Writing an APA Results Section

Here are guidelines for writing Results sections for statistical methods that require no follow-up procedures, such as the one-sample *t* test, correlations, the Mann-Whitney *U* test, or the binomial test.

1. Describe the test, the variables, and the purpose of the test. For example: "A one-sample *t* test was conducted on the KUDI scores to evaluate whether their mean was significantly different from 50, the accepted mean for male adolescents in general."

2. Report the results of the statistical test. For example: "With alpha set at .05, the one-sample *t* test was significantly different from 50, $t(29) = 2.46$, $p = .02$. The effect size *d* of .45 indicates a medium effect."

- Discuss the assumptions of a test if necessary to describe why it was chosen or, more generally, why the test was valid. It is unnecessary to present routinely the assumptions of tests.
- As a rule of thumb, report statistics to two decimal places.
- State the alpha level chosen for a statistical test and whether the test is significant or not. The alpha level might be specified for individual tests when reported. Alternatively, the alpha level for all presented statistical tests might be stated in the Methods section or at the beginning of the Results section.
- Report the test value, degrees of freedom, and significance level. When SPSS reports a *p* value of .000, we should indicate in the Results section that "$p < .01$".
- Report a confidence interval when possible. A statistical test allows us to make a decision about whether we can or cannot reject a null hypothesis, while a confidence interval allows us to reach the same statistical decision, but also provides an interval estimate of the statistic of interest (e.g., mean, mean difference, or correlation). For example: "The 95% confidence interval for the KUDI mean ranged from 50.78 to 58.49, and therefore the hypothesis that the population KUDI mean is 50 was rejected at the .05 alpha level."
- Report a statistic that allows the reader to make a judgment about the magnitude of the effect, such as a *d* statistic for a one-sample *t* test.

3. Report relevant descriptive statistics, such as the mean and the standard deviation for a one-sample *t* test.

- For a simple analysis, the descriptive statistics can be reported in the text in the form. "$M=54.63$, $SD=10.33$
- APA publication manual (2001) offers the following interesting guideline for choosing among various reporting methods when presenting results: Use a sentence for 3 or fewer numbers, a table for 4 to 20 numbers, and a graph for more than 20 numbers.
- Italicize all non-Greek symbols, like *M* for mean, except subscripts and superscripts.

4. Summarize the specific conclusions that can be reached on the basis of the analyses, but save interpretation and elaboration on these conclusions for a Discussion section. For example, "The results support the conclusion that male adolescents who do not engage in sports outside of school are somewhat more depressed than the average male adolescent."

Writing an APA Results Section

We present some guidelines for writing a Results section for statistical procedures that may require follow-up tests, such as one-way ANOVA and MANOVA in Unit 7, or the Friedman test in Unit 10. Consequently, it may be necessary to reread this material after you have read the other lessons in Unit 7 and the lessons in Unit 10.

Some researchers initially provide a description of the general overall analytic strategy that includes the omnibus tests and the follow-up tests. This general description is necessary to the degree that the analyses are unconventional and/or complex.

Below we present steps required to write a Results section.

1. Describe the statistical test(s), the variables, and the purpose of the statistical test(s). An example: "A one-way analysis of variance was conducted to evaluate the relationship between vitamin C and the change in the number of days with cold symptoms from the first year to the second year of the study."

- Describe the factor or factors. If a factor is a within-subjects factor, be sure to label it as such. Otherwise the reader may assume that it is a between-subjects factor. If a multifactorial design has one or more within-subjects factors, describe each factor as a between-subjects or a within-subjects factor.
- Indicate the number of levels for each factor. It may be also be informative to the reader to have a description of each level if the levels are different treatments. However, it is not necessary to report the number of levels and what the levels are for factors with obvious levels such as gender.
- Describe what the dependent variable(s) are.

2. Report the results of the overall test(s).

- Describe any decisions about which test was chosen based on assumptions. For example, for a one-way within-subjects ANOVA, justify the choice of using a traditional univariate test instead of a multivariate test.
- Report the test value and significance level (for the one-way ANOVA, F (2, 27) = 4.84, p = .016). For p values of .000, report them as $p < .01$. For multifactor designs, report the statistic for each of the main and interaction effects. Tell the reader whether the test(s) are significant or not.
- Report statistics that allow the reader to make a judgment about the magnitude of the effect for each overall test (e.g., for the one-way ANOVA, $\eta^2 = .45$).
- Italicize all non-Greek symbols except subscripts and superscripts

3. Report the descriptive statistics. Refer the reader to a table or figure that presents the relevant descriptive statistics (e.g., means and standard deviations for ANOVA designs). A table or figure may not be necessary for simpler designs, such as a one-way ANOVA with three groups. For these simple designs, the descriptive statistics may be presented in the text when reporting the follow-up tests.

