



The University of Sydney

Environment, Behaviour & Society Research Group

RESEARCH PAPERS AND REPORTS

FOR HONS, MPhil, PhD & POST-DOC STUDENTS

The below has been prepared to help all research students with the writing and organising of research papers and reports including dissertations and theses. The first four pages, to the end of Methods, are also relevant for research proposals.

What is a research paper or report, including a thesis report?¹

- Form of professional documentation and communication
- Designed so readers can extract information readily and easily
- Describes research work in sufficient detail for it to be verified (and maybe repeated or at least built off) by others
- Interprets/draws conclusions from data
- Places research questions and conclusions in context of related research work in the field

Language and style:

- Use objective language
- Avoid words/phrases with a meaning that could be misunderstood
- Avoid bias in language² – scholarly writing should be free of implied or irrelevant evaluation of a group or individuals being studied
- Ensure simplicity and clarity – ensure it is easy to follow your thinking
- Contemporary science and scholarship use the active voice as much as possible
- Use the past tense for things already done, eg, research methods, tests applied, etc.; use the present tense for things that live on, eg, the findings and conclusions drawn
- Present information in a logical order for the reader
- The quality of your written communication will influence your reader's understanding
- Follow a standard style guide – EBS and most of the social/environmental sciences worldwide use the *APA Publication Manual*
- For dissertations and theses being submitted in Australia, use Australian spelling and punctuation throughout; for manuscripts being submitted to a journal, follow the journal's guidelines

Research terminology:

- Use appropriate research terminology
- Define terms when first used; do not give list of definitions
- Write terms in full before using acronyms

A scholarly research paper, report or thesis has:

- An informative summary (the abstract)
- Subdivisions with headings and subheadings (two levels are quite sufficient)
- Main points made obvious
- All factual statements supported by references to peer-reviewed research or by data from this study

¹ Parts of the first four subsections have been used by permission of Dr Meloni Muir, "Practical Report Writing", School of Medical Sciences, University of Sydney.

² See the *APA Publications Manual* (5th edition), section 2.12, pp 61-76 for an excellent set of guidelines for avoiding unintentional bias in language.

Structure:

The structure and content of a research paper, report or thesis should be appropriate to your research topic. A classic research report, in any field, contains four basic sections (though the names and the numbers of actual sections or chapters may vary):

- Introduction (background literature review)
- Methods
- Results
- Discussion (interpretations, conclusions, recommendations)

Plus of course references, acknowledgments and maybe appendices (in a report, but not in a paper)

Below is an outline for a typical Hons, MPhil, PhD or Post-doc research paper, report or thesis:³

Title Page

- Title: The title summarises the main idea of the paper simply and, if possible, with style
 - A concise statement of the main topic of the research
 - Identify the actual variables or theoretical issues under investigation and the relations between them
 - Fully explanatory when standing alone
 - A good title easily compresses to the running head used for published papers
 - Titles are commonly indexed and compiled by abstracting and indexing services into reference works; therefore avoid words that serve no useful purpose, eg, the words 'method' and 'results' do not normally appear in a title, nor should such redundancies as 'a study of' or 'research on'
 - Avoid abbreviations and acronyms
 - Recommended length no more than 10 to 12 words
- By-line: Author(s) name and institutional affiliation, eg, Environment, Behaviour & Society Research Group, The University of Sydney
- Date submitted
- Running head: Abbreviated title recommended to the publisher as a running head; limited to 50 characters including spaces, shorter is better

Table of Contents

- For theses and other reports only, not for papers
- Recommended to use Word's automatic Table of Contents generator

Abstract

The abstract is a brief summary (one paragraph of 100-120 words) covering:

- Purpose of the research
- Overview of what is known from the research literature
- Main research question and/or hypothesis
- Overview of research methodology
- Summary of principle findings
- Ending with the significance of the research (very important for research proposals; frowned upon for papers)

The abstract should be:

- Accurate
- Concise
- Self-contained (eg, define all abbreviations, or do not use them; spell out names, do not use acronyms, etc.)
- Non-evaluative
- Coherent and readable, eg, use active rather than passive voice

Introduction and Review of Research Literature

The introduction is likely one-quarter of the paper or thesis – the purpose, background and review of related research. Include the following:

³ For additional details on some of the below items, see the *APA Publication Manual* (5th edition).

