THE STRUCTURE OF MOTOR SKILLS AMONG THE STUDENTS AT THE FACULTY OF SECURITY STUDIES

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Abstract: A system of 16 motor variables was used to determine the structure of motor skills in a sample of 84 students at the Faculty of Security Sciences in Banja Luka. By using factor analysis according to the Kaiser-Guttman rule, 6 latent motor dimensions were determined. The first factor is defined as the factor for the structuring movement mechanism, because it is presented with the variables used to assess coordination and movement frequency. The second factor is defined as the factor for the mechanism for regulating excitation duration, because it is represented by the measures used to assess the repetitive and static strength of arms, body, and legs. The third factor is defined as the factor for the tone regulation and synergistic regulation mechanism, because it is represented by the variables used to assess the measures of flexibility. The fourth factor is defined as the factor for the excitation intensity mechanism, because it is represented by the variable used to assess explosive power through the run speed capability. The fifth factor is also defined as the factor for synergistic regulation and tonus regulation, because it is represented by the variable used to assess balance, while the sixth factor is defined as the factor for excitation intensity, because it is represented by three variables used to assess explosive power and one variable used to assess flexibility. This paper is an attempt to demonstrate that the distinguished hierarchical structure of motor skills is of exceptional theoretical and practical value, whereby these factors should represent a determinant for predicting motor skills and programing operator training in special physical education classes.

Keywords: factor analysis, students, motor skills

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INTRODUCTION

The process of selection, guiding and monitoring in the field of special physical education (SPE) is unimaginable without information about the students' motor skills, indicating that in order to seriously program kinesiological operators, it is necessary to know the structure of motor skills, which are responsible for the efficiency of the motor behavior of the students at the Faculty of Security Sciences in solving complex situation-based and motor problems in conceptual and situational conditions. Motor skills are usually referred to in the literature as the characteristics of an individual expressing his or her physical preparedness to perform certain work and the ability to express his or her own personality creatively, which, in experimental research, are usually reduced to operatively defined latent dimensions derived from the measuring instruments. Previous research into the hierarchical functional model of motor skills (Zaciorski, 1975; Gredelj, Metikos, Hošek & Momirović, 1975; Đorđević, 1989; Kukolj 1996) demonstrates that the hypothetical factors of the phenomenological model are defined in the first-order space, including coordination, strength, endurance, speed, flexibility, precision and balance, while, based on the research conducted by Kurelić et al. (1975), hypothetical factors are defined in the second-order space from the aspect of functional mechanisms, which include the mechanism for the structuring of movement, the mechanism for tone regulation and synergistic regulation, the mechanism for the regulation of excitation intensity, and the mechanism for regulating the duration of excitation. SPE as an element of the physical culture is aimed at perfecting psychosomatics in students through the achievement and maintenance of basic and special knowledge and skills (Blagojević, Dopsaj & Vučkovcić, 2006), whereby well-defined educational and training programs should transform the general and special physical skills to meet the needs of law enforcement and other security agencies personnel (Milosevic, 1985; Milosevic & Zulic, 1988; Milosevic, Gavrilovic & Ivancevic, 1988; Blagojevic, Dopsaj & Vuckovic, 1996, Vučković, 2002; Dopsaj, Milošević, Blagojević & Vučković, 2002). The program activities of the SPE are part of the polystructural acyclic movement activities characterized by a multitude of technical elements, a rich tactical repertoire of actions, the diversity of movements of the whole body and some of its parts in different directions with varying strength and the intensity of action, whereby motor skills have a dominant role in relation to other adaptive characteristics (Milošević, Mudrić, Jovanović, Amanović & Dopsaj, 2005). Bearing in mind the above issues, we may conclude that well-developed motor skills and the appropriate level of well-trained specific motor tasks are basic factors providing conditions for the successful performance of work by law enforcement and security agencies personnel (Milošević, 1985; Blagojević et al., 2006; Dopsaj et al., 2002). Given that the knowledge about the direction and intensity of the activity on the transformation of the psychosomatic status of students enables the appropriate and optimal programming of content knowledge for SPE, and that, based on the studies conducted so far, it has been established that motor skills substantially influence the efficiency of the acquisition and reception of SPE content knowledge, as well as the fact that SFO teaching significantly influences the transformation of students' motor skills, this study seeks to determine the hierarchical motor structure among the students at the Faculty of Security Sciences in Banja Luka in order to classify the students by motor skills into as homogeneous groups as possible, to increase efficiency in teaching SPE. Based on the research aim thus defined and the fact that it is a positive selection sample, we start with the assumption that the students at the Faculty of Security Sciences have the appropriate structure of motor skills, and that the factor analysis algorithm will transform the set of manifesting motor variables into the predicted number of relevant motor factors.

