DISCRIMINANT ANALYSIS OF THE SETS WON AND THE SETS LOST BY ONE TEAM IN A1 ITALIAN VOLLEYBALL LEAGUE – A CASE STUDY

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Abstract:

Chain of factors determines success or failure in any sport match, but the measurable part of it is related to the indicators of efficient performance of technical – tactical elements or game phases during the matches. The sample consisting of 76 sets, obtained from 20 matches played by one team in Italian men's A1 league, was used in this study to determine, on the basis of five play-specific situational parameters, the differences between the sets won and the sets lost. A discriminant analysis was used. The canonical discriminant function significantly differentiated between the sets won and the sets lost, at the level of significance $p<0.00$. The discriminant function was defined by the highest projection of the variable *spike in the phase of attack*, and by somewhat lower projections of the variables *spike in the phase of counterattack*, *serve reception*, *block* and *serve*.

Key words: *volleyball, notational analysis, performance parameters*

DISKRIMINANZANALYSE DER VON EINER MANNSCHAFT GEWONNENEN UND VERLORENEN SÄTZE IN DER ITALIENISCHEN A1 VOLLEYBALL-LIGA-EINE FALLSTUDIE

Zusammenfassung:

Die Gründe eines erfolgreichen oder erfolglosen Spielresultats sind in einer Reihe von Faktoren zu suchen, aber der meßbare Teil ist mit einem Indikator der situationsbezogenen Effizienz der technischen Elemente, der Elemente der Taktik oder der Spielphasen im Laufe des Spiels verbunden. 76 von einer Mannschaft gespielten Sätzen aus 20 Volleyballspiele der italienischen A1 Liga für Männer wurden analysiert, um aufgrund von fünf situationsbezogenen spielspezifischen Parametern die Unterschiede festzustellen, zwischen den gewonnennen und verlorenen Sätzen. Um diese Unterschiede zu bestimmen wurde die Diskriminanzanalyse angewandt. Die kanonische Diskriminanzfunktion machte einen wesentlichen Unterschied zwischen den gewonnennen und verlorenen Sätzen; das Signifikanzniveau war $p<0,00$. Die Diskriminanzfunktion wurde mit der höchsten Projektion definiert durch die Variable *Schmetterschlag in der Angriffsphase* und mit etwas niedrigerer Projektion der folgenden Variablen: *Schmetterschlag in der Gegenangriffsphase*, *Aufgabeannahme*, *Block* und *Aufgabe*.

Schlüsselwörter: *Volleyball, Spielanalyse, Ausführungsparameter*

Introduction

The monitoring of play in team sports, volleyball as well, and its analysis are based on the evaluation of the effects of situation-related parameters. The evaluation can be performed on the basis of: volleyball game official records, notes made during the game (Cox, 1974; Strahonja, 1972), video recordings (Eom & Schuttz, 1992), computer programs (Fellingham, Collings, & McGown, 1994; Fontani, Ciccarone, & Giulianini, 2001), or various analyses of players' efficiency during the game (Fröhner, 1995).

The lack of uniformity of play elements evaluation methods has, for a long time, been a shortcoming of research studies conducted in volleyball. For instance, about twenty years ago a

questionnaire was circulated among the coaches in the same league. The results showed that as many as 17 different variables had been used to evaluate the efficacy of actions executed by volleyball players (Janković & Marelić, 1995). Statistical data collected during the matches played by top volleyball teams are seldom available; they are also frequently statistically incomplete to apply inferential statistics such as regression analysis, discriminant analysis, etc. Luckily, the authors were able to produce this paper because one of them, V. Janković, had coached one of the analyzed volleyball teams. It is of great assistance in investigations employing multivariate methods that a uniform computer program (Datavolley) is now predominantly used in Europe by many national teams, and thus also by statisticians, to monitor volleyball games.

The latest significant changes in the volleyball rules (e.g. each mistake made by one team is a point for the opposing team) presumably assign a different role to certain play elements in terms of winning a point. Thus, these changes have opened a space for new performance-related investigations, representing a big challenge for kinesiological research into the team-specific characteristics of play which are crucial for success. Certain methodological procedures and findings of previous research studies using multivariate methods, although conducted under the old game rules regulation, may be useful.

Eom and Schutz (1992) extracted, from among the selected technical-tactical components, the 'best' predictor or a group of predictors that determined the success of a team in a game. The comparison of the technical-tactical elements *attack* and *counterattack* has shown that setting and spiking in the phase of attack, upon the serve reception, and in the phase of the warded-off ball (the so-called counterattack) must not be treated in the same way. 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 counterattack: 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.

On the sample of 149 sets Marelić (1994) carried out the regression analysis of the correlation between five phases of play and victory or defeat in a volleyball game. Matrix of intercorrelations revealed that the highest presented value (.71) of the variables SPIK4 and SERV2 explains the importance of spike in the phase of attack and in the phase of counterattack. Additionally, the obtained correlation implied that a team that executed the defensive elements particularly well, among which the efficiency of counterattack was predominant, also had the biggest chances for success in a match.

On the basis of the analysis of volleyball matches, the same author (Marelić, 1998) investigated the characteristics of junior volleyball international quality team play. The 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 IN THE PHASE OF ATTACK and SETTING IN THE PHASE OF COUNTERATTACK had the highest projection on the discriminant function, whereas the variables BLOCK, COURT DEFENCE, SETTING IN THE PHASE OF ATTACK and SPIKE IN THE PHASE OF COUNTER-ATTACK had a small projection.

Methods

Sample of entities

This study was carried out on the sample of 76 sets obtained from 20 matches played by the volleyball team Zetaline-Padova against the following teams: Brescial-Montichiari, Modena, Sisley-Treviso, Cosmogas-Forli, Del Monte-Ferrara, Maxicono-Parma, Piaggio-Roma, Tnt Alpitour-Cuneo, Lube-Macerata, Iveco-Palermo and Vallever-Ravenna in Italian men's A1 league in the season of 1999/2000. The teams monitored were the members of the best volleyball league in the world and they consisted of players of the best national selections in the world.

Sample of variables

The follow-up of the matches is based on evaluating the performance efficiency of elements of play, that is, of the phases: 1) SERVE (*SERVE*), 2) SERVE RECEPTION (*RECEPT*), 3) SPIKE IN THE PHASE OF ATTACK (*SMATT*), 4) BLOCK (*BLOCK*) and 5) SPIKE IN THE PHASE OF COUNTERATTACK (*SMCATT)* (Zhang, 2000).

The quality of executing each phase of the game was evaluated on an ordinal 5-degree scale (Table 1). The first two degrees denote negative realization, for example, an error and an action that brings an advantage to the opponent, the third degree on the scale denotes the execution in which an action is continued without any advantage for any team, whereas the last two degrees denote either an advantage after such actions or a winning

point. This procedure is standardized in the software DATAPROJECT and used by some of the best national selections at all big international and national competitions.

Table 1. Ordinal 5-degree scale

Ordinal 5-degree scale	
double negative realization	(=) error, losing a point
negative realization	(-) action that brings advantage to the opponent
neutral realization	(/) action is continued without advantage for a team
positive realization	(+) brings advantage after actions
double positive realization	(#) winning a point

The game phase of setting is not analyzed in this paper. One of the reasons why this has not been done is that the standardized way of monitoring (software DATAPROJECT) evaluates the phase of setting exclusively through the realization of the spike after a perfect pass of the ball to the setter. Other situations in the game are not recorded so that this phase of play was omitted from further analysis due to insufficient data.

The criterion variable, binary defined, is the result the observed team achieved in each individual set in 20 matches (victory – defeat).

The frequencies of the observed phases were used to collect the data. After each execution of a particular situational parameter a variable had been evaluated on the 5-degree scale, the collected scores were put in the formula:

$$\frac{(\text{No. of } [=] \times 1) + (\text{No. of } [-] \times 2) + (\text{No. of } [/] \times 3) + (\text{No. of } [+] \times 4) + (\text{No. of } [\#] \times 5)}{\text{total number of frequencies } ([=] + [-] + [/] + [+] + [\#])}.$$

Data processing methods

The data for play of the observed team were collected by means of a specialized computer recording system, the software Datavolley Rel. 5.0 of the firm DATAPROJECT. The aforementioned calculation produces values on an ordinal scale for each of the five phases of play. These values were further used for statistical analysis.

The data were processed by means of descriptive statistics. The basic statistical parameters of the obtained indicators were determined – arithmetic means (÷), minimum (Min), maximum (Max), sums (Sum), and standard deviations (SD) for each sample. The significance of differences between the groups was tested by means of canonical discriminant analysis.

Results and discussion

The data obtained by descriptive statistics (Table 2, Figure 1) show that the differences are evident between the sets won and the sets lost in the variables SPIKE IN THE PHASE OF ATTACK (sets won 3.99 vs. sets lost 3.66), SPIKE IN THE PHASE OF COUNTER-ATTACK (sets won 3.92 vs. sets lost 3.57) and in the variable BLOCK (sets won 2.84 vs. sets lost 2.56). The reason, most probably, lies in the fact that the largest number of points in a set is generally scored by execution of these game elements.

Table 2. Descriptive statistics of volleyball-specific phases

VARIABLE	$\bar{X}$	Min	Max	St. Dev.	Sum.
SETS WON					
SERVE	2.36	1.92	3.36	0.29	70.73
RECEPT	4.01	3.47	4.48	0.27	120.22
BLOCK	2.84	1.25	4.30	0.61	85.15
SMATT	3.99	3.18	4.65	0.53	119.60
SMCATT	3.92	2.50	5.00	1.52	117.46
SETS LOST					
SERVE	2.27	1.85	2.76	0.22	104.24
RECEPT	3.83	2.41	4.62	0.43	176.15
BLOCK	2.58	1.57	4.84	0.67	118.75
SMATT	3.66	2.94	4.30	0.33	168.14
SMCATT	3.57	1.75	4.77	0.69	164.42

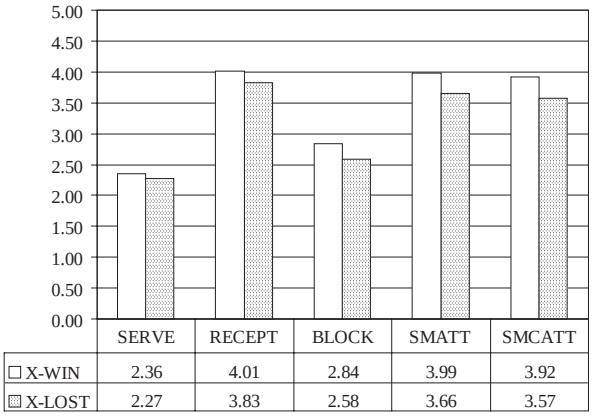

Figure 1. Arithmetic means for the sets won and the sets lost.

The results of the eigenvalue, of canonical correlation, of the chi-square test, as well as the number of degrees of freedom and the level of significance of the discriminant function are presented in Table 3. The obtained results make it possible to conclude that the discriminant function significantly discriminates the sets won from the sets lost at the level of significance 0.00 ($p<0.00$), with a relatively high canonical correlation (.58). It may be concluded that the five variables (game elements) differentiate well between the sets won and the sets lost.

Table 3. Eigenvalue (λ), canonical correlation (R), chi-square test (χ^2), number of degrees of freedom (df) and the level of significance of the discriminant function (p)

	λ	R	χ^2	df	p
0	0.50	0.58	29.07	5	0.00

Table 4 displays the correlation between the variables with the discriminant function, as well as the position of centroids of the sets won and the sets lost on the discriminant function. The sets lost are to be found on the negative pole of the discriminant function, whereas the sets won are to be found on its positive pole. The structure of the discriminant function is also bipolar. The positive pole is defined by all variables, whereas no variable was to be found on the negative pole. The discriminant function is defined by the highest projection of the variable SPIKE IN THE PHASE OF ATTACK (SMATT) and by a somewhat lower projection of the variable SPIKE IN THE PHASE OF COUNTERATTACK (SMCATT) and SERVE RECEPTION (RECEPT), whereas the variables BLOCK and SERVE had the lowest projections.

In one of the previous research studies (Zhang, 2000) it was found that *spike in the phase of attack* and *setting in the phase of counterattack* significantly affected either the victory or the defeat in a set.

By employing discriminant analysis, Cox (1974) found that the monitored sequential skill events were: spike, block, serve reception, dig, serve and setting. The author concluded that the contribution of the first two skills listed to the prediction of the team's success was larger than the contribution of the remaining four skills together.

Eom and Schutz (1992) also found that *block*, *spike in the phase of attack* and *spike in the phase of counterattack* were the most important for the success of a team.

In our investigation the variable SPIKE IN THE PHASE OF ATTACK (.71) proved to have the highest predictive value with respect to the criterion. The explanation for such a high predictive value may be found in the fact that spike in the phase of attack is mostly executed after an ideal serve reception, upon which the setter has the opportunity to organize a fast and combined attack that will hinder the opposing team's anticipation of possible ways of defence thus obstructing the timely formation of the opponent's block.

In contemporary volleyball the spikers who can efficiently realize the attack in a situation when the opponent is setting the group block are considered to be particularly effective.

Additionally and speaking in favour of the aforementioned, in the new system of play, the Rally Point System (RPS), a point is scored upon the successful realization of a spike in attack, in contrast to the previous system in which only the change of serve occurred upon the successful spike in the phase of attack. This is substantiated by the fact that the frequency of spikes is the largest in the phase of attack. Therefore, its effect on the outcome – either victory or defeat - is expected.

SPIKE IN THE PHASE OF COUNTER-ATTACK (.37) had a somewhat lower magnitude, probably due to the fact that the new game rules shortened the time necessary to win a point. Namely, the reason may be sought in the highly dangerous jump serve that has two aims: to win a point or to make the serve reception difficult so that, consequently, the point in a counterattack is won primarily by setting up a two-player or a three-player block. Still, if the players delivering the serve and creating the block do not win the point by it, and if the court defence 'catches' the opponent's attack, only then the spike for the execution of counterattack is organized.

The variable RECEPT (serve reception) (.33) has a somewhat lower statistically significant magnitude. Among coaches, the importance of serve reception is indisputable. A wish to elicit the best possible response to dangerous serves has resulted in the introduction of a new player in the body of rules – a player specialized only for receiving either a serve or a spike (libero).

The variables SERVE (.25) and BLOCK (.28) have also proved to be statistically significant and predictive. Generally, it seems that there are chances for scoring just a point or two on a serve per set on average. However, the importance of serve in volleyball resembles the role of white chess pieces. The way in which the white chess pieces open dictates the further course of play. Both winning the point on one's own serve and a serve

error have a significant impact on the final outcome. An acceptable number of error serves in successful teams is about 3.5 points per set (Marelić, 1998). This means that in a five-set match the teams may make on average of up to 15 error serves and still win the match.

A somewhat larger number of points per set (approximately 3-4) were scored by blocking than by serving. However, the result of introducing a new player – libero - into play was a more precise serve reception and a better, eventually more efficient organization of attack, so that the blockers were forced to parry the opposing spikers by just a one-player block, which hinders higher efficiency in blocking.

Table 4. Correlation of variables with the discriminant function and the position of centroids of groups on the discriminant function

VARIABLE	
	Root 1
SERVE	0.25
RECEPT	0.33
BLOCK	0.28
SMATT	0.71
SMCATT	0.37
	Root 1
G_1:0	-0.56
G_2:1	0.87

Table 5 shows the results of the classification of the sets won and the sets lost by Zetaline-Padova on the basis of the discriminant function. Out of 50 sets lost, 38 were well classified, which amounts to 82.61%, whereas out of 26 sets won 18 were well classified, which amounts to 60%. The results confirm a relatively high discriminant value of the variables suggested for the purpose of analyzing volleyball play of the observed team in terms of the sets won and the sets lost.

Table 5. Classification matrix of the sets won and the sets lost on the basis of discriminant function

	Classification percentage	G_1:0 p=.60526	G_2:1 p=.39474
G_1:0	82.61	38	8
G_2:1	60.00	12	18
Total	73.68	50	26

Conclusion

The significant changes in volleyball rules have become the challenge for further kinesiological investigations of performance. It is hoped that the analysis presented in this paper may contribute to a better understanding of the presumed changes in top-level volleyball induced by the game rules changes.

The intention was to focus on the differences in performance of situational parameters of play in terms of the sets won and the sets lost obtained by canonical discriminant analysis.

The canonical discriminant function significantly differentiated between the sets won and the sets lost at the level of significance $p<0.00$ and the canonical correlation of .58, so that it may be concluded that the predictor variables (*serve, reception, block, spike in the phase of attack* and *spike in the phase of counterattack*) statistically significantly differentiated between the sets won and the sets lost for the observed team.

The results showed that the positive pole was defined by all variables, that is, that no variable was found on the negative pole. The variable *spike in the phase of attack* defined the discriminant function with the highest projection, and the variables *spike in the phase of counterattack* and *serve reception* with a somewhat smaller projection. The projection of the variables *block* and *serve* in defining the discriminant function was the smallest in this case.

