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Original article

CORRELATION BETWEEN THE PHYSICAL GROWTH INDICES AND THE MOTOR CAPACITY INDICESIN LOWER SECONDARY STUDENTS

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Abstract

This research is a study aiming to find out if there are any correlations between the parameters which assess physical growth and those assessing motor capacity. The children's body growth is not a process which is carried out at a uniform pace, but it is a process with growth acceleration and slowdown periods, with varying durations in terms of age, living conditions, but also according to the individual hereditary particularities. The improvement of the motor capacity is the result of quantitative and qualitative transformations accumulated over time categorized into four major categories, depending on the specifics of the development: physical, psychic, motor and social. It was conducted on 195 lower secondary students (aged 10 / 11-14 / 15) between September and October 2018 in Bacau City. We used the following methods: documentation, pedagogical observation, testing, statistical-mathematical data recording and processing, graphical method, and for the data analysis we used the arithmetic mean, standard deviation and correlation coefficient. The correlation coefficient was calculated in order to highlight the connection degree between two variables and to assess the connection strength between the two variables: physical growth and motor capacity. Improving the overall motor capacity in parallel with the physical growth is a priority in the physical education of the younger generation. The research results highlight the existence of positive correlations between the physical growth assessment indicators (height, weight, lower limb length and span), negative between the motor capacity assessment indicators (standing long jump, 50m running speed, maintained hanging on the fixed bar, oina-ball throwing and 600m and endurance running for girls and respectively for boys) and negative ones between the physical growth assessment and the motor capacity assessment both in girls and boys. In conclusion, we have discovered that the hypothesis acccording to which *there are positive correlations between the physical growth assessment and the motor capacity assessment in the 5th-8th grade students has not been confirmed*.

Key words: correlations, physical growth, motor capacity, students.

Introduction

In the literature, growth is presented as a "quantitative process by which the accumulation of organic substance is achieved" (Albu, Albu, Vlad, Iacob, 2006), but also as a process "of quantitative accumulation at the level of tissues, organs of the systems leading to the increase of muscle mass, of the segmental and global dimensions, according to biological laws, differentiating according to gender, age and other inertial and external factors" (Ploieşteanu, Moisescu, 2012). In a synthetic presentation, it is a complex process comprising two aspects namely the increase in volume of the body segments and the increase of the muscle mass. The improvement of the overall motor capacity in parallel with the physical growth are priorities in the physical education of the younger generation. The children's growth"does not take place at a uniform pace, but with periods of slowing growth with duration variables in relation to age, living conditions and individual hereditary peculiarities" (Bota, 2000).

The motor capacity increase, namely that improvement in physical performance, is influenced by the quantitative and qualitative transformations accumulated over time, and are categorized into four broad categories, depending on the specificity of the development: physical, mental, motor and social. From the morphological point of view, the concept of physical growth represents the "qualitative level of the individual's somatic indices, the cumulative result of the hereditary factors and the natural and predominantly social environment, in which practising exercises plays a significant role" (Nicu, coord.,1974). The physical growth of a child "takes

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place, as known, at the greatest pace, especially in terms of some parameters" (Metveev, Novikov, 1980); at different rhythms. During the physical education lesson, "the body image, when communicating with others, intertwines with the motor one".

"A person practically reacts according to the needs of the moment, through the body scheme" (ALLARD C., (1990)), but also according to the specifics, goals and tasks of the activity."The in-depth knowledge of the morpho-functional peculiarities of school-aged children is essential for the scientific substantiation of the complex process of school physical education" (Demeter, 1981), but especially for its organization and deployment. A person aged between 3 and 19 goes through several stages of development, stages characterized by a series of "peculiarities that influence the way of training and education"(Dragnea, Bota, Teodorescu, Stănescu, Șerbănoiu, și Tudor, 2006), an idea underlined by Gheorghe Dumitriu (in 1995, p. 70), who claims that "humans, throughout their life and existence are subjected to quantitative and qualitative changes integrated into three types of developments which education must support and accentuate them." Quantity targets growth, quality is about development. The concern for physical growth and the improvement of motor capacity is justified by the age of the lower secondary pupil (5^{th}-8^{th} grade)related to the fact that the body is in a good period of growth when higher and stronger developmental indices can be obtained.

This concern is also justified by the fact that at this age there appear negative influences which can cause disturbances of the physical development (inappropriate lifestyle, poor diet, little sleep, time wasted on friends, smoking, alcohol, etc.). The preoccupation for the way training is achieved by the 5^{th}-8^{th} grade pupils, for increasing and improving motor capacity, is a concern justified by the features at the current stage.

Methods

Problem Statement

Since the improvement of the motor capacity in the lower secondary cycle is a responsible activity which requires a special attention and is done according to the physical growth, we consider that the theme, which is based on the verification of the correlation between the physical growth and the motor capacity of the lower secondary students, is topical .

Research Questions

This research has proposed to verify the hypothesis according to which *there are positive correlations between the physical growth assessment indices and motor capacity assessment indices in the 5^{th}-8^{th}-grade pupils.*

Purpose of the Study

The aim of the research is to carry out a study which verifies the existence of the correlations between the physical development and motor capacity indices in lower secondary students.

