

# Guidelines for Writing Lab Reports

These notes are intended as a guide to writing reports. There is no single correct way of describing psychological experiments/studies. However, there are widely accepted standards and conventions which you are advised to follow. The method outlined here is modelled on the format used in most academic psychology journals. For further detail it is suggested that you refer to the book 'Designing and Reporting Experiments' by Peter Harris, published by Open University Press. Designing and reporting psychological studies are inextricably linked so it is important to bear this in mind in your write-ups. For 'real' examples, it is important that you spend some time during the early stages, perusing current editions of academic journals (Ground Floor of Library) to identify ways in which 'psychological studies' are reported - the 'structure', the style of writing and the kind of language used. Moreover, you will also get a feel for some key research issues in psychology and how they are operationalised (translated into concrete testable form). Writing up a psychological experiment/study is more than a case of just following the rules. It involves being able to formulate manageable research questions that both originate from and develop an existing body of literature on a particular topic.

## 1. Aims

The fundamental aim of a psychological report is to provide sufficient information for a competent professional to be able to replicate what you have done and to identify why you did it and what implications your results have. Basically you will need to 'tell the story of your study' (Harris, 1982 p.17), the only constraint being that you follow the established conventions. A research report is primarily a 'research instrument' designed to explain:-

- What you did
- Why you did it
- How you did it
- What you found
- What you think it shows

You will need to assume that the reader is 'psychologically naïve' by spelling out all of the above aspects of the research.

Early on, the purpose of the practical write up is principally for you to demonstrate that you understand what you did and its implications. As you begin to take more responsibility for the choice of topic and design then you will need to justify this by explaining why you decided upon the study you conducted, its relevance to an existing body of literature/research and why you chose to study it the way you did. The sooner you develop this style of thinking about the research process, the better. This will be encouraged from the start.

## 2. Overall Structure

The following structure is advised:-

1. Title
2. Abstract
3. Introduction
4. Method
  - 4.1 Design
  - 4.2 Participants
  - 4.3 Stimuli/Apparatus/Materials
  - 4.4 Procedures
5. Results
6. Discussion and conclusions
7. References
8. Appendices

Number the headings and sub-headings in the way indicated here.

## 3. The structure in detail

### 3.1 Title

Aim for something punchy and concise allowing the reader to know at a glance the nub of your study. A title like 'attitude measurement' is too vague whereas titles like 'an experiment to show the effect of common versus uncommon words on response times in anagram solution' would be too long winded.

### 3.2 Abstract

The study is summarised succinctly in a single but fair sized paragraph. It should say what was done and why, providing a brief overview of the method, subjects, findings and any significant conclusions or implications drawn.

### 3.3 Introduction

This orienting section should always have two components

#### 3.3.1

Provide some relevant background information about the topic under investigation and include some references to the published literature in this area.

#### 3.3.2

Indicate and explain your reasons for the study in the light of this background information (it will replicate or develop existing research on this topic) together with a statement of the hypothesis(es) it is designed to test or the questions it is designed to answer. State the independent and dependent variable logically derived from the background information. Usually it is sensible to begin in broad terms by delineating the area, then to give brief descriptions of relevant studies reported in the literature, then to go on to develop the rationale behind the present investigation and - where appropriate - of the specific hypotheses being tested. Do not provide any results or conclusions in this section.

#### Key points:

- Avoid overkill in the introduction. What you include must be directly relevant to the problem being investigated. Avoid anything trivial or only tangentially related. Identify major findings and the implications of these to orient the reader to the relevant research context.
- If you disagree with what has been said before about the topic you are investigating, you will need to be able to substantiate this on the basis of more than mere anecdote.

### 3.4 Method

In the introduction you have told the readers in broad detail what your study is about. It is now time to tell them precisely what you did. You must give them enough information to be able to exactly replicate (repeat the study to check its consistency) the study. The method section usually contains three or more sub-sections, each of which may have its own side-headings.

The precise form of the presentation may vary. Choose the form that allows you to convey to your readers simply and concisely exactly what you did. If the study is complex, you may have to include so many details that your reader would be in danger of getting lost without the help of further headings. Use sub-headings to make the reader's task less awesome and to aid the flow of the report (although do not include sub-headings just for the sake of it).

