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Keywords

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Article

Efficiency of one against one game situations in Polish Soccer National Team and their opponents during UEFA European Championship matches

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1. Introduction

Soccer is one of the most popular team sports where different aspects, such as physical and technical performance, are associated and could affect the match outcome [1]. During the match, only individual actions enhancing the group performance are accepted. However, limiting a player's behaviour merely to activities subordinate to partners reduces satisfaction from participation in competition, and as a result may inhibit the player's motivation to act. Therefore, the ultimate success in competition of sports teams is dependent on both individual players' actions and the collective solution of situations arising in the game [2, 3].

The essence of the game is that its participants' actions are always dependent on one another, and the degree of this dependence varies and mainly results from the complexity

of the game situation. Identification of the efficiency of actions[1] both relatively (individual) and absolutely (group) dependent on partners is critical for enhancing the effectiveness of the training process, as it allows rationalising players' behaviours by comparing their actions to objectified patterns and increasing their efficiency through reflecting actions regarded as efficient in the actual game [4].

Actions which are executed with the ball against a single opponent or duels of one player without the ball against an opponent with the ball in situations of relative independence of their partners (partners do not directly influence the achievement of the game objectives) can be defined as one against one game (1v1)[1].

1v1 game means a direct competition of two players from opposite teams to achieve contrary aims within the specified rules. 1v1 game in attack means the whole of actions of a player in possession of the ball against one opponent in order to achieve such objectives as: scoring a point (goal), creating a situation to score, gaining the play field or keeping the ball. A player's behaviour and fighting against another player with the ball in order to win it, interrupt his actions, or hinder the movement of the ball is 1v1 game in defence [5].

The results of actions in 1v1 game situations should be evaluated positively or negatively in terms of achieving the game objectives in both attack and defence. However, habitual behaviour in unexpected situations of fighting for loose balls should be assessed positively regardless of the achieved objectives. The player's readiness for a clash for a loose ball and his activity in such situations (after all manifested without earlier awareness of the choice of objectives and methods of actions) are valuable, because they strengthen the synergistic effects of the whole team's actions. One can adopt the will (positive) or failure (negative) to take action as an assessment criterion in such situations [6].

The purpose of this study was to assess the efficiency of action in 1v1 game situations of soccer players from the Polish national team and their rivals in group stage matches of the UEFA European Championship final tournament played in the years 2008-2021. The following research questions were put forward:

1. What was the activity, effectiveness and reliability of individual offensive and defensive actions of Polish players and their rivals in 1v1 game situations in-group stage matches of the UEFA European Championship final tournaments?
2. What were the differences in the efficiency of particular individual actions between Polish national teams competing in group stage matches in particular European Championship final tournaments and players from the opposing teams?
3. What was the structure of offensive and defensive actions performed in 1v1 game situations by Polish soccer players and their rivals in group stage matches of the UEFA European Championship final tournaments?

2. Materials and methods

2.1 Materials

The method of observation was applied in the study. Audio-visual records of all 12 matches played by the Polish national soccer team players and their rivals in the group stage of the final tournaments *Euro 2008*, *Euro 2012*, *Euro 2016* and *Euro 2020* were used in analysis (Table 1). The game of 166 Polish national team players and 165 players of the opposing teams was analysed.

[1] The efficiency of action includes the following:
a) activity (the number of activities of one type performed by the players of one team during the match),
b) effectiveness (the number of the activities of the specific type performed with the achievement of the aim)
c) reliability (the ratio of effective activities to all the activities in the match) of the offensive and defensive performance in 1v1 situations in terms of time and place of game.

Table 1. A list of analysed matches of the UEFA European Championship final tournaments played in years 2008–2021 along with the time of scoring goals and the time of game with a favourable, unfavourable and neutral results

