THE INFORMATIVE VALUE OF MOTOR, MENTAL, AND MORAL QUALITIES IN THE PERSONALITY STRUCTURE OF PRESCHOOL CHILDREN AGED 4 YEARS

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Annotation. The study was to determine the presence or usefulness of the main components of the relationship of physical and psycho-physiological state in the personality structure of children of preschool age. The experiment involved 107 children aged 4 years (54 male, 53 female). Factor analysis of the structure of the motor system, the intellectual and moral sphere of children. Found that it is determined six orthogonal factors. The results give reason to believe that the development of the physical, intellectual and moral sphere of children of this age is complex. The interpretation of these data in the pedagogical aspect suggests that pre-school children are becoming a person under the influence of biological and psychological factors. Their activation is possible in the process of physical education.
Keywords: personality, children, preschool age, factor structure, physical education.

Introduction

Social economic changes in Ukrainian society, the processes of globalization and informatization conditioned growth of role and significance of every personality, of successfulness of his individual development. It also conditions the need in searching of ways to optimizing of rising generation's education, including pre-school children.

However, at present there is a clear contradiction between declarations about necessity of physical system's improvement and practical activity in this sphere. Traditional approaches to health related physical culture work with pre-school children often do not comply with up-to-date requirements and demand to be replaced by methods, which would facilitate health improvement, increasing of physical conditions' level, timely physical, intellectual and moral child's progressing more efficiently.

It is known that even in pre-school age biological demand in motion is a leading one and mobilizes intellectual, moral and emotional development of a child, his (her) habits and behavior [2, 4, 9, 11].

Researches note the presence of interconnection between intellectual, moral, emotional, social development and motion activity, physical level, state of child's health [3, 5, 8, 10, 16, 17], and this means that it is purposeful to use such system of teaching and education, which would stipulate integrated educational and health improving effect.

Recent years there have been carried our researches, devoted to searching of ways of physical education efficiency's improvement in pre-school establishments, videlicet: organizational-methodic aspects of physical education of senior preschool children with health abnormalities (L.V. Kozobroda) [7]; ways to optimizing of motion regime and physical condition of 6-7 years old children, who are taught in different types of educational establishments (I.O. Kogut) [6]; pedagogical conditions of personality-oriented training of motion action of 5-6 years old children in conditions of pre-school establishment (O.V. Braginska) [1].

However, one of crisis phenomena of domestic traditional and authors' educational systems is a gap between physical education and other sides of pre-school children's education, the absence of acting mechanisms, which would condition integrity of child personality's development in the process of motion activity. Separate aspects of solution of this problem were regarded in researches by: A.A. Pyvovar [13], which was devoted to combined development of 5-6 years old children's physical and cognitive abilities; V.V. Polischuk [14], who grounded and developed content of physical trainings of senior pre-school children with using of tourism's elements as technique of the first priority, for improvement of physical condition, mental level and physical health; Ye.G. Yakhna [15], who determined pedagogical conditions of complex development of senior pre-school children's physical and moral qualities in the process of physical education.

At the same time the problem of formation of pre-school child's integral personality, interaction and interdependence of its main structural components' development in the process of physical education has not been yet a subject of special researches.

The problem of this research comply with "Combined plan of scientific & research works in the field of physical culture and sports for 2011-2015" of Ministry of education and science, youth and sports of Ukraine by subject 3.1 "Improvement of program-normative principles of physical education in educational establishments" (No of state registration 0111U001733).

Purpose, tasks of the work, material and methods

The purpose of the research was determination of presence and informational significance of physical and psycho-physiological state's main components' interconnections in the structure of 4 years old children's personality.

Organization of the research: the examined contingent consisted of 4 years old children, who attended pre-school educational establishments No9 "Sonechko" and No.10 " Liubavonka" of Pereyaslavl-Khmelnitsk, Kyivska region; 107 children in total (54 boys and 53 girls).

