments involve an element of observation but a typical observation study is less controlled than an experiment and it gathers data from watching behaviour as it happens. For example, you could observe a classmate as they are revising, and take notes on body language and how much time they spend looking at books/writing/looking at their phone etc.

There are certain key design considerations when conducting an observational study:

A **naturalistic observation** involves simply watching and recording whatever unfolds in a natural, everyday situation. Naturalistic observation is the only method in psychology that gathers data on spontaneous behaviour as it happens. However, it lacks control over the many variables that could influence a person's behaviour. It is also impossible to replicate because the situation is natural and not set up by the researcher.

An alternative is to put participants into a lab and observe them doing a task – a **structured observation**. Here there is more control, and the situation could be replicated. One fairly common example is to set up a lab with particular toys/games and observe a child playing. A structured observation is more controlled but it may lack ecological validity.

An observation can be either **disclosed** – participants know that they are being observed – or **undisclosed** – kept secret. Disclosing the observation has the problem that if people know they are being watched, the presence of the observer may affect the results. This is known as the **observer effect**.

Undisclosed observation provides more natural results. However, undisclosed observation may be unethical, as participants haven't consented to take part. It is never ethically acceptable to make secret observations of people in private, although some ethical codes accept observation in public places, where people would expect to be observed by strangers.

Activities:

1. What is a naturalistic observation?
2. What is a structured observation?
3. What does it mean if an observation has been disclosed?
4. What situation is an undisclosed observation ethically accepted?
5. What is the observer effect?
6. Copy and complete the table below:

Feature of Observation	Advantage	Disadvantage
<i>Naturalistic</i>		
<i>Structured</i>		
<i>Disclosed</i>		
<i>Undisclosed</i>		

Observations Continued

Participant vs. Non-Participants Observations

In the example described at the beginning of the previous page, the researcher is on the outside and does not influence the situation, rather like watching birds through a pair of binoculars. This is called **non-participant observation**. By staying out of the situation, the researcher tries to avoid directly influencing participants' behaviour. However, as described above, they may still affect results because of the observer effect, if the observation is disclosed.

In **participant observation**, however, researchers take part in the social situation and interact with the people that they are observing, resulting in a more natural situation. In a classic example of a participant observation, a researcher and his colleagues pretended to be hearing voices in their heads and were admitted to a psychiatric hospital. They then took part in hospital activities, observing how psychiatric patients are treated by hospital staff (Rosenhan, 1973).

Participant observation gives the observer a unique insight into a social situation and participants can more easily get used to their presence. However, it can lead to subjectivity, as the researcher becomes personally involved in the situation.

Observation Schedules

Some observation studies use a list of key behaviours called an **observation schedule**. This may require the observer to tick key behaviours each time they occur or take note of what happens during a particular time period. By focussing the observer's attention on particular things, they help in gathering the data that researchers are looking for.

By providing an objective standard, observation schedules can also improve the reliability of recordings taken by more than one observer. Reliability means that results are consistent across different occasions.

Example observation schedule:

Participant number	Stands up	Scratches head	Eats a snack
P1			
P2			
P3			
P4			

Activities:

1. For each example below, suggest what type of observation would be most appropriate. What features would be necessary?
 - a. Behaviour of students in the library
 - b. Do females eat healthier foods than males?
 - c. Do males or females swear more?
 - d. Do females use touch more than men when flirting?
2. You are going to carry out a naturalistic observation. You will focus on NVC cues between people in a public space. Prepare an appropriate observation schedule for this study.

4. Case Studies

Sometimes in psychology it's just not possible to do an experiment or other kind of research. For example, say you wanted to look into the effect of violence on a child's emotional development. You could not set up an experiment to test this because that would be wrong (unethical). Instead, you would carry out a **case study** of a child who had – unfortunately – been the victim of violence.

This was done in the very famous case of Sarah Wiley – usually known as **Genie**. Genie had a terrible childhood. Her case study helps us to understand the effects of deprivation on a child's development.

Definition of a case study: An in-depth study of a person, event or organisation, sometimes over a long period of time (known as a **longitudinal** case study). Case studies are very useful ways to gather information (data) in psychology because they are done in great detail and produce lots of data which is of a very high quality.

In a case study you might use many of the other methods which are used in psychology. You use these in a very focussed way on the subject of your case study.

