

### Homework 3

Due Thurs Nov 30 10 AM

For all questions, please **show your work** or **include a copy of the output**, whichever is relevant. Please type your answers in report form, as if you were describing results in a published study. Include the relevant statistical values in the text. **Your answers should be in your own words** and most answers should be approximately one paragraph.

Data from the next several problems come from the survey of adolescent political opinions used in the last homework,<sup>1</sup> but a new data set has been created for these analyses, `political2.sav`. Download the new dataset from the data page, <http://web.pdx.edu/~newsomj/data.htm>. I have constructed a composite measure (`critical1`) that assesses the extent to which students used critical thinking when encountering news stories (possible range from 1 to 3), based on the average of three items ("When I see or read a news story about an issue, I try to figure out if it is biased," "When I hear news about politics, I try to figure out what is REALLY going on," and "News about people running for office makes me wonder how they might change things.") A follow-up survey that included the critical thinking measure was collected again after the midterm election (`critical2`) and then once again at a later date (`critical3`). The dataset also contains a variable about the student's political knowledge by asking them to identify which political party (Republican or Democrat) currently has a majority control in the Senate (`knowsen`: 1="incorrect", 2="correct").

1. Use SPSS and R to obtain an ANOVA that will answer whether there was a significant difference between pre-midterm critical thinking and post-midterm critical thinking (`critical1` vs. `critical2`). Report and interpret your findings being sure to include all of the relevant values for this type of test in your write-up.
2. Use SPSS or R to obtain an ANOVA that will answer whether there were significant differences among the three time points on critical thinking (`critical1`, `critical2`, and `critical3`). Be sure to report the appropriate within subjects ANOVA  $F$  test approach based on the recommendations given in class for this sample size. To follow up the omnibus ANOVA, conduct the appropriate test to do a planned comparison of the difference between the first (`critical1`) and last time point (`critical3`). Report and interpret your findings being sure to include all of the relevant values for these tests in your write-up.
3. Use SPSS and R to determine whether differences in critical thinking between the time before the midterm and the later follow-up after the midterm (`critical1`, `critical3`) depends on political knowledge (`knowsen`). Obtain a plot of the means and describe the pattern of results. Report and interpret your findings being sure to include all of the relevant values for this type of test in your write-up. No follow-up tests are required for this problem, but, based on the results, describe one follow-up test that would be appropriate. Give the means that would be compared and describe which statistical test would be used.
4. Use SPSS or R to determine whether differences in critical thinking over time (use all three time points: `critical1`, `critical2`, and `critical3`) depends on political knowledge (`knowsen`). Obtain a plot of the means and describe the pattern of results. Be sure to report the appropriate within subjects ANOVA  $F$  test approach based on the recommendations given in class for this sample size. Report and interpret your findings and include all of the relevant values for this type of test in your write-up. No follow-up tests are required for this problem, but, based on the results, describe the possible follow-up statistical tests that would be appropriate given your results.

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<sup>1</sup> McDevitt, M., & Kiouisis, S. (2007). The red and blue of adolescence: Origins of the compliant voter and the defiant activist. *American Behavioral Scientist*, 50(9), 1214-1230.