

Analysis of Goal Scoring Period in Major European Football League Winners 2019/2020

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Abstract

One of the most watched football tournaments in the world is the European football league (e.g., La Liga, Bundesliga, Serie A, etc.). Football matches are divided into two halves. At the end of the game, the number of goals scored can be used to determine the winner. Therefore, the objective of this study was to analyze and compare the goals scored between the first half and second half period among the winners of each top European League 2019/2020 competition. The Mann-Whitney U test was used to evaluate a total of 406 goals from 175 games from the official website and YouTube highlights. Only Liverpool, England's Premier League, showed more goals in the first half, whereas the majority of the winners—Real Madrid, Spain's La Liga, Juventus, Italy's Serie A TIM, Bayern Munich, Germany's Bundesliga, and Paris Saint-Germain, France's Ligue 1 Uber Eats—scored more goals in the second half. The results indicated that there were significant differences in goals scored between the first and second half periods in La Liga and Serie A TIM, $p < .05$. In conclusion, Real Madrid and Juventus fully utilized the disadvantages of their opponents to score a goal to win a match and competition. As the time moves towards the end of the matches, the player's fitness components, mental aspect, and team tactical become the crucial factors of team differentiation. This study recommends comparing goal scoring across several continents in the future.

Keywords: football, goals, first half, second half

INTRODUCTION

Football is the most popular sport in the world and is played by men and women as well as adults and children of all ages and skill levels (Ahmad, Puad, & Alaudin, 2020; Stlen et al., 2005). There were 11 players on each side (Gyarmati, Kwak & Rodriguez, 2014). According to the International Federation of Football Association (FIFA), more than 270 million players, including 29 million female players (Scott & Andersson, 2013), and 5 million officials, are actively involved in the game. Additionally, as reported by Turner & Stewart (2014), the number of youth football players is rising alongside the number of registered players (Kunz, 2007). The major aims of the sport of football are to score goals and prevent the opponents from scoring. Its popularity depends on how simple the game is to play, how easy the rules are to understand, and how little equipment is needed (Njororai, 2014).

Goal scoring is the key factor in effective football team performance, and studies have focused a lot of emphasis on it (Jones et al., 2004; Tenga et al., 2010; Yiannakos and Armatas, 2006). This is due to the fact that scoring goals is essential for any team's success (Hughes and Churchill, 2005), as it may distinguish between winning and losing teams. Wright et al. (2011) stated that ultimate success can be achieved when more goals are scored than the opposition. Furthermore, according to Mombaerts (2000), scoring goals is the

most crucial since it affects the outcome of the game and is seen as the sport's apex. Also, earlier research had shown that scoring goals is one of the most exhilarating and exciting features of the game (Mal, 1982; Mayes, 1975; Muhammad et al., 2013), and winning is the most important thing for the teams (Cachay & Thiel, 2000).

Football matches were typically 90 minutes in length (Hoff & Helgerud, 2004) but might extend to 120 minutes during the knockout round, which refers to games that needed a 30-minute extra session (Winder et al., 2018). It was split into two halves, the first half and the second half, each of which lasted 45 minutes and was followed by a halftime resting period (Russell, Benton & Kingsley, 2014). In international competition, Kubayi (2020) reported that 63% of all goals were scored in the second half of games in a study of goal-scoring trends during the FIFA World Cup 2018. This finding was also reported to be similar in 47% of FIFA World Cup 2006 (Acar et al., 2008), 57.9% of FIFA World Cup 2010 (Njojorai, 2013), and 57% of FIFA World Cup 2014 (Michailidis, 2014).

In Europe continents, the highest goal scored was found in the second half of the game during EURO Championship 2016 with 60.2% (Ahmad, Puad & Alauddin, 2020) and 57.9% during EURO Championship 2012 (Leite, 2013). In South American continent also found similar results during Copa America 2019 with 51.7% (Ahmad, Puad & Alauddin, 2020) and 52.2% during Copa America 2016 (Lastella, Lovell & Rampinini, 2018). In addition, similar findings also had been found in other continents such as North America (Gold Cup 2019, 63.5%), Africa (AFCON 2019, 56.9%), and lastly Asia (Asian Cup 2019, 51.5%) (Ahmad, Puad & Alauddin, 2020). However, a similar previous study by Ahmad, Puad, and Alauddin (2020) showed that only OFC Cup 2016 (football competition in the Oceania continent) found higher during the first half with 52.08% from a total of 48 goals.

