Logistic Regression

1. What is your name? Jacqueline Kent-Marvick
2. What are the steps for null hypothesis significance testing (NHST) that should be completed before conducting statistical tests? Decide upon research questions and research hypotheses.; Determine appropriate data to collect. (variables, level of measurement); Determine appropriate statistical analyses. (probability distribution, test statistic); Collect data.
3. What level of measurement is the outcome variable in logistic regression? Dichotomous nominal.
4. What level of measurement is a predictor variable in logistic regression? Nominal, ordinal, interval, ratio.
5. How would you enter the variables in StatCat in Jamovi to see what statistical test is recommended? Analyses—Jamovi menu; StatCat—Jamovi menu; Relationships, Predictions, and Groups—Jamovi menu; Cured—Dependent variable; Intervention—Independent variable; Duration—Independent variable; Recommended test—Logistic regression

* Once data are collected, what general steps for preparing the data should be taken before conducting statistical tests?
* 1- **Check data accuracy**
* 2- **check for missing data**
* 3- **check for outliers**
* 4-**Check statistical assumptions**
* Not a data preparation step- **determine criteria for rejection**

1. What steps can be taken to check data accuracy? How do things look in our data set?
2. Determine the level of measurement for each variable and make sure data types are correct **This is part of the initial review**
3. Check data for typos **This is part of the initial review**
4. Check data for nonsensical values **THIS is part of the initial review. This is part of the initial review (used more than once)**
5. Check categories make sense **This is part of the initial review**
6. Correct problems if possible or exclude**THIS is part of the initial review.**
7. Reverse code items if needed. **Complete before scoring instruments**
8. Score instruments if needed. **Complete after reverse coding items if needed**
9. Keep track of what you so it can be reported with results **this is an important part of transparency**
10. What data problems were noted in our data set **No missing or problematic values notes**

7. What steps can be taken to check missing data? How do things look in our data set? **visual inspection of the data set**

**frequencies and percents for categorical variables**

**means and standard deviations for continuous variables**

8. What steps can be taken to check for outliers? How do things look in our data set?

* **Histograms**
* **boxplots**
* **z-scores**
* **Mahalanobis distance**

9. What steps can be taken to check statistical assumptions for logistic regression? How do things look in our data set?

1. Linear relationship between continuous predictor and logit of outcome variable – **Check If interaction term between** **predictor variable and log transform of predictor variable is significant**
2. Linear relationship between predictor variable and outcome variable **Not an assumption checked for this test**
3. Independence of errors **check for overdispersion**
4. Univariate outliers **check histogram and boxplot**
5. Normality **Check histogram and boxplot**
6. Homogeneity of variance **Not an assumption checked for this test**
7. Incomplete information from the predictors **Check contingency tables and for large standard errors for predictors**
8. Complete separation **Check if outcome variable can be perfectly predicted by one variable or a combination of variables**
9. Multicollinearity **Check VIF**

10. What options are available if statistical assumptions are violated for logistic regression?

1. Linear relationship between continuous predictor and logit of outcome variable – **Note the assumption is violated when reporting results or drop the variable from analysis**
2. Univariate outliers and normality **Double check the linear relationship between the continuous predictor and the logit of the outcome variable**
3. Incomplete information from the predictors **note the assumption is violated when reporting results**
4. Complete separation **Note the assumption is violated when reporting results**
5. Multicollinearity **Drop one of the variables from the analysis**

11. What are the steps for conducting a statistical test?

1. 1 – state the null and alternate hypothesis
2. 2 – determine the criteria for rejection
3. 3 – calculate the test statistic
4. 4 – draw conclusions about the null hypothesis
5. 5 – report results

12. What are some null and alternative hypotheses for parts of logistic regression?

1. There’s no difference between the previous model and the current model – **Null for the model**
2. There’s a difference between the previous model and the current model – **Alternative for the model**
3. There’s no difference between the estimate and the value of 0 – **Null for the variable**
4. There’s a difference between the estimate and the value of 0 – **alternative for the variable**

13. What is the criteria for rejection? 0.05

14. What test statistics are you going to look at for logistic regression?

1. Pseudo r- squared. **Statistics for the model overall**
2. Chi-squared and p-value for the overall model.  **Statistics for the model overall**
3. Chi-squared and p-value for the model comparisons **Statistics for the model overall**
4. P-value and odds ration for the variables **Statistics for the variables**
5. F statistic and p-value – **not a statistic used in logistic regression**

15. What are some of the conclusions you can draw?

1. Duration x Log duration **Not statistically significant**
2. Duration x intervention **High VIF, problem with multicollinearity**
3. Duration p-value – 0.964 **Variable is not a significant predictor in the model**
4. Model 1-2 comparison p-value -0.964 **Model 2 is not significantly better than model 1**
5. Model 1 overall model test p-value 0.002 **The model with the predictor is significantly better than the model with no predictor**

16. What will you report about logistic regression?

17. What did you like/dislike about this assignment?

18. How would you change this assignment to make it better for future students?

19. Complete the answer submission in Canvas and turn in your Jamovi file.