THE EFFECT OF SPECIAL TECHNICAL EVENTS IN THE GAME ON THE SUCCESS OF PROFESSIONAL SOCCER TEAMS: TURKISH SUPER LEAGUE

O EFEITO DE EVENTOS TÉCNICOS ESPECIAIS NO JOGO SOBRE O SUCESSO DOS TIMES DE FUTEBOL PROFISSIONAL: SUPER LIGA TURCA

EL EFECTO DE LOS EVENTOS TÉCNICOS ESPECIALES DEL JUEGO EN EL ÉXITO DE LOS EQUIPOS DE FÚTBOL PROFESIONALES: SUPER LIGA TURCA

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ABSTRACT: The purpose of this research is to examine the effect of possession, passing and shooting criteria on the success of the teams in The Turkish Soccer Super League matches in the 2019-2020 season. 612 data of each team of 306 matches played by 18 teams throughout the season were examined. In all matches, the frequencies of the teams' total number of shots, number of shots on target, percentage of possession, percentage of successful passes, number of passing, number of successful passes, key passes and rating scores criteria were collected from Whoscored's webpage. One-way Anova analysis according to the match results (lose-draw-win) showed that means of the shots on target (p<.001), total number of shots (p=.03), key passes (p=.03) and rating score (p<.001) were significantly higher in win. In the analyzes according to the league ranking (rank 1-6, rank 7-12, rank 13-18).

KEYWORDS: Match analysis. Shots on target. Ball possession.

RESUMO: *O objetivo desta pesquisa é examinar o efeito dos critérios de posse, passe e chute no sucesso dos times nos jogos da Super Liga de Futebol da Turquia na temporada 2019-2020. Foram examinados 612 dados de cada equipe de 306 partidas disputadas por 18 equipes ao longo da temporada. Em todas as partidas, as frequências do número total de chutes dos times, número de chutes no alvo, porcentagem de posse de bola, porcentagem de passes bem-sucedidos, número de passes, número de passes bem-sucedidos, passes importantes e critérios de pontuação foram coletados na página Whoscored. A análise da Anova unilateral de acordo com os resultados da partida (perder-empatar-vencer) mostrou que a média dos chutes no alvo (p <0,001), número total de chutes (p = 0,03), passes importantes (p = 0,03) e pontuação de classificação (p <0,001) foram significativamente maiores na vitória. Nas análises de acordo com a classificação da liga (classificação 1-6, classificação 7-12, classificação 13-18).*

PALAVRAS-CHAVE: *Análise de jogo. Chutes no alvo. Posse de bola.*

RESUMEN: *El propósito de esta investigación es examinar el efecto de los criterios de posesión, pase y tiro en el éxito de los equipos en los partidos de la Superliga de fútbol de Turquía en la temporada 2019-2020. Se examinaron 612 datos de cada equipo de 306*

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partidos jugados por 18 equipos a lo largo de la temporada. En todos los partidos, las frecuencias del número total de tiros de los equipos, el número de tiros a puerta, el porcentaje de posesión, el porcentaje de pases exitosos, el número de pases, el número de pases exitosos, los pases clave y los criterios de puntuación de calificación se recopilaron de la página web de Whoscored. El análisis de Anova unidireccional de acuerdo con los resultados del partido (perder-empatar-ganar) mostró que las medias de los tiros a puerta (p <.001), el número total de tiros (p = .03), pases clave (p = .03) y el puntaje de calificación (p <.001) fueron significativamente más altos en win. En los análisis según la clasificación de la liga (rango 1-6, rango 7-12, rango 13-18).

***PALABRAS CLAVE**: Análisis del partido. Tiros a puerta. Posesión del balón.*

Introduction

One of the most important problems of coaches and analysts in football teams is to obtain video analysis and statistics of their own teams and opponents. The notational analysis of soccer matches is helpful in optimizing feedback for coaches and players aiming at performance improvement (CARLING; WILLIAMS; REILLY, 2005).

