

## BIOMOTOR PROFILE OF CHILDREN AT RISK OF EDUCATIONAL AND SOCIAL EXCLUSION IN NORTH-EASTERN ROMANIA

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**Abstract.** Identification of the somatic and motor profile of students at risk of social and educational exclusion can be a factor of diagnosis but also of prognosis in terms of planning the content of various sports activities in order to integrate them. In this context, 189 students from North-Eastern Romania were included in the research. Gender distribution indicates that there are 104 boys and 85 girls. Participants are enrolled at the “Cezar Botez” Middle School in Fâstâci (57 students) and the Middle School no. 1 - Racova, Gârceni (132 students). The current research aims to outline the somatic and motor profile of boys in the North-East region by area of residence, the somatic and motor profile of girls in the North-East region by area of residence, the somatic and motor profile of boys in the North-East region by age and the somatic and motor profile of girls in the North-East region by age. The results obtained in somatic tests (height, weight, arm span, body mass index for teenagers) for the North-East region of the country were analysed as well as the results recorded in motor tests (4 x 10 m Shuttle Run, Standing Long Jump, T-Test). This research is part of the project “Sustainable social and educational integration through sports activities” (PNP001).

**Keywords:** physical activities, somatic and motor development, assessment.

### Introduction

In a society characterised by strong technological influences, the educational and social integration of students with different types of vulnerability can be a major goal of the teaching activities performed in schools. School can have a massive impact on individual development at all levels, with implications for adult life. In this respect, the research conducted by Sparkes (1999) has shown that school is an environment where students improve their skills, and regarding students with vulnerabilities (poverty), they benefit more from the skills acquired during school years.

Geographical, cultural and socioeconomic conditions create different lifestyles (Morina et al., 2021) for individuals. In this context, for an objective analysis of the research results, a series of vulnerabilities of the target group (including students of Roma ethnicity, students from disadvantaged or single-parent families, students from rural areas) were identified.

Studies highlight that the growth and development process is both positively and negatively influenced by a number of factors. Except for the factors that have a negative

impact on growth and development, there is evidence that healthy practices can influence growth in a positive way, at least in younger children (Ulijaszek, 2006).

This paper aims to present the biomotor profile of students enrolled in mainstream schools in North-Eastern Romania so that they can participate in various sports activities included in the project “Sustainable social and educational integration through sports activities” (PNP001). Identification of the biomotor profile of students with different types of vulnerability can be a factor of diagnosis and prognosis in terms of planning the content of various sports branches and events for the educational and social integration of this segment of the population.

Badea (2019) indicates that the two motor activities, physical education and sport, represent ways of social integration for young people because they involve specific activities performed within groups of students, which promotes and develops a sense of belonging to a group (Bălan & Marinescu, 2015). In this regard, the engagement of young people in various motor activities involves their social integration (Macovei et al., 2012) by acting on their way of thinking and contributes to the development of their personality (Bălan et al., 2021) and the formation/ education of a healthy lifestyle (Tufan et al., 2015) that needs to be constantly maintained through exercise (Vărzaru et al., 2017).

Growth and physical development during childhood and adolescence are affected by social factors, nutritional factors, as well as factors encountered in the domestic, school and community environments (NCD Risk Factor Collaboration, 2020).

Socioeconomic conditions such as social class, income, parental education, urbanisation and hygiene have been suggested as factors influencing height (Floud et al., 1990; Schmidt et al., 1995, cited by Danubio & Sanna, 2008).

Height is a good indicator of a child’s health (Bird et al., 2019) and nutritional status (Drachler et al., 2002). Children from disadvantaged backgrounds are shorter (Drachler et al., 2002) than those who do not come from such backgrounds. Changes in body weight are also an important indicator of health status (Stănescu et al., 2016).

These two anthropometric measurements, height and weight, are two significant indicators of nutritional status, cognitive development and health (Paciorek et al., 2013), body mass index (BMI) also being among health predictors (NCD Risk Factor Collaboration, 2020) and being influenced by healthy habits (Cojocaru & Vărzaru, 2016).

In Northern Europe, adult height has largely stabilised, and the age of menarche has settled at around 13 years, while weight continues to increase due to obesity (Cole, 2003).

