Submitted: 12/02/2015 - Accepted: 12/03/2015 - Published: 24/04/2015

Structure of Personality Variables of Special Olympics Athletes and Unified Partners in Football

Dragan Popović[1*]

Miloš Popović[1]

Evagelia Boli[1]

Hamidovoć Mensur[1]

Marina Jovanović[1]

[1]Faculty of Sport and Physical Education, University of Pristina Leposavić, Serbia, Sport`s Center Novi Pazar, Serbia

*Email: dragan.popovic@pr.ac.rs

DOI: 10.26417/ejser.v3i1.p112-120

Abstract

Due to its simplicity and explicit algebraic and geometric meanings, latent dimensions, and identification structures associated with these dimensions, reliability of the latent dimensions obtained by orthoblique transformation of principal components can be determined in a clear and unambiguous manner.

Let $\mathbf{G} = (gij)$; $i = 1, ..., n$; $j = 1, ..., m$ is an acceptably unknown matrix of measurement errors in the description of a set E on a set V. Then the matrix of true results of entities from E on the variables from V will be $\mathbf{Y} = \mathbf{Z} - \mathbf{G}$.

Assume, in accordance with the classical theory of measurement (Gulliksen, 1950, Lord & Novick, 1968; Pfanzagl, 1968), that matrix $\mathbf{G}$ is such that $\mathbf{Y}^t\mathbf{G} = \mathbf{0}$ and

$\mathbf{G}^t\mathbf{G}n^{-1} = \mathbf{E}^2 = (e_{jj}{}^2)$

where $\mathbf{E}^2$ is a diagonal matrix, the covariance matrix of true results will be $\mathbf{H} = \mathbf{Y}^t\mathbf{Y}n^{-1} = \mathbf{R} - \mathbf{E}^2$

if $\mathbf{R} = \mathbf{Z}^t\mathbf{Z}n^{-1}$

is an intercorrelation matrix of variables from V defined on set E.

Suppose that the reliability coefficients of variables from V are known; let **P** be a diagonal matrix whose elements ⍰$_j$ are these reliability coefficients. Then the variances of measurement errors for the standardized results on variables from V will be just elements of the matrix $\mathbf{E}^2 = \mathbf{I}$ - ⍰.

Now the true values on the latent dimensions will be elements of the matrix

⍰ = $(\mathbf{Z} - \mathbf{G})\mathbf{Q}$

with the covariance matrix ⍰ = ⍰^{t}⍰n^{-1} = $\mathbf{Q}^t\mathbf{H}\mathbf{Q} = \mathbf{Q}^t\mathbf{R}\mathbf{Q} - \mathbf{Q}^t\mathbf{E}^2\mathbf{Q}$ = (⍰$_{pq}$).

Therefore, the true variances of the latent dimensions will be the diagonal elements of matrix ⍰; denote those elements with ⍰$_p^2$. Based on the formal definition of the reliability coefficient of some variable ⍰ = ⍰$_t^2$ / ⍰⍰ where ⍰$_t^2$ is a true variance of the variable and ⍰⍰ is the total variance of the variable, or the variance that also includes the error variance, the reliability coefficients of the latent dimensions, if the reliability coefficients of the variables from which these dimensions have been derived are known, will be

⍰$_p$ = ⍰$_p^2$ / $s_p^2 = 1 - (\mathbf{q}_p^t\mathbf{E}^2\mathbf{q}_p)(\mathbf{q}_p^t\mathbf{R}\mathbf{q})^{-1}$ $p = 1,\ldots,k$

Keywords: / reliability / latent / dimension / matrix / vector / variance /

Introduction

Mildly retarded people (F70) acquire language with some delay but most achieve the ability to use speech for everyday purposes and to hold conversations. Most of them also achieve full independence in self-care (eating, washing, dressing, bowel and bladder control) and in practical and domestic skills, even if the rate of development is considerably slower than normal. The main difficulties are usually seen in academic school work, and many have particular problems in reading and writing. However, mildly retarded people can be greatly helped by education designed to develop their skills and compensate for their handicaps. Most of those in the higher ranges of mental retardation are potentially capable of work demanding practical rather than academic abilities, including unskilled or semiskilled manual labor.

