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ROTATION ANALYSIS OF TEAMS' PERFORMANCES AT 2003 YOUTH EUROPEAN VOLLEYBALL CHAMPIONSHIP

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Abstract:

The purpose of this study was to confirm the possible statistically significant differences between two groups of teams – the group of *semi-finalists* (1st–4th place), and *other teams* (5th–8th place), on the basis of 6 situational parameters (*serve*, *serve reception*, *block*, *defence*, *attack* and *counter-attack*) in each of the 6 game rotations. A sample of 19 games played at the 2003 European Youth Volleyball Championship in Zagreb was used. The games were recorded and analysed by means of the "Data Volleyball" software. Each game was analysed for both participating teams. Canonical discriminant analysis (standard method) was employed to determine any possible differences. Discriminant functions showed significant differences between the two groups in rotations 5 and 3 ($p<.01$). In other rotations (1, 6, 4 and 2) there were no significant differences between these two groups. From the aspect of game complexes we can conclude that on the basis of the variable/phases of Complex II we can see the differences more clearly between the two groups. On the level of the game phases the variable *service* had the largest loadings across the discriminant functions, followed by the variables *attack*, *block*, and *counter-attack*. *Serve reception* and defence had low loadings on the discriminant functions.

Key words: *volleyball, discriminant analysis, situational parameters, rotations, data volley software, European Championship, youth*

Introduction

Integral match analysis, or notational analysis, implies a chain of actions like observing, collecting, saving, processing, interpreting and presenting data about participating teams' efficiency during a match. After the global (cumulative) match analysis the efficiency of each game's phase (service, service reception, attack, block, defence and counter-attack) has to be analysed for a particular set and rotation. With regard to specific game rules, one volleyball team has to practise the technical–tactical elements in each of the 6 rotations. Accurately defined formation of the players in the first or second line in a particular rotation can result in a more or less efficient performance. That performance can be influenced by numerous factors: technical-tactical knowledge, anthropometric characteristics, physical condition/fitness, as well as cognitive abilities and personality traits. Strahonja (1983) analysed the relationships between specific motor abilities and performance in volleyball. The results showed that the greatest contribution to explaining performance is given by power and accuracy factors. A considerably lower contribution is made by the factor of speed of movement and speed endurance. Strahonja and Prot (1983) conducted an investigation on a group of 52 students of the Faculty of PE in Zagreb. The finding was that basic motor abilities: co-ordination, explosive power, accuracy, frequency of alternate movements, speed of movement, balance, strength and endurance are probably responsible for performance of volleyball players. Strahonja and Matković (1983) found a correlation between latent anthropometric characteristics and situational efficiency of volleyball players.

There are numerous research studies on the influence of game situational parameters on victory, defeat or final standings of volleyball teams. Eom and Schutz (1992a) attempted to extract, from among the selected technical-tactical components, the most powerful predictor or a group of predictors of team success. The study has shown that the differences between the matches won and the matches lost are more expressed in those technical--tactical elements that are executed while organizing a counter-attack: block, court defence, setting

and spike. Finally, the discriminant analysis has shown that *block* and *spike* are the most important elements for determining the success of a team. Using notational analysis of volleyball matches Marelić (1998) researched the characteristics of team play of international volleyball for juniors. An analysis of differences between 8 phases of play in volleyball showed, on the basis of the sets won and the sets lost, that the variables *spike/attack* and *setting/counter-attack* had the highest loadings on the discriminant function, whereas the variables *block*, *defence*, *setting/attack* and *spike/counter--attack* had low loadings.

Marelić, Rešetar and Janković (2004) determined the differences between 76 won and lost sets obtained from 20 matches played in the Italian A1 league. The canonical discriminant function significantly differentiated between the sets won and the sets lost ($p<.00$). The discriminant function was defined by the highest loadings of the variable *spike/attack*, and by somewhat lower loadings of the variables *spike/counter-attack*, *serve reception*, *block* and *serve*.

Palao, Santos and Urena (2004) studied the effect of team's quality level on the performance of skills (serve, reception, spike, block and dig) in top--level volleyball at 33 male matches and 23 female matches of the 2000 Olympic Games in Sydney. In males, the results showed that *block* is the skill that differentiated the teams of level 1 from the teams of level 2. A reduction of error in relation to the level of the team was observed. In females, the authors found the significant difference in the performance of the *spike* in favour of the teams of level 1. An increase in success of *reception*, *spike*, *block* and *dig* in relation to the level of the team was observed.