A positive trend in height and body mass was identified in Romanian children and adolescents, especially at the age of puberty (Pop et al., 2021).

The literature shows a connection between the downward trend in the motor ability of students and their tendency towards overweight, with major social and economic implications for a nation (Stănescu et al., 2016). An increase in sedentary behaviour among children and adolescents is also found by Onose et al. (2020).

One of the causes of this downward trend in motor ability is the virtual offer, which is time- and resource-consuming. Children spend a lot of time in front of their computers using e-learning tools or playing electronic games and almost completely neglecting exercise, which can have a negative impact on their motor ability and thus their ability for social integration.

Most of the current problems are prevalent in rural areas compared to urban areas, and one of these factors is poverty, which leads to early school dropout, children being often forced to quit school.

In order to prevent this phenomenon, policies and programmes are commonly used to support children with different types of vulnerability to continue their studies, and this is a main goal of the project “Sustainable social and educational integration through sports activities” (PNP001). These policies and programmes should mainly address rural areas (Paciorek et al., 2013).

## **Methodology**

### *Participants*

Establishing the biomotor profile of students at risk of educational and social exclusion in North-Eastern Romania involved the application of anthropometric measurements and assessment tests for students from two schools in Vaslui county, namely the “Cezar Botez” Middle School in Fâstâci and Middle School no. 1 - Gârceni, Racova. The specialised inspector Eduard Ursu and the physical education and sport teachers Mihaela Ciobanu and Constantin Iulian Hondru were actively involved in student assessment.

The current study included 189 students enrolled in lower secondary education and aged between 10 and 16 years. Of the total number of students involved in this research, 104 are boys and 85 are girls. The age distribution of students reveals the existence of 1 girl aged 10, 26 boys and 14 girls aged 11, 34 boys and 25 girls aged 12, 22 boys and 21 girls aged 13, 18 boys and 22 girls aged 14, 2 boys and 2 girls aged 15, and 2 boys aged 16.

### *Procedure*

The biomotor profile of students from North-Eastern Romania was highlighted using anthropometric measurements (height, weight, arm span), BMI and motor tests (4 x 10 m Shuttle Run, Standing Long Jump, T-Test).

The tests were applied during the activities carried out in the 2019 school year.

### *Statistical analysis*

In this paper, the SPSS program based on descriptive statistics was used to determine the biomotor profile of students from North-Eastern Romania. The results aimed to identify the profile of students at risk of educational and social exclusion according to gender, area of residence and age. Thus, the particular features of boys and girls were identified separately for each age range, from 10 to 16 years.

## Results

### *Profile of boys from the North-East region (Vaslui) by age*

In the North-East region of Romania, the average value of height for boys aged 11 years is 1.43 m, the average weight is 35.43 kg, the average arm span is 139.78 cm, and the average value of BMI is 45.6 percentile, which means a healthy weight.

In motor tests, they obtained on average: 15.76 seconds for the 4 x 10 m Shuttle Run Test, 132.11 cm for the Standing Long Jump Test, 14.48 seconds for the T-Test. (Table 1)

Table 1. *Descriptive data for North-Eastern Romania, boys aged 11 years*

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 11 years (n = 26)					
Height (cm)	1.43	0.06	4.72%	1.25	1.55
Weight (kg)	35.43	4.95	14.06%	26.6	47.4
Arm span (cm)	139.78	8.82	6.30%	120	157.5
BMI (percentile)	45.6	21.48	46.1%	7.5	94.4
4 x 10 m Shuttle Run (seconds and tenths)	15.76	2.74	19.18%	12.63	20.38
Standing Long Jump (cm)	132.11	19.70	15.15%	90	190
T-Test (seconds and tenths)	14.48	1.66	11.52%	11.88	18.11

In the North-East region of Romania, the average value of height for boys aged 12 years is 1.49 m, the average weight is 40.57 kg, the average arm span is 146.98 cm, and the average value of BMI is 44.97 percentile, which means a healthy weight.

