

Article

Notational Analysis on Goal Scoring and Comparison in Two of the Most Important Soccer Leagues: Spanish *La Liga* and English Premier League

Vítor Gouveia ^{1,2,*}, João Pedro Duarte ¹, António Nóbrega ¹, Hugo Sarmento ¹, Eduardo Pimenta ², Flávio Domingos ^{2,3}, Diogo Monteiro ^{2,3}, Rui Matos ^{2,3}, Nuno Amaro ^{2,3} and Inês Araújo ^{1,4}

¹ University of Coimbra, Research Unit for Sport and Physical Activity (CIDAF), Faculty of Sport Sciences and Physical Education, University of Coimbra, 3040-256 Coimbra, Portugal; joaopedromarquesduarte@gmail.com (J.P.D.); antonionan7@gmail.com (A.N.); hugo.sarmento@uc.pt (H.S.); ines@estesc.ipc.pt (I.A.)

² ESECS—Polytechnic of Leiria Rua General Norton de Matos, Apartado 4133, 2411-901 Leiria, Portugal; eduardo.pymenta@gmail.com (E.P.); flavio_domingos_19@hotmail.com (F.D.); raul.antunes@ipleiria.pt (R.A.); diogo.monteiro@ipleiria.pt (D.M.); rui.matos@ipleiria.pt (R.M.); nuno.amaro@ipleiria.pt (N.A.)

³ Life Quality Research Center (CIEQV), 2411-901 Leiria, Portugal

⁴ Department of Audiology, Physiotherapy and Environmental Health, Polytechnic Institute of Coimbra, ESTeS—Coimbra Health School, 3045-093 Coimbra, Portugal

* Correspondence: vitor.gouveia@ipleiria.pt

Abstract: Goals scored are the most important performance indicator and may be a good tool to analyze game style predominance within different leagues. The aims of this study are to describe how goals are scored in the two major soccer leagues in the season of 2020/21, and to compare both leagues to watch possible differences in the offensive sequences that lead to goal-scoring. The aims of this study were: to evaluate goal scoring trends among two main soccer leagues and to compare the two leagues. A total of 1409 goals were observed using notational analysis. The total results show a dominance of positional play/fast attack ($n = 38\%$), followed by set pieces as the second means to score ($n = 32\%$) with corner kicks having a great impact ($n = 36\%$) within set pieces goals. The most goals were scored by short possessions ($n = 50\%$) with short passes number ($n = 57\%$), with the recovery of the ball in the offensive third ($n = 47\%$) and the huge dominance of finalization in central areas inside the box ($n = 78\%$). Spanish *La Liga* scored more by positional play/fast attack, with most of the possessions starting in the medium third and using more the “central wing goal area” and “between wings left in the box” end zones when compared with English Premier League. The latter has more goals from counterattacks and corner kicks with very long possessions. Most of the possessions start in the offensive third and more goals are scored in “central wing between penalty and goal area” in comparison with Spanish *La Liga*. Coaches must be aware of the trends of the game and of the differences across leagues to prepare themselves when working in different countries to each specific characteristic.

Keywords: goal scoring; offensive patterns; cultural specificity



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1. Introduction

Teams are often referred to by their game style, which is the common term used broadly to refer to the patterns of play in team sports [1], and teams present specific tactical characteristics that highlight the differences between game model and game style [2,3]. Some teams prefer a more direct play with long passes, and others may choose a closer pattern of play [4], may adopt an offensive playing style characterized by exploiting the other teams' imbalances like happens in counterattacks [5] or a team may opt to have a more penetrative behavior after winning the ball [2]. These different options within the game style can be reflected in the main game characteristics of several leagues across

the world and have been widely investigated over the last years with a focus on several variables related to performance [6–9]. Mitrotasios et al. [10] analyzed the creation of scoring opportunities across four professional leagues in Europe and found differences between all the selected variables, reinforcing and substantiating the idea of each country having a proper identity. There is a tendency to stereotype the leagues; for instance, Spanish *La Liga* (SLL) is related to ball possession and high technical performance, while English Premier League (EPL), by direct play and tough marking [11], and in the Italian *Serie A*, the defensive pattern is predominant. Several factors can contribute to the observed differences being culture, historical background and climate. Some of these factors can explain why soccer is played differently [9] even with the interchange of players, coaches, and other soccer agents between countries [12].