Complex program of studying of 4 years old children's motion systems, cognitive processes, speaking and component of moral development, included 33 indicators.

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The methods of the research: pedagogical (pedagogical experiments, pedagogic testing); psychological (diagnostics and studying of cognitive processes, speaking moral development of a pre-school child); anthropometric; physiological (pulse metering, spirometry, functional tests); methods of mathematical statistics.

Studying of dynamics of components, which ensure realization of motion activity, intellectual and moral development, permits to determine pedagogic actions, means and methods, which would be oriented on formation of comprehensively developed child's personality in process of physical education.

However, grounding and development of theoretical-methodic principles of combined development of pre-school children's motion, mental and moral qualities in the process of physical education, require researching of interconnections and interdependences of all components, which ensure functioning of child's motion system, intellectual and moral sphere.

Determination of functioning of child's organism's components as an integral system permits, with the help of mathematical analysis (correlation and factor), to carry out development of correlation of pedagogical actions' components.

In the process of analysis of correlation matrixes we made additional calculations of mean values of all indicators' interconnections. In order to do this we add all values of one indicator's correlation with the other and mean value witnessed about its significance in the structure of motion condition, intellectual and moral levels of pre-school children.

Such approach to widening of knowledge about interconnections of indicators is used in mathematical analysis [12] during initial preparation of data for factor analysis.

This method was used with respect to 33 indicators, which characterize morpho-functional state, physical level, cognitive processes and speaking of 4 years children, as well as their moral level.

The fulfilled factor analysis of 4 years boys' motion system, intellectual and moral spheres permitted to establish that they are determined by 6 orthogonal factors, in which the sum of loaded variables varies from 4. 62 to 2. 34, dispersion contribution is 72. 0% (see table 1, fig.1)

Table 1

Factor analysis of main components of 4 years old boys' motion system, intellectual and moral sphere, n=54

Indicators	Factors					
	1	2	3	4	5	6
Length of body	0. 31	0. 07	0. 83	-0. 04	0. 19	-0. 06
Mass of body	0. 07	-0. 13	0. 32	0. 82	0. 07	0. 05
Chest capacity	-0. 18	0. 09	0. 06	0. 87	0. 18	0. 06
Pinyet's index	0. 31	0. 01	0. 45	-0. 80	0. 00	-0. 10
Heart beats frequency in rest (actual)	0. 05	-0. 12	-0. 01	0. 03	-0. 11	0. 00
Heart beats frequency in rest (relative)	0. 04	-0. 09	0. 03	-0. 04	-0. 08	0. 01
Difference - heart beats frequency	-0. 01	0. 03	0. 07	-0. 11	0. 02	0. 02
Vital capacity of lungs	0. 24	0. 08	0. 90	0. 09	-0. 06	0. 08
Shtange's test	0. 08	0. 17	0. 29	-0. 02	0. 07	0. 01
Genchy's test	0. 04	0. 12	0. 21	0. 17	-0. 11	-0. 13
Rufiet' test	-0. 14	0. 02	-0. 86	-0. 02	0. 28	-0. 09
30 m run	0.92	-0. 08	-0. 17	0. 23	0. 08	-0. 01
Throws of ball	0. 91	0. 09	0. 06	0. 09	0. 04	-0. 10
Tapping test	0. 89	0. 07	0. 11	0. 17	0. 02	0. 02
Long jump from the spot	0. 06	-0. 24	0. 14	-0. 54	-0. 34	0. 03
Torso rising	0. 23	0. 22	0. 05	-0. 03	-0. 09	0. 00
Heavy ball distant throw from sitting position	0. 49	0. 15	0. 03	-0. 31	0. 61	-0. 11
Dynamometry – right hand	0. 19	-0. 10	-0. 13	0. 09	0. 77	0. 18
Dynamometry –left hand	0. 14	-0. 30	-0. 09	-0. 20	0. 60	0. 20
Shuttle run 3x10 m	0. 88	0. 05	-0. 20	0. 21	0. 16	-0. 02
Keeping balance	0. 08	0. 07	-0. 14	0. 15	0. 63	0. 11
Forward bent standing on bench	0. 11	0. 07	0. 22	-0. 15	-0. 68	-0. 10
90 m run	-0. 77	-0. 06	-0. 18	0. 21	0. 19	-0. 09
Perception	0. 15	0. 82	0. 06	0. 02	-0. 12	-0. 02
Memory	0. 01	0. 84	0. 00	-0. 04	0. 11	0. 07
Thinking	0. 01	0. 68	-0. 13	-0. 02	0. 06	0. 18
Imagination	0. 22	0. 62	0. 13	0. 13	0. 22	0. 28
Attention	0. 01	0. 55	-0. 01	-0. 09	0. 10	0. 19
Cognitive component	-0. 15	-0. 09	-0. 02	0. 04	0. 01	0. 48
Emotional component	0. 09	0. 27	-0. 01	0. 11	0. 13	0. 71
Behavioral component	-0. 02	0. 31	0. 11	-0. 03	-0. 19	0. 50
Integrative component	-0. 01	0. 30	0. 04	0. 07	-0. 02	0. 91

