Homework 2
Due Thursday, Feb 27 (10 AM)

For all questions, please show your work or include a copy of the output, whichever is relevant. Please write your answers in report form including relevant statistics, as if you were describing results in a published study. Be sure to describe each finding in terms of the research problem. Most responses to a particular question should be approximately one paragraph in length. **All answers should be in your own words.** I would like a hard copy—if that is difficult or not possible, please let me know and we will arrange an alternative.

1. The following problems use data from the school health behavior study analyzed in HW 1, but two new variables have been added: `safe`, response to a question about whether the student feels safe at school, rated on a 5-point scale of agreement (1="strongly disagree" to 5="strongly agree") and `lifesat`, the students rating of life satisfaction, rated on a 10-point scale (0="worst possible life" to 10="best possible life").[1] Download schoolhb2.sav from the data page: http://web.pdx.edu/~newsomj/data.htm.

a. In SPSS <u>or</u> R, using dummy coding and regression analysis, determine whether there are differences among the three race groups (`racecat`) in whether the student felt safe in school (`safe`) with bullying (`bullied`) as a covariate in the model. Before testing the model, center the bullying variable. Report your results, including slopes, significance tests, R-squared, and F-test and interpret them in terms of the research question. Include the special interpretation of the intercept and unstandardized slopes. State what centering the bullying variable did to the interpretation of the results.

b. In SPSS <u>or</u> R, conduct an ANCOVA analysis comparing race groups (`racecat`), controlling for bullying (use the original bullying variable, not the centered variable), to examine mean differences in feeling safe at school. Report and interpret your findings, including the adjusted means. Describe how the output from the ANCOVA and the second regression model compare, giving specific values to support your statements about the similarities and differences.

c. Use SPSS <u>or</u> R to test a regression model to investigate whether there is a significant quadratic relationship between perceived support (`support`) and feeling safe (`safe`) in school. Center the predictor before computing the quadratic variable, and be sure to include the linear term in the model. Before testing the regression model, obtain a scatterplot of safety (Y-axis) by support (X-axis) relationship with a curved (quadratic or loess) line drawn through it. Report the R-squared, unstandardized, standardized coefficients, unstandardized and standardized slope coefficients, and their significance tests, and interpret your results in terms of the research problem, including an interpretation of the linear and quadratic coefficients.

d. Test whether the effect of bullying on life satisfaction depends on feelings of safety in school. Use R (`pequod` package or Process macro) <u>or</u> SPSS (Simple1 macro or Process macro). Report and explain your results in terms of the research problem, including an interpretation of the meaning of the interaction and the simple slope tests. Be sure to include the plot and report all relevant statistics, including R-squared, unstandardized, standardized coefficients, unstandardized and standardized simple slope coefficients, and their significance tests.

2. Use your own data for Problems 2a and 2b below. Please include a one-paragraph description of the study and variables you will be using (if this is the same data set as the last homework, you may reuse part or all of your previous study description). You will need <u>at least</u> three continuous variables (i.e., five or more ordinal values, interval, or ratio scale).

a. Choose two variables for which a hypothesized quadratic relationship between them might make sense, and use SPSS <u>or</u> R to test a regression model to investigate whether there is a significant quadratic

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[1] A different random sample of the cases from the full study was taken, so the results may not coincide with the results from HW 1.

relationship between a predictor and outcome. Center the predictor before computing the quadratic variable, and be sure to include the linear term in the model. Obtain a scatterplot of the relationship with a curved regression line drawn through it. Report the R-squared, unstandardized, standardized coefficients, unstandardized and standardized slope coefficients, and their significance tests, and interpret your results in terms of the research problem, including an interpretation of the linear and quadratic coefficients.

b. Choose two variables for which you can hypothesize an interaction in predicting a dependent variable. Use R (`pequod` package or Process macro) <u>or</u> SPSS (Simple1 macro or Process macro). Report and explain your results in terms of the research problem. If the interaction is significant, include an interpretation of the meaning of the interaction and the simple slope tests. Regardless of the results, be sure to include the plot and report all relevant statistics, including R-squared, unstandardized, standardized coefficients, unstandardized and standardized simple slope coefficients (if appropriate), and their significance tests.

c. Use three variables to test a mediational hypothesis, where $X \rightarrow M \rightarrow Y$. (Be clear in your write-up about the hypothesized order of variables in the mediational model.) First, obtain correlations among the three variables and report those results. Then, use either R (e.g., the `mediate` package, `RMediation`, or the Process macro) <u>or</u> the SPSS (the Process macro) to test an indirect effect to obtain an indirect coefficient and bootstrap confidence intervals. Report your findings and provide interpretation of all of the effects, including the results from each of the direct effects tests and the test of the indirect effect. Be sure to describe whether your results support full, partial, or no mediation.

3. Read **one** of the following articles (password protected copies are available from the class website 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 https://www.appinio.com/en/blog/market-research/quasi-experimental-design) 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., interactions, curvilinear models, mediation, longitudinal), 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.** Write your paragraphs as if you were describing results in a published article and reporting someone else's results as in a review article.

Chao, R. C. L. (2011). Managing stress and maintaining well-being: Social support, problem-focused coping, and avoidant coping. *Journal of Counseling & Development, 89*, 338-348.

Duan, X., Ni, X., Shi, L., Zhang, L., Ye, Y., Mu, H., ... & Wang, Y. (2019). The impact of workplace violence on job satisfaction, job burnout, and turnover intention: the mediating role of social support. *Health and Quality of Life Outcomes, 17*, 1-10.

van de Sande, E., Segers, E., & Verhoeven, L. (2013). How phonological awareness mediates the relation between children's self-control and word decoding. *Learning and Individual Differences, 26*, 112-118.

Vezzali, L., Capozza, D., Giovannini, D., & Stathi, S. (2012). Improving implicit and explicit intergroup attitudes using imagined contact: An experimental intervention with elementary school children. *Group Processes & Intergroup Relations, 15*, 203-212.