



ANALYSIS OF THE TURKISH FOOTBALL SUPER LEAGUE OVER FIVE SEASONS FROM A TECHNICAL AND TACTICAL PERSPECTIVE*

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Abstract: The present study aims to analyze football matches in Turkish Super League from a technical, tactical and statistical perspective. It focuses on all matches played in 2015/2016-2016/2017-2017/2018-2018/2019 and 2019/2020 football seasons in Turkey. The data were obtained from MathBall, a football match analysis program, and official website of Turkish Football Federation. In each season, 306 football matches are played in Turkish Super League. Thus, a total of 1530 matches which were played in five consecutive seasons were analyzed. The data obtained from the study were analyzed using SPSS 22.0 package program based on mean values, frequency, standard deviation and percentages. Normality assumptions were analyzed to see whether the obtained data displayed a normal distribution, and one-way analysis of variance (ANOVA) was used for the comparison of three groups (football games resulting in wins, defeats and draws) in normally distributed data. On the other hand, Kruskal-Wallis H test, which is a non-parametric test, was used to analyze abnormally distributed data. There were also statistically significant differences between football teams who won, lost or drew in a match in terms of goals, shots, shots on target, blocked shots, tackling percentages, header percentages, ball steals, duration ball possession, ball possession percentage, playing with the ball in the midfield, passes in the attacking zone, playing with passing the ball to the rival's penalty box, unattended balls, fouls, yellow and red cards ($p<0,05$). In conclusion, it has been determined that the goal parameters, shot parameters and playing with the ball in the attack zone variables in the super league are very important for winning the matches.

Keywords: Football, match analysis, technical-tactical analysis, Turkish super league.

TÜRKİYE FUTBOL SÜPER LİGİ'NİN BEŞ SEZON BOYUNCA TEKNİK VE TAKTİK AÇIDAN ANALİZİ

Öz: Bu çalışma Türkiye futbol süper liginde oynanan maçları bazı teknik, taktik ve istatistiksel açıdan analiz etmek amacıyla yapılmıştır. Çalışmada süper ligde 2015/2016-2016/2017-2017/2018-2018/2019 ve 2019/2020 sezonlarında oynanan maçların (toplam 5 sezon) analizi yapılmıştır. Çalışmada elde edilen veriler MathBall maç analiz programından ve Türkiye futbol federasyonunun resmi web sayfasından elde edilmiştir. Süper ligde her sezon 306 maç oynanmış ve belirtilen toplam 5 sezonda 1530 maçın analizi yapılmıştır. Çalışmada elde edilen tüm veriler SPSS 22.0 paket programına kaydedilmiş olup, verilerin ortalama, frekans, standart sapma ve yüzde değerleri hesaplanarak değerlendirilmiştir. Verilerin normal dağılım gösterip göstermediğini tespit etmek için normallik varsayımları incelenmiş olup, normal dağılım gösteren verilerde galibiyet, mağlubiyet ve beraberlik ile sonuçlanan müsabakaların karşılaştırılmasında, tek yönlü varyans analizi (One way anova), normal dağılım göstermeyen verilerde ise, nonparametrik testlerden Kruskal-Wallis H testi uygulanmıştır. Süper ligde 5 sezonun ortalamasına bakıldığında, maçlardan galibiyet, mağlubiyet ve beraberlikle ayrılan takımlar arasında, gol, şut, isabetli şut, şut engelleme, ikili mücadele kazanma yüzdesi, hava topu kazanma yüzdesi, top kapma, topla oynama süresi, topla sahip olma yüzdesi, orta alanda topla oynama, hücum bölgesinde pas, rakip ceza alanında topla oynama, sahipsiz top, faul, sarı kart ve kırmızı kart parametreleri açısından istatistiksel olarak anlamlı farklılık tespit edilmiştir ($p<0,05$). Sonuç olarak, süper ligde gol parametreleri, şut parametreleri ve hücum bölgesinde topla oynama değişkenlerinin maçlardan galibiyet ile ayrılmak için oldukça önemli oldukları tespit edilmiştir.

Anahtar Kelimeler: Futbol, maç analizi, teknik-taktik analiz, Türkiye süper ligi.



* This study was derived from the doctoral thesis numbered 683506 and was presented as an oral presentation at the 19th International Sport Sciences Congress held in Antalya between November 11-14, 2021.

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INTRODUCTION

Hand notation (paper-and-pencil method analysis), and computer-video analysis, allows all the behaviors of the football player to be recorded accurately and objectively (Franks & Hughes, 2016). Computer-based match analysis has many advantages. With advanced software programs, direct data entry can be made, and statistical analyses can be evaluated (Pritchard, 2011). In addition to statistical records, visual analyses can also be performed (Mackenzie & Cushion, 2016). Moreover, with this method, all specific parameters that occur in matches, such as shots, goals, ball recoveries, can be analyzed, and feedback on these parameters can be provided to players in the form of tables (Hughes, 2003). Match analysis is widely used in many sports and provides coaches with objective feedback about performance (Carling et al., 2005). Additionally, through video and computer analysis, the strengths and weaknesses of a football player or team can be analyzed (Michailidis et al., 2013). Since 1910, with the emergence of more scientific communities and notational analysis, match analysis has become a more dominant topic in scientific literature with the international congresses held in this field (Sarmiento et al., 2014). In recent years, many football clubs have appointed match analysis specialists to their teams in order to achieve success in matches (Carling, 2016). With the “World Performance Analysis Congress,” match analysis has become much more important in scientific literature (Sarmiento et al., 2014).

One of the methods of match analysis, tactical analysis, allows the analysis of players' movements and the team's strategies in depth. With this method, all the parameters that occur during the match (pass, shot, cross, goal, ball recovery, ball loss, foul, offside, dribbling with and without the ball) can be presented to coaches either in video format or statistically (Setterwall, 2003). Tactics are one of the key factors for success in modern football. Due to the lack of necessary data, team tactics have been minimally researched up to now, but this situation has changed recently with advanced tracking systems and video analysis (Rein & Memmert, 2016). Effective strategy and tactics are some of the fundamental ways to success (Carling et al., 2005). Together with technical, tactical, and physical conditioning aspects, these are some of the most important factors affecting success. A football player without sufficient conditioning cannot use technical behaviors effectively, and similarly, a player with insufficient technical skills cannot perform tactical duties properly (Aksoy, 2008). In football, technical parameters are used to identify success and failure rates in matches and to establish the relationship between match results and technical elements (Göral, 2015a).

