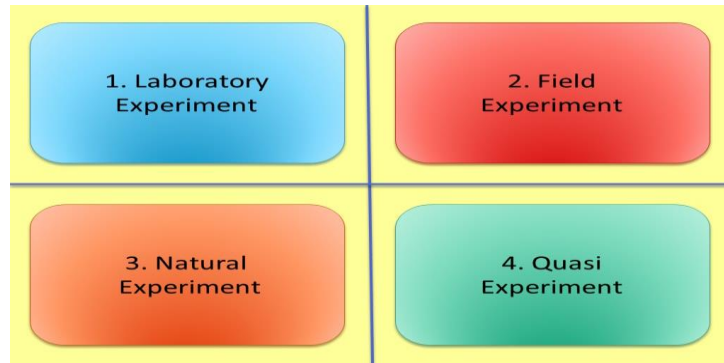


Lesson 2

The Experimental Method



Lesson Objectives

- Describe and evaluate the different **types of experiment**.
- Describe, formulate and distinguish between **aims** and **hypotheses**.
- Identify the **independent** and **dependent variables** in an investigation.
- Demonstrate **operationalization** of given variables.

Key Terms

- Lab, field, natural and quasi experiments
- Aims
- Directional and non-directional hypotheses
- Independent and dependent variables
- Operationalisation

Extension activity:

See the extension task on page 172 of the Green haired girl digi-book. Use your knowledge to analyse the clips in terms of the types of experiment presented, the IV and DV for each, as well as the strengths and weaknesses of each study.



Questions to guide your thinking ...

- What are the different types of experiment?
- How do aims and hypotheses differ?
- What is the difference between directional and non-directional hypotheses?
- What is the independent variable in an experiment? What is the dependent variable?
- What does 'operationalisation' mean?

Aims and Hypotheses



Aims

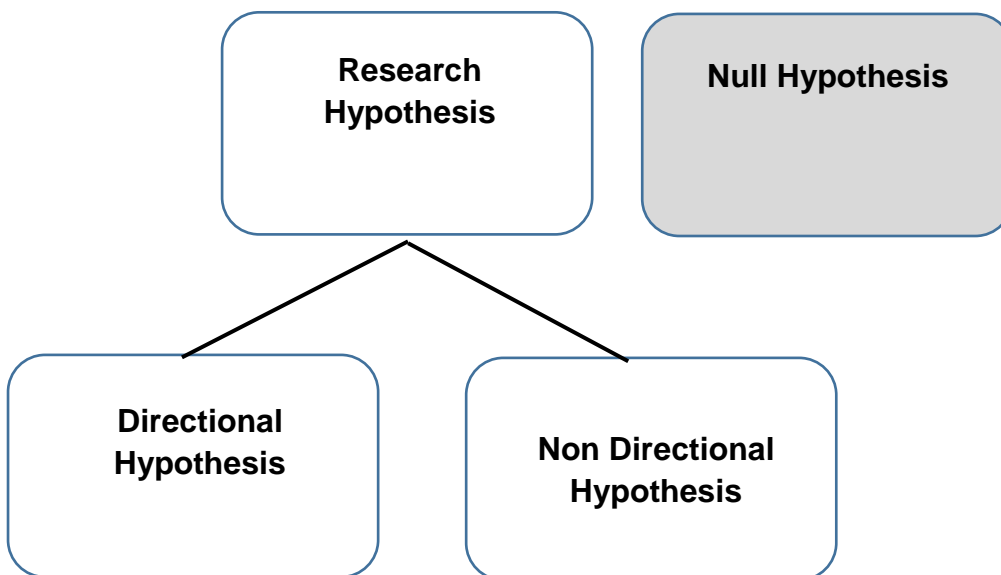
The aim of a study is a general statement of what the researcher intends to investigate. In other words, the aim describes the purpose or focus of a study. It is derived from a theory.

Hypotheses

A hypothesis is a clear, precise, testable statement that states the relationship between the variables to be investigated. It is stated at the outset of any study.



Types of hypothesis



The **research hypothesis** (sometimes called the experimental or alternate hypothesis) predicts an effect or relationship between the variables to be investigated.

For example: “Athletes who have a training partner are likely to score higher on a questionnaire measuring motivation levels than athletes who train alone”.

The **null hypothesis** is written alongside the research hypothesis. It predicts that there will be no effect or relationship between the variables in a study.

For example: “There will be no difference in motivation questionnaire scores between athletes who train with and without a training partner”.

(Why do we need a null hypothesis? As psychologists, we must accept the possibility that any results gained in an investigation are due to chance alone. The null hypothesis acknowledges this and makes the scientific prediction complete).

Research hypotheses can be **directional** or **non-directional**:

A **directional hypothesis** states the **direction** in which the results are expected to go - **typically on the basis of previous research**. For this reason, directional hypotheses include terms such as 'more' or 'less,' 'higher' or 'lower,' 'faster' or 'slower,' etc.