In motor tests, they obtained on average: 14.72 seconds for the 4 x 10 m Shuttle Run Test, 137.64 cm for the Standing Long Jump Test, 14.29 seconds for the T-Test. (Table 2)

Table 2. *Descriptive data for North-Eastern Romania, boys aged 12 years*

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 12 years (n = 34)					
Height (cm)	1.49	0.07	5.06%	1.35	1.67
Weight (kg)	40.57	9.24	22.79%	28	65.9
Arm span (cm)	146.98	10.44	7.10%	123.5	170.5
BMI (percentile)	44.97	29.12	64.76%	1.4	96.1
4 x 10 m Shuttle Run (seconds and tenths)	14.72	2.54	17.29%	11.66	19.8
Standing Long Jump (cm)	137.64	24.93	18.11%	110	195
T-Test (seconds and tenths)	14.29	1.74	12.18%	10.38	18.57

In the North-East region of Romania, the average value of height for boys aged 13 years is 1.54 m, the average weight is 46.65 kg, the average arm span is 153.04 cm, and the average value of BMI is 55.59 percentile, which means a healthy weight.

In motor tests, they obtained on average: 14.90 seconds for the 4 x 10 m Shuttle Run Test, 143.09 cm for the Standing Long Jump Test, 13.61 seconds for the T-Test. (Table 3)

Table 3. Descriptive data for North-Eastern Romania, boys aged 13 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 13 years (n = 22)					
Height (cm)	1.54	0.10	6.66%	1.37	1.77
Weight (kg)	46.65	12.54	26.89%	32	85
Arm span (cm)	153.04	9.33	6.10%	135	173
BMI (percentile)	55.59	27.27	49.06%	9.9	98.4
4 x 10 m Shuttle Run (seconds and tenths)	14.90	2.15	14.44%	12.21	19.34
Standing Long Jump (cm)	143.09	19.84	13.86%	110	175
T-Test (seconds and tenths)	13.61	1.80	13.23%	10.52	17.52

In the North-East region of Romania, the average value of height for boys aged 14 years is 1.61 m, the average weight is 50.97 kg, the average arm span is 159.11 cm, and the average value of BMI is 52.2 percentile, which means a healthy weight.

In motor tests, they obtained on average: 13.75 seconds for the 4 x 10 m Shuttle Run Test, 174.44 cm for the Standing Long Jump Test, 13.20 seconds for the T-Test. (Table 4)

Table 4. Descriptive data for North-Eastern Romania, boys aged 14 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 14 years (n = 18)					
Height (cm)	1.61	0.07	4.92%	1.47	1.84
Weight (kg)	50.97	8.19	16.07%	40	71
Arm span (cm)	159.11	9.50	5.97%	145	178
BMI (percentile)	52.2	26.22	50.24%	2.8	88.3
4 x 10 m Shuttle Run (seconds and tenths)	13.75	2.44	17.74%	11.23	18.42
Standing Long Jump (cm)	174.44	24.60	14.10%	130	215
T-Test (seconds and tenths)	13.20	0.87	6.60%	11.55	14.94

In the North-East region of Romania, the average value of height for boys aged 15 years is 1.57 m, the average weight is 42.8 kg, the average arm span is 157 cm, and the average value of BMI is 20.4 percentile, which means a healthy weight.

In motor tests, they obtained on average: 13.27 seconds for the 4 x 10 m Shuttle Run Test, 180 cm for the Standing Long Jump Test, 13.93 seconds for the T-Test. (Table 5)

Table 5. Descriptive data for North-Eastern Romania, boys aged 15 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 15 years (n = 2)					
Height (cm)	1.57	0.06	3.82%	1.51	1.63
Weight (kg)	42.8	4.2	9.81%	38.6	47
Arm span (cm)	157	5	3.18%	152	162
BMI (percentile)	20.4	5.7	27.94%	14.7	26.1
4 x 10 m Shuttle Run (seconds and tenths)	13.27	0.07	0.56%	13.2	13.35
Standing Long Jump (cm)	180	10	5.55%	170	190
T-Test (seconds and tenths)	13.93	0.48	3.44%	13.45	14.41

In the North-East region of Romania, the average value of height for boys aged 16 years is 1.71 m, the average weight is 55.65 kg, the average arm span is 170.25 cm, and the average value of BMI is 26.1 percentile, which means a healthy weight.