In a sociocultural context requiring little academic achievement, some degree of mild retardation may not itself represent a problem. However, if there is also a noticeable emotional and social immaturity, the consequences of the handicap, e.g. inability to cope with the demands of marriage or child-rearing, or difficulty fitting in with cultural traditions and expectations, will be apparent.

In general the behavioral, emotional, and social difficulties of the mildly mentally retarded, and the needs for treatment are more closely akin to those found in people of normal intelligence. An organic aetiology is being identified in increasing proportions of patients, although not yet in the majority. If the proper standardized IQ tests are used, the range 50 to 69 is indicative of mild mental retardation. Understanding and use of language tend to be delayed to a varying degree, and executive speech problems that interfere with the development of independence may persist into adult life. An organic aetiology is identifiable in only a minority of subjects. Associated conditions such as autism, other developmental disorders, epilepsy, conduct disorders, or physical disability are found in varying proportion. If such disorders are present, they should be coded independently.

Moderate mental retardation (F 71): These individuals are slow in developing comprehension and use of language, in achieving self-care and motor skills, and some need supervision throughout life. Progress in school work is limited, but a proportion of these individuals learn the basic skills needed for reading, writing, and counting. As adults, moderately retarded people are usually able to do simple practical work. Completely independent living in adult life is rarely achieved. Such people are fully mobile and physically active and the majority show evidence of social development in their ability to communicate with others.

Methods

Sample of respondents

To carry out the research correctly and to get results stable enough in terms of sampling error, it was necessary to take a sufficient number of respondents into the sample. The sample size for this type of research is conditioned by the objectives and tasks of the research, the population size and degree of variability of the applied system of parameters.

Based on the chosen statistical-mathematical model and program, objectives and hypotheses, we opted to include 40 respondents in the sample, a total of 80 in each subsample (40 Special Olympics athletes and 40 partners). The size of such a sample should meet the following criteria:

the sample effective should be such as to permit as many degrees of freedom as to make it possible for any coefficient in the pattern matrix or any correlation coefficient equal to or greater than .30 to be considered different from zero with an inference error less than .01.

to use adequate statistical methods successfully, according to the latest beliefs, the number of subjects in the sample should be five times larger than the number of the variables applied.

In addition, the respondents were to meet the following specific requirements:

- respondents were male,
- the age of respondents was defined on the basis of chronological age, so the research covered respondents aged 15 to 18 years plus-minus 0.5 years,
- respondents were required to be members of a society that brings together Special Olympics athletes,
- respondents were required to attend training classes regularly, what was determined on the basis of records kept by the coaches.

In defining the population from which the sample was drawn, except the above, no other restrictions or stratification variables were applied. The measurement was carried out in organizations and schools that bring together children with special needs.

Sample of conative variables

For the assessment of conative characteristics, the measurement instrument CON6 was selected to assess the following conative regulators:

- Activity regulator (EPSILON),
- Organ functions regulator (CHI) ,
- Defense reaction regulator (ALPHA),
- Attack reaction regulator (SIGMA),
- System for coordination of regulatory functions (DELTA) and
- System for integration of regulatory functions (ETA).

