



## INFLUENCE OF COGNITIVE AND SITUATIONAL MOTOR SKILLS IN SPORTS GAMES ON PRIMARY SCHOOL STUDENTS

*Original scientific paper*

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### ABSTRACT

*When it comes to sports (volleyball, handball, basketball, football ...) the main value is reflected in their attractiveness, wide application, and availability. At the same time, these are sports of higher achievements (top sport), sports entertainment is an important mean of active rest (recreation) and, of course, one of the most powerful means of physical education. The popularity of sports games is especially pronounced among school children and youth. In addition to compulsory physical education classes, they are widely represented in free sports activities. As it is known among other anthropological dimensions, cognitive abilities have a significant impact in achieving top results in sports. The aim of this study is to determine the relationship between a set of predictor variables of cognitive abilities and a set of criterion variables of situational motor abilities in sports games, especially in volleyball in primary school boys. By analyzing the corresponding canonical functions in the space of cognitive abilities, the function is defined by all variables, as well as by another set of data, the function is defined by all situational motor variables. As all cognitive abilities are in direct proportionality with the results of situational motor skills tests, it can be concluded that subjects with higher spatialisation ability and higher IQ will have good results in specific motor, especially in volleyball. These results are logical considering the structure of performing exercises from sports games especially volleyball, which require good coordination of movements, which is directly related to cognitive abilities.*

**Keywords:** relations, cognitive abilities, situational-motor abilities, sports, volleyball, students

### INTRODUCTION

The development of the complete anthropological status of students is one of the fundamental imperatives in the teaching of physical education (Ibri & Shala, 2012). School children have greater opportunities to participate in various forms of organized, programmed exercise. Achieving this goal is possible only with extensive knowledge of internal relations and the degree of conditionality of a number of specific dimensions of human bio-psycho-social status. Only on the basis of such generated and scientifically proven knowledge it is possible to plan and program the contents of the work that will qualitatively enable the fulfillment of the authentic needs of each individual, as a priority goal of pedagogical activity (Findak, 1999).

A lot of research has been done in studying the structure of cognitive abilities, but there are still different approaches in the theoretical approach to studying the nature and structure of human abilities. (Blaskovic, Milanovic & Matkovic, 1982). Cognitive (intellectual, mental) processes within Plato, the formed psychological trinomial (cognition-affectation-conation) are the most intensively studied processes in psychology and pedagogy. The intellect, as the center of these processes, despite such efforts, remains insufficiently known. Today, a large number of games are known in which sports competitions are regularly organized (Sabotic, 2005).

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The existence of numerous conceptions about the types of cognitive functioning, despite the long research tradition in this field, remains an obvious confirmation of this statement (Bosnar & Matkovic, 1983). Cognitive abilities are usually understood as the global capacity of an individual to act decisively, to think rationally and to fit effectively into the environment, that is, as a complex of conditions for special achievement (Babiak, 1984). Therefore, cognitive abilities are complex in nature, so depending on which component is given the greatest importance, intelligence is differently defined as the ability to adapt an individual to the environment, as the ability to learn or as the ability to think abstractly (Lanc, 1972).

## SUBJECT AND GOAL OF RESEARCH

The subject of this research included 620 respondents from the school population between 14 and 15 years of age. The problems under investigation are taken from the substructure of anthropological status, namely cognitive abilities, and specific motor abilities. It is assumed that these substructures are very important in predicting success in mastering situational motor information, or specific movement habits in sports games, especially in volleyball. Starting from the problem and the subject of research, the aim of this paper is to determine the connections between the set of predictor variables of cognitive abilities and the set of criterion variables of situational motor information in primary and secondary school students in hearing impaired sports in volleyball.

## METHODS

### Entity sample

The sample consists of 620 respondents from the ninth grade of primary schools in Prizren, between 14 and 15 years of age, who regularly attended physical education classes and who were familiar with the elements of technology from sports games especially volleyball in physical education classes, respondents at the time of testing were healthy and without visible motor and psychological deviations.

### Sample variables

Starting from the subject and goal of the research, two sets of variables marked as a sample of cognitive variables and a sample of situational motor variables were applied. A sample of variables for assessing cognitive abilities:

1. Antonyms Synonym Test (AL-4)
2. Image comparison test (IT-1)
3. Spatialization test (S-1)
4. Total IQ Test

A sample of variables for situational motor skills in volleyball:

1. Bounce the ball with your fingers against the wall for 30 seconds (BBFAW)
2. Bounce the ball with your forearms against the wall in 30 seconds (BBFAW)
3. Precision Network Serving (PNS)

## Description of the experimental approach

For the purposes of this paper, testing was conducted on a sample of 620 ninth-grade elementary school students age 14-15 who regularly attended physical education classes and who were familiar with the elements of techniques from sports games of volleyball in physical education classes. The management and teachers in primary schools of physical education approved the implementation of this research. Before conducting the research, the respondents were acquainted with the course of the research, its goals and purpose, and each respondent gave consent, which is in accordance with the ethical code of the research. Testing was conducted in physical education classes and was conducted by a group of trained physical education teachers. The room in which the measurement was carried out was sufficiently lit and tempered.

