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What is bringing soccer fans to stadiums? A comparison of kick-off time, table positions, and the role of top teams in Portuguese football's top-tier

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ABSTRACT

This study undertook a multivariable analysis of potential factors affecting stadium attendance to better prepare sports teams for possible challenges. The analysed factors included the day of the match, kick-off time, table position of the home and away teams, difference between positions of the home and away teams, and the presence or absence of top teams, with a linear mixed-model analysis. The presence of one (difference: 31.86, $p < .001$) or two (difference: 43.77, $p < .001$) top teams was the main factor increasing attendance. Evening matches (8 pm) had higher attendance than afternoon matches (4 pm) (difference: 5.13, $p = .003$), though this may be influenced by scheduling patterns. Interactions showed that when teams were separated by 11 or more positions, matches held before 8 pm on Saturdays attracted higher attendance ($p < .05$). Fans of top teams preferred less uncertainty ($p < .05$). This study shows that stadium attendances are impacted by interactions between different variables. This can lead organizers to consider adjusting match days and kick-off times based on differences in table positions. The presence of top teams increased attendance the most, showing higher identification with those teams.

KEYWORDS: attendance; competitiveness; elite teams; soccer; sports events.

INTRODUCTION

Attendance at sports events is a major concern for sports organisations. While professional sport clubs' revenues from spectators derive from stadium attendance or television audience (Horky, 2021), stadium attendance can contribute to the relationship between the club and fans (Bond et al., 2022). Increasingly, during television broadcasts, empty stands can devalue the broadcaster's product (Bond et al., 2022). That is, while television broadcasts can reduce stadium attendances (Solberg & Mehus, 2014), large stadium attendances positively impact television audiences (Buraimo, 2008).

Increasingly, stadium attendance can also impact the teams' sports success. In the eighties, Pollard (1986) introduced the concept of "home advantage", which states that the team playing in their own stadium is expected to have a certain advantage in comparison with the team playing away. This advantage can be a result of different reasons, such as a potential referee bias caused by public pressure (Boyko et al., 2007), or by the stronger support motivating the home team (Inan, 2020). Furthermore, players also recognise the importance of stadium attendance, as both home and away supporters can influence match dynamics, by encouraging the home team to fight for every ball, and, in some cases, exert psychological pressure on players, with insults or hostile atmospheres negatively affecting performance (Calleja et al., 2022). Conversely, fans also perceive that, with their behaviour in stadiums, they can positively influence the match outcome in favour of the home team (Wann et al., 1994).

Previous research highlights team identification as one of the strongest predictors of stadium attendance (Karakaya et al.,

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2016). However, attendance is considered a multifactorial phenomenon influenced by several contextual variables, including competitive balance (Buraimo & Simmons, 2009, 2015), league position and rivalry (Addesa & Bond, 2021), ticket prices (Monteiro & Mourão, 2024), day of the match (Ermakov & Krumer, 2023), and kick-off time (Krumer, 2020). While spectators attending matches in stadiums may prefer contests involving stronger winning expectations for their teams, television audiences appear to prefer more balanced competitions (Buraimo & Simmons, 2009, 2015). Similarly, scheduling factors can significantly affect attendance, as seen in Norway, where moving matches from Sunday to Saturday resulted in a 5% increase in attendance (Ermakov & Krumer, 2023).

Therefore, this study analysed the impact of different variables (i.e., day of the week, kick-off time, table positions of the home and away teams, the difference between the positions of the home and away teams, and the presence or absence of top teams) on stadium attendance in the Portuguese first division. While these factors have been examined individually in previous research, evidence from an integrated, multifactorial perspective remains limited. We hypothesised that all variables would impact stadium attendance, especially the presence or absence of top teams.

METHODS

The Portuguese context

The Portuguese first division is a football competition contested between 18 teams from August to May, in a league format. Each team plays every opponent twice (one match at home and one away), and at the end of the season, the team with the most points is crowned champion, while the last two teams in the league are relegated to the second division. The 16th team (third from last) plays a playoff (two matches: home and away) with the team that finished 3rd in the second division.

