COMPARING GROUPS: EXPLORATION AND INFERENCE

EPsy 8251

Assignment #3

Are there statistically reliable differences in the average salary for a public school and non-public school teacher in Minnesota? In this assignment, you will examine salary data from 28 school districts in Minnesota. These data are in the *MNsalary.csv* file. Please submit your responses to each of the questions below in a printed document. All graphics should be resized so that they do not take up more room than necessary and all should have an appropriate caption. Any equations should be appropriately typeset within the document. There are 10 points possible for the assignment (each question is worth one point).

GRAPHICAL AND SUMMARY EXAMINATION OF THE DATA

1. Create a side-by-side box-and-whiskers plots plot using `ggplot()` to compare the two distributions of teachers' salaries. Include this plot in your word-processed document along with an appropriate caption.
2. Compute the mean salary, the standard deviation, and the sample size for both distributions. Present these in a table (with an appropriate caption and header row) that allows them to easily be compared.
3. Based on the sample means, what do the data suggest about potential differences in the average salaries for public school and non-public school teachers in Minnesota. Explain.
4. Using the information from the table in Question 2, calculate the standard error for the mean for both distributions. Show your work.

STATISTICAL INFERENCE

5. Using mathematical notation, write the *null hypothesis* for testing whether there are statistically reliable differences in the average salary for a public school and non-public school teacher in Minnesota.
6. Using mathematical notation, write the *alternative hypothesis* for this test.
7. Using mathematical notation, write the statistical model that corresponds to the alternative hypothesis. Also, compute the parameter estimates for this model based on the data for the first observation in the data set.
8. Carry out an appropriate F-test to examine the hypotheses and report all pertinent results from the analysis.
9. What do the test results suggest about whether the null hypothesis should be rejected? Explain.
10. What does the inferential analysis suggest about potential differences in the average salaries for public school and non-public school teachers in Minnesota?