

Stat 311 Group Project Report Guidelines

General guidelines

- Your report must be typed. Use 1" margins all around. Use a standard font, such as Times New Roman, at 12 pt. Double space main text sections. Itemized or bulleted lists may be single spaced; all table and figure captions may be single spaced.
- The final report needs to sound like it was written by one person.
- Although the emphasis is on the statistical study/methods, grammar and spelling count—pay attention in your final edits.
- Use the report outline that follows. The results and discussion sections will probably be the longest sections.

INTRODUCTION

Minimum of two paragraphs: 1) motivation for your study, and 2) general question(s) you are addressing. This section should also identify the intended population for your study.

METHODS

Data Collection/Sampling

This is an outline of what data you collected and how you collected your data. This may be written in paragraph form or using enumerated lists, or a combination of both. Ideally, we should be able to read this section and use the information to reproduce a similar study.

Data Analysis

In this section you identify the statistical methods you used— t -test for means, z -test for proportions, linear regression, chi-square, etc. Note: you may have several methods depending on your study.

If you used software to produce any of your summary plots or any of your statistics, then you need to reference the software here. A software reference generally includes the name of the package, the version number, and the operating system.

In this section you would also talk about any data manipulations you ended up doing. For example, if you had data on cumulative GPA and you decided to discretize the information, you could mention it here.

If you used the same alpha level for all of your inference (CIs and hypothesis tests), then you can mention it one time here.

RESULTS

Summary/Descriptive Statistics

Include appropriate tables and plots to summarize your data. Be sure to include Table and Figure labels and captions. Also, refer to the Figure and Table labels in the text. Do not just dump tables and figures in this section without some text that refers to them. For examples of how to do this, see one of the articles I have posted on E-Reserves for this course.

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Inferential Statistics

Remember that the minimum project requirement is one CI and one hypothesis test. In terms of organizing this section, I recommend separating it out by research question. For example, if you collected data on the amount of ice cream purchased by gender, with the hypothesis that men tend to eat more ice cream than women, then you might do something like the following:

1. Do men tend to eat more ice cream than women?
 - a) What is the average number of scoops of ice cream ordered by men? We used 95% confidence interval for this estimate, which we computed as follows:

$$\bar{x} \pm 2.040 \left(\frac{s}{\sqrt{n}} \right) \Rightarrow 2.2 \pm 2.040 \left(\frac{0.71}{\sqrt{32}} \right) \Rightarrow 2.2 \pm 0.256 \Rightarrow (1.94, 2.46)$$

- b) What is the average number of scoops of ice cream ordered by women? We used 95% confidence interval for this estimate, which we computed as follows:

$$\bar{x} \pm 2.032 \left(\frac{s}{\sqrt{n}} \right) \Rightarrow 1.3 \pm 2.032 \left(\frac{0.62}{\sqrt{35}} \right) \Rightarrow 1.3 \pm 0.213 \Rightarrow (1.09, 1.51)$$

- c) We hypothesized that on average, men ordered more scoops of ice cream than women.

$$H_0 : \mu_M = \mu_F \text{ versus } H_1 : \mu_M > \mu_F$$

$$t = \frac{\bar{x}_M - \bar{x}_F}{\sqrt{\frac{s_M^2}{n_M} + \frac{s_F^2}{n_F}}} = \frac{2.2 - 1.3}{\sqrt{\frac{0.71^2}{32} + \frac{0.62^2}{35}}} = \frac{0.9}{\sqrt{0.0158 + 0.011}} = \frac{0.9}{0.1637} = 5.50$$

$$P\text{-value} < 0.005$$

Reject H_0 . NOTE: you indicate the decision here, but save the contextual summary of your finding for the discussion section.

You would then continue with question 2 if you are addressing multiple questions, multiple variables, and/or multiple types of analyses. If you are just repeating the same types of CIs and hypothesis tests for multiple variables, you do not need to show your calculations for each one; rather, you can just give the results. For a hypothesis test, you must give the null and alternative hypotheses and you must report the test statistic, P-value, and decision. You just do not need to show your work for multiple calculations of the test statistic. If you have some more lengthy calculations or you used software to conduct tests, you may include calculations and computer output in an appendix at the end of the report (after references if you have any).

Assumptions

Identify assumptions that were required for the tests you conducted and discuss whether or not the assumptions were met. If you violated any assumptions for a particular test, comment on the potential impacts on your results/conclusions?

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DISCUSSION

Summarize major findings. Discuss any issues with your study. This may include talking about specific assumptions that you made, sampling biases (we only sampled dorms, so students that live off campus are not represented), measurement biases (under or over reporting values on a survey), nonresponse bias (percentage of sample that did not respond—could this group be different than the group that responded), and the presence of lurking or confounding variables.

Be sure to comment on whether or not your results can be extended to your original population of interest. For example, location could be a confounding variable--extension of our results may be limited, however, since our observations were restricted to one ice cream store. Women may eat just as much ice cream as men, but perhaps they prefer other ice cream stores or they prefer to eat ice cream at home.

For the issues you choose to address, you should talk about how you believe the issues may have impacted your results.

CONCLUSION

This section provides an interpretation of your key findings in the context of your original question and your population of interest. For example: we found strong evidence that men ordered more scoops of ice cream than women, on average. This indicates that on average, for this one ice cream store, men seem to eat more ice cream than women. Although the results of our observational study may be limited, we suspect that similar results would be found from other studies that included multiple ice cream stores.

This section also includes a list of possible improvements for a future study. You can summarize your possible improvements in a bulleted or itemized list.

REFERENCES

This is the bibliography section for any references that you cite in your report. Some of you will not need this section.