Technical analysis involves the quantitative examination of individual and collective skills such as passing, shooting, ball control, and ball winning in football; tactical analysis, on the other hand, refers to the evaluation of these technical behaviours in the context of on-field organisation, space utilisation, and game strategies.

Numerous studies in the literature examine the technical and tactical characteristics of teams competing in different leagues. Research conducted in the English Premier League has revealed that winning teams have an advantage over their opponents, particularly in terms of the number of accurate shots, the number of passes in the attacking third, and ball possession in the penalty area (Allen & Jones, 2014). Studies on Spain's La Liga and Germany's Bundesliga indicate that successful teams stand out with a higher ball possession rate and effective passing organisation in the attacking zone (Yue et al., 2014; Brito de Souza et al., 2019). Analyses conducted within the Chinese Super League reported that winning teams showed statistically significant differences, particularly in terms of shooting efficiency, number of entries into the penalty area, and percentage of duels won (Zhou et al., 2018).

These findings reveal that technical and tactical performance indicators, while varying across leagues, are among the key variables determining match outcomes.

In football, many factors can affect the outcome of a match. One of these factors is the home advantage (Boyko et al., 2007; Lago-Peñas & Lago-Ballesteros, 2011). The home advantage can also be defined as the belief that more than 50% of the matches will end in favor of the home team (Courneya & Carron, 1992). In particular, the home advantage in football is widely accepted as a phenomenon (Page & Page, 2007). In all professional team sports, teams playing at home have an advantage (Pollard, 1986). Coaches and managers can use information about the opponent's home performance to identify strategies that could eliminate the negative effects of playing away (Legaz-Arrese et al., 2013).

It is known that home advantage, technical, tactical, and goal analyses directly affect match outcomes. In many leagues and tournaments, teams playing at home have an advantage (Allen & Jones, 2014; Armatas & Pollard, 2012; Garcia et al., 2013; Göral, 2015b; Gürkan et al., 2018; Işıkdemir, 2020; Inan, 2018; Liu et al., 2019; Peeters & Ours, 2021; Pollard & Gomez, 2014). It has also been concluded that the most goals are scored between the 76th-90th minutes, in the second half of the matches, and with the feet (Bilgin et al., 2020; Doğan et al., 2004; Dinnie, 2015; Göral & Saygın, 2012; Leite, 2015; Njororai, 2013). Furthermore, it has been found that teams that win matches are superior in many statistical, technical, and tactical parameters compared to their opponents (Castellano et al., 2012; Ertetik & Müniroğlu, 2021; Kite & Nevill, 2017; Kubayi & Toriola, 2020; Yang et al., 2018; Zhou et al., 2018).

Match performance analysis in football is widely recognized as a fundamental scientific approach that supports decision-making processes for coaches and performance analysts. Numerous studies in the literature have examined the effects of technical and tactical variables such as shots, passes, ball possession, and goal-related parameters on match outcomes across different leagues and competitions. However, a substantial proportion of these studies have focused on single seasons, a limited number of performance indicators, or narrowly examined match outcomes without adopting a comprehensive analytical framework. In the context of the Turkish Super League, long-term studies that evaluate technical, tactical, and statistical performance indicators across multiple seasons using a holistic approach remain relatively scarce.

In this respect, the present study aims to address an important gap in the literature by analyzing all matches played in the Turkish Super League over five consecutive seasons and by examining home advantage, goal timing and types, together with a wide range of technical and tactical performance parameters in a comparative manner. The originality of the study lies in its multidimensional evaluation of matches resulting in wins, draws, and losses, rather than focusing solely on match outcomes. By identifying the relative importance of various performance indicators in determining match success, the findings of this study are expected to contribute to a deeper understanding of the structural characteristics of the Turkish Super League and to provide evidence-based insights for coaches and performance analysts.

Based on all these, this study aims to analyze the matches played in the Turkish Super League in terms of home advantage, technical and tactical aspects. The analysis includes variables such as the home advantage in football, goal types, goal counts according to time periods, and the effect of the first goal on the match result. Moreover, various parameters have been evaluated in the comparison of matches that result in victories, losses, and draws.

In this study, the following hypotheses were tested in order to identify the technical and tactical performance indicators affecting match outcomes in the Turkish Super League:

H1: Home teams in the Turkish Super League have a statistically significantly higher probability of winning compared to away teams.

H2: Teams scoring the first goal in a match have a statistically significantly higher likelihood of winning than teams conceding the first goal.

H3: Matches resulting in wins are characterized by significantly higher numbers of total shots, shots on target, and shots taken from inside the penalty area compared to matches ending in draws or losses.

H4: Winning teams exhibit significantly higher ball possession and passing frequency in the attacking third and opponent's penalty area than losing or drawing teams.

H5: Overall ball possession percentage and total number of passes have a limited effect on determining match outcomes.

MATERIALS and METHODS

Research Model

In this study, an observation-based research design was employed. Prior to data collection, relevant studies in the field of football match analysis were reviewed and the theoretical background of the study was established. Match data were obtained using the MathBall match analysis software, which is widely used for objective technical and tactical performance analysis in football.

All matches were analyzed retrospectively using official match records and video-based data provided by the software. The analyses were conducted by one experienced performance analyst, who holds formal education in sports sciences and football match analysis and has prior experience in professional match analysis studies. To ensure consistency and reliability, all matches were analyzed by the same analyst using standardized analysis criteria defined by the software.

The use of closed-access data was approved by the Algorithm Information Technology Industry and Trade Limited Company, and official permission was obtained on March 16, 2020. The analysis process was completed retrospectively, and each match was evaluated separately for both teams, resulting in two team-based performance records per match. Thus, a total of 3060 team performances were analyzed across five seasons.

Universe and Sample

The universe of this study consisted of all matches played in the Turkish Super League during the 2015/2016, 2016/2017, 2017/2018, 2018/2019, and 2019/2020 seasons. In each season, 18 professional teams competed, and 306 matches were played. Since the study included all matches played during the specified five seasons, the entire population was analyzed. Therefore, no sampling method was applied. In total, 1530 matches involving 27 different teams were included in the analysis.

Ethics of the Research

Ethical approval for the study was obtained from the Health Sciences Sub-Ethics Committee of Ankara University, with the approval number 60, dated 11/02/2020, and meeting number 04.

Data Collection

The data was analyzed using the MathBall soccer match analysis program. The analyzed data was obtained from the Algorithm Information Technology Industry and Trade Limited Company after the necessary permissions were obtained on March 16, 2020, and the data was then analyzed and interpreted. To collect data on goal types and home advantage, publicly available data from the official website of the Turkish Football Federation (TFF, 2021) was used on February 20, 2021, with appropriate citation permitting the use of the information. The data obtained was presented in tables and graphs, and the results were interpreted.