A report by the Association of European Professional Football Leagues (2018) analysed stadium attendance across European leagues from the 2010/11 to 2016/17 seasons. In this report, the Portuguese first division ranked 12th, behind the second-tier divisions of England and Germany. If we consider stadium occupancy (relative attendance), the Portuguese first division ranks 13th, with an average stadium utilisation (percentage of attendance relative to stadium capacity) below 50%. These poor numbers were previously attributed to ticket prices, game schedules, and a lack of fan involvement with all league clubs (Coelho & Tiesler, 2007). A more recent approach highlighted the impact of specific clubs on stadium attendance, as those teams bring higher attendances (Martins & Cró, 2018). Specifically, three teams dominate Portuguese football in terms of trophies and fans: FC Porto, SL Benfica and Sporting CP. These teams have won most of the domestic trophies, sharing almost all the first-division titles between them (only two other teams were Portuguese champions, once each). Furthermore, these Portuguese teams have won international trophies and are consistently competing in European competitions (e.g., the UEFA Champions League and the UEFA Europa League).

Nonetheless, Portuguese fans appear to prefer matches played during the weekend and if their team has a theoretical higher chance of winning (Martins & Cró, 2018), as previously shown in other contexts (Buraimo & Simmons, 2009). Interestingly, a recent study (Monteiro & Mourão, 2024) applied a questionnaire to Portuguese fans to perceive the reasons for not attending matches, underlining the kick-off time (32.7%), physical distance from stadiums (27.9%), and ticket prices (24.9%). Of note, ticket prices can be significantly lower if fans become club members, but that also leads to another expense. Finally, considering the relevance of costs to fans, it is important to note that the Portuguese first division is transmitted in subscription channels, requiring a monthly fee to watch all matches from that competition (Monteiro & Mourão, 2024). With a broad analysis, we selected different variables: the day of the match, the kick-off time, the table positions of the home and away teams, the difference between teams' positions, and the presence or absence of the top 3 teams from Portugal (FC Porto, SL Benfica and Sporting CP).

Data analysis

A descriptive analysis was performed by calculating means and standard deviations (mean ± SD) of relative attendance (%) for each variable. For this purpose, data were collected from the official website of the Portuguese first division. Importantly, the official website provides the data for 611 matches (one match with missing information). To facilitate the analysis, each variable was coded into different possibilities. Specifically, the day of the week was divided as Monday, middle of the week (including Tuesday, Wednesday, and Thursday), Friday, Saturday, and Sunday, with holidays being fitted as Saturday (if followed by Saturday or Sunday – i.e., no working day following the holiday) or Sunday (if followed by a working day); the kick-off time was divided as before 16h, between 16h and 20h, and after 20h (importantly, if the match was delayed, the schedule time was consider since that was the time that led fans to the stadium); table positions of the

home and away teams were divided in three intervals (1st to 6th, 7th to 12th, and 13th to 18th); the difference between positions was calculated by subtracting the home team position by the away team position (returning a positive value) and divided as three categories (1, for a difference ≤ 3 positions; 2, for a difference between positions of 4–10; and 3, for a difference ≥ 11 positions); and the presence of top 3 teams was divided as 0 (absence), 1 (one team), and 2 (two teams in the same match). It is important to note that in the first match week of each season, there are no pre-match table positions available, as no team has yet accumulated points.

Additionally, a linear mixed model was carried out for the dependent variable (i.e., attendance) in order to analyse the significant differences. Day of the match, kick-off time, table positions of the home and away teams, the difference between the teams' positions, and the presence of the top 3 teams were considered fixed effects. For its part, home teams and away teams were considered as random effects. The Akaike information criterion (AIC) (Akaike, 1974) and a likelihood ratio test (Field, 2009) were used to select the model that best fitted the dependent variable. The maximum likelihood (ML) estimation was used for model comparison, and for the final model of the dependent variable, the best model, again using restricted maximum likelihood (REML) estimation, was refitted (Field, 2009). Significant results were analysed using post hoc pairwise comparison tests using Tukey correction to assess differences between groups. Marginal and conditional R^2 metrics (Nakagawa & Schielzeth, 2013) were reported for the linear mixed model as measures of effect size. Marginal R^2 is concerned with variance explained by fixed effects, and conditional R^2 is concerned with variance explained by both fixed and random effects (Nakagawa & Schielzeth, 2013). The level of significance was set at $p < .05$. This statistical analysis was conducted using the software *Jamovi* (The *Jamovi* project, 2023) for *Windows*.

