

## STUDY ON THE SOMATO-FUNCTIONAL DEVELOPMENT OF 10-11 YEAR OLD STUDENTS THROUGH THE EUFITMOS TEST PROTOCOL

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**Abstract:** In this paper we propose to carry out a study on the somato-functional development of 10-11-year-old students from the "Vasile Alecsandri" National College in Bacau (Romania) using a standardized test battery – EUFITMOS and comparing the data obtained with the reference values established as normal indices of the World Health Organization for this age category. **Method:** The research subjects are represented by a number of 54 students aged 10-11 years, 33 boys and 21 girls, voluntarily participated in the measurements. We used only 5 tests out of the 9 that make up the EUFITMOS protocol: Standing long jump; 20m run; Back-saver sit and reach; BMI; Waist circumference. **Results:** Following the evaluation of the obtained results, we can state that the average of the results obtained by both categories of subjects has a value above the average of the normal fitness zone in two of the tests and the results obtained in the rest tests place both categories of subjects in the "sport" area of fitness. **Conclusion:** Although the specialized literature places Romanian children in 2nd place in Europe for childhood obesity, following the research we can affirm that the subjects have a normal body mass index in relation to the body mass index measured at the European level for this age group.

**Key Words:** Somato-Functional Development, EUFITMOS Protocol, Body Mass Index.

### INTRODUCTION

In general, the physical fitness of children and adolescents around the world is caused by various factors, the most important of which are weight gain and higher levels of body mass index, as a consequence of physical inactivity and increased time spent in front of . video games or the modern phone.

Also, the results of numerous studies show that the somatofunctional development of the young generation is affected by genetic factors, bio-geographical, social and economic factors. [3], [5], [6].

Previous studies have concluded that active video games promote physical activity in children, documenting that student motivation is closely related to fitness level. [1]. According to Fu, You & Burns, Ryan [2] and Gao Z, Chen S, Pasco D, Pope Z. [4] "*there is evidence that active video games (AVG) may improve both health behaviors (such as physical activity) and health-related fitness in children and adolescents*".

According to EUFITMOS - fitness testing protocol during our work as a physical education teacher, we have noticed that increasing physical activity leads to an improvement in physical condition „*which is understood as an indicator of health, in particular; the ability to perform and maintain daily tasks with moderate or vigorous intensity, efficiently and with sufficient energy without excessive fatigue*" [7].

Studying the evolution of children in Europe under the auspices of the laws of growth and development, we observe deviations that particularize children in terms of somatic, functional or mental, children of a similar age do not achieve the same level of somatic indices.

The observations made in the last decades demonstrate a certain tendency to decrease the parameters of the physical and functional capacities of the body of all generations of Romanian citizens, the phenomenon of childhood obesity being particularly worrying.

Considering the previously stated, we propose as the **objective of this research**, to carry out a study on the somato-functional development of 10-11 year old students from the "Vasile Alecsandri" National College in Bacău (Romania) using a standardized test battery - EUFITMOS and comparing the data obtained. with stability reference values as normal World Health Organization indices for this age group.

## **MATERIAL AND METHODS**

The subjects of the research are represented by a number of 54 students aged 10-11 years from "Vasile Alecsandri" National College in Bacau, 33 boys and 21 girls.

Before the actual start of the testing, I received the written consent of the Director of this College for the organization of this research. All students who were the subject of the research voluntarily participated in the measurements.

Due to the fact that the time we had at our disposal was short, we decided to summarize our research to only 5 (five) tests out of the 9 (nine) that make up the EUFITMOS protocol.

The application of the battery of tests was carried out between April 4 and April 24, 2022 for the following tests:

- |  |   |
|--|---|
| <p><b>1. Standing broad jump;</b></p> <p><b>2. 20m run;</b></p> <p><b>3. Back-saver sit and reach;</b></p> | <p><b>4. Body mass index;</b></p> <p><b>5. Waist circumference.</b></p> |
|--|---|

The tests took place every Wednesday, outside the school schedule, between 14.00 and 15.00, each time being preceded by at least 30 minutes of sports games of the students' choice (football, volleyball, badminton, handball, etc.)

## RESULTS AND DISCUSSION

**Table 1. Standing broad jump results**

**a. Boys group testing**

Nr.	CODE	Result	Interpret.
1.	A.A.	120 cm.	V.A.A.
2.	A.V.	115 cm.	V.W.A.
3.	B.C.	116 cm.	V.W.A.
4.	B.I.	110 cm.	V.B.A.
5.	P.M.	112 cm.	V.W.A.
6.	M.L.	121 cm.	V.A.A.
7.	I.M.	119 cm.	V.W.A.
8.	P.C.	125 cm.	V.A.A.
9.	Ş.M.	113 cm.	V.W.A.
10.	B.A.	109 cm.	V.B.A.
11.	Ț.H.	120 cm.	V.A.A.
12.	C.N.	119 cm.	V.W.A.
13.	M.G.	118 cm.	V.W.A.
14.	T.L.	110 cm	V.W.A.