In motor tests, they obtained on average: 12.05 seconds for the 4 x 10 m Shuttle Run Test, 187.5 cm for the Standing Long Jump Test, 12.61 seconds for the T-Test. (Table 6)

Table 6. Descriptive data for North-Eastern Romania, boys aged 16 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys aged 16 years (n = 2)					
Height (cm)	1.71	0.06	3.5%	1.65	1.77
Weight (kg)	55.65	4.15	7.45%	51.5	59.8
Arm span (cm)	170.25	7.25	4.25%	163	177.5
BMI (percentile)	26.1	1.3	4.98%	24.8	27.4
4 x 10 m Shuttle Run (seconds and tenths)	12.05	0.69	5.76%	11.36	12.75
Standing Long Jump (cm)	187.5	12.5	6.66%	175	200
T-Test (seconds and tenths)	12.61	0.23	1.82%	12.38	12.84

#### *Profile of girls from the North-East region (Vaslui) by age*

Regarding the age of 10, only one girl student from the North-East region of Romania participated in the project assessments. The results indicated a height of 1.46 m, a weight of 37.8 kg and an arm span of 143 cm. Her BMI value is 61.8 percentile, which means a healthy weight.

In motor tests, the girl obtained: 14.34 seconds for the 4 x 10 m Shuttle Run Test, 120 cm for the Standing Long Jump Test, and 15.71 seconds for the T-Test.

In the North-East region of Romania, the average value of height for girls aged 11 years is 1.34 m, the average weight is 36.65 kg, the average arm span is 140.60 cm, and the average value of BMI is 46.99 percentile, which means a healthy weight.

In motor tests, they obtained on average: 14.82 seconds for the 4 x 10 m Shuttle Run Test, 128.92 cm for the Standing Long Jump Test, and 16.12 seconds for the T-Test. (Table 7)

Table 7. Descriptive data for North-Eastern Romania, girls aged 11 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls aged 11 years (n = 14)					
Height (cm)	1.34	0.34	25.87%	0.14	1.52
Weight (kg)	36.65	6.09	16.63%	28.3	50.8
Arm span (cm)	140.60	8.25	5.87%	123.5	156.5
BMI (percentile)	46.99	28.5	60.65%	11.1	95.1
4 x 10 m Shuttle Run (seconds and tenths)	14.82	1.61	10.89%	13.05	19.3
Standing Long Jump (cm)	128.92	15.95	12.37%	90	155
T-Test (seconds and tenths)	16.12	1.67	10.37%	13.06	18.35

In the North-East region of Romania, the average value of height for girls aged 12 years is 1.51 m, the average weight is 40.44 kg, the average arm span is 147.36 cm, and the average value of BMI is 39.81 percentile, which means a healthy weight.

In motor tests, they obtained on average: 16.24 seconds for the 4 x 10 m Shuttle Run Test, 127.28 cm for the Standing Long Jump Test, and 14.51 seconds for the T-Test. (Table 8)

Table 8. Descriptive data for North-Eastern Romania, girls aged 12 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls aged 12 years (n = 25)					
Height (cm)	1.51	0.08	5.69%	1.3	1.61
Weight (kg)	40.44	7.65	18.93%	28.1	56.4
Arm span (cm)	147.36	9.38	6.37%	123.5	158.5
BMI (percentile)	39.81	26.06	65.46%	2.8	92.2
4 x 10 m Shuttle Run (seconds and tenths)	16.24	3.24	19.97%	12.27	21.18
Standing Long Jump (cm)	127.28	23.58	18.52%	80	170
T-Test (seconds and tenths)	14.51	1.36	9.37%	11.8	17.54

In the North-East region of Romania, the average value of height for girls aged 13 years is 1.53 m, the average weight is 44.48 kg, the average arm span is 149.78 cm, the average value of BMI is 44.7 percentile, which means a healthy weight.

