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Liverpool FC's Performance in Top 6 and Derby Matches - A Statistical Analysis

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Abstract

In this study, Liverpool FC players' performance in three English Premier League (EPL) seasons is aimed to be examined. Specifically, this papers scopes on whether players' performances significantly differ on derbies and against Top 6 teams. Players (n=725) are divided into four groups in respect to their positions on the pitch (goalkeepers, defenders, midfielders, attackers) and their performance data is collected from WhoScored.com, a website which gathers basic and advanced statistics from football leagues all around the world. By calculating players' different statistics with respect to their position in competition into Z-Scores and taking their average, we conducted T-Tests to measure whether Liverpool players perform significantly different in derbies/Top 6 matches and non-derby/Top 6 matches. All data are collected on personal computers and analyses are conducted on IBM SPSS 25.0. We found that goalkeepers did not perform significantly different between two types of matches while defenders, midfielders and attackers significantly differed ($p<.05$). In addition, we used support vector machine (SVM) algorithms to classify to differentiate two different types of matches with an accuracy of 97.77% overall.
Key Words*:* Football, performance, rivalry, machine learning.

Liverpool FC'nin İlk 6 ve Derbi Maçlarındaki Performansının İstatistiki Açıdan İncelenmesi

Öz

Bu çalışmada, İngiltere Premier Lig (EPL) takımlarından Liverpool Futbol Kulübü oyuncularının 3 (üç) sezon boyunca sergiledikleri performanslarının incelenmesi amaçlanmıştır. Çalışmanın kapsamı daha belirgin olarak oyuncuların performanslarının ilk 6 ve derbi maçlarında önemli ölçüde farklılık gösterip göstermediğini incelemektir. Oyuncular (n=725), sahadaki pozisyonları gereği dörde (kaleci, savunmacı, orta saha, hücumcu) bölünmüş ve gereken performans verisi WhoScored.com üzerinden toplanmıştır. Bu veriler kişisel bilgisayarlar üzerinde kayıt altına alınmış ve IBM SPSS 25.0 ile analiz edilmiştir. Farklı istatistikler Z-Skoru ile standardize edilmiş ve ortalamaları alınmıştır, buna binaen T-Testleri ile Liverpool oyuncularının İlk 6/Derbi maçlarda sezonun geri kalanına nazaran anlamlı farklılıkta performans gösterip göstermediği incelenmiştir. Çalışmanın sonucunda, kaleciler anlamlı bir farklılıkta performans sergilemese de geri kalan oyuncuların anlamlı bir farklılıkta performans gösterdiği kanıtlanmıştır. Ek olarak, destek vektör makine (SVM) kullanımıyla maçların arasındaki fark %97.77 olarak saptanmıştır.
Anahtar Kelimeler: Futbol, performans, rekabet, makine öğrenmesi.

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INTRODUCTION

"Football is just never football", as it is argued by British sports journalist Simon Kuper (Kuper, 2005). As a well-known activity in the world, football attracts many people from many different backgrounds and stays as a central topic for social sciences, such as psychology and sociology (Kavetsos, 2012).

As it is often the case in other sports fields, the concept of "performance" stands in the middle of football too. Gaining a deeper understanding of how and why it changes constitutes a great research problem, and in this study, we have aimed to explore where does the difference begins. Understanding how football team's match performances differ according to contextual or situational variables is crucial because it could increase the quality and applicability of further researches (Liu, 2015). In the past, most of the empirical researches related to match performances has taken specific aspects of the game into focus, such as patterns of play, or physiological estimates (Lago-Ballesteros & Lago-Peñas, 2010). Also, focusing on the development and utilization of performance indicators has also been highly suggested since the findings could constitute creating a profile for ideal performance (Jones, James & Mellalieu, 2004; Carling, Williams & Reilly, 2005). In this study, we aimed to consider different aspects of the team's performance and specific to Liverpool FC in derby context. In the literature, there have been other studies that tried to understand the technical performance difference in position within the derby context. (Redwood-Brown, O'Donoghue, Nevill, Saward & Sunderland, 2019)

This paper focuses its projection specifically on the area of sports psychology, which concerns itself with the behaviour of athletes. Many football clubs (Gilmore, Wagstaff, & Smith, 2017), including English National Men's Football Team have a special spot for applied sports psychologists for the success of their teams (Herbert, 2016). Interventions of these professionals have been efficient with positive outcomes on different athletes (Stavrou, Jackson, Zervas, & Karteroliotis, 2007). Meanwhile, basic sports psychologists try to answer hypothetical issues regarding techniques such as visual imagery training, injuries, human bonding within teammates and most importantly for this paper: rivalry (Danish & Male, 1981). The rivalries and the competition fuelled by the desire to obtain success and their importance are even expressed by the coach of Liverpool FC, Jürgen Klopp (Hunter, 2018).