Speaking	-0. 05	0. 60	0. 27	0. 05	-0. 08	0. 43
Sum of loaded variables	4. 62	3. 52	3. 03	2. 84	2. 73	2. 34
Factor's contribution into general dispersion, %	17. 3	13. 5	11. 4	10. 7	10. 3	8. 8

The first factor included indicators of coordination abilities (keeping balance -0.88), dynamic endurance (90 m run – 0.77), and speed abilities, which were evaluated with the help of motion tests' complex: 30 m run (0.92), throws and catching of ball from wall during 30 seconds (0.91), frequency of hand's movements (0.89). This factor included indicators of physical abilities, which have nearly equal coefficient of significance and their sum is 4.62 that conditions the name of this factor "physical abilities". It also should be noted that this factor has the biggest contribution into general dispersion (17.3%).

Second factor included indicators of cognitive processes (0. 84-0. 55) and speaking (0. 60), that witnesses about close interconnection of speaking with perception, memory, attention, thinking and imagination. By its significance coeff r of cognitive processes and spea

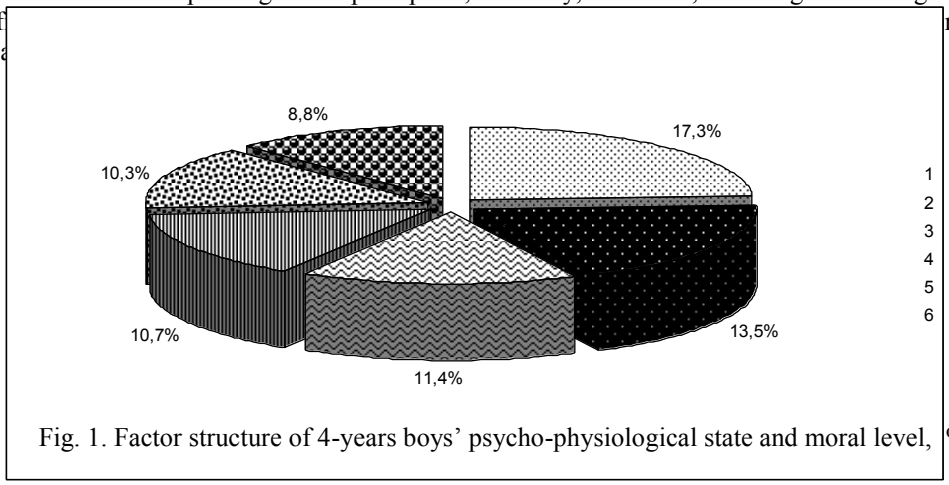

Fig. 1. Factor structure of 4-years boys' psycho-physiological state and moral level, %

Notes:
- physical abilities;
- cognitive processes and speaking;
- morpho-functional state;
- physical development;
- speed-power and coordination abilities;
- moral level and speaking;

The third factor has sum of loaded variables equal to 3.03 and its most significant indicators are indicators of functional abilities (0. 90-0. 86). It also includes indicator of body length with rather high coefficient (0.83). The obtained data permit to regard this factor as factor of "morpho-functional state" and its contribution to general dispersion is 11. 4%.