The purpose of the present study was to find out any statistically significant differences between two groups of teams – the group of *semi-finalists* (1^{st}–4^{th} place), and *other team*s (5^{th}–8^{th} place), on the basis of 6 situational parameters (*serve*, *serve reception*, *block*, *defence*, *attack* and *counter-attack*) in each of the 6 game rotations. Such an approach to this research was inspired by many situations from practice where it has been indicated that balanced quality performance through all the rotations is one of the key factors to wining (Đurković, 2007). One of the specificities of this research is the sample - youth national volleyball teams (all previous studies have been conducted on the samples of either junior or senior national and international teams).

Methods

The sample was comprised of 19 games played by 8 national teams during the preliminary and final round of the 2003 European Youth Volleyball Championship held in Zagreb. Each game was analysed for both participating teams (representing the total of 38 cases). In the preliminary round the teams were divided into two groups: "A" (Poland, The Nederlands, Germany and Croatia) and "B" (Russia, Slovakia, Czech Republic and Italy). Matches in groups were played in a single round--robin system. The first two teams classified in each preliminary pool qualified for the semi-finals (1^{st}–4^{th} place) and third and fourth ones played for ranking (5^{th}-8^{th} place).

The set of predictor variables consisted of 6 standard situational efficiency indicators recorded for each team during the games: *serve* (*serve*), *serve reception* (*reception*), *attack* (*attack*), *block* (*block*), *court defence* (*defence*) and *counter-attack* (*cattack*). By using DATAVOLLEY software the quality of executing each game phase was evaluated on an ordinal 5-degree scale (Table 1). The first two degrees denote the positive realization - actions enabled either winning an advantage or winning a point; the third degree on the scale denotes the execution in which an action is continued without an advantage for the team, whilst the last two degrees denote the negative realization, for example, an action that gives an advantage to the opponent or an error committed by the own team. This procedure is standardized and used by the best national selections at all big international and national competitions.

The frequencies of each technical-tactical element were used to collect the necessary data. Further, although each technical-tactical element was ranked on the 5-degree scale, the collected frequencies were put in the formula:

(No. of fr.(=)x1) + (No. of fr.(-)x2) + (No. of fr.(/) x3) + (No. of fr.(+)x4) + (No. of fr.(#)x5)

Total number of frequencies (error + negative realization + neutral + positive + ideal or a point).

* fr. = frequencies

Table 1. Ordinal 5-degree scale

Ordinal 5-degree scale	
Double positive realization (#)	winning a point
Positive realization (+)	gaining advantage after an action
Neutral realization (/)	action is continued without advantage for the team
Negative realization (-)	action that gives advantage to the opponent
Double negative realization (=)	error, losing a point

Such a calculation produces values on the ordinal scale for each of the five situational efficiency indicators. These values can be further used for statistical analysis.

The criterion variable was defined binary differentiating between the games played by the *semi-finalists* (1) and the *other teams* (0).

Data analysis methods. The central and dispersion parameters were calculated for both groups of teams in all the 6 rotations. The discriminant analysis was used to determine any possible differences between the two groups of teams in each of the 6 rotations.

Results

The results of discriminant analysis (standard method) between the two groups of teams in each of the 6 rotations are presented in Table 2.

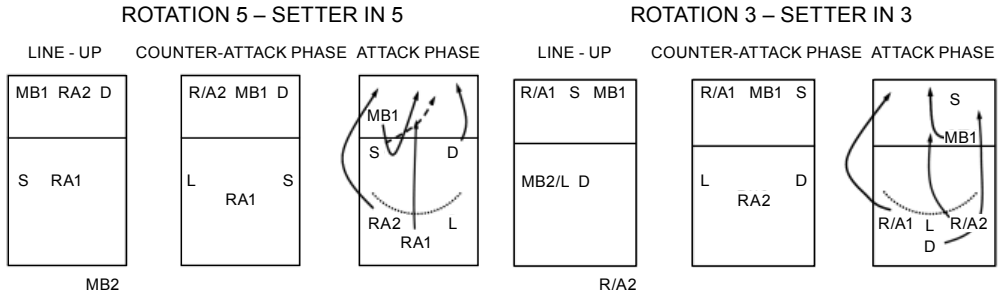
The position of players in the line-up, Complex II (counter-attack phase) and Complex I (attack phase) in rotations 5 and 3 are presented in Figure 1.

Table 3 shows the parameters of descriptive statistics of specific volleyball phases for both groups of teams for rotations 5 and 3.