For example:

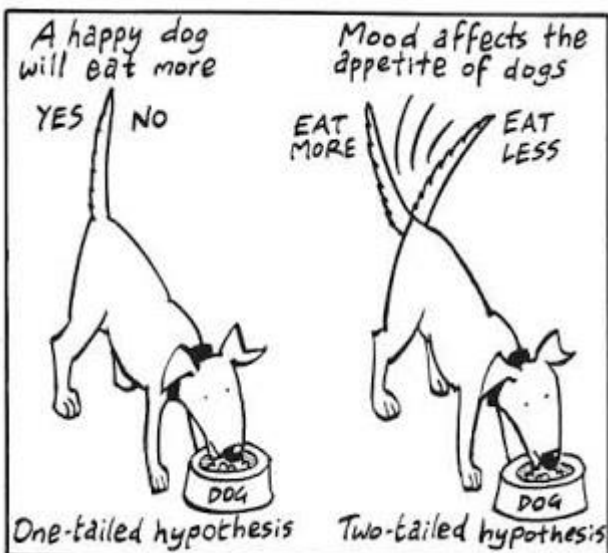
Participants who do homework with the TV on produce lower results than those who do homework with no TV on.

A **non-directional hypothesis** simply states that there will be a **difference** between conditions or groups of people. It does not state the direction of difference, unlike a directional hypothesis.

For example:

Participants who do homework with the TV on produce different results to those who do homework with no TV on.

Psychologists tend to use a non-directional hypothesis when there is no previous research to indicate a particular direction, or when findings from earlier studies were contradictory.



Note: Sometimes the terms 'one-tailed' and 'two-tailed' are used instead of 'directional' and 'non-directional'.

➤ **State whether the following general hypotheses are directional or non-directional.**

1. Alcohol affects reaction time.
2. Men who have beards are perceived as older than clean-shaven men.
3. The quality of beer affects bar takings.
4. Boys are more aggressive than girls.
5. Watching tropical fish helps you relax.
6. The faster you type, the more mistakes you make.
7. Individuals are more likely to conform when in groups of five than when in pairs.
8. Anxiety affects the level of adrenaline in blood.
9. People's running speed will be affected by whether or not they have an audience.
10. Wearing make-up has an effect on how attractive a person is rated to be.

➤ **Answer the following questions to test your knowledge of aims and hypotheses:**

1. A psychologist compares the number of reported illnesses in people who are regular gardeners and people who are not. What is the aim of this study?

2. A nutrition company conducts a study to see if the amount of fish eaten affects IQ score. Write a null hypothesis for this study:

3. A study investigates the length of time babies spend looking at simple shapes or human faces. Write a directional hypothesis for this study.

The experimental method

One of the most often used research methods in psychology is the experimental method. The experimental method involves the manipulation of an **independent variable (IV)** to measure the effect on the **dependent variable (DV)**. All other variables (i.e. any 'thing' that can vary or change within an investigation) that might affect the DV should remain constant. This is so the researcher can be confident that the cause of the change in the DV was the IV (i.e. they can determine a **cause-effect relationship**).



The independent variable is the variable that the experimenter manipulates.

The dependent variable is the variable that the experimenter measures.

➤ **For the following hypotheses, give the independent variable and the dependent variable.**

1. There is a difference in the speed with which people react to visual and auditory stimuli.
2. Drug A affects memory.
3. Bulls charge more often when presented with a red rag than when presented with a blue rag.
4. First children learn to speak earlier than second and subsequent children.
5. Men drive faster than women.

6. Lack of sleep affects learning in 10-year-old boys.
7. A baby under 9 months of age will not search for a hidden object.
8. Social class affects IQ scores.

Which of these are directional hypotheses and which are non-directional?



Operationalisation

In any research study, the independent and dependent variables require **operationalisation** – the variables need to be clearly defined in terms of how they can be measured.

- **Consider the following aims and for each, state how you would operationalise the variables:**

1. To see if the amount of work students do is affected by when they do it.



2. To see if the amount of stress people are under affects their health.

3. To see if the age of the child affects how much rough and tumble play they engage in.



4. To see whether spending time on social media affects people's sociability.

Write a directional and non-directional hypothesis for each of the above.





Types of experiment - EXTRA

All experiments involve a change in the independent variable (IV), which is measured by the subsequent effects on the dependent variable (DV).

There are four different types of experiment used in psychology each with their own strengths and weaknesses. **See your notes from your summer homework for details of lab, field and natural experiments.**

Quasi experiments

Type	Definition	Strengths	Weaknesses	Example
	<p>In a quasi experiment, the IV is based on a pre-existing difference between people, e.g. age, gender or personality type. No one has manipulated this variable, so it simply exists.</p> <p>The DV may be naturally occurring (e.g. exam results) or measured by the experimenter.</p>	<p>Control – quasi experiments are often carried out under controlled conditions and therefore share some of the strengths of lab experiments.</p> <p>As the IV is a difference between people, comparisons can be made between different types of people (e.g. between people with and without autism).</p>	<p>As in natural experiments, participants cannot be randomly allocated to conditions and therefore participant variables may have caused the change in the DV (acting as a confounding variable).</p> <p>The researcher cannot manipulate the IV and so we cannot say for certain that any change in the DV was due to the IV.</p>	<p>Baron-Cohen <i>et al.</i> (1986) got children with Down's syndrome, children with autism and 'normal' children to arrange comic strip stories into the correct sequence. It was found that children with autism performed significantly worse when it came to ordering the comic strip.</p>