Research Methods

For finding the correlation we have chosen to use the following research methods: documentation, pedagogical observation, testing, data recording and statistical-mathematical processing (arithmetic mean, standard deviation and correlation coefficient) and graphical method. The correlation coefficient has been calculated to highlight the degree of connection between two variables and to assess the strength of the connection between the two variables: physical growth and motor capacity.The correlation coefficient may vary between +1 which means the perfect positive correlation and -1 value which means negative correlation. If it is - 1, it means that the two rankings vary linearly in reverse, if +1 means that the two rankings vary linearly in the same direction, and if zero means that any correlation between the two rankings is absent.

Research subjects.

Our research had a number of 195 students (girls and boys), out of which 49 in the 5th grade, 48 in the 6th grade, 49 in the 7th grade and 49 in the 8th grade (C. Platon Secondary School, Bacau). The measurements and tests were carried out between 20.09-20.10.2018. In order to be able to make the records, we obtained the pupils' written consent, the research being conducted in accordance with the Helsinki Declaration on Human Subjects Research and with the agreement of the ethics committee of the C. Platon Secondary School, Bacau.

Evaluation Protocol

The test as an assessment method consisted of samples of physical growth evaluation (height, weight, span, length of the lower limbs) and tests for the motor capacity assessment standing long jump, 50m sprint, maintained hanging on the fixed bar, oina-ball throwing and 600m and 800m endurance running for girls and respectively for boys.

Research results

Results of physical growth, data processing, analysis, interpretation and graphical representation

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The arithmetic mean values and correlations between samples are included in table no.1 for girls and table no. 2 for boys. The physical growth was assessed according to 4 measurements and had values that are recorded in Table no.1.

Table no. 1. Physical growth indices

Sexes and grades	BOYS Grades				GIRLS Grades			
Body height								
Assess. ind.	5th	6th	7th	8th	5th	6th	7th	8th
X	1.49	1.51	1.59	1.63	1.48	1.49	1.51	1.60
S	7.26	8.27	9.61	10.11	7.39	646	9.20	6.26
Body weight								
X	40.3	43.15	51.89	55.08	38.04	39.81	42.79	53.08
S	7.11	7.45	11.22	10.16	7.26	5.59	8.95	7.20
Chest								
X	75.4	75.9	76.8	78	74.2	76.2	77.4	80.1
S	246	2.78	3.18	3.86	3.25	3.47	3.83	1.03
Length of lower limbs								
X	73.8	73.9	81.72	76.04	72.9	73.2	73.4	79.2
S	5.85	8.57	6.75	8.70	5.79	4.31	7.80	8.15

*Legend:Assess. ind. = Assessment indices

After processing the data that emerged from the four measurements we highlighted a number of aspects.

Regarding the arithmetic mean, the following facts were found:

- regarding the ***bodyheight*** (table no.1 and figure no.1), there were increases in the *girls' samples* from one year to the next. Thus, in the 5th grade a mean value of 1.48 m was recorded, in the 6th grade of 1.49 m, in the 7th gradeof 1.51 m and in the 8thgrade of 1.60 m, so there was a difference of 1 cm, 2 cm and 9 cm, respectively. The biggest difference was in the 8th grade. In the boys' samples, increases have been recorded from one year to the next. In the 5th grade, there was recorded an average value of 1.49 m, in the 6th grade of 1.51 m, in the 7th grade of 1.59 m and in the 8th grade of 1.63 m, so the differences were 2 cm, 8 cm and 4 cm respectively, from one grade to another. The highest growth was recorded in the eighth grade. By comparing the girls with the boys, it can be seen from table no. 1 and figure no. 1, that the boys are slightly taller than the girls;

- regarding the ***weight*** (table no. 1 and figure no. 2), the girls obtained increases from one year to the next. In the 5th grade, they recorded an average of 38.94 kg, in the 6th grade of 39.81 kg, in the 7th grade of 42.79 kg and in the 8th grade of 53.08 kg, so there was a difference of 1 kg with 3 kg and 11 kg respectively. The highest growth was recorded in the 8th grade. The boys' samples have been progressing from one year to the next. As found in the 5th grade, an average value of 40.35 kg was recorded, in the 6th grade of 43.15 kg, in the 7th grade of 51.98 kg and in the 8th grade of 55.08 kg, so the differences were 3 kg, 8 kg and 4 kg respectively. The biggest difference was in the 8th grade. By comparing the girls with the boys, it can be seen from the table no. 1 and figure no. 2, that the boys are heavier (more robust) than the girls;

- regarding the ***chest*** (table no.1 and Figure 3) girls' samples show progress from one year to the next. Thus, the 5th grade recorded an average value of 74.40 cm, in the 6th grade of 76.29 cm, in the 7th grade of 76.80 cm and in the 8th grade of 80.17 m, so there were differences of 2 cm, 0.40 cm and 3 cm, respectively. The highest growth was recorded in the 8th grade. The boys' samples have progressed from one year to the next. Thus, the 5th grade obtained an average of 72.5 cm, in the 6th grade, 73.92 cm, in the 7th grade of 77.82 cm and in the 8th grade 78.90 cm, so they recorded differences of 1 cm, 4 cm and 1 cm, respectively. The highest growth was recorded in the 8th grade. By comparing the girls and boys, it can be seen in figure no. 3 that boys are less developed than girls.

