2016 EUROPEAN FOOTBALL CHAMPIONSHIP GOAL ANALYSIS

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The objective of this study is to determine the factors in preparing the attacks that resulted in goal and to research the factors that influenced goal formation in 2016 European Football Championship matches.

The data were analyzed through video recording system and match viewing criteria table. Match viewing criteria table is hand notation system. All the data obtained were recorded in SPSS program and chi-square test was conducted to find out the differences between frequency, percentage and distributions.

In 2016 European Football Championship, a total of 51 matches were played with the participation of 24 teams and 108 goals were scored. 47 (92,16%) of these matches ended with goals, while the remaining 4 (7,84%) ended without goals. In 2016 European Football Championship, the highest goal average was in quarter finals. The rates of passes before goal were 15,7% for one pass, 25,9% for two passes and 58,3% for three and more passes. There is a significant difference between the rates of numbers of passes before goal ($p<0.01$). Statistically significant difference was found between the rates of goals scored from within the penalty area and outside the penalty area ($p<0.01$). There is significant difference between the rates of pre-goal moves ($p<0.01$). There is significant difference between the rates of goalkeeper mistakes ($p<0.01$). When the time interval of goals was analyzed, it can be seen that the highest number of goal was between minutes 31 and 75. The rate of goals scored in the first half was 35,2% and 64,8% in the second half.

As a conclusion, it can be seen that the contributions of players other than strikers to the score and headshot goals influence the result of the competition. Flat passes and shoots with one hit from the penalty area have been found to influence the rate of goal positively. Thus, it is thought that taking these data into consideration in technical and tactical trainings will influence success positively.

Key Words: Football, goal, analysis

Introduction. Football, which has an important place in today's world, has become an industry with both viewer and media superiority. It is watched with interest and excitement in each continent by millions of people. Although there are about 20 sports played with ball in the world today, the most popular is football when people think about ball game [1]. Thus, football is different from other branches to a great extent since it is a sport for viewing and since it is watched by a great number of people [2].

The most important factor that determines the result in football is “goal”. However, viewer’s ignoring the part until the last shot and being interested in the result can cause errors. This error can sometimes be seen even in coaches related with football. One way to get away from these errors is analysis. In football, planning the training season is very important in realizing an effective game. Competition analysis helps doing this and different kinds of data are revealed. The purpose of competition analysis and observation in football is the objective recording of the information during competition and training and obtaining correct statistical and numerical results to determine the form of performance parameters [3, 4].

Competition analyses are important tools that collect information about the moves in sport competitions and organize this information in line with purposes and that can be used to realize the desired changes in players individually or in the team performance as a whole [5]. Analysis systems which are used for competition analysis in football can give important data about the match related statistics of players’ actions such as shooting, fouling, passing the ball and ball control and bout the performance indicators of successful or unsuccessful teams [6]. In return, performance indicators revealed by competition analyses conducted with correct data according to specific criteria can make important contributions to trainers’ process of making the correct decision [7].

In competition analysis, the method of assessing the general performance plays an integrative role. While assessing football, many parameters that make up football should be separated, examined and recorded. One of the greatest benefits of competition analysis meeting this necessity and presenting an opportunity to assess the team’s moves within the game numerically. These numerical values can be converted into both the team in general and also individually on the basis of player [8, 9].

The objective of this study is to determine the factors in preparing the attacks that resulted in goal and to research the factors that influenced goal formation in 2016 European Football Championship matches.

Material and method. The matches were watched on live broadcast or later with video recording system and they were analyzed with the method of game watching criteria table and hand notation system (in hand notation system, the data are hand written manually on a form). The form has the shape of a chess board divided into squares according to the number of variables. The observed data is handwritten on the line that variables are followed.

The parameters used in the analysis were recorded as; the goal scorer’s being the goal keeper, defender, mid fielder or striker, the time interval between minutes 1-15, 31.-45., 46.-60., 61.-75., 76.-90. and 91.-120 minutes in which the goal is scored, the number of passes before goal

(1-2-3 and more passes), long or short pass before goal; the pass before goal being given from the right, left or middle corridor of the field by taking the goal post opposite, type of pass before goal, the goal shoot being by head, left foot or right foot, goal being shot from the right, left and middle part of the area when the goal post is opposite, gal shooting place, the rate of the attack being counter attack or organized, and the goalkeepers conceding goal from the right, left, over the head and between the legs.