Data processing methods

Not a single commercial statistic program performs assessment of reliability of latent dimensions. What is more, the number of the texts which define this procedure is very small and the number of those describing this procedure is even rarer. Though, in a paper which proposes a competitive application of semi-orthogonal transformations of principal components in explorative and confirmatory analyses of latent structures (Momirović, Erjavec & Radaković, 1988), a procedure for reliability estimation of latent dimensions based on Cronbach`s strategy for assessing generalizability is presented. But that procedure is as equally justified as the assumptions from which the Cronbach coefficient is derived. Nowadays, for unclear reasons, everyone calls the coefficient by his name, though, long before him, exactly the same measure with virtually the same assumptions was proposed by Spearman & Brown, Kuder & Richardson, Guttman, and described in a more simplified form by Momirović, Wolf & Popović (1999), as well as some other psychometricians who worked and created in a nascent phase of the development of the theory of measurement in the times not affected by the computer revolution.

The value of research depends not only on the sample of respondents and sample of variables, i.e. the value of the basic information, but also on the applied methods for transforming and condensing the information. Some scientific problems can be solved with the help of a number of different and sometimes equally valuable methods. However, with the same basic information and from the results of various methods, different conclusions can be made. Therefore, the problem of selecting particular methods for data processing is rather complex.

All the data in this research were analyzed at the Multidisciplinary Research Center, Faculty of Sport and Physical Education, University of Pristina by the system of data processing programs DRSOFT developed by Popović, D. (1980, 1993) and Momirović, K. & Popović , D . (2003).

Assessment of reliability of latent dimensions

Due to its simplicity and explicit algebraic and geometric meanings, latent dimensions and identification structures associated with these dimensions, reliability of the latent dimensions obtained by orthoblique transformation of principal components can be determined in a clear and unambiguous manner.

Let $\mathbf{G} = (gij); i = 1, ..., n; j = 1, ..., m$ is an acceptably unknown matrix of measurement errors in the description of set E on set V. Then the matrix of true results of entities from E on the variables from V will be $\mathbf{Y = Z - G}$.

Assume, in accordance with the classical theory of measurement (Gulliksen, 1950, Lord & Novick, 1968; Pfanzagl, 1968), that matrix $\mathbf{G}$ is such that $\mathbf{Y}^t\mathbf{G} = \mathbf{0}$

and

$$\mathbf{G}^t\mathbf{G}n^{-1} = \mathbf{E}^2 = (e_{jj}^2)$$

where $\mathbf{E}^2$ is a diagonal matrix, the covariance matrix of true results will be

$$\mathbf{H} = \mathbf{Y}^t\mathbf{Y}n^{-1} = \mathbf{R} - \mathbf{E}^2$$

if

$$\mathbf{R} = \mathbf{Z}^t\mathbf{Z}n^{-1}$$

is an intercorrelation matrix of variables from V defined on set E.

Suppose that the reliability coefficients of variables from V are known; let **P** be a diagonal matrix whose elements ⍰$_j$ are these reliability coefficients. Then the variances of measurement errors for the standardized results on variables of V will be just elements of the matrix $\mathbf{E}^2 = \mathbf{I}$ - ⍰.

Now the true values on the latent dimensions will be elements of the matrix

⍰ = $(\mathbf{Z} - \mathbf{G})\mathbf{Q}$

with the covariance matrix

$\square = \square^t\square n^{-1} = \mathbf{Q}^t\mathbf{HQ} = \mathbf{Q}^t\mathbf{RQ} - \mathbf{Q}^t\mathbf{E}^2\mathbf{Q} = (\square_{pq})$.

Therefore, the true variances of the latent dimensions will be the diagonal elements of matrix $\square$; denote these elements with $\square_p^2$. Based on the formal definition of the reliability coefficient of some variable $\square = \square_t^2 / \square^{\square}$ where $\square_t^2$ is a true variance of the variable and $\square^{\square}$ is the total variance of the variable, or the variance that also includes an error variance, the reliability coefficients of the latent dimensions, provided that the reliability coefficients of the variables from which these dimensions have been derived are known, will be

$$\square_p = \square_p^2 / s_p^2 = 1 - (\mathbf{q}_p^t\mathbf{E}^2\mathbf{q}_p)(\mathbf{q}_p^t\mathbf{Rq})^{-1}$$

$$p = 1,...,k$$

Proposition 1

Coefficients $\square_p$ vary in the range of (0,1) and can take the value 1 if and only if $\square = \mathbf{I}$, i.e. if all the variables have been measured without error and the value is 0 if and only if $\square = \mathbf{0}$ and $\mathbf{R} = \mathbf{I}$, that is, if the total variance of all the variables consists only of the variance of the measurement error and variables from V have a spherical normal distribution.

