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IDENTIFICATION OF THE EFFICIENCY OF FOOTBALL PLAYERS IN INDIVIDUAL HIGH-RISK SITUATIONS (ON THE EXAMPLE OF THE POLISH NATIONAL TEAM'S PERFORMANCE IN THE EURO 2012 TOURNAMENT)

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A. Study design/planning
B. Data collection/entry
C. Data analysis/statistics
D. Data interpretation
E. Preparation of manuscript
F. Literature analysis/search
G. Funds collection

Abstract

Aim. This work, implementative (applicative) in nature, raises issues related to the modeling of individual performance in high-risk situations. Assuming that individual actions are the basis for a team's game, praxeological assessment was conducted regarding the game of individuals in high-risk situations. These activities, due to the specificity of sports games (group pressing) and major difficulty of execution (action in discomfort), constitute a significant element, which in the modern game becomes the necessity for organized training.

Basic procedures. Evaluation of actions in difficult situations was conducted on the example of the performance of the Polish football national team and their rivals during the EURO 2012 tournament (observation of 152 players).

The study used the method of noted observation, which was based on direct secondary observation (DVD material), with the possibility to repeatedly replay the events that were the subject of research. The resulting data were recorded on a praxeological observation sheet.

Results and conclusions. Data analysis allowed to determine the level of individual actions in situations of risk, which for the purposes of application determines not only the evaluation of these actions against the dominant football teams in Europe, but above all sets the direction of modeling games in the organized training of football players in Poland.

Introduction

Individual actions are the basis for team games, because each group action is taken in the context of an individual player's decision and a series of events in the realization of the objectives of the game [1]. These activities are very significant for modern football, which is characterized by a wide variety of motor activities and high volatility of the game situations, which place specific demands on the players, particularly in terms of making decisions that are quick and unpredictable to the opponent.

When creating a characteristic of football, it can be assumed that individual action is particularly important in situations of playing 'one-on-group' (1>G), in which the player must perform a task while experiencing large organizational-motor discomfort [2] - Fig.1.

Such action requires not only perfect technique but above all, its structure is characterized by high compre-

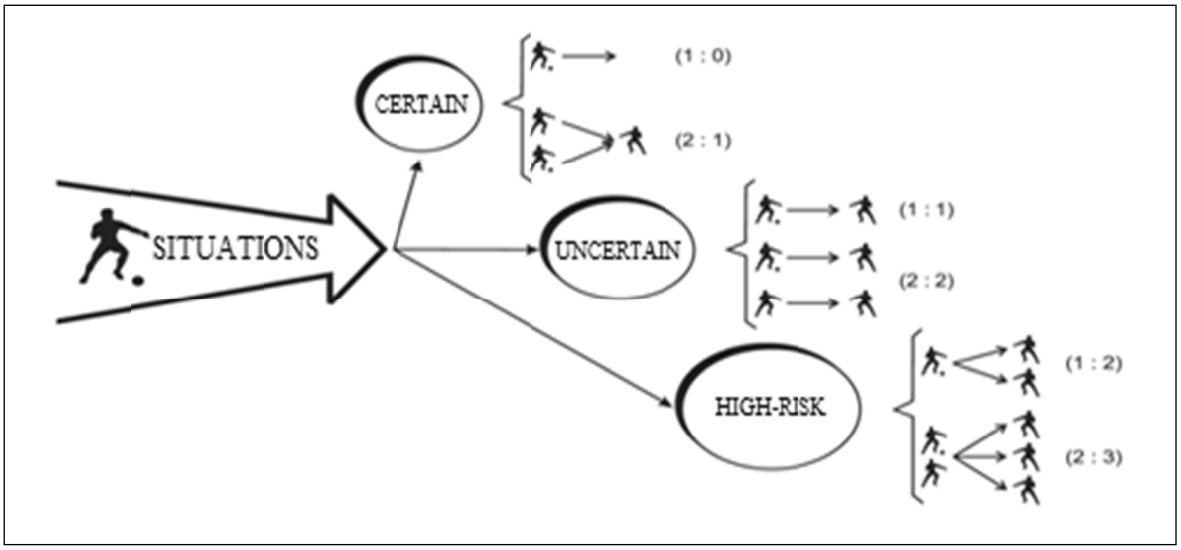

Fig. 1. Types of situations occurring in a footballer's individual performance

hension, requiring knowledge (what to do, how to do it) - [2,3], and highly developed volitional qualities - courage and tenacity in action [4]. So it seems that the 1>G actions represent a unique preciousness for the efficiency of the game and shape significant trends in the organization of modern football [5,6].