Liverpool FC, being crowned as champions in the highest division of English football 18 times, is considered as a member of "top 6" club due to its consistency of being a contender for the league title (BBC, 2018). Moreover, Liverpool is a long-established club with its history that lasts longer than 135 years (Cronin, 2017). Their recent resurgence at Champions' League final was quoted as "incredible" by different authorities in press, similar to 2013/14 EPL season where they finished as runner-ups (King, 2019). The board also made significant transfers to their starting line-up within the last three seasons, including the top scorer of 2017/18 season Mo Salah ("Premier League Player Stats – Goals", n.d.) and "world's most expensive defensive player" Virgil van Dijk (McMahon, 2017).

Within the literature of sports psychology, many different aspects of psychology has been studied before, including coach change during the season (Balduck, Buelens, & Philippaerts,

2013) performance in away matches (Oberhofer, Phillipovich, & Winner, 2009), even the connection between skin colour and player positions (Mills, Ing, Markham, & Guppy, 2018). Even though Baker, Mechtel & Vetter (2012) argue that derby matches are not significantly different in terms of attendance, outcomes goals and attempts, the advanced factors in sports methodology have rarely been studied. Therefore, we believe that this study will spawn brand new discussions in the area of sports psychology and broaden the horizons of sports scientists. This paper hypotheses that Liverpool FC players will show significantly different performances in important and competitive matches which they play against Everton FC or against the Top 6 clubs when compared to other teams in English Premier League. At this point, it must be highlighted that Everton-Liverpool matches are one of the most popular sports activities in the UK and they are generally known as "Merseyside Derby". There is a long-lasting competition and rivalry between two (Pugsley & Rookwood, 2009).

We will be examining the performance of the Liverpool FC players in the last three seasons by looking into the specific characteristics of different positions. In addition, we implemented SVM algorithm to test whether we can classify the performances on different type of matches.

METHOD

Participants

This research does not hold any volunteering participants, rather, it has real life data collected from WhoScored.com. Population of Liverpool FC players had 792 players in total from 36 matches (36 derby/Top 6 and 36 non-derby/Top 6 matches) who performed in the EPL seasons of 2015/16, 2016/17 and 2017/18. By including all players from aforementioned seasons, we used convenience sampling. Going into further details, players were divided into 4 subgroups in respect to their positions: Goalkeepers, defenders, midfielders and attackers. Goalkeeper sample size was equal to 72 players (36 derby/Top 6 players and 36 non-derby/Top 6 players), defenders sample size was equal to 289 players (145 derby/top 6 players and 144 non-derby players), midfielders sample was equal to 219 (108 derby/Top 6 players and 111 non-derby/Top 6) and finally, attacking players was equal to 212 (107 derby/Top 6 players, 105 non-derby/Top 6 matches). However, from 36 matches in total, 5 matches were excluded (2 derby/Top 6 matches, 3 non-derby/Top 6 matches) due to red cards, which could have unpredictable impact on the game. In addition, some players were excluded due to the fact that their minutes in a specific match were at least 3 standard deviations away from the position mean. Those players experienced an injury during the exhibition, received a red card or simply were a part of a tactical substitution. Eventually, the data sets which analyses were conducted on had slightly smaller sample sizes (Goalkeepers' n=67, defenders' n=273, midfielders' n=197, attackers' n=188).

Design

In football, different positions may require different characteristics (Mills, Ing, Markham, & Guppy, 2018). Since different assets of positions are measured on different characteristics (i.e. pass percentage stretches between 0-100, nevertheless, saves are distributed from 0 to 12),

every single characteristic is standardized as Z-Scores. For goalkeepers, saves divided to shots on target, total passes and pass percentage and claims were collected. Similarly, pass percentage, aerials won, total passes and tackles were the stats the records kept for defenders. For midfielders, pass percentage, key passes and total passes were tracked. Attackers' shots, goals and dribbles were observed. Then, those standardized scores are computed into one variable by taking the average of variables for each player, which became our dependent variable. Those individual scores are run in independent sample T-Tests to test if Liverpool FC players' performance significantly differed between derby/Top 6 and non-derby/Top 6 matches, which are the levels of our independent variable. Since different positions demand different characteristics, every position is compared with a within design which allows us to observe same people with different conditions. Our independent variable here is the type of the match, whether it is a high competitive match against Top 6 (Bandyopadhyay, 2018) teams and Merseyside derbies against Everton or non-derby/Top 6 matches because it lacks historical and geographical rivalry (Baker, Mechtel, & Vetter**,** 2012).