Competing teams (tournament)	Final result of the match (halftime result)	Minute of scoring a goal (current result)	Game time with unresolved result [min]	Game time with favourable result [min]	Game time with unfavourable result [min]
Poland–Germany (ECh 2008)	0:2 (0:1)	20 (0:1) 72 (0:2)	20	0	70
Poland–Austria (ECh 2008)	1:1 (1:0)	30 (1:0) 90 (1:1)	30	59	1
Poland–Croatia (ECh 2008)	0:1 (0:0)	53(0:1)	53	0	37
Poland–Greece (ECh 2012)	1:1 (1:0)	17 (1:0) 51 (1:1)	56	34	0
Poland–Russia (ECh 2012)	1:1 (0:1)	37 (0:1) 57 (1:1)	37	33	20
Poland–Czech Rep. (ECh 2012)	0:1 (0:0)	72 (0:1)	72	0	18
Poland–N. Ireland (ECh 2016)	1:0 (0:0)	51 (1:0)	51	39	0
Poland–Germany (ECh 2016)	0:0	(0:0)	90	0	0
Poland–Ukraine (ECh 2016)	1:0 (0:0)	54 (1:0)	54	36	0
Poland-Slovakia (ECh 2020)	1:2 (0:1)	18 (0:1) 46 (1:1) 69 (1:2)	41	0	49
Poland-Spain (ECh 2020)	1:1 (0:1)	25 (0:1) 54 (1:1)	61	0	29
Poland-Sweden (ECh 2020)	2:3 (0:1)	2 (0:1) 59 (0:2) 61 (1:2) 84 (2:2) 90 (2:3)	5	0	85

2.2 Methodology

Data about the game were registered on a special observation sheet, reproducing the audio-visual recording with a use of the *stop-frame* function. The way and effect of a player's duels were recorded according to the assessment criteria proposed by Szwarc [5]. In attack, the efficiency of 1v1 game situation whose objective was to score a goal, to create a situation to score, to gain the play field with the ball and to keep the ball were assessed. In defence, the efficiency of actions against a player with the ball whose aim was to take it over, or to disturb or interrupt the opponent's actions was evaluated. Activity in fighting for a loose ball was assessed as always positive. Goalkeeper's actions in 1v1 game situations within his own penalty box were not recorded.

2.3 Statistical analysis

Statistical analyses were conducted using the Statistica (ver. 10.0) statistical package. Means and standard deviations of the results were indicated. Prior to applying one-factor analysis of variance ANOVA for a single classification, the normality of distribution was tested using the Kolmogorov-Smirnov test with Lilliefors's correction, and three groups of variables of the results obtained by players in the particular European Championship tournaments were compared. In order to indicate statistically significant differences between the groups of variables, the post-hoc NIR test was applied. To determine the statistically significant differences between two groups of variables, i.e. the results of players from the Polish team and the results of their other direct rivals, the t-test for independent groups was used with an earlier assessment of the normality of distribution by the Shapiro-Wilk test and checking the homogeneity of variance by the Brown and Forsyth test.

3. Results

In the twelve investigated matches played in the final tournaments of *Euro 2008–2020*, a total of 2926 duels were registered, including 14 duels for a loose ball. On average, players had 245 clashes per match. 1555 duels of Polish players were assessed positively and 1369 negatively, and accordingly, 1369 and 1555 duels of players from the opposing teams (Table 2). Overall, in all the tested matches of the group stage, the Polish national team players showed much higher reliability in 1v1 game than their rivals (53% and 47%, respectively), and it was higher in each next tournament (50%, 53% 57% and 52%, respectively). It is worth noting that Polish representatives competed in matches of the UEFA European Championship final tournament in 2008 with exactly the same reliability of 50% as their rivals, while in matches of *Euro 2012* they manifested a 3% higher index of reliability than their rivals, and in final tournament matches of the European Championship in 2016 they significantly exceeded their opponents – their reliability in 1v1 game situations amounted to 57% and that of their rivals only 43%. In turn, in *Euro 2020*, their reliability in the 1v1 game decreased to 52% (compared to 48% reliability of their opponents).

Table 2. Efficiency of 1v1 game of players from the Polish national team and their opponents in group stage matches of the UEFA European Championship in the years 2008–2020

Tournament	Values of the efficiency of action							
	activity [number]		effectiveness [number]		reliability [%]		average number of actions in a match	
	P	R	P	R	P	R	P	R
Total	2208	2208	1185	1023	54	46	246.6	246.6
Euro 2008	681	681	342	339	50	50	230.3	230.3
Euro 2012	750	750	398	352	53	47	250.6	250.6
Euro 2016	777	777	445	332	57	43	259.0	259.0
Euro 2020	716	716	370	346	52	48	238.6	238.6

Euro – UEFA European Championship, P – Polish team players, R – remaining team players

A detailed characteristics of the efficiency of action in 1v1 game situations are presented in Table 3 and in Figure 1. These results shows that Polish representatives participating in group stage matches of the European Championship completed 1,297 defensive duels (an average of 108 duels in one match) and 1,207 offensive duels (an average of 101 duels in a match), which constituted respectively 44% and 41% of all actions in 1v1 game situations. The examined Polish players had 414 header duels (204 in defence and 210 in attack), and they fought 14 times for a loose ball. The highest reliability was achieved in defensive headers (67%) and the lowest one in offensive headers (39%). In total, they showed higher activity in defence than in attack (1,501 defensive duels with an average of 125 in a match and 1417 offensive duels with an average of 118 situations in a match, respectively) with 51% reliability of defensive and 49% reliability of offensive duels.