Analyzed Parameters

Home Advantage, Goals Scored According to Time Periods, Goals Scored According to Types, Effect of the First Goal on Match Outcome, Goals, Shots, On-target Shots, Shot Blocks, Shots from Outside the Box, Shots from Inside the Box, Shot Accuracy Percentage (%), Passes Before Shots, Winning Duels (%), Winning Aerial Duels (%), Corners, Ball Recoveries, Ball Recovery Success (%), Clearances, Time Spent on the Ball, Total Passes, Possession (%), Ball Possessions, Midfield Ball Possessions, Interceptions, Attacking Zone Ball Possessions, Passes to the Offensive Zone, In the Offensive Zone Number of Passes, Long Passes into the Attacking Zone, Dribbles into the Attacking Zone, Balls Played into the Opponent's Penalty Area, Ball Possessions in the Opponent's Penalty Area, Dribbles into the Opponent's Penalty Area, Crosses into the Opponent's Penalty Area, Loose Balls, Offside, Fouls, Yellow Cards, Red Cards

Data Analysis

All data obtained in the study were recorded in the SPSS 22.0 software, and descriptive statistics such as mean, standard deviation, frequency, and percentage values were calculated. The home advantage variable was formulated as $(\text{points won at home} \times 100) / (\text{points won at home} + \text{points won away})$ (Pollard, 2006; Pollard & Gomez, 2009). Descriptive statistics were used for goal parameters and position analysis. To determine whether the data followed a normal distribution, normality assumptions were checked. For data that followed a normal distribution, one-way analysis of variance (One-Way ANOVA) was applied to compare the three groups (Matches resulting in victory, loss, and draw). For data that did not follow a normal distribution, the non-parametric Kruskal-Wallis H test was used. In the ANOVA test, when a significant difference was found between the groups, post-hoc tests were performed to determine which group the difference originated from. According to the results of the Levene's test, for data with homogeneous distribution, the LSD test was applied, and for data without homogeneous distribution, the Tamhane's T2 test was used. In the Kruskal-Wallis H test, if a significant difference was found, the Tamhane's T2 test was used to identify which groups contributed to the difference. The results were presented in tables and graphs, and the interpretations of the findings were made.

Limitations of the Study

This study has several limitations that should be acknowledged. First, the analysis was limited to matches played in the Turkish Super League between the 2015/2016 and 2019/2020 seasons. Therefore, the findings should be interpreted within the context of the analyzed period and league structure, and generalization to other leagues, seasons, or competition formats may be limited.

Second, the data were obtained from the MathBall match analysis software and official match records. Although such systems provide objective and reliable information, the analyses were restricted to predefined technical and tactical performance indicators. Positional tracking data,

physical performance variables, and GPS-based metrics were not included in the present study.

In addition, the analyses were conducted at the team level, and individual player performances and position-specific characteristics were not examined in detail. Furthermore, contextual variables such as match importance, team quality, league standings, quality of opposition, and environmental conditions were not directly incorporated into the analytical model. This may have limited the explanatory power of certain performance indicators in relation to match outcomes.

Finally, due to the observational and retrospective nature of the study, the findings should be interpreted as associative rather than causal relationships.

FINDINGS

The findings obtained in this section are presented below in the form of tables and graphs.

Table 1. The home and away win, loss, and draw records of teams in the Turkish Super League by season, along with the averages of home-field advantage.

Season	Number of matches	Win		Defeat		Draw		Home Advantage
		Home	Away	Home	Away	Home	Away	
2019/2020	306	134	90	90	134	82	82	57,89%
2018/2019	306	137	80	80	137	89	89	60,31%
2017/2018	306	153	84	84	153	69	69	62,19%
2016/2017	306	138	101	101	138	67	67	56,52%
2015/2016	306	144	84	84	144	78	78	60,71%
All Seasons	1530	706	439	439	706	385	385	59,52%

In the Turkish Super League, the average home advantage can range from 56,52% to 62,19%, and it can be said that the average home advantage in the league has remained above 50% throughout all seasons. Furthermore, it can be said that the probability of home teams losing matches in the specified seasons is quite low.

Table 2. The numerical and percentage distribution of teams in the super league terms of winning, losing, and drawing matches at home.

Season	Number of matches	Win (Home)	Defeat (Home)	Draw (Home)
2019/2020	306	134 (43,79%)	90 (29,41%)	82 (26,80%)
2018/2019	306	137 (44,77%)	80 (26,14%)	89 (29,09%)
2017/2018	306	153 (50%)	84 (27,45%)	69 (22,55%)
2016/2017	306	138 (45,10%)	101 (33,01%)	67 (21,89%)
2015/2016	306	144 (47,06%)	84 (27,45%)	78 (25,49%)
All Seasons	1530	706 (46,15%)	439 (28,69%)	385 (25,16%)

In the specified seasons and in the overall averages of all seasons of the Super League, it can be said that teams can achieve more wins and a higher win percentage in the matches they host. From another perspective, it can be said that the loss rates of teams hosting matches in the Super League may be significantly lower.

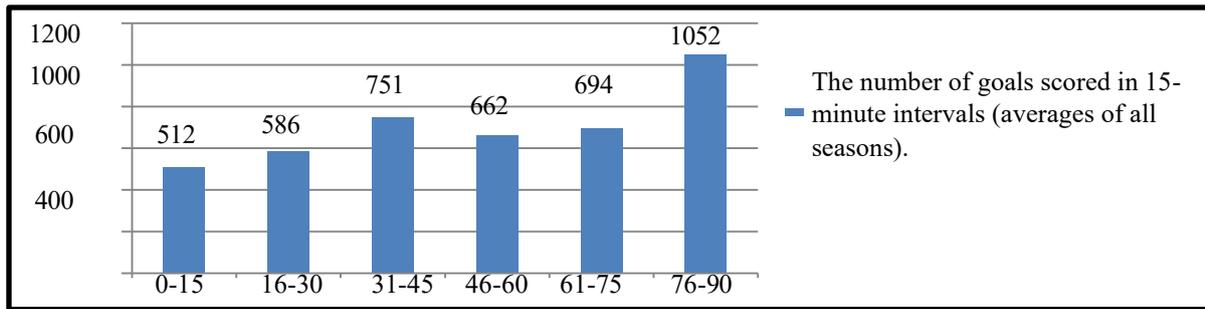


Figure 1. The number of goals scored in 15-minute intervals across all seasons in the super league (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020).

