

# COMPARATIVE STUDY REGARDING THE FUNCTIONAL AND SOMATIC DEVELOPMENT IN 10-11-YEAR OLD CHILDREN FROM DIFFERENT GEOGRAPHICAL REGIONS FROM ROMANIA

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## Introduction to the research topic

**Demographic and geographical characteristics that are specific to the regions where the research was conducted: Braşov (Moeciu), and Bacău.**

### **Braşov (Moeciu)**

The Center region, with a total surface of 34,100 km<sup>2</sup> (14.31% of Romania), comprises the counties of Alba, Braşov, Covasna, Harghita, Mureş, and Sibiu. The area has a plateau-specific geography, East-West directed valleys, with considerable resources of natural gas, gold and silver, salt, mineral and therapeutic waters, and over one third of its surface is covered with forests. The region has considerable hydrographic resources, and, in comparison with other regions, a well developed transportation network (less in the North-South direction), but the most important richness is represented by the human capital. The region is characterized by a reduced birth rate, and a demographical aging process, but it succeeded to harmoniously integrate people from other parts of the country.

### **Bacău**

#### **Geographical placement**

The North-Eastern region is the most extended development area in Romania, a second level Nomenclature of Territorial Units for Statistics (NUTS 2), according to the EUROSTAT classification. The North-East region comprises 6 counties - administrative-territorial units (NUTS 3): Bacău, Botoşani, Neamţ, Iaşi, Suceava, and Vaslui. The total surface of the N-E region is of 36,850 km<sup>2</sup>, representing 15.46% of the total surface of the country. It has a population of 3,734,546 inhabitants, representing 17.25% of the Romanian population, with a density of 101.3 inhabitants per km<sup>2</sup>. It has the second largest density in the country, after the Bucharest-Ilfov region. Out of the total population of the region, 56.6% live in a rural environment. The region has a varied geography, of which: 30% mountains, 30% sub-mountainous areas, 40% plateau. It also has areas of hills and plains.  
[www.galvaleaprutului.ro/prezgeografica.html](http://www.galvaleaprutului.ro/prezgeografica.html)

The climate of the county is continental, varying according to the geographical areas. In the mountain and hill areas, the climate is a little harsher than in the Siret plain. The average annual temperature is between 9.5°C in the plain area and 2°C in the mountain area. The annual temperature highs can reach 25°C, with extreme values of 40°C, recorded at Târgu Ocna in 1916, and of -32.5°C, in 1954, at Bacău. The precipitations vary between 540 mm in the plains, and 1100 in the mountains, a predominant wind direction of North and North-West, with an average monthly speed of 4.1 m/s, coming from North-West.

#### **Research problems, objectives, settings, design and methods**

This study has started from the following hypothesis: *Presumably, the different influence of the geographical factors can have certain consequences on the growth and specific somatic-functional development of children between 10 and 11 years old.*

The subjects of this research were 16 divided as follows: 8 subjects - 4 females, and 4 males from Moeciu, Braşov County, and: 8 subjects - 4 females, and 4 males from Bacău, between 10 and 11 years old. The subjects were selected according to the children's schedule

and agreement from those who wished to participate in this study; there was also an intention to analyze the influence of the environment on the main physiological parameters in females.

The next table presents the subjects of this research:

Table no. 1 **The group of subjects from Moeciu, Braşov County**

No.	Name	Gender	Level of education
1.	A.A.	F	Good
2.	B.L.	F	Very good
3.	D.A.	F	Good
4.	E.A.	F	Very good
5.	D.E.	M	Average
6.	F.F.	M	Good
7.	L.L.	M	Good
8.	M.A.	M	Average

Table no. 2 **The group of subjects from Bacău, Bacău County**

No.	Name	Gender	Level of education
1.	A.C.	F	Very good
2.	C.L.	F	Very good
3.	N.D.I.	F	Average
4.	M.T.	F	Very good
5.	T.A.	M	Very good
6.	T.I.	M	Good
7.	S.C.I.	M	Good
8.	V.O.	M	Good

The tasks of this research were to verify the hypothesis.

### **The research methods and techniques**

The study was conducted throughout 11 months (September 2011 - May 2012), being divided in multiple stages.

