

Task 9:

Write up your Results

Deliverables for this Task | A full working version of your Results section, with the tables and graphs as separate documents.

Step by step

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2. Write up results for each factor or interaction

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Overview

One of the biggest advantages of experimental research is that the data collection is designed specifically to optimize the relevance and quality of the data for a specific set of hypotheses. You don't have to rely on other researchers' data and explain why it *might* be relevant for your hypotheses. Instead, you collect and analyze your own data. By this time, you have your own results in the form of one or more SPSS outputs and tables or graphs.

This Task focuses on writing up the results of your analyses. As in most writing, the most important thing is to make it easy for the readers to understand what results you got. Remember that just including a table or graph is almost never enough for most readers to understand which results are important for which hypotheses.

Your main goal is to make it easy for the readers to understand exactly what results you got.

Later on (in the Discussion section), you can tell them what you think the results mean for your hypotheses.

1. Make an outline

The Results section is the part of the research paper in which you describe as clearly as possible the specific results that you obtained by analyzing your data. Don't talk about *why* you think you got these results yet – save that for the Discussion section. When you do many analyses and have a lot of data, it becomes a challenging problem to select and present the data in a way that will keep the reader awake and understanding everything you want to say.

Here's a sample outline for your results section:

[Introduction]

Effects of Time Limits. [Factor1]

Effectss of Television exposure. [Factor2]

Interactions of Time Limits and Television exposure. [Interactions]

It's a good idea to use subheadings like these to guide the reader, especially if you have several different topics or analyses to talk about. The introductory paragraph has no heading.

Notice that this is the same outline that you used for your Lit Review, and later on you'll use the same outline for the Discussion. Organizing things consistently makes it much easier for the reader to understand and makes it look like you have a clearer understanding of your topic.

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2. Write up results for each factor or interaction

Your outline specifies several parts for your Results section. What should you talk about in each of these parts of the Results section?

For each factor or interaction, give descriptive statistics, information about any significance tests, graphs and/or tables, and additional information that you think will be helpful. The order of this information can vary.

Descriptive statistics.

Include descriptive statistics about the means and standard deviations. Remember that the means are practically meaningless without information on the standard deviations. This is because ANOVA only says *whether or not* the difference between the means is significant; reporting the means shows the reader *which group scored higher* and which scored lower. An example:

Participants comprehended the text better with music ($M = 7.2$, $SD = 1.1$) than without music ($M = 5.6$, $SD = 1.4$).

Results of significance tests.

State whether or not the difference in the means was statistically significant. Statistical tests are used to judge whether the raw differences you observe are really important or not. Don't forget to report the effects that are NOT significant, too.

When reporting the results of an ANOVA, you have to include: the F statistic with the degrees of freedom for the factor being tested and the degrees of freedom for "Error"; as well as the value for p (or Sig in the SPSS output). Task Package 8 explained where to get these numbers from. An example:

The main effect of Music was significant, $F(1, 18) = 4.03$, $p < .05$.

Notice that both F and p are always in italics and that the ANOVA statistics are *not* in parentheses (they used to be, in earlier versions of APA format).

Graphs and/or tables.

Provide graphs or tables that illustrate the results for this factor. Review Task 8 for information about when to use graphs or tables. Be sure not to forget to describe what's in the tables and graphs.

ALWAYS talk about your results in writing, even if you seem to be repeating what's in the tables and graphs!

The tables and graphs are there to help the reader understand the text, not to take place of the text. The text will draw the reader's attention to what you think he/she should concentrate on: the important things that are in the tables or graphs.

When should you use tables? When you want to present together data that has more than two rows and two columns (see Section 3.67 of the APA Manual and the discussion in section 3 of Task Package 8). Your Results section should include **at least one table**.

When should you use graphs? When you want to illustrate significant differences or trends that are almost significant, you graph the group means. Use bar charts to show differences. See the discussion in section 3 of Task Package 8. Your Results section should include at least one graph.

When you are preparing a manuscript for publication in an APA journal, tables and graphs do NOT appear in the middle of the text – they are included in the manuscript as attachments (NOT as

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appendices) – each on a separate page, and in your text you should have the following note for the publisher:

Insert Table 1 about here

or

Insert Figure 1 about here

Do it all again.

You may have to do all of this (give descriptive statistics, information about any significance tests, graphs and/or tables, and additional information) more than once if:

- a) you had more than one dependent measure.
For example, if you studied the effects of the title on the understanding of a text, you might measure understanding of the whole text in different ways [for example, with a summary or answers to questions] or you might measure the understanding of different parts of the text. These will be different dependent measures. Describe the results for each one separately.
- b) you had additional analyses of this factor with covariates (ANCOVA) or with other factors, probably taken from the participants' background questionnaires. Describe the results for each one separately.

Additional information about your responses.

If you also have additional information or qualitative data, such as sample responses or how they were distributed, you can also add it as well, to help the reader understand what typical responses were like. You may want to make short observations about whether a particular result was expected or not.

Organization.

Generally, you want to describe the results that you have from most general to most specific. For example, if you studied differences between how two groups of people answered a questionnaire, you would report any differences on the whole questionnaire before talking about differences on groups of questions. Similarly, you will describe the main effects (of factors alone) before describing the effects of interactions (factors together). The “rule” then, is to talk about general results first, then increasingly more specific details.

The Results section is usually short and sweet. You have to make an extra special effort to phrase your results extremely simply and extremely clearly (make them “ridiculously explicit”, according to one student) so that your reader can be sure to understand them. A sample, very simple Results section follows.

Sample Deliverables

The sample deliverables for this example include the written Results section below, the Table on the next page, and the Figure on the following page.

