

Lab reports

Reports describe, analyse, and investigate a situation for a particular audience. They have a formal structure and common sub-sections. Lab reports, in particular, are used in the sciences and in psychology to describe and analyse the results of an experiment that explores a scientific concept.

They are typically assigned to enable you to:

- conduct scientific research
- formulate a hypothesis(es) about a stimulus, event, and/or behaviour
- review relevant literature to justify your hypothesis
- allow someone to replicate your study by providing precise details
- apply statistics to test your hypothesis
- explore theoretical explanations
- evaluate research objectively and methodically
- communicate concisely and precisely

Remember that with lab reports it may be impossible to rely on a single explanation for your findings. Therefore, it is vital that you provide as many potential and relevant interpretations as possible.

Even if your findings do not support your hypothesis, they are still valuable because you can then demonstrate that within the contextual constraints of your study, your argument was not reliable, and you can then move on to consider other areas for research, without having to go down the same path.

Lab report structure

Lab reports typically adopt the sections listed below. Check your assignment instructions for clarification.

Abstract

Introduction

Method

Results

Discussion

Conclusion

Abstract

The Abstract functions as a short, yet detailed, summary of the whole report. It is usually written as a single paragraph. The Abstract can vary in word length from a

minimum of 120 words through to 250 words.

However, always check the assignment instructions to be sure of the limit required for your report. In creating your abstract, it is important to include a sentence or two about each of the following:

- a statement about the topic, which demonstrates some reasoning for formulating the hypothesis
- the hypothesis
- brief details about how the study was conducted, including number of participants, participant characteristics (for example, gender, how they were recruited, any special equipment used to carry out the research, the main findings, and whether they supported or disconfirmed the hypothesis)
- theoretical explanations for the findings, as well as any major inconsistencies and/or alternative explanations, where word space permits
- research avenues for the future or implications of the research

Introduction

This is the first main section of the report and may be easiest to write in conjunction with the discussion section because it is often important to follow-up, in your discussion, on at least one or two of the studies you mentioned in your introduction.

The central purpose of the introduction is to justify your hypothesis. However, to begin the introduction, you need to start back at a more general area of interest relevant to your study. From there, you move rapidly into any major theories or models, as well as studies that have been conducted, which relate to the focus of your hypothesis.

When considering what studies to include, it is always useful to mention an original, pioneering study that may have been carried out previously, possibly in the 1960s or 1970s, which led the research path. In some instances, the topic area may be an emerging one, and the original study or several pioneering works may have occurred in more recent times.

Then from here, you have a range of options. It may be the case that the research findings in the topic area have been fairly consistent, except for one or two outcomes. In that case, it would probably be helpful to include the inconsistent studies to at least highlight the lack of consistency and hence, the need to continue the investigation. In other cases, it may be more difficult in that there may be a range of studies which all highlight diverse aspects of the study you have conducted. Here, you will need to prioritise which studies are most relevant to the current one – whether it be the

particular technique used or the actual findings and type of research question(s).

Method

This is a relatively formulaic section in that there is a clearly marked out structure to follow, namely, three sub-sections: participants, materials or apparatus, and procedure. The method section can be the easiest to write because it follows a straightforward structure.

Participants

In this section, give enough details about the participants so that someone could repeat the study using participants with the same characteristics. Mention the number of participants, descriptive characteristics (gender, age, bodyweight, whether they are students etc.), as well as how they were recruited. It is also important to mention whether participants volunteered and whether they were randomly assigned to experimental conditions.

Materials or Apparatus

Here you need to give details about the equipment required to carry out the study. This may include a particular type of technology, in which case you may need a model number and brand name. If you used a survey, which was designed specifically for the study, then you need to provide enough details so that someone could replicate it if they wanted to repeat the study. In such cases, it may be appropriate to attach a copy of the survey in an appendix at the end of the report, and give general details in this section, but refer readers to the appendix for a full copy. If a test is well-known, you may only need to mention its name.

Procedure

In this section, you need to repeat the exact instructions that were given to the participants. If it is important in conducting the study to express instructions to participants using particular words and phrases, then mention these exactly as they were stated in the study. You may also need to include activities and tasks undertaken by the researcher.

Results

The results provide the reader with information about what you found. Consequently, one of the key features of the Results section is to ensure that you only mention the

findings and not what they mean in relation to the study.

It may be useful to begin by naming the type of analysis carried out on the data, and if the data had been changed in any way from its raw form before you undertook the analysis. Then mention the difference or lack of difference between groups with respect to the activity they participated in during the study. If relevant, you can express this difference (or lack of) by including each group's score numerically in brackets. This then needs to be backed up with statistical evidence to support the difference (or lack of). In this case, you will need to mention the name of the statistical test using appropriate statistical symbols, such as t , F , or M . For each test, include the degrees of freedom, the value of the statistic, and the level of probability. You may also need to provide the N value or number of participants. Most importantly, you also need to state whether the difference was "significant" or "not significant."