For example, a school inspection is an example of a case study. Here, lots of different methods of research are used. The Inspector might:

- **Observe** classes being taught
- **Analyse** the exam results or jotters of classes
- **Interview** students, parents and teachers
- Ask people to complete **questionnaires** about school issues.

All of this information would be used to write up the final inspection report. In the same way, let's say that a student is misbehaving in class. The educational psychologist might become involved and she might:

- **Observe** the pupil in class
- **Analyse** the student's jotter and class work
- **Interview** the student, his friends, parents, teachers
- Ask the student to complete a **questionnaire**
- Give the student **psychometric tests** (e.g. personality test, IQ etc)

In this way the psychologist will be able to form a very **detailed** picture of the student and maybe work out why he is misbehaving – and so help him to improve his behaviour.

So case studies are very useful ways of gathering detailed psychological data, but they have one problem. The data gathered can only be linked to the subject of the case study – it cannot be **generalised** to others. So, for example, an inspection of one school only finds out things about that school and these cannot be generalised to other schools.

Activities:

1. Copy and complete the following diagram about the strengths and weaknesses of the case study method of research. **Put the comments under the correct headings.**

Case Study Strengths	Case Study Weaknesses
The detailed information can only be applied to the person, event or organisation being studied.	Gives rich and detailed information about a person, event or organisation.
When you write up a case study it might be possible to identify the person in it – this does not safeguard their privacy.	Case studies can take a long time and involve a lot of work.
Can be done where other forms of research would be unethical to do.	Uses many different methods and therefore finds out lots of different things.

2. *Annie is a pupil who gets into a lot of trouble at school, although she is a very able pupil and a very gifted musician. Recently she threw her cello at her teacher. The educational psychologist has been called in to carry out a case study on Annie. As part of the case study, the psychologist uses the following methods.*

For each method, explain how you think this might help the psychologist to find out the reasons for Annie's behaviour.

- a. Asking Annie to keep a diary and then reading Annie's diary.
- b. Interviewing Annie's teachers and friends.
- c. Interviewing Annie.
- d. Observing Annie's behaviour in a number of situations (class/dining hall etc).
- e. Giving Annie some (psychometric) tests of her ability/personality.

Descriptive Statistics

Firstly – why do psychologists use numbers? The simple answer is that any research anywhere could always be down to pure **chance** – perhaps you just got a really brainy group doing a memory test, or a class of extra nice people filling in a questionnaire about niceness. Psychologists are always trying to make sure that what they have found is more than what you would expect by chance – and that’s why they do all the fancy statistics. Numbers also helps us to get a picture of what’s going on and means that our knowledge in psychology is based on **evidence** and not just guesses about what we *think* might be happening.

With people, you’re always going to get responses which are **extreme** – very clever or very silly for example. Numbers help us to work out what our research is **telling us** about the **whole group** of participants we have used. This information is called **raw data** and it is always included in psychology reports so people can analyse it for themselves – but imagine there were 40,000 people responding to a questionnaire – you wouldn’t want to wade through all of those responses. So, psychologists **interpret** the data to make it easier to handle and get our heads around.

Mean – You total up all the scores from all your participants and divide the total by the number of participants. The mean lets you know what the average score was, but it can **disguise extreme** scores. This is a problem because sometimes an extreme score might be a really interesting piece of data, but you won’t investigate it further if it is disguised in a mean. Here’s an example of that.

Raw Scores = 1,1,3,4,5,5,5,6,7,7,7,8,23,42,100

Mean = $229/16 = 14.31$

This mean suggests that the average score was 14.31, but as you can see no actual score was that. The high and low scores (extreme scores) have been swallowed up by the mean giving us a funny picture of what’s going on.

Median – This is the **middle score** in a ranked set of scores. It’s a little better because it tells you where the real mid-point was, which can be helpful to know. For the scores above, the **median is 5.5**. Again, the high and low scores have been disguised but it does tell us where the middle point is.

Mode – This is the **most frequently occurring score** and is the simplest to work out. For the scores above it is **5** because there are more 5s in the list than anything else.

The final piece of data psychologists use is the **range**. This is simply taking the lowest score away from the highest. This tells you how your scores were **spread** across your sample. For the numbers above the range was **99** and this tells us that there was a lot of variety in the sample.