Moreover, Polish soccer players showed higher efficiency (activity, effectiveness and reliability) both in offensive and defensive duels in the consecutive matches of the European Championships from 2008 to 2016 (Table 3). In addition, a comparison of the achievements of the Polish representatives and players from the opposing teams (Table 3, Figure 1) shows that the Polish players took defensive actions more often than their rivals (108 and 101 fights, respectively) and performed them with higher reliability than their opponents (53% and 46%, respectively). In turn, in offensive actions in 1v1 game situations, they showed lower activity than rivals, but they exceeded them a lot with reliability of these actions (Polish players 54% and opponents 47%, respectively). Furthermore, detailed analysis shows that Polish players competed with rivals with generally higher reliability also in headers (53% and 47%, respectively). They manifested higher reliability in both offensive and defensive header duels (39% and 67%, respectively) than players from opponent teams did (33% and 61%, respectively).

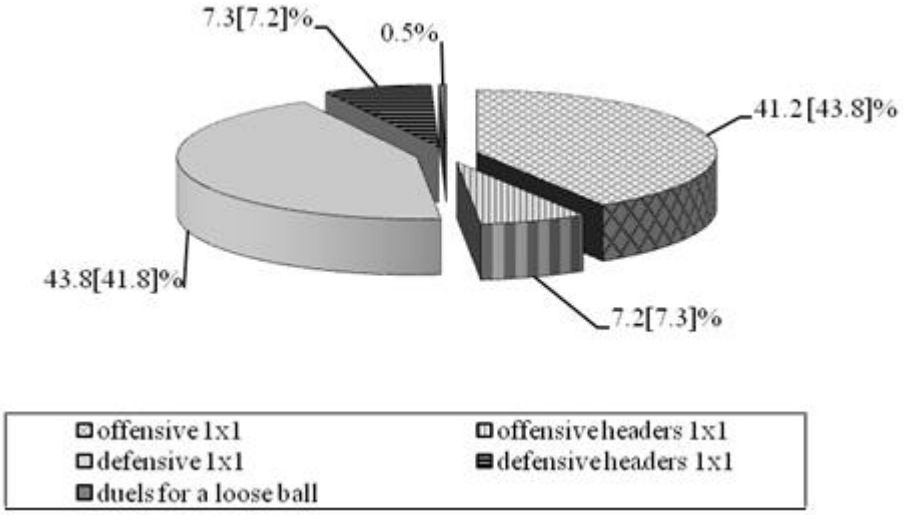

Figure 1. The percentage of various types of actions in 1v1 game situations among Polish players [percentage of the opposing teams' actions]

Table 3. The efficiency of individual offensive and defensive actions in 1v1 game situation of the Polish representatives and their opponents in the examined matches of the European Championship

		Values of the efficiency of action															
		activity [number]				**effectiveness [number]**				**reliability [%]**				**average number of actions in a match**			
UEFA European Championship		2008	2012	2016	2020	2008	2012	2016	2020	2008	2012	2016	2020	2008	2012	2016	2020
1v1 offensive actions	P	266	321	327	293	145	165	185	155	55	51	57	53	88.7	107.0	109.0	97.6
	R	305	353	315	324	162	160	134	161	53	45	43	50	101.7	117.7	105.0	108.0
1v1 offensive actions- headers	P	54	48	57	51	17	20	27	19	31	42	47	37	18.0	16.0	19.0	17.0
	R	56	28	78	42	19	8	26	14	34	29	33	33	18.7	9.3	26.0	14.0
1v1 defensive actions	P	305	353	315	324	143	193	181	168	47	55	57	51	101.7	117.7	105.0	108.0
	R	266	321	327	293	121	156	142	139	45	49	43	47	88.7	107.0	109.0	97.6
1v1 defensive actions- headers	P	56	28	78	42	37	20	52	28	66	71	67	67	18.7	9.3	26.0	14.0
	R	54	48	57	51	37	28	30	33	69	58	53	65	18.0	16.0	19.0	17.0
1v1 actions for loose ball	P	10	2	0	2	10	2	0	2	100	100	100	100	3.3	0.7	0.0	0.7
	R	10	2	0	2	10	2	0	2	100	100	100	100	3.3	0.7	0.0	0.7

