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# **Purpose of this guide**

Welcome! This guide will help you write research reports in psychology. We will refer to research reports for the rest of this guide - please note that this is just another word for a lab report.

The basic structure of a research report is fairly consistent across psychology courses, though the specific details of what we expect to see in each section of the report may differ. The same can be seen when you look at journal articles – for example, you can pretty much expect to see an introductory section in all of them, but the structure and content of the introduction may vary between articles. This is because the different ways we talk about research changes to accommodate the different ways we conduct research. Different journal articles also have different requirements and preferences for the articles they choose to publish. Having this variety makes reading articles interesting, but also means you need to learn to be flexible based on the context and content of each course (a good skill to bring to the workplace!).

The same is true of our two research reports in PSYC232 - not all of these sections will be required for your two research reports. This means you will need to check your assignment instructions carefully to see what is required in each research report and refer to the relevant sections in this guide.

For PSYC242, you will be writing your research report in two parts. The first part will consist of just introduction, method, and references. You will submit it for a grade, and receive feedback from your tutor. Then end of the course, you will submit a complete research report that includes all sections. You’ll be able to revise the introduction and method based on feedback, and add any new references you cite.

# **Plagiarism**

[Academic integrity](https://www.wgtn.ac.nz/students/support/student-interest-and-conflict-resolution/academic-integrity/plagiarism) is an important part of our University’s core values. Your degree, qualification or research holds value because it assumes that you have conducted yourself with honesty and have earned this achievement through your personal efforts. Cheating on assessments or plagiarising brings the value of your achievement into question, disrespects the efforts of the original authors and is treated seriously at this university.

Make sure you are familiar with [what constitutes plagiarism](https://www.wgtn.ac.nz/students/support/student-interest-and-conflict-resolution/academic-integrity/plagiarism) and what steps you should take to avoid it. For university students, plagiarism usually also involves submitting the same work for more than one course – the issue here is that you cannot claim additional credit for a work that you have already claimed credit for. If you are not sure about your particular case, contact your instructors and ask for advice.

We encourage you to form study groups to help you through assessments and to brainstorm ideas, but we do not recommend that you write together or share written work. This would help you avoid one of the most common cases of plagiarism stemming from students working too closely together on an assignment and unintentionally producing very similar written work.

# **Function of a research report**

Research reports are a way to talk about your research that is clear, systematic and concise. Most reports aim to provide the reader with a rationale, methodology, results and conclusions of psychological research. The reason we follow a common format is to make our communication with fellow researchers as efficient and effective as possible.

It may help to think of the narrative and logical flow of a report as following an hourglass shape:

Abstract: what is the most important information about your study?

A report starts with an abstract, which is short summary of the study and it is often used by the reader to decide if they would like to read further. Therefore, it is important to concisely outline what your research was about and what it found.

Introduction: why did you do your study?

Your introduction section provides the rationale for your study and usually places it within the context of current literature on the topic. Your introduction should be written with a gradually narrowing focus – it begins by describing the general area of research, the research question, some of the previous literature and ends with your specific predictions about the current study. Your introduction demonstrates to the reader that you have carefully reviewed literature and that it justifies your current study.

Method: what did you do?

Your method section follows on from your Introduction, and this is where you describe exactly what you did in careful detail. The goal here is to concisely report your approach to addressing your specific research aims so that a fellow researcher can fully evaluate and replicate your methodology if they want to.

Results: what did you find?

A results section should describe what specific analysis you did and what your results mean empirically. Ideally, the analysis should have been chosen because it helps to answer your research aims outlined in the Introduction, and the findings will allow you to draw broader conclusions in your discussion.

Discussion: what did your findings mean?

The discussion section explains your findings to the reader. In your explanations, you will need be critical of your data and suggest constructive ideas. Your discussion should be written with a gradually broadening focus – you are now leading them away from your specific study and back towards what your findings contribute to the literature and the field as a whole.

References: whose work did you use?

Any resources that you used to help you form your research idea or understand the findings must be cited in the appropriate places in the text, and fully acknowledged in the references section.