## Data processing methods

Canonical correlation analysis calculated the relationship between a set of variables for the assessment of cognitive abilities and a set of variables for the assessment of situational motor abilities in the sports game of volleyball. The data were processed by the statistical package “Statistic for Windows 21”.

## RESULTS AND DISCUSSION

### Relationships of cognitive abilities with situational-motor abilities

As expected, canonical correlation analysis showed that there is one significant association between a set of variables for assessing cognitive abilities and a set of variables for assessing situational motor abilities in a volleyball sport. As can be seen from Table 1, which shows data on the significance of all obtained canonical functions, this single significant function explains 11% of the total covariance of these two sets of variables, which can be considered a very low degree of correlation, regardless of the sample respondents large enough.

Table 1. Relationships of cognitive abilities with situational-motor abilities in volleyball

Canonical function	Canonical R	Canonical R-sqr.	Chi-sqr.	df	p
1	.333	.111	27.53	12	.006
2	.103	.011	2.68	6	.848
3	.044	.002	.40	2	.818

Table 2 shows the correlation coefficients of the manifest variables in both sets with an isolated canonical function. In the space of cognitive abilities, function is defined by all variables. The tests of synonyms of antonyms (AL-4 = .94) and the total coefficient of intelligence (IQ = .80) have the greatest contribution to the definition of this factor. The image comparison test also has a medium high projection on the canonical function (IT-1 = .62), while the spatialization test (S-1 = .26) has a low projection on the canonical factor, but it is statistically significant. This factor can be defined as a factor of general cognitive ability, with the influence synonymous antonym test.

In the second data set, the function is positively defined by all situational motor variables. The highest projection on the canonical factor is the variable bounce of the ball with the fingers against the wall in 30 seconds (BBFAW = .98), bounce of the ball with the forearms against the wall in 30 seconds (BBFAW =

.60), and precision of serving over the net (PNS = .32). The analysis of corresponding canonical functions suggests that the successful performance of specific motor movements in volleyball depends mostly on the ability of synonyms of antonyms, since the projections of this test are high and in direct correlation with the canonical function. Also, the variables of general intelligence and the comparison of images are highly projected on the canonical function, so their influence on the results of situational-motor tests in volleyball is very high. As all cognitive abilities are in direct proportionality with the results of tests of situational-motor abilities of respondents, it can be concluded that respondents with greater synonymous of antonyms and higher IQ will have better results in tests of specific motor skills in volleyball. Such results are also logical considering the structure of performing volleyball exercises, which require good coordination of movements, which is directly related to intelligence.

Table 2. Factor structure of cognitive abilities and situational-motor abilities in volleyball

Variable	Canonical factor 1	Variable	Canonical factor 1
IT-1	.62	BBFAW	.98
AL-4	.94	BBFAW	.60
S-1	.26	PNS	.32
IQ	.80		

## CONCLUSION

Canonical correlation analysis showed that there is a significant correlation between a set of variables for assessing cognitive abilities and a set of variables for assessing situational motor skills among boys in volleyball, this is a significant function of all variables. The greatest contribution to defining this factor have the tests of synonyms of antonyms (AL-4 = .94) and the total coefficient of intelligence (IQ = .80). This factor can be defined as a factor of general cognitive ability. In the second data set, the function is positively defined by all situational motor variables. The analysis of the corresponding canonical functions suggests that the successful performance of specific motor movements in volleyball mostly depends on the ability of synonymous of antonyms. Also, the variables of general intelligence and image comparison are highly projected on the canonical function, so their influence on the results of situational motor tests in volleyball is very high. As all cognitive abilities are in direct proportionality with the results of tests of situational-motor abilities of respondents, it can be concluded that respondents with the greater synonymous ability with antonyms and higher IQ will have better results in tests of specific motor skills in volleyball. Such results are also logical considering the structure of performing volleyball exercises, which require good coordination of movements, which is directly related to intelligence. The results of this research will serve researchers who deal with the problem of predicting results in sports games as a basis for further research and obtaining answers to questions that this research did not cover. This primarily refers to the choice of variables that are used to influence the results in sports games, as well as the age of the respondents.

Based on the obtained results, a proposal of measures should be made which would significantly improve the current situation and create more favorable and deserved conditions required for school physical education of sports games including volleyball.

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