- **Objectives and/or Aims**
 - The purpose and potential significance of the study, ie, the problem under investigation, and why it is important
 - The objectives and/or claims of the research
- **Critical Integrative Review of Background Research Literature**
 - Background of existing research in the domain of your topic
 - Comprehensive
 - Integrative
 - Critical
 - What is known and what is not known
 - Leading to the identification of gaps in existing knowledge
 - Subdivide into several sections, each dealing with a different body of relevant prior research
 - Include discussion of the theory(ies) underlying the research
 - Review and critique major research methods previously used in this domain
 - All research terms defined
 - In total, tell your reader what is known and what is not known (gaps) in the domain of your research topic
 - Leads logically to and supports the research questions or hypotheses
- **Research Questions and/or Hypotheses**
 - Flowing from the above review – the specific research questions, and hypotheses if appropriate, that were investigated
 - The gaps in current knowledge turned into researchable questions and/or hypotheses
 - Include subquestions, but avoid pseudo- or procedural questions

Methods

Another ca one-quarter of the paper or thesis – the *what* and *how* of the research:

- Describe how the study was conducted and why the methods used were appropriate
- Enable the reader to evaluate the appropriateness of your methods, and therefore the reliability and validity of your results
- Tell the reader *what* you did and *how* you did it in sufficient detail so that a reader could reasonably replicate your study
- Subdivide into several labelled sections and subsections, each dealing with a different part of the research methodology, depending on topic, but include at least the following sections and subsections:
- **Research Design**
 - The mode of inquiry that was deemed most appropriate for this research, ie, into which epistemology and mode of inquiry did it fit, and why?
 - Overall plan of the research – two stages, preliminary and main study, etc (as appropriate).
 - This section is unusual in sciences where everyone follows the same received methodology, eg, psychology where everything is 'experimental', or physiology or other bench sciences, but is needed in our field as the range of modes of inquiry or methodologies varies widely; it is therefore necessary to indicate and justify the basic methodology selected
- **Pilot Study(ies)**
 - Details of any pilot studies conducted to refine and test instruments, etc.
- **Participants: Population and Sample**
 - Appropriate identification of the population and sample are critical for assessing the results and generalising the findings
 - Identify the population that is relevant for the research under investigation
 - Indicate how the sample was selected, including how the size of the sample(s) was decided and what type of sample it was (simple random, stratified random, and why)
 - Indicate any agreements or payments etc made to participants
 - Include mention of ethical considerations and how handled
 - Characterise the final sample along lines that will be most useful to determine how far the data can be generalised, eg, numbers from different ethnic groups, or other analytic variables relevant to the dependent outcome variables

- **Data or Other Information Collection Methods**
 - What type of information, evidence or data was collected to answer the research questions or test the hypotheses?
 - Articulate the constructs implied in the research questions and/or hypotheses and the variables selected to 'measure' them
 - Detailed description of data collection instruments (for independent, mediating or moderating variables and dependent variables), and how they relate to the constructs and variables
 - For text-based interpretive research, this would be the types of evidence used and how they were gathered
 - For field, laboratory or simulation research, this is the types of data collection methods used including constructs and variables and instruments
 - Address quality assurance: reliability, construct and internal validity, and generalisability/transferability
- **Procedure**
 - Summary of each step in the execution of the research
 - Summarise instructions to participants (with actual protocols in the appendix of a report)
 - Include specific experimental manipulations (if appropriate), sequencing of administering pre- and post-tests, etc. (as appropriate)
 - Describe randomisation, counterbalancing and other control features of the design (as appropriate)
 - Most readers are familiar with standard procedures that are well published; don't repeat details of them; describe in detail any unique or new procedures
- **Data/Information Analysis**
 - Describe the specific quantitative and/or qualitative data analysis methods that were used to analyse or evaluate the data or information, and why they were appropriate⁴
 - For qualitative and interpretive research, explain in detail how you evaluated the information in front of you, qualitative, interpretative, structural analysis, etc
 - For prototype development research, give details of how you assessed the object developed and against what criteria you tested and evaluated it
 - For field or laboratory research, give details of quantitative and/or qualitative data analysis methods employed
 - Ensure your reader is clear what data analysis techniques you used to analyse the data for each question, and why
 - Sometimes this section is put into results, as a description of the data analysis methods used for each research question and associated findings, but it is preferable to put it in the end of Methods to combine in one place *all* the methods used in the study