One of the main objectives of soccer coaches is to prepare teams to disorder the defensive team, with making a goal the most determinant action of success [13]. Due to its importance, over the years, several studies were made trying to analyze the goals from different perspectives, and to do it, some selected variables and approaches were followed: analyzing the goals scored across several competitions [14–16] trying to foresee trends of the match; passing sequences [10,13], goal-scoring [13–16], type of defense [13,15], length of passes [15,17], start of the possession [15], frequency of goal-scoring [17,18], characteristics of the last pass [13,17], and shooting conditions [13,19]. Tenga and Sigmundstad [5] compared the goals scored in the Norwegian League among the top, middle and bottom teams according to their final classification in the table. These authors analyzed ten variables based on four possession characteristics and found significative differences in counterattack possessions, shorter passing sequences (0–4 passes), on the duration of the possessions (≥ 12 s), and in possessions starting in the middle third of the pitch ($p < 0.05$), showing the influence of league table in these variables. These findings show that different level teams score differently, and have different identities. Analyzing goal-scoring may not be the best tool, with others being more practical to analyze and providing further information, but it can be an effective tool to understand scoring trends, and consequently, offensive game style in different contexts.

From this perspective, it is crucial to investigate differences between competitive realities, understand them and classify the playing style using evidence-based approaches. In this domain, observational methodology has been widely used by researchers and coaches in recent years to have an in-depth knowledge of performance analysis in soccer [20–24]. At the same time, it allows us to understand the complex relations of the game of a more objective manner [25] and at the same time to surpass the limitations of traditional methodologies and focus on the action of the game with resource to this methodology [26–28]. Since the goal is the most reliable key performance in soccer [9], it is an apparent reflex of how the game is played, and it is fundamental to know its characteristics. Unfortunately, to our knowledge there is a lack of research about goal-scoring in different leagues, aiming to confirm or not commonsense conclusions. Therefore, the aims of this study are: (1) in the first place, to describe how goals are scored in the two major soccer leagues (UEFA ranking for country coefficient 2016/17–2020/21) in the season of 2020/21, and (2) secondly, to compare both leagues by watching possible differences in the offensive sequences that lead to goal-scoring.

2. Materials and Methods

2.1. Match Sample

The sample of the current study is composed of a total of 1409 goals corresponding to 546 matches scored in the 2020/21 season in the Premier League (England) and *La Liga* (Spain). A convenience sample was used comprising 705 goals from the EPL (261 matches) and 704 from SLL (285 matches). The goals were analyzed using the Wyscout® (Hudl, Chiavari, Italy) database which allowed the authors to go to the beginning of the action that started the offensive sequence that ended in a goal. The Local University ethics committee granted approval for the study (L11803).

2.2. Measures and Procedures

The data were collected with a spreadsheet created in Microsoft Office Excel (Version 16.5, Microsoft Corporation, Redmond, Washington, DC, USA). We used a notational analysis tool which was built by a panel of three UEFA PRO soccer coaches and with reference to the literature in some performance indicators regarding the analysis of 1409 goals scored in EPL and SLL. Each criterion was discussed to define avoiding grey areas of interpretation when using this tool. The descriptors were discussed and then defined, making it more understandable to avoid the interference of the interpretation when analyzing the data and reflecting the main offensive concerns coaches can consider when facing these set pieces (Table 1).

