

S1 Appendix. Descriptive statistics

S1 Fig shows the distribution of the Rate of Perceived Exertion (RPE) provided by the players after trainings and matches recorded during the soccer season and the Session RPE (S-RPE). This figure shows that the RPE have a Gaussian distribution. The mean and coefficient of variation of the RPE detected in this soccer team during the soccer season are 5.26 and 0.31, respectively. The S-RPE shows a mean and a coefficient of variation of 594.60 and 0.47, respectively.

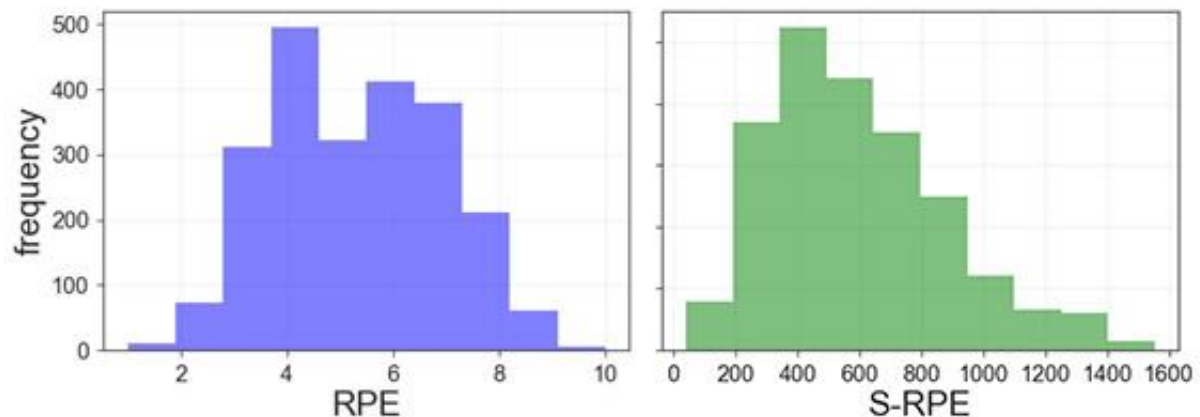
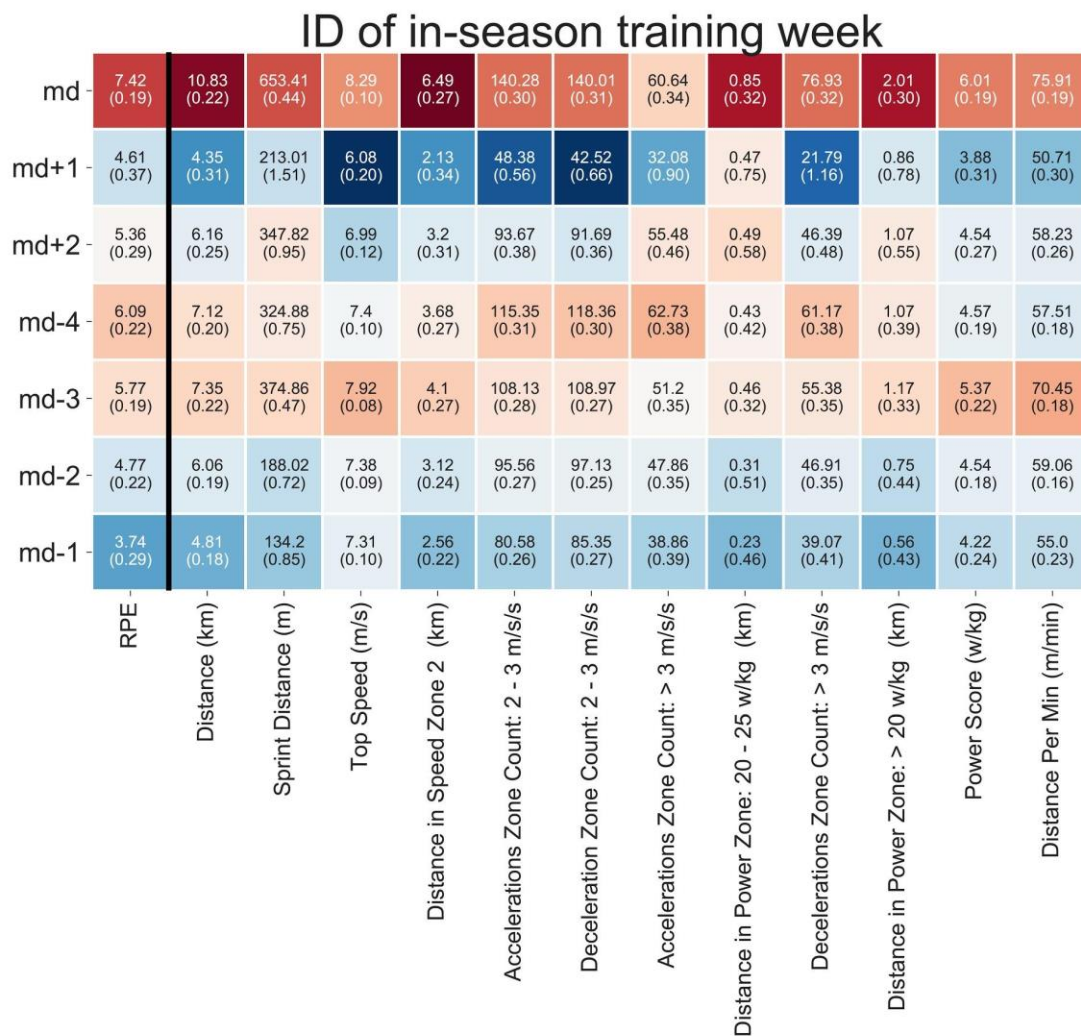