While determining the number of passes before goal, the passes are counted with the possession of the ball from the defending team. In dividing the field into parts, the part between the kick off circle and the goal post was accepted as the middle corridor, while the outer part of this corridor was accepted as the right and left wing. The reliability of the observations and the consistency control of the observers were calculated with Inter Observer Agreement (IOA=Consistency in observations/Consistency and inconsistency in observations) formula [10]. For the correct coding of parameters, video records of 3 researchers in different times were compared. Consistency between observers was 96%. 4% inconsistency was in the kind of pass before goal (whether they were accepted as long or short pass), moves before goal (direct or by tricking), the degree of the goal pass (whether it is accepted easy or difficult) and the error of the goalkeeper in the goal (whether it is first, second or third degree). Chi-square test was conducted to find out the differences between frequency (f), percentage (%) and distributions and 0.05 and 0.01significance levels were accepted.

Results.

Table 1

Distribution of matches with and without goals in 2016 European Football Championship

Status	Criteria	Frequency	Percentage
Matches with and without goal	Matches without goal	4	7,84
	Matches with goal	47	92,16
	Total	51	100,00

Table 2

Goal distribution of group, second tour, quarter final, semi-final and final matches

Status	Number of matches	Number of goals	Number of goals per match
Groups	36	69	1,91
Second tour	8	19	2,37
Quarter final	4	15	3,75
Semi final	2	4	2,00
Final	1	1	1,00
Total	51	108*	2,11

*Except penalty goals scored at the end of 120 minutes

Table 3

Distribution of passes before goals in 2016 European Football Championship

Criteria	Parameters	Frequency	%	Chi-square
Number of passes before goal	1 pass	17	15,80	216,00**
	2 passes	28	25,90	
	3 and more passes	63	58,30	
Short or long pass before goal	Short pass	57	52,80	108,00**
	Long pass	51	47,20	
Direction of the pass before goal	Right	50	46,30	216,00**
	Left	40	37,00	
	Middle	18	16,70	
Type of pass before goal	Flat	56	51,90	108,00**
	Air	52	48,10	

**p<0.01

1 pass was made before the goal with a rate of 15,7%, 2 passes were made with a rate of 25,9% and 3 and more passes were made with a rate of 58,3%. There is significant difference between the rates of numbers of passes before goal (p<0.01).

Table 4

Goal shooting status and distribution of player positions in 2016 European Football Championship

Criteria	Parameters	Frequency	%	Chi-square
Where the goal is shot from	Inside the penalty area	92	85,20	108,00**
	Outside the penalty area	16	14,80	
Goal shooting type	Right foot	46	42,60	216,00**
	Left foot	36	33,30	
	Head	26	24,10	
Goal shooting type	Right	29	26,90	216,00**
	Left	36	33,30	
	Middle	43	39,80	
Position of the shooter	Defense	12	11,10	216,00**
	Midfielder	51	47,20	
	Striker	45	41,70	

**p<0.01

When the place where the goal is shot was analyzed, it was found that 85,2% of the goals were shot from inside the penalty area, while 14,8% were shot from outside the penalty area. Statistically significant difference was found between the rates of goals scored inside the penalty area and the goals scored outside the penalty area (p<0.01).

Table 5

Distribution of moves before goal, type of attack and pass before goal, the position of the passer and difficulty degree of the goal pass

Criteria	Parameters	Frequency	%	Chi-square
Move before goal	Direct	97	89,80	108,00**
	Tricking	11	10,20	
Type of attack	Counter	21	19,40	108,00**
	Normal	87	80,60	
Pass before goal	Straight	22	20,40	108,00**
	Cross	86	79,60	
Position of the passer before goal	Active	53	49,10	108,00**
	Passive	55	50,90	
Goal pass difficulty degree	Simple	65	60,20	108,00**
	Difficult	43	39,80	

**p<0.01

While the rate of scoring goal by tricking was 10,2%, the rate of scoring with direct hits was 89,8%. There is significant difference between the rates of moves before goal (p<0.01).

