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Technical Analysis of Goals Scored in 3 Different European Leagues in The 2020-2021 Football Season

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Abstract

The aim of this study is to classify the goals scored in the 2020-2021 football season in Turkish Super League (TSL), English Premier League (EPL), and French League 1 (FL1) according to technical and tactical criteria, and to reveal the differences and similarities between the leagues. The scope of the research consists of a total of 3209 goals scored in 1180 football matches played in 3 different European Leagues in the 2020-2021 season. Each goal was classified according to the minute interval, the area where the attacking move started, the number of touches by the player before scoring, and the goals scored from set pieces. The frequency and percentage distributions of all data were calculated separately for each league. According to the results obtained, the most goals were scored in TSL (f: 1136 goals), while the least goals were scored in EPL (f: 1024 goals). Looking at the distribution of total goals by minute intervals, the most goals were scored in the last quarter of the game in TSL (f:199; 17.5%), EPL (f:166; 16.2%), and FL1 (f:186; 17.7%), while the least goals were scored in the added time of the first half. When looking at the number of touches by the player who scored the goal, it was found that the most goals were scored with one touch. Regarding the direction of the attacking move, it was observed that the rate of goals scored after wing attacks was lower in FL1 than in TSL and EPL, but the number of goals scored from central attacks was higher. According to the results, it is understood that the teams in the leagues have different game structures, which are decisive in determining the goal criteria.
Keyword: Soccer, Goal Scored, Vision Analysis, Technical Analysis

2020-2021 Futbol Sezonunda 3 Farklı Avrupa Liginde Atılan Gollerin Teknik Analizinin Yapılarak İncelenmesi

Öz

Bu çalışmanın amacı da farklı futbol ekolüne sahip olan Türkiye Süper Ligi (TSL), İngiltere Premier Lig (EPL) ve Fransa Lig 1'de (FL1) 2020-2021 futbol sezonunda oynanan tüm müsabakalarda atılan gollerin teknik ve taktik kriterler açısından sınıflandırılarak, ligler arasındaki farklılık ve benzerliklerin ortaya konmasıdır. Araştırmanın kapsamında 2020-2021 Sezonunda 3 farklı Avrupa Liginde oynanan 1180 futbol müsabakasında atılan toplam 3209 gol oluşturmaktadır. Atılan her bir gol, atıldığı dakika aralığı, gol öncesi atağın geliştiği bölge, gol öncesi oyuncunun topa temas sayısı ve duran toplardan kazanılan goller bakımından sınıflandırılmış ve tüm verilere ilişkin frekans ve yüzde dağılımları her bir lig için ayrı ayrı hesaplanmıştır. Elde edilen sonuçlara göre en fazla gol TSL (f: 1136 gol), en az gol ise EPL'de (f: 1024 gol) atılmıştır. Toplam atılan golün dakika bazında dağılımına bakıldığında TSL (f:199; 17.5%), EPL (f:166; 16.2%) ve FL1'de (f:186; 17.7%) en fazla golün oyunun son çeyreklik diliminde atılırken, en az golün ise ilk yarının uzatma dakikalarında atıldığı görülmektedir. Gol öncesi golü atan oyuncusunun topa temas sayısı açısından bakıldığında en fazla golün 1 Temas ile atıldığı, atak yönü açısından bakıldığında ise FL1'de atılan kenar hücumları sonrası gol oranının TSL ve EPL'den daha az olduğu ancak merkezden yapılan hücum sonucunda atılan gollerin ise daha fazla olduğu görülmüştür. Sonuçlara göre liglerde yer alan takımların farklı oyun yapılarına sahip olduğu, bunun da sonucu belirleyen gol kriteri üzerinde belirleyici olduğu anlaşılmaktadır.
Anahtar Kelime: Futbol, Gol, Görüntü Analizi, Teknik Analiz

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INTRODUCTION

Performance analysis has an important role in evaluating the technical and tactical components of the performance exhibited by teams in sports with complex structures, such as football (Aranda et al., 2019). It is observed that the analysis of on-field performance in both physical and technical-tactical criteria has become a necessity in national and international sports organizations where the level of competition is at its highest, especially in football (Carling, 2013; González-Rodenas et al., 2020; Modric et al., 2022; Özçilingir & Bozdağan, 2021; Pratas et al., 2016; Tenga et al., 2010). Performance analysis, which is carried out based-on observation or with technological tools within predetermined criteria, contributes to the holistic evaluation technical and tactical behaviors that occur on the field, both as a team and individually (Aranda et al., 2019; González-Ródenas et al., 2020; Gözübüyük & Karaç, 2021; Gürkan et al., 2017; Işıkdemir, 2020) and to determine the emerging advantages and disadvantages (Matos et al., 2021; Mitrotasios et al., 2019).

In football, the determining factor for the outcome is the goal. Tactical approaches in attack are an important determinant for scoring goals. Especially in modern football, the success of a team in scoring goals and the game strategies created for scoring goals are an important key to success (Li & Zhao, 2021). Therefore, it is expected that the coach and the technical team will develop attacking strategies aimed at scoring goals during matches. This is because there is a preparatory process and a finalization phase for each goal scored during a match (Kubayi & Toriola, 2019). For this reason, it is necessary to analyze the tactical elements that emerge before and during a goal in terms of performance.

When the literature is generally reviewed, research focused on indicators that can be called the character of the goal, such as the way the goal is scored, the number of passes before the goal, the period of time the goals are scored, the wing where the goal is scored, and the type of attack leading to the goal, can be seen in the football branch (Hughes & Franks, 2005; Lago-Ballesteros & Lago-Peñas, 2010; Li & Zhao, 2021; Yiannakos & Armatas, 2006; Yolgörmez, 2018). Yiannakos and Armatas (2006) reported in their research conducted for the European Championship that 57.4% of goals were scored in the second half, 42.6% in the first half, 20.3% of total goals were scored in fast breaks, 35.6% in set pieces, and 40.1% were scored as a result of attack organizations, and the most goals from set pieces were scored from corner kicks. In Yolgörmez's (2018) research on the goals scored in the Turkish Super League, it was reported that 35.9% of goals were scored from organized attacks, 57.7% from central attacks, 86.2% from the penalty area, 86.6% from foot shots, and 56.5% were scored with a single touch. In the study conducted by Li and Zhao (2021) on the goals scored in the English Premier League, French Ligue 1, German Bundesliga, Italian Serie-A and Spanish La Liga, they reported that the number of goals scored after a throw-in was highest in Spanish La Liga, the corner kick goal rate was highest in English Premier League, and the highest number of goals resulting from counterattacks was scored in German Bundesliga. They also reported that there was no statistical difference between the leagues in terms of goals scored in the last 15 minutes and goals scored directly after a free-kick.

When examined, it can be seen that goals scored in matches are evaluated according to different criteria. It is observed that the way goals are scored in national and international football organizations is compared in terms of this aspect. These evaluations are thought to facilitate

the evaluation of game systems in terms of attack and defense in different countries and international football organizations. Therefore, evaluating goals scored in matches in terms of technical and tactical criteria can serve as a reference guide for coaches to plan training and matches, both for individual players and for the team, throughout a season (Cerrah & Gürol, 2011; González-Rodenas et al., 2020; Li & Zhao, 2021; Matos et al., 2021; Modric et al., 2022; Özçilingir & Bozdağan, 2021; Wright et al., 2011). However, when looking at the studies conducted, it is seen that there is a lack of studies on the differences in the goal paths between the TSL, which is the top league in our country, and different European leagues. In this context, the goals scored in all matches in the 2020-2021 football season in the TSL, EPL, and FL1, which have three different football schools, were classified in terms of technical criteria, and the differences and similarities between the leagues were aimed to be revealed.

METHODS

Research Model

In the scope of the research, a descriptive investigation method was used to collect data. The descriptive survey model is known as a model that aims to describe data through observation without any external intervention in a situation or event (Arı & Apaydın, 2022).

Sample Group

The universe of the research consisted of 1180 football matches played in three different European Leagues (TSL: 420 match, 1136 goals; EPL: 380 match; 1024 goal; FL1: 380 match, 1049 goal) during the 2020-2021 season, and the sample group consisted of a total of 3209 goals scored in the 1180 matches played in the three leagues.

Ethical Approval

Ethics approvals were obtained from the Non-Interventional Clinical Research Ethics Committee of Nevşehir Hacı Bektaş Veli University (Ethics Committee Document No: 2100125497; Meeting No: 08; Decision No: 2022/88), and all measurements were carried out in accordance with the Helsinki Declaration.

Data Collection

The sample group of the study was obtained from all the data collected from 1180 football matches in 3 different European leagues (TSL, EPL, FL1) during the 2020-2021 season. The video recordings of the goals scored were obtained from the website published in open access by the relevant federation and broadcaster (TSL: https://www.tff.org/default.aspx?pageID=1529; EPL: https://www.premierleague.com/history/season-reviews/363; FL1: https://www.ligue1.com/fixtures-results?seasonId=2020-2021&StatsActiveTab=0; https://beinsports.com.tr). The footage was watched by a coach who had received analysis training, and classifications were made based on the observations, recorded simultaneously in Microsoft Excel and paper using observation through the pen-and-paper method. In the first stage, the total number of matches played throughout the season in all leagues recorded, along with the results of the matches, and the number of matches won by home and away teams and the number of draws were determined. In the final stage, all goals scored in the matches were analyzed by watching the footage, and information such as the time interval in which each goal

was scored, the number of times the player had touched the ball before scoring, and the attacking direction were recorded. If the goal was scored from a stationary ball, such as a penalty kick, corner kick, or free kick, it was recorded under the category of set pieces. Goals scored from set pieces were not included in the evaluation of attacking direction. During the evaluation phase, "own goals" were evaluated on behalf of the opposing team. If a team scores an own goal, the goal is registered for the other team based on the criteria.

Data Classification

Interval of the goal scored: It has been done to determine in which time interval the goal was scored during the game. Evaluations were made in eight different sections as "first half and second half; 1-15 min; 16-30 min; 31-45 min; 45+ min; 46-60 min; 61-75 min; 76-90 min; 90+ min".

Number of touches before the goal: It indicates how many times the player who scored the goal touched the ball in the final position before making the goal shot (1 touch, 2 touches, 3 touches, 4+ touches).

Attack direction before the goal: Analysis will be made to determine from which area the attack developed before the goal was scored. The area where the player scored the goal was passed the ball is defined as the area where the attack was developed (Figure 1).

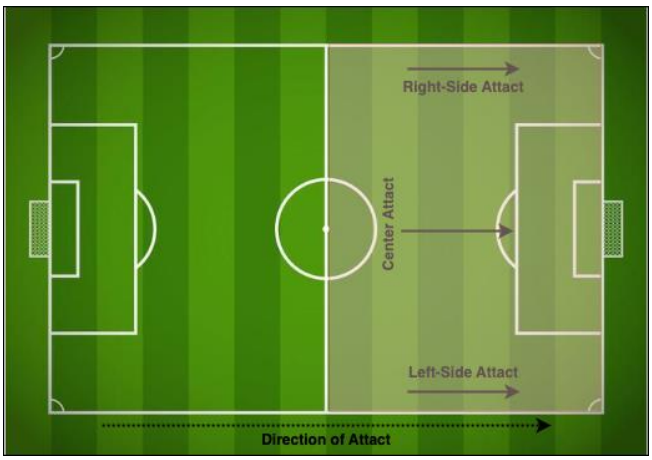


Figure 1. Attack direction before the goal-scored

Reliability Testing

To analyze the reliability of all variables, an intra-observer test was performed using the kappa measure of agreement. The kappa values varied from 0.98 to 1.00, indicating that the agreement was quite strong across all performance measures.

Data Analysis

In the scope of the research, 3209 goals scored in 1180 football matches were classified into various categories. Descriptive statistics were provided for the obtained data, and frequency and percentage distributions were calculated and presented. The Jamovi Project (Version 2.3-Computer Software) analysis program was used for data analysis.

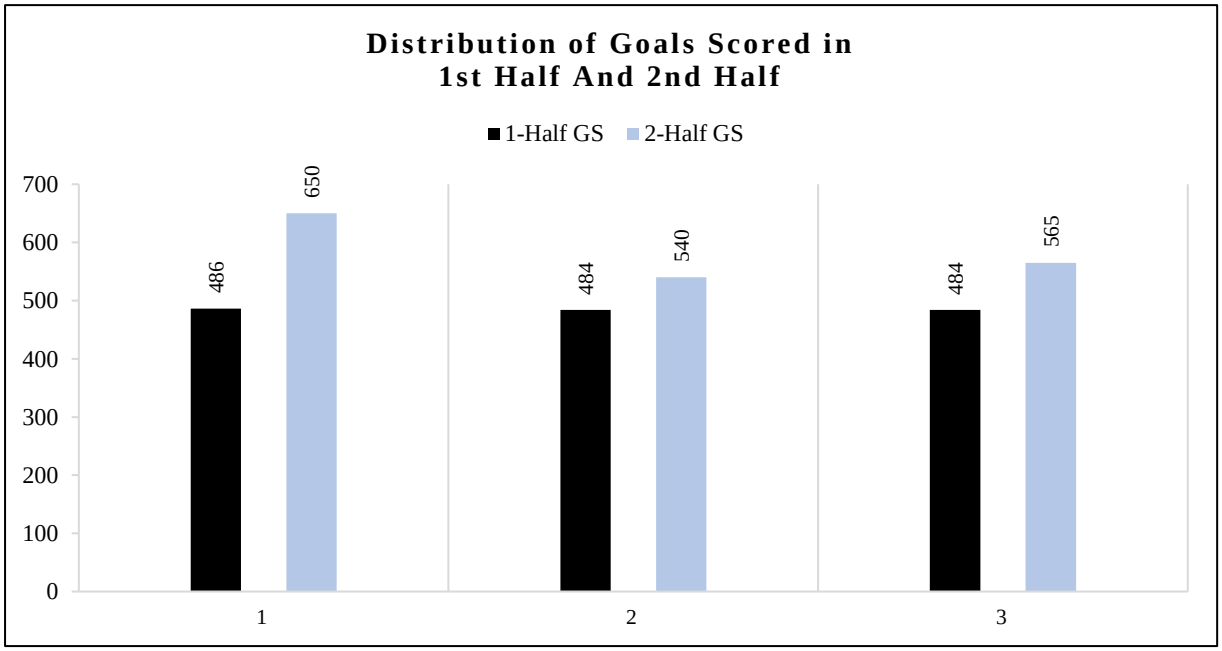
RESULT

This section presents statistics on goals scored during the 2020–2021 season in the TSL, EPL, and FL1.

Table 1. Descriptive statistical results of the TSL, EPL and FL1

	Match$_{Number}$	**Total$_{GS}$**	**1-Half GS**	**%**	**2-Half GS**	**%**	**Avarage$_{GS}$**
TSL	420	1136	486	42,8%	650	57,2%	2,7
EPL	380	1024	484	47,3%	540	52,7%	2,7
FL1	380	1049	484	46,1%	565	53,9%	2,8

TSL: Turkish Super League**; EPL:** English Premier League**; FL1:** French Liegue 1; **Match$_{Number}$**: Number of Played Match; **Total$_{GS}$**: Total Number of Goals Scored;**1-Half GS:** Number of Goals Scored in First Half; **2-Half GS:** Number of Goals Scored in Second Half; **Avarege$_{GS}$**: Average Number of Goals Per Match



Graph 1. Distribution of goals scored in first half and second half in the TSL, EPL and FL1

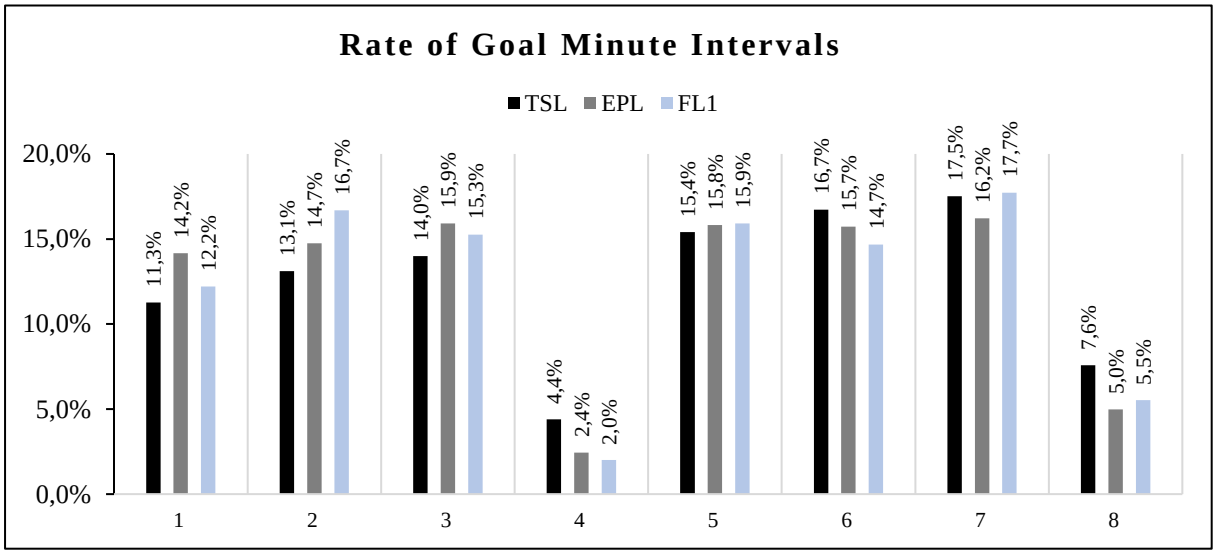
(1) Turkish Super League**; (2)** English Premier League; **(3)** French Ligue 1**; 1-Half GS:** Number of Goals Scored in First Half; **2-Half GS:** Number of Goals Scored in Second Half

According to Table 1, a total of 1136 goals (100%) were scored in 420 matches (100%) in TSL, 1024 goals (100%) in 380 matches (100%) in EPL, and 1049 goals (100%) in 380 matches (100%) in FL1. In TSL, 42.8% (486 goals) of the total goals were scored in the first half of the matches, while this rate was 47.3% (484 goals) in EPL and 46.1% (484 goals) in FL1. When the goal rates scored in the second halves of the matches are examined, the rates were 57.2% (650 goals) in TSL, 52.7% (540 goals) in EPL, and 53.9% (565 goals) in FL1. Additionally, the average number of goals per match was 2.7 in TSL and EPL, and 2.8 in FL1 (Table 1; Graph 1).

Table 2. Distribution of goals scored in leagues according to minute intervals

LEAGUE	Minute Intervals	N	f	SD	%
TSL	**01-15 Min**	420	128	0.563	11,3%
	16-30 Min	420	149	0.578	13,1%
	31-45 Min	420	159	0.588	14,0%
	45+ Min	420	50	0.324	4,4%
	46-60 Min	420	175	0.610	15,4%
	61-75 Min	420	190	0.648	16,7%
	76-90 Min	420	199	0.638	17,5%
	90+ Min	420	86	0.427	7,6%
	Total	**420**	**1136**		**100,0%**
EPL	**01-15 Min**	380	145	0.585	14,2%
	16-30 Min	380	151	0.606	14,7%
	31-45 Min	380	163	0.644	15,9%
	45+ Min	380	25	0.259	2,4%
	46-60 Min	380	162	0.643	15,8%
	61-75 Min	380	161	0.639	15,7%
	76-90 Min	380	166	0.684	16,2%
	90+ Min	380	51	0.364	5,0%
	Total	380	1024		**100,0%**
FL1	**01-15 Min**	380	128	0.541	12,2%
	16-30 Min	380	175	0.647	16,7%
	31-45 Min	380	160	0.626	15,3%
	45+ Min	380	21	0.229	2,0%
	46-60 Min	380	167	0.616	15,9%
	61-75 Min	380	154	0.598	14,7%
	76-90 Min	380	186	0.672	17,7%
	90+ Min	380	58	0.395	5,5%
	Total	380	1049		**100,0%**

f: Frequency**; %:** Percent**; TSL:** Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1



Graph 2. Percentage distribution of goals scored in leagues according to minute intervals

TSL: Turkish Super League; **EPL:** English Premier League; **FL1:** French Ligue 1; **(1)** 01-15 Min; **(2)** 16-30 Min; **(3)** 31-45 Min; **(4)** 45+ Min; **(5)** 46-60 Min; **(6)** 61-70 Min; **(7)** 71-90 Min; **(8)** 90+ Min

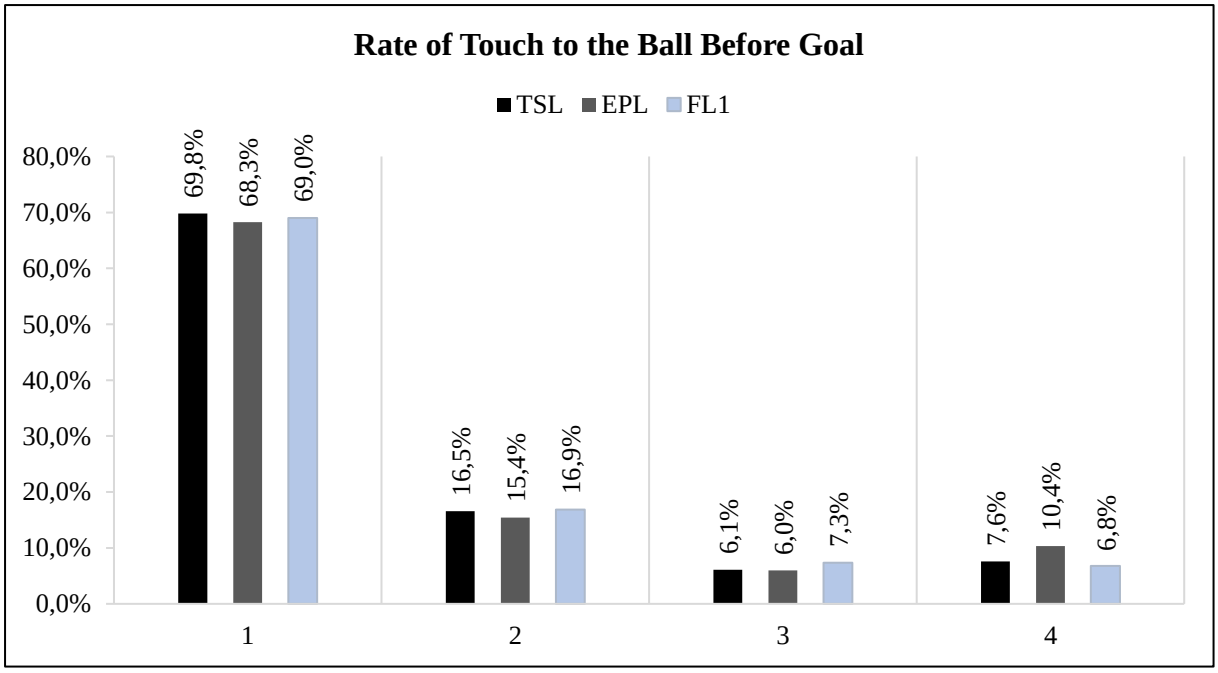
The information about the minute intervals in which goals were scored in all matches played for one season in TSL, EPL, and FL1 is provided in Table 2. According to the results obtained, when the distribution of goals scored in the first halves is examined in TSL, EPL, and FL1, the

ratio of total goals is realized as 42.8% (f = 486 goals), 47.3% (f = 484 goals), and 46.1% (f = 484 goals), respectively. When we look at the second halves, it is seen that these ratios were 57.2% (f = 650 goals), 52.7% (f = 540 goals), and 53.9% (f = 560 goals), respectively. The most frequently scored minute interval in all three leagues is between 76-90 minutes (TSL: f = 199 goals; 17.5%; EPL: f = 166 goals; 16.2%; FL1: f = 186 goals; 17.7%), while the interval with the least goals scored is between 45+ minutes (TSL: f = 50 goals; 4.4%; EPL: f = 25 goals; 2.4%; FL1: f = 21 goals; 2.0%) (Table 2). At the same time, it is observed that 41.8%, 36.9%, and 37.9% of the goals scored in a season in TSL, EPL and FL1, were scored in the last half-hour and the extra time period of the matches respectively (Graph 2).

Table 3. Number of goal scorer's contact with the ball before the goal scored in leagues

League	Number of Touch to the Ball Before Goal	N	f	SD	%
TSL	**1T**	420	793	1.417	69,8%
	2T	420	188	0.714	16,5%
	3T	420	69	0.408	6,1%
	≥ 4T	420	86	0.464	7,6%
	Total	420	1136		100,0%
EPL	**1T**	380	699	1.374	68,3%
	2T	380	158	0.738	15,4%
	3T	380	61	0.415	6,0%
	≥ 4T	380	106	0.530	10,4%
	Total	380	1024		100,0%
FL1	**1T**	380	724	1.338	69,0%
	2T	380	177	0.675	16,9%
	3T	380	77	0.446	7,3%
	≥ 4T	380	71	0.410	6,8%
	Total	380	1049		100,0%

f: Frequency**; %:** Percent**; TSL:** Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1; **1T**: One Touch; **2T:** Two Touch; **3T:** Three Touchs; **≥ 4T:** Four and More Touch