In the field of football performance analysis, previously recorded match videos were widely used to monitor, evaluate, and analyze team performances (JAMES, 2006; LIU; HOPKINS; GOMEZ, 2016), but more recently modern video analysis systems such as AMISCO, OPTA and ProZone provide a comprehensive database of soccer games (LIU *et al.,* 2013; LIU; HOPKINS; GOMEZ, 2016; MACKENZIE; CUSHION, 2013).

Player performance analyzes associated with match results can be very useful in explaining the effects on team performance (LAGO, 2009; SARMENTO *et al.,* 2014). Many studies based on notational match analysis have focused on the number of match outcome (win, draw, loss) and technical activities performed by the players (CASTELLANO; CASAMICHANA; LAGO, 2012; CLEMENTE, 2012; KITE; NEVILL, 2017; LAGO-PEÑAS *et al.,* 2010; LIU *et al.,* 2015).

Studies have been carried out to associate technical and tactical events in matches played in various championships at world and continental level (World Cup, European Championship, etc.) and football leagues with team success. In addition, studies examining the goals scored in championships according to various technical and tactical criteria evaluated success based on goals (DURLIK; BIENIEK, 2014; NJORORAI, 2014; TOKUL; MÜLAZIMOĞLU, 2018).

Studies examining the technical efficiency of the players according to the score-line (winning, draw, losing) changes during the match and the match result have revealed the

effect of the season-end success (ALMEIDA; FERREIRA; VOLOSSOVITCH, 2014; LAGO-PEÑAS; DELLAL, 2010; REDWOOD-BROWN, 2008).

Some research assessed the frequency of performance of selected technical activities in relation to match outcome and match status in matches of the championships. The most important are frequencies of different types of passes and higher percent of ball possession when the team is playing to change an unfavorable score (losing and drawing) (KONEFAL *et al.,* 2018).

In a study conducted in the Spanish league, they reported that home teams and losing teams that conceded goals had more ball possession. The opponent's identity, the worse the opponent, the greater the possession of the ball (BLOOMFIELD; POLMAN; O'DONOGHUE, 2005; LAGO; MARTÍN, 2007).

In study of the 1990 and 1994 World Cup by Hughes and Franks (2005) was identified that successful teams produced more goals per possession using longer passing sequences. However unsuccessful teams were found to adopt a more direct style of play, using shorter passing sequences, as these teams didn't have a sufficient level of skill to sustain possession of the ball. (HUGHES; FRANKS, 2005).

Many other research studies have also supported the idea that styles of play differ between successful and unsuccessful teams when a variety of different performance indicators have been analyzed (LAGO-PEÑAS *et al.,* 2011; LAGO-PEÑAS *et al.,* 2010).

In addition to these researches, football viewers, fans, TV programmers are their approaches to game analysis results. Some statistics are reflected on the screen while the matches are played. Basic information such as the percentage of teams' possession of the ball, total pass / on-target pass, total shots / shots on target are displayed on the screen. Football commentators evaluate the superiority of the teams in their comments while watching the match summaries on TV programs by also mentioning these statistics. An important issue to be wondered about; Is more Ball Possession and more passing a sign of superiority in the game? Will shooting more than your opponents bring your team the championship at the end of the league?

The purpose of this research is to examine the effect of possession, passing and shooting criteria on the success of the teams in winning games and league rankings in The Turkish Football Association (TFA) Super League matches in the 2019-2020 season.

Methods

Sample, data resource and variables

The Turkish Football Association (TFA) Super League is the highest level of professional soccer in Turkey which into the top leagues in Europe. Each season begins in August (late summer in Turkey) and in May (late spring) ends. In each season, every team plays against each of the other teams twice, once at home and the other away. In the 2019-2020 season league system, with 18 teams in the League, each team plays 34 games for a total of 306 games in the season. The end-of-season rank is determined by the points (win for 3 points, draw for 1, loss for 0) summed from the 30 games of each team. All the 306 matches in the TFA Super League of the 2019-2020 season were chosen as the sample of the current study. 34 matches played by each of the 18 teams in the league were evaluated as separate participants, and variables belonging to a total of 612 participants formed the data set. Parameters obtained from each game were compared according to their success.