Proof

If the total variance of each variable from some set of variables consists only of the measurement error variance, then it is necessary that $\mathbf{E}^2 = \mathbf{I}$ and $\mathbf{R} = \mathbf{I}$, and all the coefficients $\square_p$ are zero. The first part of the proposition is obvious from the definition of the coefficients $\square_p$; that means that reliability of each latent dimension, no matter how that latent dimension is determined, equals 1 if the variables from which the dimension is derived are measured without error.

However, the reliability coefficient matrix $\square = (\square_j)$ is often unknown, so the measurement error variance matrix $\mathbf{E}^2$ is also unknown. But if the variables from V are selected so as to represent some universe of variables U with the same field of meaning, the upper limit of the measurement error variance is defined by the elements of matrix $\mathbf{U}^2$ (Guttman, 1945, 1953), or by unique variances of those variables. Therefore, in this case, the lower limit of reliability of latent dimensions can be estimated by the coefficients

$$\square_p = 1 - (\mathbf{q}_p^t\mathbf{U}^2\mathbf{q}_p)(\mathbf{q}_p^t\mathbf{R}\mathbf{q}_p)^{-1}$$

$$p = 1,...,k$$

derived by a method identical to that by which coefficients $\square_p$ are derived with the definition $\mathbf{E}^2 = \mathbf{U}^2$, i.e. in the same way as Guttman derived his measure $\square_6$.

Proposition 2

The coefficients $\square_p$ vary in the range of (0,1) but cannot reach the value 1.

Proof

If **R** = **I**, then $\mathbf{U}^2$ = **I** too, and all the coefficients $□_p$ are equal to zero. But as $\mathbf{U}^2 = \mathbf{0}$ is not possible if matrix **R** is regular, all the coefficients $□_p$ are necessarily less than 1 and tend to 1 when the unique variance of the variables from which latent dimensions are derived tends to zero.

Applying the same technology, it is easy to derive measures of the absolute lower limit of reliability of latent dimensions defined by this method in the same way as Guttman derived his measure $□_1$. For this purpose, set $\mathbf{E}^2 = \mathbf{I}$. Then $□_p = 1 - (\mathbf{q}_p^t \mathbf{R} \mathbf{q}_p)^{-1}$

will be measures of the absolute lower limit of reliability of latent dimensions, as, of course, $\mathbf{Q}^t\mathbf{Q} = \mathbf{I}$.

Proposition 3

All the coefficients $□_p$ are always less than 1.

Proof

It is obvious that necessarily all the coefficients $□_p$ are less than 1 and tend to1 when m, the number of variables in set V, tends to infinity, as then every quadratic form of matrix **R** tends to infinity. If **R = I,** then, obviously, all the coefficients $□_p$ are equal to zero. However, the lower value of coefficients $□_p$ may not be zero, because it is possible, but not for all coefficients $□_p$, that the variance s_p^2 of some latent dimension is less than 1. Of course, the latent dimension that emits less information than any of the variables from which it was derived, has no sense, and it is perhaps best to be discovered based on the values of coefficients $□_p$.

Measures of type $□_□□$(Momirović, 1996) defined by functions $□_□$ and $□_□$ will be, for the result defined by function **h**, $□_{□□} = □^{□}□^{□□□}$

And $□□□□□□_{□□} = 1 - □^{□}□^{□□}$.