RESULTS

Overall, the Portuguese first division had an average attendance of 54.23% (± 25.92) across the 2022/23 and 2023/24 seasons (Table 1). Attendance also increased between seasons, averaging 51.68% in 2022/23 and 57.38% in 2023/24. Relative stadium assistances (%) for the considered variables are presented in Table 1. Notably, the presence of one of the top 3 teams almost doubled stadium attendance compared with matches without one of those teams (78.25 vs 43.33%).

Post hoc analyses revealed statistically significant differences for kick-off time and the presence of the top 3 teams, as well as several interaction effects involving kick-off time, day of the match, home and away team positions, and differences in table positions (Table 2). Overall, matches involving one or two top-3 teams consistently had higher attendance than matches without top-3 teams. Significant interaction effects further indicated that the influence of scheduling variables (i.e., kick-off time and day of the match) varied according to team ranking characteristics and the presence of the top 3 teams. Significant comparisons and interactions are presented in Table 2, and model details are presented in Table 3.

DISCUSSION

This study examined the influence of different variables on stadium attendance in the Portuguese first division. Consistent with our hypothesis, the results showed that attendance was affected by multiple factors and their interactions. The presence of the top 3 teams was the most influential variable, accounting for the largest proportion of explained variance and being consistently associated with higher attendance levels. Furthermore, kick-off time, day of the match, league positions, and differences between teams' positions contributed to attendance patterns through several significant interaction effects. Collectively, these findings reinforce the multifactorial nature of stadium attendance.

By increasing stadium attendances, clubs can expect to increase their revenue and their reputation (Quansah et al., 2021, 2024; Schreyer & Ansari, 2022). Furthermore, given that empty stadiums affect the quality of match broadcasts (Bond et al., 2022), increasing stadium attendance can also positively affect potential broadcasting revenues (Quansah et al., 2024). One clear example refers to the English Premier League – the most valuable league, with the most television viewers and the highest average attendances – that is benefiting from stadium tourism, through foreign fans visiting stadiums and museums and watching matches in stadiums (Ernst & Young, 2019). Increasingly, this topic also impacts different areas. For instance, social interactions are important to fan experience and satisfaction (Lee et al., 2012) and to well-being and positive social psychological health (Wann et al., 2008).

From the different variables analysed independently, the presence or absence of the top 3 teams clearly affected stadium attendance the most. That is, the presence of one (difference: 31.86, $p < .001$) or two (difference: 43.77, $p < .001$) top 3 teams showed statistically significant differences in comparison with the absence of any of these teams (Table 2). This is justified by the preference of Portuguese fans for those 3 teams, as previously stated (Coelho & Tiesler, 2007). However, due to rivalries between clubs, exceptions were also found. For example, SC Braga and Vitória SC share a

rivalry, and matches between these clubs have had attendances superior to 60%. These exceptions are most likely due, as with the top 3 teams, to team identification, since this was shown to be a major contributor to stadium attendance in a meta-analysis that included 119 studies (Kim et al., 2019). Additionally, rivalries also play an important role for teams that are not competing for the title (Addesa & Bond, 2021). Nevertheless, different variables, or even interactions between variables, can also impact stadium attendances. While previous studies focused on assessing the impact of one specific variable on stadium attendance, this study analyses different variables independently, as well as the interactions between them.

Interestingly, no statistically significant differences were found between matches with one or two top 3 teams (difference: 11.91, p = .056). This leads to a discussion on what fans may prefer: matches with higher competitiveness or matches where their teams are clearly favourites to win. However, different factors need to be accounted for. For instance, fans of low-rank teams appear to prefer watching high-quality opponents (Addesa & Bond, 2021), which may represent a (rare) opportunity to watch players with distinguished attributes (Wills et al., 2023). Previous research also highlights that uncertainty of the outcome is disregarded by fans attending matches (Buraimo & Simmons, 2009; Pawlowski & Anders, 2012; Wills et al., 2023). On that note, one study (Pawlowski & Nalbantis, 2015) analysed the impact of competitiveness on stadium attendance in leagues where teams face each other four times — instead of the usual two (double round) — reporting higher attendances in matches decisive to the title decision, but not between teams competing for European qualification. This demonstrates that uncertainty about the outcome was only prevalent when the match was between title contenders. Therefore, recognising the impact of top teams on stadium attendance should be complemented with further analysis to identify other variables that can impact attendance. With this information, we have assessed interactions with other variables by accounting for the presence or absence of those teams, thereby providing a novel approach to examining these variables.