# **Abstract**

The structure of an abstract follows the same narrative that you have maintained throughout the report and is often written last. It typically includes brief statements about your research aims, what you measured or manipulated, your key findings and your main conclusions from these findings. It is kept fairly short, so do check with your instructors about any word limits on the abstract.

# **Introduction**

An introduction section can be made up of several sub-sections, so **check your assignment instructions** for what the instructors would like included in each assignment:

* Background - The big question of our study
	+ Why is this topic interesting or important to study? This is usually a short paragraph that introduces the general topic and goal of your report. Think in terms of theoretical constructs (like racism, or self-esteem, or memory) that you aim to study, and not the specific operational variables you might use. You may use literature here to introduce the topic but avoid going into detailed descriptions of any specific study – the goal here is to introduce the topic and generate interest first.
	+ Is your study going to use any ideas or terms that are not common knowledge? It is also useful to define any new terms that you are going to use in the report that the reader might not be familiar with.
* Literature review
	+ What is the relevant research around this topic that could help justify your study? Has anyone else studied this and did they find anything that could help inform your study?
	+ There are many ways to describe literature to the reader. If a piece of literature is particularly important in order to explain and justify your study, then we usually devote a separate paragraph to it. Typically, this involves describing the aim of the study, the method used to address this aim, what the study found, and finally what the authors concluded from their findings. Here is one common way to approach this.
		- Aim: Use your first few sentences to tell the reader what the authors of the article were aiming to do. What was the main research question of the article you are summarizing? You can usually find this at the end of the article’s introduction section. Or, if you are only interested in one of the experiments within an article, what was the specific goal in that experiment? Whatever you state as the aim here, your reader will then expect to have this addressed by the end of the paragraph.
		- Method: How did the authors try to address their aim or measure what they were interested in studying? Go over the article’s participants, materials, procedure, and/or design sections, and consider what would be the most concise may to get the relevant parts of the method across to the reader. Not all of their method will be relevant to include in your write-up and you will need to make a judgement call here – usually stating what the key variables were and how they were manipulated is enough (e.g. how was the independent variable manipulated and how was the dependent variable measured? What information was collected from the participants to help answer the research question?). When describing an experiment, we usually devote a few more sentences here than when describing a survey, because the method of data collection in an experiment tends to be more complicated. You might want to add the order in which the key manipulation happened in the experiment.
		- Findings: Using the method you just described, what were their main findings? You don’t need to include statistical results here – in fact it is better not to and to use plain language instead. For example, if the authors wanted to test whether two groups of participants differ in their alcohol consumptions, did they find any differences or interesting patterns?
		- Conclusions: What conclusions did the authors draw from their findings? Alternatively, what did you take away from their findings? Did they meet their aims and did their research raise questions or issues for your own study? Devote a few sentences here and check that your conclusions form an answer to the aim you had at the start of the paragraph.
	+ *Note on findings versus conclusions*: These are closely linked, but describe distinct parts of a study. A finding is what the researchers found by doing their analysis – for example, the study found a significant difference in average sleep duration between two caffeine dose groups, with higher doses linked to shorter sleep duration. A conclusion is what the researchers take away from this analysis that answers their research aims – using the above example, the authors concluded that adults should avoid consuming high doses of caffeine before sleep as this was associated with an unhealthy sleep duration.
	+ *Note on choosing relevant information*. Most studies will have a different focus from yours and will often include additional research aims or analyses that may not be relevant to your study. Part of doing a literature review is carefully sifting through studies and their findings to focus on the information that is most relevant to you. You should always include only the most relevant information that will lead the reader to your study aim.
* Summary of the aim(s)
	+ If you’ve done a good job of your literature review, it should be clear that there is gap in our knowledge, and that your study is going to fill this gap. What are the main aims of your study and how are you planning to meet these aims?
	+ Start by describing overall what your study is trying to achieve (your overall research question or aim) and the rationale behind this (e.g. Was this aim informed by a particular piece of literature? Is this based on someone’s work or ideas?). Then, describe any specific patterns or ideas that you are going to be looking for (e.g. you might have a set of hypotheses and predictions, exploratory questions or a series of qualitative questions). Finally, state briefly what you have done in your study to answer these specific (e.g. Did you conduct a survey that measured behaviour? Did you run an experiment to test the effect of one variable on another?).
	+ Don’t provide a detailed method here, but it should be clear to your readers what sort of study they are about to read (e.g. it is clear that the study coming up is an experiment rather than an interview).