METHODS

Sampling

The sample consisted of 84 first-year male students at the Faculty of Security Sciences in Banja Luka, aged 19 ± 0.6 years. All the respondents constituting the sample were clinically healthy and without obvious morphological defects. The basic antropomorphological indicators of the sample tested accounted for TV 181.85 ± 6.13 cm, TT 78.25 ± 9.19 kg, and BMI 23.71 ± 2.43 kg/m^2.

Variable sampling

Since it was not possible to include the entire area of motorics in this research, an attempt was made to analyze the structure of motor skills at the level of second-order factors with the representative measuring instruments for assessing the primary factors, whereby the motorics area was covered with the following 16 tests: hand tapping (MBFTAP), foot tapping (MBFTAN), agility on the ground (MAGONT), side steps (MAGKUS), one-legged stance on the balance platform (MBAP1O), shoulder pass through (MFLISK), side lying leg raise (MFLOLB), toe touches standing on the bench (MFLPRK), standing long jump (MFESDM), a 20m standing-start sprint (MFE20V), throwing a midicine ball lying on the back (MFEBML), throwing a handball from the ground with legs spread (MFEBRL), flat bench press (MRABPT), weight sit-ups (MRCDTT), loaded half squats (MRLPCT), and a horizontal backrest (MSCHIL). All the variables used to assess motor skills possess the necessary metric characteristics (Metikos et al., 1989).

DATA PROCESSING METHODS

Statistical data processing was performed on the Pentium IV computer using the SPSS application (version 20.00). The basic measures of central tendency and dispersion results are defined using the arithmetic mean and standard deviation. In order to test the correctness of data distribution, the Kolmogorov-Smirnov test was used, while the testing of an alternative hypothesis was performed using a multivariate model of factor analysis, where the significance of the main components was determined using the Kaiser-Guttman rule. To determine the actual relations between the separated dimensions, the Oblimin rotation was used, after which the structure and complex matrixes were obtained.

RESULTS

Table 1 shows the descriptive parameters of the variables used to assess motor skills. The increased values of the standard deviation of the measures used to assess flexibility, explosive power, and strength indicate a high variability of the results around the arithmetic mean, but taking into account the sample size, this phenomenon may be regarded as normal. The results of the Kolmogorov-Smirnov test used to analyze the normality of the distribution demonstrate that most of the variables describe a normal distribution, while the values amounting to less than 0.05 were found for the variables used to assess coordination and balance (MAGONT, MAGKUS and MBAP1O), as well as for the variables used to assess flexibility and strength (MFLOLB and MRCDTT).

Table 1. Basic descriptive parameters of the motor variables distribution

Variables	N	Mean	SD	KS test (significance)
MBFTAP	84	40.49	6.35	0.054
MBFTAN	84	32.45	3.90	0.054
MAGONT	84	12.87	3.70	0.002
MAGKUS	84	9.24	1.40	0.021
MBAP1O	84	3.71	2.96	0.002
MFLISK	84	75.18	19.27	0.096
MFLOLB	84	72.29	11.33	0.043
MFLPRK	84	50.73	9.38	0.140
MFESDM	84	248.73	15.16	0.844
MFE20V	84	3.31	0.14	0.727
MFEBML	84	130.00	18.19	0.224
MFEBRL	84	190.00	32.71	0.677
MRABPT	84	34.98	11.95	0.173
MRCDTT	84	26.77	9.71	0.034
MRLPCT	84	23.49	9.06	0.082
MSCHIL	84	23.46	10.86	0.062
N	84			