First, we can see in Table 2 that the presence of the top 3 teams led to statistically significant differences in interaction with other variables. Secondly, it is important to consider the

Table 1. Relative stadium assistances (%) according to the considered variables: day of the match, kick-off time, table position of the home and away teams, difference between teams' positions, and presence of the top 3 teams. Values are presented as the number of matches and means ± standard deviations.

Variable		*n*	Mean ± SD
Day of the match	Monday	59	49.29 ± 26.35
	Middle of the week	20	60.87 ± 26.56
	Friday	71	53.37 ± 27.19
	Saturday	236	56.99 ± 25.03
	Sunday	225	53.14 ± 26.13
Kick-off time	< 16h	166	46.20 ± 22.99
	16h to 20h	189	57.32 ± 27.38
	> 20h	256	57.88 ± 25.51
Table position (H)	1 to 6	194	63.30 ± 24.70
	7 to 12	199	49.11 ± 25.88
	13 to 18	201	51.00 ± 25.34
Table position (A)	1 to 6	200	66.78 ± 24.96
	7 to 12	199	48.67 ± 24.20
	13 to 18	195	47.50 ± 24.41
The difference between the teams' positions	1 to 3	190	52.16 ± 24.96
	4 to 10	283	52.35 ± 26.27
	10 to 17	121	62.65 ± 25.70
Presence of the top 3 teams	0	420	43.33 ± 21.29
	1	179	78.25 ± 16.48
	2	12	92.95 ± 7.32

n: number of matches; H: home team; A: away team.

Table 2. Post hoc tests for the statistically significant results for each variable independently, and for the possible interactions.

Comparison						
Kick–off time			Difference	SE	t	*p-value*
< 16h	vs	> 20h	–5.13	1.56	3.30	0.003
Top 3 teams			Difference	SE	t	*p-value*
No	vs	One	–31.86	3.33	–9.57	< .001
No	vs	Two	–43.77	7.40	–5.91	< .001
Kick–off time X Away team position			Difference	SE	t	*p-value*
< 16h X 1–6 positions	vs	> 20h X 1–6 positions	10.63	3.20	3.33	0.026
Kick–off time X Top 3 teams			Difference	SE	t	*p-value*
< 16h X No	vs	< 16h X One	–44.57	7.67	–5.81	< .001
< 16h X No	vs	16h–20h X One	–32.88	3.73	–8.81	< .001
< 16h X No	vs	16h–20h X Two	–40.27	10.15	–3.97	0.003
< 16h X No	vs	> 20h X One	–26.10	3.56	–7.32	< .001
< 16h X No	vs	> 20h X Two	–41.01	7.81	–5.25	< .001
< 16h X One	vs	16h–20h X No	47.90	7.72	6.20	< .001
< 16h X One	vs	> 20h X No	49.35	7.70	6.41	< .001
16h–20h X No	vs	16h–20h X One	–36.21	3.80	–9.53	< .001
16h–20h X No	vs	16h–20h X Two	–43.60	10.17	–4.29	< .001
16h–20h X No	vs	> 20h X One	–29.43	3.62	–8.14	< .001
16h–20h X No	vs	> 20h X Two	–44.34	7.83	–5.66	< .001
16h–20h X One	vs	> 20h X No	37.66	3.76	10.01	< .001
16h–20h X One	vs	> 20h X One	6.78	2.20	3.08	0.045
16h–20h X Two	vs	> 20h X No	45.05	10.15	4.44	< .001
> 20h X No	vs	> 20h X One	–30.88	3.57	–8.65	< .001
> 20h X No	vs	> 20h X Two	–45.79	7.81	–5.86	< .001
Kick–off time X Difference in table positions			Difference	SE	t	*p-value*
< 16 h X ≤ 3 positions	vs	> 20h X ≥ 11 positions	7.86	2.48	3.16	0.043
< 16 h X ≥ 11 positions	vs	> 20h X ≥ 11 positions	10.83	3.40	3.18	0.041
16h–20h X ≥ 11 positions	vs	> 20h X ≥ 11 positions	8.66	2.78	3.12	0.049
Day of the match X Top 3 teams			Difference	SE	t	*p-value*
Monday X No	vs	Monday X One	–36.61	5.03	–7.28	< .001
Monday X No	vs	Monday X Two	–58.39	15.30	–3.82	0.011
Monday X No	vs	Middle X One	–34.37	5.96	–5.77	< .001
Monday X No	vs	Friday X One	–32.66	4.72	–6.92	< .001
Monday X No	vs	Friday X Two	–46.59	11.71	–3.98	0.007
Monday X No	vs	Saturday X One	–37.74	4.10	–9.20	< .001
Monday X No	vs	Saturday X Two	–52.17	10.20	–5.11	< .001
Monday X No	vs	Sunday X One	–34.99	4.25	–8.24	< .001
Monday X No	vs	Sunday X Two	–44.62	8.57	–5.21	< .001
Monday X One	vs	Middle X No	36.41	6.06	6.01	< .001
Monday X One	vs	Friday X No	36.53	4.94	7.40	< .001
Monday X One	vs	Saturday x No	31.05	4.64	6.69	< .001
Monday X One	vs	Sunday X No	31.79	4.64	6.86	< .001
Monday X Two	vs	Middle X No	58.19	15.63	3.72	0.016

