



Psychology internal assessment

Student guide to carrying out a simple experiment

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What do I need to do before I start my experiment?

1. Choose your experiment (cognitive experiments on memory and perception are usually the best to replicate). The research you do when choosing your experiment can help you when you write your introduction—make sure you keep a note of all the books and websites you have used.
2. Identify your independent and dependent variables—you should only have **one** of each, this is essential for the work to be an experiment, do not use a survey, observation or questionnaire as your research method.
3. Consider any ethical problems.
4. Make sure that the data you will obtain is appropriate for the application of statistics.
5. Formulate your aim (SL and HL) and hypotheses (HL only).
6. Complete your proposal form (page 6) and hand it in to your teacher for approval.
7. Draft your method section, making all your design decisions before you carry out your research.

Choosing a topic

The internal assessment in psychology is a replication of a *simple* experiment. The first thing you need to do is choose an experiment to replicate. It is essential that your research be based on an experiment that has been published.

- SL candidates are required to carry out a simple replication of a published study.
- HL candidates may carry out a replication of a published study or make modifications to the original study.

When choosing an experiment to replicate, consider the following questions.

- What topics are you interested in?
- What topics do you find easy to understand? Avoid choosing a topic which you find difficult as this will make writing up your experiment very challenging.
- Is the topic suitable for a simple experiment? Avoid using topics or research that are difficult to set up practically, are time-consuming, or have multiple variables and conditions.
- Are resources available to carry out an experiment in this topic area? Avoid using topic areas requiring specialist or complicated equipment/apparatus or tasks.
- Can you conduct the experiment in the time allocated for the internal assessment?
- Where will you conduct the experiment?
- Who will the participants be?
- How easy will it be to recruit participants for the experiment?

Be aware that there are certain topics and methodologies you should not use. Failure to do so means that your internal assessment will receive **zero** marks. You must avoid:

- conformity and obedience studies
- animal research

- placebo experiments
- experiments involving ingestion (food, drink, smoking, drugs)
- experiments involving deprivation (sleep, food)
- experiments involving young children
- quasi experiments—studies where you do not manipulate the independent variable because it is naturally occurring (examples of naturally occurring variables are gender, age, ethnicity, any personal characteristic of the members of the sample, culture, socio-economic status, left- or right-handedness, native language, taste in music, education level or time of the day)
- correlational research that describes a relationship between variables, surveys and observational studies
- using a “pre-packaged” item such as a computer program, website or a pre-designed test to collect your data—you must design your own materials.

The most straightforward experiments to replicate are those that have clear experimental and control conditions, and one independent and one dependent variable. Avoid choosing complex experimental designs.

It is very important that the experiment you choose follows the ethical guidelines.

Ethical guidelines

- Any experimental study that creates anxiety, stress, pain or discomfort to participants must not be permitted.
- Any experimental study that involves unjustified deception, involuntary participation or invasion of privacy, including the inappropriate use of information and communication technology (ICT), email and the internet, must be avoided.
- Consent must be gained from participants through the use of a consent form.
- All participants must be informed before commencing the experimental study that they have the right to withdraw at any time. Pressure must **not** be placed on any individual participant to continue with the investigation beyond this point.
- Each participant must be informed of the aims and objectives of the research and must be shown the results of the research.
- Young children must not be used as participants. Experimental studies involving children need the written consent of parent(s) or guardian(s). You must ensure that parents are fully informed about the implications for children who take part in such research. Where an experimental study is conducted with children in a school, the written consent of the teachers concerned must also be obtained.
- Participants must be debriefed and given the right to withdraw their own personal data and responses. Anonymity for each participant must be guaranteed.
- You must exercise the greatest sensitivity to local and international cultures.
- Avoid conducting research with any adult who is not in a fit state of mind and cannot respond freely and independently.
- If any participant shows stress and/or pain at any stage of an experimental study, the investigation must stop immediately, and the participant must be allowed to withdraw.
- Non-human animals must not be used for experimental study.
- All data collected must be kept in a confidential and responsible manner.

If you carry out any unethical work, your internal assessment will receive zero marks.

What is a simple experiment?

- A simple experiment involves the manipulation of **one** independent variable and the measurement of **one** dependent variable, while other variables are kept constant.
- An independent variable is the variable that you, as the researcher will manipulate.
- The dependent variable is the variable that you are measuring.
- It is important that your variables are operationalized. This means that the variables need to be defined and clearly measurable.
- The experiment should have a control and an experimental condition.
- The experimental design can be repeated measures or independent groups.
- Participants should be able to be randomly allocated to either the control or the experimental group.