Key: **N** – number of respondents; **Mean** – arithmetic mean; **SD** – standard deviation; **KSp** – the value of the probability of Kolmogorov-Smirnov test; MBFTAP – hand tapping; MBFTAN – foot tapping; MAGONT – agility on the ground; MAGKUS – side steps; MBAP1O – one-legged stance on the balance platform; MFLISK – shoulder pass through; MFLOLB – side lying leg raise; MFLPRK – pike stretch (on a bench); MFESDM – standing long jump; MFE20V – a 20m standing-start sprint; MFEBML – lying medicine ball throw; MFEBRL – seated handball throw (legs spread); MRABPT – flat bench press; MRCDTT – weight sit-ups; MRLPCT – half squats; MSCHIL – a horizontal backrest.

Table 2. Matrix of the inter-correlation of the variables used to assess motor skills

	MBFTAP	MBFTAN	MAGONT	MAGKUS	MBAP1O	MFLISK	MFLOLB	MFLPRK	MFESDM	MFE20V	MFEBML	MFEBRL	MRABPT	MRCDTT	MRLPCT	MSCHIL
MBFTAP	1.00															
MBFTAN	.213	1.00														
MAGONT	-.277	-.254	1.00													
MAGKUS	-.289	-.244	.617	1.00												
MBAP1O	.022	.011	-.132	-.146	1.00											
MFLISK	-.074	-.089	-.029	.009	-.194	1.00										
MFLOLB	.145	.232	.010	-.097	-.009	-.435	1.00									
MFLPRK	.072	-.013	-.118	-.173	.113	-.357	.152	1.00								
MFESDM	.164	.157	-.318	-.235	.200	-.038	.099	.142	1.00							
MFE20V	.089	-.042	-.006	-.030	-.077	-.087	.083	.082	-.181	1.00						
MFEBML	.060	-.072	-.131	-.049	-.174	.024	-.095	.131	.178	-.073	1.00					
MFEBRL	.169	-.088	-.101	-.268	.104	-.100	.068	.351	.281	-.102	.326	1.00				
MRABPT	-.089	-.111	.005	.051	-.061	-.016	.011	.053	-.082	-.011	.334	.124	1.00			
MRCDTT	.114	-.180	-.017	-.038	-.124	.082	.061	.202	-.046	-.060	.253	.099	.454	1.00		
MRLPCT	-.016	-.067	-.147	-.094	.175	-.236	.099	.262	.083	-.035	.139	.200	.311	.273	1.00	
MSCHIL	-.016	-.031	-.055	-.086	-.162	.060	-.198	.237	.034	.029	.217	.047	.276	.438	.187	1.00

Key: MBFTAP – hand tapping; MBFTAN - foot tapping; MAGONT – agility on the ground; MAGKUS – side steps; MBAP1O – one-legged stance on the balance platform; MFLISK – shoulder pass-throughs; MFLOLB – side laying leg raise; MFLPRK – pike stretch (on a bench); MFESDM – standing long jump; MFE20V – a 20m standing-start sprint; MFEBML – lying medicine ball throw; MFEBRL – seated handball throw (legs spread); MRABPT – flat bench press; MRCDTT – weight sit-ups; MRLPCT – half squats; MSCHIL – a horizontal backrest.

Table 3. Matrix of characteristic roots and components of common variance explained

Components	Initial characteristic values			The sum of square loadings			Rotation sums of square loadings
	Characteristic roots	Variance %	Cumulative sequence %	Characteristic roots	Variance %	Cumulative sequence %	Characteristic roots
1	2.735	17.091	17.091	2.735	17.091	17.091	2.235
2	2.275	14.216	31.307	2.275	14.216	31.307	2.249
3	1.683	10.521	41.828	1.683	10.521	41.828	1.762
4	1.355	8.469	50.297	1.355	8.469	50.297	1.233
5	1.119	6.993	57.290	1.119	6.993	57.290	1.392
6	1.063	6.643	63.933	1.063	6.643	63.933	1.921
7	.899	5.621	69.554				
8	.834	5.211	74.765				
9	.714	4.462	79.226				
10	.662	4.140	83.366				
11	.613	3.834	87.200				
12	.571	3.570	90.770				
13	.481	3.005	93.775				
14	.423	2.643	96.419				
15	.289	1.807	98.225				
16	.284	1.775	100.000				