With analyzing of the forth factor's content (10.7%) we can observe rather clearly influence of physical condition's indicators (ОГК-0.87; mass of body – 0.82; Piniet's index– 0. 80), as well as indicator of speed-power abilities (motion test – "long jumps from the spot" – 0.54). The forth factor has sum of loaded variables 2.84 and was called "physical level".

The fifth factor (10. 3%) included indicators of speed-power (0. 61), coordination (0. 63) and power abilities (0. 77 and 0. 60), which, in our research, were evaluated with the help of motion tests "distant throw of heavy ball from sitting position", "keeping balance" (test by Ye.Ya. Bondarevskiy) and dynamometry. The sum of significance coefficients of this factor is 2.73. The fifth factor was interpreted as the factor of "speed-power and coordination abilities".

In the sixth factor (2. 34) the most significant indicators are those of all moral level's components (0. 91; 0. 71; 0. 50; 0. 48) and speaking (0. 43), that witness that formation of child's moral grounds happens in integrity of his (her) cognitive, emotional and behavioral components in the process of child's communicating with surrounding people. But the most important moral instance for a child of this age is an adult person, his opinions, attitudes, demands. That is why the sixth factor was called "moral level and speaking" and its contribution to general dispersion is 8.8%.

One of the tasks of our research was determination of informational significance of morho-functional state, physical condition, psychic processes and moral level's components in general structure of motion system, intellectual abilities and moral qualities of 4 years girls (see table 2).

Table 2

Factor analysis of main components of 4 years old boys' motion system, intellectual and moral sphere, n=53

Indicators	Factors					
	1	2	3	4	5	6
Length of body	0. 34	0. 60	0. 42	0. 14	-0. 32	-0. 06

Mass of body	0. 10	0. 37	0. 20	0. 00	-0. 66	0. 16
Chest capacity	-0. 02	-0. 20	0. 29	-0. 06	-0. 86	-0. 07
Pinyet's index	0. 24	0. 45	0. 02	0. 17	0. 73	-0. 03
Heart beats frequency in rest (actual)	-0. 10	0. 15	-0. 02	-0. 07	0. 00	-0. 89
Heart beats frequency in rest (relative)	-0. 13	0. 11	-0. 05	0. 04	0. 01	-0. 90
Difference - heart beats frequency	-0. 09	-0. 04	-0. 06	0. 22	0. 03	-0. 35
Vital capacity of lungs	0. 18	0. 33	0. 77	0. 22	-0. 34	-0. 08
Shtange's test	0. 19	-0. 03	0. 80	0. 03	-0. 04	0. 16
Genchy's test	0. 17	-0. 07	0. 80	0. 16	0. 06	0. 30
Rufiet' test	-0. 06	-0. 17	-0. 87	-0. 03	0. 09	0. 13
30 m run	0. 00	0. 92	-0. 11	-0. 10	0. 02	0. 12
Throws of ball	0. 04	0. 20	0. 11	-0. 08	-0. 12	0. 02
Tapping test	-0. 01	0. 07	0. 12	-0. 01	0. 03	0. 03
Long jump from the spot	0. 08	-0. 19	0. 09	0. 16	0. 66	0. 26
Torso rising	-0. 14	-0. 03	-0. 18	0. 38	0. 25	-0. 20
Heavy ball distant throw from sitting position	0. 00	0. 27	0. 05	0. 89	-0. 02	0. 00
Dynamometry – right hand	0. 18	0. 10	0. 16	0. 88	0. 07	0. 20
Dynamometry –left hand	0. 27	0. 13	0. 19	0. 70	0. 26	0. 01
Shuttle run 3x10 m	0. 05	0.90	-0. 08	-0. 09	0. 04	0. 14
Keeping balance	0. 23	-0. 07	0. 14	0.22	0. 24	0. 60
Forward bent standing on bench	-0. 05	0. 50	0. 14	-0. 16	-0. 17	0. 12
90 m run	-0. 05	0. 56	-0. 27	-0. 22	-0. 31	-0. 22
Perception	0. 69	0. 05	0. 19	0. 23	0. 02	0. 16
Memory	0. 75	-0. 01	0. 34	0. 28	-0. 08	0. 17
Thinking	0. 55	0. 05	0. 29	0. 22	0. 01	-0. 07
Imagination	0. 71	-0. 05	0. 03	0. 11	-0. 02	0. 30
Attention	0. 66	-0. 15	0. 02	0. 10	0. 07	0. 13
Cognitive component	0. 09	-0. 21	-0. 01	0.05	-0. 09	0. 06
Emotional component	0. 76	0. 26	0. 01	-0. 01	0. 14	-0. 12
Behavioral component	0. 44	0. 27	0. 02	-0. 19	0. 05	0. 17
Integrative component	0. 77	0. 19	0. 02	-0. 07	0. 07	0. 03
Speaking	0. 77	-0. 04	0. 15	-0. 08	0. 00	0. 11
Sum of loaded variables	4. 75	3. 58	3. 46	2. 82	2. 75	2. 73
Factor's contribution into general dispersion, %	18. 6	14. 0	13. 5	11. 0	10. 8	10. 7