Table 2. Discriminant analysis – standard methods

	λ	R	χ^2	df	p
ROT1	.12	.32	3.68	6	.72
ROT6	.31	.49	8.88	6	.18
ROT5	.75	.66	18.51	6	.00
ROT4	.11	.32	3.58	6	.73
ROT3	.51	.78	30.37	6	.00
ROT2	.38	.53	10.66	6	.10

Legend: λ - eigenvalue, **R** - canonical correlation, χ^2 - chi-square test, **df** - degrees of freedom, **p** - level of significance



Legend: S – setter, R/A – receiver attacker, MB – middle blocker, D – diagonal player, L - libero

Figure 1. The position of players in the line-up, Complex II (counter-attack phase) and Complex I (attack phase) in rotations 5 and 3.

Table 3. Descriptive statistics of volleyball phases in rotations 5 and 3

ROTATION 5 – SEMI-FINALISTS						ROTATION 3 – SEMI-FINALISTS					
VARIABLE	**N**	**Mean**	**Min**	**Max**	**SD**	**VARIABLE**	**N**	**Mean**	**Min**	**Max**	**SD**
SERVE	20	2.57	2.00	3.14	.33	SERVE	20	2.69	2.09	3.50	.39
RECEPTION	20	3.91	2.64	5.00	.57	RECEPTION	20	4.13	2.89	4.89	.52
DEFENCE	20	2.97	1.00	4.25	.83	DEFENCE	20	3.07	1.00	5.00	1.15
BLOCK	20	2.28	1.00	3.50	.62	BLOCK	20	2.46	1.00	3.40	.69
ATTACK	20	3.76	2.33	4.67	.58	ATTACK	20	3.94	2.44	5.00	.66
CATTACK	20	3.68	2.00	5.00	.73	CATTACK	20	3.43	.00	5.00	1.05
ROTATION 5 - OTHERS						**ROTATION 5 - OTHERS**					
VARIABLE	**N**	**Mean**	**Min**	**Max**	**SD**	**VARIABLE**	**N**	**Mean**	**Min**	**Max**	**SD**
SERVE	18	2.27	1.85	2.89	.32	SERVE	18	2.46	1.50	3.55	.43
RECEPTION	18	4.01	2.57	4.83	.59	RECEPTION	18	3.89	2.60	5.00	.62
DEFENCE	18	2.85	0.00	5.00	1.22	DEFENCE	18	2.94	.00	5.00	1.08
BLOCK	18	2.38	1.00	4.00	.73	BLOCK	18	3.45	2.20	5.00	.76
ATTACK	18	4.05	2.83	5.00	.56	ATTACK	18	3.43	2.50	4.67	.61
CATTACK	18	3.10	0.00	5.00	1.31	CATTACK	18	3.72	1.67	5.00	.70

Legend: N - number of cases, MEAN - arithmetic mean, MIN – minimum, MAX – maximum, SD - standard deviation

Table 4 shows the correlations between the variables and discriminant functions, as well as the results of centroids of the games played by the semi-finalists and the games played by other teams on the discriminant functions for rotations 5 and 3.

Table 4. Correlations of variables with the discriminant functions and the position of the centroids of the groups on the discriminant functions in rotations 5 and 3

ROTATION 5		**ROTATION 3**	
Variable	**Root 1**	Variable	**Root 1**
SERVE	-.54	SERVE	.22
RECEPTION	.10	RECEPTION	.17
DEFENCE	-.06	DEFENCE	.04
BLOCK	.08	BLOCK	-.56
ATTACK	.29	ATTACK	.33
CATTACK	-.33	CATTACK	-.13
	Root 1		**Root 1**
Other teams	.88	Other teams	-1.26
Semi-finalists	-.80	Semi-finalists	1.13

Table 5 shows the results of the classification of the games played by the two groups of teams on the basis of the discriminant functions for rotations 5 and 3.

Table 5. Classification matrix of the games played by the semi-finalists and the other teams on the basis of the discriminant functions

ROTATION 3	Classification percentage	Other teams	Semi-finalists
Other teams	77.78	14	4
Semi-finalists	85.00	3	17
Total	81.58	17	21
ROTATION 5	Classification percentage	Other teams	Semi-finalists
Other teams	88.89	16	2
Semi-finalists	90.00	2	18
Total	89.47	18	20

Discussion and conclusion

The results presented in Table 2 make it possible to conclude that the discriminant function significantly discriminates between the two groups of teams ($p<.01$) in rotations 5 and 3. In the other rotations there were no significant differences between the semi-finalists and the other teams.