The process of rational training organization also requires precise observation of the game, which can provide important information about conduct during the game and, above all, can determine the efficiency of individual players.

To evaluate the efficiency of an athlete, it is necessary to introduce praxeological assessment belonging to the category of utilitarian evaluation [7]. According to Panfil [8], introducing praxeological assessment for sports activities allows to further investigate the mechanism of success and failure in sports, and consequently, enables ordering and rationalizing the optimal direction of training.

Using utilitarian evaluation is particularly important in the case of sports, in which the impact of a partial action of players on the team results is diverse. Thus, evaluating the contribution of individual players to the result allows to objectify control.

Evaluating efficiency requires taking praxeological indicators into account [9], which based on their quantitative and qualitative characteristics – especially in the case of high-level players, may not only objectivize the observed effects but also set standards and trends in the development of the game [10].

Previous praxeological studies on team sports games mainly related to the research issue of performance in the game of individuals, acting in a 1>1 (one-on-one) game situation [1, 8, 9, 11]. Therefore, extending analysis of these activities to one-on-group situations in this study is not only an innovation of research on this problem (lack of precise data in literature on the subject) but is also a wider recognition of activities in the game of individuals.

Study aim, research questions and hypotheses

The aim of the study was to develop patterns of action efficiency in team players during the game of football, and to evaluate the effectiveness of actions taken during the offensive game in risky situations (1>G), which are significant situations for the modern game of football [10].

An additional aim – the so-called applicative objective in the praxeological evaluation of the game of individual players, was to evaluate the game of the Polish national team players compared to the dominant sports teams in Europe.

Given the decreasing level of football in our country, these tests may be a significant clue in finding a training system concept (especially young players).

The following research questions and hypotheses were put forward in the study:

1. Do the winning teams have a higher level of praxeological indicators in one-on-group actions?
2. What are the differences in the level of praxeological indicators for the one-on-group performances of high-level players and the Polish national team players during the EURO 2012 matches?

Research hypotheses:

1. The actions of an individual's game in 1>G situations are significant for the game, and winning teams

have a higher value of praxeological indicators than the losing teams.
2. Due to the low sports competences (EURO 2012 ranking), the Polish national team has lower praxeological indicators in 1>G game actions than the teams that are the so-called the leaders of the Polish group.

Study materials and methods

Evaluation of the efficiency of the so-called 'Polish group' teams in 1>G game situations was conducted during the Euro 2012 tournament and the following teams were included in this group: Czech Republic, Greece, Poland and Russia (Tab. 1).

Table 1. Summary of meetings and sports results of 'Polish group' teams in the EURO 2012

No.	Competition	Meeting	Score	Analyzed team	Stage of rivalry
1.	EURO 2012	Poland – Greece	1:1	Poland – Greece	eliminations
2.	EURO 2012	Poland – Czech Republic	0:1	Poland – Czech Republic	eliminations
3.	EURO 2012	Russia – Poland	1:1	Russia – Poland	eliminations
4.	EURO 2012	Russia – Greece	0:1	Russia – Greece	eliminations
5.	EURO 2012	Czech Republic – Russia	1:4	Czech Republic – Russia	eliminations
6.	EURO 2012	Greece – Czech Republic	1:2	Greece – Czech Republic	eliminations

Table 2. Sports ranking of the 'Polish group' teams in the EURO 2012

No.	Team	No. of matches	Points	Goals
1.	Czech Republic	3	**6**	4 : 5
2.	Greece	3	**4**	3 : 3
3.	Russia	3	**4**	5 : 3
4.	Poland	3	**2**	2 : 3

Table 3. Example observation sheet and data records in the 1>G game action (on the example of the Poland - Czech Republic match)