- regarding the ***length of the lower limbs*** (table no.1 and figure no. 4), the girls' samples recorded differences, from one year to the next. Thus, the 5th grade obtained an average of 72.92 cm, 73.21 cm in the 6th grade, 73.46 cm in the 7th grade and 79.21 cm in the 8th grade, so a difference of 1 cm, 1

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cm and 6 cm respectively was obtained. The highest growth was recorded in the 8th grade. The boys' samples show increases from one year to the next. Thus, in the 5th grade an average value of 73.08 cm was calculated, in the 6th grade 73.92 cm, in the 7th grade by 81.72 cm and in the 8th grade 86.04 cm, so there were differences of 0.5 cm, 5 cm and 5 cm respectively from one year to the next. The highest growth was recorded in the 8th grade. By comparing the girls with the boys, it can be seen in figure no. 4 that the boys have longer lower limbs than the girls.

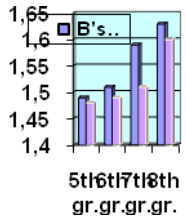

Figure no. l –Body height

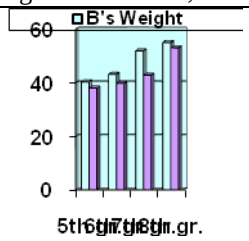

Figure no. 2 Weight

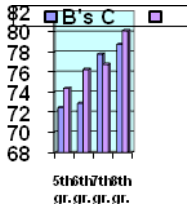

Figure no. 3 Chest

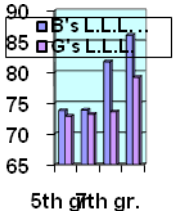

Figure no. 4 Length of the lower limbs

Regarding the standard deviation of the 4 samples, there is a good homogeneity in girls.

Results of the motor capacity, data processing, analysis, interpretation and graphical representation in boys

The motor capacity was evaluated by 5 practical assessments; the results are shown in table no.2 and highlight interesting aspects.

Regarding the arithmetic mean, the results highlight the following;

- in the ***standing long jump*** (figure no. 5), the girls recorded average values of 1.50 m in the 5th grade, 1.66 m in the 6th grade, 1.69 m in the 7th grade and 1.71m in the 8th grade. The dynamics of evolution has increased from the 5th to the 8th grade. The boys recorded average values of 1.73 meters in the 5th grade, 1.80 meters in the 6th grade, 1.82 meters in the 7th grade and 1.87 meters in the 8th grade. By comparing the girls with the boys, it can be seen in figure no. 5 that the boys are slightly better in all four grades than the girls;

- at the ***50 m sprint***, the girls recorded average values of 9.11 seconds in the 5th grade, 9.03 seconds in the 6th grade, 8.82 seconds in the 7th grade and 8.78 seconds in the 8th grade. The values improve from the 5th to the 8th grade. The boys recorded average values of 8.81 seconds in the 5th grade, 8.50 seconds in the 6th grade, 8.11 seconds in the 7th grade and 8.09 seconds in the 8th grade. By comparing the girls' scores with those recorded by the boys (table no.2 and figure no. 6), the boys are faster than the girls in all grades;

Table no.2Motor development indices

Sexes and grades	BOYS Grades				GIRLS Grades			
Standing long jump								
Indices	V	VI	VII	VIII	V	VI	VII	VIII
X	1.50	1.66	1.69	1.71	1.73	1.80	1.82	1.87
S	8.28	0.20	0.20	0.20	0.25	0.19	0.24	0.24
50 m sprint								
X	9.11	9.03	8.82	8.78	8.81	8.50	8.11	8.08
S	0.60	0.62	0.32	0.73	0.70	0.67	0.85	0.88
Hanging								
X	9.56	13.45	14.58	14.29	10.62	13.46	14.84	21.6
S	3.84	6.63	5.61	4.79	7.59	6.10	6.44	7.05
Oina-ball throwing								

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X	13.92	15.35	15.70	18.85	16.74	19.83	20.80	21.04
S	4.14	2.89	3.64	4.16	3.96	3.50	3.40	4.43
Endurance running								
X	3.15	3.14	2.56	2.48	3.40	3.29	3.26	3.22
S	20.58	16.66	25.74	25.74	19.60	19.28	12.73	21.46

- at the ***maintained hanging event*** (tab.no.2 and fig.no.7), the girls recorded average values of 9.56 seconds in the 5th grade, 13.45 seconds in the 6th grade, 14.58 seconds in the 7th grade and 14.29 seconds in the 8th grade. The dynamics has risen from the 5th to the 7th, except in the 8th grade when there is a slight decrease. The boys recorded average values of 10.62 seconds in the 5th grade, 13.46 seconds in the 6th grade, 14.48 seconds in the 7th grade and 21.60 seconds in the 8th grade. The dynamics of evolution has slightly increased from the 5th to the 6th grade, and a higher escalation from the 7th to the 8th grade. By comparing the girls with the boys, it can be seen in figure no. 7 that the boys are stronger than the girls in all grades.

