Year 11 into 12 Psychology Summer Work 2023

**Instructions:**

Read through the information and examples in Section A

Complete the online multiple choice questions in Section B

Design a study into the effect of caffeine on memory based on your understanding from Section A

# Section A

In this section you will find explanation of a range of research methods features or terms. In the boxes is a worked example based on the idea of someone investigating the effect of caffeine on attention.

When completing research, Psychologists must start with an **aim**. An aim is a simple statement of what they are looking at and often contains an expectation of what they intend to find.

*For example, if a researcher was interested in how drinking coffee and tea affects attention might have the following aim: “To investigate whether drinking caffeinated beverages affects reaction times”.*

Once they have created an aim, they will then need to think carefully about how they will complete their research. To do this they first need to identify their **variables**, i.e. the things they will change or measure between participants. In a piece of research we want to keep everything the same except for the Independent variable, the thing that the researcher will vary between participants. This is referred to as the **Independent Variable** or IV. The researcher will need to be very specific about how they intend to vary this, identifying the things they will make participants do, known as **conditions**.

*In this example, the IV is whether or not they have drunk caffeinated beverages. In this case it would make sense to have two conditions; one where the participants have had 1 cup of coffee in the half an hour prior to taking part, and one where the participants have had 1 cup of water in the half an hour before taking part.*

Notice just how specific this is – even stating the volume of drink, keeping the amount of liquid the same between the two conditions, and the time scale in which this has taken place. Being vague about the IV and saying something like “having drinks containing caffeine” wouldn’t be useful as different drinks contain different amounts of caffeine and are different sizes, and if it wasn’t within the half an hour before, it could be that the caffeine might have worn of for some participants.

A researcher will need to think carefully about what their dependent variable is and how to measure it. The **Dependent Variable** is the thing we think the IV will have an effect on. It must be clear how this will be measured, so something like “memory” or attention must be broken down into how you will know whether it is better or worse.

*In this example, there are a number of ways to measure attention. It could be that the participants are taught content and asked questions about it, asking them to click a button each time they notice a certain feature in a video clip etc. A very simple way to measure this is to give a spot the difference task and see how long it would take. This would means the DV would be time taken to find all 5 differences in a simple spot the different task.*

This process of being specific about Variables, of thinking about specifically how you will vary or measure them, is referred to as **Operationalisation**.

Once you have identified your Variables you will be able to create **hypotheses.** In a piece of research you would need to create 2 hypotheses; an Experimental Hypothesis and a Null Hypothesis.

The **experimental hypothesis** states that there will be an effect of the IV on the DV. It will include the operationalised IV and DV. These hypotheses can be **directional**, i.e. they state how the IV will affect the DV, or how the 2 conditions of the IV will perform in the DV, or **non-directional**, that there will just be a difference. A researcher would usually decide whether to make a directional or non-directional hypothesis based on prior research or an earlier finding.

*Directional experimental hypothesis: participants who have drunk 1 cup of coffee in the half an hour prior to completing a simple spot the difference task will find all 5 differences in a significantly faster time in seconds than those who have drunk the same amount of water in the same period.*

*Non-directional experimental hypothesis: There will be a significant difference in the time taken in seconds to find all 5 differences in a simple spot the difference task between those who have drunk 1 cup of coffee in the 30 minutes prior to completing the task than those who have drunk the same amount of water in the same period.*

Note that these are very specific. Note also the use of the word faster in the directional hypothesis. Other words that suggest a directional hypothesis include greater, longer, less etc. Note the use of the phrase “there will be a difference” in the non-directional hypothesis. Also note the use of the word “significant”.

A **null hypothesis** is a statement that the IV does not affect the DV. Note that this is not necessarily the opposite of the Experimental Hypothesis, but simply there will be no difference between the two conditions of the IV.

