Title: Describe your take home message in 12 words or fewer.

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*[Note*: If you are in my class, you do not need an author note for your lab report.]

Author Note

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Abstract

In this “article,” Nate summarizes the formatting and content of each section of a psychology paper following the guidelines of the 6th edition of the APA Manual. Psychology papers adhere to a standard outline and format. A particular kind of information is expected in each section and there are specific formatting rules. The abstract should be a concise summary of your paper. In about 150 words or less, it should cover some or all of the following elements, not necessarily in this order: Previous research; your question or hypothesis; key aspects of the method; what you found; your conclusions about what your findings mean; and why your study matters. Be specific (here and throughout the paper) when possible; for example, “participants learned significantly more when they studied trivia questions under water than on land” is better than “participants’ learning was significantly affected by where they studied.”

Keywords: Up to five keywords (e.g., Learning, Memory, Bias, Heuristic)

-- Insert title (again) here --

Your introduction goes here. The big task of the introduction is to explain two things: the issue/problem your study is addressing and why your study is important. For this class it should probably be somewhere around a couple of pages.

Describing previous scholarship is a big part of writing an effective introduction. Explaining the background research should serve multiple goals. It should explain terms and concepts the reader needs to know in order to understand your research and it should tell your reader about the findings that led to your hypothesis or question.

In describing previous scholarship, you will be citing references. The references should be in APA format (see below). Please refrain from including background if it is only tangentially related to the issues in your paper.

Use your description of background research to set up the question(s) you asked in your research. Your research might be driven by a question or a hypothesis. To me, they are basically the same thing. In both cases you have a question; with a hypothesis you also have an educated guess about what the answer is.

When you write about your hypotheses or questions, try to answer three questions. 1) What are they? 2) Why do you think they make sense? In other words, explain the reasoning behind your predictions (or questions). Your reasons will probably be a mix of intuition and findings from previous research. 3) Explain why the reader should care. Maybe your findings have the potential to falsify a theory? Maybe they have real-world implications (e.g., they could suggest a new technique for teachers)? Maybe both? It is common, but unwise, to say your study is important because it could tell us X, when X is already known; the real question is, in the context of the existing scientific literature, what does your study *add* and why it *that* important?

At the end of the introduction, or in the first paragraph of the method (but not both), try to summarize your method in one paragraph. Only include the key elements.

Target Audience and Style

Throughout the paper, write as if your reader is an intelligent person who knows basic psychology concepts and basic statistics. But assume the reader does not know anything about the research you did or the background literature. “Writing to the professor,” for example by failing to define terms, is a common mistake.

Write in the past tense (e.g., “the results showed”). If you can make your paper easier to read by using “I” or “we” (e.g., “we analyzed response accuracy in two ways”) go ahead and do it. But try not to overdo it.

Formatting

According to the APA manual, 6th edition, there are multiple levels of headings within the body of the text. The rules for headings are explained in the Method section; here, I will just add that there are no blank lines or page breaks between sections. Also notice that everything is double-spaced.

Use an ampersand when citing a reference inside parentheses (Allen, Mahler, & Estes, 1969; Baron-Cohen, 1995) but use “and” if you want to cite something outside of parentheses, such as Baker and Brown (1984). The first time you cite an article, include all of the authors’ names. Any subsequent time you cite an article with more than two authors, just use the first author’s name followed by et al. For example, here is how our three articles from above would now be cited (Allen et al., 1969; Baker & Brown, 1984; Baron-Cohen, 1995). If you quote something, put it in quotes and give a reference with a page number.

Academic Honesty

Work with other students (do analyses, read drafts for each other, etc.) but write your own paper in your own words. When you are actually typing you should be alone. Do not plagiarize from my handouts, each other, published works, the internet, or even yourself. If you are not 100% sure what plagiarism is, or if you cannot tell whether something you have written would be considered plagiarism, you must ask me about it.

Method

The first level of heading (Method, above) should be centered in bold. Other heading formats will be explained as we arrive at them.

Here is the point of a method section: After reading your method, your reader should be able to replicate your study at another college or university. Describe your study in exact detail. Be concrete and precise. For this class it should probably take a page or two.

Sometimes the first paragraph of the method section is a summary of the method. Other times you will go straight to the participants heading (see below).