The fulfilled factor analysis permitted to determine that the structure of motion, intellectual and behavioral activity of 4-years old girls is determined, like in case with boys, by 6 orthogonal factors with the sum of loaded variables varying from 4.75 to 2,73 (see fig. 2). From all factors the first has the greatest sum of variables – 4.75 and the biggest contribution to general dispersion (18. 6%). It included indicators of moral level components, which have the biggest values (0. 77; 0. 76; 0. 44), of all cognitive processes (0. 75; 0. 71; 0. 69; 0. 66; 0. 55) and speaking (0. 77). Thus, concerning of junior pre-school age girls, we can clearly observe dependence of first moral ideas, understanding of ethic norms on the level of intellect. That is why the first factor was called "cognitive processes, moral level and speaking".

The second factor included indicators, which determine physical abilities' level (quickness 0. 92; coordination abilities– 0. 90; dynamic endurance– 0. 56; flexibility – 0. 50). This factor has sum of coefficients 3.58 and significance coefficient– 14. 0%. This factor we defined as factor of "physical abilities".

The third factor has sum of coefficients 3.46 and dispersion contribution 13, 5%. Here the most significant are indicators, characterizing functional state of respiratory system (Shtange's and Genchy's tests- 0.80; vital capacity of lungs – 0.77) and physical workability (-0, 87). This factor was interpreted by us as factor of "functional abilities".

Analyzing the content of the forth factor we should note that the most significant are speed-power indicators (distant throw of heavy ball from sitting position 0. 89; dynamometry– 0. 88-0. 70). This factor has sum of loaded variables 2.82 and its contribution to general dispersion is 11.0%. It was called "speed-power" abilities".

The fifth factor has sum of coefficients 2,75 and its most significant indicators are anthropometric ones (ОГК – 0. 86; mass of body– 0, 66) and indicator of body constitution (0. 73). Significance coefficient of the fifth factor is 10, 8%. We defined this factor as factor of "physical level".