The analysis of the goal-scoring offensive sequences were selected according to five variables: (1) “offensive pattern”—this one includes the main characteristics of the attack that ended in goal (positional play/direct attack, counterattack, direct and indirect free kick, corner kicks, throw-in, penalty kick and own goal); (2) “ball possession length” was one of the variables adapted from [15] and classifies the ball possession according to the time (short, medium, long and very long); (3) “ball possession type”—was adapted from [20], takes into account the number of passes performed in each possession (short, medium and long); (4) “beginning of the possession”—also from [15]—the pitch is divided into 3 sectors (thirds) and the start of the possession is recorded; and (5) “Finalization zone [29]”—the pitch is divided in eleven zones in which the finalization is observed: OB—out of the box, CWCGA—central wing goal area, CWGAP—central wing between goal area and penalty, CWPGA—central wing between penalty and goal area, BWRB—between wings right bottom, BWLB—between wings left bottom, BWRIB—between wings right in the box, BWLIB—between wings left in the box, RW—right wing and LW—left wing.

Each goal was analyzed from the beginning of the possession according to the above-mentioned variables until the ball enters in the goal. In the goals scored from set pieces, the moment of the first touch on the ball at the start of that play was considered.

Table 1. Observation tool used in the present study.

Variable	Description
Offensive pattern	Positional play/fast attack: Aim’s progression without taking advantage of unbalances after the recovery of the ball which are created because of ball circulation, searching for rupture passes, ball conduction and/or dribbles with the other team organized (at least with 3 players behind the line of the ball).
	Counterattack: Starts with the recovery of the ball, followed by an immediate exploration of the disorganization of the defending team searching for the depth in the first 2 passes. Very fast progression from the ball recovery and finalization.
	Direct free kick: The goal is scored after a direct free kick, without the ball staying in the possession of the other team (excluding a rebound).
	Indirect free kick: The goal is scored as after an indirect free kick, without the ball staying in the possession of the other team (excluding a rebound).
	Corner kick: The goal is scored after a corner kick, without the ball staying in the possession of the other team (excluding a rebound).
	Throw-in: The goal is scored after a throw-in, without the ball staying in the possession of the other team (excluding a rebound).
	Penalty: The goal is scored after a penalty, without the ball staying in the possession of the other team.
Ball possession duration [15]	Short: Between 0 and 10 s. Medium: Between 10 and 20 s. Long: Between 20 and 45 s. Very long: more than 45 s.

Table 1. *Cont.*

Variable	Description
Ball possession type [30]	Short: The attacking team performs between 0 and 3 passes, without the opponent staying in possession of the ball (excluding a rebound). Medium: The attacking team performs between 4 and 6 passes, without the opponent staying in possession of the ball (excluding a rebound). Long: The attacking team performs more than 7 passes, without the opponent staying in possession of the ball (excluding a rebound).
Beginning of the possession [15]	Defensive third: The ball is recovered in the defensive third of the pitch. Medium third: The ball is recovered in the medium third of the pitch. Offensive third: The ball is recovered in the offensive third of the pitch.
Finalization zone [29]	Zone: The goal is scored in one of the zones OB, CWGA, CWGAP, CWPGA, BWRB, BWLB, BWRIB, BWLIB, RW and LW.

Abbreviations: OB (out of the box); CWCGA (central wing goal area); CWGAP (central wing between goal area and penalty); CWPGA (central wing between penalty and goal area); BWRB (between wings right bottom); BWLB (between wings left bottom); BWRIB (between wings right in the box); BWLIB (between wings left in the box); RW (right wing); and LW (left wing).

2.3. Finalization Zones

Defined to note were the last touch to score occurred (adapted from [29]). Abbreviations: OB (out of the box); CWCGA (central wing goal area); CWGAP (central wing between goal area and penalty); CWPGA (central wing between penalty and goal area); BWRB (between wings right bottom); BWLB (between wings left bottom); BWRIB (between wings right in the box); BWLIB (between wings left in the box); RW (right wing); and LW (left wing).