- **1st Stage** (August - September 2011) - theoretical documentation, consulting the professional literature, in order to know the subject as good as possible;
- **2nd Stage** (September - October 2011) - identification of the subjects for the research;
- **3rd Stage** (October 2011 - April 2012) - applying the somatic and functional assessment tests;
- **4th Stage** (April - May 2012) - centralization, analysis, and interpretation of the data; drawing the conclusions; writing the paper.

The research was conducted in two different locations, with different geographical environments. Two groups of subjects were constituted, of 8 subjects each, with a total of 16 subjects. The genders were distributed equally in both groups, each having 4 females and 4 males. Their age was between 10 and 11, corresponding to the 5th grade.

The study consisted in assessing the various somatic parameters that play a role in influencing the harmonious development of the body. There were no specific physical education interventions to influence the measured parameters.

This study, which can be extended on much larger groups, and for which it needs a large team because of the high volume of work and the time spent to this purpose, aimed to highlight the development in 2 different groups from 2 different geographical and inhabiting environments. One group consisted of subjects from a rural environment (Moeciu, Braşov County), while the other had subjects from an urban environment (Bacău).

### **The research methods we used were:**

The theoretical documentation method, the observation method, the measurement and assessment method, the experimental method, data recording and analysis. Out of the assessment and measurement methods, we used the measurement of the body segments and dimensions, the weight, and the proportionality relations between them.

### **Results and discussion**

After the tests, and after the analysis of data, several charts were made, presenting the development of the subjects during the applied tests.

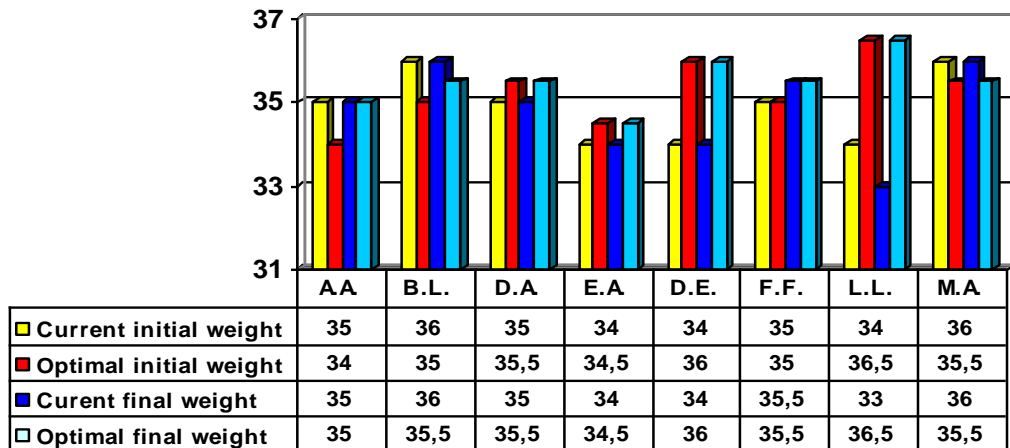
These figures can be considered to be relevant for emphasizing the somatic particularities that are specific to 5th grade children.

Table no. 3 Centralization of the results recorded during the assessment tests used for the group of subjects from Moeciu, Braşov

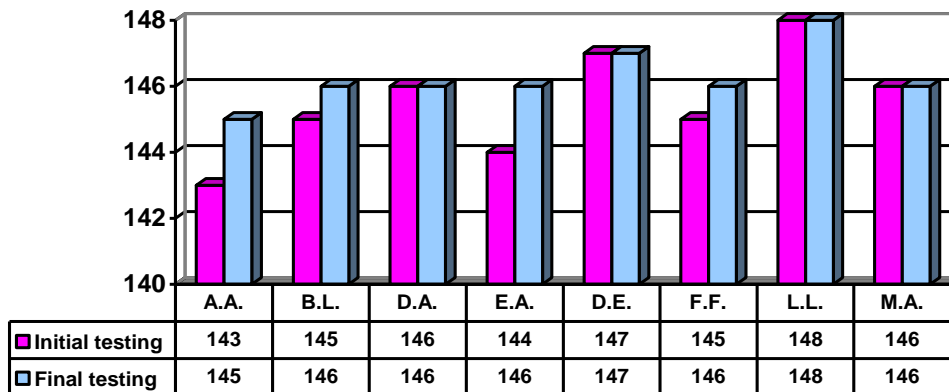
No.	Name	Weight		Height		Thoracic elasticity		Bone Mass Index	
		I.T.	F.T.	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.
1	A.A.	35/34	35/35	143	145	4	5	35.17	35.91
2	B.L.	36/35	36/35.5	145	146	4	6	37.24	36.55
3	D.A.	35/35.5	35/35.5	146	146	4	4	33.56	32.87
4	E.A.	34/34.5	34/35.5	144	146	5	5	32.87	33.33
5	D.E.	34/36	34/36	147	147	3	4	36.39	36.39
6	F.F.	35/35	35/35.5	145	146	5	5	37.67	37.93
7	L.L.	34/36.5	33/36.5	148	148	4	5	37.83	37.83
8	M.A.	36/35.5	36/35.5	146	146	4	4	37.68	37.67