**b. Girls group testing**

Nr.	CODE	Result	Interpret.
1.	A.G.	112 cm.	V.W.A.
2.	T.D.	115 cm.	V.A.A.
3.	B.R.	111 cm.	V.W.A.
4.	C.R.	107 cm.	V.B.A.
5.	S.S.	112 cm.	V.W.A.
6.	F.R.	116 cm.	V.A.A.
7.	U.C.	119 cm.	V.A.A.
8.	B.G.	109 cm.	V.B.A.
9.	R.A.	111 cm.	V.W.A.
10.	S.A.	114 cm.	V.W.A.
11.	M.A.	118 cm.	V.A.A.
12.	M.M.	119 cm.	V.A.A.
13.	D.I.	108 cm.	V.B.A.
14.	F.L.	110 cm	V.B.A.

15.	B.F.	121 cm.	V.A.A.
16.	L.A.	108 cm.	V.B.A.
17.	C.F.	123 cm.	V.A.A.
18.	A.N.	119 cm.	V.W.A.
19.	M.F.	109 cm.	V.B.A.
20.	G.G.	117 cm.	V.W.A.
21.	V.S.	123 cm.	V.A.A.
22.	C.D.	125 cm.	V.A.A.
23.	B.J.	109 cm.	V.B.A.
24.	S.T.	114 cm.	V.W.A.
25.	T.D.	119 cm.	V.W.A.
26.	G.L.	126 cm.	V.A.A.
27.	L.D.	120 cm.	V.A.A.
28.	A.I.	117 cm.	V.W.A.
29.	P.D.	122 cm.	V.A.A.
30.	T.R.	109 cm.	V.B.A.
31.	R.S.	116 cm.	V.W.A.
32.	G.A.	114 cm.	V.W.A.
33.	R.T.	119 cm.	V.W.A.
<b>Arithmetic mean</b>		<b>117,18 cm.</b>	<b>≥ 114,6cm</b>

15.	F.C.	111 cm.	V.W.A.
16.	U.O.	113 cm.	V.W.A.
17.	V.S.	114 cm.	V.A.A.
18.	V.R.	116 cm.	V.A.A.
19.	R.C.	112 cm.	V.W.A.
20.	A.A.	110 cm.	V.B.A.
21.	D.J.	117 cm.	V.A.A.
<b>Arithmetic mean</b>		<b>113,04 cm.</b>	<b>≥ 112,05 cm.</b>

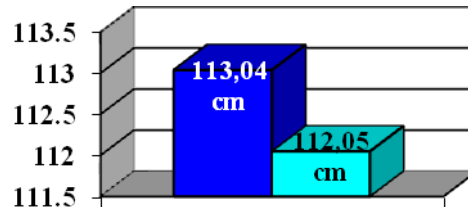
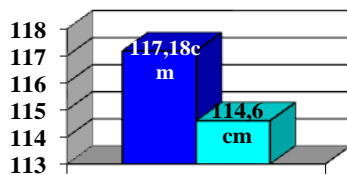
**Legend:**

V.A.A. - Value above the average of the normal fitness zone

V.W.A. - Value within the average of the normal fitness zone

V.B.A. - Value below the average of the normal fitness zone

Normal fitness zone (healthy) ≥ 110,2cm/≥119,0 cm    Normal fitness zone (healthy) ≥ 110,8cm/≥ 113,3 cm.



**Figure 1** Arithmetic mean test comparison: Standing broad jump.

**Table 2.** 20 m run results

**a. Boys group testing**

Nr.	CODE	Result	Interpret.
1.	A.A.	4,09 sec.	V.A.A.
2.	A.V.	4,11 sec.	V.W.A.
3.	B.C.	4,14 sec.	V.W.A.
4.	B.I.	4,25 sec.	V.B.A.
5.	P.M.	4,08 sec.	V.W.A.
6.	M.L.	4,06 sec.	V.A.A.
7.	I.M.	4,21 sec.	V.W.A.
8.	P.C.	4,01 sec.	V.A.A.

**b. Girls group testing**

Nr.	CODE	Result	Interpret.
1.	A.G.	4,32 sec.	V.A.A.
2.	T.D.	4,26 sec.	V.A.A.
3.	B.R.	4,33 sec.	V.A.A.
4.	C.R.	4,48 sec.	V.B.A.
5.	S.S.	4,27 sec.	V.A.A.
6.	F.R.	4,47 sec.	V.B.A.
7.	U.C.	4,23 sec.	V.A.A.
8.	B.G.	4,45 sec.	V.B.A.