2.4. Reliability Testing

Data accuracy and reliability of the performance variables were obtained from two trained soccer specialists. First, two training sessions were considered to define variables and clarify doubts or misunderstandings. Then, both observers analyzed the same 140 goals to guarantee inter-observer reliability.

The technical error of measurement (TEM) was considered with resources to the equation proposed by Mueller and Martorell [31], the intraclass correlation (ICC) and the coefficient of variation (CV). The reliability data is presented in Table 2. The reliability values range from 0 to 1; ICC < 0 indicates “no reliability”, ICC ≥ 0 and <0.2 “light reliability”, from 0.2 to <0.4 “reasonable reliability”, from 0.4 to <0.6 “moderate reliability”, from 0.6 to <0.8 “substantial reliability”, and from 0.8 to <1 “almost perfect reliability” [32,33]. The CV, expressed as %CV, was a percentage of the mean, and generally CVs ≤ 5% indicate a good performance of the method, while CVs ≥ 10% do not [24].

Table 2. Data control and quality.

Variables	TEM	ICC	CV (%)
Offensive pattern	5.28	0.960	29.62
Ball possession length	0.71	0.997	2.03
Ball possession duration	2.35	0.989	5.04
Beginning of the possession	0.00	1.000	0.00

Abbreviations: TEM (technical error of measurement); ICC (intra-class correlation); CV (coefficient of variation).

2.5. Statistics

Independent samples *t*-test was used to perform between group comparisons. The magnitude of the effects was interpreted as follows: <0.20 (trivial); 0.20 to 0.59 (small); 0.60 to 1.19 (moderate); 1.20 to 1.99 (large); 2.00 to 3.99 (very large); ≥4.00 (extremely large). The level of significance was established as $p < 0.05$. All analyses were performed using the

statistical software Statistical Package for the Social Sciences, Version 26 (SPSS Inc., IBM Company, Armonk, NY, USA).

3. Results

Data comparison between the goals scored in the two leagues are presented in Table 3. The data analysis shows that positional play is dominant in the goals scored in the SLL (0.46 vs. 0.31; $p = 0.001$). Counterattack goals are significantly more frequent in the EPL (0.22 vs. 0.34; $p = 0.001$) and the same was verified for corner kicks (0.10 ± 0.13 ; $p = 0.041$).

Table 3. Means comparison between the two leagues: SLL and EPL.

Variables	Competition		Mean Differences	Student's <i>t</i> -Test		Magnitude Effects	
	SLL	EPL		<i>t</i>	<i>p</i>	<i>d</i>	(Qualitative)
Offensive pattern							
Positional play/fast attack	0.46	0.31	−0.15	5.659	<0.001 **	0.30	(small)
Counterattack	0.22	0.34	0.12	−5.370	<0.001 **	0.27	(small)
Direct free kick	0.02	0.02	0.00	0.192	0.848	0.00	-
Indirect free kick	0.04	0.05	0.01	−0.262	0.793	0.05	(trivial)
Corner kick	0.10	0.13	0.03	−2.048	0.041 *	0.10	(trivial)
Throw-in	0.03	0.02	−0.01	1.334	0.183	0.06	(trivial)
Penalty	0.12	0.11	0.01	0.430	0.667	0.03	(trivial)
Self-goal	0.03	0.02	0.01	0.343	0.732	0.06	(trivial)
Ball possession duration							
Short (0–10 s)	0.51	0.49	−0.01	0.712	0.477	0.04	(trivial)
Medium (10–20 s)	0.26	0.29	0.03	−1.154	0.249	0.07	(trivial)
Long (20–45 s)	0.19	0.16	−0.03	1.780	0.075	0.08	(trivial)
Very long (>45 s)	0.03	0.06	0.03	−3.017	0.003 *	0.14	(trivial)
Ball possession type							
Short (1–3 passes)	0.58	0.56	−0.02	0.817	0.414	0.04	(trivial)
Medium (4–6 passes)	0.20	0.21	0.01	−0.662	0.508	0.02	(trivial)
Long (7 passes)	0.22	0.22	0.00	−0.317	0.752	0.00	-
Beginning of the possession							
Defensive third	0.21	0.25	0.04	−1.596	0.111	0.10	(trivial)
Medium third	0.36	0.25	−0.11	4.545	<0.001 **	0.24	(small)
Offensive third	0.43	0.50	0.07	−2.597	0.010 *	0.14	(trivial)
Finalization zones							
OB	0.11	0.12	0.01	−0.163	0.870	0.03	(trivial)