# **Method**

A method section can be made up of several sub-sections, so **check your assignment instructions** for what the instructors would like included in each assignment:

* Design
	+ The design subsection gives the reader a helpful overview of the experiment before getting into the details in the procedure. This section typically summarizes the independent variables (what levels they had, whether they were manipulated within or between subjects), dependent variables (what kind of data did it produce) and subject variables (what kind of data did it produce).
	+ This section is usually included for experimental research and is usually not necessary for survey-based research.
* Participants
	+ Who participated in your research? The information you choose to report depends on what is important for the reader to know about the participants, what information you had ethical approval to collect, and what information you have available to you.
	+ Typical information to include is number of recruited participants, any available demographic features (e.g. age), method for their selection (e.g. Were they attending a course at university when they were contacted? Were they compensated or rewarded in any way for participating? Were participants excluded and why?), was informed consent obtained and a statement about having ethical approval to recruit these participants.
* Materials
	+ This section details all the materials, stimuli, instructions or apparatus that were needed to run your study. This is probably one of the most varied sections and heavily depends on what features of your research are necessary for replication.
	+ If you used a survey, it is typical to provide details such as source of the survey, what it aims to measure (e.g. construct or operationalization), what instructions it had, how many questions/items it had, and the response scale used. It is also common to provide the survey questions if you have created a new survey (usually in a table), or to provide some examples of the questions if this is an existing survey someone else has created.
	+ If you used some sort of stimuli or apparatus, it is typical to provide details such as source or where you got them from, what it is meant to induce or measure, any instructions that you gave the participants along with the stimuli, and any relevant features of the stimuli (e.g. dimensions, size, model, etc.).
	+ Depending on how many materials you used, this could end being a long sub-section. It is a good idea to organize your numerous materials into sub-headings or separate paragraphs (e.g. each scale in a survey or each variable gets a separate paragraph).
* Procedure
	+ A step-by-step account of what it was like to be a participant in your study and the events that happened to your participants from beginning to end. Depending on your type of study, this could very brief (as is typical for survey-based research) or very extensive (as is typical in experimental research). There is no single standard for what is useful to include in a procedure section because studies can vary greatly in how they were conducted. You will need to consider what the reader will want to know about it was like to be a participant in your study.
	+ Typically, we include information about how the study began (e.g. was a survey link sent to the participants? Were they invited into the lab?), where the study took place (e.g. Was it online? Were the participants in a group?), the order and timing of events (e.g. if the study was made up of several parts, what order were these presented in? How long did the survey/experiment take? Could the participant complete the study in their own time or were sessions scheduled? Was there a time limit for the study?) and what happened upon completion (e.g. debrief? Rewarded immediately?).

# **Results**

In PSYC232 and PSYC242 we cover data analysis primarily in our labs. When it comes to writing this up, a results section can be made up of several elements, so **check your assignment instructions** for what the instructors would like included in each assignment:

* Data manipulation
	+ Was the data manipulated in any way before you ran subsequent analyses? This may not apply to all studies, but sometimes we would sum or average individual item scores before running analysis. In experiments that use response time as a variable, it is common to average together the response times of many trials to be a single dependent variable that represents that type of trial.
* Descriptive Statistics
	+ Describe the data or any patterns that are relevant to your study aims. This often involves some measure of group average (e.g. mean, median), variance (e.g. standard deviation) and a graph that can help the reader understand the data (e.g. histogram or a bar chart). It is common to describe any trends or patterns that are relevant to your study aims (e.g. low group average, skewed distribution of scores on the bar chart). Here are some examples of how descriptive stats could be described depending on the aim of your study:
		- Example using mean, standard deviation and a measure of reliability: The mean score on the gratitude scale indicated that feelings of gratitude were, on average, low in the sample (*M* = 2.51, *SD* = 0.51). Cronbach’s alpha for the scale indicated good reliability (α = .86).
		- Example referring to data on a graph: Figure 1 showed that most responses clustered in the medium to high range of scores, with few participants responding low on the measure.
		- Often, descriptive statistics are presented in Tables and Figures. Typically, we don’t repeat information in text that is also in a table or figure; instead, we might refer the reader to the table, e.g. “Means and standard deviations in each experimental condition are presented in Table 1”.
* Statistical analysis
	+ Describe any statistical analyses or tests that you ran. For each analysis, a general principle is to report within 1 to 2 sentences what test you ran (e.g. t-test), what data/variables did it test (e.g. effect of caffeine dose on sleep duration), what the test showed, which is usually a comment on significance and direction of the effect (e.g. the test produced non-significant results, hence we do not reject the null hypothesis), and any relevant statistical output (e.g. *t*(20) = 2.56, *p* = .064). Here are some examples of how you would structure the results of a statistical analysis:
		- Example of a t-test write-up: I conducted an independent samples t-test to examine differences between low and high caffeine dose groups in their average sleep duration. The test produced a significant result with a medium effect size, hence we rejected the null hypothesis (*t*(48) = 6.02, *p* = .001, *d* = 0.61, 95% CI [.35, .74]). Results indicated that participants had longer average sleep duration in the low (*M* = 7.50, *SD* = 0.52) than in the high (*M* = 6.32, *SD* = 0.41) dose group.
		- Example of a correlation write-up: I conducted a Pearson’s correlation test to examine the relationship between levels of gratitude and life satisfaction. Results rejected the null hypothesis (*r*(198) = .71, *p* < .001), indicating that there was a significant, strong and positive correlation between levels of gratitude and life satisfaction.

# **Discussion**

A discussion section can be made up of several sub-sections, so **check your assignment instructions** for what the instructors would like included in each assignment:

* Summary of the key findings
	+ This typically involves restating the aims of your study, followed by a summary of the key findings as they relate to these aims. What did you find (in plain language rather than stats this time) and did your findings answer your research question(s)? Not all of the data from your results section may be directly relevant to your aims – you will need to focus on the key findings.
	+ If you had a hypothesis and prediction statement at the end of your introduction, then this is where you would remind the reader of this statement, describe whether your findings matched your predictions, and decide whether your hypothesis was overall supported or not by your findings.
* Comparison of findings to literature
	+ How consistent were your key findings with the literature? The most common approach here is to carefully compare your findings to each of the key studies you have described in your introduction and note any consistencies or inconsistencies. How do our findings compare against the findings in the literature? Your comparison should also provide reasons for why your findings match or do not match the work of others. Were there any methodological differences in how you collected data? Why do you think this affected the findings?
* Implications
	+ Consider the theoretical implications of your key findings. Focus on the theoretical constructs that led to your choice of operational variables. What do your findings using these operational variables suggest about the underlying constructs or theory? Did we contribute in some way to the theoretical debate that inspired this study?
* Applications
	+ Consider practical applications of your key findings. Could these findings generalize outside a laboratory or research setting and be applied to issues in society? Who could make use of these findings and how? What about your findings specifically makes you think this is a good idea for an application?
* Limitations
	+ Consider if your study had any methodological weakness. Given the key findings you identified at the start of the discussion, is there any potential issue with your method or data that, if you fix, would make you more confident in the conclusions you can draw from these findings? Identify a limitation and explain how this limitation could have affected the conclusions you can draw from the data. Describe how you could fix this limitation and what might you expect to see in the findings if you make this change.
* Future directions
	+ Consider where this research can be taken to next. Given the findings you identified at the start of the discussion, what changes could be made to the study that would extend this line of research? Identify a future direction and explain what about your findings suggested this would be a good future study. Describe briefly what this future study would be like and what you might expect to find if you run this study. Keep your proposed changes close to the scope of your research question - your future directions should not be a completely unrelated study.
	+ Note that in a report, a good future direction idea should be distinct from a limitation, or it should at least suggest a direction that is different from the solution you identified as part of your limitation. A future direction should be about extending your research beyond your study. It is also a good way to end your report on an impactful idea – in what new interesting ways can we use our findings to continue this line of research?

*Note about making good, critical-thinking points in the discussion*: Your observations and arguments in the discussion must be guided by the findings in every sub-section. A good argument or idea should come directly from our study and be informed by our data, rather than a general comment you could have made without having seen our data or done our study.