Table no. 4 Centralization of the results recorded during the assessment tests used for the group of subjects from Bacău

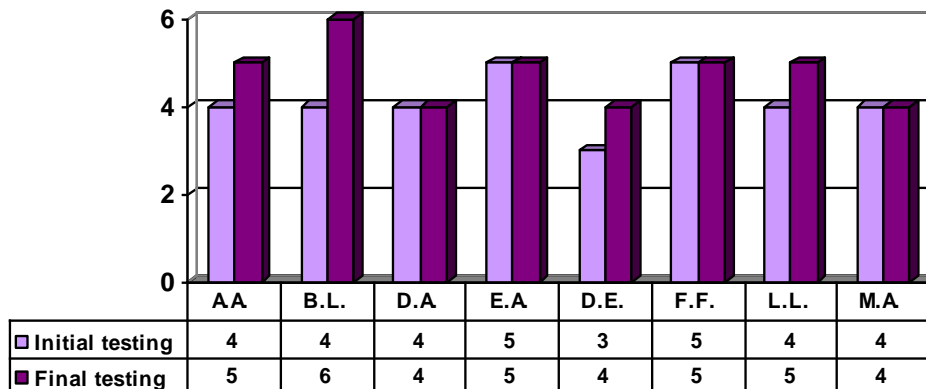
No.	Name	Weight		Height		Thoracic elasticity		Bone Mass Index	
		I.T.	F.T.	I.T.	F.T.	I.T.	F.T.	I.T.	F.T.
1	A.C.	35/33.5	36/34	142	143	4	5	35.91	35.66
2	C.L.	34/35	34/35	145	145	4	4	35.17	35.17
3	N.D.I.	35/34.5	35/34.5	144	144	4	5	33.33	33.33
4	M.T.	34/34.5	36/35	144	145	5	5	33.33	35.17
5	T.A.	34/35.5	35/35.5	146	146	3	4	34.24	34.26
6	T.I.	35/35	35/35	145	145	4	5	37.93	37.93
7	S.C.I.	34/35.5	34/35.5	146	146	4	4	34.93	34.93
8	V.O.	34/35.5	36/35.5	146	146	4	5	34.93	34.93



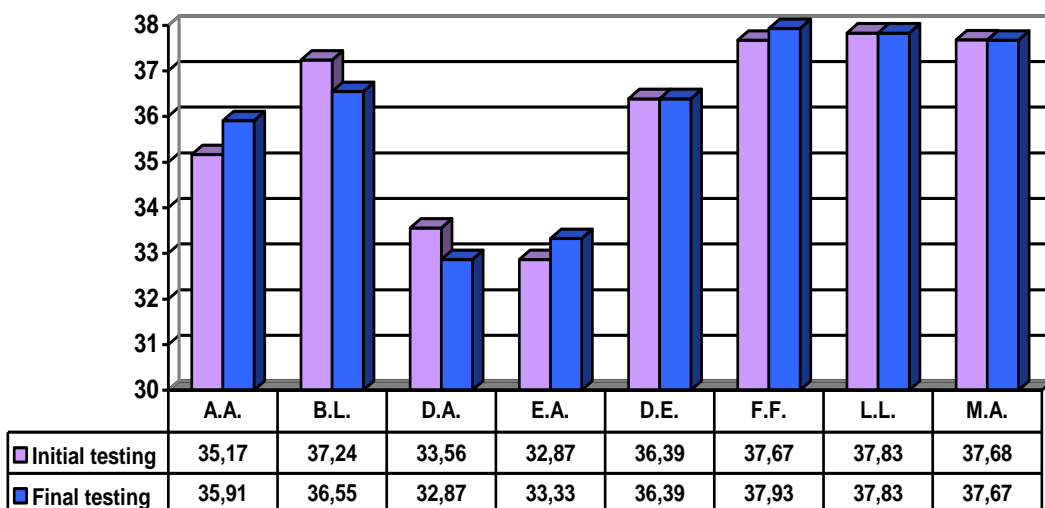
Graphic no.1. Dynamics of the subjects' results (weight-height ratio) - subjects from Moeciu, Braşov