4. Describe and summarize the general conclusions of the analysis. For example, "The results of the one-way ANOVA supported the hypothesis that different types of vitamin C treatment had a differential effect on the reduction of cold symptoms in individuals."

5. Report the results of the follow-up tests.

- Describe the procedures used to conduct the follow-up tests. Explain any decisions you made about choice of tests based on their assumptions.
- Report the method used to control for Type I error across the multiple tests.
- Summarize the results of the follow-up procedures. It may be useful to present the results of the significance tests among pairwise comparisons with a table of means and standard deviations. When possible, report confidence intervals for pairwise comparisons.
- Describe and summarize the general conclusions of the follow-up analyses. Make sure to include in your description the directionality of the test. For example, the mean for one treatment group is higher or lower than the mean for another group.

6. Report the distributions of the dependent variable for levels of the factor(s) in a graph, if space is available. The graph should be inserted in the text where appropriate. For example, if the graph pertains to assumptions, you would insert it in the section where assumptions are discussed. Likewise, if the graph reflects the means and standard deviations, it should be presented with the discussion of the descriptive statistics.

Creating Figures in APA Format

Figures (i.e., graphs) can provide a visual representation of complex data or statistical results. Here are some guidelines for creating figures in APA format. See the *Publication Manual of the American Psychological Association* (2001) for more detailed information.

1. Label each figure using consecutive Arabic numbers (e.g., Figure 1).
    - Italicize the figure number and follow the number with a period (e.g., *Figure 1.*, not Figure 1.).
    - Refer to each figure in the text.
    - Refer to figures in the text by their numbers.
2. Figure captions should be brief and explain the figure's content.
    - Capitalize the first letter of the first word of a figure caption.
    - Do not italicize the caption.
    - End the caption with a period.

3. The presentation of figure numbers and captions depends on whether the manuscript containing the figures is in submission form (e.g., submitted manuscript to a journal) or in final form (e.g., in a dissertation or published journal).
    - For manuscripts in submitted form, no labels appear on individual figures. In its place, a page labeled Figure Captions precedes all figures. This page includes the figure number and caption of the first figure on the first line, the figure number and caption of the second figure on the second line, and so on.
    - For manuscripts in final form, the figure number followed by the figure caption is included at the bottom of individual figures.
4. Use the following guidelines for labeling the axes of graphs and legends.
    - Center the labels on the axes of the graphs.
    - Capitalize all important words on the axis labels and in the title of legends.
    - Capitalize the first word of legend entries.
5. All statistical symbols in figures should be italicized except subscripts and Greek symbols.
6. Content footnotes amplify information in figures and should communicate a single idea.
7. In the text of the manuscript, draw the reader's attention to the highlights of the information presented in the figure. Do not reiterate in the text all the information in the figure.

Creating Tables in APA Format

Besides figures, tables also provide a summary of results. We offer some guidelines for creating tables in APA format, but the *Publication Manual of the American Psychological Association* (2001) should be consulted for more detailed information.

1. Label each table using consecutive Arabic numbers (e.g., Table 1).
    - Do not italicize the table number (e.g., Table 1, not *Table 1*).
    - Refer to each table in the text.
    - Refer to tables in the text by their numbers.
2. Table titles should be brief and explain the table’s contents.
    - Capitalize the first letter of each important word in the title.
    - Italicize table titles.
3. The table number comes first and the table title comes next on the following line.

4. Headings in tables provide labels for the information in the body of the table.
    - Provide a brief heading for each column.
    - Headings identify information below them, not across from them.
    - Capitalize the first word of headings.
    - Abbreviations may be used for statistical indices (e.g., *M* for mean and *SD* for standard deviation).
    - All statistical symbols should be italicized except subscripts and Greek symbols.
    - Set off a heading with a horizontal line if subheadings are below it.
    - Do not use vertical lines in headings.
5. The body of the table contains the data.
    - Do not use vertical lines to differentiate columns in a table's body.
    - Horizontal lines can be used in the body of more complex tables to divide it into sections. Provide a title in the center at the top of each demarcated section.
    - Decimalized values are generally reported to two decimal places.
    - A zero does not precede a value less than 1 if the statistic cannot be greater than 1 (e.g. a correlation coefficient).
    - Report p-values to two decimal places, as a rule of thumb (e.g., $p < .01$).
6. Notes may be general, specific, or probability notes and are presented at the bottom of tables.
    - General notes provide information about the table as a whole and are designated by the word *Note*.
    - Specific notes refer to a specific column, row, or individual entry in the table and are designated with superscripted lowercase letters.
    - Probability notes indicate the level of significance and are designated with asterisks (e.g., $*p < .05$ or $**p < .01$).
7. In the text of the manuscript, draw the reader's attention to the highlights of the information presented in the table. Do not reiterate in the text all the information in the body of the table.