Research in Kinesiology
2018, Vol. 46 No. 1-2, pp. 39-41

CANONICAL CORRELATION BETWEEN SOME BASIC-MOTOR AND SPECIFIC-MOTOR CAPACITIES OF ELEMENTARY SCHOOL PUPILS

Original scientific paper

Blerim Sulejmani[1], Astrit Iseni[2], Zoran Radić[3], Isa Asllani[4] and Aleksandar Simeonov[5]

[1,2,4] Faculty of Physical education, Tetovo, Macedonia

[3,5] Faculty of Physical education, sport and health, Skopje, Macedonia

Abstract

For the realization of the aims of this research, a sample survey procedure was conducted. Samples were taken by 90 male respondents, pupils of elementary school "Bajram Shabani" in Kumanovo. The purpose of this research is to establish a connection between basic motor skills and specific - motor skills. To confirm the correlation between the two investigated spaces, a correlation canonical analysis was utilized. Twenty-two (22) tests were used for samples collected from the respondents, out of which thirteen (13) for the assessment of basic motor skills and nine (9) to evaluate motor-specific skills.

While observing the results of the canonical analysis of correlation, we were able to confirm that there is a significant connection between the two investigated spaces. From Bartlett's "lambda" test example, it has been confirmed that research areas (basic motor and specific motor skills) are interconnected by a couple of canonical factors at the relevant statistical level of 0,000. Based on the analysis conducted on which results derived from this canonical correlation analysis and only a couple of isolated canonical factors, we can conclude that 14 year old students with poorer performance in basic motor skills tests and repetitive power, have achieved weaker results in specific motor tests of explosive force and running at 30, 80 and 100 meters, while those who have better results in the basic-skill and repetitive-based motor tests have achieved better results in specific-motor tests of explosive force and running at 30, 80 and 100 meters.

Keywords: *basic motor skills, specific motor skills, canonical correlation, pupils*

INTRODUCTION

The relationship between anthropometric characteristics and all other anthropological environments has always been subject of many researchers, where an important statistical correlation has been confirmed between these anthropological environments, so this study aims at confirming the relationship or connection between the anthropometric characteristics and motor skills among primary and high school students. As the most notable researchers in this field of study in the Balkans we can mention: Krezić (2002), Jašarević (2004; 2006), Mekić et al, (2008), Zeljković (2009), Velićkovic (2012), Ibri (2012), Popeska & Mitevska Petrusheva (2012), Przhul & Cicovic (2012) and many others.

The information and results that we will get from the analysis of the correlation, the relationship between the anthropometric characteristics, the motor skills and the definition of the anthropological status of the participants from the secondary schools are necessary for the planning and quality education of teaching in physical and health education.

METHOD

The aim of this study is to determine the canonical correlation between a given system of basic motor tests (predictors), with another specific motor tests (criteria) among elementary school pupils.

The research was conducted with pupils of Elementary School "Bajram Shabani" in Kumanovo. Samples were taken by 90 male respondents. Twenty-two (22) tests were utilized for this research, out of which thirteen (13) for the assessment of basic motor skills and nine (9) to evaluate specific motor skills.

The results of this research come only from those respondents who have attended the subject of physical and health education on a regular basis and thus have participated in all basic motor and specific motor tests. In order to explore the canonical relationship between the two research areas, the basic motor space and the specific motor space, canonical correlation analysis was used as a diversified (versatile) statistical data, while the results were processed with statistical program Statistica 10.0.

RESULTS AND DISCUSSION

In order to verify the correlation between basic motor skills and specific motor skills, we used the canonical correlation analysis, which is a more efficient and better mathematical-statistical procedure, when used to establish the relationship between two multidimensional systems. Table 1 and Table 2. present the results of basic statistical parameters of basic motor tests and specific motor test, as follows: the minimal score, the maximal score, the arithmetic medium as the main indicator and the standard deflection as a main indicator.

From the analyses of results presented in Table 1 and 2, it can conclude that the values of all variables have large differences between their minimum and maximum score. Standard deviations of test benchmarking (MSQU, MPRO, MLS, MST, SMTJLF, SMTJRF, SMHJSP, SMFJSP, SMLJSP, SMTJSP) are at a high level as heterogeneous results with a high variability, while other tests are at a high level, indicating that discrimination is not satisfactory and it is about results that are homogeneous or have low variability.