- at the ***oina-ball throwing*** (table no.2 and fig. no.8), the girls recorded average values of 13.92 m in the 5th grade, 15.35 m in the 6th grade, of 15.70 m in the 7th grade and 18.85 m in the 8th grade. The dynamics of evolution has increased from the 5th to the 8th grade. The differences are continuous, but small. The boys recorded average values of 16.74 m in the fifth grade, 19.83m in the 6th grade, 20.80 meters in the 7th grade and 21.04 meters in the 8th grade. The dynamics of evolution has increased from the 5th to the 8th grade. The bigger difference is in the 6th grade. By comparing the girls with the boys, it can be seen from the tab.no.2 and fig. no. 8, the boys are more explosive on arm movement than the girls.

- at the ***endurance running*** (table no. 2 and figure no.9), the girls recorded average values of 3.25 minutes in the 5th grade, 3.14 minutes in the 6th grade, of 2.56 minutes in the 7th grade and 2.48 minutes in the 8th grade. The dynamics of the average time evolution at the 600 m endurance running does not improve from year to year. The boys recorded average values of 3.40 minutes in the 5th grade, 3.29 minutes in the 6th grade, 3.26 minutes in the 7th grade and 3.22 minutes in the 8th grade. The dynamics of arithmetic mean evolution on the 800 m endurance running in boys has increased from year to year. By comparing the girls with the boys, it can be seen from fig. no. 9 that the boys are a little bit better than the girls, but the distances are different.

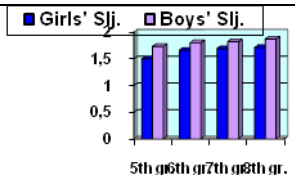

Figure no.5 – Standing long jump

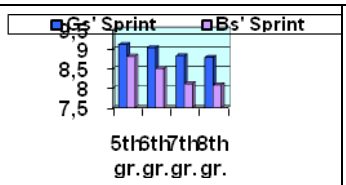

Figure no. 6 50 m sprint

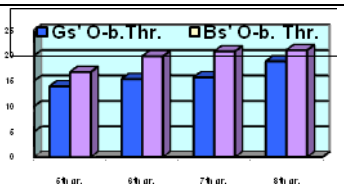

Figure no.7 Oina-ball throwing

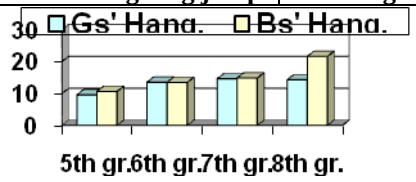

Figure no. 8- Hanging

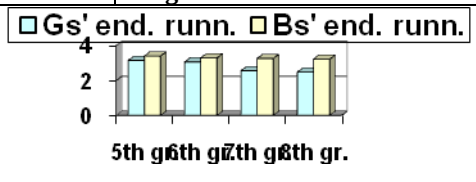

Figure no. 9 Endurance running

Regarding the standard deviation of the 4 samples, there is also a good homogeneity in boys.

Results of the correlations between the physical growth assessment indices and the motor capacity assessment indices in girls

Regarding the correlation coefficient (table no. 3), we can observe the following:

- in ***the 5th grade***, the correlation value varies linearly in a positive direction:

- for the *height* with: weight, span, length of lower limbs, standing long jump, sprint, oina-ball throwing and endurance running, with values ranging from 0.68 to 0.04; an exception is

observed in the hanging test where it is in the opposite direction with the value of – 0.02;

- for the *weight* with: span, length of lower limbs, standing long run, sprint, oina-ball throwing and endurance running, with values between 0.85 and 0.04; anexception is observed in the sprint and hanging tests where it is in the opposite direction with the value of - 0.10 and -0.20 respectively;

- for the *span* with: length of the lower limbs, standing long jump, hanging and oina-ball throwing, ranging from 0.44 to 0.08; an exception is observed in the sprint and endurance running where it is in the opposite direction with a value of -0.20 and -0.00, respectively.