Below are some hints as to what to include in the sub-sections:

#### 3.4.1 Design

There are a variety of ways that an experiment or study can be staged (the types of conditions, the order of events, how potentially confounding variables are controlled). Here a brief but formal overview of the design is required (e.g. between subject, within-subject, matched subject). Include a brief statement of the manipulation and of the outcome measure used. You may also need to restate the hypothesis(es) in relating it to the manipulation.

This section should not include any details of procedure. Rather it is a brief depiction of the logical framework of the experiment/study that will dictate the nature of the data analysis. Keep everything as brief and as concise as possible.

#### 3.4.2 Participants

Who the participants are will contribute to the generalisability of the findings (i.e. the extent to which the findings are meaningful in terms of other samples of the target population rather than in terms of the peculiarities of one particular sample). Saying that 'ten participants were used' is inadequate - whilst providing ten life histories is not only unnecessary but tedious to read.

State briefly how many and who the participants were, giving any critical details of their characteristics (e.g. age, sex etc) depending on the interests of the study). Give such details as are relevant to the nature of the study you are reporting and which may have some effect on the results (e.g. geographical location, social class, education level, etc). Provide details of how the sample was obtained including sampling procedures used and to what extent this was successful (e.g. response rates to questionnaires). You will also need to mention any other participants involved like stooges (i.e. confederates) and experimenters/observers.

You will also need to explain how participants were distributed (e.g. procedures for randomisation or matching) among your experimental conditions.

#### 3.4.3 Stimuli/Apparatus/Materials

Describe any equipment or materials used. Use diagrams if this will help but, as a general rule, it is the function not the appearance that is important. Strike a sensible balance - you do not need to mention that so many pencils were used unless they are critical to the experimental manipulations. If you are using a questionnaire or booklet of self-report measures/rating scales, provide a concise description of the items - again so that the reader can in principle replicate the study.

#### 3.4.4 Procedure

This section describes exactly what happened in the experiment/study (the operations) with sufficient detail and clarity that the reader would be able to repeat it if necessary (i.e. replicate it to check the consistency of the findings). All details are important (e.g. description and explanation of each experimental condition, the experimental/study instructions, the number of trials given and in what order, what response measures were taken, what rest periods were allowed, how long the experiment took etc). Provide all the details necessary to conduct an exact replication of the

study. Think about the experiment/study as a staged event and all that this involves. The procedure section is often difficult to write and is a good way of practising clear, economical, descriptive writing.

You will also need to include a statement of any 'instructions' delivered to subjects during the course of the study especially if these are part of the manipulation process (e.g. designed to produce a certain response set or orientation). If the instructions are lengthy, include them in the Appendices.

### 3.5 Results

It is necessary to give a brief description of the data, drawing attention to the most salient features. Orient your reader to the data obtained and the way they are analysed. First describe the findings (giving relevant descriptive statistics) and then proceed to the more inferential aspects of the analysis giving details of any statistical assumptions that have been made, the form of the test used and why. Use tables (Table 1, Table 2...) and graphs/histograms (Figure 1, Figure 2...) if this will help the reader to understand the results.

Report the precise test used and why.

Report the precise value obtained from the statistic you used - i.e. the obtained value together with any additional information necessary to help the reader understand the key findings and the statistical significance of these (e.g. the critical value, the degrees of freedom, the N).

You need to include the workings of the test. State briefly any statistical support for the hypotheses guiding the study (but do not discuss the results yet or draw any conclusions).

#### Key points:-

- Avoid too much detail in this section. Any raw data in the form of individual scores should be provided in the Appendix as well as any statistical calculations that need to be made available to make sense of the results without having to look elsewhere in the report.
- Rules for presenting Tables and Figures are discussed later
- Do not discuss or draw any conclusions about the data until it has been systematically analysed. In the absence of appropriate tests it is not possible to tell whether observed values are important in terms of the population or signify merely chance variation.
- If the obtained value is not significant, abide by the statistical decision (i.e. acknowledge that no effect was obtained) no matter how close to statistical significance they come.
- Include sufficient information to enable the reader to come up with their own conclusions about the implications of the data.
- Do not be afraid to squeeze all relevant information from the data but at the same time don't go into irrelevant detail.