There were many football competitions held at the club level. Some nations have leagues with up to four tiers. Numerous football tournaments have been held in Europe, including the top five European countries' league competitions, which are England's Premier League, Spain's La Liga, Italy's Serie A TIM, Germany's Bundesliga, and France's Ligue 1 Uber Eats (UEFA, 2021). These five leagues unquestionably have the largest fan bases in the entire world (Oghonyon et al., 2020). In every game of the English Premier League's 2008–2009 season, 57.4% of goals were scored in the second half (Durlik & Bieniek, 2014). According to previous research by Papadopoulos et al. (2021), all clubs in Spain's La Liga and Italy's Serie A TIM scored the majority of their goals in the second half of the 2017/2018 season. Moreover, Armatas et al. (2009) determined that 59% of the goals scored during the 2006–2007 Greek Super League season occurred in the second half of football games.

However, to our knowledge, there was still a lack of studies that examined the goal-scoring period among champions in the top European football league. Therefore, the purpose of this study was to evaluate the first and second half of the 2019–2020 seasons of the top five league champions, which included the Premier League, La Liga, Serie A TIM, Bundesliga, and Ligue 1 Uber Eats.

METHODOLOGY

A total of 406 goals from 175 league games were tallied by the league winners of each 2019/2020 season (Premier League - England, La Liga - Spain, Serie A TIM - Italy, Bundesliga - Germany, and Ligue 1 Uber Eats - France). The data was gathered from a database on the websites of the official league federations and via YouTube clips from official game highlights. This study was conducted using an analysis of the game time between the first and second halves of all league football games (first half + injury time & second half + injury time) and the frequency of goals scored during those periods. The performance indicators have been exported into Microsoft Excel, and IBM SPSS version 25.0 statistical analysis software has been used to calculate the data. Since the data were not normally distributed, the Mann-Whitney U test was utilized as the data analysis. The significant level was set at $p \leq .05$.

RESULTS

As shown in Figure 1, Bayern Munich, the champions of Germany Bundesliga has the highest goals per match, 2.94 goals with a total of 100 goals in 34 matches, followed by PSG (champions of France Ligue 1 Uber Eats, 2.78 goals per match) with a total of 75 goals in 27 matches, Liverpool (champions of England Premier League, 2.24 goals per match) with a total of 85 goals in 38 matches, Juventus (champions of Italy Serie A TIM, 2 goals per match) with a total of 76 goals in 38 matches and lastly Real Madrid (champions of Spain La Liga, 1.84 goals per match) with a total of 70 goals in 38 matches.