- for the *lower limb length*: there is no correlation with the endurance running (0,00) and in the opposite direction it correlates with the standing long jump, sprint, hanging and oina-ball throwing with values between -0,*22 and - 0.12;*

- forthe *standing long jump*with: oina-ball throwing and the endurance running with values of 0.19 and 0.33 respectively and in the reverse direction it correlates with the hanging and the sprint with values between -0.22 and -0.12;

- for the *sprint* with: in reverse, it correlates with the hanging, oina-ball throwing and the endurance running with values of -0.54, -0.40 and -0.30 respectively;

- for *hanging* with: oina-ball throwing of a value of 0.13 and vice versa endurance running with a value of -0.74;

- for *oina-ball throwing*: in the negative direction with the endurance running

- in *the 6th grade*, the correlation value varies linearly in a positive direction:

-for the *height* with: weight, span, length of lower limbs, sprint and hanging with values ranging from 0.87 to 0.08; an exception is noted in the standing long jump, oina-ball throwing and endurance running, where it is inversely with values of -0.18, -0.13 and -0.3;

- for the*weight* with: span, length of the legs, sprint, sprint, hanging and endurance running with values between 0.81 and 0.02; an exception is observed in the standing long jump and oina-ball throwing, where it is inversely with values of - 0.14 and - 0.07 respectively;

- for the *span* with: lower limb length, sprint and hanging, with values of 0.58 and 0.10; an exception is noted in the standing long jump (-0,29), oina-ball throwing (0,00) and endurance running (-0,03), where the correlation is inversed;

- for the *length of the lower limbs* with: sprint and hanging with values between 0.03 and 0.23 and in the reverse direction i.e. there is no correlation with the standing long jump (-0.07), oina-ball throwing (- 0.06) and endurance running (-0.04);

- for the *standing long jump* with: hanging and oina-ball throwing and endurance running with values of 0.11, 0.04 and 0.08 and inversely with sprint (-0.72)

- for the *sprint*: no corrections with hanging (-0.22), oina-ball throwing (-0.04) and endurance running (0.05);

- the *hanging* correlates inversely, i.e. negatively with the oina-ball throwing with a value of -0.53, with endurance running with a value of -0.24;

- for the *oina-ball throwing*: with endurance running of 0.23.

- in ***the 7th grade***, the correlation value varies linearly in a positive direction:

- forthe *height* with: weight, span, length of the lower limbs, oina-ball throwing and endurance running, with values ranging from 0.88 to 0.02; an exception is noted in the standing long jump, sprint and hanging, where it is inversely with values of - 0.13, -0, 10 and - 0.12;

- forthe *weight* with: span, length of the lower limbs and endurance running, ranging from 0.74 to 0.06; an exception is noted in the standing long jump, sprint, hanging, oina-ball throwing, where it is in the opposite direction with values ranging from - 0.22 to -0.06;

- for the *span* with: the length of the lower limbs and hanging, with values of 0.68 and 0.32; except for the standing long jump (-0.22), sprint (-0.16), oina-ball throwing (-0.14), and endurance running (-0.03) where it is inversed;

- for the*length of lower limbs* with: hanging, with a value of 0.15 and vice versa, i.e. there is no correlation with standing long jump (-0.30) and sprint (-0.36) oina-ball throwing (-0.17) and resistance run (-0.23);

- for the *standing long jump* with: oina-ball throwing (0.25); and in the reverse direction with the sprint (-0.15), hanging (-0.06) and endurance running (-0.13);

- for the *sprint* with: oina-ball throwing (0.05) and endurance running (0.18) and in the opposite direction it correlates with the hanging (-0.14);

- for the *hanging*: it correlates negatively with the oina-ball throwing of a value of -0.15 and the endurance running with a value of -0.09;

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- for the *oina-ball throwing* with: endurance running of 0.20.

- in ***the 8th grade***, the correlation value varies linearly in positive direction:

- for the *height* with: weight, span, length of lower limbs, standing long jump and hanging, ranging from 0.92 to 0.03; an exception is noted in the sprint test, oina-ball throwing and endurance running, where it is in the opposite direction with values of - 0.08, - 0.49 and – 0.18;

- for the *weight* with: span, length of the lower limbs and standing long jump with values ranging from 0.68 to 0.10; an exception is noted in the sprint, hanging, oina-ball throwing and endurance running, where it is inversely in the range of -0.47 and -0.07 respectively;

- for the*span* with: length of the lower limbs and hanging, with values of 0.64 and 0.09; an exception is noted in the standing long jump (-0.10), sprint (-0.24), oina-ball throwing (-0.31) and endurance running (-0.09), where it is inversed;

- for the *length of lower limbs with*: hanging (0.02), oina-ball throwing (0.23) and endurance running (0.26); and vice versa, i.e. there is no correlation with the standing long jump (-0.12) and sprint (-0.15);

- for the *standing long jump*: hanging (0.15) and endurance running (0.04) and vice versa with sprint (-0.44) and oina-ball throwing (-0.23) ;

- for the sprint with:endurance running (0.16) and in the reverse direction it correlates with hanging (-0.73) and oina-ball throwing (-0.29);

- for the *hanging* with: oina-ball throwing of a value of 0.42 and correlating negatively with the endurance running with a value of -0.02;

- for *oina-ball throwing* with:endurance running with a value of 0.05.