EURO 2012 – Polish group									
Teams		Polish Representation offensive action				Czech Republic Representation offensive action			
Indicator Studied competitor Formation Effectiveness indicator		Ineffectiveness indicator	Activity indicator	Reliability indicator	Effectiveness indicator	Ineffectiveness indicator	Activity indicator	Reliability indicator	
1	O1	0	0	0	0	0	1	1	0
2	O2	0	0	0	0	0	0	0	0
3	O3	0	0	0	0	0	0	0	0
4	O4	0	0	0	0	0	1	1	0
5	P1	1	1	2	0.5	1	0	1	1
6	P2	0	0	0	0	1	1	2	0.5
7	P3	0	0	0	0	1	0	1	1
8	P4	0	1	1	0	3	0	3	1
9	N1	1	0	1	1	2	1	3	0.66
10	N2	1	1	2	0.5	2	1	3	0.66
Total	**average of actions**	**0.30**	**0.30**	**0.60**	**0.20**	**1.00**	**0.50**	**1.50**	**0.48**

KEY: O-1 – right defender, O-2 – central right defender, O-3 – central left defender, O-4 – left defender, P-1 – right midfielder, P-2 – central defensive midfielder, P-3 central offensive midfielder, P-4 – left midfielder, N-1 – right striker, N-2 – left striker,

A – activity S – effectiveness Ns – ineffectiveness Nz – reliability

The obtained data used to assess action efficiency indicators in 1>G situations, and the final classification at the elimination stage, the leaders of which were the Czech Republic and Greece (advancement to further stages of competition), are presented in Tab. 2.

In the praxeological assessment, independent monitoring of 12 teams was conducted, with 152 players participating in direct sports competition.

We used the method of noted observation [5], which was based on direct, secondary observation, with the possibility to repeatedly replay events that were the subject of research. Research analysis was conducted on the basis of the video material, recorded on a DVD, using the so-called freeze-frame option. The played footage was used to obtain detailed information on the game and the resulting data were recorded on observation sheets specially prepared for this purpose [12] - Fig. 3.

In the praxeological assessment of the game for 1>G actions, we calculated indicators of effectiveness, ineffectiveness, activity and reliability [8,9].

To evaluate the validity and reliability of the observation sheet (validation), we used the method of competent judges - experts [2,13]. For the resulting statistical values, the reliability of data collection in correlation indicators during the parallel test was 0.92. The reliability of data collection in re-test correlation indicators (after a 2-week repetition) was 0.96.

In order to evaluate the collected data, we used basic statistical methods. In order to investigate the significance of differences in the level of efficiency indicators we used basic statistical calculations: arithmetic mean, standard deviation and the Student's t-test – which determined the level of significance of differences [13].

Presenting and discussing the study results

1. Evaluation of diversity in efficiency value indicators of the tested individual 1>G game actions in terms of the obtained sports results

The obtained data on praxeological indicators that are presented in this section should indicate that teams having a greater sports value (the teams winning their matches in the championship tournament) had a higher level of action efficiency indicators in 1>G individual games [14]. Confirmation of this relationship may be of interest during tasks in applicative activities, which is why the research analysis in this section is aimed towards determining the degree of differentiation of praxeological values in the studied actions of individual performance from the perspective of sports results (matches won vs. matches lost).

Analysis of the data in Table 4 shows that almost all action efficiency indicators of the 1>G game are characterized by higher values for the teams that achieved superior sports results (won their matches). Differentiation of these values was highest for indicators of effectiveness and reliability ($p<0.05$).

These facts mean that the indicators have the greatest informative value regarding effects on sports outcome. These results are consistent with the findings of Duda, Brzyski [10] and Brzyski [15], who in their studies during the 2006 World Cup and 2008 European Championship tournaments have shown similar differentiation in favor of more advanced sports teams. This trend is also confirmed by studies Castellano et al. [16] in which higher praxeological indicators were achieved for players with greater football skills. This fact also positively verifies the adopted method in the praxeological evaluation of the studied players, in which the players' abilities correspond with the sports result of a team [14].