9.	Ş.M.	4,26 sec.	V.W.A.
10.	B.A.	4,27 sec.	V.B.A.
11.	Ț.H.	4,06 sec.	V.A.A.
12.	C.N.	4,15 sec.	V.W.A.
13.	M.G.	4,16 sec.	V.W.A.
14.	T.L.	4,32 sec.	V.W.A.
15.	B.F.	4,03 sec.	V.A.A.
16.	L.A.	4,29 sec.	V.B.A.
17.	C.F.	4,01 sec.	V.A.A.
18.	A.N.	4,21 sec.	V.W.A.
19.	M.F.	4,17 sec.	V.B.A.
20.	G.G.	4,14 sec.	V.W.A.
21.	V.S.	4,05 sec.	V.A.A.
22.	C.D.	4,02 sec.	V.A.A.
23.	B.J.	4,34 sec.	V.B.A.
24.	S.T.	4,31 sec.	V.W.A.
25.	T.D.	4,24 sec.	V.W.A.
26.	G.L.	4,00 sec.	V.A.A.
27.	L.D.	4,07 sec.	V.A.A.
28.	A.I.	4,25 sec.	V.W.A.
29.	P.D.	4,06 sec.	V.A.A.
30.	T.R.	4,23 sec.	V.B.A.
31.	R.S.	4,15 sec.	V.W.A.
32.	G.A.	4,18 sec.	V.W.A.
33.	R.T.	4,16 sec.	V.W.A.
<b>Arithmetic mean</b>		<b>4,15 sec.</b>	<b>≤ 4,21 sec.</b>

9.	R.A.	4,43 sec.	V.B.A.
10.	S.A.	4,31 sec.	V.A.A.
11.	M.A.	4,20 sec.	V.A.A.
12.	M.M.	4,32 sec.	V.A.A.
13.	D.I.	4,43 sec.	V.B.A.
14.	F.L.	4,46 sec.	V.B.A.
15.	F.C.	4,41 sec.	V.B.A.
16.	U.O.	4,35 sec.	V.W.A.
17.	V.S.	4,37 sec.	V.B.A.
18.	V.R.	4,30 sec.	V.A.A.
19.	R.C.	4,31 sec.	V.A.A.
20.	A.A.	4,45 sec.	V.B.A.
21.	D.J.	4,21 sec.	V.A.A.
<b>Arithmetic mean</b>		<b>4,348 sec.</b>	<b>≤ 4,375 sec.</b>

**Legend:**

V.A.A. - Value above the average of the normal fitness zone

V.W.A. - Value within the average of the normal fitness zone

V.B.A. - Value below the average of the normal fitness zone

Normal fitness zone (healthy) ≤ 4,28 sec./≤ 4,14 sec.    Normal fitness zone (healthy) ≤ 4,32 sec./≤ 4,43 sec.

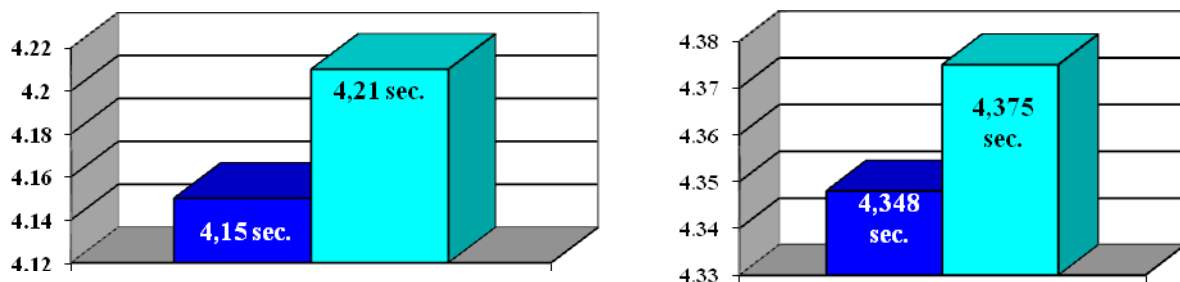


Figure 2 Arithmetic mean test comparison: 20 m run.

Table 3. Back-saver sit and reach results

**a. Boys group testing**

Nr.	CODE	Result	Interpret.
1.	A.A.	20,2 cm.	V.B.A.

**b. Girls group testing**

Nr.	CODE	Result	Interpret.
1.	A.G.	24,1 cm.	V.W.A.

