**SPLH 861 HW1: Main Effects in General Linear Models (6 points total)  
Due Friday 9/12/2014 by 11:59 PM via Blackboard  
Revision Due by Friday 10/10/14 by 11:59 PM via Blackboard  
  
Please submit all requested files (word document, syntax, and output)  
using this naming convention: 861\_Firstname\_Lastname\_HW1**

**General Instructions:**

This homework focuses on a study of 200 undergraduates conducted in the Department of Wordology at Midwestern Red State University focusing on the contributions of abilities and environment in playing Scrabble. Because of the heavy verbal component of playing Scrabble successfully, students were assessed on their verbal ability via the Boston Naming Test, which consists of 60 drawings the respondent must name correctly (1 point per drawing, such that possible scores range from 0 to 60). Also of interest was the extent to which spatial abilities contribute to Scrabble success. To that end, spatial ability was assessed with the Block Design test, in which participants are shown 17 patterns that must be re-created via colored blocks (1 point per drawing, such that possible scores range from 0 to 17). Finally, the contribution of environment was examined by randomly assigning participants to one of two kinds of opponents: an easy opponent (who was instructed to play simple words and to avoid the double- or triple-letter or word squares), or a hard opponent (who was instructed to play as well in order to score as many points as possible). The outcome was the student's total score at the end of three Scrabble games, in which higher scores are better.

Your task is to answer the research questions below by estimating general linear models predicting scrabble scores using restricted maximum likelihood. I have provided the data in SPSS, SAS, and STATA formats, and you will need to create your own syntax file. Please make comments in your syntax file as to what the codes do, that way you will have it as a future reference in analyzing your own data. Please submit your syntax file and the resulting final output file (i.e., with correct results only) with this word file containing the items below.

With respect to your predictors, use the easy opponent as the reference group, center verbal ability at 30, and center spatial ability at 10. All values should be recorded to the nearest .01 to be correct. Use a cut-off of *p* < .05 as your indicator of significance. Note that key values (the REML −2LL and the fixed intercept estimate) have been given for each model so that you can verify that you have estimated the right model—do not proceed until these match your output. The format in which the other requested statistics should be given has also been provided for each question.

**Record the following in preparation for your results section (3 points):**

1. Estimate an empty model for the scrabble score outcome (−2LL = 2330.2):
   1. Record the fixed intercept estimate and standard error: Est = , SE=
   2. Record the total variance estimate and SE: Est = , SE=
2. Add a fixed effect for opponent type (−2LL = 1983.7, fixed intercept estimate = 300.17):
   1. Record the estimate, SE, and *p*-value for opponent type: Est = , SE = , *p* <
   2. Record the predicted intercept and SE for easy opponents: Est = , SE =
   3. Record the predicted intercept and SE for hard opponents: Est = , SE =
   4. Record the variance accounted for by opponent type: R2 =
3. Add a fixed effect for verbal ability (−2LL = 1837.6, fixed intercept estimate = 295.68):
   1. Record the estimate, SE, and *p*-value for verbal ability: Est = , SE = , *p* <
   2. Record the additional variance accounted for by verbal ability: ΔR2 =
   3. Record the total variance accounted for by the model: R2 =
   4. Record the significance test of the model R2: *F* ( , ) = , *p* <
4. Add a fixed effect for spatial ability (−2LL = 1817.4, fixed intercept estimate = 294.84):
   1. Record the estimate, SE, and *p*-value for spatial ability: Est = , SE = , *p*
   2. Record the predicted intercept and SE for hard opponents: Est = , SE =
   3. Record the additional variance accounted for by spatial ability: ΔR2 =
   4. Record the total variance accounted for by the model: R2 =
   5. Record the significance test of the model R2: *F* ( , ) = , *p* <

**Write a results section that includes the following information. Please note that I DO NOT WANT A NUMBERED LIST. Please write as if it were a real results section for a manuscript using continuous prose, transitions between sections, and so forth (3 points).**

1. Begin by briefly summarizing the design of the study, the variables included (and their mean and SD), and purpose of the analyses. Also provide all relevant modeling info: program used, estimator chosen, and how significance was assessed for fixed effects (univariate Wald test) and for the overall model (multivariate Wald test). A reader should be able to replicate your analyses given the information provided.
2. Report the empty model results from #1 (which provide a baseline for further comparison).
3. Report the results from the models in #2–#4, including both the relevant statistics and the corresponding verbal interpretation (i.e., what happened with scrabble scores).
4. Create a table of parameter estimates for the final model in #4. Use Table 2.7 from Hoffman (2014) chapter 7 as an example of the format, and refer to this table to interpret each fixed effect from the final model, using the text that follows Table 2.7 as a template.

**— Your Results Begin Here —**