2. Determining efficiency indicators of the tested individual game actions of the Polish team in the EURO 2012 matches

Stressing the utilitarian importance of the rational value of praxeological indicators in the action of the 1>G individual's game, later research was focused on the evaluation of Polish national team players (in the above action) compared to other representations (teams: Czech Republic, Greece and Russia) with which the Polish national team competed in the tournament. The obtained results allow not only to assess the Polish representation's players in these tournaments, but also helps define an efficiency model for the 1>G game, and at the same time, allows to find a way to effectively prepare a player in organized training.

Based on the analysis of game performance indicators (effective, ineffective, active, reliable) for 1>G actions, we conducted statistical calculations and assessed the degree of differentiation for the following teams: Poland, Greece, Russia and the Czech Republic (Tab.: 5-8).

Analysis of the data in Table 5 contains the characteristics of differentiational indicators of ineffective offensive actions in the 1>G game. Data shows that the players of individual teams presented similar values.

However, the Czech team (leader of the 'Polish group') significantly surpassed the Polish and Greek players in this parameter during the EURO 2012.

Analysis of the data in Table 6 contains the characteristics of differentiation of ineffective offensive action praxeological indicators in the 1>G game. From the data, it may be concluded that players of the competing

Table 4. Evaluation of diversity in efficiency value indicators of 1>G game in terms of the obtained sports result of the 'Polish group' players in the EURO 2012 (S – effectiveness, N – ineffectiveness, A – activity, Nz – reliability)

[p – indicator for the losing team, w- indicator for the winning team]

Study group / Statistical parameters	Polish group - 2012							
	Sp	Sw	Np	Nw	Ap	Aw	Nz p	Nzw
Arithmetic mean	1.00	1.65	1.20	1.10	2,20	2,75	0,36	0,54
Standard deviation	0.50	0.44	0.62	0.29	1.08	0.83	0.11	0.05
Coefficient of variation	49.67	26.88	51.37	26.76	49.24	30.35	30.76	8.29
Significance of differences between groups	**0.048***		**0.391**		**0.226**		**0.018***	

* $p<0.05$

Table 5. Evaluation of variation in values of effective actions in 1>G game, players of 'Polish group' teams in the EURO 2012 tournament

Study group	EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012	
Statistical parameters	Poland	Greece	Poland	Russia	Poland	Czech Republic	Czech Republic	Russia	Russia	Greece	Czech Republic	Greece
Arithmetic mean	0.30	0.60	0.20	0.60	0.30	1.00	0.50	0.80	0.50	1.00	1.00	**0.40**
Standard deviation	0.48	0.70	0.42	0.70	0.48	1.05	0.71	0.79	0.71	0.94	0.94	**0.52**
Coefficient of variation	161.02	116.53	210.82	116.53	161.02	105.41	141.42	98.60	141.42	94.28	94.28	**129.10**
Significance of differences between groups	**0.1404**		**0.0712**		**0.0396 ***		**0.1912**		**0.0988**		**0.0497***	

*$p<0.05$

Table 6. Evaluation of variation in values of inefficient actions in 1>G game, players of 'Polish group' teams in the EURO 2012 tournament

Study group	EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012	
Statistical parameters	Poland	Greece	Polan d	Russia	Poland	Czech Republic	Czech Republic	Russia	Russia	Greece	Czech Republic	Greece
Arithmetic mean	0.50	0.40	0.60	0.70	0.30	0.70	0.70	0.50	0.50	0.60	0.70	**0.80**
Standard devitation	0.53	0.70	1.07	0.95	0.48	0.95	0.67	0.53	0.71	0.70	0.67	**0.63**
Coefficient of variation	105.41	174.80	179.16	135.53	161.02	135.53	96.42	105.41	141.42	116.53	96.42	**79.06**
Significance of differences between groups	**0.3613**		**0.4140**		**0.1277**		**0.2351**		**0.2385**		**0.3682**	

teams presented a similar level of activity, thus it can be believed that this parameter does not decide the outcome of a sports competition.

Analysis of the data in Table 7 contains the characteristics of differentiation of active offensive action praxeological indicators in the 1>G game. The data shows that the players of individual teams presented similar values. Nonetheless, the Czech team (group leader) significantly outclassed the Polish team players in this parameter.