Abbreviations: OB (out of the box); CWGA (central wing goal area); CWGAP (central wing between goal area and penalty); CWPGA (central wing between penalty and goal area); BWRB (between wings right bottom); BWLB (between wings left bottom); BWRIB (between wings right in the box); BWLIB (between wings left in the box); RW (right wing) and LW (left wing). * Significance level: $p < 0.05$; ** Significance level: $p < 0.01$.

Ball possession length presents different outcomes, with the goals from EPL having significantly more goals scored after very long ball possessions (0.03 vs. 0.06; $p = 0.003$).

SLL had significantly more offensive sequences that ended in goal after the recovery of the ball in the medium third of the pitch (0.36 vs. 0.25; $p = 0.001$) and EPL had more starting in the offensive third (0.43 vs. 0.50; $p = 0.010$).

In finalization zones, some differences were also found between the two leagues, with SLL having significantly more goals in CWGAP (0.32 vs. 0.22; $p = 0.001$) and BWRIB (0.05 vs. 0.02; $p = 0.012$). In turn, EPL had more goals scored from CWPGA (0.22 vs. 0.34; $p = 0.001$).

4. Discussion

This study aimed to describe offensive sequences that resulted in goals from the two major club's domestic competitions and, simultaneously, compare both leagues in the same selected variable, targeting to understand the trends of the game and analyze possible differences. In our study, the positional play/fast attack was the most used means to

score (38%), followed by set pieces (30%), counterattack (28%), and self-goal (2%). The literature presents contradictory results; for example, the results of [34,35] agree with the present study in the major preponderance of positional play. However, [5,15,36] reported different results, with counterattack being the means to score more goals, especially against imbalanced defenses. This can be emphasized by an impact of interceptions and others (rebounds, deflections, flick-on from a contested header, etc.) higher than 56% in the total attempts and goals scored [16]. Recoveries of the ball seem to lead to a higher percentage of scoring opportunities than restarts or set plays [2] which may be an argument in favor of counterattack in the way it depends on the recovery of the ball and in a fast progression to take advantage of defensive imbalances of the other team.

The present study reports 32% of goals scored by set pieces in both leagues, which aligns with the relevant literature because these types of possessions are least frequent compared with positional attacks or counterattacks [13]. The present data reveal that corner kicks and penalties achieved the highest percentage of goals (both with 36%), followed by indirect free kicks (14%), throw-ins (8%), and free kicks (6%). Corner kicks seem to be reported consistently as one of the most productive set pieces in goal-scoring [3,4,34], and are a characteristic of contemporary soccer. In the present study, corner kick goals also unveil differences between the two leagues, with EPL presenting more goals than SLL ($p < 0.05$). Reference [37] report a similar trend, with the EPL being the most productive league regarding goals scored from corner kicks compared to the other “big-five leagues.” This can be due to the physical advantage EPL players seem to have [8,38] combined with the major capacity of EPL defenders to win air duels [6].