From the analysis of the cross-correlation of basic motor skills and specific motor skills (Table 3.), low-level correlations have been identified. Significant statistical correlations exist between all basic motor variables with specific motor tests, even in the range of .30 to -62, except for basic motor tests (MDPSP) and (MST) that do not have significant statistical correlations with no test by the specific motor tests, so we will not comment on it.

As a result of applying Bartlett's "lambda" test (Table 4.), it can be concluded that basic motor tests (as a predicting system) and specific motor variables (as a criterion system), are connected only by one pair of canonical factors in the significant statistical level of 0.0000. This relation between the first pair of canonical factors is at a high level, as evidenced by the canonical correlation coefficient in Rc = (, 83), while the determination coefficient (Can R2) clarifies the percentage of variance between the two spaces, in the amount of 69%. To clarify the structure of the canonical dimension, the structure of the canonical factors should be defined.

Table 1. Descriptive statistical parameters of the basic motor variables-

	Valid N	Mean	Minimum	Maximum	Std.Dev.	Skewness	Kurtosis
MTF	90	26.9000	20.0000	33.0000	2.84447	-0.142242	-0.32995
MTH	90	29.5889	19.0000	38.0000	3.86542	-0.094046	0.08763
MTFW	90	24.8778	16.0000	32.0000	3.61280	-0.167877	-0.36736
MBLP30	90	21.6556	12.0000	30.0000	3.64171	-0.432955	0.48496
MES30	90	31.5444	10.0000	43.0000	6.34966	-0.928367	1.51919
MSQU	90	51.5000	7.0000	220.0000	30.39709	3.502934	16.11160
MPRO	89	14.5169	0.0000	38.0000	8.13258	0.666852	0.53592
MDPSP	90	21.1422	3.0000	35.0000	6.58256	-0.039739	-0.14237
MLS	90	173.3389	127.0000	207.0000	12.90889	-0.351184	1.38124
MST	90	90.0889	49.0000	136.0000	20.19547	0.102214	-0.78766
MEB	90	20.0863	17.1800	25.5600	1.90715	0.705937	0.03742
M10x5	90	19.5349	16.2000	24.9000	1.79562	0.916655	0.63872
MTT	90	8.4166	6.8800	12.0600	1.08024	1.303936	1.88013

Table 2. Descriptive statistical parameters of the specific motor variables

	Valid N	Mean	Minimum	Maximum	Std.Dev.	Skewness	Kurtosis
SMTJLF	90	489.0000	302.0000	778.000	85.3041	-0.106087	0.558893
SMTJRF	90	496.3333	261.0000	670.000	84.9882	-0.582307	0.151795
SMJHSP	90	33.3333	10.0000	57.000	8.4654	-0.079393	-0.002074
SMFJSP	90	899.1111	600.0000	1155.000	131.2555	-0.231048	-0.434514
SMLJSP	90	172.0556	115.0000	238.000	24.1607	-0.196938	0.016681
SMTJSP	90	511.8000	360.0000	663.000	66.8031	-0.079711	-0.414011
RU30м	90	4.7727	4.0000	6.200	0.5287	0.671524	-0.153484
RU80м	90	11.5524	9.5000	14.900	1.3611	0.833165	0.112738
RU100м	90	14.9949	12.5000	19.800	1.7182	0.986668	0.515517