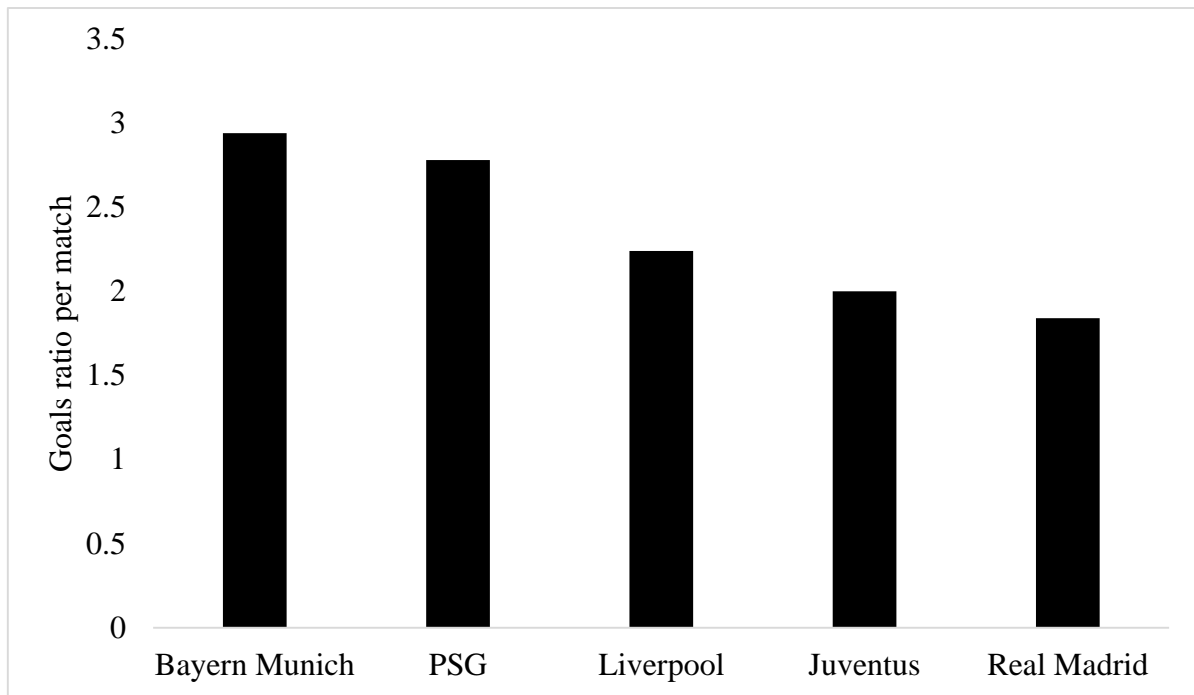


Figure 1. Goals per match for each winners

Figure 2 below showed that Bayern Munich scored 45 goals in the first half and 55 goals during the second half, PSG (34 goals 1st half & 41 goals 2nd half), Liverpool (43 goals 1st half & 42 2nd half), Juventus (28 goals 1st half & 48 goals 2nd half) and Real Madrid (29 goals 1st half & 41 goals 2nd half).