At the end of the season in the Super League top five teams from Turkey are entitled to participate in the UEFA League. However, one of the top five teams lost their right to participate due to the UEFA penalty. He was replaced by the sixth-ranked team. On the other hand, although the leagues were suspended this season due to the Covid-19 outbreak, all matches were played. In order to prevent the negative impact of the pandemic on the clubs, the three teams that should be relegated by the Federation decision were not relegated.

Performance-related data of these matches were collected from public accessed websites “https://tr.whoscored.com” whose data resources is “Whoscored” supported by OPTA Sportsdata Company (WHOSCORED, 2020).

The inter-operator reliability of the company’s tracking system (OPTA Client System) used to collect football match statistics was identified to be on an acceptable level. Furthermore, reliability of the tracking system (OPTA Client System) used by OPTA Sportsdata Company to collect soccer match statistics has been tested by Liu and colleagues (LIU *et al.,* 2013), which showed that teams match events coded by independent operators using this system reached a very good agreement (weighted kappa values were .92 and .94) (LIU *et al.,* 2013). The study was conducted in compliance with the Declaration of Helsinki. Ethics committee approval of the current study was gained from the Muğla Sitki Koçman University (Application No: 200346). Permission to use the statistics published on the "whoscored" website has been obtained.

In all matches, the frequencies of the teams' total number of shots, number of shots on target, percentage of possession, percentage of successful passes, number of passing, number of successful passes, key passes and OPTA rating criteria were collected.The success of the teams was analyzed according to the match results (win-draw-lose) and their ranking (upper-level teams: 1-6 ranked "UEFA" group, mid-level teams: 7-12 ranked group, lower-level teams: 13-18 ranked relegation line and nearby teams) at the end of the season and the home-away status of the team.

Teams are divided into three groups while being evaluated according to their success order. The first group was made up of teams that finished the league in the top six. The second group was the next six teams, that is, teams from 7-12. The third group was made up of six teams at the end of the ranking.

Definition of parameters

Shot: Kicks with any legal part of the body for the purpose of scoring a goal, whether it is accurate or not.

Shot on Target: All goal attempts that could result in a goal if not blocked or saved.

Passing: Balls voluntarily given by a player to a teammate

Pass success: voluntary passes taken by a player are taken by his teammate

Ball Possession: The amount of time a team controlled the ball during a game, from the moment it takes over the ball from the opposing team without any clear interruption, as a proportion of total time when the ball was in play (Konefal et al., 2018).

Statistical analysis

All variables were checked for normal distribution (A kurtosis value between was ±1.0) and homogeneity of variance (Levene's test). Arithmetic means and standard errors were calculated. To compare the mean values of the examined variables a one-way ANOVA was used. When a significant effect size was found, a post-hoc Fisher's LSD test was performed. The level of statistical significance was set at $p < .05$.

Moreover, partial eta squared ($\eta 2$) was calculated, and the effect sizes were determined: small effect size (≥ 0.01 and <0.06), medium effect size (≥ 0.06 and <0.14), large effect size (≥ 0.14) (Cohen, 1988). All statistical analyses were made using the SPSS (version 22.0, SPSS Inc., Chicago, IL) software package.

Results

The data revealed that there was a significant difference in the mean of total shoots (p =.03) and shoot on target (p <.001) according to the teams' winning, drawn and losing status. Also, a significant difference was found in the key pass average (p =.03) and OPTA rating (p <.001) by game success. The multiple comparison test (LSD) revealed more total shooting, shoot on target and key passes for winner in the game than loser and tied teams. “Partial eta squared” found large in the shoot on target (Table 1).