It is not difficult to show that, for regular sets of particles, measures of type $□_□$ are estimates of the lower limit of reliability of measures of types$□□_□$ and $□_□$, and measures of type $□_{□□□}$are estimates of the upper limit of reliability of measures of types $□_□$ and $□_□□$

Results

To achieve high athletic performance in each kinesiological activity, as well as in football, the application of scientific research in the training process is of crucial importance. As success in sport depends on a number of factors, it is very important to have reliable indicators on which dimensions affect the achievement of maximum results and to what extent. Conative space is the part of a person which is responsible for the modalities of human behavior. As there are normal and pathological modalities of behavior, analogous to that, there are normal and pathological conative factors.

The characteristic of normal conative factors is that they are mostly independent of each other and normally distributed in the population. Attempts of studying normal modalities of behavior and normal conative factors are rare, therefore this subspace of personality is not clearly enough defined.

In previous studies, pathological conative factors are much better defined than normal factors, and in most cases there are certain theoretical explanations for them.

It is thought that pathological conative factors are responsible for those forms of behavior which reduce the adaptive level of human, considering its potential capabilities. The impact of conative factors is not the same on all the activities that are insensitive to the influence of conative factors, and there are those on which the influence of these factors is crucial. This influence can be positive or negative depending on which factors and activities are in question. So, there is no activity that would be completely independent of the influence of conative factors, that is why determination of the structure of conative regulatory mechanisms in athletes is very important.

Therefore, estimation of latent dimensions in such research is possible on the basis of simple confirmative algorithms which are suitable not only for their considerable efficiency and effectiveness, but because they provide a simple interpretation of the results.

The algorithm applied in this research together with the accompanying program attempts to solve the structure of the treated spaces in the simplest possible way.

Principal Components of Conative Variables

Table 1

	FAC1	FAC2	h^2
epsilon	,12	(,93)	,89
Chi	(,77)	-,34	,72
Alpha	(,89)	-,12	,85
Sigma	(,76)	,38	,72
Delta	(,85)	,05	,65
Eta	(,95)	-,08	,90
Lambda	3,54	1,16	
%	59,14	59,14	
Cum.	19,48	78,62	

Pattern of Conative Variables

Table 2

	OBL1	OBL2
epsilon	-,04	,94
chi	,83	-,28
alpha	,90	-,04
sigma	,68	,44
delta	,78	,11
eta	,95	-,00

Structure of Conative Variables

Table 3

	OBL1	OBL2
epsilon	,05	,94
chi	,80	-,20
alpha	,90	,04
sigma	,72	,51
delta	,79	,19
eta	,95	,09

Intercorrelations of Oblimin Factors

Table 4

	OBL1	OBL2
OBL1	1,00	,10
OBL2	,10	1,00

Just like in the determination of all the structures of the analyzed anthropological status, the selection of a data processing method depended on the fact that each method of determining factors put certain restrictions on the primary information, so only the factors obtained by at least several factor methods can be considered as real factors.

Hotelling`s method of principal components reduced the intercorrelation matrix, according to Momirović's B6 criterion, to two principal components which explained 78.62% of the total variance of the variables (Table 1). Thus the first characteristic root drew already 59.14% of the common variance of the variables. Most variables have high positive projections ETA .95, ALPHA .89 DELTA .85, CHI .77 and SIGMA .76 over the first principal component. This principal component, undoubtedly, acts as a general conative factor.

The second principal component explains 19.48% of the variance, and the variable of the activity regulator EPSILON .93 has the highest projection on it.

The communalities of all the variables are satisfactory. Though the other principal components cannot be given a specific reality as is the case with the first principal component, their inspection may reveal those generators of variability which, according to the position of their importance, are responsible for the variability of the analyzed space.

To obtain a parsimonic structure, the entire initial coordinate system is rotated in one of the oblique rotations. In this case, Jenrich and Sampson`s direct oblimin criterion is used while the same number of factors is retained and three matrices are obtained: a pattern matrix (Table 2), a structure matrix (Table 3) and a factor intercorrelation matrix (Table 4). In order to obtain an interpretable structure, the factor pattern matrix and the structure matrix will be interpreted at the same time.