Table 3. Cross-correlation between basic motor and specific motor tests

	SMTJLF	SMTJRF	SMJHSP	SMFJSP	SMLJSP	SMTJSP	RU30м	RU80м	RU100м
MTF	0.3079	0.2917	0.2313	0.3329	0.3879	0.2827	-0.3753	-0.4285	-0.3944
MTH	0.3348	0.3521	0.2749	0.3385	0.3715	0.5028	-0.3719	-0.4323	-0.4607
MTFW	0.3705	0.4033	0.3809	0.4480	0.4328	0.4467	-0.3957	-0.5449	-0.5134
MBLP30	0.4298	0.4552	0.4143	0.4104	0.4388	0.3917	-0.4872	-0.4310	-0.4035
MES30	0.1831	0.0883	0.0002	-0.0035	0.0440	0.0652	-0.0484	-0.0731	-0.1469
MSQU	0.2300	0.2189	0.1761	0.2177	0.1505	0.1698	-0.1916	-0.2266	-0.2221
MPRO	0.52177	0.50021	0.422788	0.516786	0.513473	0.547142	-0.6238	-0.5599	-0.5561
MDPSP	0.40122	0.35714	0.398180	0.430920	0.415598	0.340414	-0.4601	-0.4763	-0.4765
MLS	0.43419	0.41922	0.247463	0.416548	0.369079	0.364284	-0.3432	-0.4098	-0.4133
MST	-0.4660	-0.4348	-0.35390	-0.3305	-0.49692	-0.4513	0.3791	0.3416	0.3175
MEB	-0.4943	-0.5039	-0.40895	-0.50398	-0.58532	-0.45596	0.49422	0.50608	0.49568
M10x5	-0.5754	-0.5478	-0.47853	-0.49522	-0.54979	-0.52149	0.48002	0.55542	0.57268
MTT	-0.5135	-0.46427	-0.463430	-0.519921	-0.518594	-0.489730	0.457594	0.537223	0.575575

Table 4. Matrix of coefficients from canonical correlation of basic motor and specific motor tests
Çi-Square Tests with Successive Roots Removed

	Canonicl - R	Canonicl - R-sqr.	Çi-sqr.	Df	p	Lambda – Prime
0	0.831264	0.691000	206.8295	117	0.000001	0.066960
1	0.611978	0.374517	116.9869	96	0.071990	0.216700
2	0.540541	0.292184	81.0907	77	0.353125	0.346453
3	0.486238	0.236427	54.6545	60	0.670620	0.489467
4	0.444239	0.197348	34.0189	45	0.884030	0.641022
5	0.328402	0.107848	17.2015	32	0.984718	0.798631
6	0.246977	0.060998	8.4715	21	0.992791	0.895173
7	0.176349	0.031099	3.6568	12	0.988859	0.953324
8	0.126797	0.016078	1.2399	5	0.940987	0.983923

The structure of basic motor tests and specific motor capabilities is presented in Table 5 and table 6 consequently. From the first and only canonical factor of the basic motor variables (Table 5.) the most important projections appear in the variables: propulsion (MPRO), value -75, t-test (MTT), value.74 , 10 x5 squat test (M10X5), value .73, eight bending (MEB), value .67, foot tapping on the wall (MTFW), value -.63, deep penetration from sitting position (MDPSP), value-.61, hand tapping (MTH), value-.57, body lifting from laying position for 30 seconds (MBLLP30), value -55, leg split (MLS), value-. 54, while the weaker projections are with the variables: foot tapping (MTF), with a value of -48 and a stick tapping (MST), with a value of .48, which can be defined as a factor of skill

Table 5. Canonical factor structure of basic motor tests

	CAN 1
MTF	-0.489930
MTH	-0.577539
MTFW	-0.639976
MBLP30	-0.557985
MES30	-0.129118
MSQU	-0.285753
MPRO	-0.754125
MDPSP	-0.610523
MLS	-0.544965
MLS	0.489507
MEB	0.672117
M10x5	0.737518
MTT	0.743547

Table 6. Canonical factor structure of specific motor tests

	CAN 1
SMTJLF	-0.829720
SMTJRF	-0.804424
SMJHSP	-0.702769
SMFJSP	-0.840600
SMLJSP	-0.849446
SMTJSP	-0.845395
RU30м	0.855855
RU80м	0.900574
RU100м	0.913095

and repetitive power. In addition to this, there is also a canonical factor in the area of specific motor skills (Table 6.) with the most important projections in this canonical specific motor ability to appear in the variables: running at 100 meters (RU100м), value .91, running in 80 meters (RU80м), value .90, running at 30 meters (RU30м), value .85, long jump from a standing position (SMLJSP), value -.84, triple jump from the a standing position (SMTJSP), value -.84, five jump from a standing position (SMFJSP), value-.84, triple jump with left leg (SMTJLL), value -.82, triple jump with right leg (SMTJRL), value- .80 and high jumping from a standing position (SMHJSP), with a value of -70. According to these results this canonical factor can be defined as a factor of velocity and explosive power.

