

Homework 3 Due Tuesday 6/8/21 (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 descriptive and statistical values in your write-up (e.g., percents, regression coefficients). **Your answers should be in your own words** and most answers should be approximately one paragraph. Data sets are available at <http://web.pdx.edu/~newsomj/data.htm>.

1. For the problem below, a new data set (`widow.sav`) was taken from a study conducted by David Morgan and Margaret Neal that examined social relationships among recent widows, including a yes/no question about whether the respondent felt lonely was asked at two different time points (`lonely1`, `lonely2`), each six months apart, age of the respondent at Time 1 (`age1`) and years of education (`educ1`). A question about income adequacy (`incadq1`), a 4-point rating of the extent to which she felt she had enough money each month to get by, and self-rated health (`health1`) were both assessed at the first time point.

- a. Use SPSS, R, or SAS to test a lagged regression model to investigate whether income adequacy and health predicted loneliness at Time 2 after controlling for loneliness at Time 1. Report and interpret your findings, with special attention to the interpretation of the longitudinal model. Be sure to include the regression coefficients, the odds ratios, confidence limits, model fit information, and a pseudo- R^2 measure.
- b. Use SPSS, R, or SAS to test an ordinal logistic model predicting the ordinal variable income adequacy with age, education, and health as predictors. Report and interpret your findings. Be sure to include the regression coefficients, the odds ratios, confidence limits, model fit information, and a pseudo- R^2 measure.
- c. Use SPSS, R, or SAS to test an ordinal probit model with the same outcome and predictors as you used in the logistic model. Obtain standardized coefficients. Report and interpret your findings. Be sure to include the regression coefficients, confidence limits, standardized coefficients, model fit information, and a pseudo- R^2 measure. Write one or two sentences about how your results and conclusions compare to the logistic model above.

2. Data for the next problems come from the Later Life Study of Social Exchanges (`llsse.sav`).¹ There are seven variables in this data set, `age`, which is the respondent's age at baseline, `srh`, which is self-rated health (higher values indicate better perceived health), `dep`, which is a measure of depression, `anger`, which is whether the respondent felt angry in reaction to recent negative interactions with social network members, `cope`, which is a nominal three-category variable which represents one of three types of coping actions respondent took after having a negative interaction with a network member (1 = "try to get the person to change", 2 = "try to keep good will", 3 = "try keep from feeling upset"), `years`, which is the number of years until the first hospitalization, if any, and `sensor`, which is a censor variable for whether

¹ Study citation: Sorkin, D. H., & Rook, K. S. (2004). Interpersonal control strivings and vulnerability to negative social exchanges in later life. *Psychology and Aging*, 19, 555–564. Measures citation: Newsom, J.T., Rook, K.S., Nishishiba, M., Sorkin, D., Mahan, T.L. (2005). Understanding the relative importance of positive and negative social exchanges: Examining specific domains and appraisals. *Journals of Gerontology: Psychological Sciences*, 60B, P304-P312.

the respondent was hospitalized during the study period (0 = 'hospitalized' 1 = 'not hospitalized').

a. Use SPSS, R, or SAS to conduct a multinomial logistic predicting the three different coping strategies with age, self-rated health, depression, and anger. Use the first category of the coping variable ("try to get the person to change") as the referent on the outcome. Report and interpret your results, and be sure to include the coefficients, confidence limits, and whether the coefficients were significant.² You may include a formatted table of these values and discuss only significant results in the text if you would like, but otherwise you should include all of the coefficients, odds ratios, and confidence intervals for all of the predictors.

b. Use SPSS, R, or SAS to test a Cox survival regression model to determine whether depression or age predict hospitalization. (Use the full sample N that is available for this analysis instead of the subset with available cases in the coping analysis). Report and interpret the coefficients and hazard ratios for the predictors.

3. Data for the following problems come from a study on racism conducted by Xu and colleagues³ that contains a number of questions to assess racist views (the Implicit Association Test; `implicit.sav`). I've selected a random sample of cases and a subset of six yes-or-no items: `marriage` 'Do you think there should be laws against marriages between Black and White people?'; `president` 'If your party nominated a Black person for President, would you vote for him if he were qualified for the job?'; `church` 'Do Black people attend the church that you, yourself, attend most often, or not?'; `products` 'Have you ever stopped buying certain products because of the way the company or country which makes them has treated Black people?'; `avoid` 'If you were driving through the neighborhoods in a city, would you go out of your way to avoid going through a Black section?'; `join` 'If you and your friends belonged to a social club that would not let Black people join, would you try to change the rules so that Black people could join?'.

a. Use R or SAS⁴ to conduct a two-parameter logistic IRT analysis of the six items. Obtain the *a* and *b* parameters and create a table of the values. Discuss the range of values and whether any items look like they might be candidates for elimination. Obtain ICC and information plots for all of the items and discuss what these plots tell you about the relative qualities of the items.

b. Use R or SAS to conduct a latent class analysis. Test a one-, two-, three-, and four-class model and construct a plot of the BIC values for the three models. Based on these values choose one of these models and report and interpret the entropy, the predicted proportions in each class, and the response probability

² If using R, the exp code I illustrated in the handout may not work with the `multinom` function in the `nnet` package, but significance tests, ORs, and intervals using the `broom` package and `tidy(model, conf.int = TRUE, conf.level = 0.95, exponentiate = TRUE)`

³ Xu, K., Nosek, B., & Greenwald, A. (2014). Psychology data from the race implicit association test on the project implicit demo website. *Journal of Open Psychology Data*, 2(1).

⁴ If you are familiar with Mplus and you wish to use Mplus to conduct the analysis you are free to do so.