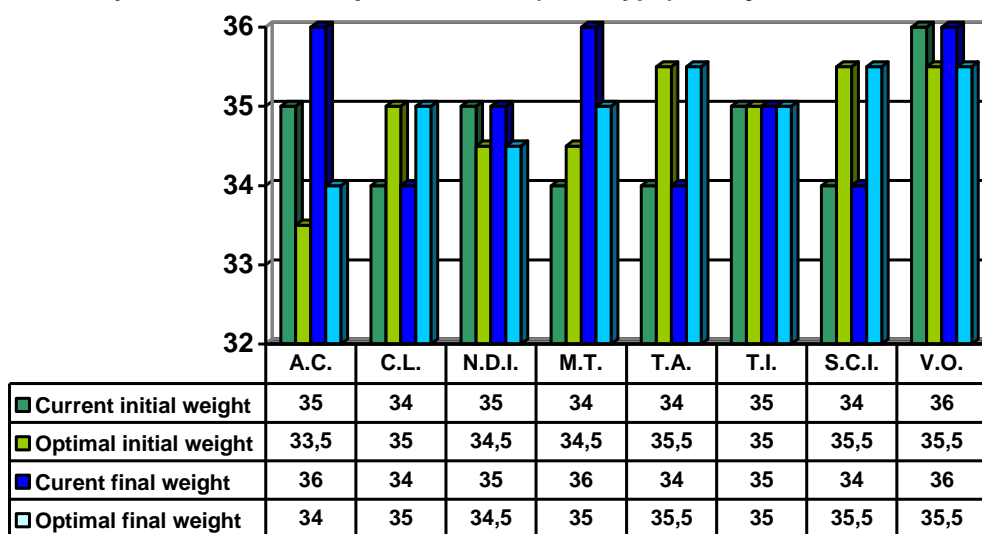
Graphic no.2. Dynamics of the subjects' results (height) - subjects from Moeciu, Braşov



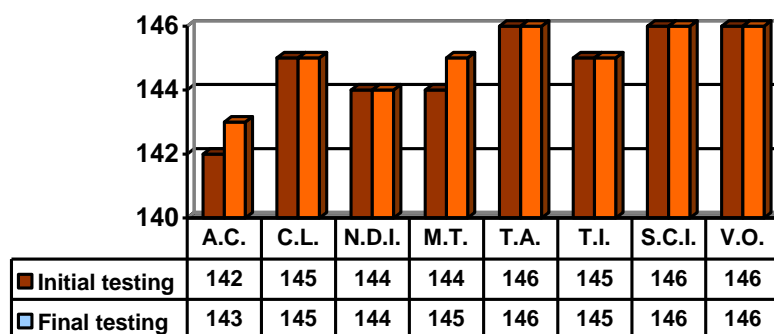
Graphic no.3. Dynamics of the subjects' results (thoracic elasticity) - subjects from Moeciu, Braşov