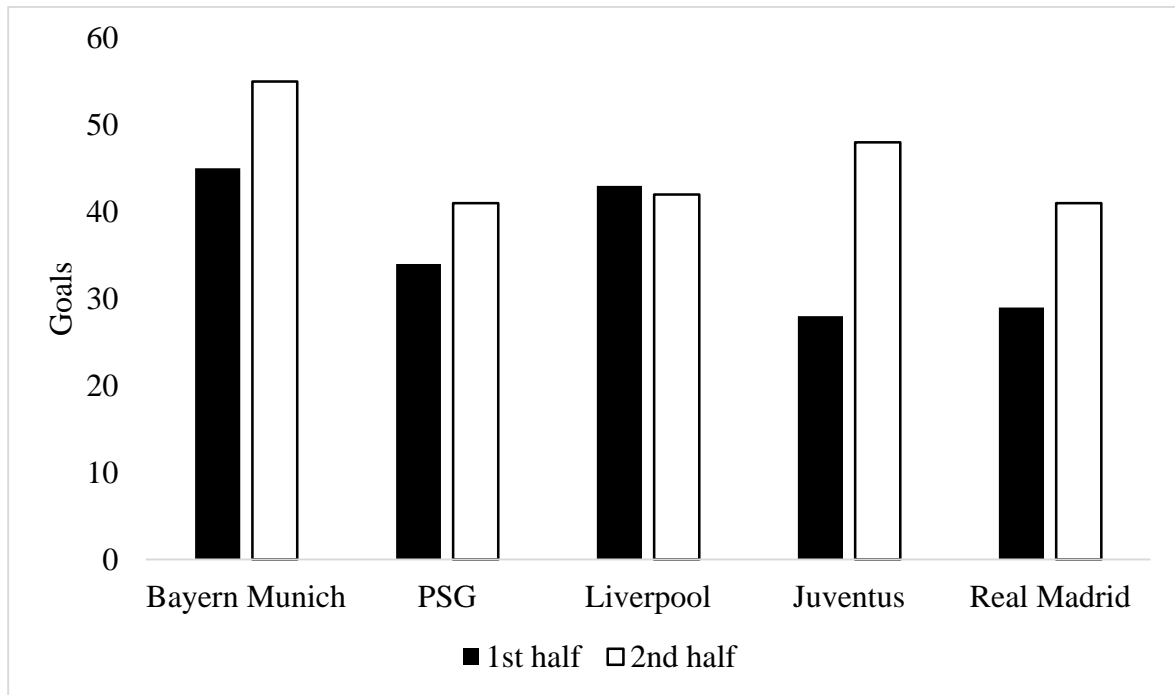


Figure 2. Goals per half for each winners

Table 1: Mann-Whitney U Test

Winners	Period	Mean Rank	Mann-Whitney U Test	Sig.
Bayern Munich	First Half	36.91	661.500	.513
	Second Half	40.09		
PSG	First Half	37.21	673.000	.585
	Second Half	39.79		
Liverpool	First Half	38.64	716.500	.952
	Second Half	38.36		
Juventus	First Half	33.08	516.500	.022
	Second Half	43.92		
Real Madrid	First Half	33.78	542.500	.048
	Second Half	43.22		

From Table 1, it can be concluded that there was no significant different in goal scoring between 1st half and 2nd half for Bayern Munich ($U = 661.500$, $p = .513$), PSG ($U = 673$, $p = .513$) and Juventus ($U = 716.500$, $p = .952$). In contrast, this study found that second-half goals was statistically significantly higher than first-half goal for Juventus ($U = 516.500$, $p = .022$) and Real Madrid ($U = 542.500$, $p = 0.48$).

DISCUSSIONS

The purpose of this study was to evaluate goal scoring in the first and second halves of the 2019–2020 seasons for the top five league champions—Premier League, La Liga, Serie A TIM, Bundesliga, and Ligue 1 Uber Eats. The results of this study revealed that for both Juventus and Real Madrid, their second-half goals were statistically significantly higher than the first-half goals. This result was found to be consistent with an earlier study by Lastella, Lovell, and Rampinini (2018) that discovered there was a significantly higher goal-scoring frequency in the second half compared to the first half of the EURO 2016 Championship, Portuguese Premier League (Pratas, Volossovitch & Carita, 2018), Premier League, La Liga, Serie A TIM, and Ligue 1 Uber Eats across three consecutive seasons (2008–09, 2009–10 and 2010–11) (Alberti et al., 2013). The fitness level at the end of the game may have contributed to a significant difference in goals scored between the first and second halves. To play for the whole 90 minutes of a football game, players must be more physically fit. It

was supported by prior research that football players needed to be able to engage in intermittent, high-intensity exercise for extended periods to be competitive in football (Krustrup & Bangsbo, 2001; Krustrup et al., 2003; Krustrup et al., 2005; Mohr, Krustrup & Bangsbo, 2003; Mohr, Krustrup & Bangsbo, 2005). However, as games progressed toward their end, participants' levels of fitness started to decline, which inadvertently helped the opposing team get the dominant position. This had been agreed upon by Barros et al. (2007), where the mean distance reached in the first half was significantly higher than in the second half, indicating that the player's performance had already dropped minute by minute and had continued to do so throughout the second half. In addition, according to Armatas et al. (2007), this predominance of goals at the end of the match can be related mainly to the athletes' fatigue as the playing time elapses. Studies that compared the rates of effort between the first and second half have shown the reduced performance of athletes and showed there was a 5% reduction in the total distance of the second half compared to the first (Bangsbo, Nørregaard & Thorsø, 1991; Rienzi et al., 2000; Stolen et al., 2005). This decline in performance towards the end of the football game may be triggered by a range of things, such as a decrease in muscular glycogen levels, an accumulation of metabolic waste products, problems with the neurological system, and malfunctions with the stimulus-contraction mechanism (Bianchi, Grossi & Bargossi, 1997; Mohr, Krustrup & Bangsbo, 2005; Rahnema, Reilly & Lees, 2004; Reilly, 2003; Rienzi et al., 2000; Spencer & Katz, 1991; Stølen et al., 2005; Weineck, 2000; Wilmore & Costill, 2001). In addition, when considering positional roles, strikers may benefit in terms of fitness level as claimed by prior studies (Andrzejewski et al., 2017; Boone et al., 2012), which claim that strikers have higher VO₂max levels than defenders. This directly allows the opponents' strikers to use the advantage to score a goal, which may explain why the majority of goals were scored in the second half. This is supported by Hoppe et al. (2017), who found that defenders used more energy overall than players in other positions because their lower body's physical ability was more explosive. The other factors might be due to team tactical. Usually, coaches frequently use substitutions as a team tactic when a team is about to lose, with the expectation that the replacement players would be more physically fit. Bradley, Lago-Peñas, and Rey (2014) confirmed that substitute players to be deemed effective from a work-rate perspective as the players introduced must be immediately able to perform at an equivalent or higher work rates than the players they were replacing, and the remaining on the pitch either their teammates or opponents. Furthermore, coaches had used replacement players, which was evident in tactical changes in the selection of players to replace injured or underperforming players (Bradley, Lago-Peñas & Rey, 2014; Reilly, Drust & Clarke, 2008). Concerning to this, it was expected that substitute players would be able to score a goal since they may be at an advantage, particularly in terms of overall component energy levels. Ferguson (1999) previously defined substitute players as players who can score goals after coming off the bench.

