

The effects of ball possession and won duels for the success of the match in the European Football Championship – Euro 2020

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Abstract

Aim: the aim of this research is to show the relations, effects, and interactions of ball possession, won duels, and goals scored inside the penalty area in the European Football Championship, Euro 2020. **Methods:** the research involves 24 final stage teams in the tournament and the above-mentioned relevant factors for the success of the match were analyzed. The percentage of ball possession is divided into three groups (low, medium, and high), the percentage of won duels are divided into two groups (low and high), while all goals scored inside the penalty area are taken into account for the success of the match. Two-way factorial variance analysis ANOVA was used to calculate the main and intercept effects. **Findings:** ball possession has shown a significant main effect ($(F_{2,18}) = 17.60$, $p < 0.001$, $\eta^2 = 0.66$), which means that teams, depending on the percentage of ball possession, showed differences in goals scored within the penalty area. Duel winning has shown no statistically significant main effect ($(F_{1,18}) = 2.09$, $p > 0.16$, $\eta^2 = 0.10$). Therefore, the success of scoring goals probably does not depend on the percentage of won duels. Interaction, ball possession and duel winning show statistically significant effects ($(F_{2,18}) = 4.16$, $p < 0.03$, $\eta^2 = 0.31$) for the success of the match, respectively goals scored within the penalty area. **Discussion:** ball possession from a low to a medium percentage is influenced to some extent by won duels in relation to the success of goals scored within the penalty area, while teams with a high percentage of ball possession and a low percentage of won duels managed to achieve a larger number of goals within the penalty area.

Key Words: football, match analysis, performance indicators.

Introduction

Recently, the game pattern with high ball possession has taken extraordinary proportions in elite football clubs. Ball possession is characteristic of teams with mainly striking style and match dominance, and there is no coincidence that many teams like FC Barcelona, Manchester City, Bayern München, Spain national team, etc. have been very successful. On the other hand, teams that are unable to reach high percentage of ball possession must either have a good defense, or win a lot of duels to reduce the opponent's ball possession. Ball possession is considered a highly complex phenomenon as it is related to many factors like the ball possession zone, opponent team quality, playing as a guest or a host, etc., thus requiring further research (Merlin et al. 2020).

Successful teams in the Champions League, world championships and the European Cup show high ball possession compared to losing teams (Hook & Hughes, 2001). Even findings in the English Premier League show that there is a significant difference in the ball possession time between successful and unsuccessful teams (Jones et al., 2004). The analysis of the 2008 European Football Championship shows close correlation of attack actions' duration and prediction of the result outcome (Cacal et al., 2015). Hence, ball possession duration and the success of the match were also analyzed in the French European Championship, thus proving a close correlation between them (Casal et al., 2017).

The best national teams (Spain, Germany, Italy, etc.) tried to dominate matches even in the European Championship by putting pressure on the opponent as fast as possible in order to possess the ball and dominate the game. Clearly, a team with a good ball possession is always offered a chance to initiate an attack action and at the same time keep the opponent away from the ball (Hughes, 1991).

Although ball possession certainly has many advantages and players feel better when they often keep the ball, it is necessary to understand that ball possession does not score goals by itself, but a good game with ball possession, through good positioning, quality passes and necessary patience, through which the opponent has to make numerous moves, immensely helps in creating chances of scoring a goal. Ball possession is in itself means of achieving to the goal, i.e., to score a goal, while the opponent can only score a goal if he possesses the ball (excluding penalties, ball deviations, etc.), therefore keeping the ball gives the opponent less chances of scoring a goal (Escher, 2020).

Over 19.000 matches have been analyzed in a survey by the International Center of Sports Studies from 35 European leagues, looking closely at the relationship between ball possession and goal difference. The result was quite simple: the more ball possession, the more points – hence, ball possession is extremely important! The number of points increases significantly starting from 57% of ball possession. If ball possession increases above 75%, then the chance of winning the game is

significantly higher, and it is common for the team with a higher ball possession to score one more goal. It is often the opposite in cases with teams with lower ball possession. If a team's ball possession falls below 40%, things get complicated. Teams with less than 30% of ball possession can hardly avoid losing. Nevertheless, there are individual cases when teams with very low-ball possession win matches from time to time (CIES, 2019).

However, some studies associating ball possession with the outcome of the match have shown that teams modify ball possession depending on the outcome of whether they are winning, are in a draw or losing the match. On the one hand, researches by Jones et al. (2004), Lago & Martin (2007), Lago-Peñas (2009), Lago-Peñas and Dellal (2010) and Barreira et al. (2011) show that teams losing the matches had longer time of ball possession. On the other hand, researches by Bloomfield et al. (2005), Taylor et al. (2008), Casal et al. (2019) and Maneiro et al. (2020) show the opposite from these results, claiming that a longer time of ball possession is observed in teams winning the matches. Also, researches clarify that home teams have higher percentage of ball possession than away teams (Almeida et al., 2014).