### 3.6 Discussion

In this section an attempt is made to link the results gained in the experiment/study to the ideas described in the introduction. Use plain English. Did the experiment/study confirm or undermine the hypotheses tested? If not why not? Can you suggest improvements that could have made the experiment/study more powerful? If the results were confirmatory, what further research would you suggest to develop the findings? Present tentative explanations for unexpected findings outlining briefly how a further study might help to determine between them.

Consider the shortcomings of the methods of the study suggesting appropriate remedies. Try to avoid being morbid or nit-picking about this unless you have good grounds for believing they are crucial to your findings.

#### Key points:

- Experiments/studies are designed to test hypotheses to help solve problems and/or to develop theories or may be simply explorative. However things are not so simple: the results yielded are not self-evident.
- Achieving statistically significant results does not mean that we can conclude that the psychological hypotheses underlying the experiment/study are supported. The results yielded supply the facts that then have to be interpreted in the light of broader considerations. You will need to search for the most reasonable explanation for your findings by examining carefully all possible explanations. In other words, statistical significance is different from psychological significance: do not confuse significance with meaningfulness.
- Ask yourself, 'what caused the difference?' 'what caused the relationship?' observed at the statistical level in question. Are there confounding variables that could equally well account for the difference/relationship? To answer these questions you will need to look back over the design to assess its quality and to ascertain whether it is reasonable to assume that the independent variable is the cause of the effects obtained or indeed whether there is some aspect of design that may have acted to nullify the effect.
- If the results are unexpected this may not necessarily be due to a design flaw. Unless you have evidence that the design is fundamentally flawed (lack of appropriate control) then there is no reason why you should feel obliged to search for explanations here.
- In writing the discussion follow the sequence of thinking outlined below:-
  - a) agree what needs to be explained and summarise the key findings
  - b) try to account for these findings and then
  - c) draw out the implications of these findings

**findings -> meaning -> implications...**

- beware of over-generalising the implications
- do not repeat in the discussion what you said in the introduction. Nevertheless refer to what you said to make sense of the findings.

#### **4. Reporting Published work**

In the report itself, refer to published work as follows:-

"Smith (1982) found that..." Note that this is not an historical statement - it does not mean that "Smith found in 1982 that...". In fact Smith may have found what he did years previously and they may still be applicable today.

If you cite more than one author for any one particular paper referred to, include all their names at the first citation (e.g. Smith, Kline and Beecham, 1993). Subsequently you can refer to papers authored by more than two people using the abbreviation 'et al' (e.g. Smith et al, 1993). Cite multiple publications by the same author in chronological order. If some papers are authored by them in the same year, suffix the date with 'a', 'b' etc (e.g. Smith, 1993a; 1993b). Separate authors of separate papers with semi-colons (e.g. Smith, 1993; Grimes, 1992).

Above all:-

- Check that the reference does in fact exist
- That it says what you claim it does
- That you have referenced it correctly

All references cited in the body of the report should be given in full in the reference section. Citations and references should be formatted according to the departmental guidelines (see p.\*\*).

#### **5. Appendices**

Put all raw data into one set of Appendices and any statistical calculations into another set. Such details are not usually included in published articles but should be included in your practical reports/assignments to aid marking. You will also need to include copies of instruction sheets, questionnaires etc.

#### **6. Style of Language**

- Past passive test e.g. 'each participant completed the...'
- Avoid personal pronouns e.g. I designed the study to... versus The study was designed to...' (although it is becoming more acceptable now to say 'I' in some instances)
- Brevity and conciseness: make your points explicitly and precisely
- Do not use note form
- Use the same case and tense throughout
- Do not waffle and tell the truth

#### **7. General points**

- Substantiate all factual assertions by indicating who says what, when and on what basis the claim is being made in the form of citations
- Separate facts from your opinions about the facts (your interpretations)
- Learn to develop your arguments in a logical way and to articulate them clearly
- Define your terms
- If you use abbreviations, define them on first appearance
- Label all Figures and Tables consecutively starting with the first one of each class to appear. Figures include graphs, histograms, diagrams and depictions. Use labels to refer to Tables and Figures in the text and give them informative titles
- Avoid sexism