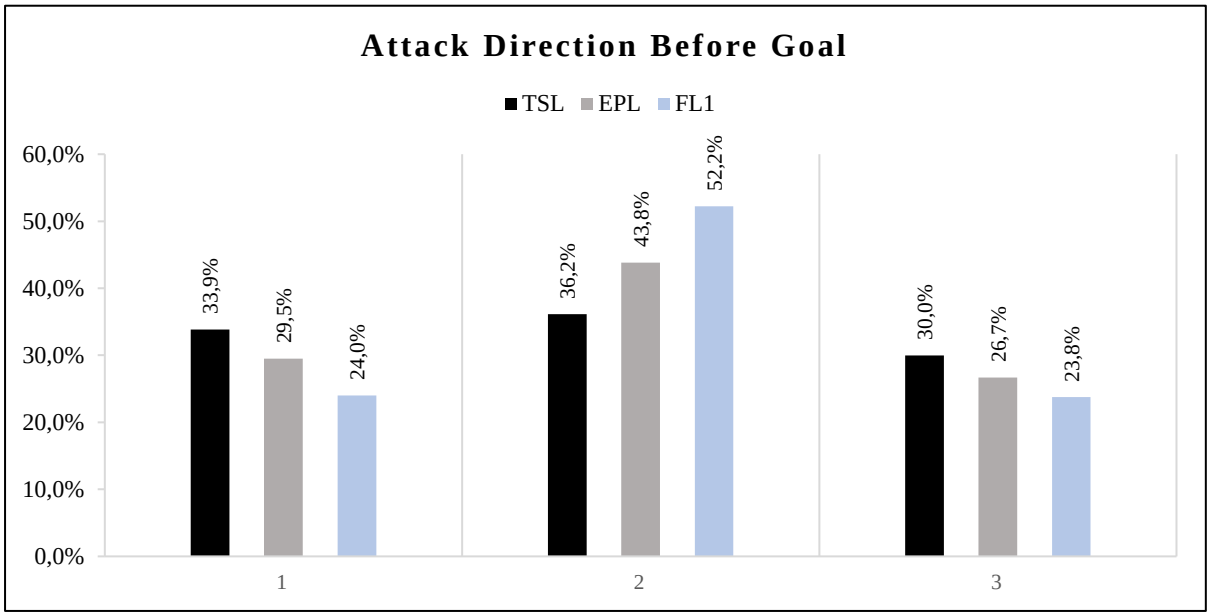
Graph 3. Percentage distribution of goal scorers in leagues according to the number of touch to the ball
TSL: Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1; 1 Touch to the Ball Before Goal **(1)**; 2 Touches to the Ball Before Goal **(2)**; 3 Touches to the Ball Before Goal **(3)**; 4 or More Touches to the Ball Before Goal **(4)**

Table 3 provides information on the number of touches by the goal-scoring player for all matches played in a season in TSL, EPL, and FL1 leagues. According to the results, the number of goals scored with only one touch is higher compared to other variables in TSL, EPL, and FL1 (Table 3). When examining the goals scored, it is seen that 69.8% (f=793 goals), 68.3% (f=699 goals), and 69.0% (f=724 goals) of the total goals scored in TSL, EPL and FL1 with a single touch by the goal-scoring player respectively (Graph 3).

Table 4. Direction of attack before goal in goals scored

League	Direction of Attack Before Goal	N	f	SD	%
TSL	**Right Wing Attack**	420	280	0.884	33,9%
	Central Attack	420	299	0.945	36,2%
	Left Wing Attack	420	248	0.690	30,0%
	Total	**420**	**827**		**100,0%**
EPL	**Right Wing Attack**	380	232	0.800	29,5%
	Central Attack	380	345	1.040	43,8%
	Left Wing Attack	380	210	0.769	26,7%
	Total	**380**	**787**		**100,0%**
FL1	**Right Wing Attack**	380	183	0.713	24,0%
	Central Attack	380	398	0.984	52,2%
	Left Wing Attack	380	181	0.702	23,8%
	Total	**380**	**762**		**100,0%**

f: Frequency**; %:** Percent**; TSL:** Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1; *Goals scored from set-pieces are not included in the attacking aspect of goals scored.



Graph 4. Percentage distribution according to pre-goal attack direction preference in leagues

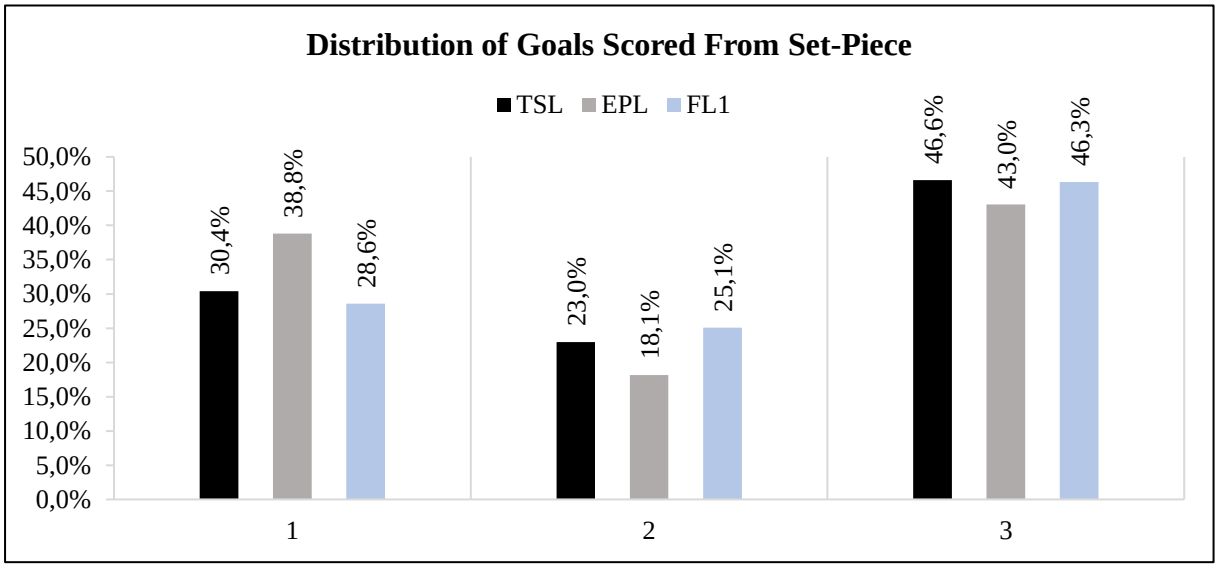
TSL: Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1**; (1)** Right Wing Attack**; (2)** Central Attack**; (3)** Left Wing Attack