The obtained results for rotation 5 make it possible to conclude that the discriminant function significantly discriminates between the games played by the semi-finalists from the games played by the other teams ($p<.01$), with a relatively high canonical correlation (.66). It may be concluded that six volleyball phases can differentiate well between two groups of volleyball teams in rotation 5.

Table 3 (*Rotation* 5) represents data obtained by means of descriptive statistics. Arithmetic means, maximal and minimal results and standard deviations were calculated. The differences between arithmetic mean values in performance of a game phase could be noticed. The highest differences are to be seen in the variable *serve* (semi-finalists 2.57 vs others 2.27), *counter-attack* (semi-finalists 3.68 vs others 3.1) and *attack* (others 4.05 vs semi-finalists 3.68).

Table 4 (*Rotation* 5) shows the correlation between the variables and discriminant function as well as the position of the centroids of the games, played by both groups of teams, on the discriminant function. The structure of the discriminant function was bipolar. The semi-finalists were located on the negative pole and other teams on the positive pole. The negative pole was defined by the following variables: *serve*, *counter-attack* and *defence*, and the positive pole by the variables: *attack*, *reception* and *block*.

The discriminant function was defined by the highest loading of the variable *serve* (-.54). The serving player in rotation 5 is the middle blocker 2 (Figure 1). It is those players (Ostapenko/Russia and Mozdzonek/Poland) who were the most efficient servers in their teams. The variable *counter-attack* had a lower loading (-.33). That is very logical because counter-attack is the next chain in the chain of Complex II – a very aggressive serve (power jump serve) results in either scoring a direct point or in situations from which it is easier to realize a counter-attack. Variable *attack* (.29) was situated on the positive pole of the discriminant function. That means that other teams were even successful in this variable. Variables *reception* (.10), *block* (.08) and *defence* (-.06) had minimal loadings on the discriminant function.

The predictive power of the variables of Complex II is confirmed in the study conducted by Zetou, Tsigilis, Moustakidis, and Komninakidou (2006) who concluded that an "ace" in serve and successful spike in a counter-attack remain the most powerful aggressive tools for top-level teams and were predictors of victory. None of the three *dig* or the four *block* categories significantly discriminated to a game's outcome.

Table 5 (*Rotation 5*) shows the results of the classification of the games played by the two groups of teams on the basis of the discriminant function. Out of 18 games played by the other teams, 16 were well classified, which amounts up to 88.89%, whereas out of 20 games played by the semi-finalists, 18 were well classified, which amounts up to 90%. The results (89.47% in total) confirm

a very high discriminant value of the suggested variables.

The obtained results for rotation 3 show that the discriminant function significantly discriminates between the games played by semi-finalists from the games played by the other teams ($p<.00$), with a very high canonical correlation (.78). It may be concluded that the six variables can differentiate well between the two groups of volleyball teams. Table 3 (*Rotation 3*) represents data obtained by means of descriptive statistics. The highest differences between arithmetic mean values in game phases are presented in *block* (others 3.45 vs semi-finalists 2.46), *attack* (semi-finalists 3.94 vs others 3.43) and *serve* (semi-finalists 2.69 vs others 2.46).

Table 4 (*Rotation 3*) displays the correlation between the variables and discriminant function as well as the position of the centroids of the games, played by both groups of teams, on the discriminant function. The structure of the discriminant function was bipolar. The semi-finalists were located on the positive pole and the other teams on the negative pole. The positive pole is defined by the following variables: *attack*, *serve*, *reception* and *defence*, and the negative pole by *block* and *cattack*. The discriminant function was defined by the highest loadings of the variable *block* (-.56). Taking into account that the variable *block* is situated on the negative pole, it can be assumed that the group of the other teams performed better in that variable. In rotation 3 blocks were performed by the setter, receiver attacker 1 and middle blocker 1 (Figure 1). Thus, logically, domination in the block by the other teams influenced slightly the domination in *cattack* (-.13).

Alfonso, Mesquita, and Palao (2006) analysed the impact of the blocking system and the number of blockers on blocking efficiency. The results showed that the use of the commit-block (blocking tactic) makes it difficult to formate double and triple blocks and does not increase the block effectiveness, or it does not enhance the opponent's errors in spiking.