# **References**

Include a separate section for your References at the end of your Discussion and make sure any in-text citations that you use in your report are properly formatted and referred back to in the References section. References and in-text citations should follow the current APA style guidelines.

In-text citation are used to refer to sources within the main body of your research report. We have listed some common ways in which you can cite something in-text below and refer to this [in-text citation guide from Massey University](https://owll.massey.ac.nz/referencing/apa-in-text-citation.php) for other ways:

* **In-text citation examples with one author**:
	+ According to Bartholomeow (1990), cats are fluffy.
	+ Cats have been shown to be fluffy (Bartholomeow, 1990).
* **In-text citation examples with two authors**:
	+ According to Bartholomeow and Purrsephone (1990), cats are fluffy.
	+ Cats have been shown to be fluffy (Bartholomeow & Purrsephone, 1990).
* **In-text citation examples with three or more authors**:
	+ According to Bartholomeow et al. (1990), cats are fluffy.
	+ Cats have been shown to be fluffy (Bartholomeow et al., 1990).

Once you have used a source in your write-up, you must credit it fully in your References section. See some examples below and [this referencing guide for the most common types of sources](https://apastyle.apa.org/instructional-aids/reference-guide.pdf). For other types of sources, check [our library's APA-style links](https://libguides.victoria.ac.nz/referencing-citing/styles#s-lg-box-wrapper-4490920) and also this [interactive guide provided by Massey University](https://owll.massey.ac.nz/referencing/apa-interactive.php).

* **Journal article reference:**

Bartholomeow, C., & Purrsephone, K. (1990). Machine-learning algorithm for determining fur density in the common domesticated cat. *Journal of Feline Medicine and Surgery, 50*(3), 428-439. https://doi.org/985432142

* **Book reference:**

Bartholomeow, C., & Purrsephone, K. (2001). *Practical management guidelines on feline vaccination in rural Russia* (2nd edition). McPaw Publications. <https://doi.org/65942174>

# **General APA writing and formatting tips**

Neatly formatted reports, structured paragraphs and correct grammar help to bring out your good ideas. A reader will find it hard to see your point, even if it is a good one, if they struggle to read your sentences or understand your data/graphs.

* Use formal language and factual descriptions.
* Proofread your work before submitting. It also helps to read your sentences out loud to check that it makes sense and flows well. Did you run out of breath reading one sentence? You should probably split that one long sentence into two sentences.
* Formatting your report:
	+ A typical APA report is double-spaced and uses size 12 Times New Roman font. There are many [other good font options](https://apastyle.apa.org/style-grammar-guidelines/paper-format/font) and the most important aspect is their legibility.
	+ Headings are formatted by first determining [what level it should be written at](https://apastyle.apa.org/style-grammar-guidelines/paper-format/headings). The headings for your main sections, such as Method, are all level 1 headings. Sub-sections that exist within these main sections, such as Participants, are typically level 2 headings.
	+ Paragraphs are aligned to the left margin and the first line of each paragraph is indented, with the exception of abstracts (1st line should be flush left with no indent) and reference entries (each should have a hanging indent). These alignments make it easier for the reader to notice how you grouped your sentences together and where important sections start and end.
* Formatting your data and statistical output:
	+ Do not put a zero before the decimal point when the statistic cannot be greater than 1 (e.g. Pearson’s *r*, *p* value).
	+ Most of your numbers should be reported to 2 or 3 [decimal places](https://www.bbc.co.uk/bitesize/guides/zscq6yc/revision/2), with the exception of the *p* value which should be to 3 decimal places. Try to be consistent – if you plan to use 3 decimal places for every number then do so throughout the paper.
	+ Use italics for statistical symbols (e.g. *F*, *t*, *p, M, SD*).
	+ Report exact *p* values if you know them (e.g. *p* = .128) and if the value is so small that Jamovi reports it as less than .001, then report it as *p* < .001.
	+ If your Jamovi is set to produce numbers to 2 decimal places and it produces a number like .00, then we usually report this either as < .01 or we change Jamovi settings to report numbers in 3 decimal places instead, like .003.
* Formatting your figures
	+ How do we decide what to include? An APA figure needs sufficient detail in the figure itself so that a reader does need to read extra text to understand it. Your choice of design, titles and notes all contribute to making the figure comprehensive.
	+ Number your figures (e.g. Figure 1) in bold font above the figure in the order that they appear in your research report.
	+ Include a title below the figure number in italics. A title is usually a brief sentence describing what is plotted in the figure. If you are not sure what to say, a safe option is to describe what’s on your axes (e.g. Mean scores on the gratitude scale plotted against time spent watching the sunset).
	+ Keep the design of the figure minimal and easy to understand:
		- Include axis labels
		- Include tick marks on the axes
		- Remove any gridlines or borders around the graph. These don’t usually add anything useful and removing them keeps the figure clean.
		- Keep the colour palette in greyscale unless colour is absolutely necessary.
		- Include a legend if any additional features need to be labelled. A legend is usually needed when more than 1 independent variable is plotted on the same graph.
	+ Include a figure caption (often called Note) below the figure. A good figure caption should describe the variables on the x and y axes, and any additional information that might not be clear from the image (e.g. error bars). Do not describe trends or interpret the data in the caption.
	+ Sample bar graph