Nonetheless, it should be noted that ball possession is overestimated as a concept, but underestimated as a means for a specific purpose. No really ambitious team wants to possess the ball so their players would play with the ball endlessly – but to score goals. Hence, you do not play for 'ball possession,' but you use ball possession to score against your well-organized opponents. On the other hand, direct duels are considered by many people to be the essence of a soccer match: one has the ball, the other wants the ball. But are won duels really that important?

A football match consists of approximately 250 duels, i.e., about three fouls per minute. Even the best defenders lose on average every third duel, despite intense duel training (Fussballtraining.de, 2019). In principle, each contested duel may result in keeping or losing the ball. Most teams with low technical abilities use duels to interrupt opponents' actions or win the ball.

A closer observation of the data suggests that the global duel quota hardly allows to come to any conclusion about success chances or team's behavior. Duel location and type is much more important than duel number or quota. A lost duel with the ball on the side of the opponent penalty area is usually less serious than the one ten meters away from your goal (Zenger, 2020).

Therefore, the context is crucial from a tactical point of view: if teams retreat to a defensive position and narrow the space, they will certainly win many duels in their defensive zone – but there will be a long way to reach the opponent's gate after winning the ball. On the other hand, if teams make pressure on the opponent's half, there will only be few won duels as the opponent usually plays fast and with long balls when put under pressure. However, if a duel is won in the opponent's half, it often results with a better chance of scoring a goal.

As for the percentage of won duels, depending on the position of defensive players (right-back, center-back or left-back) there are no statistically significant differences between them (Konefat et al., 2019).

Finally, losing duels should not only be focused on the final lost duel before a goal is scored, but on a 'chain' of lost duels which ultimately make the difference (that are decisive). There is no way to completely avoid losing duels, but they may only be reduced with training and necessary experience.

The focus of ball possession and duel winning, however important, are only some of the complex factors that could have an impact on the success of the match. The penalty area was considered to be the target of most teams in the last European Championship Euro 2020 because out of 142 scored goals in 51 matches, the number of goals scored within the penalty area reached a 79.6% quota (UEFA, 2022a). Studies show that winning teams perform better in the opponent's penalty area than drawing or losing teams (Ruiz-Ruiz et al. 2013). Therefore, this study aims to show the relationship between these variables in relation to goals scored inside the penalty area through ball possession and won duels indicators.

Method

Study sample and model

A total of 24 final stage teams in the European Football Championship Euro 2020 were included in the research. Data from the official UEFA website were used for the analysis of the relevant factors for the success of the match, namely the effects of ball possession and duel winning on goals scored within the penalty area. The percentage of ball possession is divided into three groups: low, medium and high, the percentage of won duels is divided into two groups: low and high, and the number of goals scored within the penalty area (16 meters), excluding goals scored from penalties, has been used as a variable for the success of the game.

Data analysis

According to the findings of the normal distribution of data through the Kolmogorov-Smirnov test ($p > 0.05$) and Levene's homogeneity of variance test ($p > 0.05$), two-way ANOVA was used to determine the effects of the main factors and interaction. Differences in the mean percentage of ball possession are calculated using the Post Hoc test (Bonferroni). Data calculation was carried out using the SPSS 25 statistics software.

Results

Table 1. Descriptive Statistics of Goals in the Penalty Area

Ball Possession	Won Duels	M	SD
Low	Low	1.00	.81
	High	3.00	.81
	Total	2.00	1.30
Medium	Low	3.80	2.16
	High	7.00	2.64
	Total	5.00	2.72
High	Low	8.33	2.08
	High	6.40	1.81
	Total	7.12	2.03
Total	Low	4.00	3.33
	Medium	5.41	2.42
	Total	4.70	2.94

Table 1 shows mean values of goals scored within the penalty area in relation to the low (M=2.00, SD=1.30), medium (M=5.00, SD=2.72) and high (M=7.12, SD=2.03) ball possession percentage, as well as in relation to the percentage of won duels in the match. A high ball possession percentage results in a higher average of goals scored inside the penalty area.

