Additional SPSS Instructions for Two-Way (and Higher-Way) ANOVAs

Our text gives instructions for two-way ANOVA with both IVs independent measures (p. 508; and it works the same way if there are more than two IVs, all independent measures, you would simply add an additional column for each IV). Below are instructions for two (or more) IVs, all repeated measures, and any mixed-design ANOVA (at least one repeated measures IV and at least one independent measures IV).

(Also note: For any ANOVA, if you want line graphs, which are especially useful for seeing all the cell means and any possible interaction, after clicking Continue, click Plots on the bottom menu; select one IV for the horizontal axis and the other for Separate Lines, click Add, Continue, and then OK. Under "Options," you can select Descriptive statistics and/or Estimates of effect size (to get partial eta squared), and you can also get cell means and means for each level of each factor by selecting everything in the "Estimated Marginal Means" box at the top on the left and clicking the triangle to shift them into the box on the right. Click Continue, and OK.)

Both IVs repeated measures: Suppose your two IVs were stimulus type (picture vs. word) and stimulus size (large vs. small); all participants received all four kinds of stimuli; and the DV is percent correct identification.

As for one repeated measures IV (see p. 468 of our book), each row of the data file is a subject and each column is a score. So for this example, there would be four columns of data for each subject. The first (var00001) would be percent correct for pictures-large, the second (var00002) would be percent correct for pictures-small, the third (var00003) would be percent correct for words-large, and the fourth (var00004) would be percent correct for words-small.

Go to Analyze, General Linear Model, Repeated Measures. Factor 1 would be stimulus, with 2 levels, click add. Factor 2 would be size, with 2 levels, click add, and then click Define. Highlight all four rows in the box on the left and click the triangle to shift them into the Within Subjects Variables box on the right. Note that by entering the factors in the right way given how the data file is set up, you can put all the columns into the box at once. But be sure to check that they are in the right order. (E.g., for this example, (1,1) should be large pictures, (1,2) should be small pictures, etc., because the factors were entered in the order stimulus type and then size, so size alternates first.) Remember that it is only the "Test of Within-Subjects Effects" box that you want to look at in the output (plus anything extra you selected, such as the interaction plot).

For more than two IVs, all repeated measures, you have additional columns of data, which should be organized this way, e.g., for factors entered in the order 1, 2, and 3: the order of the columns would be 1,1,1, (that means level 1 of each of the three IVs); 1,1,2 (that's level 1 of factor 1 and 2 and level 2 of factor 3); 1,2,1; 1,2,2; 2,1,1; 2,1,2; 2,2,1; 2,2,2.

Mixed design, one repeated measures IV, one independent measures IV: Suppose in the example used above, the stimulus IV was independent measures and the size IV was repeated measures, so each participant either saw large and small pictures OR large and small words. The way to do this is to combine the instructions from p. 435 (one-way independent measures ANOVA) and p. 468 (one-way repeated measures ANOVA) as follows:

Each row represents a different subject. The first column identifies which stimulus group each person was in; e.g., pictures = 1 and words = 2. The second and third columns represent each person's score on large stimuli and small stimuli, respectively. Go to Analyze, General Linear Model, Repeated Measures. Factor 1 would be size, with 2 levels, click add, define. Highlight the bottom 2 rows in the box on the left and click the triangle to shift them into the Within-Subjects Variables box on the right. Highlight the other variable in the box (the one that represents type of stimulus) and click the triangle next to the Between-Subjects Factor(s) box. Then click Options and/or Plots, if you want, and Continue, OK. In the output, you will want to look at both the "Tests of Within-Subjects Effects" box for the main effect of the repeated measures IV and its interaction with the independent measures IV, and the "Tests of Between-Subjects Effects" box for the main effect of the independent measures IV. (And remember to ignore "Intercept" in the "Tests of Between-Subjects Effects" box.)

Follow this same approach for a mixed-design ANOVA with more than two IVs.

Interpreting the output: