

## RELATION BETWEEN MOTOR AND SITUATIONAL-MOTOR ABILITIES OF SEVENTH AND EIGHTH GRADE STUDENTS PLAYING VOLLEYBALL

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### Summary

Based on a sample of 112 boys seventh and eighth grade of Elementary school, age 13 to 15, we applied system of 21 variables, among them 18 variables were to estimate motor abilities and 3 were to estimate situational-motor abilities in volleyball and all is to determine mutual relations. According to results gained with appliance of canonical correlation analysis we can conclude that relations between observed group of variables – motor ability (as predict group of variables) with criteria group of variables (situational-motor abilities) - will result with statistically significant coefficient of canonical correlation.

**Key words:** motor, situational-motor, relations, volleyball, students, canonical correlation analysis

### INTRODUCTION

Aim of physical education is to systematically gain positive influence on development of anthropological characteristics to provide stimulus for normal growth and development of students, to prepare them to self control and test their health and body ability. Regarding to, the aim of education is to help students to strengthen and improve their motor and functional abilities, widen technical and tactical knowledge about sports and other forms of physical education in order to preserve their health, keep their work ability and recreate. It is very important to follow realization of this program and estimate gained results in order to improve corrective-educational practice in physical and health education and stimulate teachers to have more responsible and creative relation toward work. All this provides reliable information that should follow with eventual corrective interventions in practical realization of curriculum.

Correlation between specific motor abilities with other anthropological areas is still basic and actual theoretical and practical problem that is very important because it gives opportunity of forming rational procedures of optimal orientation and selection of youth athletes, as well it provide better foundation for training planning, controlling and programming and more efficiency controlling of anthropological characteristics development. (Findak, 1999, Tokić & Prskalo 1999).By following, checking and evaluation we should get

return information about how students accomplished all their tasks in physical and health education, in other words how each student came closer to his program tasks (Findak, Metikoš, Mraković 1992). Subject of this research refers to motor abilities (predictor group of variables) and situational-motor abilities from volleyball (standard group of variables), as well as defining their connections and relations with students age of 13 to 15. Problem of this research refers to defining significant factors (motor) that are important for improvement of situational-motor abilities (in volleyball), in order to gain specific information important to adequately plan and program curricula in the field of physical and health education.

Starting with subject and problem of the research, the main goal of this research is defining relations between motor (predictor group of variables) and situational-motor abilities in volleyball (standard group of variables).

### METHODS

#### Participants

The research was conducted on 112 students of seventh and eighth grade of Elementary school "Centar" in Tuzla, age of 13 to 15.

#### Instruments

Measuring instruments for this research were: motor abilities (18 variables) and situational-motor abilities in volleyball (3 variables).

**Sample of predictor variables**

Sample of predictor variables in this research included 18 variables to estimate motor abilities. Group of variables in predictor space was formed of 18 variables for motor space estimation and they include some segments of this space with 3 variables: movement frequency, flexibility, explosive strength, coordination, precision, balance.

- MBFTAR** – hand tapping
- MBFTAN** – leg tapping
- MBFTNZ** – leg tapping against wall
- MFLISTK** – slewing with bat
- MFLPRK** – forward band on stand
- MFLBOS** – side legs wide opened
- MFESDM** – standing long jump
- MFE20V** – running 20 m – sprint high start
- MFEBML** – throwing medicine ball while lying on the beck
- MKOS3M** – slalom with three medicine balls
- MAGTUP** – zig-zag test
- MAGKUS** – step aside
- MPGVCN** – aiming vertical goal with leg
- MPGHCR** – aiming horizontal goal with arm

- MPGPIK** – dart
- MBAP2O** – standing across on two legs eyes open
- MBAU2O** – standing vertically on two legs eyes open
- MBAU1O** – standing vertically on one leg eyes open

**Sample of standard variables**

To estimate situational-motor abilities in volleyball the sample of standard variables presents a group of (3) measuring instruments:

1. SOTPGS – tennis – forehand above hand serve
2. SOGCPM – aiming goal over the net from base posture
3. SOCOUK – two hand bump within 30 seconds.

**Data processing methods**

Data we gained through this research were processed through program packages STASTITICA 5.0 and SPSS 12.0. To determine relations between two groups of data we used Hotelling’s canonical correlation analysis.

**RESULTS AND DISCUSSION**

Table 1. Matrix of specific roots and canonical relation coefficients

Chi-Square Tests with Successive Roots Removed (noname.sta)						
	Canonical	Canonical				Lambda
	R	R-sqr.	Chi-sqr.	df	p	Prime
0	0,66	0,43	94,94	54	0,00	0,39
1	0,44	0,19	38,01	34	0,29	0,68
2	0,39	0,16	16,94	16	0,39	0,84

According to calculated specific equation of nonsymmetrical matrix (Table 1), applying Bartlett lambda test and suitable  $\chi^2$ , one of significant and positive pair of canonical factors (Canonical R) was isolated and it explains connection between motor abilities and situational-motor abilities in volleyball on the level of significance  $p \leq .01$ .

This canonical pair has the largest correlation (Canonical R) .66 and it contains the biggest percentage of mutual variance of first and second set of variables. That correlation indicates that this pair refers to what is important for this two groups of variables, explains (Canonical R-sqr) 43% of variance of this variable groups. Variables are oriented (scaled) in such way that negative harbinger of variable correlation and canonical

factor doesn’t mean weaker result value that was achieved in this variables, more exactly pre minus signals the lower the value of this variable the better guarantee for results in motor variables. The following variables are: MFE20V - running 20 m - sprint high start, MKOS3M – slalom with 3 medicine balls, MAGTUP- zig-zag test and variable MAGKUS – step aside. This canonical pair explains joint variability between groups of variables with correlation coefficient (.43), while other correlations are not statistically significant and their joint variability does not influence relations of these two sets of variables. Statistical significance of canonical pairs is determined with values of Bartlett’s  $\chi^2$  test and its value totals 94, 94. Structure of isolated canonical factors matrix in the area of motor and situational mobility.

Table 2.

Factor Structure, left set (noname.sta)	
	KF 1
MBFTAR	0,53
MBFTAN	0,36
MBFTNZ	0,31
MFLISK	0,33
MFLPRK	0,2
MFLBOS	0,23
MFESDM	0,62
MFE20V	-0,66
MFEBML	0,7
MKOS3M	-0,64
MAGTUP	-0,68
MAGKUS	-0,65
MPGVCN	0,08
MPGHCR	0,39
MPGPIK	0,11
MBAP2O	0,38
MBAU2O	0,05
MBAU1O	0,22

Table 3.

Factor Structure, right set (noname.sta)	
	KFO 1
SOTPGS	0,24
SOGCPM	0,94
SOCOUK	0,59

First canonical pair includes first factor from the first set (general motor factor) that can be defined according to biggest correlation of variables: MFEBML – throwing medicine ball while lying on the back (.70), MAGTUP – zig-zag test (-.68), MFE20V - running 20 m –sprint - high start (-.66), MAGKUS – step aside (-.65), MKOS3M – slalom with 3 medicine balls (-.64), MFESDM – standing long jump (.62), MBFTAR – hand tapping (.53), with first factor from second set, gained according to biggest correlations in all variables: SOGCPM-aiming goal over the net from the base posture (.94), SOCOUK – two hand bump within 30 seconds (.59), SOTPGS – tennis – forehand above

hand serve (.24) (factor for estimation of situational-motor abilities in volleyball) (Table 3). The largest variable correlations from the first statically significant pair are positive and refer to quality realization of these tests. Achieving high and quality results leads us to high development of their latent dimensions, in this case explosive strength, coordination and segment speed. From above mentioned we can conclude that with performing this volleyball elements, like service, explosive strength is very important for strength and for service precision. Also, segment speed has significant role with performance of repeating movements, and we already know that coordination is basic for motor and is necessary to make any kind of movement structures in volleyball and any other sport activities.

## CONCLUSION

Relations between motor and situational – motor variables are established with Hotelling method of canonical correlation analysis, and significance of canonical correlation coefficients was tested with Bartlett  $\chi^2$  test on the level of significance  $p \leq .01$ .

We consider that in this work we selected adequate measuring instruments which cover latent areas that are highly significant for curricula in physical and health education. Naturally, better prognoses in result improvement would be gained with completing predictor group of variables and variables from other areas (morphological, functional, conative etc.)

The results of this research will enable optimal and appropriate usage of situational-motor tests in volleyball to follow effects in curricula of physical and health education in order to improve its plan and program. Likewise, the results of this research will enable quality selection what will follow with mentioned age student participation in outclass activities (sections) and activities out of school (like volleyball clubs).

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## RELACIJE IZMEĐU MOTORIČKIH I SITUACIONO-MOTORIČKIH SPOSOBNOSTI IZ ODBOJKE UČENIKA VII I VIII RAZREDA

*Originalni naučni rad*

### **Sažetak**

Na uzorku od 112 dječaka VII i VIII razreda, uzrasta 13-15 godina bio je primijenjen sistem od ukupno 21 varijable, od toga 18 varijabli za procjenu motoričkih sposobnosti i 3 varijable za procjenu situaciono-motoričkih sposobnosti iz odbojke, s ciljem utvrđivanja međusobnih relacija. Na osnovu rezultata dobijenih primjenom kanoničke korelacione analize možemo kazati da će relacije između posmatranih skupova varijabli motoričke sposobnosti (kao prediktorski skup varijabli) sa kriterijskim skupom varijabli (situaciono-motoričke sposobnosti) obrazovati statistički značajne koeficijente kanoničke korelacije.

**Ključne riječi:** motorika, situaciona motorika, relacije, odbojka, učenici, kanonička korelaciona analiza

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