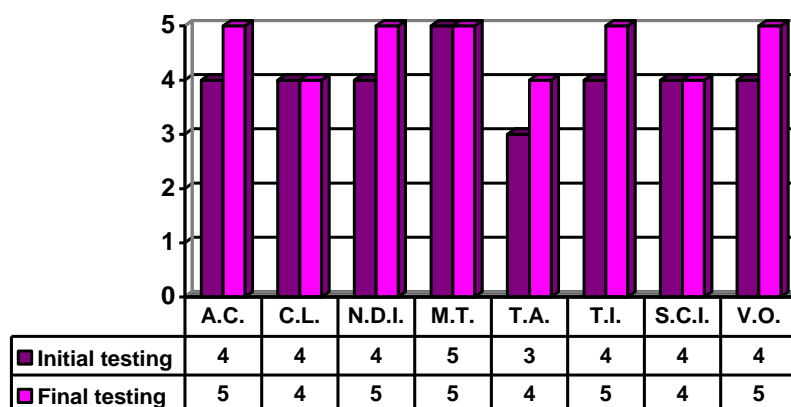
Graphic no.4. Dynamics of the subjects' results (bone type) - subjects from Moeci, Braşov



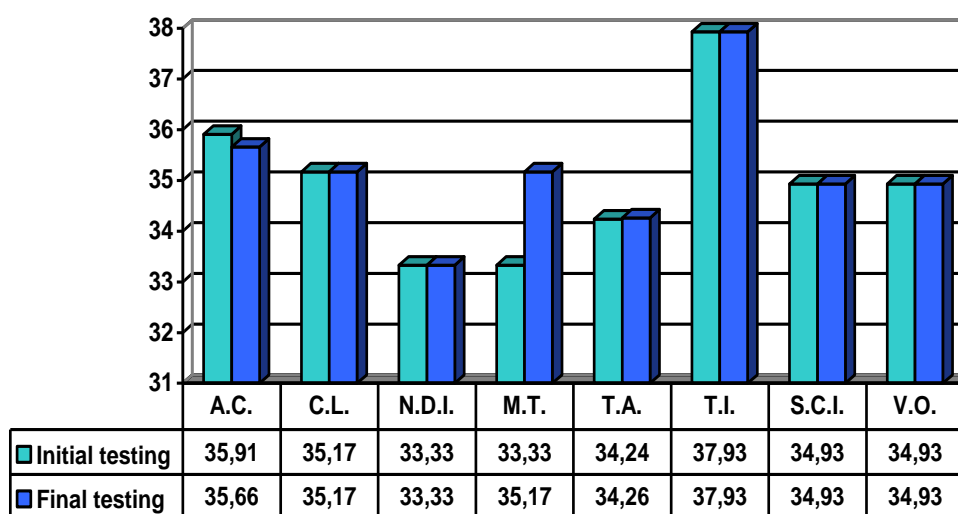
Graphic no.5. Dynamics of the subjects' results (weight-height ratio) - subjects from Bacău



Graphic no.6. Dynamics of the subjects' results (height) - subjects from Bacău



Graphic no.7. Dynamics of the subjects' results (thoracic elasticity) - subjects from Bacău



Graphic no.8. Dynamics of the subjects' results (bone type) - subjects from Bacău

### Interpretation of the results for the group of subjects from Moeciu, Braşov County

**Figure 1** shows that for the group of subjects from **Moeciu, Braşov County**, with regards to the weight and height ratio (Lorentz's Formula), in the **initial testing**, out of 8 subjects, 3 (2 girls and 1 boy) have recorded a weight that was larger by 0.5-1.5 kg in relation to their height, 4 subjects (2 girls and 2 boys) have recorded a weight that was smaller by 0.5-1.5 kg in relation to their height, and 1 subject (a boy) recorded an optimal weight in relation to his height. In the **final testing**, 1 boy and 1 girl out of the 8 subjects had an optimal weight, and the variations between the current weight and the optimal weight for the 6 subjects was smaller or higher, with values between 0.5-1.5 kg, for both genders.

**Figure 2** shows that with regards to the height, in the **initial testing** we have a variation from 143 cm to 148 cm, and in the **final testing** we have a variation between 145 cm and 148 cm.

**Figure 3** shows that, with regards to the thoracic elasticity, in the **initial testing** there were values between 3 and 5 cm, and in the **final testing**, between 4 and 6 cm. The recorded values are normal and equally distributed for both genders.