P – Polish team players, R – remaining team players

Comparison of the data from three consecutive European Championship finals showed significant differences between Polish players' tournament performances (Table 4). Both, activity and effectiveness of individual offensive and defensive performance in tournaments held in 2012, 2016 and 2020 were significantly higher ($p < 0.001$) in comparison with *Euro 2008*. This regularity also concerned activity ($p < 0.001$) and efficiency ($p < 0.05$) in offensive actions and efficiency ($p < 0.01$) in defensive actions. In addition, players from the Polish team who played in the final tournament in 2016 achieved significantly higher reliability ($p < 0.01$) in 1v1 game situations than Polish representatives competing in 3 matches of the UEFA European Championship tournament in 2008 (Table 4).

Table 4. The efficiency of action of competitors from Polish teams in 1v1 actions in the subsequent UEFA European Championships

Values of the efficiency of action / types of 1v1 actions		F	*p*	ECh 2008	ECh 2012	ECh 2016	ECh 2020
Activity [number of actions]	∑	11.108	0.001	230.33*	250.67	259.00	238.33
	Offensive	9.487	0.001	106.67*	123.00	128.00	114.66
	Defensive	0.921	0.411	120.33	127.33	131.00	123.66
Effectiveness [number of actions]	∑	9.078	0.001	117.33*	133.33	148.33	123.33
	Offensive	4.524	0.021	54.00*	61.66	70.66	58.00
	Defensive	7.034	0.003	60.00*	71.00	77.67	65.33
Reliability [%]	∑	5.685	0.009	50.49†	53.19	57.30	51.68
	Offensive	1.280	0.296	50.15	50.29	54.86	50.58
	Defensive	14.997	0.001	49.51*	56.26	59.33	52.83

*p-value; F– value of one-factor analysis of variance * significantly lower in comparison to Euro 2012, 2016 and 2020;* † significantly lower in comparison to 2016.

A comparative analysis of the *Euro 2008* exhibited that rivals of the Polish team displayed significantly higher ($p < 0.01$) activity in offensive 1v1 actions (Table 5). In contrast, the defensive actions activity of Polish players was significantly higher ($p < 0.01$).

However, in subsequent matches, both in the *Euro 2012, Euro 2016* and *Euro 2020* tournaments, the activity of Polish players did not significantly differ from the activity of players from opposing teams. The effectiveness and reliability of the Polish players in the *Euro 2012* and *Euro 2016* tournaments was significantly higher than the effectiveness and reliability of the offensive and defensive actions of their opponents ($p < 0.01$). In matches of the European Championship tournaments in 2012 and in 2020, there were no significant differences in the effectiveness actions between Polish players and their rivals (of offensive and offensive and defensive, respectively) (Table 5).

Table 5. The efficiency of analysed actions of Polish teams and direct opponents in the UEFA European Championship in 2008, 2012, 2016 and 2020 (means ± standard deviations)

Values of the efficiency of action		ECh 2008			ECh 2012			ECh 2016			ECh 2020		
		P	R	*p*	P	R	*p*	P	R	*p*	P	R	*p*
Activity	∑	230.3±16.9	230.3±16.9	1.000	250.6±14.4	250.6±14.4	1.000	259.0±5.6	259.0±5.6	1.000	238.6±15.6	238.6±15.6	1.000
	Of 1v1	106.6±6.6	120.3±10.1	0.003	123.0±6.06	127.3±16.8	0.479	128.0±16.5	131.0±21.7	0.746	114.7±6.3	123.7±13.4	0.004
	Def 1v1	120.3±10.1	106.6±6.5	0.003	127.3±16.8	123.0±6.0	0.479	131.0±21.7	128.0±16.5	0.746	123.7±13.5	114.7±6.3	0.004
Effectiveness	∑	117.3±25.5	116.3±9.7	0.913	13.3±7.6	118.0±6.9	0.001	148.3±1.3	110.6±6.7	0.001	125.3±16.5	117.1±8.3	0.281
	Of 1v1	54.0±14.3	60.3±1.3	0.204	61.6±3.5	56.0±12.2	0.201	70.6±14.0	53.3±9.7	0.008	57.8±8.9	58.1±6.8	0.897
	Def 1v1	60.0±10.8	52.6±9.0	0.137	71.0±4.5	61.3±8.0	0.006	77.6±12.9	57.3±5.5	0.001	65.5±7.6	56.9±9.0	0.124
Reliability	∑	50.4±7.2	50.9±7.1	0.897	53.1±0.5	47.0±0.7	0.001	57.3±1.6	42.6±1.6	0.001	52.5±3.9	49.1±4.0	0.642
	Of 1v1	50.1±10.4	50.4±4.8	0.932	50.2±4.5	43.4±4.2	0.004	54.8±4.7	40.6±2.2	0.001	50.4±7.4	47.0±4.5	0.379
	Def 1v1	49.5±4.6	49.8±10.4	0.932	56.2±4.3	49.7±4.5	0.006	59.3±2.2	45.1±4.7	0.001	52.8±4.4	49.6±7.6	0.642

