

Team Datamax Supplemental Notes

When assessing performance in high-pressure situations, subjective measures may be equally as important as empirical measures. We identified pain as a dependent variable that allowed for some individual subjectivity while remaining a fairly objective measure of an athlete's fatigue. Pain is also of particular interest to trainers and coaches, since pain and injury can have long-lasting implications for potentially an entire season of play. We began our investigation of the data by performing a logistic regression in order to determine which of the various health and wellness variables in the provided data were significant predictors of whether an athlete would report experiencing pain on a given day. Stepwise model selection was performed with a 10% significance level for entry into the model. Of the eight possible variables available, four were found to be significant with regards to pain. These were athlete's self-assessed soreness and sleep quality, as well as overall monitoring score and menstrual status. Overall, a Wald test found the model to be highly significant ( $p < 0.0001$ ) with individual p-values for our predictors of  $< 0.0001$ ,  $< 0.0001$ ,  $< 0.0001$  and  $0.0301$ , respectively and model diagnostics did not indicate strongly influential points or the presence of significant multicollinearity between predictors. Odds ratio estimates indicated that reduced soreness and improved sleep quality led to a significantly decreased chance of an athlete reporting pain, whereas increases in overall monitoring score corresponded to a slightly increased chance of an athlete reporting pain. Interpretation of the effect of menstrual status is made more difficult due to sporadic reporting, but odds ratio estimates indicated that athletes who did not report their menstrual status had more than doubled odds of reporting pain compared to athletes who reported that they were menstruating, and athletes who reported that they were not menstruating had slightly decreased odds of reporting pain compared to athletes who reported that they were menstruating.

Since coaches and trainers have a responsibility both to maintain player well-being but also to get the best performance from their team, we wanted to further investigate the role of self-reported soreness and overall well-being in assessing athlete performance. Using aggregated all-time world rankings for country's national 15's rugby teams (gathered from the official World Rugby website) as a proxy for country strength in 7's rugby, we integrated several data sources to compare the team's average self-reported soreness, monitoring score, and RPE on game days with the strength of each opponent they faced, as well as whether they won or lost the individual match. In each case the results appeared to indicate two distinct clusters in the data; one in which the self-reported metrics were low and typical opponent strength were high, with a more even proportion of wins and losses, and one in which soreness and opponent strength were low, consisting of mostly won matches. This potentially indicates that athletes are anxious about playing strong opponents, and as such are more likely to push themselves harder in training and experience reduced levels of self-assessed well-being, as well as give lower assessments of their own performance, in the period surrounding competitive, high-pressure matches. Such a tendency may lead to increased likelihood of injury and pain. By taking steps to promote mental wellness as well as to prevent overtraining on the part of the athletes in the training block preceding a difficult match, coaches and trainers may be able to not only reduce factors contributing to an increased risk of pain in their athletes, but also conceivably improve outcomes of difficult matches during the competitive season as a result.