Aim and hypotheses

Before conducting your experiment you should have an aim, and at HL a hypothesis.

An aim is a clear statement of what you are going to study, for example, “To investigate the effect of leading questions on estimates of the speed at which a car is travelling in an accident”.

At HL you are also required to formulate hypotheses. These are statements that researchers make predicting what they think the outcome of their experiment will be. There are two types of hypotheses that are required—an experimental/research hypothesis and a null hypothesis.

Research hypothesis— H_1

The research hypothesis must be a clear, concise prediction of what is expected to happen in the experiment—how the independent variable affects the dependent variable. This must be operationalized, that is it must be evident how the variables will be quantified, and may be either one- or two-tailed (directional or non-directional).

Example: “The time taken to reel in a fishing line through a 4-m course is reduced by the presence of co-actors”.

Null hypothesis— H_0

The null hypothesis states that no significant difference is expected to be found between the groups on the measure of the dependent variable—there will be no effect of the manipulation of the independent variable on the dependent variable, and that any difference found is due to chance.

Example: “The presence of a co-actor will have no significant effect on the time taken to reel in a fishing line through a 4-m course”.

The researcher sets out to prove their research hypothesis correct and to prove the null hypothesis wrong. This means that manipulation of the independent variable has had an effect on the dependent variable and that any relationship between these variables was not due to chance.

Statistical analysis of results will determine whether the data is **significant**. When data is significant, the null hypothesis can be rejected, when it is not significant, the null hypothesis is retained. This means that it cannot be concluded with enough certainty that manipulation of the independent variable had an effect on the dependent variable.

Method

The method section of your internal assessment tells the reader about the design decisions you made and how you carried out your experiment. It should include enough information and detail to allow the reader to be able to replicate your experiment precisely.

The method section is divided into the following four sections.

Design

Details of the design decisions you made should be described, including:

- experimental and control conditions
- the type of experimental design chosen and why you chose it (independent groups, repeated measures, or matched pairs)
- identification of variables (independent and dependent variables), operationally defined
- ethical considerations and reference to documentation (informed consent, debriefing) in the appendices.

Participants

Details of the participants involved in the research should be included, for example:

- the researchers involved in conducting the research
- the target population, described in terms such as age, sex, education, or reference to any other relevant variables
- the sampling method and justification of why it was used
- the size of the sample (a participant sample of 20 is recommended), and how the participants were selected and assigned to experimental conditions.

Materials

A clear outline of materials or apparatus should be used. The exact details and examples should be placed in the appendices.

Procedure

This sub-section should include a statement of where the research was undertaken, the instructions given to participants, details of debriefing, and any other relevant details that would be necessary for replication of the experiment.

Further evidence should be included regarding design decisions, such as counterbalancing, random allocation of participants to groups, single- or double-blind, control of extraneous variables, standardized procedures and steps taken to avoid any possible bias in sampling or in the experimental procedures.

What do I do next?

Once you have decided upon your method you can carry out your experiment and collect and analyse your data and write up your **results** section. You can now decide whether or not you can accept your research hypothesis and reject your null hypothesis.

You will then need to consider your results in relation to the research you outlined in your **introduction** and discuss this in your **discussion** section and formulate your **conclusion**—did you meet the aim of your experiment?

You will then need to summarize all these things in your **abstract**.

Forms for you to use

On the next few pages you will find some useful forms.

- Proposal form—fill this in and give it to your teacher once you have chosen your experiment.
- Checklist—use this throughout your internal assessment to make sure you have completed all the sections.

Psychology internal assessment proposal form— SL and HL

Text in italics is for HL only. All other text is for both SL and HL.

Student name _____

Topic

What topic does your research relate to?

Which experiment are you replicating/modifying?

What research is your study based on?

Aims and hypotheses

What is the aim of your research?

Research hypothesis

Null hypothesis

Variables—use only one independent variable and one dependent variable

Independent variable

Dependent variable

Possible extraneous variables

Control for extraneous variables

Design

Research method

Design (repeated measures/independent measures)

Type of data (nominal/ordinal/interval/ratio)

Statistical test

Procedure

Condition 1 (experimental)

Condition 2 (control)

Equipment and task

Apparatus list

Description of the task

Participants

Age range:

How many?

Target population (for example, students)

Male/female

Sampling method (for example, random)

How will they be allocated to conditions (experimental or control)?