P – players of Polish teams; R – players of opposing teams.

The analysis of the types of offensive actions in 1v1 game situations showed that the representatives of Poland primarily implemented actions to maintain the ball (44% of all offensive duels) and actions with an objective to gain the play field (23%).

Offensive header duels accounted for 15% and keeping the ball as a result of defenders' foul game for 12% of the total individual activity. Individual offensive actions aiming at scoring goals comprised 4% of all actions, and creating situations to score only 2%. The structure of individual game of players from the opposing teams was similar (Figure 2). Actions aiming to maintain the ball (47% of all actions) and to gain the play field with the ball (22%) dominated their game. Scoring goals, similarly to Polish players, accounted for only 4% of all rivals' activities and creating situation to score for less than 1%.

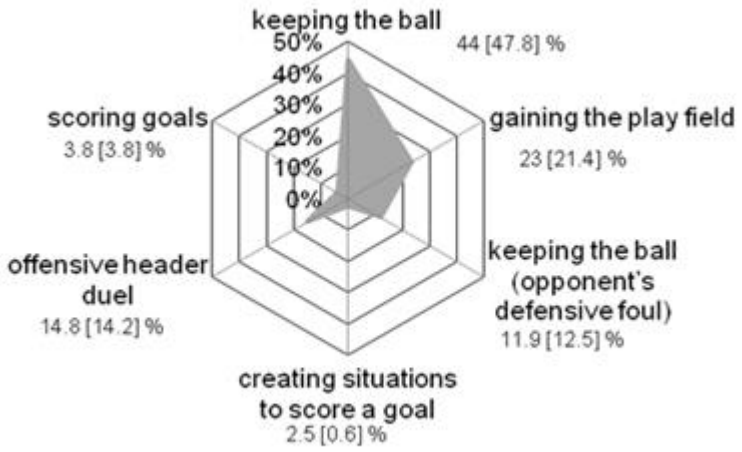

Figure 2. The structure of offensive actions in 1v1 game and fight situations of Polish representatives in the examined matches of the European Championship [the percentage of rivals' actions]

In turn, the results of the individual defensive actions structure presented in Figure 3 show that in Polish players' defensive duels whose aim was to take over the ball from an opponent (29%) and kicking it out (23%) dominated. Interrupting rival's activities, defensive header duels and keeping the ball as a result of the opponent's foul were 22%, 14% and 12% of all individual game of Polish players, respectively. Activity in particular types of defensive actions in 1v1 game/fight situations of our representatives and their rivals was very similar.

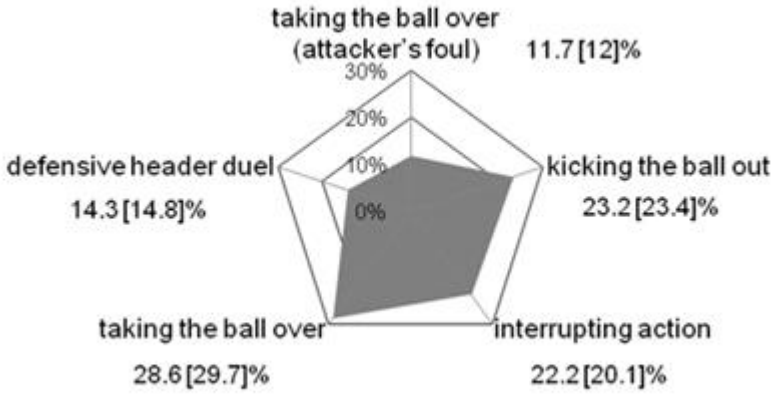

Figure 3. The structure of defensive actions in 1v1 game situations of Polish representatives in the examined matches of the European Championship [the percentage of rivals' actions]

4. Discussion

Success in soccer is determined by both efficient individual actions and common, efficient solving situations arising during competition. The main purpose of this study was to assess the efficiency of action in 1v1 game and fight situations of 166 Polish national team players and 165 their rivals in group stage matches of the UEFA European Championship final tournaments held in 2008, 2012, 2016 and 2020.