Table 6

The status of goal keepers during goal in 2016 European Football Championship

Criteria	Parameters	Frequency	%	Chi-square
The side from where the goalkeeper conceded the goal	Right upper	26	24,10	432,00**
	Right lower	22	20,40	
	Left upper	22	20,40	
	Left lower	28	25,90	
	From above	7	6,50	
	Between the legs	3	2,80	
Goalkeeper's error in the goal	First degree	6	5,60	216,00**
	Second degree	21	19,40	
	Third degree	81	75,00	

**p<0.01

Goalkeepers had first degree errors with a rate of 5,6%, second degree errors with a rate of 19,4% and third degree errors with a rate of

75%. There are significant differences between goalkeeper's number of errors in the goal ($p<0.01$).

Table 7

Distribution of the time intervals of scored goals (except elimination penalties)

Time intervals	Number of goals scored	%	% in the half
1-15 minutes	7	6,50	1st half: 35,2
16-30 minutes	10	9,30	
31-45 minutes	21	19,40	
46-60 minutes	22	20,30	2 nd half: 64,8
61-75 minutes	32	29,60	
76-90 minutes *	14	13,00	
91-120 minutes	2	1,90	

* A few additional minutes at the end of the match were put in this time interval.

When the time intervals of goals were analyzed, it was seen that the number of goals scored was the highest between minutes 61-75. The rate of goals scored in the first half was 35,2%, while it was 64,8**%** in the second half.

Discussion and conclusion. This study was conducted to determine the factors in preparing the attacks that resulted in goal and to research the factors that influenced goal formation in 2016 European Football Championship matches. It is important to find out and understand the related parameters to analyze the collective performance of teams and to endure that the observation reaches its main targets [11]. The goals scored have a key role in the analysis of the teams' success in sports games and championships [12]. In 2016 European Football Championship, a total of 51 matches were played with the participation of 24 teams and 108 goals were scored. 47 (92,16%) of these matches ended with goals, while the remaining 4 (7,84%) ended without goals. A total of 108 goals were scored in 2016 European Football Championship. In groups, 69 goals were scored in 36 matches with a goal average of 1,91 per match, while 19 goals were scored in 8 matches with a goal average of 2,37 per match in the second tour, 15 goals were scored in the quarter final in 4 matches with an average of 3,75, 4 goals were scored in 2 matches with a goal average of 2 per match in the semi-final and 1 goal was scored in 1 match with an average of 1 goal per match. In total, the championship ended with 51 matches, 108 goals, and an average of 2,11 goals per match. In 2016 European Football Championship, the highest average of goal per match was in quarter final. The reason for this may be

the fact that quarter finals have a more offensive game system than the other matches and the fact that teams are not equal to each other. According to Michailidis [12] in sport games and organizations such as tournaments, the goals scored have a key role for team's success and a good analysis. In their analysis, Sajadi and Rahmana [13] stated that in 64 matches, 143 goals were scored with an average of 2.23 goals per match, 52,4% of which were scored by strikers. In the analysis of 2006 FIFA World Football Cup by Acar [14] 147 goals were scored in 64 matches.

In our study, 1 pass was made before the goal with a rate of 15,7%, 2 passes were made with a rate of 25,9% and 3 and more passes were made with a rate of 58,3%. Significant difference was found between the rates of numbers of passes before goal. The highest number of passes before goal was 3 passes and more with 58,3%. Goal (%) rates increased as the number of passes increased. The rate of short passes before goal was 52,8% while the rate of long passes were 47,2%. Significant difference was found between the rates of numbers of short and long passes. More goals were scored with short passes. İmamoğlu [15] found that the highest number of passes before goal in 2010 FIFA World Cup was 3 passes with a rate of 29,7%. They found that more results were taken when 3 passes were made before goal. İmamoğlu [16] found the rate of short pass before goal as 61,7% and the rate of long pass before goal as 38,3% in 2006 FIFA World Football Cup. They found that short passes resulted in more goals.

Işıkdemir [17] found that the rate of short passes before goal was the highest (47,09) in 2014 FIFA World Cup. The rate of short passes before goal was 57,3% and the rate of long pass was 42.7% in 2010 FIFA World Cup. More goals were scored with short passes [10]. In their study, Sajadi and Rahmana [13] stated that 61% of the goals were scored with direct shooting and 47% of these were scored with shooting after a short pass and in terms of the differences between number of shoots and winning and losing teams, they concluded that significant differences were found with the higher number of shoots of the winning team.