When you have a lot of data, it may be convenient to display this in a table or graph and then summarise the main features, highlights, or patterns in words. Avoid duplicating the entire content of the table. Put table and figure numbers and titles at the top of the table/figure. The captions should stand alone and should include sufficient detail and description of units and abbreviations that the reader can interpret the table or figure without referring to the body of the report.

Discussion

This section is allocated the most marks, so it is well worth your investment in time to do it thoroughly. You typically begin with a sentence or paragraph summarising the results, including whether they support or disconfirm the hypothesis. You can then choose to highlight the similarities in findings with the current study and previous ones. It is then relevant to move on to the most challenging part of the Discussion: explaining your findings.

A good proportion of your discussion should be devoted to explaining, interpreting, and where relevant, justifying your findings. This can involve repeating some of the theoretical frameworks or models mentioned in the Introduction, but with a greater focus towards making sense of the outcomes in the current study. Beyond affirming the theory, you should also consider any alternative explanations for the findings. These may be drawn from studies that presented inconsistent findings with the theory. Additionally, you may also be able to draw on aspects of the study which may have been left to chance, rather than being experimentally controlled.

For lab reports completed at University, there is usually no need for a separate

Conclusion; the final paragraph of the Discussion concludes your report. In the last part of the discussion, it is beneficial to mention any limitations in the study, such as a lack of diversity amongst participants, sample size, and other characteristics of the sample population. If you can think of other disadvantages associated with the design of the study, this will most certainly add bonus marks. In the final part, before your concluding paragraph, it is a good idea to consider the future application of the findings in some way, and even the need for further investigations to ascertain unexplained aspects of the research outcomes. This particular part can also be included in the concluding paragraph, but will depend on your assignment instructions. In closing the report, finish by reaffirming the findings and their significance to the research area and gaps in literature or further research required.

Science lab report writing resources

Emerson, L., & Hampton, J. (Eds.). (2005). *Writing guidelines for science and applied science students* (2nd ed.). Thomson/Dunmore Press.

Eunson, B. (2005). *Communicating in the 21st century for science and technology*. John Wiley & Sons.

Lobban, C. S., & Schefter, M. (1992). *Successful lab reports: A manual for science students*. Cambridge University Press.

Silyn-Roberts, H. (2012). *Writing for science: A practical handbook for science, engineering and technology students* (3rd ed.). Prentice Hall.

Van Emden, J. (2001). *Effective communication for science and technology*. Palgrave.

Psychology lab report writing resources

Findlay, B. (2019). *How to write psychology research reports and essays* (8th ed.). Pearson Education.

Harris, P. (2008). *Designing and reporting experiments in psychology* (3rd ed.). Open University Press.

Mitchell, M. L., Jolley, J. M., & O'Shea, R. P. (2013). *Writing for psychology* (4th int. ed.). Wadsworth.

O'Shea, R. P., & McKenzie, W. A. (2012). *Writing for psychology* (6th ed.). Thomson.

Rosnow, R. L., & Rosnow, M. (2009). *Writing papers in psychology: Proposals, research papers, literature reviews, poster presentations and concise reports*

(9th ed.). Wadsworth.

Smyth, T. R. (2004). *The principles of writing in psychology*. Palgrave Macmillan.

Academic writing and study skills support

1. Academic Q+A

If you have a quick question about study skills or academic writing, then they can ask it on the [Academic Q+A forum](#), which can be accessed via the [Academic Support Stream site](#).

2. Consultations

One-to-one consultations with learning advisors and writing consultants are [available online and on campus](#). Consultants can answer your questions about academic writing and study skills or give you feedback on your assignment's structure, focus, paragraph structure, flow, presentation, use of sources, and referencing.

3. Online Writing and Learning Link (OWLL)

Develop your academic writing and study skills with the [Online Writing and Learning Link \(OWLL\)](#) website from Massey University. OWLL includes information on assignment writing, assignment types, referencing, study skills, and exam skills.

4. Pre-reading Service

The [Pre-reading Service](#) is a free service, which gives students an opportunity to send their draft assignment to [CLS consultants](#) for review and advice. Students receive individual written feedback on their assignment's structure, focus, paragraph structure, flow, style, presentation, referencing, and use of sources. The service can be accessed via the [Academic Support Stream site](#).

5. Workshops

Free study seminars and workshops are run on campus and online. See [Workshops page on OWLL](#) for [programmes and registration details](#).