The variable *attack*, placed on the positive pole, had a high predictive value (.33) followed by the variable *reception* (.17). That is logical because efficiency in that variable is a precondition for efficiency in *attack*. The explanation may be found in the fact that spike in the phase of attack is mostly executed after a positive serve reception, upon which the setter has the opportunity to organize a fast and combined attack that will disrupt the opponent's block and defence system organization. The results of the study of Janković, Marelić and Milanović (1991) confirmed the high values of co-operation between the setters and attackers in all situations of the game: during negative, alternate or ideal serve reception. It is obvious that a correlation between setting and attacking has the highest influence on the final success of a team. The similar results reporting on the correlation of reception, setting and attack were obtained by Eom and Schutz (1992b).

Even in this rotation the group of the semi-finalists predominated in *serve* (0.22), but the group of the other teams performed block and *counter-attack* phases better. Group of semi-finalists retained domination in Complex I (variables *reception* and *attack*). The results of the study by Yannis and Panagiotis (2004) showed that the Athens gold-medallist team of Brazil had, in addition to the previously said, remarkable reception effectiveness which led to an outstanding attack capability, thus re-establishing the attack as the most important skill in volleyball.

Table 5 (*Rotation 3*) shows the results of the classification of the games played by the two groups of teams on the basis of the discriminant function. Out of 18 games played by the other teams, 14 were well classified, which amounts up to 77.78%, whereas out of 20 games played by the semi-finalists, 17 were well classified, which amounts up to 85%. The results (81.58% in total) confirm a very high discriminant value of the suggested group of variables.

The results obtained enabled the conclusion that the two groups of volleyball teams could be better distinguished on the basis of the phases of Complex II. Actually, it was expected, since it is more difficult to win a point within that game complex. Even less successful teams can score a considerable number of points within Complex I. The main reason is that spike in the phase of attack is mostly executed after the positive serve reception, upon which the setter has the opportunity to organize a fast and a combined attack. Marelić, Rešetar, Zadražnik and Đurković (2005) made the efficiency performance model (of the volleyball phases) expressed in percentages, with the structure of points achieved within a certain phase of the game that one team should achieve in order to win a volleyball set. The authors concluded that successful teams have won about 9 points with spiking in Complex I and about 5 points with spiking in Complex II. Thus, the variable *serve* had the highest loadings on the discriminant functions followed by the variables *attack*, *block* and *counter-attack*. The variables *reception* and *defence* had lower loadings on the discriminant functions.

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ROTACIJSKA ANALIZA EKIPNE IGRE NA EUROPSKOM PRVENSTVU U ODBOJCI 2003. U ZAGREBU

Sažetak

Uvod

Integralna analiza utakmice podrazumijeva niz radnji usmjerenih na promatranje, praćenje, prikupljanje, pohranjivanje, obradu, interpretaciju i prezentaciju podataka o vlastitoj igri i igri protivnika za vrijeme i nakon utakmice. S obzirom na specifičnost odbojke ekipa se mora uvježbavati u svih 6 rotacija igre. Točno određeni raspored igrača na mreži i u polju u određenoj rotaciji može rezultirati više ili manje uspješnom igrom, na što utječe puno faktora, kao što su: tehničko-taktička znanja igrača, antropometrijske karakteristike, njihove motoričke, funkcionalne i kognitivne sposobnosti te konativne osobine. Cilj ovoga istraživanja je usporedba skupina polufinalista i ostalih ekipa u prostoru pokazatelja situacijske učinkovitosti u svakoj od 6 rotacija zasebno.

Metode istraživanja

Uzorak entiteta čini 19 utakmica odigranih na EP kadeta u Zagrebu 2003. godine. Natjecalo se 8 reprezentacija koje su bile podijeljene u dvije skupine: skupinu "A" (Poljska, Nizozemska, Njemačka i Hrvatska) i skupinu "B" (Rusija, Slovačka, Češka i Italija). Nakon odigranih utakmica po skupinama, slijedile su utakmice za plasman. Prediktorski skup varijabli predstavljaju sljedeće faze odbojkaške igre: *servis*, *prijem servisa*, *napad*, *blok*, *obrana* i *kontranapad*. Kriterijska varijabla binarno je definirana i diferencira odigrane utakmice reprezentacija polufinalista (1) od ostalih reprezentacija (0). Podaci s odigranih utakmica zabilježeni su pomoću statističkog programa *DATAVOLLEY*. Statističkim programom *Statistica 7.0.* izračunati su deskriptivni pokazatelji za obje skupine ekipa, a diskriminacijskom je analizom provjerena razlika u igri između polufinalista i ostalih ekipa u prostoru 6 situacijskih parametara u svih 6 rotacija.

