**One-Way ANOVA Exercise**

Bone mineral density BMD was measured in three groups (N=20 for each group) of subjects that experience different levels of musculoskeletal loading on a daily basis. Subjects were Olympic weightlifters, Olympic swimmers, and age-matched controls. BMD (g/cm2) of the lumbar spine was measured using dual-energy X-ray absorptiometry (DEXA). The data is included in the Excel file associated with this assignment. Since there are more than two groups, a t-test should not be used to determine significant differences. An analysis of variance ([ANOVA](http://www.davidmlane.com/hyperstat/intro_ANOVA.html)) statistical technique can be used to determine if differences exist between more than two groups. This is primarily due to an inflation of Type I error related to [conducting multiple t-tests](http://en.wikipedia.org/wiki/Multiple_comparisons). Following the ANOVA, post-hoc tests can be performed to determine specifically which groups are different.

1. Download “One-Way ANOVA Exercise.xlsx” from my webpage and save the file to your H: drive.
2. Follow the instructions in the “One-Way Between” worksheet and refer to the various readings (e.g., ANOVA – Ch.9 Vincent.pdf) and class notes.
3. Repeat the statistical analysis, from question 2., in SPSS and copy and paste the output tables from SPSS into Excel. The SPSS results should be pasted into a separate worksheet named “SPSS Between”. The Word document “How to perform a One-Way ANOVA in SPSS” will guide you through the necessary steps.

A sport psychologist was interested in determining the affect of alcohol on golf performance. Twenty male subjects participated in the study at a local course. After a sufficient warm-up, each participant hit 10 drives, which were measured for both distance and accuracy. A combined score (distance hit - deviation from the target line) was the dependent variable. After the initial 10 drives, participants were given 10 minutes to consume a bottle of beer. Participants then rested for an additional 10 minutes. Immediately following the rest, 10 drives were hit, followed by 10 minutes to consume another beer. This was repeated until 7 sets of 10 drives were completed and 6 bottles of beer were consumed. The raw data is included in the Excel file associated with this assignment. See the tab labeled “Repeated Measures ANOVA”.

1. Perform a One-way ANOVA in SPSS using the raw data. The Word document “How to perform a One-Way Repeated Measures ANOVA in SPSS” will guide you through the necessary steps. According to the results, answer the questions posed in the text box. The SPSS results should be pasted into a separate worksheet named “SPSS Repeated”.