Table no. 3 Values of the correlations between the physical growth and motor capacity parameters in girls

Grade	Indices	H (cm)	W (kg)	Span (cm)	Lower limbs (cm)	Slj	50 m	Hanging	Oina-ball throwing (m)	600m
5th	X	1.48	38.94	143.92	72.92	1.50	9.11	9.56	13.92	195.16
	Correlation	1	0.68	0.68	0.66	0.10	0.04	- 0.02	0.16	0.20
		2		0.85	0.44	0.26	- 0.10	- 0.20	0.18	0.04
		3			0.44	0.24	- 0.20	0.14	0.08	-0.02
		4				0.40	-0.22	- 0.32	- 0.12	0.00
		5					- 0.36	- 0.18	0.19	0.33
		6						- 0.54	- 0.40	- 0.30
		7							0.13	- 0.74
		8								- 0.07
6th	X	149.50	39.81	148.05	73.21	1.66	9.03	13.59	15.35	194.58
	Correlation	1	0.66	0.69	0.87	- 0.18	0.08	0.14	- 0.13	- 0.13
		2		0.81	0.52	- 0.14	0.23	0.02	- 0.07	0.03
		3			0.58	-0.29	0.13	0.10	- 0.00	- 0.03
		4				- 0.07	0.03	0.23	- 0.06	- 0.04
		5					- 0.72	0.11	0.04	0.08
		6						- 0.22	- 0.04	- 0.05
		7							- 0.53	- 0.24
		8								0.23
7th	X	151.38	42.79	1.450	73.46	1.69	8.82	14.58	15.70	223.25
	Correlation	1	0.85	0.82	0.88	- 0.13	- 0.10	- 0.12	0.02	0.05
		2		0.64	0.74	- 0.07	- 0.06	- 0.22	- 0.07	0.06

		3			0.68	- 0.22	- 0.16	0.32	- 0.14	- 0.03
		4				- 0.30	- 0.36	0.15	- 0.17	- 0.23
		5					- 0.15	- 0.04	0.25	- 0.13
		6						- 0.14	0.04	0.18
		7							- 0.15	- 0.09
		8								0.20
8th	X	160.38	53.08	156.83	79.21	1.71	8.78	14.29	18.85	216.46
	Correlation	1	0.92	0.73	0.69	0.03	- 0.08	0.03	- 0.49	- 0.18
		2		0.68	0.62	0.10	-0.14	- 0.07	- 0.47	- 0.18
		3			0.64	- 0.10	- 0.24	0.09	- 0.31	- 0.09
		4				- 0.12	- 0.15	0.02	0.23	0.26
		5					- 0.44	0.15	- 0.23	0.04
		6						- 0.73	- 0.29	0.16
		7							0.42	- 0.02
		8								0.05

** Legend: H = height; W = weight; Span = range; Ll = lower limbs; Slj = standing long jump; 50m = 50 m sprint; Hanging = Maintained hanging on the fixed bar; Oina-ball throwing = throwing the ball from a remote spot; 800m = endurance running.

Results of the correlations between the anthropometric growth assessment parameters and the motor capacity assessment ones in boys

The values of the correlations between the assessment parameters of physical growth and motor capacity are presented in Table no. 4.

Table no. 4 Values of the anthropometric and aptitude parameters and their correlations in boys

Grade	Indices	H (cm)	W (kg)	Span (cm)	Lower limbs (cm)	Slj	50 m	Hanging	Oina-ball throwing (m)	800m
5th	X	149.38	40.35	74.58	73.08	1.73	8.81	10.62	16.74	220.63
	Correlation	1	0.83	0.76	0.92	0.06	- 0.07	- 0.32	- 0.06	0.41
		2		0.70	0.77	0.28	- 0.18	- 0.38	0.02	0.48
		3			0.82	0.13	- 0.28	- 0.35	- 0.18	0.45
		4				- 0.28	- 0.12	- 0.26	- 0.09	- 0.29
		5					- 0.33	- 0.19	- 0.03	0.31
		6						- 0.01	- 0.30	0.09
		7							- 0.28	- 0.08
		8								- 0.43
6th	X	151.38	43.15	150.21	73.92	1.73	8.81	10.62	16.74	220.63
	Correlation	1	0.75	0.91	0.85	0.15	- 0.12	- 0.02	0.02	0.04
		2		0.77	0.71	- 0.07	- 0.09	- 0.12	- 0.22	0.24
		3			0.77	0.08	- 0.19	- 0.02	- 0.10	0.08
		4				- 0.23	0.15	0.07	- 0.21	- 0.40

		5					0.01	- 0.18	0.08	- 0.06
		6						- 0.25	- 0.62	- 0.12
		7							- 0.10	0.14
		8								-0.28
7th	X									
		1.59	51.98	1.54.	81.72	1.82	8.11	14.48	20.80	206.36
	Correlation	1	0.25	0.35	0.28	- 0.22	0.29	0.22	-0.01	0.06
		2		0.79	0.73	- 0.36	0.46	0.18	-0.30	0.06
		3			0.74	- 0.41	0.36	0.49	-0.35	0.04
		4				- 0.01	- 0.20	0.44	-0.42	0.07
		5					- 0.88	-0.45	0.01	- 0.27
		6						- 0.08	-0.02	- 0.02
		7							-0.06	- 0.07
		8								-0.31
8th	X			161.3						
		1.63	55.08	9	86.04	1.87	8.092	21.6	21.04	202.4
	Correlation	1	0.64	0.50	0.64	0.18	- 0.13	0.22	- 0.04	0.01
		2		0.38	0.54	0.19	- 0.22	- 0.12	0.35	- 0.19
		3			0.52	0.12	0.32	0.10	0.06	0.12
		4				0.11	- 0.04	0.24	- 0.21	0.12
		5					- 0.96	0.03	- 0.42	- 0.25
		6						- 0.13	- 0.02	- 0.01
		7							- 0.22	- 0.66
		8								-0.33

* Legend: H = height; W = weight; Span = range; Ll = lower limbs; Slj = standing long jump; 50m = 50 m sprint; Hanging = Maintained hanging on the fixed bar; Oina-ball throwing = throwing the ball from the remote spot; 800m = endurance running.