Table 1 – Comparison analysis of variables (ANOVA) and effect size according to the game result (mean±sd)

Variable	Game Result			F(Sig.)	P.eta squared (η2)	Post Hoc (LSD)
	1 Lose (n=224)	2 Draw (n=164)	3 Win (n=224)			
OPTA rating	6.36±.20	6.67±.12	7.02±.24	**611.41(.001)****	.668-L	3>1,2, 2>1
Total shot	12.46±5.15	12.57±5.36	13.67±4.90	**3.73(.025)***	.012-S	3>1,2
Shot on target	3.65±2.12	4.09±2.16	5.55±2.44	**43.20(.001)****	.124-L	3>1,2
Ball possession %	50.45±10.55	50.02±10.38	49.55±10.55	0.42(.659)	.001-S	null
Pass success %	79.75±5.83	78.30±6.83	79.69±6.78	2.91(.055)	.009-S	1>2, 3>2
Total pass	426.75±96.98	416.24±96.25	422.72±103.98	0.53(.589)	.002-S	null
Pass success	344.06±97.56	330.78±98.22	342.79±106.56	0.95(.388)	.003-S	null
Key pass	9.46±4.17	9.37±4.46	10.35±4.14	**3.46(.032)***	.011-S	3>1,2

Significance level: * p <.05; ** p <.01
ES: effect size (η2); S: small (≥.01 and <.06), M: medium (≥.06 and <.14), L: large (≥.14)
Source: Prepared by the author

The data revealed a significant difference in all variables of the teams grouped according to league rankings. The top one-third ranked teams recorded more total shots (respectively: 14.48±5.10; 12.82±5.16 11.50±4.74) and shots on target (respectively: 5.18±2.48; 4.34±2.35; 3.88±2.20) than the second and third one-third teams (p<.001). In terms of possession percentage, the first one-third teams had a higher percentage (respectively : 53.29±10.15%; 49.22±10.34%; 47.51±10.20%: p<.001). A significant difference was found only between the first and last group in the variable of pass success percentage (respectively: 80.50±6.75%; 78.22±6.28%; p=.002). In the number of total pass, pass success and key pass, the first one-third was found to be significantly higher than the other two subgroups (p<.001). While the effect size was medium in OPTA rating and key pass variables among the success groups at the end of the league, all other variables were small (Table 2).

Table 2 – Comparison analysis of variables (ANOVA) and effect size according to the league rank (mean±sd)

Variable	Rank of League			F(Sig.)	P.eta squared (η2)	Post Hoc (LSD)
	1) Rank 1-6 (n=204)	2) Rank 7-12 (n=204)	3) Rank 13-18 (n=204)			
OPTA rating	6.82±.32	6.64±.35	6.58±.31	**28.80(.001)***	.086-M	1>2,3
Total shooting	14.48±5.10	12.82±5.16	11.50±4.74	**18.23(.001)***	.056-S	1>2,3, 2>3
Shot on target	5.18±2.48	4.34±2.35	3.88±2.20	**16.09(.001)***	.050-S	1>2,3, 2>3
Ball possession %	53.29±10.15	49.22±10.34	47.51±10.20	**17.19(.001)***	.053-S	1>2,3
Pass success %	80.50±6.75	79.30±6.24	78.22±6.28	**6.39(.002)***	.021-S	1>3
Total pass	454.01±101.26	408.64±95.14	404.73±94.26	**16.30(.001)***	.051-S	1>2,3
Pass success	371.93±105.21	328.29±96.09	319.90±94.34	**16.36(.001)***	.051-S	1>2,3
Key pass	11.26±4.20	9.46±4.26	8.56±3.85	**22.94(.001)***	.070-M	1>2,3

Significance level: * p <.01
ES: effect size (η2); S: small (≥.01 and <.06), M: medium (≥.06 and <.14), L: large (≥.14)
Source: Prepared by the author

Independent sample t-test results revealed a significant difference between the teams' home and away matches in all game variables. The home performances of the teams for all variables were higher than away. Teams played with more ball possession (respectively: 51.4±10.41%; 48.61±10.41; p<.001) in home matches than away, and played with a higher percentage of pass success (respectively: 80.09±6.28; 78.60±6.61; p=.004). A significantly high average total shot was found at home, and the average shot on target was also higher than outside. The key pass average was higher in home games. OPTA's rating also scored higher points in home matches (Table 3).