Activities:

1. Find the Mean, Median, Mode, and range of the following three sets of figures.

- a. 1,1,2,4,5,5,7,7,7,8,8,9,15,21,23,24,24,25,30,84,87
- b. 3,3,3,3,3,3,6,6,6,21,21,21,48,48,49,60,60,60,70,75
- c. 22,21,45,67,32,31,42,65,78,70,78,82,97,1,4,6,4,7, 12

2. Copy and complete the following sentences

- a. The mean is.....
- b. When working out the median you have to put the numbers in.....
- c. Interpreted data is the opposite of....
- d. The trouble with the mean is that it can....
- e. You work out the mode by....
- f. The range tells us....

Graphical Display of Data

Psychologists can be busy people! Sometimes the best way to show your data is in the form of a graph. This gives a quick and easy way to draw conclusions from research just by looking at the graph.

The most common charts and graphs used by psychologists are as follows.

Bar Charts – these are good for comparing different groups or categories.

Line graph – these are good for plotting changes over time.

Pie Chart – these are good for showing percentages of a total.

Activities:

1. Using the following data, create a **bar chart** with a colour coded key. Describe in words underneath your graph what the graph is telling us.

Category	Hours of TV Watched Per Week
Males aged 12-17	40
Females aged 12-17	35
Males aged 17-45	20
Females aged 17-45	20

2. Using the following data, create a **line graph**. Describe what the graph is telling us.

Month	Number of Lates: Male pupils	Number of Lates: Female pupils
Aug	101	97
Sep	105	96
Oct	108	97
Nov	200	150
Dec	170	160
Jan	160	170
Feb	210	200
Mar	160	140
Apr	150	130
May	100	95
Jun	90	15

3. Use the following data to create a **pie chart** with a key.

School dinner food choices: October 2009

Total number of pupils = 120

Pupils who choose pizza = 60

Pupils who choose cabbage = 10

Pupils who choose curry = 30

Pupils who chose sandwiches = 20

4. Measure the height of 6 people in your class. Create a bar chart displaying the results.

Ethics in Psychology

No matter what you are doing in psychology it must be done **ethically**. Ethics in research are very important. Ethics is all about making sure that your participants, your research team and anyone who possibly might be affected by the research is **protected**.

Ethics in psychology research are outlined by the organisation in charge of psychology – the British Psychological Society (BPS). If you want to carry out research you have to follow its code of ethics. If you do not, you could find yourself banned from being a psychologist!

NOTE! The BPS rules say that everyone taking part in psychology research must be over 16. If not, then their parents must give informed research.

The code of ethics can be summarised as follows:

1. **General Issues:** All psychology research should **protect** those carrying it out and taking part. It should not **upset** anyone, **offend** anyone or make anyone feel **bad/uncomfortable/worried/frightened** and so on.
2. **Consent:** Everyone taking part in research should **agree** to it. They should also know what they're agreeing to. This is called **informed consent**. If you can't get consent before you start the research you can get consent afterwards (**retrospective consent**). But you can only do this if there's no other way to do your research.
3. **Right to Withdraw:** Anyone taking part in your research should have the right to stop doing it if they want to. There should be **no pressure** on them at all to continue.
4. **Confidentiality:** As far as possible, everyone who takes part in your research should not have their names published or any other details about their performance in your research made known to anyone else.
5. **Protection:** Everyone taking part in your research (and the researchers) should be protected from possible **physical** and **mental harm** throughout the experiment.
6. **Privacy:** Participants should be treated with dignity and their privacy should not be invaded in any way.
7. **Deception:** You should always avoid **lying** to participants as far as possible. If you have to then you should make sure that this is absolutely necessary and make sure you tell them the about the research at the end. You would then need to get retrospective consent from the participants.
8. **De-briefing:** All participants should have the chance to talk about the research afterwards. This helps them understand what has happened and can help sort out any bad feelings they had about it.
9. **Giving Advice:** You should avoid giving participants any kind of advice. Only properly trained psychologists should do this.

