Task 4 - Writing Hypotheses in psychology

Psychologists use a number of different methods and techniques to conduct research. One way is to conduct an experiment. When designing experiments psychologists need to have very clear research aims and testable hypotheses. As a psychologist you :

- You might be asked to write a suitable hypothesis for a study
- You might be asked to identify the IV and the DV from a hypothesis or the two variables if it is a correlation
- You might be asked to analyse data to support or reject hypotheses

Before you start the tasks below open the research methods pack on page 9 and 10 and read about hypotheses. Keep this open if you get stuck with any of the tasks.

The basics: A definition:

A hypothesis is a **testable statement** predicted by a psychologist based on a set of previous observations and/or theories. The wording should allow a precise test to be made to see if the prediction is correct. Hypothesis testing is one of the key features of science.

With all the following tasks, the answers are at the end of this document – please attempt each task before looking at the answers.

DO NOT worry if you find this work confusing. Hypotheses writing is a tricky concept and only gets better with practice. As long as you give each task a go - this is all we ask.

Task 1: Without knowing much about how to write a hypothesis in psychology, try and write a hypothesis for this research aim: "investigating the power of uniforms in obedience".

Here is an example of hypothesis for a different research aim. Look how the Aim has been turned into something a researcher could actually test....

Research aim: *"Investigating the effect of group size in conformity"*

Hypothesis: *Participants in large groups are more likely to conform than participants in small groups*

Now its your turn. Please do not worry about getting this wrong. Just try and write something that a researcher could test, in the same way as example above.

Research aim: "Investigating the power of uniforms in obedience"

Hypothesis:

Task 2: Now look at the back of this sheet and see if you have anything close to the suggested answer.

Did you note there were two suggestions?   Write down here the main difference between the two hypotheses in the answers to task 1.

Reading the answer to task 2 will help you with task 3. Can you now spot which is which?

Task 3: directional or non-directional?

A) Participants who slept more than 8 hours a night over 3 nights will perform better on a cognitive task than participants who slept fewer than 8 hours a night over 3 nights

B) There will be a difference in a participants' blood pressure measurements 6 months before the summer exams, and 3 days before the summer exams

C) Participants aged 70 or over score higher on a happiness questionnaire if they have a pet dog or cat compared with participants aged 70 or over who do not have a pet dog or cat.

D) Teachers whose students complete their work on time have lower stress scores than teachers whose students do not complete their work on time

E) There will be a difference in the number of correct items recalled after watching a crime, between witnesses questioned using a standard police interview, and witnesses questioned using the up-dated 'cognitive' interview.

Why have two different ways of writing hypotheses? This is related to whether previous research has consistently found similar findings or whether the findings have been inconclusive or this is new research.

This is important for when we do 'inferential statistics' which allow us to determine the probability that a research hypothesis is true or not – but more of that in the second year. For now, just remember this…

Directional = previous research has found similar findings

Non-directional = it is new research or previous findings have been inconclusive

Task 4: write a hypothesis for each of these two scenarios, decide whether you need to write a directional or non-directional hypothesis first.

Scenario 1: Dr Jemima Wickramasinghe is studying the effectiveness of a new anti-depressant, 'Seroboost' against a placebo. She has tested the mood of participants by a questionnaire before treatment, then the same questionnaire was given 10 weeks after the treatment begun.

Hypothesis:

Scenario 2: A researcher wanted to find out whether a replication of Elizabeth Loftus's study would show the same results on leading questions. They asked 20 participants to watch a film of a car crash, then asked 10 of them how fast was the car travelling in MPH when it 'hit' the other car, and the other 10 how fast was the car travelling in MPH when it 'smashed' the other car.

Hypothesis:

Half-time reflections	YES	NOT YET
I can write a basic hypothesis		
I can identify a directional and a non-directional hypothesis		
I can state why a directional or non-directional hypothesis is predicted		
I can write a non-directional hypothesis		
I can write a directional hypothesis		
Don't worry if you have ticked any of the 'not yet' boxes. Press on with the following tasks and you might find it begins to make more sense		

Lets get a little more complex – IVs and DVs

All of the hypotheses you have worked on so far are for 'tests of difference'. In other words, the researchers are looking to see if manipulating (changing) an Independent variable will make a difference on the dependent variable (what you measure).