The efficiency of actions during a soccer match is an important topic that was previously described in goalkeepers' activity [7]. Our research shows that Polish players on average performed 245 clashes in 1v1 game situations per match, with an average reliability of 53%, higher than among players of the opposing teams (47%). The presented results are consistent with other researchers' reports. For example, Gerisch and Reichelt [8] proved that players competing in the Champions League duelled for the ball from 200 to 270 times in a match, with 50% reliability. Szwarc, Kromke and Lipińska [5] analysed 13 matches of the Spanish players, European Champions (from 2008) and World Champions (from 2010). They found that these players performed 226 individual clashes per match with high (56%) reliability. The analysis of the study results by Dellal et al. [9] shows that in matches of the 2006/2007 season English Premier League players had, on average, 228 duels, and the frequency of their activity did not differ much from the activity of the compared with them players from Spanish *La Liga*. In turn, Szwarc et al. [10] analysed the game of the best teams in the World and European Championships in the years 1999–2014. It appears that top-skilled players apply on average 231 actions in 1v1 game situations in one match, with average reliability of 51%.

Thus, we found slightly higher average activity of Polish players in 1v1 game situations. Moreover, these players were more often engaged in defensive actions and performed them more efficiently than offensive actions (reliability of 55% and 52%, respectively). It is worth noting that the reliability of these actions was higher in each subsequent final tournament from 2008 to 2016 (50%, 53% and 57%, respectively). However, in matches of *Euro 2020* it was close to the reliability of the first two tournaments.

Notably, in the European Championship tournament in 2008 Polish soccer players competed with the same 50% reliability as their rivals, whereas in matches of *Euro 2012* they had the reliability index higher by 6% than their rivals. During the European Championship tournament in 2016 they significantly outweighed their opponents with reliability – by as much as 14%. In turn in matches of *Euro 2020* they had the reliability index higher only by 3% than their rivals. Therefore, we confirmed the opinion that winners generally exhibit higher efficiency of action in defence than lower ranked teams [11–13].

The aim of individual defensive actions is, first of all, to receive the ball, and when this is impossible, to knock it out and interrupt the rival's action [14]. Previous research [15, 16, 17] proved that the higher is the probability of winning , the higher reliability in receiving the ball. Moreover, Shafizadeh, Taylor and Lago Peñas [18] noted that the leading teams at the European Championship in 2012 were more efficient in receiving the ball and knocking it out than other teams. In this and in our earlier study [5] we confirmed these observations – taking the ball over from the opponent amounted to 29% of all individual defensive actions, and knocking the ball out and interrupting rival's game to 46% of defensive duels. The efficiency of individual defensive actions of Polish representatives at *Euro 2012,2016* and *2020* was higher than the efficiency in the European Championship tournament in 2008. With a similar level of activity, these players manifested significantly higher reliability in 1v1 game than their rivals (except *Euro 2020*).

In individual offensive actions Polish footballers who participated in the European Championship final tournaments in 2008, 2012, 2016 and 2021 were less active than their opponents, but much more efficient (reliability: 54% and 47%, respectively). In their individual actions, those positioning the game (maintaining the ball, also as a result of the rival's foul, and gaining the play field with the ball) comprised a total of 78% of all 1v1 games, while actions aiming to create goal situations and scoring them accounted for 6% of all offensive actions. It is worth adding that activity in offensive actions varies depending on the current time and the result of competition. It is known from previous studies [19, 20, 21, 22] that sport-efficient team usually seek changes to the current status of the game (they attack) in the initial and final phases of both halves of the game, while in the remaining periods they concentrate on maintaining the status of the game (they defend).

5. Conclusions

In summary, the analysis of the results and the overview of literature indicate that success in competition is determined by high reliability in 1v1 game, much exceeding 50%, in particular, by the activity and effectiveness manifested in individual defensive actions. In our opinion, information contained in the present paper is of high application value not only for coaches working at the highest sport level, but it can also be an inspiration for coaches and players practising soccer at a youth, amateur and semi-professional level. Teaching players efficient actions in 1v1 game may turn out to be a new way to achieve the highest sporting purposes in the future.

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