2.	A.V.	21,5 cm.	V.A.A.
3.	B.C.	22,6 cm.	V.A.A.
4.	B.I.	23,8 cm.	V.A.A.
5.	P.M.	20,6 cm.	V.A.A.
6.	M.L.	21,1 cm.	V.A.A.
7.	I.M.	21,3 cm.	V.A.A.
8.	P.C.	22,5 cm.	V.A.A.
9.	Ș.M.	20,3 cm.	V.W.A.
10.	B.A.	20,1 cm.	V.B.A.
11.	Ț.H.	20,9 cm.	V.A.A.
12.	C.N.	21,9 cm.	V.A.A.
13.	M.G.	21,8 cm.	V.A.A.
14.	T.L.	21,0 cm.	V.A.A.
15.	B.F.	23,4 cm.	V.A.A.
16.	L.A.	23,8 cm.	V.A.A.
17.	C.F.	23,1 cm.	V.A.A.
18.	A.N.	21,9 cm.	V.A.A.
19.	M.F.	20,6 cm.	V.A.A.
20.	G.G.	20,3 cm.	V.W.A.
21.	V.S.	23,0 cm.	V.A.A.
22.	C.D.	25,2 cm.	V.A.A.
23.	B.J.	20,9 cm.	V.A.A.
24.	S.T.	21,4 cm.	V.A.A.
25.	T.D.	24,9 cm.	V.A.A.
26.	G.L.	22,6 cm.	V.A.A.
27.	L.D.	20,3 cm.	V.W.A.
28.	A.I.	21,7 cm.	V.A.A.
29.	P.D.	22,8 cm.	V.A.A.
30.	T.R.	20,9 cm.	V.A.A.
31.	R.S.	22,3 cm.	V.A.A.
32.	G.A.	20,1 cm.	V.B.A.
33.	R.T.	23,3 cm.	V.A.A.
<b>Arithmetic mean</b>		<b>21,88 cm.</b>	<b>20,3 cm.</b>

2.	T.D.	25,3 cm.	V.A.A.
3.	B.R.	23,9 cm.	V.A.A.
4.	C.R.	24,7 cm.	V.A.A.
5.	S.S.	25,2 cm.	V.A.A.
6.	F.R.	25,8cm.	V.A.A.
7.	U.C.	26,7 cm.	V.A.A.
8.	B.G.	23,7 cm.	V.B.A.
9.	R.A.	25,7 cm.	V.A.A.
10.	S.A.	25,8 cm.	V.A.A.
11.	M.A.	27,3 cm.	V.A.A.
12.	M.M.	26,5 cm.	V.A.A.
13.	D.I.	26,1 cm.	V.A.A.
14.	F.L.	25,3 cm.	V.A.A.
15.	F.C.	24,8 cm.	V.A.A.
16.	U.O.	25,4 cm.	V.A.A.
17.	V.S.	25,6 cm.	V.A.A.
18.	V.R.	27,3 cm.	V.A.A.
19.	R.C.	26,5 cm.	V.A.A.
20.	A.A.	24,1 cm.	V.W.A.
21.	D.J.	27,4 cm.	V.A.A.
<b>Arithmetic mean</b>		<b>24,418 cm.</b>	<b>≥ 24,15 cm.</b>

**Legend:**

V.A.A. - Value above the average of the normal fitness zone

V.W.A. - Value within the average of the normal fitness zone

V.B.A. - Value below the average of the normal fitness zone

Normal fitness zone (healthy) ≥ 20,3 cm

Normal fitness zone (healthy) ≥ 22,9 cm. / ≥

25,4 cm.

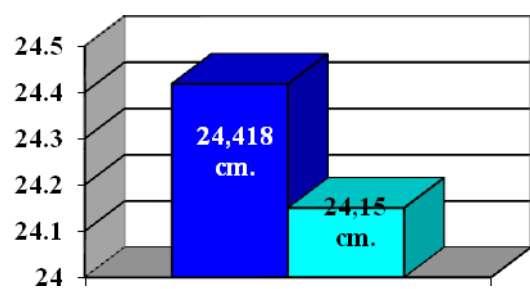
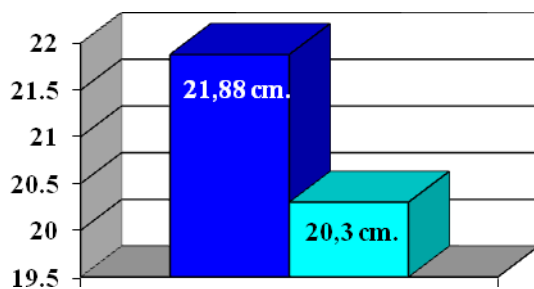


Figure 3 Arithmetic mean test comparison: Back-saver sit and reach.