Regarding the correlation coefficient, Table no.3 shows that:

- in ***the 5th grade***, the correlation value varieslinearly in a positive direction:

- for the *height* with: weight, span, lower leg length, standing long jump and endurance running, ranging from 0.92 to 0.06; an exception is observed in the sprint, hanging and oina-ball throwing where it is inversely in the range of – 0.32 to – 0.06;

- for the*weight* with: span, length of lower limbs and standing long jump, oina-ball throwing and endurance running, with values between 0.77 and 0.02; the exception is observed in the sprint and hanging tests where it is inversely in the value of -0.18 and -0.38 respectively;

- for the *span*with: length of the lower limbs, standing long jump and the endurance running with values ranging from 0.82 to 0.13; an exception is observed in the sprint, hanging and oina-ball throwing where it is in the opposite direction with the value between -0.35 and -0.18 respectively;

- for the *length of the lower limbs*: there is a backward correlation with the standing long jump, sprint, hanging, oina-ball throwing and endurance running with values between -0.29 and -0.09;

- for the *standing long jump* with the endurance running at a value of 0.31 and in the reverse direction correlated with the sprint, hanging and oina-ball throwing with values between -0.33 and -0.03;

- for the *sprint* with the endurance running (0.09) and in the reverse direction correlated with hanging and oina-ball throwing with values of -0.01 and -0.30 respectively;

- for the *hanging*: reversed in a negative direction with the oina-ball throwing of a value of -0.28, endurance running with a value of -0.08;

- for the *oina-ball throwing*: in the negative direction with the endurance running with a value of -0.43.

- in ***the 6th grade***, the correlation value varies linearly in a positive direction:

- for the *height* with: weight, span, lower leg length, standing long jump, oina-ball throwing and endurance running with values between 0.91 and 0.02; an exception is noted in the speed and hurdle

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run, where it is inversely with values of - 0.12 and - 0.02;

- for the *weight* with: span, length of the lower limbs and endurance running with values ranging from 0.77 to 0.24; an exception is observed in the standing long jump, sprint, hanging, oina-ball throwing, where it is in the opposite direction with values between -0.22 and -0.07 respectively;

- for the *span* with: the length of the lower limbs (0.77), standing long jump (0.08) and endurance running (0.08), except for the sprint (-0.19), hanging (-0.02) and oina-ball throwing (-0.10) where they are in the opposite direction;

- for the *length of lower limbs* with: sprint (0.01), hanging (0.07) and vice versa, there is no correlation with the standing long jump (-0.23), oina-ball throwing (-0.21) and endurance running (-0.40);

- for the *standing long jump*with: sprint (0.01) and oina-ball throwing (0.08); in the reverse direction with hanging (-0.18) and endurance running (-0.06);

- for the *sprint*: in reverse, it correlates with the hanging (-0.25), oina-ball throwing (-0.62), and endurance running (-0.12);

- for the *hanging* with:endurance running with a value of 0.14 and vice versa with oina-ball throwing of a value of -0.10;

- for the *oina-ball throwing*: it does not correlate with the endurance running (-0.28).

- in ***the 7th grade***, the correlation value varies linearly in a positive direction:

- for the*height* with: weight, span, lower limb length, sprint, hanging and endurance running with values between 0.35 and 0.06; an exception is noted in the standing long jump and oina-ball throwing where it is in the opposite direction with values of - 0.22 and - 0.01;

- for the *weight* with: span, lower limb length, sprint, hanging and endurance running with values between 0.79 and 0.06; an exception is noted in the standing long jump and oina-ball throwing, where it is in the opposite direction with values of -0.36 and -0.30;

- for the *span* with: the length of the lower limbs, sprint, hanging and endurance running with values of 0.74 and 0.04; an exception is noted in the standing long jump (-0.41), oina-ball throwing (-0.35), where it is in the opposite direction;

- for the *lower limb length* with: hanging of a value of 0.44 and endurance running of 0.07 and vice versa, i.e. there is no correlation with the standing long jump (-0.01), sprint (- 0.20) oina-ball throwing (-0.42);

- for the *standing long jump* with oina-ball throwing (0.01); and in the reverse direction with sprint (-0.88), hanging (-0.45) and endurance running (-0.27);

- for the *sprint*: it does not correlate with the hanging (-0.08), oina-ball throwing (-0.04) and endurance running (-0.02);

- for the *hanging*: it correlates negatively with the oina-ball throwing a value of -0.06 and endurance running with a value of -0.07;

- for the *oina-ball thro*wing, it does not correlate with the endurance running with a value of -0.31.