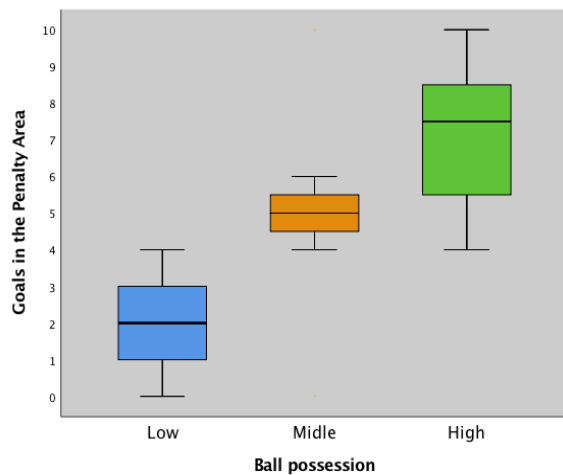


Figure 1. Mean goals scored inside the penalty area in relation to ball possession

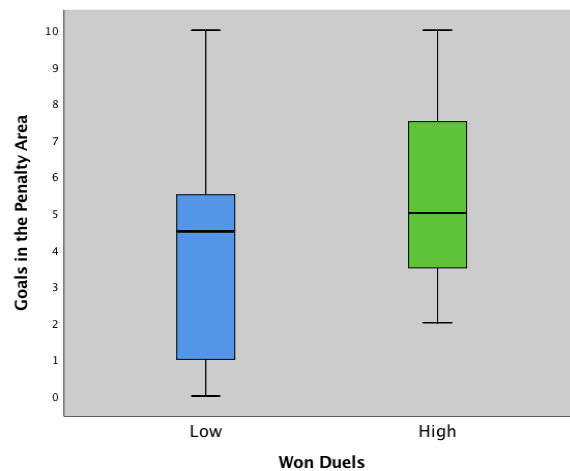


Figure 2. Mean goals scored inside the penalty area in relation to won duels.

Figures 1 and 2 show average goals scored within the penalty area in relation to ball possession and won duels factors. A big difference is observed in the average figures of the ball possession factor groups, but the same does not apply for the won duels factor in the match.

Table 2. Tests of between-subject effects of goals in the penalty area.

Source	SS	df	MS	F	Sig.	η^2
Korrigiertes Modell	140.292 ^a	5	28.058	8.609	.000	.705
Konstanter Term	556.735	1	556.735	170.816	.000	.905
Ball Possession	114.749	2	57.375	17.604	.000	.662
Won Duels	6.811	1	6.811	2.090	.165	.104
Ball Possession * Won Duels	27.140	2	13.570	4.164	.033	.316
Error	58.667	18	3.259			
Total	731.000	24				

a. R-Squared = ,705 (Adjusted R-Squared = ,623)

Table 2 shows the results of the effect of factors and their interaction on goals scored within the penalty area.

The two-way ANOVA shows that there was a statistically significant interaction between the effects of ball possession and won duels ($F(2, 18) = 4.164, p < 0.033, \eta^2 = .316$).

The simple main effects analysis shows that ball possession did have a statistically significant effect on goals in the penalty area ($F(2, 18) = 17.604, p < 0.001, \eta^2 = .662$).

The simple main effects analysis shows that won duels did not have a statistically significant effect on goals in the penalty area ($F(1, 18) = 2.090, p > .165, \eta^2 = 0.104$).

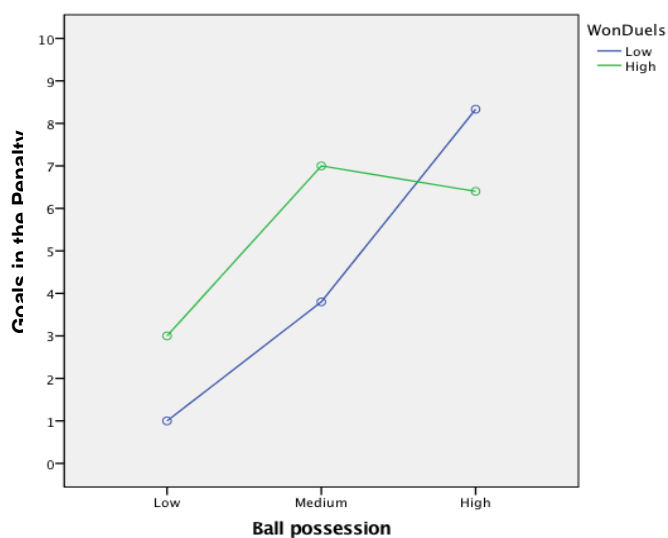


Figure 3. Mean goals scored inside the penalty area in relation to the interaction of ball possession and won duels factors

The graph in Figure 3 shows the relationship of ball possession with goals scored within the penalty area and won duels. The relationship of these two variables shows that as the ball possession increases, so do the chances of scoring a goal within the penalty area.

The interaction of ball possession and won duels is evident from the different profile slopes in the graph (i.e., non-parallel lines).

Table 3. Multiple comparisons of goals in the penalty area.