From the relationships between the first canonical factor of the basic motor skills and the spatial capacity of the specific motor skills, we can conclude that students who have poorer results in basic skill and repetitive power driven tests have achieved weaker results in specific motor explosive force tests and running at 30, 80 and 100 meters, and vice versa.

Correspondence:
Astrit Iseni
State University of Tetovo
Faculty of Physical Education
Str. Ilinden nr. 12000 Tetovo, Macedonia.
E –mail: astrit .iseni@unite.edu.mk

CONCLUSION

Based on the analyzed results obtained from this canonical correlation analysis research and the only isolated pair of canonical factors, we can conclude that 14-year-old students who have poorer results in basic motor skill tests and explosive force, have achieved weaker results in specific motor explosive force tests and running at 30, 80, and 100 meters, while those with the best results in basic motor skill tests and explosive forces have achieved better results in the specific motor tests of explosive force and running at 30.80, and 100 meters.

REFERENCES

Bala , G. (1990). Logičke osnove metoda za analizu podataka iz istrazivanja u fizičkoj kulturi. [Logical basic methods for data analyses in research in physical culture. In Serbian.] Novi Sad: autorsko izdanje.

Ibri, L. (2012). Canonical relations of morphological dimensions and motor abilities of top wrestlers. Research in Kinesiology, 40(1), 17-23.

Jašarević , I. (2004). Dinamika razvoja bazičnih motoričkih sposobnosti,morfoloških karakteristika i motoričkog znanja dječaka i djevojčica uzrasta 11-14 godina. [Dinamic of development of fundamental motoric abilities and motor knowledge of boys and girls aged 11 – 14 years old. In Bosnian]. (Unpublished doctor dissertation, Faculty of physical education and sport, Unievrsity in Tuzla). Tuzla: Fakultet za tjelesni odgoj i sport.

Jašarević, I., Mahmutovic, I., & Nurkovic, N. (2006). Kanoničke relacije antropometrijskih varijabli i varijabli situaciono – motoričkih testova sportskih igara kod dječaka učesnika tromjesečnog rekreativnog vježbanja,[Canonical relation between anthopometric variables and variables for situation – motoric tests applied in sport games with boys participating in three months recreational program. In Bosnian.]. Sport, naučni i praktični aspekti, Tuzla.

Krezić , S. (2002). Kanoničke relacije morfoloških karakterisitka i bazičnih motoričkih sposobnosti (EUROFIT) kod učenika gimnazije uzrasta od15 do 18 godina. [Canonical relations between morphologic characteristics and basic motor abilities (EUROFIT) at students in gymnasium at the age 15 – 18 years old. In Bosnian.]. (Unpublished master thesis, Faculty of physical culture in Sarajevo). Sarajevo: Fakultet za fiičku kulturu u Sarajevu.

Malacko , J., & Popovič, d. (2002). Metodologija kineziološko antropoloških istraživanja. Vtoro izdanje. [Methodology of kinesiological and anthropological studies. Second edition. In Serbian.] Leposavič: Fakultet za fizičku kulturu Univerziteta u Pristini.

Mekić , M., Hadzic, R., Mirvc, E., & Bukvic, O. (2008). Impact of basic motor abilities and conative characteristics of results of success in some sport games for students of teaching faculties. Sport Mont, VI(15 – 16 - 17), 829 - 832.

Popeska, B., & Mitevska – Petrusheva, K. (2012). Relations between anthoropometric characteristics and motor variables in 6 yeard old children. Researçh in physical education, sport and health, 1, 139-143.

Pržulj, D., & Cicovic, B. (2012). Canonical relations between morphological dimensions and the results of repetitive sthrenght among female students participating in sport recreational exercise. Researçh in Kinesiology, 40(2), 127-132.

Velickovic, V. (2012). Relations between coordination and situational – motor tests of soccer players. Activities in Physical Education And Sport, 2 (1), 73-75.

Zeljković, M., & Zeljković, D. (2009). Relacije između motoričkih sposobnosti i morfoloških karakteristika učenika uzrasta 15 – 18 godina. [Relations between motor abilities and morphological characteristics between students at the age 15 – 18 years old. In Serbian.]. Sportlogia Journal, Zbornik radova, Fakukltet fizičkog vaspitanja i sporta, Banja Luka.