It continues...

Table 2. Continuation.

Day of the match X Top 3 teams			Difference	SE	t	*p-value*
Monday X Two	vs	Friday X No	58.30	15.27	3.82	0.011
Monday X Two	vs	Saturday X No	52.82	15.17	3.48	0.036
Monday X Two	vs	Sunday X No	53.56	15.17	3.53	0.031
Middle X No	vs	Middle X One	–34.17	6.86	–4.98	< .001
Middle X No	vs	Friday X One	–32.46	5.79	–5.60	< .001
Middle X No	vs	Friday X Two	–46.39	12.13	–3.82	0.012
Middle X No	vs	Saturday X One	–37.54	5.32	–7.05	< .001
Middle X No	vs	Saturday X Two	–51.97	10.67	–4.87	< .001
Middle X No	vs	Sunday X One	–34.79	5.43	–6.41	< .001
Middle X No	vs	Sunday X Two	–44.42	9.12	–4.87	< .001
Middle X One	vs	Friday X No	34.28	5.90	5.81	< .001
Middle X One	vs	Saturday X No	28.80	5.65	5.10	< .001
Middle X One	vs	Sunday X No	29.54	5.66	5.21	< .001
Friday X No	vs	Friday X One	–32.58	4.62	–7.06	< .001
Friday X No	vs	Friday X Two	–46.50	11.67	–3.99	0.007
Friday X No	vs	Saturday X One	–37.66	4.00	–9.41	< .001
Friday X No	vs	Saturday X Two	–52.08	10.15	–5.13	< .001
Friday X No	vs	Sunday X One	–34.90	4.12	–8.46	< .001
Friday X No	vs	Sunday X Two	–44.53	8.51	–5.23	< .001
Friday X One	vs	Saturday X No	27.10	4.31	6.28	< .001
Friday X One	vs	Sunday X No	27.84	4.31	6.46	< .001
Friday X Two	vs	Saturday X No	41.02	11.54	3.55	0.030
Friday X Two	vs	Sunday X No	41.76	11.54	3.62	0.025
Saturday X No	vs	Saturday X One	–32.18	3.62	–8.88	< .001
Saturday X No	vs	Saturday X Two	–46.60	10.01	–4.65	< .001
Saturday X No	vs	Sunday X One	–29.42	3.77	–7.80	< .001
Saturday X No	vs	Sunday X Two	–39.05	8.34	–4.68	0.001
Saturday X One	vs	Sunday X No	32.92	3.63	9.08	< .001
Saturday X Two	vs	Sunday X No	47.34	10.01	4.73	< .001
Sunday X No	vs	Sunday X One	–30.16	3.76	–8.02	< .001
Sunday X No	vs	Sunday X Two	–39.79	8.34	–4.77	< .001
Day of the match X Difference in table positions			**Difference**	**SE**	**t**	***p-value***
Monday X 4–10 positions	vs	Saturday X ≥ 11 positions	–11.08	3.22	–3.44	0.045
Friday X 4–10 positions	vs	Saturday X ≥ 11 positions	–12.06	3.04	–3.97	0.007
Saturday X 4–10 positions	vs	Saturday X ≥ 11 positions	–8.47	2.45	–3.46	0.042
Saturday X ≥ 11 positions	vs	Sunday X ≤ 3 positions	9.37	2.60	3.61	0.026
Home team position X Top 3 teams			**Difference**	**SE**	**t**	***p-value***
1–6 positions X No	vs	1–6 positions X One	–29.85	4.18	–7.13	< .001
1–6 positions X No	vs	1–6 positions X Two	–42.18	7.74	–5.45	< .001
1–6 positions X No	vs	7–12 positions X One	–31.14	4.40	–7.08	< .001
1–6 positions X No	vs	13–18 positions X One	–30.74	4.67	–6.59	< .001
1–6 positions X One	vs	7–12 positions X No	31.18	4.05	7.70	< .001
1–6 positions X One	vs	13–18 positions X No	31.72	4.16	7.63	< .001

