Homework 3
Due Thurs Dec 3 10 AM (pdf format please)

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.

1. A researcher conducts a study comparing the three types of personnel interviewing approaches used for hiring new employees. Fifteen companies are randomly assigned to unstructured, semi-structured, and structured interview groups (n = 5 per group). The head of personnel at each company then rates the quality (on a 1-10 scale) of the new employees hired over the past year using their interviewing approach. Using the data from the table below, compute an ANOVA by hand to determine whether the three interviewing approaches differ significantly on employee quality. Compute eta-squared to examine the variance in employee quality accounted for by interviewing approach. Please show your work. Report and interpret your results, including the relevant means and statistics in your write-up.

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<th>Unstructured</th>
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2. Enter the data from Problem 1 and use **SPSS** and **R** to explore your results further by conducting an ANOVA and, if significant, requesting Tukey and Games-Howell post hoc tests to check which interviewing groups differ from one another on employee quality. Report and interpret your post hoc test findings in terms of the research problem.

Data from the next several problems come from a survey of adolescent political opinions, which can be downloaded from the data page, [http://web.pdx.edu/~newsomj/data.htm](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, 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.") The possible range of scores on the composite measure is from 1 to 3. The data set also contains a variable about the political party they most relate to (party: 1 = other, 2 = Republican, 3 = Democrat), whether they could correctly identify the party in control of the US Senate at the time of the survey (senate: 1 = no, 2 = yes). 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). Not all of these variables will be needed for all of the analyses below.

3. **Use SPSS or R** to conduct an analysis of variance to determine whether the three party affiliation groups differ in critical thinking (critical1). If significant, obtain Tukey and Games-Howell post hoc tests and report whichever (in your educated opinion) is most appropriate in this case. Report and interpret your results, including means, F-test, significance, and eta-squared.

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4. Use **SPSS** or **R** to conduct a planned contrast to discover whether Democrats significantly differ from Republicans on the critical thinking measure ([critical1]). (Note that in actual practice you would never do both post hoc tests and a prior contrasts after an ANOVA). Report and interpret your results.

5. **Use SPSS and R** to investigate whether the party differences ([party]) in critical thinking ([critical1]) might depend on their political knowledge (correct knowledge about Senate control; [senate]). Supplement your results with a plot of the means. If there is a significant interaction, conduct one simple effects test of interest to you. Report and interpret your findings, being sure to include the means, statistical test values, significance, and partial eta-squared values.

6. 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.

7. 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 $F$ test approach based on the recommendations given in class for addressing sphericity in repeated-measures ANOVA for this study. Report and interpret your findings being sure to include all of the relevant values for this type of test in your write-up.

8. Use **SPSS and R** to determine whether differences in critical thinking over time (use all three time points: [critical1, critical2, and critical3]) depends on political knowledge (correct knowledge about Senate control; [senate]). Obtain a plot of the means and describe the pattern of results. Be sure to report the appropriate $F$ test approach based on the recommendations given in class for addressing sphericity in repeated-measures ANOVA for this study. 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 which follow-up tests might be appropriate and give the means that would be compared, using just one set of means to illustrate each type of follow-up test).

9. Read **one** of the following articles (password protected copies are available from the class website [http://web.pdx.edu/~newsomj/](http://web.pdx.edu/~newsomj/)) and write **two paragraphs** summarizing the article. First, describe the study design (e.g., randomized experiment, non-equivalent control group design, cross-sectional survey; for a quick refresher, see [http://sphweb.bumc.bu.edu/otlt/mph-modules/programevaluation/ProgramEvaluation7.html](http://sphweb.bumc.bu.edu/otlt/mph-modules/programevaluation/ProgramEvaluation7.html)) and purpose of the study in your own words. Be sure to include who/what was studied (e.g., who were the participants?) and the number of cases. Then, choose one statistical test used in the article that you have learned about in the course in this section (i.e., two-way, within-subjects, mixed ANOVA, loglinear, nonparametric tests), and, in your own words, describe the hypothesis that is being tested, the results obtained, and what the findings mean. Be sure to include the relevant statistical values and whether the results were significant. If there were follow-up tests conducted, describe those results (if not, indicate that there were no follow-ups and whether or not you think this was appropriate in this case). Write your paragraphs as if you were describing results in a published article and reporting someone else’s results as in a review article.