Table 4. Factor analysis of motor skills – the structure matrix

The structure matrix						
	1	2	3	4	5	6
MAGONT	-.845					
MAGKUS	-.811					
MBFTAN	.522		.382			-.357
MBFTAP	.515					
MRCDTT		.783				
MRABPT		.766				
MSCHIL		.643				
MRLPCT		.554			-.494	
MFLOLB			.870			
MFLISK			-.729			
MFE20V				.829		
MFESDM	.340			-.413		.410
MBAP1O					-.796	
MFEBRL						.839
MFEBML		.311			.356	.557
MFLPRK				.350		.505

Key: MAGONT – agility on the ground; MAGKUS – side steps; MBFTAN – foot tapping; MBFTAP – hand tapping; MRCDTT – weight sit-ups; MRABPT – flat bench press; MSCHIL – a horizontal backrest; MRLPCT – half squats; MFLOLB – side lying leg raise; MFLISK – shoulder pass-throughs; MFE20V – a 20m standing-start sprint; MFESDM – standing long jump; MBAP1O – one-legged stance on the balance platform; MFEBRL – seated handball throw (legs spread); MFEBML – lying medicine ball throw; MFLPRK – pike stretch (on a bench).

Table 5. Factor analysis of motor skills – the complex matrix

	The complex matrix					
	1	2	3	4	5	6
MAGONT	-.820					
MAGKUS	-.807					
MBFTAP	.558					
MBFTAN	.533		.406			
MRCDTT		.789				
MRABPT		.754				
MSCHIL		.661				
MRLPCT		.546			-.508	
MFLOLB			.855			
MFLISK			-.748		.338	
MFE20V				.820		
MBAP1O					-.796	
MFEBRL						.836
MFEBML		.420			.315	.583
MFLPRK			.311	.355	-.301	.576
MFESDM	.436			-.446		.452

Key: MAGONT – agility on the ground; MAGKUS – side steps; MBFTAP - hand tapping; MBFTAN - foot tapping; MRCDTT – weight sit-ups; MRABPT – flat bench press; MSCHIL – a horizontal backrest; MRLPCT – half squats; MFLOLB – side laying leg raise; MFLISK – shoulder pass-throughs; MFE20V – a 20 m standing-start sprint; MBAP1O – one-legged stance on the balance platform; MFEBRL – seated handball throw (legs spread); MFEBML – lying medicine ball throw; MFLPRK – pike stretch (on a bench); MFESDM – standing long jump.

Table 6. Matrix of interrelations among isolated latent dimensions

Factors	1	2	3	4	5	6
1	1.000	-.028	.129	-.059	.006	.154
2	-.028	1.000	-.042	.051	.010	.202
3	.129	-.042	1.000	.032	-.084	.064
4	-.059	.051	.032	1.000	-.013	-.018
5	.006	.010	-.084	-.013	1.000	-.096
6	.154	.202	.064	-.018	-.096	1.000

DISCUSSION

The comparison of these results (as shown in Table 1) with the results obtained from the research conducted by Metohos, Hofman, Prot, Pintar, and Oreb (1989) on the population of the students at the Faculty of Physical Culture in Zagreb, in 1981, indicated no significant differences in the variables used to assess coordination (MAGONT and MAGKUS) and the variables used to assess explosive power of the upper extremities (MFEBML). The analysis of the results obtained demonstrate that the students at the Faculty of Physical Education have achieved better results in the variables used to assess the strength of the trunk MRCDTT and legs (MRLPCT), and the variables used to assess balance (MBAP1O) and the mobility of the shoulder joint (MFLISK), while the students at the Faculty of Security Sciences achieved better results in the variables used to assess the frequency of hand and leg movement (MBFTAN and MBFTAP), the explosive power of the lower and upper extremities (MFESDM, MFE20V and MFEBRL), the strength of arms, shoulders, and the back (MRABPT and MSCHIL), along with the variables used to assess the flexibility of the legs and arms (MFLOLB and MFLPRK). Based on the above results, we may conclude that the students at the Faculty of Physical Education have more strength in the trunk and legs and better mobility of the shoulder joint and balance than the students at the Faculty of Security Sciences, while the students at the Faculty of Security Sciences have a better frequency of movement by hand and leg, the explosive power of the lower and upper extremities, the repetitive strength of the arms and the static strength of the trunk, therefore a better flexibility of the trunk and legs. Given that the variability and co-variability of the tests for the frequency of movement is responsible for the ability to structure movement, while the explosive power is determined by the mechanism for regulating the excitation intensity and the repetitive and static forces of the mechanism for regulating the duration of excitation, we may consider these mechanisms to be at a higher level among the students at the Faculty of Security Sciences than among the students at the Faculty of Physical Culture.