For example in Loftus' study in task 4 the 'thing' being manipulated – the **independent variable** is the verb used in the questions. So whether participants are in the condition in which they were asked if the cars 'hit' vs the condition in which they were asked if the cars 'smashed'. The effect of the I.V is measured by the car's speed in MPH this would therefore be the **dependent variable.**

So a test of difference is used when we want to see if there is a difference in scores (the DV) between the participants in either condition (the IV)

Task 5 – Identify the IVs and DVs in these experiments (tests of difference)

A) A researcher has tested the mood of participants by a questionnaire before treatment, then the same questionnaire given 10 weeks after the treatment begun.

B) There will be a difference in a participants' blood pressure measurements 6 months before the summer exams, and 3 days before the summer exams

C) Participants in large groups are more likely to conform than participants in small groups

D) Participants aged 70 or over score higher on a happiness questionnaire if they have a pet dog or cat compared with participants aged 70 or over who do not have a pet dog or cat.

Now we get a little more complex again – test of difference vs correlations

The investigations we have looked at so far in this homework are experiments. This is where researchers hope to find that the DV is affected by the changes in the IV, but some investigations are correlations. This means there are two things being measured (variables) to see if there is a link between the two sets of scores.

For example, we may want to see whether there is a link between students GCSE scores and their A level results, this allows us to predict what A levels someone might get based on their GCSE scores.

In this case, we state a different type of hypothesis, one for a correlation.   The hypothesis for the GCSE/A level example above is as follows…

- ***There will be a correlation between participant's GCSE scores and their A level results***

A more psychological example is the correlation between how long a person is in an orphanage, and their IQ scores (see Rutter, 1994)

- ***The longer a child remains in an orphanage, the lower their IQ scores will be (before adoption)***

This is an example of a negative correlation, because as one variable increases, the other decreases.

Just for now, be aware that when there is a correlation, you **do not** state 'there will be a difference'. We will do more on hypotheses writing for correlations later in the course.

Task 6: try and write a hypothesis for these scenarios – these are all correlations

The more people exercise, the greater a feeling of general well-being

The more friends on 'social media' the less self-esteem a person feels

The more time spent revising, the better students' grades

The final part – null hypotheses

With every 'alternative' hypothesis, there is a null hypothesis. In other words, when we predict an effect to occur, there is also a likelihood that nothing will change.

The null hypothesis is just that prediction. For example, with a test of difference, if the IV does not effect the DV, we should accept the null hypothesis and not the alternative hypothesis.

So why is the hypothesis researchers study actually called the 'alternative' hypothesis?

Weird isn't it? but put it this way, if the IV hadn't been manipulated, then we would expect nothing to change – the 'null' hypothesis; the world just keeps ticking along as normal. If

the IV is manipulated, we hope for an 'alternative' thing to happen. Something that wouldn't have happened without the IV.

An example:

If someone with depression doesn't receive treatment, we would not expect them to improve, so nothing happens – the 'null' hypothesis. However, if the drug works, we would expect change in mood to occur – the 'alternative' hypothesis. So if those on the new drug significantly improve their mood after treatment, we can say that the 'alternative' hypothesis is supported. If mood does not improve, then the null hypothesis is supported.

Final task – write null hypotheses for these alternative hypotheses. Please note that convention suggests they are always written using these frameworks

Test of difference: ***There will be no difference in the participants' scores between the two conditions***

Correlation: ***there will be no correlation between the two variables.***

Example: test of difference

Alternative hypothesis: Participants in large groups are more likely to conform than participants in small groups

Null hypothesis: There will be no difference in conformity between participants in large of small groups

Example: correlation

Alternative hypothesis: There will be a correlation between the number of hours people exercise a week, and their scores on a 'well-being' questionnaire

Null hypothesis There will be no correlation between the number of hours people exercise a week, and their scores on a 'well-being' questionnaire

> **Now it's your turn…**

Alternative hypothesis: Participants who slept more than 8 hours a night over 3 nights will perform better on a cognitive task than participants who slept fewer than 8 hours a night over 3 nights

Null Hypothesis:

Alternative hypothesis: Teachers whose students complete their work on time have lower stress scores than teachers whose students do not complete their work on time

Null Hypothesis:

Alternative hypothesis: The more friends on social media a person has, the lower their self-ratings of self-esteem

Null Hypothesis:

Full-time reflections	YES	NOT YET
I know what an IV and DV is		
I can identify IVs and DVs		
I know the difference between tests of difference and correlations		
I can write a hypothesis for a correlation		
I know what a null hypothesis is		
I can write a null hypothesis for tests of difference and correlations		
Don't worry if you have ticked any of the 'not yet' boxes. We will deal with this when you return to college		

ANSWERS on HYPOTHESES

Task 1: suggested answers:

1) There will be a difference in obedience between participants who are told to do something by a person in a uniform and participants who are told to do something by a person in civilian clothes.   OR
2) Participants will obey a person in a uniform more than they will a person in civilian clothes

Task 2: the main difference is that the first one of the hypotheses is predicting a difference, but not the direction of the results. This is called a 'non-directional' hypothesis, whereas the other hypothesis is predicting a difference between conditions and a direction of the results – it states which condition will produce more obedience. This is called a 'directional' hypothesis

Task 3: answers - directional or non-directional?