In motor tests, they obtained on average: 16.32 seconds for the 4 x 10 m Shuttle Run Test, 126.76 cm for the Standing Long Jump Test, and 14.54 seconds for the T-Test. (Table 9)

Table 9. Descriptive data for North-Eastern Romania, girls aged 13 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls aged 13 years (n = 21)					
Height (cm)	1.53	0.07	4.67%	1.35	1.63
Weight (kg)	44.48	8.64	19.43%	31	64.1
Arm span (cm)	149.78	9.18	6.12%	130	163
BMI (percentile)	44.7	34.4	76.96%	2.4	94.6
4 x 10 m Shuttle Run (seconds and tenths)	16.32	2.52	15.48%	12.84	20.02
Standing Long Jump (cm)	126.76	23.28	18.36%	90	170
T-Test (seconds and tenths)	14.54	1.82	12.56%	11.62	18.79

In the North-East region of Romania, the average value of height for girls aged 14 years is 1.57 m, the average weight is 49.34 kg, the average arm span is 155.45 cm, and the average value of BMI is 49.50 percentile, which means a healthy weight.

In motor tests, they obtained on average: 15.40 seconds for the 4 x 10 m Shuttle Run Test, 143.40 cm for the Standing Long Jump Test, and 15.14 seconds for the T-Test. (Table 10)

Table 10. Descriptive data for North-Eastern Romania, girls aged 14 years

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls aged 14 years (n = 22)					
Height (cm)	1.57	0.05	3.24%	1.5	1.68
Weight (kg)	49.34	9.32	18.89%	36.5	79.3
Arm span (cm)	155.45	6.21	3.99%	148	167
BMI (kg/m <sup>2</sup> )	49.5	29.21	50.01%	0.5	98
4 x 10 m Shuttle Run (seconds and tenths)	15.40	2.19	14.24%	12.83	20.04
Standing Long Jump (cm)	143.40	17.48	12.19%	110	170
T-Test (seconds and tenths)	15.14	1.22	8.06%	12.5	17.85

In the North-East region of Romania, the average value of height for girls aged 15 years is 1.53 m, the average weight is 53.1 kg, the average arm span is 147.5 cm, and the average value of BMI is 76.35 percentile, which means a healthy weight.

In motor tests, they obtained on average: 14.77 seconds for the 4 x 10 m Shuttle Run Test, 147.5 cm for the Standing Long Jump Test, and 15.96 seconds for the T-Test. (Table 11)



Table 11. *Descriptive data for North-Eastern Romania, girls aged 15 years*

Biomotor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls aged 15 years (n = 2)					
Height (cm)	1.53	0.007	0.46%	1.53	1.54
Weight (kg)	53.1	0.84	1.59%	52.5	53.7
Arm span (cm)	147.5	2.12	1.43%	146	149
BMI (percentile)	76.35	3.88	5.09%	73.6	79.1
4 x 10 m Shuttle Run (seconds and tenths)	14.77	0.21	1.43%	14.62	14.92
Standing Long Jump (cm)	147.5	3.53	2.39%	145	150
T-Test (seconds and tenths)	15.96	1.83	11.47%	14.67	17.26

*Profile of boys from the North-East region (Vaslui) by area of residence*

For boys aged 11-16 years from rural areas in the North-East region of Romania, the average value of height is 1.51 m, the average value of weight is 42.61 kg, and the average value of arm span is 149.21 cm. Their average BMI is 40.81 percentile, which means a healthy weight.

In motor tests, they obtained on average: 14.74 seconds for the 4 x 10 m Shuttle Run Test, 145.72 cm for the Standing Long Jump Test, and 13.97 seconds for the T-Test. (Table 12)

Table 12. *Descriptive data for the North-Eastern region, boys from rural areas*

Motor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Boys from rural areas (n = 104)					
Height (cm)	1.51	0.10	6.79%	1.25	1.84
Weight (kg)	42.61	10.44	24.51%	26.6	85
Arm span (cm)	149.21	11.88	7.96%	120	178
BMI (percentile)	40.81	13.04	31.97%	20.4	55.59
4 x 10 m Shuttle Run (seconds and tenths)	14.74	2.54	17.28%	11.23	20.38
Standing Long Jump (cm)	145.72	27.33	18.75%	90	215
T-Test (seconds and tenths)	13.97	1.63	11.70%	10.38	18.57

*Profile of girls from the North-East region (Vaslui) by area of residence*

For girls aged 10-15 years from rural areas in the North-East region of Romania, the average height is 1.50 m, the average weight is 43.38 kg, and the average arm span is 148.89 cm. Their average BMI is 53.19 percentile, which means a healthy weight.