The analysis of the inter-correlation matrix of the variables used to assess motor skills (Table 2) demonstrates that the most significant correlation was obtained within the set of variables used to assess coordination (MAGKUS and MAGONT). A significant correlation was also found within the set of variables used to assess repetitive power (MRCDTT and MRABPT) and (MRCDTT and MSCHIL), the set of variables used to assess explosive power (MFEBRL and MFEBML), followed by the set of variables used to assess explosive power and strength (MRLPCT and MRABPT), while a significant negative correlation was found within the set of variables used to assess flexibility (MFLOLB and MFLISK and MFLPRK and MFLISK). Also, a significant correlation was found between the variables used to assess flexibility and explosive power (MFLPRK and MFEBRL) and explosive power and strength (MFEBML and MRABPT), while a negative correlation was found between the variables used to assess coordination and explosive power (MAGONT and MFESDM). Given that the faster agility task performance (MAGONT) represents a better result, this correlation may be regarded as significant. A very weak (positive and negative) or insignificant correlation was found among other variables observed. Based on the value of the Kaiser-Meyer-Olkin indicator and the statistical significance of Bartlett's sphericity test, the model of factor analysis was used to determine the latent structure of the motor skills of the students at the Faculty of Security Sciences in Banja Luka.

By analyzing the main components (Table 3) using the Kaiser-Guttman rule, 6 significant latent dimensions were extracted, explaining a total of 63.93% of the variance of the entire system, whereby their individual contribution to the first principal component amounts to 17.09 5%; 14.21% to the second one; 10.52% to the third one; 8.46% to the fourth one; 6.99% to the fifth one, and 6.64% to the sixth component of the common variance.

In considering the structure and the motor skills matrices (Table 4 and Table 5), it is obvious that the first isolated factor is clearly presented and composed of the variables used to assess coordination (MAGONT and MAGKUS) and the variables used to assess the frequency of movement (MBFTAP and MBFTAN), enabling the students to perform complex motor activities and appropriately reorganize them in new conditions. The ability to quickly change the direction of movement (based on the synchronization of the work of motor units) enables the rapid change of stances and guards, directions and attack directions, the rapid performance of combinations of strokes and blocks, defense moves and simultaneous movements, blocks and strokes during different attacks, while the frequency of movement is important in the realization of cyclical structures of attacks in those situations in which, for the purpose of attack or defense, a certain number of technical elements such as movements combined with blocks, strokes, sweeps or throws (Milošević et al., 2005) is repeated. Considering the ability to control the movements of the whole body or certain parts of it in the space, and the speed of solving and performing complex motor tasks and performing simple movements with as many repetitions per unit time as possible, which is the essential characteristic of the content of most of the tasks of these measuring instruments (whose basis is best defined by the mechanism for structuring movements), this factor may be defined as a factor for structuring the movement.

The second isolated factor consists of the measures used to assess the repetitive and static strength of the arms, trunk, and legs (MRCDTT, MBABPT, MSCIL and MRLPCT), which is defined as the ability to perform long-term work on the basis of alternating contractions and muscle relaxations, as well as the ability to perform isometric contractions with certain duration, enabling the students to perform a number of activities and repetitions of certain techniques in education for the purpose of attacking or self-defense, including control over an opponent when carrying out transport on a shorter or longer journey. In defining a mechanism that would be responsible for repetitive and static power, we have taken into account the finding that the quantitative and qualitative characteristics of power depend on the anatomical, biomechanical and physiological characteristics of the locomotor apparatus as the subsystem being managed and the physiological and psychological characteristics of the central nervous system as the controlling subsystem underlain by physiological processes regulating the duration of excitation in those parts of the central nervous system that cause muscle activation; this factor may, therefore, be defined as the factor for the regulation of the duration of excitation.

