

Trends in the development of effort and motor skills in ninth graders

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Abstract:

Background: The adolescent period, particularly from ninth grade onward, is characterized by considerable physical, psychological, and social changes. Physical education plays an important role at this stage, promoting not only balanced physical development but also encouraging an active and healthy lifestyle. Exercise and motor skills are fundamental components that must be supported by modern teaching methods tailored to age-specific needs. **Purpose:** This study aims to identify trends in the development of physical effort capacity and motor skills among ninth graders in Romania at the regional level. The study examines key trends in the development of effort and motor capacities in ninth graders in the context of physical education classes and the typical physical and mental maturation processes occurring at this age. **Method:** The study involved assessing the functional and motor potential of ninth graders at a regional level, aiming to identify deficiencies in their functional and motor development. Participants were measured and tested to collect data on somatic development as well as motor and functional abilities. **Results:** The study presents a somatic, functional, and motor profile of ninth graders in the surveyed areas, revealing concerning signs regarding normal somatic and functional development. It also highlights a trend of motor regression compared to previous generations. **Discussion:** At the national level, 2023 data show an increase in waist circumference, body mass, and body mass index (BMI) compared to 2012. The application of four standardized samples in 2023 reveals a significant regression relative to the 2012 baseline values nationally. These findings indicate a pronounced trend toward overweight, reflecting a decline in the physical health status of adolescents compared to the 2012 cohort. This trend is related to modern lifestyle factors, such as increased consumption of processed foods, decreased time allocated for physical activity, and greater exposure to screens. **Conclusions:** The results emphasize the urgent need for curricular intervention by either increasing the number of physical education classes or adapting their content to match the actual motor skill levels. Continuous monitoring of motor performance through annual standardized motor test batteries is necessary. Additionally, involving parents, the community, and the digital environment is crucial to fostering a culture of movement and addressing the observed decline.

Keywords: trends, sport, growth and development, physical education, motor activities, students

Introduction

In recent decades, public health and physical education experts have reported a concerning increase in overweight and obesity rates among children and adolescents. European studies indicate that approximately one in three adolescents is overweight or obese, with a noticeable upward trend in Eastern Europe, including Romania (Wijnhoven et al., 2014; World Health Organization [WHO], 2022).

Data from somatic measurements performed on a representative sample of ninth-grade boys and girls in 2012 and 2023 reveal a significant increase in waist circumference, body mass, and body mass index (BMI) in 2023. These results align with Popkin and Hawkes (2016), who highlight the global nutrition transition characterized by higher consumption of calorie-dense foods and reduced physical activity from a young age. Mihăilă, Rusu, and Dragomir (2018) documented a steady increase in average BMI among Romanian adolescents from 2005 to 2015, associating it with increased sedentary behavior and decreased involvement in extracurricular physical activities. Similarly, the WHO-coordinated COSI Romania study shows that Romania exceeds the European average in childhood obesity prevalence, particularly among boys aged 11–15 years (WHO, 2022).

At the international level, Rosenkranz and Dzewaltowski (2008) emphasized that the school environment was essential in shaping eating habits and physical activity, particularly during adolescence.

The transition from middle school to high school is challenging for students because they navigate both puberty and a new environment. Puberty, occurring between ages 10 and 16, marks the transition from childhood to adolescence and involves considerable physical changes alongside emotional development. During this time, young people become more self-aware, try to create a personal style to establish their place in peer groups, and develop a strong desire for independence from authority figures such as parents and teachers.

The high school environment presents challenges such as integrating into new social groups, experimenting with smoking and alcohol, and striving for independence from parents. Therefore, this period represents a new beginning for students standing at the threshold of adolescence and adulthood. In this context, it is essential to guide young people toward adopting a lifestyle that prioritizes health, supports balanced physical and mental development, and promotes personality growth aligned with the social environment in which they live.

We are therefore referring to a healthy lifestyle, which involves adopting habits and behaviors that protect physical and mental health. These include healthy eating, regular participation in physical activity, sufficient rest, stress management, avoiding harmful behaviors such as smoking, alcohol consumption, energy drinks, and drug use, as well as personal care (Mihailescu & Enache, 2010). One of the components of a healthy lifestyle is therefore participation in regular physical activity (Belomazheva-Dimitrova 2020); however, current global estimates show that 1 in 3 adults and 81% of adolescents do not get enough physical activity. In addition, as countries experience economic development, levels of inactivity tend to increase and can reach up to 70%. This increase is driven by changing transportation habits, greater reliance on technology for work and leisure, cultural values, and more sedentary behavior (WHO, 2018). Both sedentary lifestyles and insufficient physical activity negatively affect health systems, the environment, economic growth, community and individual well-being, as well as overall quality of life (Mihai et al., 2024).

One consequence of sedentary lifestyles is the increasing prevalence of obesity, with 3 out of 10 children aged 7–9 in Romania affected (INSP, 2020). This excessive weight is primarily attributed to unhealthy diets high in calories and low levels of physical activity. The World Health Organization urges officials worldwide to actively promote physical activity. Without effective, long-term educational programs aimed at children and adolescents, Romania may face a substantial increase in obesity and other non-communicable diseases in the future (Roman et al., 2016).