There are also studies in literature which support the opposite of our results [18, 16]. Dufour [18] stated that as the number of passes increased, the probability of scoring a goal decreased. İmamoğlu [16] reported that in 2006 FIFA World Football Cup, 1 pass was the highest number of pass with a rate of 42,5 and as the number of passes increased, the rate of goal (%) decreased.

In 2016 European Football Championship, 46,3% of the passes to the goalpost of the opponent team before the goal were passed from the right. It as followed by left, while the least number of passes were from the middle (16,7%). Statistically significant difference was found in the direction of the passes before goal. This result shows that passes on target from the right side in European Football Championship can be

resulting from the skills of the player and the weak defense of the opponent players on the left. In 1998 FIFA World Football Cup, the direction passes were given was the left side with a rate of 44.1%, and the right side with a rate of 32.2% [10] In their study they compared the goals of 1986 and 1990 FIFA World Football Cup, Jinshan and Xinoke [19] found that attacks from the wings were more successful than the attacks from the center. In the same study, it was stated that 27.8% of 32 goals in 14th FIFA World Football Cup, goals came from the wings. In 1988 European Football Championship, preparations for goal shoot occurred from the wings with a rate of 56% [20]. Our study and the studies in literature show that in football, attacks from the wings have an important place in scoring goal.

In our study, the rate of flat passes was 51,9%, while the rate of air passes was 48,1%. Significant difference was found between the rates of flat passes and air passes. High rates of flat passes can be resulting from players' views that flat passes are more likely to reach their target than air passes or the fact that strikers have less skills of scoring head goals than scoring goals with feet.

When the places for shooting a goal were examined, the goals were scored from within the penalty area with a rate of 85,2%, while goals were scored outside the penalty area with a rate of 14,8%. Significant difference was found between the rates of goals scored within the penalty area and the goals scored outside the penalty area. Dufour [18] stated that in 1982 FIFA World Football Cup, 54.6% of the goals were scored with shoots from within the penalty area. In 1998 FIFA World Football Cup, goals were scored with shoots from within the penalty area with a rate of 87,1% and outside the penalty area with a rate of 12.9% [10]. When the places for shooting a goal were examined for 2006 FIFA World Football Cup, the goals were scored with shoots from within the penalty area with a rate of 82,5% and outside the penalty area with a rate of 17,5% [16]. In the goals recorded from the analysis of 2000 European Football Championship, 68 goals were scored with shoots from within the penalty area with a rate of 81,1% and 15 68 goals were scored with shoots from outside the penalty area with a rate of 18,9% [21] In the analysis of the goals scored in quarter finals, semi finals and finals of 2000 European Football Championship, 85% of the goals were scored with shoots from within the penalty area [22]. The reasons why goals are shot from within the penalty area are the fact that football players want to keep a high rate of shot by preferring places close to the goalpost and the fact that close goal shoots cause difficulties for goal keepers.

In our study, the highest goal shooting type is with right foot with a rate of 42,6%. Goals were shot with left foot with a rate of 33,3% and with head with a rate of 24,1%. Significant difference was found between the rates of goals scored with right foot, left foot and head. In 2006 FIFA

World Football Cup, the rate of passes given with feet before goal (89,2%) was much higher than the rates of passes given with head (10,8%) [16]. This can be because right footed football players are more than those with left footed players. Since football is a game played with feet, feet are used more than the head and flat passes are preferred more.

In our study, goals were shot from the right side of the field with a rate of 26,9%, while they were shot from the left side with a rate of 33,3% and from the middle with a rate of 39,8%. In 2006 FIFA World Football Cup, 82,5% of the goals were scored from the middle field [17]. In 2010 World Cup, the goals were shot from the mid field with a rate of 39,31%, from the right side with a rate of 28,97% and from the left side with a rate of 31,72% [15].

When the positions of the players who scored goal were analyzed, it was found that midfielders (47,20%) scored more than defenders (11,10%) and strikers (41,70%) and the difference between these rates were statistically significant. The reason for this can be the fact that midfielders meet the ball in the goal area more than the players of other positions.

The rate of scoring goal by tricking was 10,20%, while the rate of scoring goal with direct shoots was 89,80% and this difference was statistically significant. The rate of scoring goal with direct shoots was found to be 83,1% in 2006 FIFA World Cup [17]. In 2010 FIFA World Cup, the rate of scoring goal with direct shoots was found to be 82,07% [15]. Mülazimoğlu [23] stated that the number of goals scored with one shoot in 2014 FIFA World Cup was 66,67%. When it is considered that the objective of football is scoring goal, the reason for this can be the fact that players prefer to take less risk of making the opponent get the ball and they prefer to score goal in the most suitable position.