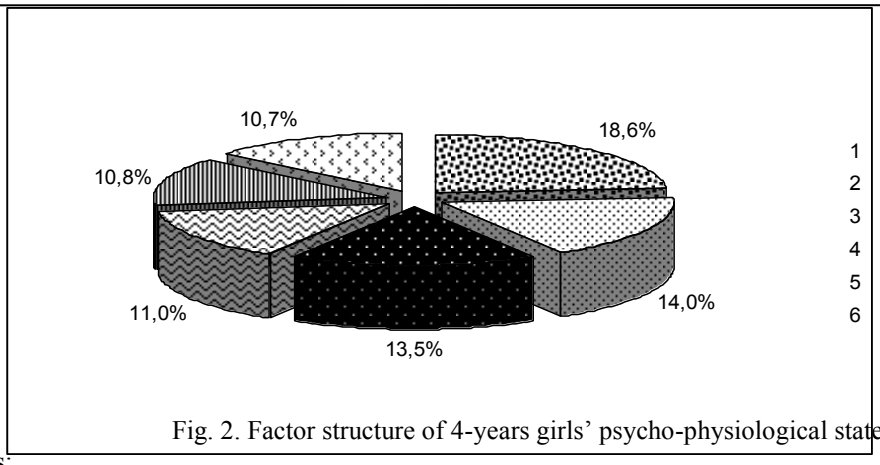

Fig. 2. Factor structure of 4-years girls' psycho-physiological state and moral level, %

Notes:

- cognitive processes, moral level and speaking;
- physical abilities;
- functional abilities;
- speed-power abilities;
- physical level
- functional state of cardio-vascular system.

The sum of coefficients of the sixth factor (2. 73), like contribution to general dispersion (10. 7%), are not very less than of the fifth factor. The most significant are indicators of heat beats frequency of actual (-0. 89) and relative (-0. 90) rest. We also found here the influence of vestibular balance indicator (0. 60). It gives ground to think that optimizing of heart beats frequency (reducing with being older) will facilitate improvement of static balance indicators. The sixth factor was called "functional state of cardio-vascular system".

Summary

Thus the fulfilled factor analysis of main components of 4-years boys' and girls' motion system, intellectual and moral spheres revealed interconnections between physical condition, morpho-functional state, cognitive processes, components of moral progressing and speaking (see table 3). The carried out analysis of factor structure permits to think that development of physical, intellectual and moral spheres of 4-years boys progresses in complex way and is ensured, first of all, by the following factors: physical abilities, cognitive processes and speaking, morpho-functional state, physical level, speed-power and coordination abilities, moral level and speaking. We also found some sex differences (the girls of this age has more intensive changes in intellectual-moral sphere), which, however, are not significant and do not influence on the content of most of factors. For 4 years old girls (sum of dispersion contributions – 78.6%) the structure of motion, intellectual and moral activity is determined by the following factors: cognitive processes, moral development and speaking; physical abilities; functional abilities; speed-power abilities; physical condition; functional state of cardio-vascular system. Interpretation of these data in pedagogic aspect permits to think that formation of personality of 4-years old children happens under influence of biological and psychic factors, which can be activated in the process of physical education.

The prospects of further researches imply further and more profound studying of factors, which influence on formation of child's personality.

Table 3

Main factors of motion system, intellectual and moral sphere of 4 years old children

Age	Sex	Factors	Sum of coefficients	Contribution%
4 years old	Boys	1. Physical abilities	4. 62	17. 3
		2. Cognitive processes and speaking	3. 52	13. 5
		3. Morpho-functional state	3. 03	11. 4
		4. Physical development	2. 84	10. 7
		5. Speed-power and coordination abilities	2. 73	10. 3
		6. Moral level and speaking	2. 34	8. 8
	Total		19. 8	72. 0
	Girls	1. Cognitive processes, moral level and speaking	4. 75	18, 6
		2. Physical abilities	3. 58	.
		3. Functional abilities	3. 46	14. 0
		4. Speed-power abilities	2. 84	13. 5

		5. Physical level 6. Functional state of cardio-vascular system.	2. 75 2. 73	11. 0 10. 8 10. 7
	Total		20. 11	78. 6

References:

1 Bagins'ka O.V. *Pedagogika, psihologia ta mediko-biologicni problemi fizicnogo vihovanna i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 2008, vol. 6, pp. 3-5.
2 Vil'chkovs'kij E.S., Denisenko N.F. *Organizaciia rukhovogo rezhimu ditej u doshkil'nikh navchal'nikh zakladakh* [Organization of motor mode of children in pre-school], Ternopil, Wanderer, 2008, 128 p.
3 Volkov L.V. *Sportivna pidgotovka molodshikh shkoliariv* [Sports training younger students], Kiev, Education of Ukraine, 2010, 388 p.
4 Glazyrina L.D. *Fizicheskaia kul'tura – doshkol'nikam* [Physical education - pre-school children], Moscow, Vlados-Press, 1999, 262 p.
5 Dubogaj O.D. *Fizkul'tura iak skladova zdorov'ia ta uspishnogo navchannia ditini* [Exercise as part of successful health and education of the child], Kiev, School world Publ. house, 2006, 128 p.
6 Kogut I.A. *Dvigatel'nyj rezhim i fizicheskoe sostoianie detej 6-7 let, obuchaiushchikhsia v shkolakh raznogo tipa* [Motor mode and the physical condition of the children 6-7 years old, enrolled in schools of different types], Cand. Diss., Kiev, 2006, 22 p.
7 Kozibroda L.V. *Organizacijno-metodichni aspekti fizichnogo vikhovannia ditej starshogo doshkil'nogo viku z vidkhilenniami u stani zdorov'ia* [Organizational and methodological aspects of physical education preschool children with disabilities in health], Cand. Diss., Lviv, 2006, 179 p.
8 Kozyreva O.V., Usakov V.I. *Fizicheskaia kul'tura: vospitanie, obrazovanie, trenirovka* [Physical culture: upbringing, education, training], 2007, vol.1, pp. 58 – 61.
9 Krucevich T.Iu., Pangelova N.E. *Sportivnij visnik Pridniprov'ia* [Dnipro Sports Bulletin], 2012, vol. 2, pp. 4-7.
10 Krucevich T.Iu., Pangelova N.E. *Fizicheskaia kul'tura: vospitanie, obrazovanie, trenirovka* [Physical culture: upbringing, education, training], 2013, vol.2, pp. 74-76.
11 Moskalenko N.V., Anastas'ieva Z.V. *Doshkil'ne fizichne vikhovannia ditej* [Preschool children physical education], Dnipropetrovsk, Innovation, 2009, 95 p.
12 Okun' Ia. *Faktornyj analiz* [Factor analysis], Moscow, Statistics, 1974, 200 p.
13 Pivovar A.A. *Poiednanij rozvitok fizichnikh i piznaval'nikh zdibnostej ditej 5 i 6 rokiv u procesi fizichnogo vikhovannia* [Combined development of physical and cognitive abilities of children 5 and 6 years in the physical education], Cand. Diss., Pereyaslav-Khmelnickiy, 2005, 210 p.
14 Polishchuk V.V. *Rozvitok rukhovikh i rozumovikh zdibnostej ditej 5-go i 6-go rokiv zhittia v procesi fizichnogo vikhovannia zasobami doshkil'nogo turizmu* [The development of motor and cognitive abilities of children of 5th and 6th years of life in the physical education facilities preschool Tourism], Cand. Diss., Lviv, 2008, 21 p.
15 Iakhno Ie. *Sportivnij visnik Pridniprov'ia* [Dnipro Sports Bulletin], 2010, vol.2, pp. 28 – 31.
16 Hopper C., Fisher B., Munoz K.D. *Physical ability and nutrition for health*, Champaign, Human Kinetics, 2008, 374 p.
17 Schmidt Richard A., Timoty D. Lee. *Motor control and learning: A Behavioural Emphasis*, [4th ed], Hardback, 2005, 544 p.

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