Participants

The second level of subheading should be left justified, bold, and its own paragraph. There should not be a period. (Pro tip: The APA says any section with a subheading should have a minimum of two subheadings; in other words, do not have a section with a single sub-headed section.)

This section should describe your sample. Talk about how your sample was recruited and compensated. (On rare occasions this should be done in the procedure section instead of here). Explain how many participants were excluded from your data analysis and for what reasons. Then describe the final sample: number of participants, their age (as a mean or a median, accompanied by the range or standard deviation), breakdown by gender (number who were male, female, other), and possibly breakdown by race and/or ethnicity. Include other pertinent information if appropriate.

Materials

In some papers you should describe your stimuli/materials (e.g., what the participants read, heard, looked at, etc.). Examples always help. Be concrete and precise.

Design

In some papers it is appropriate to explain your study’s “design.” Design, in this context, means what your independent variables were, how many levels they had, and whether each variable was manipulated within-participants or between-participants. You might want to talk about your dependent variable(s) here, too, especially if you are going to do a correlation or if it is not obvious what they are.

For example, you could say you conducted a 2x2 experiment in which you investigated the effects of treatment (drug versus placebo) and participant gender (male or female) on happiness ratings.

Here is a quick tutorial on the meaning of “independent variable,” etcetera. In the example above, treatment is an independent variable with two levels. The levels are drug and placebo. Gender is a “quasi-independent” (aka “subject”) variable, meaning it was analyzed like an independent variable, but unlike a true independent variable, it was not manipulated by the experimenter. (The experimenter did not randomly assign participants to be male or female.) The dependent variable is happiness ratings. I hope that helps, but not define these terms in your lab report, you should assume your reader knows everything I have said in this paragraph (e.g., what a quasi-independent variable is). The previous paragraph is sufficiently detailed for your reader to infer the rest.

Procedure

Describe what the participants did in sufficient detail that someone could replicate the study. Do not talk about the steps the *experimenter* went through unless they are relevant, the key is the participant’s eye-view.

Go through it step by step and be clear and thorough. You may want to include the instructions participants read (either summarize them or, if the specific wording is crucial, quote them), what the participants did during a given trial, the order of presentation (if relevant), and so on. You might want to have subsections in the procedure, such as the ones that follow.

Session 1. The third level of heading is bold with a period. It is not a separate paragraph. There are additional heading levels (fourth, etc.). They are rarely needed so if you want to use them you will have to look them up.

Session 2. In this example, the headings are Session 1 and Session 2 because I am acting as though I did a two-session experiment. I probably do not need to tell you that you should talk about session 1 under the session 1 heading and how much you like coffee under the session 2 heading.

Results

A good results section is an unbiased summary of your data. In my experience, one of the most common mistakes beginners make, in the results section, is they fail to address their own hypotheses. Tell the reader what they need to know to answer the questions and/or address the hypotheses from your introduction. Then, if appropriate, report other results. For this class, your results section should probably be a page or two. In might be as short as a single paragraph.

Do not just stick a bunch of numbers in here and be done with it. Talk about your findings in the results section. Do not go overboard, because elaborately spelling everything out will become redundant with your discussion section. Try to strike a balance, so that you are concise but your reader is not confused and knows why the results matter. Sometimes talking about your findings is easy; for example, instead of saying two means were different, which is not very informative, say which one was higher than the other.

Here is an example. Suppose we did an experiment to test the prediction that people can read concrete nouns (e.g., “potato”) more quickly than abstract nouns (e.g., “liberty”). We used a within-participant design, ran 36 participants, and found that our participants were faster on the concrete nouns than the abstract nouns. Furthermore, a t-test showed that the difference was statistically significant. We could report the result as follows: “It took participants fewer seconds to name concrete nouns (*M* = .664, *SD* = .109) than abstract nouns (*M* = .689, *SD* = .113). This difference was significant, *t*(35) = 2.29, *p* = .02.” (The APA Manual strongly suggests reporting confidence intervals or effect size anytime you report a p-value. Although I agree for published research, I have not done it here, nor do I want you to unless you feel sure that you can do it correctly.)