Analysis of the data in Table 8 contains the characteristics of differentiation of reliable offensive action praxeological indicators in the 1>G game. The data shows that the Polish team players, compared to individual teams, presented worse results but insignificant

Table 7. Evaluation of variation in values of active actions in 1>G game, players of 'Polish group' teams in the EURO 2012 tournament

Study group	EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012	
Statistical parameters	Poland	Greece	Poland	Russia	Poland	Czech Republic	Czech Republic	Russia	Russia	Greece	Czech Republic	Greece
Arithmetic mean	0.80	1.00	0.80	1.30	0.60	1.50	1.10	1.30	0.90	1.60	1.70	**1.20**
Standard deviation	0.79	1.05	1.23	1.49	0.84	1.18	1.20	1.16	1.10	1.51	1.49	**0.92**
Coefficient of variation	98.60	105.41	153.66	114.96	140.55	78.57	108.84	89.19	122.28	94.10	87.91	**76.58**
Significance of differences between groups	**0.3186**		**0.2125**		**0.0334***		**0.3544**		**0.1260**		**0.1909**	

*p<0.05

Table 8. Evaluation of variation in values of reliable actions in 1>G game, players of 'Polish group' teams in the EURO 2012 tournament

Study group	EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012		EURO 2012	
Statistical parameters	Poland	Greece	Poland	Russia	Poland	Czech Republic	Czech Republic	Russia	Russia	Greece	Czech Republic	Greece
Arithmetic mean	0.20	0.42	0.13	0.32	0.20	0.48	0.13	0.42	0.27	0.38	0.40	**0.15**
Standard deviation	0.35	0.47	0.32	0.40	0.35	0.45	0.22	0.40	0.37	0.36	0.37	**0.24**
Coefficient of variation	174.80	112.04	241.96	127.86	174.80	92.73	164.73	96.65	138.87	94.06	92.61	**161.02**
Significance of differences between groups	**0.1288**		**0.1390**		**0.0672**		**0.0355***		**0.2428**		**0.0474***	

*p<0.05

in values. Differentiation (at the level of statistical significance) in this indicator was noted during the Czech Republic - Russia match and the Czech Republic – Greece match. The analysis of data suggests that this indicator could have affected the results of the competing teams (the Czech Republic became the leader of the group).

Based on the above presented analyses, it can be seen that the degree of differentiation in praxeological indicators during the 1>G game actions took on different levels of the value for the competing teams, and the Polish team's performance in effective and active actions was worse compared to the group leader (the Czech Republic). This fact means that these actions may decide the sports value of the competing teams. However, wanting to confirm this theory, we made attempts at characterizing the degree of variation in praxeological indicators of the 1>G performance, assessing these indicators on a global scale (summing the values of all the matches played - Tab.: 9-12).

Table 9 presents summarized assessment of the diversity of effective actions in the 1>G game of the 'Polish group' teams players. The table shows that the Polish players represented the worst parameters for this activity in the effective values. This fact largely corresponds to the obtained sports results, in which the Polish team assumed last place in the analyzed matches (see Table 2).

Table 10 presents summarized assessment of the diversity of ineffective action in the 1>G game of the 'Polish group' team players. The table shows that players of the studied teams performed a similar number of activities in the observed matches. No statistically significant differences were found for the studied parameter in the total evaluation of diversity of ineffective actions in the 1> G game.

The analyzed statistical parameters (Table 11) reveal that in the summarized assessment of the diversity of active actions in the 1>G game, players of the Polish

Table 9. Summarized assessment of the diversity of effective action in the 1>G game of the 'Polish group' players during the EURO 2012

Statistical parameters / Study group		Poland (P)	Greece (G)	Russia (R)	Czech Republic (Cz)
Arithmetic mean		0.27	0.67	0.63	0.83
Standard deviation		0.45	0.76	0.72	0.91
Coefficient of variation		168.67	113.71	113.43	109.54
Degree of significance of differences	Poland – Greece	**0.008****			
	Poland – Russia	**0.010***			
	Poland – Czech Republic	**0.002****			

*p<0.05, ** p<0.01

Table 10. Summarized assessment of the diversity of ineffective action in the 1>G game of the 'Polish group' players during the EURO 2012