Figure S1. RPE and S-RPE histogram. The plots show the distribution of the RPE provided by each player after the training sessions and matches and S-RPE.

Figure S2 shows the Identity Card (i.e. the means and the coefficient of variations) of the RPE and the external loads detected during the match and training days. The external loads provided in this figure are the most used in literature by athletic trainers and coaches to assess and schedule the trainings. Except for the similar RPE values detected in MD + 1 and MD - 2, Figure S2 shows significant difference between each match day. In this figure, it is also possible to detect that the external loads have a similar trend through the in-season training week. In general, the higher performance was performed in md and in days long before a match (i.e., md -4 and md -3) where we detected the lower variability as well. Otherwise, the lower training loads was performed in days close to match day where we detected the higher variability too (i.e., md +1, md +2, md -1 and md -2). A deep analysis of the workloads difference between md is out of the paper topic. However, the statistical differences detected by Least Significant Difference post-hoc test is provided in the note of the Figure S2. A future study was schedule in order to provide a focused analysis of this topic.



Statistical different was detected between each md except for: md+1 vs md-2 in RPE; md+1 vs md-1, md+2 vs md-2, and md-4 vs md-3 in Distance (km); md+1 vs md-2 and md-1, md+2 vs md-4 and md-3 in Sprint Distance (m); md-4 vs md-2 and md-1, and md-2 vs md-1 in Top Speed (m/s); md+2 vs md-2 in Distance in Speed Zone 2 (km); md+2 vs md-2 in Accelerations Zone Count: 2-3 m/s/s; md-4 vs md-2 and md-1 in Decelerations Zone Count 2-3 m/s/s; md vs md+2 and md-4, md+1 vs md-1, md+2 vs md-2, md-2 vs md-1 in Accelerations Zone Count: >3 m/s/s; md+1 vs md+2, md-4 and md-3, md+2 vs md-3, and md-4 vs md-3 in Distance Power Zone: 20-25 w/kg; md+2 vs md-2 in Decelerations Zone Count: <3 m/s/s; md+1 vs md-2, and md+2 vs md-4 and md-3 in Distance in Power Zone: > 20 w/kg (km); md+1 vs md-1, md+2 vs md-4 and md-2, and md-4 vs md-2 in Power Score (w/kg); and md+1 vs md-1, md+2 vs md-4 and md-2, and md-4 vs md-2 and md-1 in Distance Per Min (m/min).