The third factor has a very simple structure and is defined by the variables used to assess the flexibility measures (MFLOLB and MBFLISK), which is responsible for movement tasks requiring the ability to realize one-time maximum amplitude of movement, with the possibility of developing considerable excitation in the primary motor centers of the brain cortex and in those subcortical nuclei functioning as the amplifiers or modulators of eruptive information. Since the results of these tests are affected by the timely inclusion and exclusion of agonistic and antagonistic muscle groups as well as the fine regulation of the movement by which it is possible to describe the optimal path of movement (whose basis is best defined by the mechanism for tonus regulation and synergistic regulation), this factor may be defined as the factor for tone regulation and synergistic regulation.

The fourth factor is defined by the variable used to test explosive power through the run speed capability (MFE20V). Bearing in mind the fact that the speed of generating force determines the efficiency of the realization of blocks, strokes, and movement in the guard, and that the change in the speed of the force generation allows for a rapid detachment from the direction of attack, walking into the opponent , the rapid change of movement direction and sudden attack requiring discontinuous muscle strain (underlain by the excitation intensity of the neuromuscular system, which causes the excitation of the maximum possible number of motor units in performed or attempted motor movements), for which the mechanism for registration of excitation intensity is responsible, this factor may be defined as a factor of excitation intensity.

The fifth factor is determined by the variable used to assess balance (MBAP10) which is defined as the ability to maintain the balance position with open eyes in a given position on a reduced and stable surface of the support (both based on the information from the visual analyzer regarding body position in relation to the reference point and the information from the kinesthetic analyzer and vestibular apparatus), with random movements occurring as a noise generator. Bearing in mind the fact that the SPE content knowledge technique is a system of rational movements and movements manifested in the level of adoption achieved (such as typified movements, blocks, strokes, throws, sweeps and levers), whereby some body segments change their position (thereby disrupting balance), it follows that during a mutual attack, a student who knows how to maintain his or her own balance is more successful, while at the same time disrupting the opponent's balance, using his or her mistakes in the performance of certain attacks or interventions. Based on the finding that the manifestation of tone regulation in motor reactions controls the order, the ratio and the intensity of the inclusion and exclusion of the motor units of agonistic and antagonistic muscle groups, and the extent of force generated by this factor, this factor can be defined as a factor of synergistic regulation and tone regulation.

The sixth factor is represented by three explosive power measures (MFEBRL, MFEBML, MFESDM), which are part of the mechanism for assessing the regulation of excitation intensity (which is responsible for simultaneously activating the maximum number of units per unit time) and by one measure of flexibility (MFLPRK) in which the results depend to a large extent on the ability to regulate the tone of antagonists of the rear side of femur (which enables the maximum amplitude of the movement to be achieved), for which the mechanism for tone regulation and synergistic regulation is largely responsible. Given that the first two tests in their reactions include the musculature of the arm and shoulder area, and that the force produced is transmitted to the external objects which, under the effect of the force, move in space, while the third test includes the muscularity of the legs, whereby the force produced results in the displacement of the body in space, as well as the fact that the explosive power affects the speed of strokes, blocks, throws, walking into throws, defense against grips, defense against throws, breaking the opponent's guard followed by the speed of walking into the opponent in various attack types, to avoid attacks, the speed of defense against strokes, grips (Milošević et al., 2005), while the flexibility of the trunk influences the efficiency of the implementation of throw and lever techniques carried out with the body leaning forward as well as the throwing technique carried out with the body leaning backward, as well as the fact that the variable MFEBRL (underlain by short-term muscular contraction caused by the maximum amount of excitation of the central nervous system, for which the mechanism for regulating the excitation intensity is largely responsible) has the largest projection on this factor, it is possible to define this factor as a factor for excitation intensity.