The benefits of physical activity on health and quality of life are well established. It strengthens bones, increases muscle strength and endurance, reduces stress, anxiety, and frustration, improves blood circulation, and aids in appetite control (Făgăraș et al., 2024). Regular physical activity also helps prevent and manage non-communicable diseases such as heart disease, hypertension, stroke, diabetes, and various types of cancer. Additionally, it supports maintaining a healthy body weight and contributes to improved mental health, overall quality of life, and well-being. Physical activity encompasses all forms of movement. Common ways to stay active include walking, cycling, wheeling, sports, active recreation, and play—activities accessible and enjoyable for people of all skill levels (WHO, 2018). Moderate to vigorous physical activity is associated with a lower BMI and reduced rates of overweight. However, evidence suggests that the direct association between time spent watching TV and overweight may be even more significant (Ungurean et al., 2022).

Physical education in schools should form habits of independent motor activity, sport as a leisure-time activity, and physical education classes bring physical benefits (obesity prevention, harmonious development), mental and emotional benefits (stress reduction, development of self-discipline) and social benefits (communication and cooperation skills, increased self-confidence).

Regardless of the teaching approaches used, there are specific learning outcomes that pupils should develop when participating in physical education. Student outcomes have been traditionally categorized into four general domains: physical, cognitive, social, and affective (Breed et al., 2024). In an educational context, the physical education (PE) class is a prime place for students to acquire social skills and interact appropriately with their classmates and teachers (Barney et al., 2022). Also, students aged 9 to 15 years who participate in sport activities show behaviors with a lower risk of developing bullying (Benítez-Sillero et al., 2023). In fact, students who participate in physical and sports activities may show less aggressive attitudes and more respectful behavior towards their peers and rules, and may have greater self-control.

Despite these benefits the subject of physical education and sport is allocated one hour per week, totally insufficient we believe, this aspect has a direct influence on the formation of the competences of this subject, the aims of school physical education. Often, given the limited time allocated by the curriculum for physical education in schools, (Rus, et al., 2019) the issue of assessing the quality of learning and development of students remains a real challenge for teachers.

There is a constant attempt to change assessment systems in physical education, which are predominantly focused on students' motor ability, the other effects of practicing physical education (psychological, social, cognitive) are not assessed through scoring (Dudley & Burden, 2019). There are attempts to introduce technology and artificial intelligence into the assessment process that can be transferred to the educational system (Zeng, 2020). The assessment of somatic, functional and motor potential has been taking place periodically in our country, the last assessment was completed in 2012 (Cojocaru et al., 2015).

Materials and methods

Context and Participants

This study is based on the hypothesis that the limited number of physical education and sport hours in high school, combined with unrestricted access to information technology and a lack of leisure-time physical activity, contributes to a decline in the level of effort and motor capacity among ninth graders. The study aims to identify trends in physical development, exercise capacity, and motor skills of ninth-grade students in Romania at a regional level. The study was performed during the 2023–2024 school year in Orșova, at the Nautical Base of the Orșova School Club, which offers excellent facilities for physical education and water sports training. It involved three ninth-grade classes from three high schools: two in Mehedinți County (25 students) and one in Suceava County (25 students), totaling 50 students—15 boys and 35 girls aged 14–16 years. The average height was 165 cm (± 9.5) for girls and 176 cm (± 7.5) for boys, while the average body mass was 64.09 kg (± 12.05) for girls and 75.6 kg (± 6) for boys. The results of this group were compared with national and county-level data from 2012.

The study subjects were measured, weighed, and assessed functionally and motorically using the Ruffier test and motor tests including the 10 $\times$ 5 m shuttle run, standing long jump without momentum, trunk raises from a supine position, and endurance running—800 m for girls and 1000 m for boys. The selection process adhered to specific inclusion and exclusion criteria.

Inclusion criteria:

- students enrolled in school units, grades IX–X, aged 13–15 years
- voluntary participation of students in the activities
- possibility of monitoring and evaluating results
- clinically healthy status—physically fit with no medical contraindications to physical activity
- signed parental consent for underage students to participate in the study

Exclusion criteria:

- students medically exempt, either temporarily or for the entire 2023–2024 school year
- refusal to participate by the student and/or parent
- health issues, including secondary obesity confirmed by medical specialists

We selected these samples to enable a comparison with the results obtained in 2012, as published in the Report on the Evaluation of the Somatic, Functional, and Motor Potential of the School Population in Romania (Cojocaru et al., 2015). Currently, the evaluation system for ninth-grade students has changed. Anthropometric assessment included measurements of weight and height, as well as calculation of the BMI, which, according to the WHO, falls within the following ranges for this age group (14–16 years): 18.51–21.9 (age 14) and up to 23.4 (age 16) for boys, and from 22.4 (age 14) to 23.7 (age 16) for girls. Following the results obtained from the tests and applied samples, we performed statistical analysis using the mean, standard deviation, coefficient of variability, and Student's t-test. Our goal was to assess the results recorded by the research subjects separately for boys and girls. The interpretation was performed through comparison with the corresponding county results and the national data recorded in 2012 for the common motor measurements and tests.