**Figure 1**

*Mean ratings across reward conditions in Experiment 1*

*Note*. Mean ratings of satisfaction for control, small, medium and large reward conditions. Error bars show standard errors.

* + Sample line graph

**Figure 2**

*Mean reaction time across conditions in Experiment 2*

*Note*. Mean reaction time recorded for congruent (square) and incongruent (circle) image conditions over 20 trials.

* Formatting your tables
	+ How do we decide what to include? An APA table needs sufficient detail in the table itself so that a reader does need to read extra text to understand it. Your choice of design, titles and notes all contribute to making the table comprehensive.
	+ Number your tables (e.g. Table 1) in bold font above the table in the order that they appear in your research report.
	+ Include a title below the table number in italics. A title is usually a brief sentence describing what information is shown in the table.
	+ Keep the design of the table minimal and easy to understand:
		- Include headings for each column/row
		- Keep the colour palette in greyscale unless colour is absolutely necessary.
	+ A note is optional for a table, because often the table itself is descriptive enough for the reader to understand it (unlike a figure). You would include a note if there is something in your table that cannot be understood from the title/headings alone.
	+ Sample table for descriptive statistics

**Table 1**

*Means and standard deviations for Analysis 1 across four conditions*

|  |  |  |
| --- | --- | --- |
| Condition | *M* | *SD* |
| 250ms | 2.14 | 0.25 |
| 500ms | 2.68 | 0.74 |
| 750ms | 1.97 | 0.65 |
| 1000ms | 1.80 | 0.23 |

*Note*. ms = milliseconds

* + Sample table for factor analysis

**Table 2**

*Results from a Principal Components Analysis on items measuring tendency to cry*

|  |  |  |
| --- | --- | --- |
|  |  | Factor loadings |
| Item |  | Component 1 | Component 2 |
| 10 | I cry when things don’t go as I want them to | .85 |  |
| 6 | I cry having been humiliated or insulted | .82 |  |
| 2 | I cry when feeling self pity | .82 |  |
| 9 | I can be moved to tears by the beauty of natural scenes |  | .83 |
| 1 | Watching/hearing an admired person does not make me want to cry (R) |  | .79 |
| 8 | I cry when I have achieved success |  | .65 |
| 7 | I seldom cry while I watch sad movies/TV (R) |  | .57 |

*Note*. Oblimin rotation was used. Reverse-coded items are denoted with (R). Factor loadings below .30 were excluded.

* For more tips, visit the current [APA Style and Grammar Guidelines](https://apastyle.apa.org/style-grammar-guidelines). It has lots of useful information, but it is more detailed than most courses would expect you to write, so make sure to always check with your instructor what is the minimum required for your written assignment. Courses will generally accept variations to formatting as long as your report remains legible, organized and internally consistent.
* [Sample APA-formatted papers](https://apastyle.apa.org/style-grammar-guidelines/paper-format/sample-papers). Refer to these only for formatting and general look/feel of what a psychology paper is like. Use our writing guide, instructions and lab notes for advice on specific content that we will mark you on!