*Null Hypothesis: There will be no significant difference in the time taken in seconds to find all 5 differences in a simple spot the difference task between those who have drunk 1 cup of coffee in the 30 minutes prior to completing the task than those who have drunk the same amount of water in the same period. Any difference will be due to chance*

Students often wonder why the null hypothesis is necessary. If we do not find enough evidence to support the experimental hypothesis, the null hypothesis is retained and accepted and allows us to conclude on the relationship between the IV and DV. This is part of a process called falsification which will be taught later on in your studies.

One of the most common research methods in Psychology is an **experiment**. There are several different types of experiment. In a **laboratory experiment** the research takes place in a controlled environment. This means that it is not the normal environment for that person to be in at that time, and that the researcher is controlling the tasks the participant completes. This method has high **control** – i.e. we are able to confident that if there is a difference in the performance of the participants in the different conditions then this should be due to the IV and not anything else, but because it is controlled it could be quite unnatural.

*A psychology student could conduct a laboratory experiment looking at drinking caffeine on attention by asking them to come to a quiet classroom at lunch time, providing 1 cup of coffee of water and then giving the spot the difference task.*

Another way of conducting an experiment is through a **field experiment**. This is where you vary the IV and measure the DV but in the participants natural environment, and whilst they are doing their normal task. This tends to lead to more natural behaviour, but less control as you cannot manipulate the situation in the same way. Some people assume this means participants have not given consent, but this is not always true.

*A psychology student could conduct a field experiment by giving out caffeinated drinks or water at the start of the lesson and then completing and observation to rate the attention of each student.*

In this example, measuring the DV might need to be measured differently in order to fit in with the lesson.

A **natural experiment**, unlike lab and field, is not about where the research takes place, but how the IV is varied between participants. The IV in a natural experiment is not changed or manipulated by the researcher, but has been made to vary prior to the research, perhaps by the participant themselves or someone else. When using a natural experiment there is less control of the IV – participants cannot be randomly allocated to a condition of the IV, as they already (naturally) belong to one of the conditions prior to the experiment.

*A psychology student could ask who has already had a cup of coffee or had a drink of water earlier in the day prior to their experiment and then compare the performance of each on a spot the difference task.*

In this example we must consider what may have motivated the participant to drink coffee – were they up late at night or early in the morning? Is this more or less than they usually have? Does this matter? These are examples of **extraneous variables** – extra factors which might affect the DV that are not the IV. These can be factors from the environment (perhaps the room was excessively hot when some of the participants took part) or from the participant themselves (such as whether they have had enough sleep).

Finally, a **quasi-experiment** is similar to a natural experiment, in that the IV is not changed or manipulated by the researcher, and participants are already in their respective conditions of the IV prior to the experiment. However, the main difference between quasi- and natural experiments is that in a quasi-experiment, the IV has not been made to vary by anyone in the past, as it is a personal characteristic that cannot be (or is often not) made to vary, such as the sex of the participant, or their age. Again, this means that a researcher is unable to randomly allocate participants to their conditions, which could lead to naturally occurring differences between the conditions that can bias results – known as **individual differences**.

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| *A psychology student could compare observations of a year 7 class and a year 12 class to see whether the attention of younger or older students is affected more by drinking caffeine at the start of a lesson.* |

# Section B

Please follow either of the following links to the multiple-  
choice quiz (MCQ) on the research methods information  
from Section A. Once you have entered your name, there  
are 15 questions in total, split over 3 pages. Once you have  
submitted your answers, you can then click ‘view results’ to  
see your score. https://tinyurl.com/RGSPsychologySummerWorkQuiz23

# Section C

Design a study into the effect of caffeine on memory. In your plan you should include the following;

* An explanation of your IV – including what the different conditions of this will be
* An explanation of your DV and how you will measure this
* An experimental hypothesis
* A null hypothesis
* A statement of which type of experiment you will use and a justification for using this type of experiment
* One extraneous variable that might affect your results

You will be discussing these plans in the first week of September in your lessons.