**Figure 4** shows that, for the bone type parameter we have in the **initial testing**, values of 32.87 – 37.24 (girls), and of 36.39 – 37.83 (boys), while in the **final testing**, the girls' values are between 32.87 – 36.55, and the boys' values, of 36.39 – 37.93. There is a larger bone mass index both in the initial, and the final testing, with regards to the male subjects. There are no professional studies for this age category, and with this subject, that is why this kind of research must be continued and extended, to verify the data. But, by making a comparison within the group of subjects of this study, one can identify small variations of this index, according to weight and height.

### **Interpretation of the results for the group of subjects from Bacău**

**Figure 1** shows that for the group of subjects from **Bacău**, with regards to the weight and height ratio (Lorentz's Formula), in the **initial testing**, out of 8 subjects, 3 (2 girls and 1 boy) have recorded a weight that was larger by 0.5-1.5 kg in relation to their height, 4 subjects (2 girls and 2 boys) have recorded a weight that was smaller by 0.5-1.5 kg in relation to their height, and 1 subject (a boy) recorded an optimal weight in relation to his height. In the **final testing**, 4 subjects (3 girls and 1 boy) had larger weights than the optimal one, with values between 1 – 1.5, 1 subject (boy) recorded an optimal weight, 3 subjects (1 girl and 2 boys) had lower weights than the optimal one, with values between 0.5-1.5 kg.

**Figure 2** shows that with regards to the height, in the **initial testing** we have a variation from 142cm to 146cm, and in the **final testing** we have a variation between 143cm and 146cm. One can see that the male subjects have higher values (they are taller), both in the initial and in the final testing.

**Figure 3** shows that, with regards to the thoracic elasticity, in the **initial testing** there were values between 3 and 5 cm, and in the **final testing**, between 4 and 5 cm. The minimal value of 3 cm has been recorded in only one subject (a boy), while for 3 subjects the same value has been recorded, both in the initial and in the final testing.

**Figure 4** shows that, for the bone type parameter we have in the **initial testing**, values of 33.33 – 35.91 (girls), and of 34.24 – 37.93 (boys), while in the **final testing**, the girls' values are between 33.33 – 35.17, and the boys' values, of 34.26 – 37.93. There is a larger bone mass index both in the initial, and the final testing, with regards to the male subjects. There are no professional studies for this age category, and with this subject, that is why this kind of research must be continued and extended, to verify the data. But, by making a comparison within the group of subjects of this study, one can identify small variations of this index, according to weight and height.

### **Comparative interpretation of the results recorded by the Moeciu group and the Bacău group**

The weight-height ratio (**Lorentz's formula**) shows small weight variations between the two groups, of 0.5 – 1.5 kg. The optimal and current weight ratio is identical in the two groups.

Regarding the height results, we can observe a tallness of the Moeciu subjects, both for the girls, and the boys, in comparison with the other group; with regards to the gender comparison, the boys in both groups are taller than the girls, and the Moeciu boys are up to 2 cm taller than the Bacău boys.

Regarding the thoracic elasticity, the values are within normal limits, for boys and for girls, in for both groups.

Regarding the bone mass index, it is influenced by weight and height fluctuations. The girls have a smaller bone mass index than the boys, and when comparing the two groups, one can see that the Bacău girls have a smaller bone mass index than the Moeciu girls. Coming back to the previously mentioned idea, these studies must be extended to establish certain levels for this index for this age group, or with regards to both genders.

### **Conclusions:**

The following conclusions can be drawn from the present study:

- 1. the weight-height ratio (calculated using Lorentz' formula) in the 5th grade children chosen to be subjects for this research is inscribed within normal parameters, with small variations between 0.5 and 2 kg, higher or lower, between the current and the optimal weight;**
- 2. the thoracic elasticity is normal for this age category, thus one cannot say whether the geographical factors have positively or negatively influenced this parameter;**
- 3. the bone mass index is clearly influenced by the individual weight and height of each of the subjects. There is a small variation in favor of the Moeciu group.**

The geographical factors, such as the altitude, the sun, air currents, atmospheric pressure, can influence this parameter.

***The climate, the altitude, the traditions, the culture, the socio-economic development, the education are all important factors in influencing the state of health in a community.***

Thus, at the end, one can say that the initial hypothesis was confirmed for certain parameters - the geographical factor can constitute a main element for influencing the growth and development of children.

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