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July 2015 Lesson Element Aims, Hypotheses and Variables Instructions and answers for teachers These instructions cover the student activity section which can be found on page 7. This Lesson element supports OCR AS and A Level Psychology. When distributing the activity section to the students either as a printed copy or as a Word file you will need to remove the teacher instructions section. Introduction Students are required to have knowledge of aims, hypotheses, independent and dependent variables and operationalising them as well as extraneous variables. They should be able to identify variables and formulate aims and hypotheses. The key objectives of this lesson element are to familiarise students with:

- Identifying and writing research aims
- Identifying and writing alternate and null hypotheses
- Identifying independent and dependent variables
- Operationalising variables.

July 2015 This activity offers an opportunity for English skills development. This activity offers an opportunity for maths skills development. July 2015 Worksheet 1 Aims are statements about what the researcher wants to investigate. Hypotheses are predictions about what the researcher expects to find. Student misconceptions The most common error when writing aims is students often confuse them with hypotheses or statements of findings (results). It is therefore important that students understand the distinction between them. Worksheet 1 is designed to introduce students to aims of research. The activity can be used to link to the core studies. If students have not studied the core studies, extracts could be given to help them identify the aims. To stretch and challenge, students could be given the task of finding out about the studies for themselves. Variables worksheet 2 Experiments always have an independent and dependent variable. The independent variable is the one the experimenter manipulates (the thing that changes between the conditions the participants are placed into). The dependent variable is the thing being measured, or the results of the experiment. Students will be required to identify independent and dependent variables as well as formulate them when designing their own research. Teacher answers (Activity) 1) Babies will show a preference for different types of patterns. IV: type of pattern DV: babies preference July 2015 July 2015 Student misconceptions When writing hypotheses, students often write in the past tense as in what the researcher has found as opposed to what he predicts to find. Students often confuse one and two tailed hypotheses and so it is important to give them plenty of practice at both writing them and identifying them. To facilitate this, students could be given examples of research and asked to write their corresponding hypotheses. As an extension activity students could be asked to rephrase the hypotheses from the activity from one tailed to two tailed and then to write a corresponding null hypothesis and vice versa. Worksheet 4 Anything that is not the independent variable that has the potential to affect the results is called an extraneous variable. It can be a natural characteristic of the participant, such as intelligence levels, gender, or age for example, or it could be a feature of the environment such as lighting or noise. Teacher answers (Activity) There are many extraneous variables that could affect the results other than the monetary reward. These include: the amount of revision the student does how many hours of lessons the students has a week attendance percentage the subjects the students are studying the natural differences in ability of the student. Consolidation task Students learn about conducting research by having the opportunity to plan, design and carry it out for themselves. They will be asked to reflect on their practical experiences, so it is therefore encouraged that students are given the opportunity to design and conduct their own experiments. As a plenary activity, students could be given the opportunity to begin planning and designing their own experiment at this stage. July 2015 July 2015 Assessment The following questions could be used as in class activity, test or homework:

