Week of February 2

1. Single-df comparisons in within-subjects designs
2. Single-df comparisons: ANOVA
3. Single-df comparisons: MRC

Single-df Comparisons

- As with between-subjects designs, the omnibus within-subjects analysis does not tell us anything conclusive about significant differences between the means of specific levels (or combinations of levels) of the independent variable
- As with between-subjects designs, single-df comparisons can be used to test for such differences
- The key difference between between-subjects comparisons and within-subjects comparisons is the error term used to test for significance

The Error Term: Between-Subjects Designs

- In the between-subjects case…
  - The error term for the omnibus analysis is an average of the within-cell variances
  - In practice, it is usually reasonable to assume that within-cell variance is constant across cells (homogeneity of variance)
  - Therefore, it is usually reasonable to use the error term from the omnibus analysis to test single-df comparisons

The Error Term: Within-Subjects Designs

- In the within-subjects case…
  - The error term for the omnibus analysis is an average of level-by-subject interactions
  - In practice, it is usually unreasonable to assume that these interactions are constant across "cells"
  - Therefore, it is usually best to test each single-df comparison using its own error term, rather than using the error term from the omnibus analysis

Single-df Comparisons: ANOVA

1. Reminder: The data file must have *s* rows to represent the participants and *a* columns to represent levels of the within-subjects factor
2. If a "side" of the comparison is a combination of levels, use Transform—Compute to create a new variable representing an average of the levels on that side
3. Select GLM—Repeated Measures, tell it that the within-subjects factor has 2 levels, and define those 2 levels as the 2 variables representing the sides of the comparison
4. Ask for any desired Options and Plots, then click OK

Reading Output from GLM—Repeated Measures

- For A_{comp}—the effect of the comparison—look at the row labeled with the name of your within-subjects factor and "Sphericity Assumed" in the Tests of Within-Subjects Effects section
- For A_{comp} x S—the error term—look at the row labeled "Error" and "Sphericity Assumed" in the Tests of Within-Subjects Effects section

Single-df Comparisons: MRC

1. Reminder: The data file must have *a* x *s* rows to represent each level of the within-subjects factor for each participant, and one column to represent the dependent variable
2. Use one vector to code A_{comp}
3. Use *s* – 1 vectors to code the participants
4. Using Transform—Compute, create *s* – 1 vectors to code the A_{comp} x *S* interaction
5. To get the R^2 for A_{comp} and A_{comp} x *S*, regress the DV on the vector(s) used to code the effect
6. The *df* for each effect is equal to the number of vectors used to code the effect
7. Complete the summary table by hand

An Example

- A professor wonders whether time of day affects students' tardiness to a class or appointment.
- Over the course of two weeks, the professor schedules three meetings with each of eight students. The meetings are scheduled in the morning (8 AM), at noon, or in the afternoon (4 PM), with order randomized.
- This results in a one-way within-subjects design, with time of day as a three-level within-subjects factor.
- The dependent variable is how many minutes after the hour the student arrives for the meeting.
- Data are available on the course website