When looking at the average of five seasons in the super league, it has been concluded that the most goals are scored in the 76-90 minute interval, while the fewest goals are scored in the 0-15 minute interval.

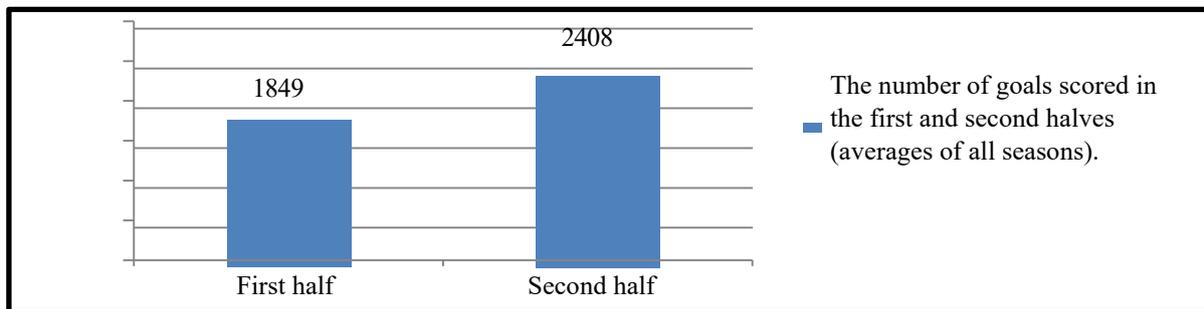


Figure 2. The number of goals scored by halves in all seasons of the super league (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020).

When looking at the averages of five seasons, it has been concluded that the most goals are scored in the second half of the matches.

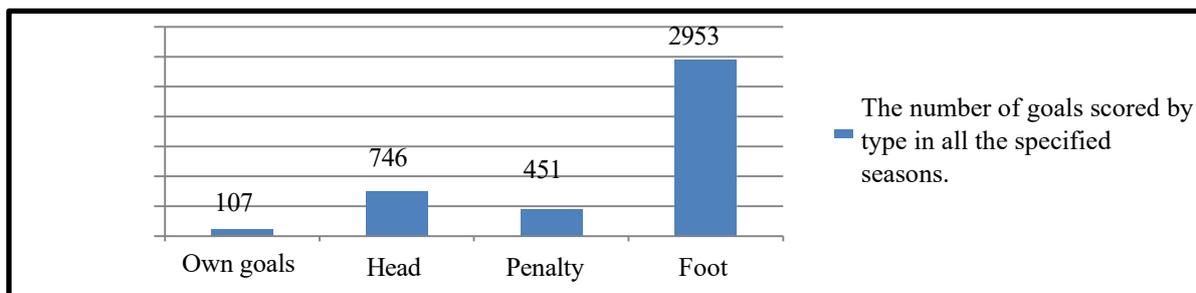


Figure 3. The number of goals scored by type in all seasons of the super league

When looking at the averages of the specified seasons, it has been observed that the most goals are scored with the foot, followed by headers.

Table 3. Descriptive statistics results related to the effect of the first goal on the match outcome, the number of matches evaluated, and the number of goalless matches in all seasons of the super league.

FIRST GOAL ADVANTAGE IN THE AVERAGE OF THE SPECIFIED 5 SEASONS.	
Draw	280 (19,65%)
Win	979 (68,70%)
Defeat	166 (11,65%)
Number of goalless matches	105
Number of matches evaluated	1425

In the average of 5 seasons in the super league, in the 1425 matches considered (matches with goals), it has been concluded that the teams that scored the first goal won 68,70% of the matches, lost 11,65% of the matches, and drew 19,65% of the matches.

Table 4. ANOVA, Kruskal-Wallis test, and Post Hoc LSD and Tamhane's T2 test results for the average of matches resulting in victory, loss, and draw in all seasons of the super league (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020)

Parameters	Group	n	Mean	S.D.	p	F	Post Hoc
Goal	Win	1145	2,41	1,17	,000*	1113,865	L,D<W
	Lose	1145	,61	,72			L<D
	Draw	770	1,04	,85			**
Shots	Win	1145	13,34	4,89	,000*	31,618	L,D<W
	Lose	1145	11,76	4,86			
	Draw	770	12,16	4,93			
On-target Shots	Win	1145	5,47	2,42	,000*	225,118	L,D<W
	Lose	1145	3,56	2,10			L<D
	Draw	770	4,03	2,12			**
Shot Blocks	Win	1145	2,57	1,82	,036*	3,316	W<L
	Lose	1145	2,77	2,00			**
	Draw	770	2,74	2,05			
Shots from Outside the Box	Win	1145	5,14	2,71	,172	1,759	-
	Lose	1145	5,35	2,80			
	Draw	770	5,31	2,78			
Shots from Inside the Box	Win	1145	8,21	3,55	,000*	83,292	L,D<W
	Lose	1145	6,40	3,36			L<D
	Draw	770	6,83	3,45			
Shot Accuracy Percentage (%)	Win	1145	42,13	14,33	,000*	184,367	L,D<W
	Lose	1145	30,62	14,87			L<D
	Draw	770	33,89	14,90			
Passes Before Shots	Win	1145	1,57	1,32	,000*	8,501	L,D<W
	Lose	1145	1,37	1,21			**
	Draw	770	1,40	1,23			
Winning Duels (%)	Win	1145	50,84	5,27	,000*	29,223	L,D<W
	Lose	1145	49,16	5,26			L<D
	Draw	770	49,99	5,12			
Winning Aerial Duels (%)	Win	1145	51,76	10,39	,000*	33,909	L,D<W
	Lose	1145	48,20	10,44			L<D
	Draw	770	50,00	10,18			
Corners	Win	1145	4,75	2,71	,400	,917	-
	Lose	1145	4,90	2,80			
	Draw	770	4,81	2,75			

Table 4. ANOVA, Kruskal-Wallis test, and Post Hoc LSD and Tamhane's T2 test results for the average of matches resulting

in victory, loss, and draw in all seasons of the super league (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020)