Ethical considerations

Items to consider (for example, consent, deception, debriefing, protection from harm, confidentiality)

Standardized instructions

You will need to write some instructions that you give to all your participants. Standardized instructions, which can be given to participants either verbally or in writing, will avoid any variables caused through giving participants slightly different instructions each time.

Consent form

You will need to design a consent form to give to your participants to sign before they take part in your experiment.

Debriefing instructions

You will need to have written clear debriefing instructions to give to participants before you can start your research. For example,

Thank you for taking part in my research project, I am conducting an experiment onas part of my IB internal assessment for psychology. Do you have any questions you would like to ask?

Student signature.....

Teacher signature.....

Internal assessment checklist—SL and HL

Text in *italics* is for HL only. All other text is for both SL and HL.

Title page	Done	To do
Have you stated the title of your research?		
Have you included your student name and number?		
Have you included the subject and level (SL or HL)?		
Have you included the date, month and year of submission?		
Have you included the number of words?		

Abstract	Done	To do
Have you stated what you are studying?		
Have you mentioned the aim <i>and hypotheses</i> ?		
Have you briefly described the method?		
Have you given some details about the participants and where the research was conducted?		
Have you briefly stated your results?		
Have you written your conclusion?		
Is the abstract less than 200 words in length?		

Introduction	Done	To do
Have you included the subject you are investigating?		
Have you included details of the study that is being replicated, including the aim?		
Have you included a thorough review of the background literature (including theories and studies) relating to the study being replicated? Have you cited one reference (SL)? <i>Have you cited at least three references? (HL)?</i>		
Have you provided a rationale and justification for your research?		
<i>Have you stated a clear aim and experimental hypothesis that is operational?</i>		
<i>Have you stated whether your hypothesis is one-tailed or two-tailed?</i>		
<i>Have you stated a clear null hypothesis?</i>		

Method	Done	To do
Design		
Have you stated the experimental design (independent groups/repeated measures)?		
Have you explained why the design decision was made?		
Have you stated and explained the experimental and control conditions?		
Have you stated the independent variable?		
Have you stated the dependent variable?		
Have you explained how you controlled any extraneous variables?		
Have you mentioned ethical considerations?		
Participants		
Have you described the participants (number, age, gender distribution) and the population from which they were drawn?		
Have you stated how the participants were selected and allocated to the conditions?		
Have you clearly justified the sampling technique you have used?		
Materials		
Have you included all materials and apparatus that you used?		
Have you included specimens of materials and apparatus in the appendices?		
Have you included standardized instructions in the appendices?		
Have you included debriefing instructions in the appendices?		
Have you included other important material in the appendices?		
Procedure		
Have you described how you developed your materials?		
Is the procedure relevant and clearly described in chronological order?		
Is there enough detail in your procedure, to allow replication?		
Have you referred to any ethical issues that were addressed (for example, obtaining informed consent and carrying out debriefing)?		

Results	Done	To do
Have you given a summary table of raw data in the appendices?		
Have you provided descriptive statistics (central tendency and dispersion) for your data? <i>Have you included inferential statistics for your data?</i>		
Have you labelled axes on graphs, columns on tables and given clear titles?		
Are the results clearly stated and accurate in a written statement?		
<i>Have you reported why a particular statistical test was used? Justification should include details on the types of data used (nominal/ordinal/interval/ratio) and the experimental design (independent measures/repeated measures).</i>		
<i>Have you shown the calculations for any inferential statistical test in the appendices?</i>		
<i>Does your statement of conclusion contain details of the level of significance, the critical and observed values and degrees of freedom?</i>		
<i>Have the hypotheses been accepted or rejected according to the results of the statistical tests?</i>		

Discussion	Done	To do
Have you related the results of your study to the results of the studies cited in the introduction?		
<i>Have you stated what your results mean in relation to your hypothesis?</i>		
Have you explained why you got those results?		
Have you evaluated your design and methods?		
How would you improve this study if you were to do it again?		
Have you included ideas for modifications and/or improvements for follow-up studies?		
<i>What are the implications of your findings?</i>		
Have you given a conclusion?		

References	Done	To do
Have you included a complete set of references?		
Are the references presented in an approved format?		

Appendices	Done	To do
Are the appendices clearly labelled and well set out?		
Are the appendices complete (materials used, standardized instructions, debriefing notes, informed consent statements, calculations, tables of raw data)?		

Presentation	Done	To do
Do you have all of the proper section headings, page numbers, and a table of contents?		
Is your report within the word limit of 1,000–1,500 words (SL) or 1,500–2000 words (HL)?		
Is the report in the correct format (title, abstract, introduction, method, results, discussion, references and appendices)?		