In terms of the type of attack, while the rate of goal from counter attack was found to be low with a rate of 19,40%, the rate of a team's scoring goal with their own attack was very high with a rate of 80,60%. This difference was statistically significant. Acar [14] found in their 2006 FIFA World Cup analysis that of the 147 goals, 63% were from prime attack (92 goals), 16% were from free kick (24 goals), 9% were from penalty (13 goals), 8% were from corner kick (12 goals) and 4% were from throw in (6 goals). In 2010 FIFA World Cup, the rate of a team's scoring goal with their own attack was very high with a rate of 77,9% [15]. In 2006 FIFA World Cup, the rate of a team's scoring goal with their own attack was also very high with a rate of 85,7% [16]. The reasons for low rate of scoring goals from counter attack may be the emphasis put on defense, not leaving space for the opponent and playing within a team's own half of the field. Counter attack can mostly change depending on a team's understanding of the game.

In our study, the highest rate of passes given before a goal was cross passes with a rate of 79,6%, while the lowest rate of passes was straight passes with a rate of 20,4%. This difference was statistically significant. In 2010 FIFA World Cup, the highest rate of passes given before a goal was cross passes with a rate of 46,21%, while the lowest rate of passes was chandelle pass with a rate of 2,76% [15].

In our study, the rate of passive passer position (50,90%) was higher than the rate of active passer position (49,1%). This difference was statistically significant.

As a result of our findings, it was found that 60,20% of the passes were simple, while 39,80% of the passes were difficult passes. This difference was statistically significant. It can be said that the passer can prepare passes with better hit and suitable goal positions without feeling the pressure of the opponent.

In terms of the direction of conceding a goal, it was found that the highest number of goals conceded by a goal keeper was from the left lower side with a rate of 25,90%. Other parameters were upper right (24,10%), lower right (20,40%), upper left (20,40%), over the goal keeper (6,50%) and between the legs (2,80%). This difference was statistically significant. In the analysis of 2000 European Football Championship goals, it was found that 27 goals (32,5%) were scored from the lower left corner of the goalkeeper [21]. In 2014 FIFA World Cup, it was found that goalkeepers conceded goals from the lower left side at the most (40 goals) [17]. The reason may be that the side hit by the players scoring the goal is important. The goalkeeper's errors in the goal were first degree with a rate of 5,6%, second degree with a rate of 19,4% and third degree with a rate of 75%. This difference was statistically significant. Goalkeepers' rates of errors in goals were low. In 2006 FIFA World Cup, the highest rate of goalkeeper errors was third degree errors (65,3%) [16].

When the time intervals of the goals scored in 2016 European Football Championship were analyzed, it was found that the highest number of goals were scored between minutes 61 and 75 with a rate of 29,60%. The lowest number of goals were scored between minutes 1 and 15 with a rate of 6,5%. The rate of goals scored in the first half was 35,2% and the rate of goals scored in the second half was 64,8%. In 2006 FIFA World Cup, İmamoğlu [16] found that the number of goals scored in the first half was 48,98%, while the number of goals scored in the second half was 51,02%. In their analysis of goals scored in the quarter finals, semi finals and finals of 2000 European Football Championship, Egesoy [22] stated that that the number of goals scored in the first half was 45,2%, while the number of goals scored in the second half was 55%. İmamoğlu [15] found that in 2010 FIFA World Cup, the number of goals scored in the first half was 40%, while the number of goals scored in the second half was 59,31%. In their study, Giampietro [24] found that the number of goals

scored in the second half (55,1%) was higher than the number of goals scored in the first half (44,9%). The reasons for this may be the fact that players are more concentrated in the 61-75th minutes of the game, substitute players getting in the game show a good performance and the tactical mentality of the team.

As a conclusion, it can be seen that the most important factor that determines the result in football is goal, and the contribution of players other than strikers and the head goals affect the competition result directly. Flat passes and goals scored within the penalty area with one hit were found to influence the rate of goal positively. Thus, it is thought that taking this data into consideration during technical and tactical trainings will affect success positively. It is thought that competition analysis which is conducted with correct data according to specific criteria will make great contributions to the process of trainers' decision making.

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