Figure S2. Identity Card of training workloads. This plot shows a heatmap reflecting the mean and the coefficient of variation (CV in the brackets) of the RPE provided by each player the workloads performed. The darker are the color, the higher is the mean.

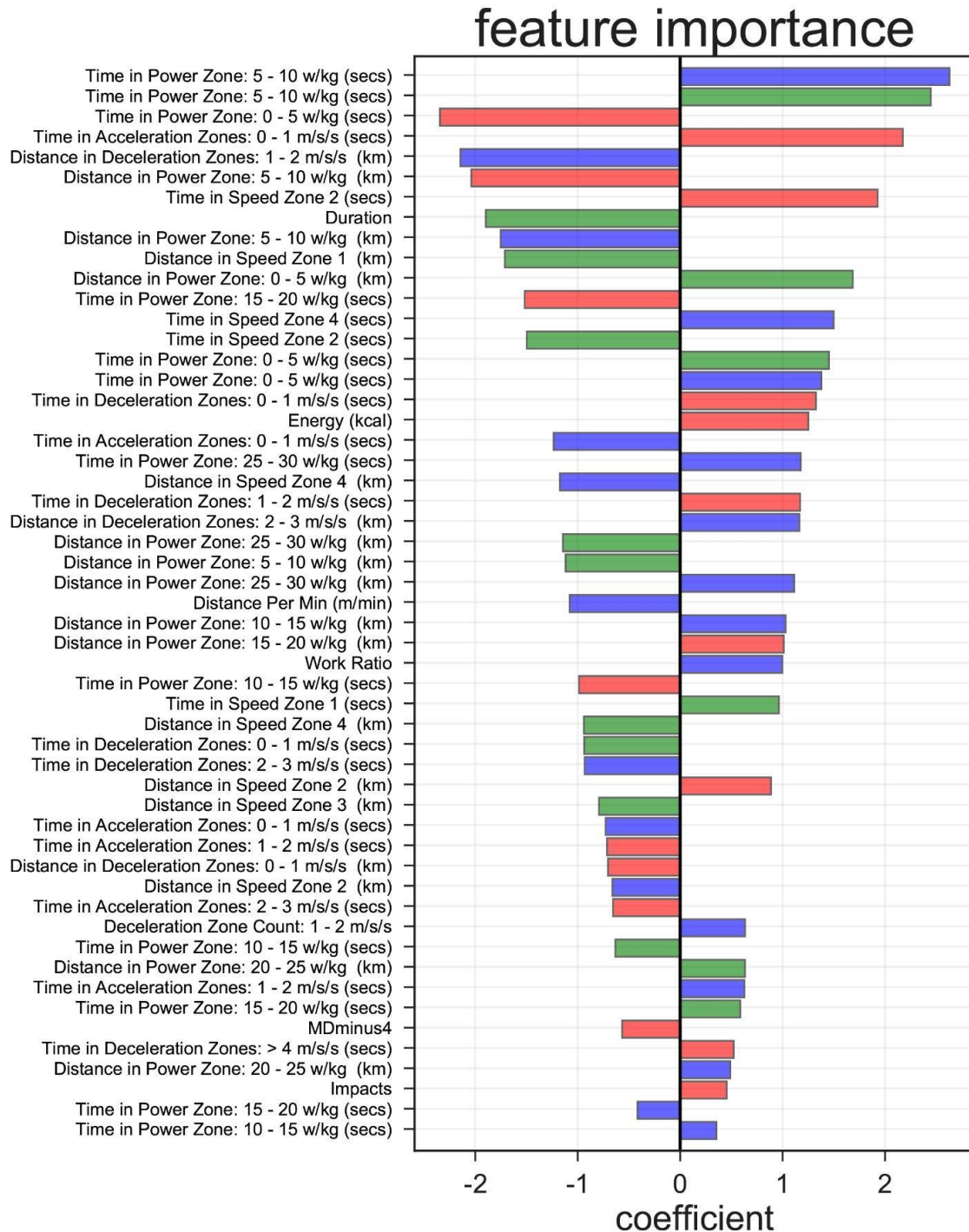


Figure S3. T_{sRPE} feature selection. The figure shows the feature selected and the importance of the features in the classifiers, computed as the decrease coefficient. The red bars reflect the Daily features; the green bars reflect the Acute features; the blue bars reflect the Acute: Chronic Workload Ratio (ACWR) features. The sign of the coefficient reflects the influence of the features on the RPE. For