It continues...

Table 2. Continuation.

Home team position X Top 3 teams			Difference	SE	t	*p-value*
1–6 positions X Two	vs	7–12 positions X No	43.52	7.63	5.70	< .001
1–6 positions X Two	vs	13–18 positions X No	44.06	7.67	5.74	< .001
7–12 positions X No	vs	7–12 positions X One	–32.48	3.90	–8.34	< .001
7–12 positions X No	vs	13–18 positions X One	–32.08	4.06	–7.89	< .001
7–12 positions X One	vs	13–18 positions X No	33.02	3.94	8.39	< .001
13–18 positions X No	vs	13–18 positions X One	–32.62	3.94	–8.28	< .001
Away team position X Top 3 teams			**Difference**	**SE**	**t**	***p-value***
1–6 positions X No	vs	1–6 positions X One	–31.01	3.77	–8.22	< .001
1–6 positions X No	vs	1–6 positions X Two	–44.98	7.86	–5.72	< .001
1–6 positions X No	vs	7–12 positions X One	–33.26	4.82	–6.91	< .001
1–6 positions X No	vs	13–18 positions X One	–35.34	5.19	–6.81	< .001
1–6 positions X One	vs	7–12 positions X No	31.63	3.61	8.77	< .001
1–6 positions X One	vs	13–18 positions X No	30.67	3.62	8.48	< .001
1–6 positions X Two	vs	7–12 positions X No	45.61	7.71	5.91	< .001
1–6 positions X Two	vs	13–18 positions X No	44.65	7.69	5.81	< .001
7–12 positions X No	vs	7–12 positions X One	–33.89	4.47	–7.58	< .001
7–12 positions X No	vs	13–18 positions X One	–35.96	4.83	–7.45	< .001
7–12 positions X One	vs	13–18 positions X No	32.93	4.47	7.37	< .001
13–18 positions X No	vs	13–18 positions X One	–35.00	4.74	–7.38	< .001
Top 3 teams X Difference in table positions			**Difference**	**SE**	**t**	***p-value***
No X ≤ 3 positions	vs	One X ≤ 3 positions	–21.97	4.12	–5.33	< .001
No X ≤ 3 positions	vs	One X 4–10 positions	–31.38	3.75	–8.36	< .001
No X ≤ 3 positions	vs	One X ≥ 11 positions	–31.68	3.84	–8.25	< .001
No X ≤ 3 positions	vs	Two X ≤ 3 positions	–40.99	7.71	–5.32	< .001
No X ≤ 3 positions	vs	Two X 4–10 positions	–50.78	15.06	–3.37	0.018
No X 4–10 positions	vs	One X ≤ 3 positions	–25.73	4.05	–6.34	< .001
No X 4–10 positions	vs	One X 4–10 positions	–35.14	3.69	–9.51	< .001
No X 4–10 positions	vs	One X ≥ 11 positions	–35.44	3.79	–9.36	< .001
No X 4–10 positions	vs	Two X ≤ 3 positions	–44.75	7.67	–5.83	< .001
No X 4–10 positions	vs	Two X 4–10 positions	–54.54	15.04	–3.63	0.008
No X ≥ 11 positions	vs	One X ≤ 3 positions	–24.01	4.32	–5.56	< .001
No X ≥ 11 positions	vs	One X 4–10 positions	–33.42	4.05	–8.26	< .001
No X ≥ 11 positions	vs	One X ≥ 11 positions	–33.72	4.11	–8.20	< .001
No X ≥ 11 positions	vs	Two X ≤ 3 positions	–43.03	7.84	–5.49	< .001
No X ≥ 11 positions	vs	Two X 4–10 positions	–52.82	15.13	–3.49	0.012
One X ≤ 3 positions	vs	One X 4–10 positions	–9.42	2.90	–3.24	0.027
One X ≤ 3 positions	vs	One X ≥ 11 positions	–9.71	3.04	–3.20	0.031
One X ≤ 3 positions	vs	Two X ≤ 3 positions	–19.02	5.78	–3.29	0.026