Table 4. Body Mass Index - BMI results

**b. Boys group testing**

Nr.	CODE	Result	Interpret.
1.	A.A.	14,6	V.W.A.
2.	A.V.	13,5	V.B.A.
3.	B.C.	14,7	V.W.A.
4.	B.I.	14,6	V.W.A.
5.	P.M.	15,1	V.W.A.
6.	M.L.	14,3	V.W.A.
7.	I.M.	14,8	V.W.A.
8.	P.C.	13,4	V.B.A.
9.	Ş.M.	14,7	V.W.A.
10.	B.A.	14,1	V.W.A.
11.	Ț.H.	13,7	V.B.A.
12.	C.N.	13,6	V.B.A.
13.	M.G.	13,7	V.B.A.
14.	T.L.	14,4	V.W.A.
15.	B.F.	13,6	V.B.A.
16.	L.A.	14,7	V.W.A.
17.	C.F.	13,8	V.B.A.
18.	A.N.	14,6	V.W.A.
19.	M.F.	14,3	V.W.A.
20.	G.G.	14,8	V.W.A.
21.	V.S.	14,1	V.W.A.
22.	C.D.	14,2	V.W.A.
23.	B.J.	13,8	V.B.A.
24.	S.T.	13,4	V.B.A.
25.	T.D.	14,5	V.W.A.
26.	G.L.	13,6	V.B.A.
27.	L.D.	14,3	V.W.A.
28.	A.I.	14,8	V.W.A.
29.	P.D.	14,8	V.W.A.
30.	T.R.	14,1	V.W.A.
31.	R.S.	13,9	V.B.A.
32.	G.A.	13,8	V.B.A.
33.	R.T.	14,2	V.W.A.
<b>Arithmetic mean</b>		<b>14,19</b>	<b>16,6</b>

**b. Girls group testing**

Nr.	CODE	Result	Interpret.
1.	A.G.	13,6	V.B.A.
2.	T.D.	14,2	V.W.A.
3.	B.R.	14,1	V.W.A.
4.	C.R.	13,7	V.B.A.
5.	S.S.	14,6	V.W.A.
6.	F.R.	14,8	V.W.A.
7.	U.C.	13,5	V.B.A.
8.	B.G.	14,6	V.W.A.
9.	R.A.	14,7	V.W.A.
10.	S.A.	15,1	V.W.A.
11.	M.A.	14,3	V.W.A.
12.	M.M.	13,2	V.B.A.
13.	D.I.	15,2	V.W.A.
14.	F.L.	14,4	V.W.A.
15.	F.C.	13,3	V.B.A.
16.	U.O.	14,6	V.W.A.
17.	V.S.	14,2	V.W.A.
18.	V.R.	13,8	V.B.A.
19.	R.C.	14,9	V.W.A.
20.	A.A.	14,8	V.W.A.
21.	D.J.	14,2	V.W.A.
<b>Arithmetic mean</b>		<b>14,27</b>	<b>16,87</b>

**Legend:**

**V.A.A.** - Value above the average of the normal fitness zone

**V.W.A.** - Value within the average of the normal fitness zone

**V.B.A.** - Value below the average of the normal fitness zone

**Normal fitness zone (healthy)**

**10 years: between 13,9 and 18,8**

**10 years: between 13,7 and 19,4**

**11 years: between 14,2 and 19,5**

**11 years: between 14,1 and 20,3**

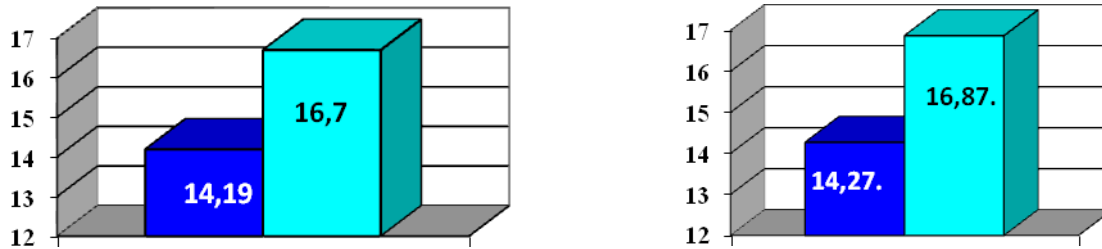


Figure 4 Arithmetic mean test comparison: Body Mass Index - BMI.