1) Identify which of the following is a one tailed alternate hypothesis. [1] Children who are read to twice a day will learn to read quicker than those who are not read to. There will be no difference in how quickly children learn to read regardless of whether they are read to twice a day or not at all. There will be a difference in how quickly children learn to read if they are read to twice a day compared to not at all. 2) Write a corresponding null hypothesis to the following alternate hypothesis. [1] Male participants will score more basketball hoops than female participants will. 3) A psychologist was interested in testing the effectiveness of two behavioural intervention plans with a group of offenders who have a history of petty crime such as theft. One group of offenders was given sessions where they were taught about the implications of their crime and the effects it had on their victims. The other group was given one to one sessions whereby they met with the victims of their crime and they learned about how their theft had impacted on them. a) Write an appropriate aim for this study. [1] b) Write a two tailed alternative hypothesis for this study. [2] c) Identify two possible extraneous variables that may affect the results of the study. [2] d) Suggest ways in which the extraneous variables could be controlled. [4] We'd like to know your view on the resources we produce. By clicking on 'Like' or 'Dislike' you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you. 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The aim is a statement about what the researcher wants to investigate. It is usually kept quite broad and is written using the following format: 'The aim of the research is to investigate ...'. So the aim of Bandura's (1961) study was to investigate whether aggression can be transmitted through the imitation of aggressive models. Complete the activity on the following page. July 2015 IV: DV: 4) Males will make more driving errors than females. IV: DV: Operationalising variables To ensure cause and effect is established it is important that we identify exactly how the independent and dependent variables will be measured, this is known as operationalising the variables. This enables another Psychologist to replicate your research and is essential in establishing reliability (achieving consistency in the results). Let's take the aim above to see if children will perform better working alone than in groups. Without operationalising the variables we don't know how many children will be in the group or how performance will be measured. By stating that the children will either work alone or in groups of three is operationalising the independent variable. How could the dependent variable be operationalised? Activity Go back to the independent and dependent variables in the previous activity and operationalise them. July 2015 1) Babies will show a preference for different types of patterns. IV: DV: 2) Participants who get less sleep will have slower reflexes. IV: DV: 3) Participants who practice doing a task will get better the more they do it. IV: DV: 4) Males will make more driving errors than females. IV: DV: July 2015 Writing Hypotheses - Worksheet 3 Hypotheses are statements about the prediction of the results. There are some general rules when formulating them. Typically they: are written in the future tense include both conditions of the independent variable include the dependent variable. There are four types of hypotheses: 1. Null Hypotheses – these predict that no difference will be found in the results between the conditions. Typically these are written 'There will be no difference...'. 2. Alternative Hypotheses – these predict that there will be a significant difference in the results between the two conditions. 3. One tailed (directional) hypotheses – these state the specific direction the researcher expects the results to move in, e.g. higher, lower, more, less. 4. Two tailed (non directional) hypotheses – these state that a difference will be found between the conditions of the independent variable but does not state the direction of the results. Typically these are always written 'There will be a difference ...'. All research has an alternative hypothesis (either a one tailed or two tailed) and a corresponding null hypothesis. It is common to question why we have null hypotheses. Once research is conducted and results found, psychologists must accept one hypothesis and reject the other. So if a difference is found the Psychologist would accept the alternative hypothesis and reject the null. The opposite applies if no difference is found. Activity July 2015 To test cause and effect it is important to make sure that only the independent variable is causing the effect on the dependent variable. When something else has the potential of affecting the dependent variable that is not the independent variable it is called an extraneous variable. There are different types of extraneous variables: Participant Variables Situational Variables These are characteristics of an individual which may affect the dependent variable. For example, if you were testing memory recall, some of your participants may have a better memory than others, or the age of the participant may affect how well they can recall. These are natural differences in memory that may affect the results regardless of the independent variable. These are features of the environment which may affect the dependent variable. For example if you were testing memory recall, unexpected background noise may affect how well participants can recall. Researcher Effect Demand Characteristics The researcher may give away the aims of the research study; this may be intentional or unintentional. For example, in an interview, questions may be asked in a particular way to encourage certain responses. Or in an observation, desired behaviours could be encouraged through certain body language. If the participants work out the aims of the research study, they may begin to behave in a certain way. For example, in Milgram's research, critics argued that participants worked out that the shocks were not real and they administered them as they thought this was what was required of them. Psychologists try to identify extraneous variables before conducting their research so they can control for them to prevent them from affecting their results. Activity July 2015 Read the following extract and identify as many extraneous variables as you can and suggest possible ways to control for them. Answer the questions that follow. A psychologist wanted to investigate whether giving students an incentive to achieve increases the number of high grades achieved. He asked two colleges to take part. One college offered students a payment of £50 for every A grade they achieved. The second college did not offer any rewards. The independent variable is: The dependent variable is: Possible extraneous variables Can you suggest ways to control these? July 2015 Write a suitable alternate hypothesis for this study. State whether it is one tailed or two tailed and justify your choice. Write a suitable null hypothesis for this study.

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