Lab 9: Writing Results Sections

This lab overviews the statistics that we've learned thus far in the class, including power and effect size. The assignment is below and the following pages include some general pointers about writing results sections and making graphs of means (as opposed to histograms and boxplots).

Lab Assignment

1. Read the class data from the Excel file (lab9data.xls) in the COURSES folder into Excel and/or SPSS.

2. Test the null hypothesis that the average Empathizing and Systematizing Quotients are different for men and women. Calculate measures of effect size and power for your tests.

3. Write a brief description (1 paragraph) of these results as if for publication in a journal article. Include relevant descriptive and inferential statistics, as well as interpretation. Your interpretation might also benefit from reference to your measures of power and effect size. You might also want to include tables or graphs, if they illustrate a salient aspect of your results that you discuss in the text, although they are not necessary.

4. Test the null hypothesis that people respond equally quickly to a visual reaction time task and to a visual go-no go task. Calculate measures of effect size and power for your test.

5. Write a brief description (1 paragraph) of these results as if for publication in a journal article. Include relevant descriptive and inferential statistics, as well as interpretation. Your interpretation might also benefit from reference to your measures of power and effect size. You might also want to include tables or graphs, if they illustrate a salient aspect of your results that you discuss in the text, although they are not necessary.

6. Turn your write-ups (.doc, .docx, or .rtf) and Excel/SPSS outputs into the COURSES hand-in folder before class on Thursday, February 11. Hand-in any hand work in class Thursday.

Writing Results

Read the attached page on what the APA Publication Manual (5th edition) says about writing about statistics (pp. 138-139). Another excellent resource on writing results sections is *The Chicago Guide to Writing about Numbers*, by Jane Miller.

Several tips about writing up results:

1. Always include descriptions of your data, both means and standard deviations for your samples if your data is continuous, or frequencies if your data is categorical. Journals often publish means using the letter *M* and standard deviations using the letters *SD*. These descriptive statistics can be included in the text or in a table.

   e.g., "The participants gave higher ratings to the lever scenario (*M* = 3.76, *SD* = 3.9) than to the bridge scenario (*M* = -3.56, *SD* = 5.82)."

   e.g., "Twelve participants gave higher ratings to the lever scenario than to the bridge scenario, three participants gave the same ratings to both scenarios, and no participants gave higher ratings to the bridge scenario."

2. When reporting an inferential statistic, include both the test statistic (e.g., *t* or *z* or chi-square), the associated degrees of freedom if there are any, and whether the p-value is less than or greater than your selected alpha (0.05 or 0.01). Specify if a one-tailed test was used to calculate the p-value, otherwise a two-tailed test is assumed.

   e.g., "The participants gave higher ratings to the lever scenario (*M* = 3.76, *SD* = 3.9) than to the bridge scenario (*M* = -3.56, *SD* = 5.82), $t(33) = 15.5$, $p < 0.05$."

   e.g., "Participants were more likely to rate the lever scenario as more moral than the bridge scenario, $\chi^2(2, N = 15) = 15.9$, $p < 0.05$."

3. NEVER just report that a statistic is significant. Always include a description of the result.

   e.g., "The sample mean was significantly larger than the mean proposed by the null hypothesis, $t(24) = 2.5$, $p < 0.05$."

   e.g., "The patients' depression scores after taking the placebo were significantly higher than their depression scores before taking the placebo, $t(9) = 2.3$, $p < 0.05$."

   e.g., "Patients were more likely to improve on the drug than on the placebo, $\chi^2(1, N = 20) = 5.3$, $p < 0.05$."

4. When reporting nonsignificant results (NOTE: not insignificant, which means something very different), either (1) you can either just state that the $p > 0.05$ by saying it's not significant (n.s.) or (2) you can state a specific p-value (given by SPSS or calculated by Excel because it's perhaps very close to your alpha.

   e.g., "Placebos had no effect on patients' depression scores, $t(9) = 1.4$, *n.s.*"

   e.g., "The different between the sample means was marginally significant, $t(50) = 2.0$, $p = 0.05$."

5. Numbers less than twenty and numbers at the beginnings of sentences are written out.

6. Always reference your tables and figures in the text.

   e.g., "See Table 1 for means and standard deviations."

7. REMEMBER that the numbers are not the important thing; the context and interpretation is what your reader wants to know.

8. You can get MS Word to insert a chi symbol (χ) by selecting the `INSERT/SYMBOL` menu option. You can get MS Word create a superscript by selecting the number and selecting the `FORMAT/FONT` menu option and checking the superscript checkbox (or by pressing `COMMAND-SHIFT-=`).

Graphing Means in Excel

Graphing means in Excel is really easy, and it is my preferred tool for graphing.

1. Enter a table of means in a spreadsheet, along with your sample labels. For example, like this:

Pull Lever	3.76
Push Off Bridge	-3.56

2. Highlight your table, and select the `INSERT/CHART` menu option (or click the button in the toolbar that looks like a bar graph).

3. Select the type of chart that you want, either a *bar graph* (i.e., a horizontal bar graph) or a *column graph* (i.e., a vertical bar graph). To graph means, use the default option for `CHART SUB-TYPE`. Check the graph looks about right by using the `VIEW SAMPLE` button, then click the `FINISH` button.

4. Once you have your chart, you can modify it in a number of ways:

    a. You can move the chart to its own worksheet, but selecting the `CHART/LOCATION` menu option.

    b. You can add a title or axis labels by selecting the chart and using the `CHART/CHART OPTIONS` menu option. You can also add or remove a chart legend in this window.

    c. You can change a number of physical features of the chart by double-clicking on them, e.g., the colors of the bars, the color of the background, the font and font size of the text.

Graphing Means in SPSS

Graphing means in SPSS can be a little more difficult, but ultimately the graphing tools in SPSS are more powerful. However, for most graphs that you are likely to need, Excel can do the job. I'm not going to go into too much detail on SPSS graphing at this point, because I think it's needlessly complex.

1. Use the original raw data file.

2. Select the `GRAPHS/CHART BUILDER` menu option.

3. Select the type of graph that you want. If your data is set up as independent samples (i.e., your independent grouping variable and dependent variables are in two different columns), you can easily create a bar graph by dragging the bar graph to the CHART PREVIEW window, the independent grouping variable to the x-axis and the dependent variable to the y-axis, then clicking OK.