Ball Recoveries	Win	1145	17,25	5,22			
	Lose	1145	16,32	5,14	,000*	9,704	L,D<W
	Draw	770	16,64	4,97			
Ball Recovery Success (%)	Win	1145	68,81	13,25			
	Lose	1145	68,96	13,75	,361	1,019	-
	Draw	770	68,09	13,68			
Clearances	Win	1145	21,71	9,74			L,D<W
	Lose	1145	17,26	7,58	,000*	80,100	L<D **
	Draw	770	20,59	8,54			
Ball Playing Time (sc)	Win	1145	1592,38	279,83			
	Lose	1145	1564,78	266,82	,015*	4,189	L,D<W
	Draw	770	1561,02	262,57			
Total Passes	Win	1145	388,38	117,43			D<W,L
	Lose	1145	383,03	97,48	,001*	6,920	**
	Draw	770	370,11	101,61			
Possession (%)	Win	1145	50,41	7,45			
	Lose	1145	49,59	7,45	,032*	3,447	L<W
	Draw	770	50,00	7,22			
Playing the Ball in Midfield	Win	1145	271,22	74,74			
	Lose	1145	271,02	61,69	,049*	3,010	D<L,W
	Draw	770	264,26	62,80			
Interceptions	Win	1145	14,23	6,08			
	Lose	1145	13,68	5,74	,052	2,966	-
	Draw	770	13,73	5,65			
Attacking Zone Ball Possessions	Win	1145	133,96	44,83			
	Lose	1145	132,44	47,31	,716	,334	-
	Draw	770	132,88	43,61			
Passes to The Offensive Zone	Win	1145	39,37	12,76			
	Lose	1145	39,84	13,60	,684	,380	-
	Draw	770	39,48	13,49			
In the Offensive Zone Number of Passes	Win	1145	79,67	33,30			
	Lose	1145	75,15	32,07	,001*	6,571	L,D<W
	Draw	770	75,64	29,99			
Long Passes into the Attacking Zone	Win	1145	12,66	9,42			
	Lose	1145	13,12	9,27	,000*	11,558	W,L<D
	Draw	770	14,73	9,89			
Dribbles into the Attacking Zone	Win	1145	16,79	5,99			
	Lose	1145	16,70	6,26	,013*	4,337	D<W,L **
	Draw	770	16,01	5,66			

Table 4. ANOVA, Kruskal-Wallis test, and Post Hoc LSD and Tamhane’s T2 test results for the average of matches resulting in victory, loss, and draw in all seasons of the super league (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020)

Balls Played into the Opponent’s Penalty Area	Win	1145	37,69	10,96	,001*	7,221	W<L **
	Lose	1145	39,56	12,87			
	Draw	770	38,95	11,89			
Ball Possessions in the Opponent’s Penalty Area	Win	1145	18,33	7,76	,000*	37,331	L,D<W L<D
	Lose	1145	15,66	7,57			
	Draw	770	16,45	7,26			
Dribbles into the Opponent’s Penalty Area	Win	1145	5,82	2,85	,000*	102,015	L,D<W **
	Lose	1145	4,32	2,51			
	Draw	770	4,59	2,49			
Crosses into the Opponent’s Penalty Area	Win	1145	14,64	6,34	,000*	75,069	W,D<L W<D **
	Lose	1145	18,31	8,03			
	Draw	770	17,05	7,34			
Loose Balls	Win	1145	39,19	11,11	,000*	15,699	W,L<D **
	Lose	1145	39,96	11,20			
	Draw	770	42,14	12,28			
Offside	Win	1145	2,04	1,64	,154	1,874	-
	Lose	1145	1,97	1,61			
	Draw	770	1,89	1,64			
Fouls	Win	1145	15,03	4,30	,000*	9,038	L<W,D
	Lose	1145	14,56	4,23			
	Draw	770	15,38	4,26			
Yellow Cards	Win	1145	2,14	1,34	,000*	7,997	W<L,D
	Lose	1145	2,29	1,37			
	Draw	770	2,38	1,40			

W: Win, L: Lose, D: Draw

*p<0,05

**Tamhane’s T2 testi

Kruskal-Wallis H test results

Parameters	Group	n	Mean	S.D.	p	Post Hoc Tamhane’s T2
Red Cards	Win	1145	,08	,28	,000*	W<L,D D<L
	Lose	1145	,19	,47		
	Draw	1145	,15	,39		

W: Win, L: Lose, D: Draw

*p<0,05

According to the ANOVA test results for matches ending in wins, losses, and draws in the Turkish Super League (2015/2016-2016/2017-2017/2018-2018/2019-2019/2020) seasons, the following statistics were compared between groups: goals, shots, shots on target, blocked shots, shots from the penalty area, shot accuracy, passes before shots, percentage of duels won, percentage of aerial duels won, ball possession, ball clearance, ball possession time, total passes, ball possession percentage, midfield ball possession, passes in the attacking zone, long passes into the attacking zone, dribbles into the attacking zone, balls sent into the

opponent's penalty area, ball possession in the opponent's penalty area, passes into the opponent's penalty area, dribbles into the opponent's penalty area, crosses into the opponent's penalty area, free balls, fouls, yellow cards, and red cards. The differences observed between the groups in many parameters in the 5-season average of the Super League indicate that the analyzed parameters may have significant effects on the match results in the Super League. No statistically significant differences were found between the groups for other parameters ($p>0,05$).

DISCUSSION and CONCLUSION

Discussion of Home Advantage in Football

This study aims to analyze matches played in the Turkish Super League from technical, tactical, and statistical perspectives. It examines variables such as the home advantage factor, types of goals scored, the distribution of goals across time intervals, and the impact of the first goal scored on the match outcome. Additionally, the analysis includes comparisons of matches resulting in wins, losses, and draws using various parameters. The findings are discussed in comparison with similar research.

The present study demonstrated that home advantage remains a consistent characteristic of the Turkish Super League, with home teams obtaining more than half of the available points across five consecutive seasons. In addition, the findings revealed that match outcomes were strongly associated with offensive effectiveness, particularly goal-related variables and actions performed in the attacking and penalty areas. Furthermore, the temporal distribution of goals indicated a higher scoring frequency in the final stages of matches, and teams scoring the first goal were more likely to secure a win.

A study on the Turkish 1st Football League covering 10 seasons (2005/2006–2014/2015) and 3,062 matches (Gürkan et al., 2017b) found the home advantage average to be 61.10%. Research on the English Premier League from the 1992/1993 to 2011/2012 seasons, encompassing 7,720 matches (Allen & Jones, 2014), identified the home advantage average ranging between 57,36% and 64,35%. Another study of Brazil's Serie A league across the 2003–2007 seasons with 2,326 matches (Pollard et al., 2008) recorded an average home advantage of 65%. Research analyzing 6,732 matches in the Turkish Super League from the 1995/1996 to 2016/2017 seasons (Öndeş, 2019), concluded that the average home advantage was 62.69%, and home teams collected 65.75% more points than away teams.

