PSYC 5316: Advanced Quantitative Methods

1. Compute and report descriptives for demographic data, specifically mean and SD for age and frequency counts for genders.
2. Import the performance data for the 59 participants. How many trials were collected overall?
3. Filter out the trials on which an incorrect response was made. How many of these error trials were there? How many trials remain?
4. Filter out trials that exceeded 10 seconds. How many of these long trials were there? How many trials remain?
5. Group the True problems into the design cells defined by crossing subject ($N = 59$) with format (digit, word) and problem size (small, large) and collapse the distribution of RTs into a single mean RT for each design cell. Export this data as a CSV file onto your computer. How many rows does this CSV file contain (not counting the header)? Repeat this procedure with False problems.
6. Open the `true.csv` dataset in JASP and perform a Bayesian ANOVA on the mean RTs with format and problem size as fixed factors and subject number as a random factor. Construct a plot of mean RTs with format on the horizontal axis and problem size as two separate lines. Do you think there is evidence for an interaction from this plot? Explain.
7. Repeat the previous exercise with `false.csv`.
8. For true problems, which model receives the best support from the data? What is the next best fitting model? Give posterior probabilities for these models. Compute the Bayes factor for the best model over the second best model. Explain what this Bayes factor tells you.
9. Repeat the previous exercise for false problems.
10. Overall, what do these results imply about the architecture of mental arithmetic? In other words, which model (additive or interactive) is best supported by our data?