SE: standard error. Statistical significance set at p < .05

interactions beyond alternating the presence or absence of these teams (i.e., comparing different kick-off times, day of the week, table positions and differences in positions, while maintaining the number of top 3 teams). When one of the top 3 teams was playing, we found that matches between 16h and 20h had higher attendances in comparison with matches played after 20h (difference: 6.78, p = .045). However, we should highlight that > 60% of those matches were played after

Table 3. Marginal and conditional R^2 for each model with statistically significant results.

Variables and Interactions	Marginal R^2	Conditional R^2
Kick-off time	0.01	0.75
Top 3 teams	0.35	0.72
Kick-off time X Away team position	0.01	0.76
Kick-off time X Top 3 teams	0.35	0.73
Kick-off time X Difference in table positions	0.01	0.75
Day of the match X Top 3 teams	0.35	0.72
Day of the match X Difference in table positions	0.02	0.74
Home team position X Top 3 teams	0.34	0.72
Away team position X Top 3 teams	0.36	0.73
Top 3 teams X Difference in table positions	0.36	0.73

20h. Considering that anticipating the kick-off time during Europa League matches increased the stadium attendance (Krumer, 2020) we can conclude that fans prefer to watch top teams in the afternoon rather than at night. However, previous research has reported no significant differences in attendance across weekend kick-off times, with Sunday night matches being the main exception, likely due to their proximity to the following workday (Addesa & Bond, 2021).

Additionally, when one of the top 3 teams was playing, higher attendances were observed when teams were separated by 4–10 positions (difference: 9.42, p = .027) and ≥ 11 positions (difference: 9.71, p = .031) compared with matches when teams were separated by ≤ 3 positions. Higher attendances were reported for two of the top 3 teams than for only one of those teams when teams were separated by ≤ 3 positions (difference: 19.02, p = .026). At first, this may seem like conflicting results, but it correlates with previous research that found attendances increased when the match included teams competing for the league title (Pawlowski & Nalbantis, 2015) and when fans of low-rank teams can watch high quality players (Addesa & Bond, 2021). These findings also highlight the importance of considering the impact of interactions between variables rather than limiting the analysis to a specific variable. For instance, while the level of table differentiation between teams had a non-significant impact on attendance when considered independently, significant differences emerged when another variable (i.e., the presence of the top 3 teams) was added to the analysis.

Aside from the presence or absence of the top 3 teams, we also found statistically significant differences across kick-off times, with matches starting > 20h showing higher attendances than those starting < 16h (difference: 5.13, p = .003). However, this was most likely due to the participation of top teams, since > 60% of matches involving one or two of the top 3 teams were played after 20h. This was also seen when assessing interactions between kick-off time and other variables. Specifically, when the away team was placed within the 1–6 positions, matches had higher attendances when starting < 16h in comparison with matches that started > 20h (difference: 10.63, p = .026). The difference between the teams' table positions also showed differences, with matches between teams separated by ≥ 11 positions showing higher attendances if starting < 16h (difference: 10.83, p = .041) or between 16 h and 20 h (difference: 8.66, p = .049) than when starting > 20h. Moreover, matches starting < 16h with teams separated by ≤ 3 positions showed higher attendances than matches starting > 20h with teams separated by ≥ 11 positions (difference: 7.86, p = .043). Considering that Portuguese fans identified the kick-off time as one of the most important reasons (32.7%) for not attending stadiums (Monteiro & Mourão, 2024), the competition organizers could experiment with earlier schedules to improve overall attendance in their league.

