**Psy 230 Lab 9
Single-factor ANOVA—Comparing between-subjects and within-subjects designs**

An undergraduate psychology student decides to investigate factors that might influence performance in a game of Scrabble. In a “normal” game of Scrabble, players face different sides of a square game board and attempt to construct words on the board with letters they have drawn from a large pool of letters. After doing quite poorly in a game with friends, the student suspects that she was at a disadvantage facing the board from the back and being forced to read the letters and words on the board upside down. She decides to conduct a simple experiment to test her speculation.

The student decides to use a between-subjects design in which she randomly assigns her friends to one of the four positions around the board—front, back, left, and right. Her experiment involves four games of Scrabble, each game consisting of different players. The game ends when either the letters have all been played or no more moves are possible. The dependent variable consists of the number of points each person accumulates during the course of the game.

The results are as follows:

 ***Front Back Left Right***

 ***k1 k2 k3 k4***

 38 22 30 30

 30 21 27 22

 17 3 9 11

 19 10 18 13

(1) a. Calculate the single-factor **between-subjects ANOVA** in SPSS. **Paste in the data matrices.** Use alpha = .05. **Indicate your decision** (Retain Ho or Reject Ho).

 b. What kinds of concerns do you have about the type of design the student selected to investigate this problem?

(2) Now assume the same data were collected with a within-subjects design.

 a. Conduct the single-factor **within-subjects ANOVA** in SPSS. **Paste in the data matrices.** Use alpha = .05. **Indicate your decision** (Retain Ho or Reject Ho). **Post hoc comparisons are not required.**

 b. Write the APA-formatted results section for this within-subjects experiment. Since post hoc tests are not required, you will have two sentences and one table of means and standard deviations.

 c. Compare the *SS*, *MS*, and *F* values in the two analyses, pointing out similarities and differences.

 d. Explain the difference in the *outcomes* of the two analyses. Which design is more sensitive? Which term or source of variability in the analysis demonstrates the increase in power afforded by the within-subjects design?