## Week of February 16

1. Omnibus analysis of the two-way mixed factorial: MRC approach
2. Detailed analysis of the two-way mixed factorial

## Summary Table: MRC

| Source | *SS* | *df* | Mean $R^2$ | *F* |
|---|---|---|---|---|
| *A* | $R^2_A$ | $a - 1$ | $R^2_A/df_A$ | $MR^2_A/MR^2_{S/A}$ |
| *S/A* | $R^2_{S/A}$ | $a(s - 1)$ | $R^2_{S/A}/df_{S/A}$ | |
| *B* | $R^2_B$ | $b - 1$ | $R^2_B/df_B$ | $MR^2_B/MR^2_{BxS/A}$ |
| *A x B* | $R^2_{AxB}$ | $(a - 1)(b - 1)$ | $R^2_{AxB}/df_{AxB}$ | $MR^2_{AxB}/MR^2_{BxS/A}$ |
| *B x S/A* | $R^2_{BxS/A}$ | $a(b - 1)(s - 1)$ | $R^2_{BxS/A}/df_{BxS/A}$ | |
| Total | 1.00 | $abs - 1$ | | |

## Omnibus Analysis of a Mixed Factorial: MRC Data File

- Need a total of *abs* rows
- Need one column for the dependent variable
- Also, it's usually a good idea to use one column for a subject ID number, one column to identify levels of the between-subjects factor, and one column to identify levels of the within-subjects factor

## Omnibus Analysis of a Mixed Factorial: MRC Coding

- Use $a - 1$ vectors to code the main effect of the between-subjects factor (*A*)
- Use $b - 1$ vectors to code the main effect of the within-subjects factor (*B*)
- Using Transform—Compute, create $(a - 1)(b - 1)$ vectors to code the *A x B* interaction
- Use $a(s - 1)$ vectors to code the between-subjects error term (*S/A*; see pp. 308-310 for an example)
- For the omnibus analysis, there is no need to code the within-subjects error term (*B x S/A*)

## Omnibus Analysis of a Mixed Factorial: Conducting the Analysis

1. To get $R^2$s for each of the *A*, *S/A*, *B*, and *A x B* effects, regress the DV on the set of vectors used to code that effect
   - As usual, the *df* for each effect equals the number of vectors used to code that effect
2. The $R^2$ for the within-subjects error term (*B x S/A*) equals $(1 - R^2_{Y.MAX})$
   - The *df* for *B x S/A* equals $a(b - 1)(s - 1)$
3. Calculate the Mean $R^2$s and *F* ratios by hand

## Numerical Example

http://psych205.50webs.com/presentations/data_060216.sav

- The subjective stress level of 4 high-Neuroticism undergrads, 4 moderate-N undergrads, and 4 low-N undergrads is assessed one month before exam week, during exam week, and one month after exam week
- This is a two-way mixed factorial design, with Neuroticism as a three-level between-subjects factor and time as a three-level within-subjects factor
- The DV is subjective stress level

## Exercise

- Working with a partner…
  1. Create all necessary coding vectors for an omnibus MRC analysis of the data
  2. Use Regression—Linear to conduct the omnibus analysis
  3. Using information from the SPSS output, write out a summary table for this analysis
  4. Run the following line of SPSS syntax to get the cell means: means stress by neuroticism by time.
  5. How would you summarize the results of the study for a *USA Today* reporter?

## Detailed Analysis of a Two-Way Mixed Factorial Design… In a Nutshell

- Conceptually, you can follow up the omnibus analysis of an *A x* (*B x S*) design in all the same ways that you can follow up the omnibus analysis of an *A x B* design
- Computationally, things are complicated by the need to use a different error term to conduct each follow-up test
- Practically, using GLM to test simple effects is rather easy, using GLM to test interaction contrasts and simple comparisons is doable, and doing MRC coding for any of this is a pain in the butt
  - Annotated SPSS syntax files for the Chapter 18 problems are available on the course website (http://psych205.50webs.com)

## Detailed Analysis of a Two-Way Mixed Factorial Design: Step By Step

| First, conduct the omnibus analysis. Is the interaction significant? | |
|---|---|
| If not… | If so… |
| 1. Analyze the main effects.<br>2. Follow up significant results with main comparisons (pp. 316-319). | 1. Analyze simple effects (pp. 319-322, 323-324, 327-329, or 330-332) or interaction contrasts (pp. 333-337 or 338-341).<br>2. Follow up significant results with simple comparisons (pp. 322, 324-326, 329-330, 332-333, or 337-338). |

## My Advice

- If you need to conduct detailed analyses of a mixed design…
  1. See if you can figure it out how to do things on your own (with reference to Chapter 18 and SPSS Help—Command Syntax Reference)
  2. Nicely ask someone who has done this before (e.g., an older student, a statistically-inclined professor) to help you out
  3. Pay someone who has done this before to help you out; better yet, have your advisor pay someone to help you out