Next, this study also found a contradictory finding when there were no significant differences in goals scored between the first half and second half in Bundesliga (Bayern Munich), Ligue 1 Uber Eats (PSG), and Premier League (Liverpool). The team's tactical emphasis on short sequence passing, also known as ball possession (the percentage of time each team had the ball at any one time), might be the cause (Bradley et al., 2013). Additionally, Anderson and Sally (2013) defined the concept of ball possession as the ability to pass the ball to a teammate while avoiding losing it to the opposing team. To our knowledge, Bayern Munich is recognized for their sturdy possession play, which helped them achieve recent success by enabling them to reach the Champions League Final three times in four years (2009–2010, 2011–2012, and 2012–2013) (Kempe et al., 2014). This study thus assumed that all clubs in the German Bundesliga, including the defending champion, used the ball possession strategy throughout the tournament. Teams must move the ball effectively and straight across short distances to enter the penalty area, which increases the chances of scoring a goal. This has been agreed by Oberstone (2009) that claimed the short passes were a more beneficial way of advancing the ball to the opponent's half. Besides, Acar et al. (2008) revealed that playing fast and being well organized in attacking positions yields more scoring opportunities. Hughes and Franks (2005) also concluded that successful teams tend to play possession football with more touches of the ball per possession rather than unsuccessful teams.

On the other point of view, during Premier League matches of the 2015/2016 season, all teams making more shots on target that associated with either a greater volume of long passes or accuracy passes had increased the occurrence of wins as the home teams have more advantage over the visiting teams when they have more shots on target and less ball possession or less accuracy passes (Lima, Tertuliano & Fischer, 2021). This has been agreed by previous studies where successful execution of technical actions such as passing and shooting are crucial factors of performance (Collet, 2013; Hughes et al., 2012; Jamil, McErlain-Naylor & Beato, 2020; Lago-Peñas et al., 2010; Liu et al., 2015, 2016; Zhou et al., 2018). As a result, the playing style

in Premier League had implemented the long accurate pass strategy as it was beneficial for them to win a match, especially when they played at their home ground. This study speculated that the 2019/2020 season's champions might use the same tactics and fully utilize them during their home matches to claim the title. There was a lack of information regarding the Ligue 1 Uber Eats competition. However, according to Collet (2013), players who play in Ligue 1 Uber Eats had been considered to have the highest quality performance based on FIFA rankings and the fact that teams from UEFA and Conmebol continents took 14 out of the 16 qualified positions in the FIFA World Cup 2018. In a nutshell, this study concluded that Ligue 1 clubs had a comparable strength, which directly related to the non-significant difference in score between the first and second halves. This was confirmed by Pawlowski et al. (2010), who showed that between 2001 and 2008, Ligue 1 Uber Eats had the highest competitive balance. Due to geographic, cultural, historical, and social factors, these three main European football leagues differ from one another. Football clubs from various nations and continents frequently have unique match-play characteristics (Sapp, Spangenburg & Hagberg, 2018; Sarmiento et al., 2013). This study's primary shortcoming was that it only compared teams to the league champions, which does not accurately represent how well the squad as a whole performed.

CONCLUSIONS

In conclusion, Real Madrid and Juventus made the most of their opponent's weaknesses to score goals and win games and competitions. As time moves towards the end of the match, a player's mental readiness, physical preparation, and team tactics become the main components of team differentiation. This study recommends future research should compare goal scoring across other continents.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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