In order to create a control group and compare derby/Top 6 conditions with non-derby/Top 6 conditions, we randomly selected six teams from English Premier League between the years of 2015-2018. Of course, Top 6 clubs and Everton were excluded from the population, as well as the relegated teams of 2015-16 (Aston Villa, Norwich City & Newcastle United) and 2016-17 (Sunderland, Middlesbrough & Hull City) seasons for the continuum of the teams within seasons (Premier League Tables, 2019.). As a result, our random sampling result consisted of Crystal Palace, West Ham United, Watford, Swansea City, Leicester City and West Bromwich Albion (see Appendix A).

Procedure

The first step towards conducting this research was applying for an ethical approval. Ethical approval of this study was given by Institution 1 Human Subjects Ethics Committee on 07.03.2019, which will last for 6 months. Then, the data of this study is collected for four different main positions of football: Goalkeepers, defenders, midfielders and attackers. Each of those datasets are kept separately for the convenience of analyses. As aforementioned above, the data of the players were collected from WhoScored.com, a website that keeps track of professional football players all around the world, whose basic data is open to public. Specifically, data was gathered from the "Match Centre" of the competitions by hand. Not only the individual statistics, but also can one see team stats such as possession and corners. Furthermore, minutes of substitutions and number of red cards are also present. The data set for derby/Top 6 matches is kept in one separate Microsoft Excel file and the data of non-derby/Top 6 matches is kept in two separate Microsoft Excel files. Later, all those data were merged into one IBM SPSS 25.0 file and the analysis was conducted.

SVM Dataset

In this research, we have four separate datasets named by attack, defence, goalkeeper and midfielder. In each dataset contains Liverpool football club players' normal game performance information and derby game performance information. Attacking players' information represents in attack dataset, defensive players information represents in defence

dataset, goalkeeper's information reveals in goalkeeper's dataset and lastly midfield players information disclosed in midfielder's dataset. Attack dataset includes 16 attributes and 188 instances, defence dataset includes 17 attributes and 273 instances, midfielder's dataset includes 16 attributes and 197 instances, and goalkeeper's dataset includes 19 attributes and 67 instances. Match, Player, Position, Shots, Goals, Minutes Played and Match Type attributes are the unique attributes for the four data sets. Match Type attributes which is the nominal attribute includes derby or not derby information of every game.

Preprocessing

In the preprocessing phase, backward elimination feature selection method had used in order to determine useful and effective performance measures in both four separate datasets. After the backward elimination method implemented, attack dataset contains 8 attributes, defense dataset includes 10 attributes, and midfielder's dataset contains 10 attributes and goalkeeper's dataset attributes reduced to 11 attributes.

RESULTS

Each characteristic for each subgroup is standardized as Z-Scores before taking T-test to obtain clear results as foretold above. After that, the difference in terms of the 4 different positions was computed via independent samples T-test for our hypothesis: Liverpool FC players' performance significantly differed between derby/Top 6 and non-derby/Top 6 matches. 4 T-tests have been conducted for each 4 subgroups to test our prediction. Consistent with the present study's hypotheses, it turned out that there was significant difference on Liverpool FC players' performance between derby/Top 6 and non-derby/Top 6 matches for defenders, midfielders and attackers ($p < .05$) but no goalkeepers.

Goalkeepers

Table 1. Group statistics

	Match Type	N	Mean	St. Dev.	St. Er. M
z_success	Derby/Top6	34	-,0470	,45042	,07725
	Not Derby	33	,0664	,56182	,09780

Table 1 provides the descriptive statistics for goalkeepers. The goalkeepers' performances were divided into two for a t-test: Derby/Top6 (n=34, M=-.05, SD=.45) and non-derby/Top 6 matches (n=33, M=-.07, SD=.56). There was no missing statistics in z_success. The data was normally distributed with the skewness of .40 (SE=.29) and kurtosis of .29 (SE= .58). There was no missing data in the goalkeepers' z_success as the minimum value was equal to -1.08, the maximum value was equal to 1.50.

