Analysis Project 1

One of the core objectives of this class is that you can conceptualize, implement, interpret, and write-up statistical analyses. The first analysis project will evaluate your ability to carry out a mixed model. Projects will be distributed and collected via Canvas; you are responsible for confirming that uploaded files are complete. Late projects will be penalized at a rate of 5 points per day. **Your assignment responses are expected to be entirely your own work. Projects cannot be discussed with anyone** *except* **the instructor and TA**; you may use your notes, class handouts, assigned readings, and statistical software package. Use of the internet is not permitted with the exception of the class resources on Canvas. If you turn in your project before the deadline, you may resubmit incorrect portions for up to ½ of the points lost. This assignment is due **11:59 pm February 28ᵗʰ**.

The 24th Winter Olympics are currently being held in Beijing, China. Twenty years ago, Salt Lake City hosted the winter Olympics, and still helps train many competitors. With eyes to the future of when Salt Lake City might host the Olympics again, the present study is seeking to understand how psychological variables may impact the performance of dyads that engage sports like pairs figure skating.

The data ("OlympicPairs.txt") consist of data from 70 dyads who might one day participate in the Olympics. Individuals were assessed on four variables. Each individual was assessed with regards to their performance (variable: *Performance*), their individual perceptions of the dyad's relationship quality (variable: *RelQuality*), their individual motivation to improve their performance (variable: *Motivation*), and how cohesively they felt they worked with their partner (variable: *Cohesion*).

Additional columns of data were created from the four variables. The scores within each dyad were swapped to produce columns corresponding to the responses of one's partner (variable prefix *Partner*). The scores were also averaged within each dyad to represent the combined dyad score (variable prefix *Dyad*). Three additional columns assign a unique value to each dyad (variable: *DyadID*), to each individual within each dyad (variable: *DyadIndID*), and to each individual (variable: *IndividualID*).

Requirements:

Goal: Your primary goal is to address what impacts *IndPerformance*, with the hypothesis that psychological characteristics like relationship quality, motivation, and cohesion could be essential when it comes to sports that require dyads to work together. Using whatever you know about sports and people, develop an analytic plan for these data, including more specific hypotheses about what will be related to individual performance. You do not need to do research in sport psychology, but do try to form a plausible set of hypotheses.

Given the number of available variables, it is probably not advisable to try to use all of the variables. Aim to develop a few well-reasoned hypotheses, and match your analytic plan accordingly. As with any regression, the significance of some predictors may change depending on the other predictors in the model, so consider carefully which variables you will test and in what order. To try to limit the options you might consider, for this analysis project you do not need to consider interactions.

Write-up: The short write up should consist of 4 sections: 1) a brief introduction to your question(s) of interest and hypotheses, 2) a detailed description of the analyses that were conducted and the models you chose to run, 3) a description of the results of your analyses, and 4) a short discussion summarizing the implications of your results. That is, sections corresponding to the introduction, methods, results, and discussion sections of a typical research paper. There is no minimum or maximum page limit, but it is likely that at least 2-4 pages (double-spaced, type 12) will be required (e.g., 1 paragraph introduction, 2 methods, 2 results, 1 discussion) to address what affects performance well. Write-ups should be clear, concise, and professionally written. There should be no misuse/ambiguity regarding statistical terms, and clear statistical evidence should be given for all statements/claims made.

Syntax/Output: Regardless of the program used for analysis, please provide copies of all syntax and output used in the analyses. Please provide your write-up as a separate file from your syntax/output. Including comments in your code would be very helpful for Steven.

Analysis: In your analyses, the following skills should be demonstrated: use of a mixed model, specification of a random intercept, interclass correlations (including interpretation), likelihood ratio tests, consideration of multiple models including consideration of how effects change after controlling for other variables, interpretation of model parameter estimates (coefficients), differentiation of level 1 and level 2 predictors, and consideration of practical significance above and beyond statistical significance.