Table 4 provides information on the areas where the goal-scoring attacks were developed in all matches played in a season in TSL, EPL, and FL1 leagues. According to the results, the goals scored in TSL, EPL, and FL1 were performed with 36.2%, 43.8%, and 52.2%, respectively, by continuing the attack organization developed in the center (Table 4). However, while 63.8% (f=528 goals) of the total goals scored in TSL (excluding goals scored from set pieces) were scored as a result of right and left flank attacks, this rate was 56% (f=442 goals) in EPL, and this rate was 47.8% (f=364 goals) in FL1 (Graph 4).

Table 5. Goals scored from set-pieces

League	Set Piece Goal Classification	N	f	SD	%
TSL	**Corner Kick**	420	94	0.456	30,4%
	Free Kick	420	71	0.412	23,0%
	Penalty	420	144	0.579	46,6%
	Total	420	309		100,0%
EPL	**Corner Kick**	380	92	0.470	38,8%
	Free Kick	380	43	0.356	18,1%
	Penalty	380	102	0.520	43,0%
	Total	380	237		100,0%
FL1	**Corner Kick**	380	82	0.472	28,6%
	Free Kick	380	72	0.437	25,1%
	Penalty	380	133	0.587	46,3%
	Total	380	287		100,0%

f: Frequency**; %:** Percent**; TSL:** Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1



Graph 5. Percentage distribution of goals scored from set piece organisations in leagues

TSL: Turkish Super League**; EPL:** English Premier League**; FL1:** French Ligue 1; Goals Scored From Corner Kick (1); Goals Scored From Free Kick (2); Goals Scored From Penalty (3)

Table 5 provides information on the goals scored as a result of set-piece organizations in all matches played in a season in TSL, EPL, and FL1 leagues. According to these results, 27.2%, 23.1%, and 27.4% of the total goals scored in TSL, EPL, and FL1, respectively, were scored as a result of set-piece organizations. It was determined that the most goals were scored from penalty kicks in set pieces while the least goals were scored as a result of free kicks. Moreover, the league where the most penalty goals were scored was TSL (f=144; 46.6%), while the league

where the least penalty goals were scored was EPL (f=102 goals; 43%). It was also seen that the most corner kick goals were scored in EPL (f=92 goals; 38.8%), while the least corner kick goals were scored in FL1 (f=82 goals; 28.6%) (Table 5; Graph 5).

DISCUSSION

In this study, the goals scored in the matches played in the 2020-2021 football season in the Turkish Super League (420 matches; 1136 goals), English Premier League (380 matches; 1024 goals), and French Ligue 1 (380 matches; 1049 goals) were examined in terms of the time interval of the goal, the number of touches made before the goal by the player who scored, the attacking direction before the goal, and the variables of the goals scored from set pieces.

According to the findings, the goal ratio scored in the first half of the matches in the Turkish Super League was lower compared to the English Premier League and French Ligue 1, while the goal ratio scored in the second half was higher (Table 1; Graph 1). Armatas et al. (2009) reported that 41.04% of the goals were scored in the first half of the matches and 58.96% in the second half in their study on the Greek Super League (Armatas et al., 2009). Alberti et al. (2010) reported that 55.1% of the goals were scored in the second half and 44.9% in the first half in their study on the English Premier League, French Ligue 1, Italian Serie A, and Spanish La Liga (Alberti et al., 2013). Ertetik and Müniroğlu (2021) examined 107 goals scored in 66 football matches participated in the UEFA football organization and reported that 54.21% of the goals were scored in the second half and 45.79% in the first half (Ertetik & Müniroğlu, 2021). Stafylidis et al., (2022) examined 222 goals scored in 91 matches played in the first half of the 2021-2022 football season of the Greek Football League and reported that 61.71% of the goals (137 goals) were scored in the second half and 38.71% (85 goals) were scored in the first half (Stafylidis et al., 2022). In another study Ağyol and Tanyeri (2022) examined goal scoered at Euro 2020 Europian Football Championship, and reported that 58.4% of the goals were scored in the second half and 36.7% in the first half (Ağyol & Tanyeri, 2022). When looking at the distribution of the goals scored, it is seen that the number of goals scored in the second half is higher compared to the number of goals scored in the first half. It can be thought that more goals scored in the second halves of the competitions may have occurred due to the physical condition and tactical approaches of the teams during the competition.