Table 5. Waist circumference results

c. Boys group testing

Nr.	CODE	Result	Interpret.
1.	A.A.	81,3 cm.	V.B.A.
2.	A.V.	82,3 cm.	V.A.A.
3.	B.C.	82,7 cm.	V.A.A.
4.	B.I.	83,1 cm.	V.A.A.
5.	P.M.	82,8 cm.	V.A.A.
6.	M.L.	82,9 cm.	V.A.A.
7.	I.M.	82,1 cm.	V.A.A.
8.	P.C.	83,6 cm.	V.A.A.
9.	Ş.M.	81,3 cm.	V.W.A.
10.	B.A.	79,7 cm.	V.B.A.
11.	Ț.H.	84,3 cm.	V.A.A.
12.	C.N.	82,6 cm.	V.A.A.
13.	M.G.	84,4 cm.	V.A.A.
14.	T.L.	83,2 cm.	V.A.A.
15.	B.F.	83,6 cm.	V.A.A.
16.	L.A.	84,3 cm.	V.A.A.
17.	C.F.	84,7 cm.	V.A.A.
18.	A.N.	82,5 cm.	V.A.A.
19.	M.F.	84,6 cm.	V.A.A.
20.	G.G.	81,4 cm.	V.W.A.
21.	V.S.	82,3 cm.	V.A.A.
22.	C.D.	82,5 cm.	V.A.A.
23.	B.J.	82,6 cm.	V.A.A.
24.	S.T.	82,3 cm.	V.A.A.
25.	T.D.	84,2 cm.	V.A.A.
26.	G.L.	84,8 cm.	V.A.A.
27.	L.D.	81,3 cm.	V.W.A.
28.	A.I.	82,5 cm.	V.A.A.
29.	P.D.	83,2 cm.	V.A.A.
30.	T.R.	83,5 cm.	V.A.A.
31.	R.S.	82,7 cm.	V.A.A.

b. Girls group testing

Nr.	CODE	Result	Interpret.
1.	A.G.	69,8 cm.	V.W.A.
2.	T.D.	70,2 cm.	V.A.A.
3.	B.R.	71,1 cm.	V.A.A.
4.	C.R.	70,8 cm.	V.A.A.
5.	S.S.	70,4 cm.	V.A.A.
6.	F.R.	72,0 cm.	V.A.A.
7.	U.C.	71,5 cm.	V.A.A.
8.	B.G.	67,8 cm.	V.B.A.
9.	R.A.	71,6 cm.	V.A.A.
10.	S.A.	72,3 cm.	V.A.A.
11.	M.A.	71,4 cm.	V.A.A.
12.	M.M.	70,2 cm.	V.A.A.
13.	D.I.	70,9 cm.	V.A.A.
14.	F.L.	72,1 cm.	V.A.A.
15.	F.C.	72,3 cm.	V.A.A.
16.	U.O.	72,5 cm.	V.A.A.
17.	V.S.	72,4 cm.	V.A.A.
18.	V.R.	70,2 cm.	V.A.A.
19.	R.C.	71,6 cm.	V.A.A.
20.	A.A.	69,9 cm.	V.W.A.
21.	D.J.	72,1 cm.	V.A.A.
<b>Arithmetic mean</b>		<b>71,1 cm.</b>	<b>≤ 69,85 cm.</b>

**Legend:**

V.A.A. - Value above the average of the normal fitness zone

V.W.A. - Value within the average of the normal fitness zone



32.	G.A.	78,6 cm.	V.B.A.
33.	R.T.	82,6 cm.	V.A.A.
Arithmetic mean		82,74 cm.	≤ 81,35 cm.

V.B.A. - Value below the average of the normal fitness zone

Normal fitness zone (healthy) ≤ 80,1 cm/≤82,6 cm. Normal fitness zone (healthy) ≤ 68,9 cm/ ≤ 70,8 cm.

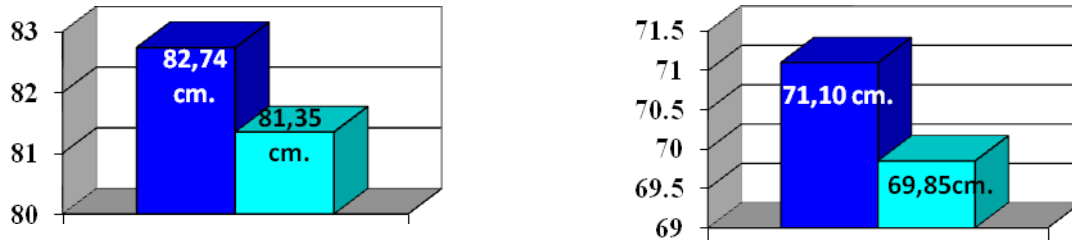


Figure 5 Arithmetic mean test comparison: Waist circumference.

## DISCUSSIONS

### 1. Standing broad jump

According to the test protocol, the result presented in the previous tables for each individual subject is the best result of the two attempts performed by each subject.

As it is difficult to fit each subject into a distinct age category, namely 10 or 11 years, we decided to do an arithmetic mean of the parameters declared by this test protocol to be in the normal (healthy) fitness zone and an arithmetic mean . of the values obtained by the subjects and to compare these two arithmetic means.