example, the lower is the Time in Power zone 0–5 w/kg (secs), the higher is the effort perceived by players during the current training or match.

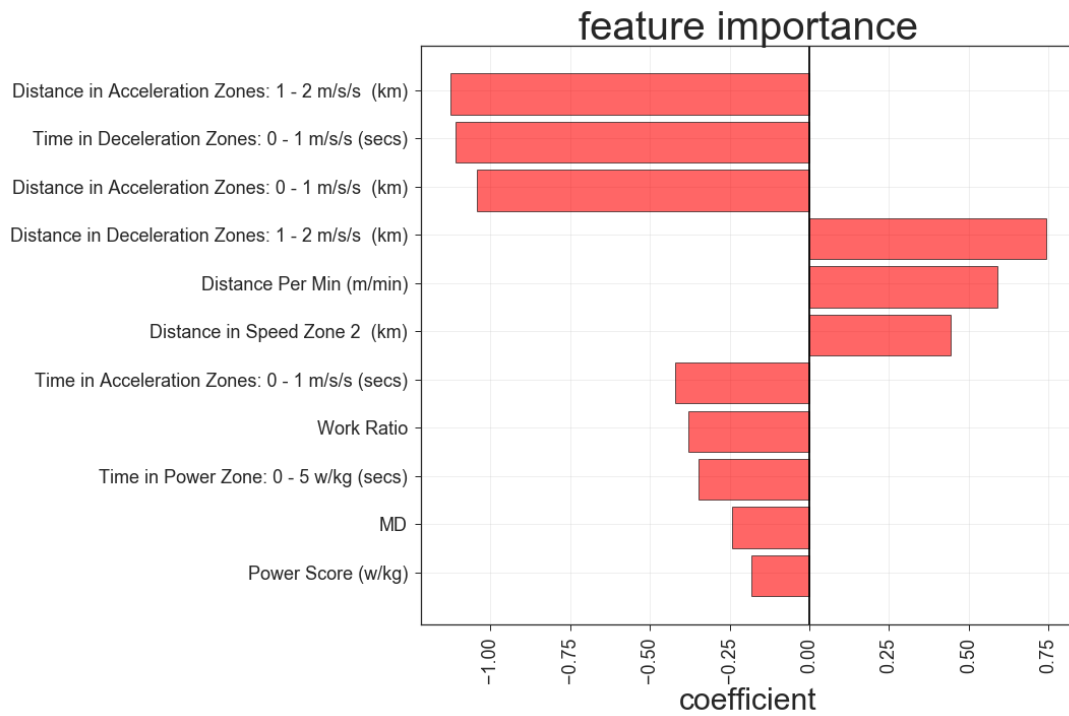


Figure S4. T_S^{S-RPE} feature selection. The figure shows the feature selected and the importance of the features in the classifiers, computed as the decrease coefficient. The red bars reflect the Daily features; the green bars reflect the Acute features; the blue bars reflect the ACWR features. The sign of the coefficient reflects the influence of the features on the RPE. For example, the lower is the Time in Deceleration zone 0-1 m/s/s (km), the higher is the effort perceived by players during the current training or match.