When comparing offensive patterns between leagues, [10] reported a higher percentage of combinative attacks in SLL than in other leagues (EPL included) in creating scoring opportunities. The same trend was found in our study, with SLL having more goals from positional play/fast play than EPL (46 % vs. 31%; $p < 0.001$). We also found differences in the counterattack, with an advantage for EPL (34% vs. 22%; $p > 0.001$). Reference [10] only reported differences between Bundesliga and the others, without differences between SLL and EPL. Physical attributes can affect the game style, or some championships may choose players with a particular profile to match the type of game played there. SLL seems to have players with more technical quality, and EPL has more athletic players, taller than in SLL [8,38], generally stronger physically [9,10], and that can be helpful in air duels. Reference [12] refuted this idea when comparing the “big-five leagues”, defending that no differences were found between players after analyzing their individual actions in Champions League matches. Goal-scoring will be specific to the team’s style of play and the technical profile of players [13]. However, when analyzing these results together, researchers must be aware of the terminology used, and caution must be taken when making comparisons of the results to avoid comparing different concepts; there is no consensus or missing information for some styles [39]. In addition, the offensive game style seems to be affected by the competition in which the data are collected, and researchers and coaches must be aware of that when making comparisons.

The current study results show a more significant percentage of goals scored with less than three passes in both leagues, which aligns with the literature [14,16,36]. This can be due to several reasons: more effective set pieces and counterattacks [4,13,40–42] with these patterns involving fewer touches on the ball; meager possessions are more common during a match [14] and it is expected that it also originates more goals [16]; shorter possessions resulting in goal seem to be a tendency of the match with quicker attacks being more effective in disrupting the opposite defense contrary to longer possessions that allow the defense to adjust and minimize surprise effects [14]. After normalizing the goals scored for 100 possessions, [16] concluded that shorter passing sequences (0–4 passes) were favorable to goal-scoring (9.52 goals for 100 possessions vs. 7.28 goals for longer sequences of 5–8 passes). In parallel, [2] studied the offensive patterns of FC Barcelona and Real Madrid, and both teams reported passing sequences of four or more passes as the most common, a fact they attribute to the superior quality of the players in comparison to most

of the teams, with higher passing sequences demanding more tactical and technical skills. Reference [15] concluded that long possessions (≥ 5 passes) were more effective than short possessions when facing an imbalanced defense, but not against a balanced one. Results of the present study did not show significant differences in the possession type before the goal, contrary to what could be expected due to the nature of the counterattack possessions requiring fast progression from start to end in a way that the defending teams fail to regain defensive balance [5]. Contrary to [5], no relation was found between counterattack, possession length, and possession type; for example, EPL showed a higher percentage of counterattacks than SLL, but possession length also showed superior values in “very long” possessions and no differences were found on possession type. This highlights the importance of having more variables that can complement the goals analysis (such as ball possession, success to the box, or the offensive third) and others that will affect ball possession (type of opposition). It also should be noted that the match status can affect passing sequences [43] and consequently affect the attacking game style.

The present study found differences between leagues in “possession duration” only in the “very long” category, with the EPL having more of these (45% vs. 21%; $p > 0.05$). This is somehow unexpected to the general beliefs [44] and different from the results of [10], which can be caused by several factors: different management of the possession according to the result, teams in EPL may allow more possession in some zones or circumstances. In addition, the quality of the opponent is a factor that influences the goal-scoring pattern, with more positional attacks being performed against theoretically inferior teams than superior ones [45].

Wright et al. [16] indicate a higher percentage of goals scored in EPL started in the offensive midfield (62%), while [46] reported 60% in SLL. In the current study, we divided the pitch into three-thirds, but the results for EPL and SLL seem clear and in line with [16]. In references [5,15], both studies concluded that the possessions starting in the final third of the pitch were more effective in goal-scoring and entering in the score box and in contrast, possessions starting in the first third are less effective. The results of [35] confirm the idea, with possessions starting in the offensive third having significantly fewer passes than in the other thirds of the pitch. Furthermore, starting possession closer to the opponent’s goal can make it easier to penetrate in shooting zones [2,41]. In this line, [16] state that teams should apply pressure within the defensive third of the opposition territory [39] to force turnovers of possession and create more goal-scoring opportunities. This shows the importance of the articulation between offensive and defensive methods, and coaches must be aware of that to implement and develop it in their training sessions. For instance, when pressuring the opponent on the offensive third, the consequent exploration of the recovery of the ball must be present, aiming to enter end zones as fast as possible.