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DISKRIMINACIJSKA ANALIZA DOBIVENIH I IZGUBLJENIH SETOVA JEDNE MOMČADI U TALIJANSKOJ A1 ODBOJKAŠKOJ LIGI – ANALIZA SLUČAJA

Sažetak

Uvod

Promatranje i analiza odbojkaške igre najčešće se zasnivaju na procjenjivanju parametara situacijske učinkovitost dobivenih iz odbojkaškog zapisnika, stenograma utakmice, video zapisa ili računalnih programa. U odbojci su statistički podaci dobiveni na utakmicama vrhunskih ekipa često nedostupni i nepotpuni, pa se na njima ne mogu primjenjivati postupci inferencijalne statistike. Na sreću, danas u Europi mnoge reprezentacije koriste unificirani računalni program (Datavolley), pa tako i specijaliste-statističare za praćenje odbojkaške igre.

Metode

Uzorak entiteta činilo je 76 setova dobivenih u 20 utakmica talijanske A1 lige u sezoni 1999./2000. god. koje je odigrala momčad Zetaline (Padova) s ekipama: Brescial-Montichiari, Modena, Sisley-Treviso, Cosmogas-Forli, Del Monte-Ferrara, Maxicono-Parma, Piaggio-Roma, Tnt Alpitour-Cuneo, Lube-Macerata, Iveco-Palermo i Vallever-Ravenna.

Podaci su prikupljeni specijaliziranim računalnim sustavom bilježenja sadržanim u programskoj podršci Datavolley Rel. 5.0 tvrtke DATAPROJECT.

Na ordinalnoj skali od pet stupnjeva ocjenjivala se učinkovitost izvedbe situacijskih elemenata igre, odnosno odbojkaških faza: 1. SERVIS, 2. PRIJEM SERVISA, 3. SMEČ IZ NAPADA, 4. BLOK i 5. SMEČ IZ KONTRANAPADA.

Prva dva stupnja označavaju negativnu realizaciju, npr. grešku i akciju koja donosi prednost protivniku, treći stupanj na skali označava izvođenje nakon kojeg se akcija nastavlja bez prednosti i za jednu ekipu, dok posljednja dva stupnja označavaju da je izvedba donijela prednost ili bod.

Kriterijsku varijablu čini binarno definiran rezultat svakog pojedinog seta na utakmici (pobjeda ili poraz za momčad Zetaline). Ulazni podaci su frekvencije odbojkaških faza, a nakon što je svaka izvedba procijenjena na skali od pet stupnjeva, frekvencije su uvrštene u formulu:

$$\frac{(\text{br.}\boxed{=}\text{ x 1}) + (\text{br.}\boxed{-}\text{ x 2}) + (\text{br.}\boxed{/}\text{ x 3}) + (\text{br.}\boxed{+}\text{ x 4}) + (\text{br.}\boxed{\#}\text{ x 5})}{\text{ukupna frekvencija } (\boxed{=} + \boxed{-} + \boxed{/} + \boxed{+} + \boxed{\#}).}$$

Takvim načinom računanja dobivamo numeričke vrijednosti na ordinalnoj skali za svaku od pet faza igre koje možemo koristiti kao podatke za statističku obradu.

Rezultati i rasprava

Iz podataka dobivenih deskriptivnom statistikom (tablica 1, dijagram 1) vidljivo je da su značajnije razlike po kriteriju dobivenih i izgubljenih setova postignute u varijablama SMEČ U FAZI NAPADA (3,99 dobiveni naspram 3,66 izgubljeni setovi), SMEČ U FAZI KONTRANAPADA (3,92 dobiveni prema 3,57 izgubljeni setovi) te u varijabli BLOK (2,84 dobiveni prema 2,56 izgubljeni setovi), najvjerojatnije zbog toga što se tim elementima igre osvaja najveći broj poena u setu. U tablici 2 prikazani su rezultati svojstvene vrijednosti, kanoničke korelacije, hi-kvadrat testa, broj stupnjeva slobode i razina značajnosti diskriminacijske funkcije. Iz dobivenih vrijednosti možemo ustvrditi da diskriminacijska funkcija značajno razlikuje dobivene od izgubljenih setova na razini značajnosti od 0.00 ($p<0.00$), uz relativno visoku kanoničku korelaciju (.58).