In a simple comparison between the two values, we can state that the average of the results obtained by the male subjects has a value above the average of the normal fitness zone - 117.18 cm. / 114.6 cm. a fact that does not determine us to state that the male subjects have an average of the results that place them in the "sports" area of fitness.

Individually, the results obtained by the boys are as follows:

- 6 subjects (18.18%) - B.I., B.A., L.A., M.F., B.J. and TR. - they obtained results below the average of the normal fitness zone;
- 16 subjects (48.49%) achieved a performance within the average of the normal fitness zone;

- 11 subjects (33.33%) - A.A., M.L., P.C., T.H., B.F., C.F., V.S., C.D., G.L., L.D. and P.D. they achieved performance above the average of the normal fitness zone.

The average of the results obtained by the girls has a value above the average of the normal fitness area – 113.04 cm. / 112.05 cm., thus proving that girls are also in the "sports" area of fitness.

Individually, the results obtained by the girls are as follows:

- 5 subjects (23.80%) – C.R., B.G., D.I., F.L. and A.A. - they obtained results below the average of the normal fitness area;
- 8 subjects (38.10%) achieved a performance within the average of the normal fitness zone;

8 subjects (38.10%) – T.D., F.R., U.C., M.A., M.M., V.S., V.R. and DJ they achieved performance above the average of the normal fitness zone.

## **2. 20 m run**

According to the test protocol, the result presented in the previous tables for each individual subject is the best result of the two attempts performed by each subject.

The average of the results obtained by both categories of subjects, boys and girls, is below the average of the normal fitness zone, confirming the fact that the research subjects are in the "sports" fitness zone.

Individually, the results obtained by the boys are as follows:

- 11 subjects (33.33%) – A.A., M.L., P.C., T.H., B.F., C.F., V.S., C.D., G.L., L.D. and P.D.- obtained results below the average of the normal fitness zone, i.e. they have a speed better than the average of those tested in the European countries where this test protocol was applied;
- 16 subjects (48.49%) achieved a performance within the average of the normal fitness zone;
- 6 subjects (18.18%) – B.I., B.A, L.A., M.F., B.J. and TR. they achieved performance above the average of the normal fitness zone.

Individually, the results obtained by the girls are as follows:

- 11 subjects (52.38%) – A.G., T.D., B.R., S.S., U.C., S.A., M.A., M.M., V.R., R.C. and DJ they have a better speed than the average of those tested in the European countries where this test protocol was applied;
- 1 subject (4.76%) achieved a performance within the average of the normal fitness zone.

The 9 (nine) results with a value above the average of the normal fitness zone obtained by girls (42.86%) worry us and force us to admit that speed is not the best psychomotor quality of the girls who obtained these results.

### **3. Back-saver sit and reach**

According to the test protocol, the result presented in the previous tables for each individual subject is the best result of the two attempts performed by each subject.

Comparing the average of the obtained values we are able to state:

- the average of the results obtained by the male subjects has a value above the average of the normal fitness zone – 21.88 cm. / 20.3 cm;
- the average of the results obtained by the female subjects has a value above the average of the normal fitness zone - 24.418 cm. / 24.15 cm.

Individually, the results obtained by the boys are as follows:

- 3 subjects (9.09%) – A.A., B.A. and G.A. - they obtained results below the average of the normal fitness zone;
- 3 subjects (9.09%) – Ş.M., G.G. and L.D - achieved a performance within the average of the normal fitness zone;

Individually, the results obtained by the girls are as follows:

- 1 subject (4.76%) – B.G. - obtained a result below the average of the normal fitness area;
- 2 subjects (9.52%) – A.G. and A.A. - they achieved a performance within the average of the normal fitness zone;

The results with values above the average of the normal fitness area obtained by 27 male subjects (81.82%) and 18 female subjects (85.71%) prove to us without a doubt that the majority of boys have a back mobility above the European average.

### **4. Body Mass Index – BMI**

According to the test protocol, the result presented in the previous tables for each individual subject is calculated according to the BMI formula for a single measurement and weighing performed for each subject.

Individually, the results obtained by the boys are as follows:

- 12 subjects (36.36%) – A.V., P.C., T.H., C.N., M.G., B.F., C.F., B.J., S.T., G.L., R.S. and G.A.- obtained results below the average of the normal fitness area calculated by us for boys – 14.05;
- The remaining 21 subjects (63.67%) achieved a performance within the average of the normal fitness area, so, we can say that they have a normal body mass index in relation to the body mass index measured at the European level for this category of age.