The Research Process

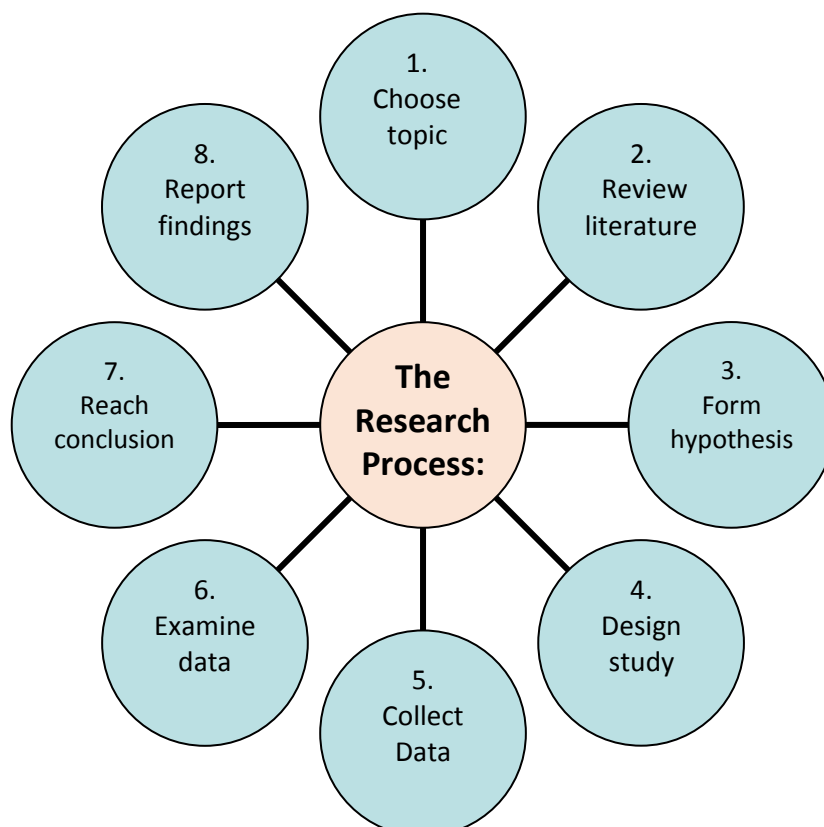
All psychology begins with **observation**. This means that we see something happen and we ask “Why did that happen?” We try to suggest answers to this question by guessing what might be happening...

Psychology is a systematic way of observing behaviour and trying to work out what is going on. This means that you think about what you’re seeing and you try to carefully work out what’s going on, instead of just jumping to conclusions. In many ways, you are already undertaking psychological research because when you see anything and ask yourself what it is that you’re seeing, then try to make sense of it, just like the things you are about to see in the class today.

During situations you probably did this:

1. Watched what was happening – **observed**
2. Asked yourself questions about what you were seeing
3. Suggested possible answers for what you were seeing – **devise a hypothesis**
4. Tested out your answers – **carried out some research**
5. Thought carefully about what you found out – **analysed your research**
6. Worked out whether your possible answers were right or wrong – **supported or rejected your hypothesis**.

Real-life psychologists will follow a similar process when planning research. Planning and conducting research is a very logical process and there are many steps that a psychologist must take to ensure their work is thorough.



1. Firstly you would choose a topic to investigate. This would be an area that you are interested in and perhaps an area where you have expertise.
2. You would read and review any existing research that had been conducted by other people into your topic/area. This helps you to decide on variables and allows you to have knowledge of what people have found out already. The literature you read could include established theories and previous research on the topic.
3. Based on previous research a hypothesis would be formulated clearly identifying the research variables. You could write an experimental or null hypothesis. Remember that an experimental hypothesis could be either **one or two tailed**. Your hypothesis is a prediction of what you think you will find out from your study. You would also decide at this point what your IV and DV will be.
4. Design the research study. You could choose to use either the experimental or non-experimental method. You would think about the method that best suits what you are investigating. At this stage you must decide how you will gather a sample of participants, what task they will do and how you will avoid EVs influencing your work. You will decide what type of data you want to gather; quantitative or qualitative.
5. To collect the data you carry out your study! The results/performance from your participants becomes your “raw data”.
6. The raw data is analysed for each condition of the independent variable. To analyse your data you may use some of the measures of central tendency e.g. you may calculate the mean to find the average score. You may display your analysed data in a graph or table.
7. From all of your data you can reach a conclusion. Think back to what your initial prediction was – is your hypothesis supported or rejected?
8. Next is the write-up of your report. Here you detail everything that you did in the planning stages and when you conducted the study. This is also the opportunity to evaluate your work – what worked well in your study and what would you do differently next time? Other people can read your report (as part of their literature review!) and possibly even replicate your study.

Activities:

1. Copy the research process diagram into your jotters.
2. At each stage, extend your diagram to include a description of what happens at each stage.