(I) Ball Possession	(J) Ball Possession	Mean Difference (I-J)	SE	Sig.
Low	Medium	-3.0000*	.90267	.011
	High	-5.1250*	.90267	.000
Medium	Low	3.0000*	.90267	.011
	High	-2.1250	.90267	.090
High	Low	5.1250*	.90267	.000
	Medium	2.1250	.90267	.090

*. The mean difference is significant at the .05 level.

Table 3 shows the differences between the groups of goals scored within the penalty area in relation to the ball possession percentage. There are differences, statistically significant, between the groups with a low (Low - Medium, $p < 0.05$), medium and high percentage of ball possession (Low - High, $p < 0.05$), while the group with medium percentage of ball possession does not show a statistically significant difference with the group with a high ball possession (Medium - High, $p > 0.05$).

Discussion

Given the fact that 2/3 of all goals in Euro 2020 were scored within the penalty area, it is preferred to pay special attention to the factors leading to the most effective ways of reaching to the most wanted area of scoring. Based on the Euro 2020 data, the analysis of the relationship of ball possession and won duels in relation to the success of goals scored within the penalty area has shown special statistically significant effects.

Recently widely rumored, one of the favorite ways of playing a match by many coaches in this championship was the one with a high percentage of ball possession. This is also noticed by the mean percentage in the research, where the group with the highest percentage of ball possession in relation to won duels reached 7.12 goals compared to the medium-percentage group with 5 and the low-percentage group with a total of 2 goals.

Ball possession explains the 66% of the mean variance of goals scored within the penalty area ($p < 0.001$, $\eta^2 = 0.662$). It is certain that the confidence of dominating the match through ball

possession also increases the possibility of searching for free space inside the penalty area to finalize actions. Otherwise, from another point of view this also enables avoiding duels of winning the ball because the team already owns it.

Won duels during a match are unlikely to have statistically significant impact on scoring goals within the penalty area ($p > 0.165$). As teams are unable to have high percentage of ball possession, they have to fight harder and win duels, thus increasing the possibility of creating new chances and preventing the opponent from winning the ball.

The interaction of ball possession percentage and won duels percentage shows statistically significant effect on the mean goals scored within the penalty area ($p < 0.033$, $\eta^2 = 0.316$). Hence, duel winning has a significant influence on rising the percentage performance of ball possession.

Figure 3 shows that teams with a high percentage of duel winning and low percentage of ball possession have an impact on goals scored within the penalty area to a certain extent, while teams with a high percentage of ball possession and less won duels reached the highest mean percentage of goals scored within the penalty area. Successful performance within the penalty area depends more on the high percentage of ball possession.

Increasing the number of goals scored within the penalty area with a low percentage of ball possession to a medium one seems to be not that emphasized for both levels of won duels, while the transition from the medium percentage to the high percentage of ball possession is much more preferred to teams with a low percentage of won duels, which can hardly be said for teams with high percentage of won duels.

According to the data analysis from Table 3, there are no statistically significant differences in the results of the groups with medium and high ball possession percentage ($p > 0.90$), which means that teams can count on the possibility of increasing the mean number of goals within the penalty area with a significant percentage of ball possession.

It is no coincidence that a significant number of teams during matches persistently try to keep the ball as long as possible, dominating the space and trying to reach the opponent's penalty area in the most effective way, an area with the largest number of scored goals in the championship. This was also observed in the final match where the actual champion had a 61% of ball possession compared to the losing finalist, England, with a 39% of ball possession (UEFA, 2022b).

Conclusion

Based on the European Football Championship Euro 2020 data and the research analysis, it can be concluded that teams with a very high percentage of ball possession reach higher average of goals scored within the penalty area, while teams with a low percentage of ball possession may have been influenced by duel winning to increase the percentage of ball possession and mean scored goals.

According to the results of the research, we suggest that elite national teams with high percentage of ball possession can increase their scoring chances within the penalty area because ball possession, in addition to dominating the game, increases the chance of reaching the space within the penalty area for a final pass leading to a goal, leaving the opponents with less chances of possessing the ball and keeping them away from their own goal. As it is proven before, technical activities are likely to have more statistically significant impact on the success of the match than physical activities (Carling, 2013; Castellano et al., 2012; Di Salvo et al., 2013; Hoppe et al., 2015).

Although the style of the game with ball possession is still essential to many elite clubs, it should be noted that such tendencies cannot be undisputable for weaker teams for which many fundamental studies are required because a higher percentage of ball possession is eventually related to pass accuracy and a number of complex factors comprising the success of the game (CIES, 2019).

Perhaps, a significant number of teams that are not able to have a high percentage of ball possession will be forced to regain it through won duels, taking advantage of fast counterattacks and trying to win more space as fast as possible to reach the opponent's penalty area. Although research findings suggest that won duels have no direct impact on the mean number of goals scored within the penalty area, the possibility that a won duel could be as valuable as winning the match should never be excluded.

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