Rezultati

Statistički značajne razlike postoje u rotacijama 5 i 3 ($p<.01$). U ostalim rotacijama (1, 6, 4 i 2) na osnovi odabranog skupa varijabli nisu evidentirane značajne razlike. Razlika među dvjema skupinama ekipa u rotacijama 5 i 3 može se registrirati već na deskriptivnoj razini (usporedba srednjih ocjena u promatranim varijablama). Najveće razlike između dviju skupina ekipa u rotaciji 5 prikazuju se u varijablama *servis* (polufinalisti 2,57 - ostali 2,27), *kontranapad* (polufinalisti 3,68 – ostali 3,10) i *napad* (ostali 4,05 - polufinalisti 3,68). Najveće razlike između dviju skupina ekipa u rotaciji 3 prikazuju se u varijablama *blok* (ostali 3,45 – polufinalisti 2,46), *napad* (polufinalisti 3,94 – ostali 3,43) i *servis* (polufinalisti 2,69 - ostali 2,46).

U rotaciji 5 struktura diskriminacijske funkcije je bipolarna. *Polufinalisti* su smješteni na negativnom, a *ostale ekipe* na pozitivnom polu. Negativni pol definiraju varijable *servis*, *kontranapad* i *obrana polja*, a pozitivni *napad*, *prijem servisa* i *blok*.

Najveću projekciju na diskriminacijsku funkciju ima varijabla *servis* (-.54). Do nje po veličini projekcije nalazi se varijabla *kontranapad* (-.33). Ti rezultati govore da grupa *polufinalista* dominira učinkovitošću u kompleksu II, tj. u fazama igre koje slijede nakon vlastitog servisa (uključujući *servis*). Vrlo je vjerojatno da agresivan servis (većina igrača na ovom turniru servirala je agresivan skok servis) u ovoj rotaciji dovodi ili do izravnih poena ili do olakšanog kontranapada za reprezentacije polufinalista. Nižu projekciju ima varijabla *napad* (0.29) u čijoj izvedbi je skupina *ostalih ekipa* bila ravnopravna, često i uspješnija. Varijable *prijem servisa* (.10), blok (.08) i *obrana polja* (-.06) imale su minimalne projekcije na diskriminacijsku funkciju.

U rotaciji 3 struktura diskriminacijske funkcije je također bipolarna. *Polufinalisti* su smješteni na pozitivnom, a *ostale ekipe* na negativnom polu. Pozitivni pol definiraju varijable *napad*, *servis*, *prijem servisa* i *obrana*, a negativni varijable *blok* i *kontranapad*.

Najveću projekciju na diskriminacijsku funkciju ima varijabla *blok* (-.56). S obzirom na to da se ta varijabla nalazi na negativnom polu, možemo pretpostaviti da je skupina *ostalih ekipa* bila uspješnija u toj fazi igre. S obzirom na dominaciju u fazi bloka, logički slijed je dominacija skupine *ostalih ekipa* i u varijabli *kontranapad* (-.13). Sljedeća varijabla po veličini je *napad* (.33), koja se nalazi na pozitivnom polu, što znači da su u toj varijabli bile učinkovitije ekipe *polufinalista*, kao i u varijabli *servis* (.22). Varijabla *prijem servisa* (.17), nalazi se s niskom projekcijom na pozitivnom polu, što je i logično jer je učinkovitost u njoj jedan od preduvjeta za visoku učinkovitost u varijabli *napad* (precizan prijem omogućava brži i raznovrsniji napad protiv slabije organiziranog sustava bloka i obrane). Skupina polufinalista, dakle, zadržava dominaciju u kompleksu I.

Rasprava i zaključak

Gledajući s aspekta kompleksa igre može se zaključiti da se na osnovi varijabli iz kompleksa II ove dvije skupine ekipa mogu puno bolje razlikovati. To je zapravo i logično jer je u kompleksu kontranapada puno teže doći do poena. Naime, u odbojci ekipa koja prima servis i organizira napad u određenoj je prednosti pa i manje kvalitetne ekipe završavaju fazu napada sa čak 55 - 60 % uspješnosti. Kada analiziramo vrijednosti samo na razini faza, onda se može vidjeti da je najveće projekcije na diskriminacijske funkcije imala varijabla *servis*, zatim varijabla *napad*, *blok* te varijable *kontranapad*. Vrlo niske projekcije imale su varijable *prijem servisa* i *obrana*.