In Turkey's Regional Amateur League, a study covering the 2014/2015 to 2018/2019 seasons (5 seasons) and 9,524 matches (Gürkan et al., 2020) found the home advantage average to be 58.24%. Research on the Muğla Amateur Super League, covering the 2012/2013 to 2016/2017 seasons (5 seasons) and 552 matches (Göral et al., 2018), determined the home advantage average to be 59,98%. However, recent studies suggest that the impact of home advantage has slightly declined in recent years compared to previous periods.

Studies in the literature also indicate that the home advantage is not decisive under all conditions and may diminish or disappear in certain circumstances. In particular, it has been reported that the home advantage in professional and amateur leagues has shown a declining trend over time in recent years (Pollard & Gomez, 2014; Peeters & van Ours, 2021). Some studies have revealed that factors such as reduced spectator pressure, more standardised refereeing decisions, and improved away conditions limit the home advantage (Allen & Jones, 2014). Furthermore, it has been noted that in certain leagues and seasons, away teams have

accumulated more points or home teams have failed to perform as expected (Page & Page, 2007). These findings demonstrate that the home advantage can vary depending on the league, season, and contextual factors, and does not always provide an absolute superiority. While some of the above studies are similar to our study, some studies do not share similarities with our findings.

The findings strongly support Hypothesis 1 (H1), which stated that home teams have a significantly higher probability of winning compared to away teams. The results demonstrated that home advantage exceeded 50% across all analyzed seasons, indicating that playing at home remains a consistent and influential factor in the Turkish Super League. This finding is consistent with previous research reporting a persistent home advantage across different leagues and competitive levels (Allen & Jones, 2014; Pollard & Gomez, 2014).

Discussion of Goal Parameters

The analysis also includes goal parameters for matches that ended in wins, losses, and draws. Across the five seasons, it was found that most goals were scored between the 76th and 90th minutes, in the second halves of matches, and through foot strikes. Additionally, in all the specified seasons, teams that scored the first goal won over 65% of the matches. A review of the literature reveals that these findings align with previous studies. For example, a study on set-piece goals in the Turkish Super League from the 2006/2007 to 2010/2011 seasons (Cerrah et al., 2016) found that the highest number of goals occurred between the 76th and 90th minutes, accounting for 21,67% of all goals scored. Similarly, an analysis of goals scored across 19 FIFA World Cups from 1930 to 2010 (Leite, 2013) revealed that out of 772 matches and 2,208 goals, 951 goals (43,07%) were scored in the first halves, and 1,202 goals (54,44%) in the second halves, with the 76th to 90th minutes being the most prolific period. Another study analyzing 8,270 goals across 3,100 matches in 10 major European leagues during the 2015/2016 season (Germany, England, France, Italy, Spain, Russia, Belgium, Portugal, Turkey, and Ukraine) (Leite, 2017) also found that most goals were scored in the second halves (4,656 goals) and specifically between the 76th and 90th minutes (1,892 goals). A study on the UEFA Champions League from the 2006/2007 to 2015/2016 seasons (10 seasons) (Gürkan et al., 2017a) analyzing 1,250 matches and 3,426 goals, concluded that the majority of goals occurred in the second halves and between the 76th and 90th minutes. A study of the 2010 FIFA World Cup (İmamoğlu et al., 2011) found that most goals were scored with foot strikes, followed by headers. Similarly, research on 240 matches in the Portuguese Premier League during the 2009/2010 season (Pratas et al., 2016) concluded that teams scoring the first goal won 70% of the time. Another study covering 5,478 matches across five major European leagues from 2014 to 2017 (Inan et al., 2019) found that the percentage of home teams scoring the first goal and subsequently winning was 70% in Germany's Bundesliga, 74% in France's Ligue 1, 75% in England's Premier League, 78% in Spain's La Liga, and 75% in Italy's Serie A. The findings across various leagues and tournaments consistently show that most goals are scored between the 76th and 90th minutes, during the second halves, and primarily through foot strikes. Furthermore, teams scoring the first goal often achieve victory. Thus, our findings are in alignment with previous research in the literature. Although many studies report that goals are predominantly scored in the final minutes of matches and that teams scoring the first goal are more likely to win, the literature also presents differing findings. Some research suggests that goal timing and the impact of the first goal may vary according to league characteristics, match context, and team quality (Armatas & Pollard, 2012; Lago-Peñas & Lago-Ballesteros, 2011). In certain competitions, particularly in matches between closely matched teams, goal distributions across match periods appear more balanced, and the advantage of scoring first may be reduced (Leite,

2015; Inan et al., 2019). The higher frequency of late-match goals is commonly attributed to physical fatigue, decreased defensive concentration, and increased tactical risk-taking by trailing teams, whereas the first-goal advantage may be explained by psychological momentum and improved tactical control of the match (Rampinini et al., 2009; Lago-Peñas et al., 2011).

Hypothesis 2 (H2), suggesting that teams scoring the first goal have a higher likelihood of winning the match, was also clearly supported by the results. The analysis revealed that teams scoring the first goal won approximately 69% of the matches. This finding aligns with earlier studies emphasizing the psychological momentum and tactical control gained by scoring the opening goal (Leite, 2015; Inan et al., 2019).

Discussion of Shot Parameters

This section discusses the shot parameters, including total shots, shots on target, shots from outside the penalty area, and shots from inside the penalty area, in matches that resulted in wins, losses, or draws in the Turkish Super League across five seasons. Across all seasonal averages, a statistically significant difference ($p < 0,05$) was found between teams that won matches and those that ended in losses or draws ($L, D < W$).

For shots taken from outside the penalty area, no statistically significant difference was observed between groups in any season ($p > 0,05$). However, for shots taken from inside the penalty area, a statistically significant difference ($p < 0,05$) was identified in all seasonal averages between teams that won matches and those that ended in losses or draws ($L, D < W$). Additionally, a statistically significant difference ($p < 0,05$) was found between teams that lost matches and those that ended in draws ($L < D$).

These findings are consistent with the results reported in the literature. For instance, a study on 1,056 matches in the Chinese Super League between 2012 and 2017 (Zhou et al., 2018) found that the average total shots for teams winning, drawing, and losing matches were 12,9, 12,1, and 11,8, respectively, while the average shots on target were 5,5, 4,3, and 4,1, respectively. A statistically significant difference ($p < 0,05$) was also observed between teams that won matches and those that drew or lost.

