Maximizing Objective Performance with Wellness Indicators

We explored the links between subjective, self-reported data and Canada's performance. To do so, we used external information on relative team strengths to construct a model measuring how well the team performed given the strength of their opposition. With this measure of objective performance, we were able to observe the importance of individual wellness measures through multivariate analysis. First, we standardized all of the subjective wellness scores to account for individual variation in self-reporting. Then, finding that fatigue was the most significant factor in determining how well the team performed, we examined how each self-reported wellness score affected fatigue. With multivariate analysis, we were again able to determine which factors had the most impact on a player's fatigue.

We measured the objective performance of Canada by developing a model based upon the Points-Exchange System infused with outside data from World Rugby, the governing body of Rugby Union. This model independently measured Canada's performance for each game within the rating system based solely on points scored and the opponent's rating. Then, we were able to turn some qualitative wellness measurements into quantitative ones. Using this data we analyzed how subjective wellness indicators correlated with the objective performance of the team for the entire season.

Conducting multivariate analyses on every standardized wellness indicator we discovered that fatigue was the only statistically significant factor affecting in-game performance. Multiple regressions indicated that fatigue accounted for over 45% of the variation in objective performance with a p-value of 0.015. Fatigue and performance were negatively correlated, indicating that fatigue generally accompanies success for Canada.

Again using multiple regressions, we analyzed the correlation between each subjective wellness score and standardized fatigue. We analyzed the wellness indicators at multiple time intervals before the fatigue measurements were taken on game day. Our regressions indicated that four measurements correlated extremely well with fatigue when measured two days before, with p-scores below a threshold of 10^{-3}. These indicators two days before, when combined, account for nearly 95% of the variation in our standardized fatigue measurements the day of the game.

Our analysis was made possible solely through the development of a model that measured performance accounting for the quality of the opponent. Similarly, the standardization of wellness scores was integral to the success of our regressions because it eliminated the variation in the self-reported data. Our analysis indicates that the aggregated "monitoring score" was not reliable in predicting performance but instead that using four indicators, reported two days in advance of a game, we could accurately account for a significant amount of variation in objective performance for Canada's national team.