When looking at the distribution of total goals scored based on minutes, the interval of 76-90 minutes is where the most goals are scored in the Turkish Super League (TSL) in proportion to the total number of goals scored, while the intervals of 45+ minutes and 90+ minutes are where the least goals are scored, according to Table 2 and Graph 2. Similar results were observed in the English Premier League (EPL) and French Ligue 1 (FL1). It can be considered that teams attempt more goals in the final stages of the game, leading to a decrease in defensive security and resulting in these findings. Armatas et al. (2009) reported in their study that in the Greek Super League, 23.30% of the 240 goals were scored in the last 15 minutes of the match (76-90 minutes) (Armatas et al., 2009). Similarly, Alberti et al. (2010) reported in their study that approximately 20% of the 10,885 goals were scored in the last 15 minutes of the match (76-90 minutes). The research findings reported that the leagues with the most goals scored in the 76–90-minute interval were the Spanish La Liga and the English Premier League, while the leagues with the least goals scored were the French Ligue 1 and the Italian Serie A (Alberti et

al., 2013). In a study by Kubayi and Toriola (2019), who examined the goals scored in five FIFA World Cup tournaments (1998-2002-2006-2010-2024), 24.65% of the 795 goals were scored in the last 15 minutes of the matches (76-90 minutes) (Kubayi & Toriola, 2019). However, in another study, Kubayi (2020) reported in his findings on the goals scored in the 2018 World Cup that 17.16% (29 goals) of the 169 goals scored were scored between minutes 46-60 (Kubayi, 2020). Especially in the last 15 minutes of matches, the level of fatigue can cause a decrease in sprint and high-intensity performance components, which can have a negative effect on technical and tactical requirements on the field (Rampinini et al., 2008; Rostgaard et al., 2008). It is thought that the high goal rate in the final stages of matches may be due to the decrease in physical properties.

When looking at the number of touches on the ball by the player who scored the goal during the goal, in the TSL, 69.8% of the total goals were scored with only 1 touch, while in the EPL and FL1, these rates were 68.3% and 69.0% respectively (Table 3; Graph 3). In all three leagues, it is shown that as the number of touches on the ball by the player who scored the goal increasein the goal area, the goal rate decrease This can be evaluated as a result of the simple football understanding brought by the requirement of today's football and the desire to achieve a clear result in the goal area. Çobanoğlu and Terekli (2018) reported in their research findings analyzing the 108 goals scored in the 2016 European Championships that 68.52% (74 goals) of the goals were scored with one touch, 18.52% (20 goals) with two touches, and 12.96% (14 goals) with three or more touches (Çobanoğlu & Terekli, 2018).

When the goals scored from the attacking direction before the goal were examined, it was observed that 63.8% of the total goals in the TSL were scored after right and left side attacks, while in the EPL and FL1, these rates were 56.2% and 47.8%, respectively. The goal rate scored from the center in the FL1 was 4.5% higher than the goal rate scored from the side attacks (Table 4; Graph 4). It can be thought that the attacking style of the game in the TSL is based on side attacks, while in the FL1, it is due to the approach of attacking from the center. In addition, teams' in-game strategies and tactics should also be considered as an important factor. Yavuz and Saygın (2021) reported in their analysis of matches played in the 2020-2021 season in the English Premier League (196 matches), German Bundesliga (65 matches), and Spanish La Liga (50 matches) that in the Premier League, 25.4% (113 goals) of the total goals were scored from the left wing, 46.7% (207 goals) from the center, and 27.9% from right wing attacks, while in the German Bundesliga, these rates were 29.4% (56 goals), 34% (65 goals), and 36.6% (70 goals), and in the Spanish La Liga, these rates were 31.6% (35 goals), 47.7% (53 goals), and 20.7% (23 goals) respectively (Yavuz & Saygın, 2021).

When looking at the total goal rate of goals scored from set pieces (corner kicks, free kicks, and penalties) by Duran, it is seen that the goal rate after corner kicks in TSL is higher compared to FL1 (difference: 1.8%) and lower compared to EPL (difference: 8.4%), at a rate of 30.4%. When looking at the goal rate from free kicks, it is observed that the goal rate in TSL is 4.8% higher than in EPL, while it is 2.1% lower than in FL1. When penalties are examined, the rate of goals scored from penalties in TSL and FL1 is 12.7%, while this rate is 10.0% in EPL (Table 5; Graph 5). The similarities and differences that emerge among the leagues should be considered as a result of the meaning attached to set pieces in teams' tactical understanding of offensive play. Wright et al. (2011) examined 169 goals scored in English Premier League matches and reported that 14% of the goals were scored after free kicks, 7% after corner kicks,

and 5% after penalty kicks (Wright et al., 2011). Cerrah and Gürol (2011) examined 6,726 goals scored in 8 seasons of TSL and reported that 30% (2,028 goals) of the total goals were scored from set pieces, and 38% were from free kicks, 29% from corner kicks, 24% from penalty kicks, and 10% from throw-in organizations (Cerrah & Gürol, 2011).

CONCLUSION

As a result, it is observed that the number of goals scored in the second half of matches played in both national and international league and cup competitions is higher compared to the number of goals scored in the first half. It is also important to note that a significant number of goals are scored in the last 15 minutes of the game, which indicates that physical attributes should be considered by coaches. Additionally, the high percentage of goals scored from set-pieces among total goals scored shows that coaches should develop strategies not only for scoring goals from set-pieces but also for defending against attacking teams. Furthermore, it is observed that the simple style of play brought by modern football leads to fewer touches in the goal area and consequently increases the chances of scoring.

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Authors' Contribution: The first author contributed to the study design; the first and second authors analyzed the data; the third author helped with review and editing. All authors revised the manuscript and contributed to the interpretation of the results. All authors have read and approved the final version of the manuscript. A consensus was reached on the order of authors.

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