The first oblimin factor has the largest parallel and orthogonal projections with the test vectors whose intentional objects of measurement were integration of regulatory functions (ETA), defense reaction regulation (ALPHA), organ function regulation (CHI), coordination of regulatory functions (DELTA) and attack reaction regulation (SIGMA).

It is reflected in the hypo- or hyperfunction of inhibitory mechanisms in certain situations followed by inhibition of some physiological processes and increased egotonicity. This factor of the first row belongs to the asthenic (anxiety) syndrome characterized by a decrease of excitation in the higher centers for regulation and control. It is obvious that it reduces adaptation in sport because it deactivates those structures of the nervous system which are responsible for that. This regulator is in a two-way relationship with the defense reaction regulator that modulates tonic arousal.

The second oblimin factor represents the single factor of the activity regulator. The activity regulator (EPSILON) is one of the elementary and lowest located regulatory systems in the hierarchy. Its function is regulation and modulation of the activating part of the reticular formation, and therefore it is directly responsible for the activity and energy level on which other systems function, including cognitive and motor processors. Extroverted and introverted behavior models depend partially on the basic functional level of the activity regulator and partially on (mainly inhibiting) functions of cortical processors.

The factor intercorrelation matrix (Table 4) shows that the first latent dimension has no statistically significant correlation with the second one, what means that the isolated latent dimensions are factorially pure. The cybernetic model of conative regulator that is actually integrated into the model of cognitive functions, works through the biologically and socially most important and complicated system for regulation and control of regulatory functions that is in relationship with all other systems. The efficacy of cognitive regulatory mechanisms depends partially on the physiological factors which determine the amount and stability of the regulation and partially on the programs created under the influence of exogenous factors as well as on the interaction of social factors and physiological basis of regulatory mechanisms. As the player has no especially expressed desire to perform uncontrolled aggressive movements in a football game, this pathological personality trait should be particularly examined by all available measurement instruments in future studies.

Conclusion

The research was conducted with the aim to determine the structure of conative characteristics in Special Olympics athletes and partners in football.

For this purpose, 80 athletes and partners engaged in football were tested. For the assessment of cognitive characteristics, the measurement instrument CON6 was selected by which the following conative regulators were estimated: activity regulator, organ function regulator, defense reaction regulator, attack reaction regulator, system for coordination of regulatory functions, system for integration of regulatory functions, and system for excitation and inhibition.

All the data in this research were analyzed at the Multidisciplinary Research Center, Faculty of Sport and Physical Education, University of Pristina by the system of data processing programs DRSOFT developed by Popović, D. (1980, 1993) and Momirović, K. & Popović, D . (2003).

The algorithms and programs implemented in this research have been fully presented and the results of these programs have been analyzed.

To obtain a parsimonic structure, the entire initial coordinate system is rotated in one of the oblique rotations. In this case, Jenrich and Sampson`s direct oblimin criterion is used while the same number of factors is retained and three matrices are obtained: a pattern matrix (Table 2), a structure matrix (Table 3) and a factor intercorrelation matrix (Table 4). In order to obtain an interpretable structure, the factor pattern matrix and the structure matrix will be interpreted at the same time.

The first oblimin factor has the largest parallel and orthogonal projections with the test vectors whose intentional objects of measurement were integration of regulatory functions (ETA), defense reaction regulation (ALPHA), organ function regulation

(CHI), coordination of regulatory functions (DELTA) and attack reaction regulation (SIGMA).

It is reflected in the hypo- or hyperfunction of inhibitory mechanisms in certain situations followed by inhibition of some physiological processes and increased egotonicity. This factor of the first row belongs to the asthenic (anxiety) syndrome characterized by a decrease of excitation in the higher centers for regulation and control. It is obvious that it reduces adaptation in sport because it deactivates those structures of the nervous system which are responsible for that. This regulator is in a two-way relationship with the defense reaction regulator that modulates tonic arousal.