A) Participants who slept more than 8 hours a night over 3 nights will perform better on a cognitive task than participants who slept fewer than 8 hours a night over 3 nights **Directional**

B) There will be a difference in a participants' blood pressure measurements 6 months before the summer exams, and 3 days before the summer exams **Non-directional**

C) Participants aged 70 or over score higher on a happiness questionnaire if they have a pet dog or cat compared with participants aged 70 or over who do not have a pet dog or cat.   **Directional**

D) Teachers whose students complete their work on time have lower stress scores than teachers whose students do not complete their work on time **Directional**

E) There will be a difference in the number of correct items recalled after watching a crime, between witnesses questioned using a standard police interview, and witnesses questioned using the up-dated 'cognitive' interview.   **Non-directional**

Task 4: Answers

Scenario 1: Dr Jemima Wickramasinghe is studying a ==new anti-depressant==, 'Seroboost' against a placebo. She has tested the mood of participants by a questionnaire before treatment, then the same questionnaire was given 10 weeks after treatment begun.

This should be a non-directional hypothesis – because the drug is new, there are no other research findings

Hypothesis: "There will be a difference in improvement of mood as measured by a mood questionnaire between participants before treatment, and 10 weeks after treatment begun"

Scenario 2:

Scenario 2: A researcher wanted to find out whether a ==replication== of Elizabeth Loftus's study would show the ==same results== on leading questions. They asked 20 participants to watch a film of a car crash, then asked 10 of them how fast was the car travelling in MPH when it 'hit' the other car, and the other 10 how fast was the car travelling in MPH when it 'smashed' the other car.

This should be a directional hypothesis because there are previous findings suggesting a direction.

Hypothesis: Participants asked how fast was a car travelling in MPH when it 'hit' the other car will estimate a lower speed than participants asked how fast was the car travelling in MPH when it 'smashed' the other car.

Task 5 – Identify the IVs and DVs in these experiments - Answers

A) A researcher has tested the mood of participants by a questionnaire before treatment, then the same questionnaire given 10 weeks after the treatment begun.
   IV = before and after treatment begun
   DV = improvement in mood on mood questionnaire

B) There will be a difference in a participants' blood pressure measurements 6 months before the summer exams, and 3 days before the summer exams
   IV = 6 month before summer exams and 3 days before summer exams

> **DV = Blood pressure measurements**

C) Participants in large groups are more likely to conform than participants in small groups

> **IV = large or small groups**
> **DV = conformity levels**

D) Participants aged 70 or over score higher on a happiness questionnaire if they have a pet dog or cat compared with participants aged 70 or over who do not have a pet dog or cat.

> **IV = Whether participants have a pet dog or cat**
> **DV = scores on a happiness questionnaire**

Task 6: try and write a hypothesis for these scenarios – these are all correlations

The answers below are either directional or non-directional – can you tell which is which?

The more people exercise, the greater a feeling of general well-being

There will be a correlation between the number of hours people exercise a week, and their scores on a 'well-being' questionnaire

The more friends on 'social media' the less self-esteem a person feels

The more friends on social media a person has, the lower their self-ratings of self-esteem the report

The more time spent revising, the better students' grades

There will be a correlation between hours spent revising before a test, and the marks out of 50 students get on their history test.

Final task answers –

Alternative hypothesis: Participants who slept more than 8 hours a night over 3 nights will perform better on a cognitive task than participants who slept fewer than 8 hours a night over 3 nights

Null Hypothesis: There will be no difference in performance on a cognitive task between Participants who slept more than 8 hours a night over 3 nights and participants who slept fewer than 8 hours a night over 3 nights

Alternative hypothesis: Teachers whose students complete their work on time have lower stress scores than teachers whose students do not complete their work on time

Null Hypothesis: There will be no difference in teachers stress scores between those whose students complete their work on time and those whose students do not complete their work on time

Alternative hypothesis: The more friends on social media a person has, the lower their self-ratings of self-esteem

Null Hypothesis: There will be no correlation between the number of 'friends' someone has on social media, and the participants' self-ratings of self-esteem.