Table 3 – Comparison analysis of variables (independent samples t-test) and effect size according to the home and away team

Variable	Home (n=306)	Away (n=306)	t (Sig.)	η^2
OPTA rating	6.75±.34	6.62±.34	**4.81(.001)****	.037-S
Total shooting	14.13±5.14	11.73±4.87	**5.94(.001)****	.055-S
Shot on target	4.9±2.46	4.03±2.26	**4.55(.001)****	.033-S
Ball possession %	51.4±10.41	48.61±10.41	**3.32(.001)****	.018-S
Pass success %	80.09±6.28	78.60±6.61	**2.86(.004)****	.013-S
Total pass	432.9±100.00	412.10±97.72	**2.60(.01)***	.011-S
Pass success	351.80±101.17	328.30±99.85	**2.89(.004)****	.013-S
Key pass	10.62±4.24	8,90±4,09	**5.12(.001)****	.041-S

Significance level: * p <.05; ** p <.01
ES: effect size (η2); S: small (≥.01 and <.06), M: medium (≥.06 and <.14), L: large (≥.14)
Source: Prepared by the author

Discussion

We often talk about football or criticize the game with your friends about the game after a match in social life. First of all, we evaluate the superiority of the teams in terms of the goals scored. The goal positions of the teams, shots and set play are important game events that are criticized. The most important scientific evidence you use against your opponent in this match criticism discussion will be the match statistics such as the teams' possession rate, the total number of passes and the correct pass percentage, the number of shots on the goal. Could the game statistics really tell us that for a football match one team is superior to another? Could the statistics of a match or all matches in a season clearly reveal the success of the team? This study produced results that answered questions that people often use seeking the truth of this information.

According to this study' results, in the 2019-2020 season of the Turkish Super League, the most important distinctive game event in the success of the teams that won the match was the number of shots and shooting accuracy variables. Significantly higher number of key passes was the variable explaining more shot averages. Eight game events examined in this study revealed that sustained seasonal success is more important than a game success. Contrary to the seasonal success (league rank), it was an important result of this study that there was no difference between the winning, losing and tied teams in the game both ball possession and percentage of successful pass variables.

Konefal *et al*. (2018) examined the performance frequency of selected technical activities by soccer teams playing in the EURO 2016 (only group stage) in relation to match outcome and match status. This study revealed that the most important technical activity for the teams at the end of a match is the number of shots on the goal and the shot success rate. However, when the team is playing to change an unfavorable score (losing and drawing in match status), the most important are frequencies of different types of passes and higher percent of ball possession (KONEFAL *et al.,* 2018).

Lago-Peñas et al. (2018) analyzed various technical activities in men's professional soccer league matches. Winning teams had averages for total shots (W: 14.4±5.1, D: 13.6±5.2, L: 11.9±4.8), shots on goal (W: 6.6±2.8, D: 5.1±2.7, L: 4.2±2.4) that were significantly higher than drawer and loser. The variables that discriminate between winning, drawing and losing teams were the total shots, shots on goal, crosses, crosses against, ball possession and venue (LAGO-PEÑAS *et al.,* 2010).

It has been demonstrated in both national leagues (ARMATAS *et al.,* 2009; KONEFAL *et al.,* 2018; LAGO-PEÑAS *et al.,* 2010) and championships (CASTELLANO; CASAMICHANA; LAGO, 2012; LIU *et al.,* 2015; SZWARC, 2004) that winning teams exhibit a distinctively higher total number of shots and shots on target play technical activity than draws and losers. The results of this study are similar to previous studies demonstrating the superiority of winning teams in the total shot and shot on target criteria. Despite some previous research results reporting that a significant proportion of goals scored in high-level football matches are scored from set-piece play (about 25--40%) (MITROTASIOS; ARMATAS, 2012), this superiority of winning teams in the shooting criteria may not be observed in all shot types (free kick, shooting from outside the penalty area, etc.) (KONEFAL *et al.,* 2018).

In general terms, the rates of possession of the teams are evaluated according to the time the ball is in play. In some studies (KUBAYI; LARKIN, 2020; TOKUL; MÜLAZIMOĞLU, 2018), analyzing the goals scored, they classified the criteria of possession according to the number of passes of the team before the goal scored (Short: one or two passes, Medium: three or four passes, Long: five or more passes). The higher percentage of goals scored with short ball possession (50-60%) indicates that having the ball before the goal is not a distinctive significant game advantage (KUBAYI; LARKIN, 2020; MITROTASIOS; ARMATAS, 2012).