In motor tests, they obtained on average: 15.75 seconds for the 4 x 10 m Shuttle Run Test, 131.98 cm for the Standing Long Jump Test, and 14.99 seconds for the T-Test. (Table 13)

Table 13. Descriptive data for the North-Eastern region, girls from rural areas

Motor tests	Arithmetic mean	Standard deviation	Coefficient of variation	Minimum	Maximum
Girls from rural areas (n = 85)					
Height (cm)	1.50	0.16	11.26%	0.14	1.68
Weight (kg)	43.38	9.18	21.17%	28.1	79.3
Arm span (cm)	148.89	9.46	6.35%	123.5	167
BMI (percentile)	53.19	12.34	23.19%	39.81	76.35
4 x 10 m Shuttle Run (seconds and tenths)	15.75	2.55	16.19%	12.27	21.18
Standing Long Jump (cm)	131.98	21.46	16.25%	80	170
T-Test (seconds and tenths)	14.99	1.59	10.62%	11.62	18.79

## Discussion

Achieving a complete picture of all the results obtained by boys from rural areas in the North-East of Romania (average age: 12.46 years,  $\pm 1.22$ ), we have found the following arithmetic means: height - 1.51 m ( $\pm 0.1$ ), weight - 42.61 kg ( $\pm 10.44$ ), BMI - 40.81 percentile ( $\pm 13.04$ ), arm span - 149.21 cm ( $\pm 11.88$ ). Their arithmetic mean for the 4 x 10 m Shuttle Run Test is 14.74 seconds, for the Standing Long Jump Test, 145.72 cm ( $\pm 27.33$ ), and for the T-Test, 13.97 seconds ( $\pm 1.63$ ).

The overall results obtained by girls from rural areas in the North-East of Romania (average age: 12.64 years,  $\pm 1.14$ ) indicate the following arithmetic means: height - 1.50 m ( $\pm 0.16$ ), weight - 43.38 kg ( $\pm 9.18$ ), BMI - 53.29 percentile ( $\pm 12.34$ ), arm span - 148.89 cm ( $\pm 9.46$ ). Their arithmetic mean for the 4 x 10 m Shuttle Run Test is 15.75 seconds ( $\pm 2.55$ ), for the Standing Long Jump Test, 131.98 cm ( $\pm 21.46$ ), and for the T-Test, 14.99 seconds ( $\pm 1.59$ ).

Previous studies (Tudor et al., 2020) show that the results obtained by coeval boys and girls in the target group from rural areas in Western Romania have higher values in anthropometric measurements (height, weight, arm span). Regarding BMI (calculated in  $\text{kg/m}^2$ ), boys from rural areas in the Western region of the country have increased values ( $19.99 \text{ kg/m}^2$ ) compared to the North-East region ( $18.29 \text{ kg/m}^2$ ), while girls from rural areas in the Western region of the country have lower values ( $19.66 \text{ kg/m}^2$ ) compared to the North-East region ( $21.87 \text{ kg/m}^2$ ).

Comparing the results obtained by coevals in the target group from urban areas in Western Romania, higher values are found in anthropometric measurements for both boys and girls. Regarding BMI, lower values are identified in girls from urban areas in Western Romania compared to girls from rural areas in the North-East region of the country (Tudor et al., 2020). Different results, which are superior in urban areas compared to rural areas, have also been related to children's height (Paciorek et al., 2013).

Almost similar results but for some different aspects due to the investigated age are also identified in other studies that reflect the levels of physical development and motor ability of 5th grade students in Vaslui county (Cojocaru et al., 2015).

Previous studies on the biomotor potential of the Romanian school population (Cojocaru et al., 2015) for 5th grade boys (10-11 years old) from Vaslui county indicate an average

height of 1.46 m. In the present study, boys aged 10 years have an average height of 1.43 m, while boys aged 11 years have an average height of 1.49 m. In 1970, Romanian boys had an average height of 1.437 m, in 1981 - an average height of 1.412 m, in 1994 - an average height of 1.44 m, and in 2012 - an average height of 1.48 m. Comparing the results obtained at national level with the results from Vaslui for boys aged 11 years, one can see that the tendency towards an increase in height is maintained.