- ***in the 8th grade***, the correlation value varies linearly in positive sense:

- for the*height* with: weight, span, lower limb length, standing long jump, hanging and endurance running, with values ranging from 0.64 to 0.01; an exception is noted in the sprint and oina-ball throwing, where it is in the opposite direction with values of - 0.13 and - 0.04;

- for the *weight* with: span, length of the lower limbs, standing long jump and oina-ball throwing between 0.54 and 0.19; an exception is observed in the sprint, hanging and endurance running, where it is inversely in the range of -0.22 to -0.12;

- for the *span* with: length of the lower limbs (0.52), standing long jump (0.12), sprint (0.32), and hanging (0.10), oina-ball throwing (0.6) and endurance running (0.12);

- for the *length of the lower limbs* with: standing long jump (0.11), hanging (0.24) and endurance running (0.12); and vice versa, i.e. there is no correlation with sprint (-0.04) and oina-ball throwing (-0.24);

- for the *standing long jump* with: hanging (0.03) and vice versa with sprint (-0.96) and oina-ball throwing (-0.42) and endurance running (-0.25);

- for the *sprint* with: the endurance running (0.16) and in the reverse direction correlates with hanging (-0.73) and oina-ball throwing (-0.29);

- for the *hanging*: it correlates negatively with the oina-ball throwing of a value of -0.22 and endurance running with a value of -0.66;

- for the *oina-ball throwing*: negative with endurance running with a value of -0.33.

Discussions

Sion G. states in 2007 that "there are close correlations between the types of development, but their evolution is relatively independent of one another (for example, the end of the growth period

does not stop the mental development or a slowdown in development from this point of view, but growth is essential for the early phases of the mental development when development rhythms are closer" and especially for the stages of the motor development.

Regarding the arithmetic mean of the 4 physical growth assessment samples, it is can be observed that they have increased in both girls and boys, from the fifth to the eighth grades, and have been higher in boys than in girls, and with respect to the arithmetic means in the evaluation of the motor capacity, it can be noted that they have recorded increasing values for both girls and boys from the 5th grade to the 8th grade and the boys have scored better than the girls.

As we can see from the data presentation, there is no positive linear correlation between the physical growth and the motor capacity which is manifested in the four grades. The physical growth assessment indices (table no. 1, height, weight, length of the lower limbs and span) both in girls and boys correlate positively with each other, while the motor capacity indices (table no.2, standing long jump, 50m sprint, maintained hanging on a fixed bar, oina-ball throwing and endurance running on 600m for girls and 800m for boys) mostly correlate negatively with each other. In addition, in the vast majority of growth indices and motor capacity assessment indices, the correlations are negative, which highlights the lack of movement at this age.

Conclusions

The analysis and interpretation of the main assessment indices for physical growth and motor capacity, which aimed at highlighting the correlations which can be established between them, allow us to assume that the hypothesis according to which *there are positive correlations between the physical growth assessment indices and those of motor capacity, in* 5^{th}-8^{th}*- grade students*, has not been confirmed.

Bibliography

Albu C., Albu A., Vlad T.L., Iacob I., *Psihomotricitatea/Psychomotor Activity* , Institutul European Publishing House, Iași, 2006, p. 10.

Allard C., Psychotherapie et image du corp chez l'enfant, Masson Publishing House, Paris, 1990, p. 9.

Bota C., *Ergofiziologie/Ergophysiology*, Globus Publishing House, Bucharest, 2000, p. 274.

Demeter A., *Bazele fiziologice şi biochimice ale calităţilor fizice /Physiological and biochemical fundamentals of the physical qualities* , Sport – Tourism Publishing House, Bucharest, 1981, p. 6.

Dragnea, A., Bota A., Teodoreascu S., Stănescu M., Şerbănoiu S., And Tudor V., *Educaţie fizică şi sport – teorie şi didactică / Physical Education and Sport – Theory and Didactics* -, FEST Publishing House, 2006.

Dumitriu Gh., *Psihologia educaţiei/ Education psychology*, Universitaty of Bacău, Bacău, 1995, p. 70.

Metveev L.P., Novikov A.D., *Teoria şi metodica educaţiei fizice/Theory and Methodology of Physical Education*,Bucharest, Sport-Tourism Publishing House, 1980, p. 432.

Nicu A., coord., *Terminologia educaţiei fizice şi sportului/ Terminology of physical Education and sport*, Stadion Publishing House, Bucharest, 1974, p.145.

Ploieșteani C., Moisescu, P., *Teorie și metodologie curriculară în educație fizică școlară și sportivă Ideal educativ/ Theory and curricular methodology in physical education and sport. Educational Ideal,,* University Press Publishing House, Galați, 2012, p. 106.

Siong., *Psihologia vârstelor/ Age psychology*, 4th Edition, Bucharest, Fundația*România de Mâine Publishinh House*, Bucharest, 2007, p. 13.