Tablica 3 prikazuje korelacije varijabli s diskriminacijskom funkcijom i položaj centroida dobivenih i izgubljenih setova na diskriminacijskoj funkciji. Na negativnom polu diskriminacijske funkcije nalaze se izgubljeni, a na pozitivnom polu dobiveni setovi. Struktura diskriminacijske funkcije je bipolarna. Pozitivni pol definiraju sve varijable, dok se na negativnom polu nije smjestila nijedna varijabla. Najvećom projekcijom diskriminacijsku funkciju definira varijabla SMEČ U FAZI NAPADA (SMNAP), nešto nižom projekcijom varijable SMEČ U FAZI KONTRANAPADA (SMKNAP) i PRIJEM SERVISA (PRIJEM), dok najmanjim projekcijama funkciju definiraju BLOK i SERVIS. Slično je dobio i Marelić (1998).

U ovom se istraživanju varijabla SMEČ U FAZI NAPADA (.71) pokazala kao najsnažnija prediktorska varijabla. Objašnjenje za tako veliku prediktivnost nalazimo u tome da se smeč u procesu napada većinom izvodi nakon idealnog prijema servisa nakon kojega je dizač u mogućnosti organizirati brz i kombinacijski napad koji otežava anticipaciju protivničke obrane, a time i pravovremeno formiranje protivničkog bloka. Ovome u prilog ide i činjenica da se u novom sustavu igre (RPS - *rally point system*)

uspješnom realizacijom smeča u napadu osvaja bod, za razliku od starog sustava gdje se nakon smeča u napadu osvajala samo promjena servisa.

SMEČ U FAZI KONTRANAPADA (.37) ima nešto manju vrijednost, vjerojatno zato što se, novim pravilima, skratilo vrijeme igre za poen. Razlog možda leži i u izuzetno opasnom skok servisu koji ima dva cilja: osvojiti poen ili otežati prijem servisa tako da se dvojnim ili trojnim blokom osvoji poen. Tek ako se servisom i blokom poen ne osvoji, a obrana polja "uhvati" protivnički napad, organizira se smeč za kontranapad.

Nešto nižu statistički značajnu vrijednost ima varijabla PRIJEM (.33). Važnost prijema servisa među trenerima nije upitna, čak je težnja za što boljim odgovorom na opasne servise rezultirala time da je u pravila uveden novi igrač – specijalist samo za prijem servisa i smeča (libero).

Varijable SERVIS (.25) i BLOK (.28) također su se pokazale statistički značajnima i prediktivnima. U setu se servisom u prosjeku postiže 1-2 poena, ali je uloga servisa poput uloge bijelih figura u šahu - njegovim "otvaranjem" diktiramo daljnji tijek igre. Ne samo da osvajanje poena servisom ima značajnu ulogu u stvaranju rezultata, već jednako tako i greška servisa. Prihvatljiv broj grešaka servisa kod uspješnih odbojkaških ekipa iznosi oko 3,5 poena po jednom setu (Marelić, 1998). To znači da na utakmici od pet setova ekipe prosječno smiju pogriješiti i u 15-ak servisa, a da još uvijek mogu ostvariti pobjedu. Blokom se prosječno postiže nešto više poena po setu nego servisom (oko 3-4), ali je uvođenje libera (precizniji prijem servisa i bolja organizacija napada) rezultiralo time da blokeri moraju često individualnim blokom parirati protivničkim smečerima, što smanjuje uspješnost bloka.

Tablica 4 prikazuje rezultate klasificiranja dobivenih i izgubljenih setova momčadi Zetaline na temelju diskriminacijske funkcije. Od 50 izgubljenih setova, 38 je dobro klasificirano (82,61%), dok je od 26 dobivenih setova, 18 dobro klasificirano (60%).

Zaključak

Rezultati kanoničke diskriminacijske funkcija pokazuju značajne razlike između dobivenih i izgubljenih setova na razini značajnosti od $p<0.00$ uz kanoničku korelaciju (.58), te možemo ustvrditi da prediktorske varijable (servis, prijem, blok, smeč u procesu napada i smeč u procesu kontranapada) statistički značajno razlikuju dobivene od izgubljenih odbojkaških setova. Pozitivni pol definiraju sve varijable. Najvećom projekcijom diskriminacijsku funkciju definira varijabla *smeč u procesu napada*, nešto nižim projekcijama varijable *smeč u procesu kontranapada* i *prijem servisa* te najnižim projekcijama varijable *blok* i *servis*.