Similar results have been reported in other studies. Research on the 2014 Brazil Championship (Barreira et al., 2016), the 2012 UEFA European Championship (Sgrò et al., 2015), the UEFA Champions League (Lago-Peñas et al., 2011), and Germany's Bundesliga (Yue et al., 2014) concluded that teams winning matches had higher averages of total shots and shots on target compared to losing teams. Specifically, in the Brazil Championship, UEFA European Championship, and UEFA Champions League, teams that won matches had significantly higher averages for both total and on-target shots. In Germany's Bundesliga, winning teams had a higher average of total shots than losing teams. All these findings support the results of our study.

Winning teams demonstrated significantly higher numbers of shots, shots on target, and actions inside the opponent's penalty area. This finding indicates that match success in the Turkish Super League is more strongly associated with offensive efficiency and the ability to create high-quality scoring opportunities rather than with overall possession dominance. With respect to offensive performance indicators, the results provide strong support for Hypothesis 3 (H3). Winning teams exhibited significantly higher values in total shots, shots on target, and shots taken from inside the penalty area compared to teams that drew or lost matches. These

findings highlight the importance of shot quality and shooting efficiency rather than merely increasing the number of attempts, supporting previous research conducted in elite football competitions (Castellano et al., 2012; Zhou et al., 2018).

Discussion of Passing Parameters

In terms of total passes, a statistically significant difference ($p < 0,05$) was found across all seasonal averages between teams that ended matches in draws and those that ended in wins or losses ($D < W, L$). Based on these findings, it can be concluded that the total number of passes does not directly influence match victories across all seasons. Teams that won or lost matches exhibited similar total passing averages, suggesting that total passes alone are not a sufficient criterion for determining match outcomes.

A study comparing the top 5 and bottom 5 teams in Italy's Serie A league based on various parameters (Rampinini et al., 2009) concluded that the teams finishing in the top 5 had higher average passing parameters. Similarly, an analysis of the 2014 FIFA World Cup (Göral, 2015a) revealed that successful teams made more passes and had higher pass accuracy rates. However, the findings of these studies do not align with the results of our research.

The effectiveness of total passing parameters in football can vary depending on leagues, tournaments, and the nature of the studies conducted. In some leagues and tournaments, the number of passes may play a crucial role in securing victories, while in others, this may not necessarily be the case.

Passing Parameters in the Attacking Zone

Across the five-season averages, a statistically significant difference ($p < 0,05$) was observed in passing parameters in the attacking zone between teams that ended matches in losses or draws and those that ended in victories ($L, D < W$).

In a study comparing teams finishing in the 1st–4th, 5th–8th, 9th–12th, and 13th–16th positions in the Chinese Super League (Yang et al., 2018), it was found that the first two groups (1st–4th and 5th–8th) had higher averages of passes entering the attacking third (3rd zone) and penalty area. Similarly, another study on the 2016 UEFA European Championship (Gürkan & Müniroğlu, 2018) concluded that teams winning matches had higher averages of successful passes in the opponent's half compared to teams losing matches.

It was determined that teams winning matches performed more passes in the attacking zone, referred to as the "3rd zone" in football. Based on these findings, it can be stated that rather than making excessive passes in various areas of the field, maintaining possession and executing passes in the attacking zone, especially within the opponent's penalty area, is a more critical parameter for achieving victories in football matches.

Similarly, Hypothesis 4 (H4) was supported by the findings, which showed that winning teams performed significantly more actions in the attacking third and the opponent's penalty area. Higher values in attacking-zone passes, ball possessions, and actions inside the penalty area were observed in matches resulting in victories. These results indicate that territorial dominance in advanced areas of the pitch plays a critical role in determining match success, reinforcing the notion that effective attacking play is a key determinant of performance in modern football.

Discussion of Ball Possession (%) and Time in Possession (Seconds)

This section discusses ball possession percentages and possession times in matches resulting in wins, losses, and draws. Across five-season averages, a statistically significant difference ($p < 0,05$) was observed in ball possession percentages between teams losing matches and those winning matches ($L < W$). However, the results indicate that the ball possession percentages and possession times among the three groups (wins, losses, draws) were very close to each other. In all seasons where statistically significant differences were identified, the ball possession percentages and possession times between the groups were still observed to be very similar. Based on these findings, it can be concluded that ball possession and possession time alone are not sufficient parameters for achieving victories in the Turkish Super League.

In a study conducted during the 2015/2016 season of the English Premier League (Aquino et al., 2017), it was found that the successful teams finishing in the top 8 positions had an average ball possession rate of 50,60%, while the teams in the bottom 10 positions (9th–20th) had an average possession rate of 47,59%. The same study reported that teams winning matches had an average ball possession rate of 50,34%, losing teams had 49,68%, and teams drawing matches had 49,95%. Similarly, a study on the 2018 FIFA World Cup (Aquino et al., 2019) found that teams winning matches had an average ball possession rate of 50,5%, teams losing matches had 49,2%, and teams drawing matches had 49,8%.

Discussion of Ball Possession in the Opponent's Penalty Area

In the five-season averages, a statistically significant difference ($p < 0,05$) was observed in ball possession in the opponent's penalty area between teams winning matches and those drawing or losing matches ($L, D < W$). Additionally, a significant difference was also found between teams losing matches and those drawing matches ($L < D$).

A study conducted on the 2013/2014 season of the Turkish Super League (Güçlüöver, 2016) revealed that relegated teams had an average possession rate in the penalty area of 16,22%, while promoted teams had a rate of 22,27%, with a statistically significant difference between the two groups ($p < 0,05$). Similarly, the same study reported that relegated teams had an average possession rate around the penalty area of 62,48%, compared to 71,60% for promoted teams, again showing a statistically significant difference between the two groups ($p < 0,05$).

These findings indicate that teams winning matches have more possession and play more frequently in the opponent's penalty area. In order to achieve success in the Super League, it is essential not only to move the ball into the attacking zone but also to be effective in the penalty area and produce goals. Ball possession in the opponent's penalty area is a critical parameter for success in the Super League. Coaches should prioritize this parameter, focusing on it in tactical training sessions and drills.

In contrast, the findings related to Hypothesis 5 (H5) revealed that overall ball possession percentage and total number of passes had a limited effect on match outcomes. Although statistically significant differences were observed in some cases, the possession values among winning, drawing, and losing teams were very similar. This suggests that possession-based indicators alone are insufficient to explain match success and that the effectiveness of actions performed in critical attacking zones is more decisive. This result supports recent literature emphasizing the quality and context of possession rather than its quantity (Aquino et al., 2017; Brito de Souza et al., 2019).