Table 1.a. Independent samples test

	Levene's Test		T-test				
z_success	**F**	**Sig.**	**t**	**df**	**Sig.(2-tailed)**	**Mean Diff.**	**Std. Er. Diff.**
Equal variances assumed	1,034	,313	-,913	65	,364	-,11345	,12422
Equal variances not assumed			-,910	61,26	,366	-,11345	,12463

*Difference is significant at the p = .05 (2-tailed)

Table 1.a demonstrates the independent T-test which points out that Liverpool FC goalkeepers' performance did not significantly differ between derby/Top 6 and non-derby/Top 6 matches ($t(65)=-.913$, $p = .364$).

Defenders

Table 2. Group statistics

	Match Type	N	Mean	S	St. Er. M.
z_success	Derby/Top6	141	-,1354	,53844	,04534
	Not Derby	132	,1418	,50609	,04405

Table 2 demonstrates the sample sizes, mean, standard deviation and standard error mean. Once again, Like goalkeepers, defenders have two types of performances: Derby/Top6 (n=141, M=-.14, SD=.54) and non-derby/Top 6 matches (n=132, M=.14, SD=.51). There was no missing statistics in z_success. Data's skewness and kurtosis were tested as well and it turns out to be normally distributed as the skewness is -.16 (SE=.15) and kurtosis equals to 1 (SE= -.30). The minimum value was equal to -2.24 while the maximum value was equal to 1.63.

Table 2.a. Independent samples test

	Levene's Test		T-test				
z_success	**F**	**Sig.**	**t**	**df**	**Sig.(2-tailed)**	**Mean Diff.**	**Std. Er. Diff.**
Equal variances assumed	,451	,502	-4,37	271	,000	-,27716	,06335
Equal variances not assumed			-4,38	270,99	,000	-,27716	,06322

*Difference is significant at the p = .05 (2-tailed)

Table 2a illustrates there is a significant difference between Liverpool FC defenders' performance in derbies/Top 6 matches and non-derby/Top 6 matches ($t(271)=-4,37$, $p <.05$).

Midfielders

Table 3. Group statistics

	Match type	N	Mean	St. Dev.	St. Er. M.
z_success	Derby/Top6	98	-,0956	,57220	,05780
	Not derby	99	,1039	,61178	,06149

The sample sizes, mean, standard deviation and standard error mean were shown in Table 3. As usual, players are categorized into two: Derby/Top6 (*n*=98, *M*=-.10, *SD*=.57) and non-derby/Top 6 matches (*n*=99, *M*=.10, *SD*=.61). Moreover, there was no missing statistics in z_success. We have further analyzed the homogeneity of the data as well, which was normally distributed with the skewness of -.28 (SE=.17) and kurtosis of 2.55 (SE= .345). The data stretches between the values of -2.51 and 1.69.

Attackers

Table 3.a. Independent samples test

	Levene's Test		T-test				
z_success	**F**	**Sig.**	**t**	**df**	**Sig.(2-tailed)**	**Mean Diff.**	**Std. Er. Diff.**
Equal variances assumed	1,303	,255	-2,36	195	,019	-,19947	,08442
Equal variances not assumed			-2,36	194,37	,019	-,19947	,08439

*Difference is significant at the p = .05 (2-tailed)

Table 3.a. points out Liverpool FC midfielders' performance significantly differed between derby/Top 6 and non-derby/Top 6 matches ($t(195)=-2.36$, $p < .019$).

Table 4. Group statistics

	Match Type	**N**	**Mean**	**St. Dev**	**St. Er M**
z_success	Derby/Top6	104	-,1582	,65622	,06435
	Not Derby	84	,0614	,67383	,07352

Table 4 demonstrates the sample sizes, mean, standard deviation and standard error mean. Attackers were also divided into two, Derby/Top6 (*n*=104, *M*=-.16, *SD*=.66) and non-derby/Top 6 performances (*n*=84, *M*=-.06, *SD*=.67) Similar to other positions, there was no missing statistics in z_success. Data's skewness and kurtosis were tested as well and it turns out to be normally distributed as the skewness is .80 (SE=.18) and kurtosis equals to .86 (SE= .353). The minimum value was equal to -2.24 while the maximum value was equal to 1.63.