The results regarding the comparison between the two leagues showed statistically significant differences in the beginning of the possession, with the SLL exhibiting more goals in the middle third (36% vs. 22%; $p < 0.001$) and the EPL in the offensive third (50% vs. 43%; $p > 0.05$). The results for EPL are in line with [10] in goal-scoring opportunities and for SLL the pattern is to start possession lower in the pitch. In both leagues, the percentage of initial pressure of the opponent is high. Significant differences were found in some scoring areas: CWGAP (advantage to SLL, 32% vs. 22%; $p < 0.001$), BWRIB (advantage to SLL, 5% vs. 2%; $p < 0.005$) and CWPGA (advantage to EPL, 34% vs. 22%; $p < 0.001$). Reference [2] reported differences between FC Barcelona and Real Madrid, with more finalizations near the goal to FC Barcelona, confirming a game style more based on combination play and combinative players, finishing the offensive sequences as near to the goal as possible. The trend of more goals scored inside the box and in the area corresponding to the “score pentagon” are in line with the literature [13,16,17,34] where it is possible to get an “open angle between the goal and the ball” [13].

Sarmiento et al. [9] interviewed professional soccer coaches, and they referred mainly to cultural factors as the source of differences between football leagues, stating that the cultural issues are related to politics, economy, fans, culture of sports leaders and historical

aspects specific to each nation. In a practical example, in the same study a coach stated that his job is to work for the fans, and they can directly influence the team's playing style. In addition, it should be considered that directors are fans and are influenced by the mentioned cultural aspects of the game. A coach states that in England there is no balance in the game they play, which can be an explanation for the high number of counterattacks in the present study. Spanish attacking style is considered more constructed, more elaborate. Even in the present study, positional play and fast attack are included in the same category which can generate some misinterpretation of data when making comparisons, but the main idea is to differentiate those from counterattack that consist of the immediate exploration of ball recovery to take advantage of other team imbalances [23]. It is important that coaches can adjust training methodologies when working or going to work in a different national league [1] and to prepare themselves strategically to the game played.

5. Conclusions

The results of the present study make clear the importance of short possessions (both in duration and in the number of passes) in goal-scoring in contemporary soccer, which can be related to the impact of set pieces, counterattack and the way teams can pressure their opponents in higher areas of the pitch. Positional play/fast attack represent the most used offensive methods.

Coaches must be aware and work to articulate the defensive behaviors with offensive ones on their game styles. If a team pressures high in the pitch, it is beneficial to find solutions to counterattack when getting the ball near the other team's goal. At the same time, coaches can have a preferred offensive game style, but they must prepare their teams to deal with different opponents that represent different difficulties, and a team will be more effective when attacking if it can be sharp adapting to the other team game style having several variations of the attack to surpass the opposition. Regarding finalization zones, it is interesting that the most important spaces when a team defends are the ones that teams used more to score (central areas within the box) which can be an indicator that teams are using more creative ways to enter in the box in good condition to score to overcome well-organized defenses. Coaches must also prepare players from a technical and tactical perspective, to explore the available spaces and anticipate even more organized defenses with more players closing those vital areas.

The comparison between leagues showed that goals scored in SLL and EPL have some significant differences. This reinforces some commonsense ideas about the game played in different countries and the influence of the history which it is very interesting when considering the fluctuation of players, coaches, and even technical directors across countries. Coaches must be aware of the differences between leagues from different countries, preparing themselves when they are going to work with other leagues, knowing their characteristics regarding goal-scoring to prepare their teams for those specific realities and to understand the interpretation of the offensive game from the players, which can be helpful to make decisions about the game style.

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