Overall, the hypothesis-driven interpretation of the findings indicates that match success in the Turkish Super League is primarily associated with offensive efficiency, particularly actions performed in the attacking and penalty areas, rather than general possession dominance. This structured evaluation enhances the methodological robustness of the study and strengthens its contribution to the existing literature on football performance analysis.

Discussion of Ball Recovery Parameter

In the five-season averages, a statistically significant difference ($p < 0,05$) was found in ball recovery rates between teams that lost or drew matches and those that won ($L, D < W$). A study on the Turkish Super League (Bakır and Müniroğlu, 2020) revealed that teams recovered possession 413 times in home matches and 467 times in away matches. Another study analyzing the top 4 teams in the 2016 European Football Championship (Kurak and Açak, 2018) concluded that Portugal, Germany, Wales, and France reached the opponent's goal more quickly and concluded attacks faster by recovering the ball in advanced areas of the field.

In our study, it was observed that the ball recovery averages of all three groups (win, draw, and loss) were very close. However, in all seasons where significant differences were detected, teams winning matches had higher ball recovery averages than the other two groups. This indicates that teams winning matches applied more pressure on their opponents, employed various methods to recover the ball, and aimed to immediately regain possession to execute their game plan. By maintaining possession, especially in the opponent's penalty area, they created more scoring opportunities and posed a greater threat.

Discussion of the Corner Parameter

Across all seasons analyzed, no statistically significant differences were found in the corner averages among the three groups (win, loss, and draw) ($p > 0,05$). Studies in the literature support our findings. Research conducted on the 2012 European Football Championship (Sgro et al., 2015), the 2016 European Football Championship (Gürkan and Müniroğlu, 2018), and the 2018 World Cup (Gürkan et al., 2019) concluded that the corner averages of teams winning and losing matches were very close.

In a study conducted on the 2014/2015 season of the English Premier League (Lowe, 2016), the top four teams scored 19 goals from corners, while the bottom four teams scored 16 goals from corners. These findings indicate that the number of corners taken in matches is very similar across all groups. It can thus be inferred that during the analyzed Super League seasons, the corner parameter alone was not a sufficient criterion for achieving victory in matches.

Discussion of the Foul Parameter

Across all seasons analyzed, a statistically significant difference was found between teams that lost matches and those that either won or drew matches in terms of foul counts ($L < W, D$) ($p < 0,05$). A study conducted on the 2012 season of the Malaysian Super League (Mohammad Zaki et al., 2014) found that the foul counts of teams that won and lost matches were very similar. Similarly, another study focusing on UEFA Champions League final matches (Çoban, 2019) reported no statistically significant differences in foul counts between teams that won and those that lost matches ($p > 0,05$).

The results indicate that the number of fouls committed by teams across different groups was very close, suggesting that the foul parameter did not have a direct impact on match outcomes in most seasons analyzed. However, the observation that teams losing matches committed

fewer fouls compared to the other two groups over the five-season average might be attributed to these teams focusing on maintaining possession to score goals when trailing. Conversely, teams in the other two groups might commit more fouls-either consciously or unconsciously-as part of their efforts to defend the lead or regain possession.

Discussion of the Yellow Card Variable

The findings of this study indicate that the number of yellow cards may be associated with match outcomes. In particular, matches resulting in losses were characterized by a higher number of yellow cards compared to matches resulting in wins. This pattern suggests that teams falling behind in the scoreline may be more inclined to commit tactical fouls in order to disrupt the opponent's attacking play, which is subsequently reflected in disciplinary sanctions. Moreover, the psychological pressure created by being in a losing position, combined with increased defensive workload, may lead players to make timing errors and engage in uncontrolled challenges.

However, the number of yellow cards should not be interpreted solely as an indicator of poor discipline. Yellow cards also provide indirect information about match tempo, intensity of duels, and the defensive strategies adopted by teams. In this context, the inclusion of the yellow card variable contributes to a more comprehensive understanding of the contextual and psychological dynamics of match performance, alongside technical and tactical indicators. The results suggest that teams losing control of the match or adopting more aggressive defensive approaches to restore balance are more susceptible to disciplinary sanctions.

Discussion of the Red Card Parameter

Across all season averages, a statistically significant difference was found between teams that won matches and those that lost or drew ($W < L, D$), as well as between teams that drew and those that lost ($D < L$) ($p < 0,05$). The findings of previous studies also align with these results (Lago-Penas et al., 2011; Brito de Souza et al., 2019; Li et al., 2020).

The lower average number of red cards for teams that won matches compared to those that lost or drew suggests that these teams did not finish matches with a player sent off, and this factor may have played a significant role in their success. Conversely, the higher number of red cards for teams that lost matches indicates that these teams finished at least one match with a player sent off, which could be a contributing factor to their defeats.

Conclusion

The present study provides a comprehensive technical and tactical analysis of matches played in the Turkish Super League over five consecutive seasons. The findings indicate that home advantage remains a consistent characteristic of the league, with home teams securing more than half of the available points across all seasons. In addition, match outcomes were shown to be closely associated with offensive effectiveness rather than overall possession dominance. In particular, goal-related variables, shooting efficiency, and actions performed in the attacking and penalty areas emerged as key determinants of success.

The temporal distribution of goals revealed that scoring frequency increased notably in the final stages of matches, highlighting the influence of physical fatigue, tactical risk-taking, and reduced defensive concentration as matches progress. Furthermore, the strong association between scoring the first goal and match victory emphasizes the importance of early offensive effectiveness and subsequent tactical control. Overall, the results suggest that success in the Turkish Super League is primarily driven by the quality and efficiency of attacking actions, rather than by the sheer volume of possession-based indicators. These findings contribute to

the existing literature by demonstrating that technical and tactical performance indicators influencing match outcomes may vary in magnitude depending on league-specific characteristics.

Recommendations

Based on the findings of this study, future research should extend technical and tactical analyses to different leagues, competitive levels, and tournament formats in order to identify contextual similarities and differences in performance indicators. Integrating positional and tracking data with traditional match statistics may provide deeper insights into the dynamic interactions between physical, technical, and tactical factors influencing match outcomes.

From a practical perspective, coaches and performance analysts are encouraged to prioritize offensive efficiency, particularly actions performed in the attacking third and the opponent's penalty area, rather than focusing solely on possession-based strategies. Emphasis should also be placed on maintaining physical and cognitive performance in the final phases of matches, given the increased likelihood of decisive events occurring during this period. Finally, the development and dissemination of match analysis education programs may enhance the effective use of performance data in both professional and amateur football environments.

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