Similar results were obtained by Shakiri, Lolić, Ademi, Saiti, and Kostovski (2013), who carried out research in a sample of 80 respondents to determine the structure of the basic-motor status of cadet judokas. Using factor analysis, they determined 6 factors defining the structure of the basic motor space and defined them as follows: 1) the factor for the mechanism of synergistic regulation and tone regulation; 2) the factor for the regulation of excitation duration and movement structure; 3) the factor for regulation and excitation intensity; 4) the factor for regulation, excitation duration, and movement structure; 5) the factor for synergistic regulation and tonus regulation (represented by balance measures), while they were unable to define the sixth factor due to the complexity of the character.

The analysis of the inter-correlation matrix of the isolated main components (Table 6) indicates a statistically significant weak correlation between the mechanism for regulating the duration of excitation (presented on the basis of the measures used to assess the repetitive and static forces) and the mechanism for the regulation of excitation intensity (presented on the basis of the measures used to assess explosive power). This is also supported by the conclusion that these two mechanisms together form a general factor that Gredelj et al. (1975) call the mechanism of energy regulation (whereby the action of the first regulation mechanism is manifested in the amount of motor work or the duration of muscle strain, while the other regulation mechanism is responsible for the magnitude of the forces developed per unit time). There was no statistically significant correlation between other factors. Likewise, the above facts are supported by the results of the study conducted by Božić, Milošević, and Zulić (1990), and Blagojević et al. (1994), which indicated that the quality of the formation of the complexes of the basic and derived algorithms in structuring programs in special physical education depends on the quality of the perception of longitudinal dimensionality and motor educability, with the information processes dominating in the first and second stage, while a more intense dynamic structure of motor programs occurs in the third stage, in which the contractile properties of the muscles come to the fore, as evidenced by the impact of the dynamic power of the upper extremity and trunk.

CONCLUSION

This study was conducted in a sample of 84 respondents to determine the structure of the basic-motor status among the students at the Faculty of Security Sciences in Banja Luka. Six latent motor factors were determined using the factor analysis according to the Kaiser-Guttman rule. The first factor is defined as the factor for the mechanism for structuring movement. The second factor is defined as the factor for the regulation and excitation duration mechanism. The third factor is defined as the factor for the tone regulation and synergistic regulation mechanism. The fourth factor is defined as the factor for the excitation intensity mechanism. The fifth factor is defined as the factor for synergistic regulation and tonus regulation, while the sixth factor is defined as the factor for excitation intensity.

Based on the results of the factor analysis performed on the motor space, the model of motor skills among the students at the Faculty of Security Sciences may be defined as

$$M = 0.17\ F1 + 0.14\ F2 + 0.10\ F3 + 0.08\ F4 + 0.07\ F5 + 0.06\ F6$$

where M represents the model of motor characteristics, F1 – the factor for the movement structuring mechanism (presented on the basis of the measures used to assess coordination and the frequency of movements), F2 – the factor for the mechanism for regulating excitation duration (presented on the basis of the measures used to assess repetitive and static forces), F3 – the factor for the mechanism for tone regulation and synergistic regulation (presented on the basis of the measures used to assess flexibility), F4 – the factor for the excitation intensity mechanism (presented on the basis of the measures used to assess explosive power through the run speed capability), F5 – the factor for the synergistic regulation and tone regulation mechanism (presented on the basis of the measures used to assess balance), and F6 – the factor for the excitation intensity mechanism (presented on the basis of the measures used to assess explosive power).

Considering that future security personnel are likely to perform hazardous and complex tasks, it is very important that they have the optimum skills that could contribute to the successful performance of professional tasks. Due to the importance of motor skills within the system of selection, training, education and control of their level, there is a need for the continuous development and improvement of training programs and ways to determine the level of the general and specific motor skills achieved in order to improve the work ability of police officers and personnel employed at other security agencies (Anderson, Plecas & Segger 2001; Dopsay and Vuckovic, 2006; Dopsay, Blagojevic and Vuckovic, 2007; Strating, et al., 2010; Vuckovic, Blagojevic and Dopsay, 2011). Given the above, in addition to learning and mastering the basic elements of techniques and their connections envisaged under the content knowledge of the SPE program, substantial attention should be given to the teaching process and a focus should be placed on the selection and formation of the model characteristics of each individual in order for future security personnel to be successful in their profession. Our research results open up possibilities for further research, and in combination with other test batteries, which may contribute to the selection of better candidates and improvement of the quality of the teaching process, thus producing more quality security personnel.

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