Table 4.a. Independent samples test

	Levene's Test		T-test				
z_success	**F**	**Sig.**	**t**	**df**	**Sig**	**Mean Diff.**	**Std. Er. Diff.**
Equal variances assumed	,031	,861	-2,25	186	,025	-,21955	,09743
Equal variances not assumed			-2,24	175,7	,026	-,21955	,09770

*Difference is significant at the p = .05 (2-tailed)

As stated in Table 4a, Liverpool FC attackers' performance was significantly different between derby/Top 6 and non-derby/Top 6 matches ($t(186)=-2.25$, $p <.05$).

SVM

Support vector machine classifier is used to determine the classification results in order to specify if match type is derby or not. Polynomial kernel with C-SVC type of support vector machine classifier is used to fit the problem and 10-fold stratified cross-validation used to evaluate performance metrics. The sample size of ten values randomizes the seed for avoiding the number of repetitions in order to calculating mean, variance, true positive rate, false positive rate, precision, recall, f-measure, Matthews's correlation coefficient, receiver operating characteristic and precision-recall area.

Goalkeepers Dataset

In this research accuracy rate is calculated %97.60 mean value and variance is calculated 0.60 on goalkeeper data set results. Figure 2 illustrates the weighted average of the true-false positive rates, precision, recall, f-measure, Matthew's correlation coefficient, receiver operating characteristic and precision-recall area values.

Table 5. Goalkeepers' detailed accuracy by class

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	1,000	0,061	0,944	1,000	0,971	0,942	0,970	0,944	d
	0,939	0,000	1,000	0,939	0,969	0,942	0,970	0,969	n
Weighted Average	0,970	0,031	0,972	0,970	0,970	0,942	0,970	0,957	

In addition as a result of goalkeeper, data set kappa statistic, mean absolute error and root mean squared error values are calculated 0.94, 0.029 and 0.17.

Defenders Dataset

In this research accuracy rate calculated %97.87 rate mean value and variance calculated 0.14 on defence dataset results. Figure 3 illustrates the weighted average of the true-false positive rates, precision, recall, f-measure, Matthew's correlation coefficient, receiver operating characteristic and precision-recall area values.

In addition as a result of goalkeeper, data set kappa statistic, mean absolute error and root mean squared error values are calculated 0.95, 0.022 and 0.14.

Table 6. Defenders' detailed accuracy by class

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,972	0,015	0,986	0,972	0,979	0,956	0,978	0,972	d
	0,985	0,028	0,970	0,985	0,977	0,956	0,978	0,963	n
Weighted Average	0,978	0,022	0,978	0,978	0,978	0,956	0,978	0,968	

Midfielders Dataset

In this study accuracy rate calculated %97.20 percent mean value and variance calculated 0.75 on midfielder data set results. Figure 4 illustrates the weighted average of the true-false positive rates, precision, recall, f-measure, Matthew's correlation coefficient, receiver operating characteristic and precision-recall area values.

Table 7. Midfielders' detailed accuracy by class

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,939	0,030	0,968	0,939	0,953	0,909	0,954	0,940	d
	0,970	0,061	0,941	0,970	0,955	0,909	0,954	0,928	n
Weighted Average	0,954	0,046	0,955	0,954	0,954	0,909	0,954	0,928	

In addition, as a result of goalkeeper, data set kappa statistic, mean absolute error and root mean squared error values are calculated 0.93, 0.025 and 0.15.

Attackers Dataset

In this research accuracy rate calculated %98.4 percent mean value and variance calculated 0.25 on attack data set results. Figure 1 illustrates the weighted average of the true-false positive rates, precision, recall, f-measure, Matthew's correlation coefficient, receiver operating characteristic and precision-recall area values.

Table 8. Attackers' detailed accuracy by class

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,990	0,024	0,981	0,990	0,986	0,968	0,983	0,977	d
	0,976	0,010	0,988	0,976	0,982	0,968	0,983	0,975	n
Weighted Average	0,984	0,018	0,984	0,984	0,984	0,968	0,983	0,976	

In addition, as a result of attack data set, kappa statistic, mean absolute error and root mean squared error values are calculated 0.96, 0.016 and 0.12.

DISCUSSION

This study aimed to test whether Liverpool F.C players performed significantly different in derby/Top 6 matches compared to normal matches and it is one of the leading researches in the area as it is distinguished by focusing on quantitative performance data. One of the main sub-questions were whether there could be a difference between positions, and we have found a significant difference in the performances of defenders, midfielders and attackers but no significant results were found for goalkeepers. Our prediction was only upon the existence of a difference but according to our results Liverpool FC players play significantly worse in English Premier League (EPL) matches. There might be various reasons of our result when we consider the importance of derby/Top 6 matches and the additional variables it brings.