Jones, James and Mellalieu (2004) successful teams in the English Premier League were found to have significantly longer possessions than unsuccessful teams, this difference was also seen in the results according to the match status (winning, losing, and drawing). However, both successful and unsuccessful teams had longer durations of possession when they were losing matches compared to when winning. In the current study, though there was no significant difference, the winning teams showed a lower ball possession rate than the other two match situations (lose-draw). Previous studies have revealed that when teams are losing, they tend to pass more than match outcomes (LAGO-PEÑAS; DELLAL, 2010; LAGO, 2009). The researchers explain that when teams took the lead in the match, they preferred team defense and played fast and direct in the remainder of the game. Harrop and Nevill (HARROP; NEVILL, 2014) analyzed English League One matches. They found that the total average pass in lost matches was significantly higher than in tied and winning matches. A significantly lower percentage of successful passes were completed when the team drew. This study results concluded that the teams should perform fewer passes and dribbles but complete more successful passes and shots to be successful. In the current study, which

supports previous studies, when the team success is evaluated as the league rank instead of the match output, the top-ranking teams have significantly higher technical events than the middle and lower ranks. Harrop and Nevill's research results highlighted that the variables 'passes', 'successful passes (%)', 'total shots', 'dribbles' and 'match location (home-away)' were significant factors in predicting the team's success. Besides, the fewer passes and dribbles the team perform, the more likely they are of winning games. In most previous studies, the excess of offensive technical events such as total shots, shots on target and crosses indicate winners (ARMATAS *et al.,* 2009; SZWARC, 2004). Huges and Franks (2005) found that successful teams turn their possession activities into more shooting on target. In a similar result, Lago-Peñas et al (LAGO-PEÑAS *et al.,* 2010) showed that shooting efficiency was 46.2% in gains, 37.5% in draws and 37.6% in losers, and the importance of shooting.

In previous studies where match outcomes (win-draw-lose) and seasonal success evaluation were made in matches played at home and away, it was revealed that the success in home matches was higher. It was examined in previous studies that the teams defined as "home advantage" performed better than the away games in the matches they played at home (LAGO-PEÑAS *et al.,* 2010; LAGO-PEÑAS; DELLAL, 2010; LAGO; MARTÍN, 2007; TAYLOR *et al.,* 2008). Sarmento *et al*. (2014)' the review research, the good performance events of the teams in matches played at home; it was reported that they scored more goals, shot more targets, more passes and successful passes, more successful dribbles and more corners. In previous studies where match outcomes (win-draw-lose) and seasonal success evaluation were made in matches played at home and away, it was revealed that the success in home matches was higher.

The feature that makes this study valuable is the simultaneous evaluation of three complementary success variables: season ranking, match outcome and home-away match. The study was limited to the performances of the teams in the matches in the Turkish Super League in the 2019-2020 season. In future studies, it can be compared with previous seasons using similar variables. Country football characters can be determined by binary or multiple comparisons with other country leagues. During the match, technical events can be examined according to the score-line changes or parts of the total time (quarter time or periods etc.). The time for both periods can be evaluated according to contextual variables as the first-middle-end period as game processes.

Conclusion

The analysis of the matches in the Turkish Super League in the 2019-2020 season showed that the total number of shots, shots on target and the number of key passes were an important determinant of a match success (winner). All these technical events turned out to be important in the success of the teams according to the league rank. The success of the teams in the top rankings provided the superiority in the percentage of possession, accurate shooting, successful passes, and key passes. According to the analysis results, the success in the home matches was more meaningful, the teams exhibited more ineffective technical events in the away matches.

Practical application

Analysts can build a model for their teams by taking this current research and similar generalization study results and methods as an example. They can also examine their opponents' statistics in terms of match success, home, or away variables. Coaches can create training plans and match strategies appropriate to the information obtained from this research results. Researchers can conduct new research by removing variables and other samples that are outside the current study boundaries.

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