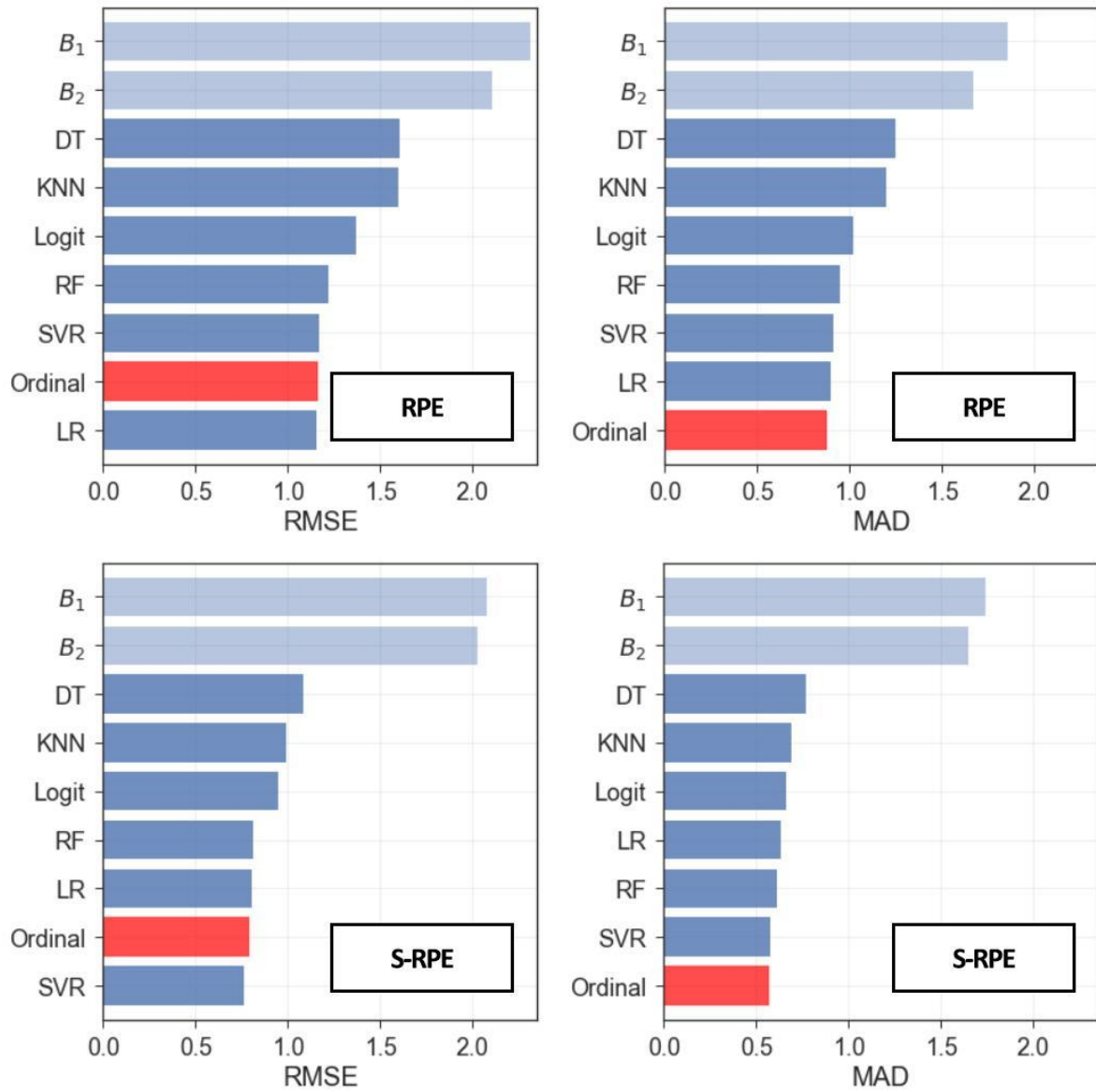


Figure S5. Classifier performances on both $T_{S^{RPE+RFEV}}$ and $T_{S^{S-RPE+RFEV}}$. This figure shows the Root Mean Squared Error (RMSE) and Mean of Absolute Difference (MAD) for both the datasets.