B.L.U.E.- "Figure"-ing Fatigue: How to Better Understand Player Fatigue and its Effect on Rugby Gameplay

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Summary

Rugby Canada, with the aid of the Canadian Sport Institute - Pacific, collected data that explores the self-perceived wellness, activity, and fatigue of their Women's Sevens' players. Data was also collected for all games played over the course of the 2017 - 2018 Season. The focus of our analysis was to create a new fatigue score based off of the data collected and the player's self-perceived scores using PCA (Principal Component Analysis). This new variable helped us understand and explain fatigue in more intricate detail.

Background

The data was collected over the course of the 2017 - 2018 Women's Sevens rugby season starting in August and ending in July after the World Cup. Ideally, each individual recorded their self-wellness ratings by survey every morning before 8:30 am. Data was also collected for each game and specified whether the teams won or lost and by how much. The rate of perceived exertion was also recorded with a combination of survey data and physiological measurements. These data sets were combined using unique dates and the individual player IDs then analyzed. The team hypothesized that there was a better rating or fatigue. After creating a new fatigue score using PCA, the score was compared to other variables.

Analysis

In order to determine a measure for fatigue, we put relevant variables from the wellness.csv and the RPE.csv into our PCA. After we found that PC1 explained roughly 25% of the variance in our variables, we used the scores from PC1 as our measure for fatigue. Next, we investigated which variables explained the most variance in PC1, which revealed that the self-reported wellness scores were the most impactful. Furthermore, analyses with ANOVA demonstrated that while illness and pain significantly increased fatigue, menstruation did not. Lastly, our correlational analyses confirmed that fatigued athletes tend to have more points scored against them and score fewer points against their opponents.

Result

This team constructed an effective pre-game tool for a rugby coach to assess the fatigue levels of their athletes. We verified that our measure correctly interacts with measures such as health and game results. With this information, Rugby Canada can continue to refine their training programs and allocate athletic resources strategically throughout a tournament with ease. By continuing to lead the industry in data analytics, Rugby Canada will gain an essential edge over its competitors.