When you present the results of any inferential statistic (e.g., a t-tests, a correlation, an ANOVA), make sure to report the relevant means. A mean should always be accompanied by its standard deviation. Which means are relevant? All of the means that were used in the analysis. Let us return to the 2x2 design—it was (drug versus placebo) and (male or female)—that we talked about earlier. Suppose you run an ANOVA on your data. You will be analyzing four means (with a standard deviation for each): drug male, drug female, placebo male, placebo female. These are “cell means,” which is another way of saying they are for a specific combination of conditions (e.g., drug female), not a single condition (e.g., drug). The mean for a single condition (e.g., drug), which is called a “marginal mean,” would be computed by averaging all scores for the drug condition (ignoring whether the participant was male or female). You should either report cell means or explain why you decided to report marginal means instead.

Although you should always report means and standard deviations for an inferential statistic, the reverse is not true: You do not have to do an inferential statistic to report a set of means. For example, if your main dependent variable was happiness rating, but you measured reaction times as a secondary variable, you can report reaction time without running a t-test, ANOVA, or any other inferential statistic. And by the way, there are situations, including when you analyze reaction times, where medians are better than means (or, actually, a mean of medians works best, ask me for details).

Sometimes you should present your data using a table or graph. This is unnecessary if you only have a few means (as in the concrete/abstract noun example above). If you have a lot of data points to report, though, using a figure or table is best. For example, if you did a 2x2x3 ANOVA, which is an analysis of 12 different means, you should use a table (with means and standard deviations) or a figure (with error bars). Another example is if understanding a correlation is crucial. In this case a graphical presentation, such as a scatterplot, is the best way to go.

If you use a table or figure, follow APA formatting rules. This template does not explain these formatting rules (except in that I have placed graphs and tables at the end of the document, even though most researchers think this is a silly rule). See online resources or the APA manual for more on properly formatting graphs and tables.

Discussion

The discussion should address the issues raised in your introduction. For this class it should probably be a maximum of about two pages. You might want to include some or all of the following.

Summarize your findings. Were your hypotheses supported?

Talk about why you found what you found. Why was your hypothesis supported, if it was? If it was not supported, why not? You should generally avoid redundancy, but here you might need to repeat some of the things you said in the introduction, especially for hypotheses that were supported.

Talk about implications of your study for a) the real world or b) psychological theory. This is where you remind us why your study is important. Again, there might be some reiteration, but (at the risk of repeating myself about redundancy) keep redundancy to a minimum.

You might want to point out problems with your study. You might want to propose future research, although doing so is not always useful.

Conclusion

It is often good to end with a short paragraph either summarizing the conclusions or making a larger comment on a lesson learned from the research. Such as the following.

Science cannot proceed without clear, accurate, and complete communication through journal articles. The content is by far the most important thing. Next, in my view, is putting information in the right places (e.g., methods in the Method section, discussion in the Discussion section). Least important—again, in my opinion—is formatting minutiae such as getting reference style correct. But getting everything right is a worthy goal.

References

Allen, G. A., Mahler, W. A., & Estes, W. K. (1969). Effects of recall tests on long-term retention of paired associates. *Journal of Verbal Learning and Verbal Behavior, 8,* 463-470. http://dx.doi.org/10.1016/S0022-5371(69)80090-3

Baker, L. & Brown, A.L. (1984). Metacognitive skills and reading. In P. David Pearson (Ed.), *Handbook of reading research*. New York: Longman.

Baron-Cohen, S. (1995). *Mindblindness: an essay on autism and theory of mind*. Boston: MIT Press/Bradford Books.

[NOTE: Make sure you write your references in APA style. These are examples of citing a journal article, a chapter in a book, and a book, respectively. There is a different format for each of these and for dozens of other types of publication.

The Williams College library has a helpful set of examples of how to do APA references: http://libguides.williams.edu/citing/apa. There are plenty of other resources online as well. And if you want to borrow the APA manual itself just ask me.]

Footnotes

[NOTE: If you have footnotes they go here. If not delete this page.]

Table 1

*Describe the table, for example: Mean correlations in each of the three conditions of Experiment 1*

[Put table right here.]

*Note.* Put a note here if necessary (with the word note italicized). For example: Mean correlations were calculated by computing a correlation for each participant and then averaging these correlations across participants.

[NOTE: If you have a table it goes on this page. If you have more than one, each gets its own page. There are specific rules for formatting tables; see APA manual.]

[Put the figure right here.]

*Figure 1.* Write the caption here.

[NOTE: If you have a figure it goes here. If you have more than one, each gets its own page. There are specific rules for formatting figures; see APA manual.]