Previous studies on the biomotor potential of the Romanian school population (Cojocaru et al., 2015) for 5th grade girls (10-11 years old) from Vaslui county highlight an average height of 1.46 m. In the present study, girls aged 11 years have an average height of 1.43 m. In 1970, Romanian girls had an average height of 1.455 m, in 1981 - an average height of 1.42 m, in 1994 - an average height of 1.468 m, and in 2012 - an average height of 1.472 m. A decrease in height can be observed by reference to the analysed age.

In terms of weight, a comparison with the biomotor potential in 2012 reveals that boys from Vaslui county had an average of 38.7 kg, while in the present research, they have an average of 35.43 kg. In 1970, boys had an average weight of 35.1 kg, in 1981 - an average weight of 33.6 kg, in 1994 - an average weight of 35.71 kg, and in 2012 - an average weight of 40.11 kg. A decrease in weight can be observed by reference to the analysed age and target group.

In terms of weight, a comparison with the biomotor potential in 2012 shows that girls from Vaslui county had an average of 38.19 kg, while in the present study, they have an average of 36.65 kg. In 1970, girls had an average weight of 36.1 kg, in 1981 - an average weight of 33.6 kg, in 1994 - an average weight of 36.06 kg, and in 2012 - an average weight of 39.01 kg. The results indicate an increase in weight by reference to the analysed age and target group, except 2012.

International studies (Morina et al., 2021) show that 13-year-old boys from Kosovo and Montenegro have an average height of 1.598 m, while boys from North-Eastern Romania have an average height of 1.54 m. Girls of the same age from Kosovo and Montenegro have an average height of 1.593 m, while girls from North-Eastern Romania have an average height of 1.53 m. It can be seen that both boys and girls aged 13 included in the target group are 5-6 cm shorter. Boys from Kosovo and Montenegro have an average weight of 50.4 kg, while boys from North-Eastern Romania have an average weight of 46.65 kg. Girls from Kosovo and Montenegro have an average weight of 49.2 kg, while girls from North-Eastern Romania have an average weight of 44.48 kg. For this parameter, a difference of 4-5 kg in favour of children from Kosovo and Montenegro can also be observed.

## **Conclusion**

Boys from North-Eastern Romania have an average height of 1.43 m at the age of 11 and 1.71 m at the age of 16. Girls from North-Eastern Romania have an average height of 1.46 m at the age of 10 and 1.57 m at the age of 14.

Boys from North-Eastern Romania have an average weight of 35.43 kg at the age of 11 and 55.65 kg at the age of 16. Girls from North-Eastern Romania have an average weight of 37.8 kg at the age of 10 and 53.1 kg at the age of 15.

Boys from North-Eastern Romania have an average value of arm span of 139.76 cm at the age of 11 and 170.25 cm at the age of 16. Girls from North-Eastern Romania have an average value of arm span of 143 cm at the age of 10 and 155.45 cm at the age of 14.

Boys from North-Eastern Romania have an average value of BMI of 45.6 percentile at the age of 11 and 52.2 percentile at the age of 14. Girls from North-Eastern Romania have an average value of BMI of 61.8 percentile at the age of 10 and 76.35 percentile at the age of 15. Regarding the average value of BMI at group level, all children fall within healthy parameters according to the interpretations made for their ages.

The average value recorded by children from North-Eastern Romania in the 4 x 10 m Shuttle Run Test is between 15.76 seconds at the age of 11 and 12.05 seconds at the age of 16 for boys and between 14.34 seconds at the age of 10 and 14.77 seconds at the age of 15 for girls.

The average value recorded by children from North-Eastern Romania in the Standing Long Jump is between 132.11 cm at the age of 11 and 187.5 cm at the age of 16 for boys and between 120 cm at the age of 10 years and 147.5 cm at the age of 15 for girls.

The average value recorded by children from North-Eastern Romania in the T-Test is between 14.48 seconds at the age of 11 and 12.61 seconds at the age of 16 for boys and between 15.71 seconds at the age of 10 and 14.96 seconds at the age of 15 for girls.

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## **Authors' Contribution**

All authors have equally contributed to this study and should be considered as main authors.

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