Statistical parameters / Study group		Poland (P)	Greece (G)	Russia (R)	Czech Republic (Cz)
Arithmetic mean		0.47	0.60	0.53	0.70
Standard deviation		0.73	0.67	0.68	0.75
Coefficient of variation		156.49	112.44	127.77	107.10
Degree of significance of differences	Poland – Greece	**0.232**			
	Poland – Russia	**0.358**			
	Poland – Czech Republic	**0.113**			

Table 11. Summarized assessment of the diversity of active action in the 1>G game of the 'Polish group' players during the EURO 2012

Statistical parameters / Study group		Poland (P)	Greece (G)	Russia (R)	Czech Republic (Cz)
Arithmetic mean		0.73	1.27	1.17	1.43
Standard deviation		0.94	1.17	1.23	1.28
Coefficient of variation		128.79	92.56	105.78	89.16
Degree of significance of differences	Poland – Greece	**0.028***			
	Poland – Russia	**0.066**			
	Poland – Czech Republic	**0.009****			

*p<0.05, **p<0.01

Table 12. Summarized assessment of the diversity of reliable action in the 1>G game of the 'Polish group' players during the EURO 2012

Statistical parameters / Study group		Poland (P)	Greece (G)	Russia (R)	Czech Republic (Cz)
Arithmetic mean		0.18	0.32	0.33	0.34
Standard deviation		0.33	0.37	0.38	0.38
Coefficient of variation		185.85	118.42	115.33	111.58
Degree of significance of differences	Poland – Greece	**0. 023**			
	Poland – Russia	**0.049***			
	Poland – Czech Republic	**0.042***			

*p<0.05

national team reached the lowest value of this indicator during the EURO 2012. Statistical significance of differences in the summarized assessment of the level of differentiation of these activities was found in the matches: Poland - Greece and Poland - Czech Republic. In other matches, there was no significant difference.

For the last analyzed parameter (Table 12), we present summarized assessment of the diversity of reliable action in the 1>G game of the competing players. From the data obtained, it can be noted that the average values for players of the Czech Republic, Russian and Greek teams was estimated at a similar level during the observed matches of the EURO 2012. In contrast, the Polish national team players recorded the lowest indicators of reliability for actions in the 1>G game during the observed matches.

The global dimension of the praxeological indicators defined trends of the competing teams towards 1>G game actions. Based on the analysis of the above data, it can again be noted that the team representing the highest level of sports competence (in the group competition: the Czech Republic) obtained the highest values for efficient and reliable actions, and the Polish team had the worst value and significantly (statistically significant) deviated from the level of actions in the 1>G game of the leading teams (the Czech Republic and Greece), which advanced to the next stage of the competition.

In the summary of the presented research problem, it can be stated that assessment of the individual offensive game in 1>G actions substantially corresponds to the obtained sports result. The teams which were higher classified, achieved better praxeological parameters in this action. Thus, taking into account the fact that similar relationships (in the analysis of the 1>G game) were obtained in other championship tournaments (2006 World Cup and EURO 2008 [10,15], it can be considered that the activities are significant for the effectiveness of the game and can influence the results of team sports [14]. Also, the obtained values of efficiency indicators can be a praxeological determinant in modeling sports games [17,18]. Such actions are utilitarian in nature; they set a rational direction in the organized training of football players.

Conclusions:

1. Actions in individual (1>G) game situations are actions significant for game effectiveness. The winning teams in the analyzed tournament had higher values of praxeological indicators for the games than the losing teams.
2. The evaluation of action in the 1>G game is differentiated by players regarding the level of effective action indicators in offensive plays, which in consequence, can decide the sports outcome.
3. Due to the low sports competence (ranking in the EURO 2012 tournament), the Polish national team had lower values of praxeological indicators in the observed 1>G game actions than the champion teams.
4. Analysis of the individual game actions (1>G) of the Polish national team players in the observed EURO 2012 matches revealed a low level of action efficiency indicators, which may suggest their low sports competence in the individual game situations. This may be due to errors in directing the player or the training mentality in the existing system.
5. The introduction of new terms to describe the individual performance (actions in situations of the 1>G game) may indicate trends and tendencies in the process of rationalizing the organized training process of players and help to recognize important mechanisms for achieving victories and defeats in the game of football.

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