Results

Perhaps as much as one-third of the thesis, report or paper – what you *found* from the research:

- Summarise the data collected and the findings relative to each research question and/or hypothesis
- Divide the section into several subsections, each reporting the findings in answer to one of the research questions.
- Include all relevant results, including those that run counter to expectation
- For quantitative analyses, report levels of statistical significance *and* effect size/strength of relationship indicators
- Include sufficient descriptive statistics so the direction of the findings and the nature of the effect being reported can be understood by the reader
- For qualitative analyses, report sufficient detail to justify how you arrived at the results and so the reader can assess the validity of the findings
- Just the "facts" here; do not discuss or interpret the data (that comes in the next section)
- Include tables and figures as appropriate (eg, ANOVA tables, figures or explanatory qualitative diagrams that illustrate complex relationships and comparisons)⁵
- Tell the reader what to look for in tables and figures and provide sufficient explanation to make them readily intelligible

⁴ See the *APA Publication Manual*, pp 21-26, 130-144 for additional information on the presentation of statistics. See Miles and Huberman (1994), *Qualitative Data Analysis: A Sourcebook of New Methods* (Thousand Oaks, CA: Sage) for some ways of presenting qualitative analyses.

⁵ See the *APA Publication Manual*, sections 3.62-3.86, for detailed information on tables and figures.

- Avoid using tables for data that can be presented easily in a few sentences in the text
- Be scrupulous in presenting the data in as fair a manner as possible
- For multiple studies being reported in one paper or report, describe the method and results of each study separately

Discussion and Conclusion

Maybe just one-sixth of the paper, report or thesis, but a critical part, putting the results into context:

- Summarise the most important findings from the study; open the section with a clear statement of the support or non-support for the original hypotheses or the essential answers to the major research questions
- Discuss similarities and differences between the results and the work of others
- Evaluate and interpret the findings, ie, interpret or give meaning to the findings, tying them back to the research questions, hypotheses, theory(ies) and previous research reviewed earlier in the paper or report
- Emphasise any theoretical implications of the results
- Discuss the strengths and limitations of the study: acknowledge limitations (be specific), suggest improvements and address alternative explanations for the results
- Discuss the overall significance of the findings, ie, comment on the importance of the findings
- Discuss the policy, planning and/or design implications as appropriate
- Discuss what would be the next steps in continuing research and development

References

- Include a list of archival references, in standard APA format, of all published work directly cited in the paper
- If a reference is not in English, translate the title into English (in parentheses).
- Do not reference unpublished or internal reports, unpublished papers, conference papers that have not been published, or papers or books in languages that are unlikely to be known to a majority of readers.
- Minimise the use of on-line internet sources, as most are not refereed and do not constitute "scholarly archival literature". Do not cite ephemeral or non-peer-reviewed website information. For on-line refereed publications and major government reports, use the standard APA citation format, and cite the date of retrieval.

Appendix(es)

- Helpful if the detailed description of certain material is distracting or inappropriate in the body of the report
- Include research protocols, unpublished tests and its validation, new computer program designed for your research, instruments, consent forms, etc. (include in reports, but usually not in papers)

Author's Note or Acknowledgements

- Identify sources of financial support
- Acknowledge supervisors' and other colleagues' professional contributions to the study
- Include disclosures, eg, that the study is based on a PhD thesis, the results were presented earlier at a conference, and any relationships that raise the possibility of being perceived as a conflict of interest
- Include contact details for further information concerning the research