Individually, the results obtained by the girls are as follows:

- 6 girls (28.57%) – A.G., C.R, U.C., M.M., F.C. AND V.R. they scored below the mean of the normal fitness zone calculated by us for boys – 13.9;
- The 15 (fifteen) results with a value within the mean of the normal fitness zone obtained by girls (71.43%) encourage us to state that all the subjects of this experiment, boys and girls, are within normal limits in terms of body mass index measured at European level for this age category.

In conclusion, we can say that none of the subjects of our research is close to the indicators that precede a possible state of obesity.

## **5. Waist circumference**

The result presented in the previous tables for each individual subject is the average value of the two measurements.

In a simple comparison between the two values, we can state that the average waist circumference measured in male subjects has a value above the average of the normal fitness zone - 82.74 cm. / 81.35 cm., which leads us to state that the male subjects have a waist circumference greater than that of European boys subjected to this test protocol.

Individually, the results obtained by the boys are as follows:

- 3 subjects (9.09%) – A.A., B.A. and G.A - have a waist circumference below the average of the normal fitness zone;

- 3 subjects (9.09%) – Ş.M., G.G. and L.D. - they have a waist circumference within the average of the normal fitness zone;
- 27 subjects (81.382%) have a waist circumference above the mean of the normal fitness zone.

The average waist circumference measured in girls has a value above the average of the normal fitness zone – 71.70 cm. / 69.85 cm., thus proving that the girls also have a waist circumference above that of the European girls subjected to this test protocol.

Individually, the results obtained by the girls are as follows:

- A girl - B.G. (4.76%) – has a waist circumference below the average of the normal fitness zone;
- 2 girls – A.G. and A.A. (9.53%) have waist circumference within the average of the normal fitness zone;
- The other 18 girls (85.71%) have a waist circumference above the average of the normal fitness zone.

## CONCLUSIONS

Before elaborating the final conclusions of this study, we must admit that we cannot generalize the results obtained, due to the fact that the number of subjects is very small, which forces us to admit that our study, from this point of view, is not objective.

Given the fact that we are forced to acknowledge the above, let us nevertheless elaborate some final conclusions of this study, as follows:

1. The use of the standardized test battery - EUFITMOS, which is applicable in all schools in Europe, in measuring the somato-functional indices of the students from the "Vasile Alecsandri" National College in Bacău ensured us the possibility of comparing the results obtained with those established as indices normal in Europe in the age group under investigation;
2. The fact that 71.43% of the researched girls and 63.67% of the male subjects have a normal body mass index in relation to the body mass index measured at the European level for this age group, encourages us to state

that all the subjects of this experiment, boys and girls, are nowhere near the indicators that precede an eventual state of obesity.

3. This is very important for us, considering that we carry out our professional activity as a sports instructor and for the fact that the specialized literature regarding European childhood obesity ranks Romanian children in 2nd place in Europe.

## REFERENCES

1. Fu, You & Burns, Ryan. (2018). *Effect of an Active Video Gaming Classroom Curriculum on Health-Related Fitness, School Day Step Counts, and Motivation in Sixth Graders. Journal of Physical Activity and Health. 15. 10.1123/jpah.2017-0481.*
2. Gao Z, Chen S, Pasco D, Pope Z. (2015). *A meta-analysis of active videogames on health outcomes among children and adolescents. ObesRev.;16:783–794. PubMed doi:10.1111/obr.122872.*
3. Jungmann SM, Wagner L, Klein M, Kaurin A. (2022). *Functional Somatic Symptoms and Emotion Regulation in Children and Adolescents. Clin Psychol Eur. 2022 Jun 30;4(2) :e4299. doi: 10.32872/cpe.4299. PMID: 36397947; PMCID: PMC9667419.*
4. Papastergiou M. (2009). *Exploring the potential of computer and video games for health and physical education: a literature review. Comput Educ.; 53:603–622. doi:10.1016/j.compedu.2009.04.0014.*
5. Rask, C. U., Olsen, E. M., Elberling, H., Christensen, M. F., Ornbøl, E., Fink, P., Thomsen, P. H., & Skovgaard, A. M. (2009). *Functional somatic symptoms and associated impairment in 5-7-year-old children: The Copenhagen Child Cohort 2000. European Journal of Epidemiology, 24(10), 625–634. 10.1007/s10654-009-9366-3*
6. Winter, S., Quinn, C., Murray, E., & Lenz, K. (2018). *Screening für Somatoforme Störungen des Kindes- und Jugendalters SOMS-KJ [Screening for somatoform disorders in childhood and adolescence SOMS-CA]. Hogrefe.*
7. <https://eufitmos.eu/wp-content/uploads/2021/09/EUFITMOS-fitness-testing-protocol.pdf>
1. Ogilvie, B. C., & Tutko, T. A. (1966). *Problem athletes and how to handle them. London: Pelham.*