

Homework #3

DUE 23 October in class

Recall the anticipatory timing experiment. **The scientific questions of interest for this homework are:** Is there an association between age and the outcome? Between gender and the outcome?

The purpose of this homework is to carry out a complete analysis of these data to answer the stated scientific questions using a General Linear Model (NO RANDOM EFFECTS YET) as we have learned in class. Use categorical age or continuous age, as you feel appropriate. Use our model building procedure:

- Decide upon a reasonable mean model to get residuals for EDA; you already did this in HW #1. Carry out exploratory data analysis for the mean and the covariance structures; you already did this in HW #1 also.
- Decide which two or three or four covariance structures seem reasonable to consider based on your EDA plots. Now select only one of them using likelihood ratio tests, if possible, or AIC and BIC.
- Using your chosen covariance structure, reduce your mean model by eliminating non-significant terms, if possible. However, keep in mind the scientific questions of interest. Do not throw out terms which are needed to answer the questions.
- Carry out diagnostics to check for violations of model assumptions.

Instead of writing an abstract, this time write a Results section for a manuscript. The Results section should briefly describe trends in the data by reporting relevant summary statistics, give the main results of the analyses, detail the answers to the scientific questions of interest and their interpretations, and lastly VERY briefly summarize (one sentence) whether diagnostics found any indications of model violations.

A Results section DOES NOT describe the data collection procedure, your modeling process (e.g. how you chose your final mean and covariance structures), or results from interim analyses (any analyses done on the way to getting your final model).

DO NOT attach computer output for every model you try fitting. DO attach computer code and output for your final model ONLY. This is a homework assignment and not a project; spend a few hours only on this. There is no one correct approach.

Note that the material covered by this Homework will be on the Exam (18 Oct), but the Homework is not due until after the Exam (23 Oct).