Amongst others, one reason may be the ingrained mindset of derby matches being highly important in many aspects, for example, rivalries of that kind can bear importance not only in psychology but also in greater spheres such as sociology and economics (Bandyopadhyay, 2018). In the light of those greater spheres and search of a satisfying answer for the question of changing performance levels, Karanfil (2017) acknowledges that performance is quite a large phenomenon, however, half of the undulant performance of football teams in derby matches can be explained by rivalry. In a similar vein, Doran & Jordan (2018) also argue that rivalry can be extremely motivating for athletes in competition with their rivals. This motivation and the notion of rivalry might fuel performance, both physiologically and mentally. While perceiving the opponent as rivals may increase testosterone levels of players and thus exceeding their performance barriers, the historic rivalry could also influence the motivational climate and therefore affect the mentality of players (Castro-Sánchez, Zurita-Ortega, Chacón-Cuberos, López-Gutiérrez, & Zafra-Santos, 2018; Neave & Wolfson, 2003).This kind of an impact is already presented in the literature by Pike, Kilduff, & Galinsky (2018), implying that performance of American teams in major sports leagues such as NCAA, NFL and MLB are affected by the teams that they rival.

One another reason why we have found these results may be the anxiety that the mindset of playing against big teams creates for the players. Another reason might be the effect of audience since in "important" matches it may create a stress effect combined with the natural importance of the match itself and may even result in choking (Vealey, Low, Pierce, & Quinones-Paredes, 2014). When we consider the findings of a recent study, stress level does have a significant effect on the physical performances of the players (Brick, Fitzpatrick, Turkington, & Mallett, 2019). This level of stress might be arisen by the symbolic and cultural importance attributed to the matches by the fans. Lee, Kim, & Chang, (2016) state that derbies draw more interest from fans and as a result, they are watched more. This kind of an interest may affect players' psychology and therefore, their performance on pitch (Abdullah et al., 2016). Having this in mind, our findings are consistent with the results of previous literature, especially with Jones and Cale's (1997) study which supports that players' performance might significantly changes according to the difficulty of the task that they were given and rising anxiety levels. Yet, we should note that we cannot measure anxiety level of players and this finding can only be subject to a future study. Another important aspect about our findings is that only the goalkeepers do not perform significantly different. One of the reasons of this finding may be that different difficulty levels do create difference between position performances (Martín, Sfer, Villar, & Barraza, 2017).

SVM based classification is also included in this study and the results show that it is highly effective method to classify players' individual performances on derby/Top 6 matches and non-derby/Top 6 matches. With an average of 97.77% accuracy, SVM algorithm seems like a prolific one.

About limitations, our data was not biased since we did not collect it by hand and had proper exclusion criterion. We think, in the future, similar replication studies should be conducted with including the level of stress, anxiety and more external factors. We accept the fact that we cannot measure psychological and physiological factors on those Liverpool FC players,

therefore, we confirm that this might be an important limitation. Nevertheless, we believe that this study may spot new gaps in the existing literature of sports sciences and hope it will bring new research on those factors that are mentioned above. The relation between the team and technical director might be examined as well and data collected from teams coming from different cultural contexts may also affect the results. Also, the internal validity of our study might be weakened because of the different positions we have compared. Even though we have standardized our scores, another study which examines positions one by one could be more informative for the future references. In conclusion, our study tried to fill the gap in sports psychology literature in terms of comparing position performances in the specific context of derby/Top 6 matches. If there could be expansions to its content and replications done highly effective results can be seen for the fruitful continuity of the field. We believe, it constitutes an adequate starting point for further research.

CONCLUSION

As it is hypothesized in this study, Liverpool FC defenders, goalkeepers and attackers have been found to show significantly lower levels of performance and recorded less of their key characteristics in their matches against Top 6 sides and in Merseyside Derbies ($p<.05$). Players' performances are taken into consideration with respect to their position and their key aspects of the game are calculated. However, it should be noted that goalkeepers' performance does not significantly vary between those two types of matches. Moreover, it is suggested that machine learning algorithms such as SVM may be used to discriminate between the type of the matches since the observed accuracy was 97.7% overall.

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Conflicts of Interest: The authors declare no conflict of interest.

Ethical clearance (approval): That is especially important when conducting research with humans. The major principle for making sure that no harm is done to any participants in the research. Also as this was not an interventional study, 'permission form' and 'voluntary confirmation letter' were taken from all the participants.

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Appendix A