The day of the match also impacted stadium attendance, when accounting for the difference in the table position, with matches played on Saturday between teams separated by ≥ 11 positions showing higher attendance than matches played between teams separated by 4-10 positions on Mondays (difference: 11.08, p = .045), Friday (difference: 12.06, p = .007), and Saturday (difference: 8.47, p = .042), and matches played between teams separated by ≤ 3 positions on Sundays (difference: 9.37, p = .026). In this matter, we should merge different information to provide a possible justification for these results. First, previous research has reported that moving Sunday matches to Saturday increased attendance by 5% (Ermakov & Krumer, 2023). First, we should consider that work and school days – Monday to Friday for most – can reduce the likelihood that some fans will attend matches. Secondly, the preferred early kick-off times are limited to weekends (i.e., playing during work and school schedules would inherently limit the stadium attendance). Thirdly, the preference for matches between teams separated by ≥ 11 positions increases the chances of one of those teams being a top 3 team (the Portuguese first division has 18 teams), which could impact this comparison between days of the week. Nevertheless, we should take into account that Saturdays, unlike Sundays, are not followed by a working day, which can impact the stadium attendance if the match is expected to end late at night. This was evident in Alonso and O'Shea's (2013) study, where respondents highlighted that late matches would delay their child's bedtime.

Finally, it was clear that the presence of top teams explained most of the variance in stadium attendance (Table 3), although

other variables and interactions were shown to be important considerations when scheduling matches. Considering the findings previously reported, several measures can be taken to potentially increase stadium attendance. Specifically, attention is needed for matches without one of the top 3 teams, for which afternoon scheduling could be advantageous. Similarly, matches on Saturday could increase stadium attendance, although that may depend more on the difference in the competing teams' table positions. While the presence of the top 3 teams was clearly decisive, one should consider how to motivate fans to return for the following matches. To achieve this, a previous study recommended focusing on excitement, performance, and esteem by creating strategies such as organising events with players and fans or providing the most loyal fans with access to specific areas of the stadium (Funk et al., 2009).

Although this study focuses on the Portuguese first tier, it supports previous findings and strengthens current knowledge on this topic. Additionally, stadium attendance is not exclusive to football, and general considerations are provided. Moreover, we provide a multifactorial analysis that shows novel findings, including interactions among variables. This highlights the importance of assessing interactions between different variables, moving beyond previous approaches that consider one variable per analysis. The subject of stadium attendance is complex, but it can have an important and positive effect on communities (Yoshida et al., 2015) .

From a practical standpoint, competition organizers and clubs may benefit from adopting a multifactorial scheduling strategy that considers both team-related and contextual variables to optimise attendance, thereby identifying effective strategies beyond structural characteristics of the competition, such as the presence of top teams or rivalries. However, this study is subject to some limitations. Although a multifactorial approach was adopted, other potentially relevant variables – such as ticket prices, weather conditions, team form, or promotional activities – were not included due to data availability. In addition, attendance was analysed using aggregated match-level data, which does not allow for the examination of individual fan motivations or heterogeneity in attendance behaviour. Future research could incorporate additional contextual and fan-level factors.

CONCLUSIONS

We found that the presence of one of the top 3 teams had the most impact on stadium attendance. Reflecting on the importance of team identification, these results demonstrate that Portuguese fans mostly identify with the top three teams. If one of those teams was playing, more fans attended the stadium, regardless of other variables. This finding suggests that organisers should focus solely on these teams' calendars, disregarding other variables. However, we found that the stadium attendance is multifactorial, with different variables playing important roles. For instance, while matches > 20h had higher attendance, nearly 60% of matches with the top 3 teams occurred > 20h, thereby contributing – although not as an isolated factor – to the prevalence of this kick-off time. Our findings also highlight that anticipating the kick-off time to < 16h may benefit overall attendance, similar to Saturday matches between teams separated by ≥ 11 positions. Regarding the uncertainty of the outcome, it appears that fans prefer competitiveness when the match is between title contenders; otherwise, they prefer matches where the difference between the teams is greater. Previous studies have provided important information to clubs to help them increase their stadium attendance. While clubs may have less autonomy over the calendar or the quality of opposition, they can anticipate attendance by considering several variables. Our study highlights that analysing stadium attendance in sports events should be conducted with a multi-factorial approach, providing a more nuanced perspective than traditional approaches that consider variables independently. According to our findings, clubs can develop strategies for specific constraints, such as the day of the match, kick-off time, and opposition, to overcome challenges to increasing stadium attendance.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Hugo Silva – Conceptualization; Methodology; Data Analysis; Writing - original draft, review & editing.Ibai Errekagorri – Conceptualization; Methodology; Data Analysis; Writing - original draft; review & editing.Vitor Sobral – Conceptualization; Methodology; Data Analysis; Writing - original draft; review & editing.

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