The second oblimin factor represents the single factor of the activity regulator. The activity regulator (EPSILON) is one of the elementary and lowest located regulatory systems in the hierarchy. Its function is regulation and modulation of the activating part of the reticular formation, and therefore it is directly responsible for the activity and energy level on which other systems function, including cognitive and motor processors. Extroverted and introverted behavior models depend partially on the basic functional level of the activity regulator and partially on (mainly inhibiting) functions of cortical processors.

References

[1] Andrejević, D. (2000). Problem samozapošljavanja i zapošljavanja invalida i drugih hendikepiranih lica u Republici Srbiji. Belgrade, Serbia: Republički zavod za tržište rada i Institut za mala i srednja preduzeća.

[2] Arsić, R., & Stanković, V. (2014). Analysis of the sports results achieved at national level competitions organized for the hearing-impaired children of Serbia. In S. Simović, V. Stanković (Eds.), V *Međunarodni naučni kongres „Antropološki aspekti sporta, fizičkog vaspitanja i rekreacije".* Banja Luka, Bosnia and Herzegovina.

[3] Boli, E., Popović, D., & Popović, J. (2012). The structure of personality characteristic of dancers. *Kinesmetric*, 1, 161-177.

[4] Boli, E., Popović, D., Hošek-Momirović, A., Popović, J. & Savić, V. (2012). Algorithm and program for determining differences in the level of personality characteristics of male and female dancers in Mahalanobis` space. *Kinesmetric*, 1, 17-43.

[5] Gunzberg, H. (1973). Procena sposobnosti kod umereno i teže retardirane dece. Zagreb, Croatia.

[6] Momirović, D, Wolf, B., & Popović, D. (1999). The introduction to the theory of measurement and internal metric properties of composite measuring

instruments. Priština, Serbia: Faculty of Physical Education, Centre for Multidisciplinary Research.

[7] Momirović, K. & Popović, D. (2003). Construction and aplication of taxonomy neural networks. Leposavić, Serbia: Faculty of Physical Education, Centre for Multidisciplinary Research.

[8] Popović, D.: (1980) Research methodology in Physical education. Niš, Serbia: University of Niš.

[9] Popović, D. (1992). Methodology of research in physical education. Athens, Greece.

[10] Popović, D. (1993). Programs and subprograms for the analysis of quantitative modifications. Priština, Serbia: Faculty of physical education, Center for multidisciplinary research.

[11] Popović, D., Kocić, J., Boli, E. & Stanković, V. (1995a). Conative characteristics of female dancers. International Congress "Images of Sport in the World", 75th Anniversary of the German Sport University, Abstract Volume, (pp. 96), Open Forum, Cologne, Germany.

[12] Popović, D., Petrović, J., Boli, E. & Stanković, V.: (1995b) The structure of the personality of female dancers. 3rd International Congress on Physical education and Sport, Exercise & society supplement issue No. 11 (pp. 196), Komotini, Greece.

[13] Popović, D., Stanković, V., Kulić, R. & Grigoropulos, P. (1996). The structure of personality of handball players. 4th International Congress on Physical education and Sport, Exercise & society supplement issue No. 15 (pp. 164), Komotini, Greece.

[14] Popović, D., & Stanković, V. (2005a). The differences of the levels of cognitive abilities and personality characteristics among grammar school and medical school students.In N. Dikic, S. Zivanic, S. Ostojic, and Z. Tornjanski (Eds), *10th Annual Congress of the*

[15] http://en.unesco.org/themes/education-21st-century (date: 12.10.2014)

[16] http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/right-to-education/normative-action/fundamental-principles/equality-of-opportunity-and-treatment/ (date: 12.10.2014)

[17] http://www.unesco.org/education/nfsunesco/doc/isced_1997.htm (date: 12.10.2014)