Note that this sample does not mention any tables or graphs. *In this case*, this is correct for a research paper. The only effect with enough numbers to merit a table or a graph is the interaction, which is not significant so you normally wouldn't graph it. However, for this class, I've asked that you include at least one graph and one table in any case – for practice. That's why they're not mentioned in this Results section.

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Results

This study evaluated the effects of time limits and television exposure on reading comprehension.

< [Introduction](#)

Effects of Time Limits

Participants who read the text without a time limit comprehended more ($M = 5.1, SD = 1.91$) than participants who read with a time limit ($M = 3.3, SD = 1.70$). This effect was very statistically significant, $F(1, 36) = 9.592, p < .004$. Participants with no time limits answered, on average, 55% more of the multiple-choice questions correctly.

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Effects of Television Exposure

Participants who read the text with television exposure comprehended more ($M = 6.5, SD = 1.65$) than participants who read without television exposure ($M = 5.1, SD = 1.91$). The effect was statistically significant, $F(1, 36) = 5.803, p < .021$. This result was not the expected outcome.

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A separate analysis with Television Exposure and Age as factors confirmed that the effect of television exposure was not due to age, $F(1, 36) < 1$.

< [Additional analyses](#)

A separate analysis with Television Exposure and Gender as factors confirmed that the effect of television exposure was not due to gender, $F(1, 36) < 1$.

Interaction of Television Exposure and Time Limits

The interaction of time limits and television exposure was not significant, $F(1, 34) < 1$, for the current data set. The difference between no television and television for the no time limit group was the same for the time limit group. The highest average was for the condition with television exposure and no time limits ($M = 6.5, SD = 1.65$). The lowest average was for the condition of time limitations and no television exposure ($M = 3.3, SD = 1.70$). Time limitations may have influenced all conditions equally.

< [Significance test](#)

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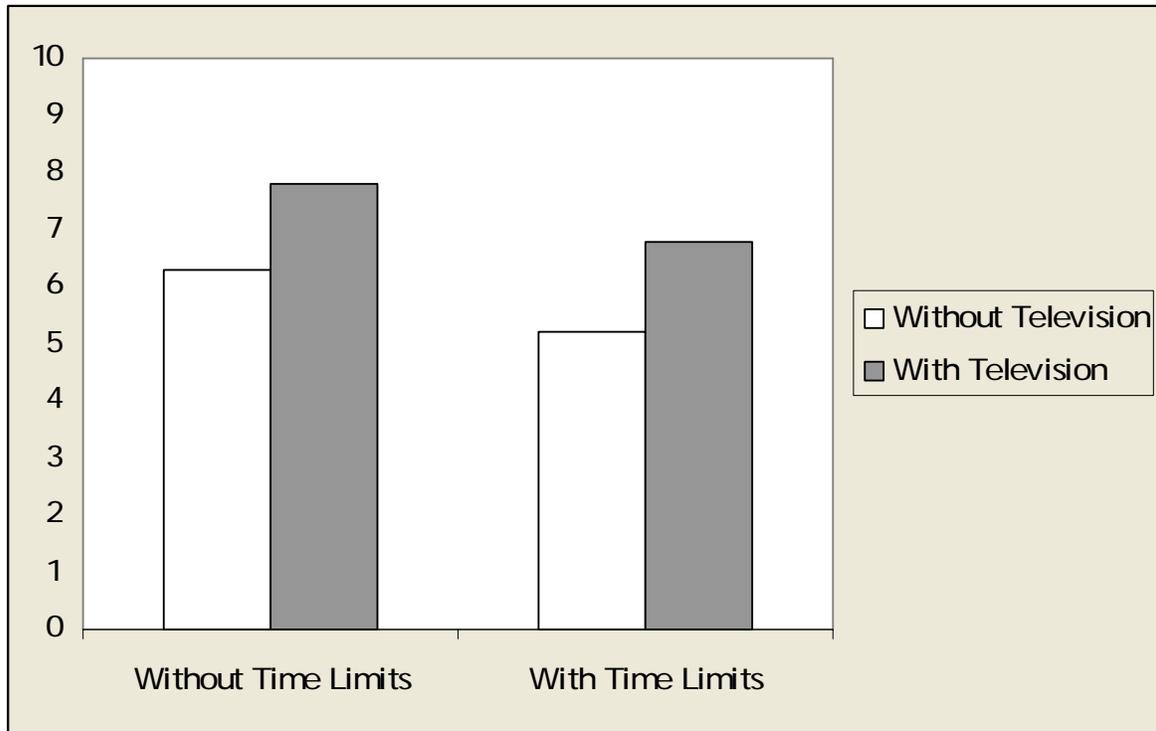
Table 1

Mean (and standard deviation) Number Correct Answers as a Function of Time Limits and Presence or Absence of Television (N = 40)

Television Exposure	Time Limits	
	Without Time Limit	With Time Limit
Without Television	6.30 (2.1)	5.20 (1.4)
With Television	7.80 (1.2)	6.80 (1.8)

Figure 1

Mean Number Correct Answers as a Function of Time Limits and Presence or Absence of Television (N = 40)



* Note that there should not be a box around the graph and that both axes should have as labels the name of the factor or measure that is presented.

Further Resources on Writing up your Results

APA Publication Manual, sections 3.53 to 3.86.

Few, S. 2004. *Show me the numbers: designing tables and graphs to enlighten*. Oakland, CA: Analytics Press.

Tufte, E. 2006. *Beautiful evidence*. Cheshire, CT: Graphics Press.

Tufte, E. 1997. *Visual explanations*. Cheshire, CT: Graphics Press.

Tufte, E. 1990. *Envisioning information*. Cheshire, CT: Graphics Press.

Tufte, E. 1983. *The visual display of quantitative information*. Cheshire, CT: Graphics Press.

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Review the Results sections from published research!