Results

The analysis of the comparative results between our research subjects and the national BMI measurements shows a significant difference in favor of the 2012 national subjects at a threshold of $p < 0.01$. The mean value at the target group level indicates a value on the borderline of overweight. We also find the same regression trend at the level of the two counties, both in Mehedinți county at $t = 13.91$ for $p < 0.01$ and in Suceava county at $t = 9.11$ for $p < 0.01$. Thus, we find that the body mass index is higher in ninth grade in 2023, which is worrisome in terms of health status. The trend towards overweight is also found at the level of the two counties.

The analysis of the difference between our male research subjects and the national Ruffier test results indicates a significant difference in favor of the 2012 national level subjects at a threshold of $p < 0.01$. The difference in Mehedinți county is significant at $t = 4.87$ for $p < 0.01$, also in Suceava county we find a significant difference between the two measures at $t = 1.89$ for $p < 0.05$. We thus observe a depreciation of the physical capacity level from the average rating in 2012 to the satisfactory rating in 2023 (Table 1).

Table 1. Statistical indicators in somatic and functional measurements, boys, grade IX

Statistical indicators	BMI						The Ruffier test					
	Subjects	Study	MH	MH	SV	SV	Subjects	Study	MH	MH	SV	SV
	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012
<i>X</i>	24.19	21.17	24.63	21.31	23.81	20.84	13.67	8.35	14	7.68	13.37	8.35
<i>S</i>	0.90	9.77	0.72	2.97	0.87	2.85	5.96	1.76	3.42	1.84	7.49	1.20
<i>Cv</i>	3.72	-	2.94	13.93	3.66	13.67	43.63	-	24.44	24.01	56.06	14.39
<i>t</i>	9.46		13.91		9.11		3.45		4.87		1.89	
<i>p</i>	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		< 0.05	

The average BMI for boys in the ninth grade of the BMI scale (Table 2) shows that the group average is satisfactory, within the normal range for this age. The values of the coefficient of variability show that in the ninth grade boys we have a high homogeneity (3.72) (Chart 1).

Table 2. Classification of subjects according to BMI, 9th grade, boys

(BMI)	Nr. subjects	Percent %
Underweight	0	0
Normal	11	73%
Overweight	4	27%
Obesity gr.1	0	0
Obesity gr.2	0	0
Obesity gr.3	0	0

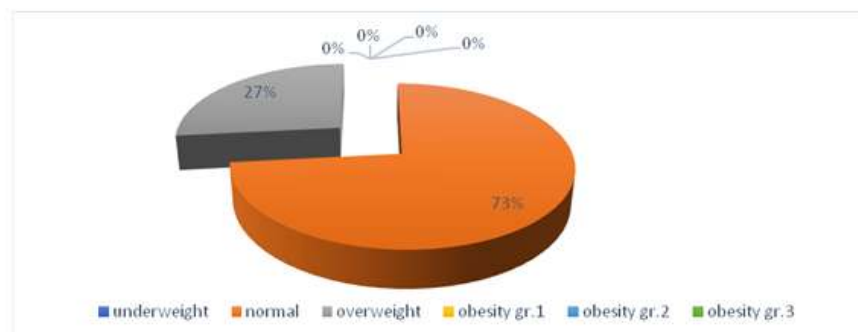


Chart 1. Representation of subjects' classification according to BMI, 9th grade, boys

The analysis of the comparative results between our research subjects (girls) and the national BMI measurements shows a significant difference in favor of the national BMI measurements in 2012 at a threshold of $p < 0.01$. We find the same regression trend at the level of the two counties. We thus find that the BMI is higher in ninth grade in 2023, which is worrisome in terms of health status. The trend toward overweight is also found at the two-county level.

Analysis of the difference between the values of our research subjects and the national Ruffier test results indicates a significant difference in favor of the subjects at the national level in 2012, at a threshold of $p < 0.01$. The difference is also significant at the county level which means that there is a trend of depreciation in the level of effort capacity from the "average" score recorded at the national level to the "satisfactory" score in the target group (Table 3).

Table 3. Statistical indicators in somatic and functional measurements girls, 9th grade

Statistical indicators	BMI						The Ruffier test					
	Subjects 2023	Study 2012	MH 2023	MH 2012	SV 2023	SV 2012	Subjects 2023	Subjects 2012	MH 2023	MH 2012	SV 2023	SV 2012
$\bar{X}$	23.40	20.39	24.12	20.05	22.62	20.72	12.03	8.43	12.88	7.50	11.11	8.63
S	1.58	8.09	1.37	2.52	1.40	2.56	4.16	1.73	4.92	1.47	2.90	1.07
Cv	6.76	-	5.71	12.58	6.22	12.34	34.62	-	38.17	19.54	26.15	12.36
t	11.01		11.73		5.41		5.11		4.62		3.52	
p	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01	

The average BMI of the 9th grade girls in our research subjects, as measured by the BMI measurements, is 23.40. Referring to the rating scale (Table 4) we observe that the average of the group is satisfactory, falling within the normal values at this age. The values of the coefficient of variability show that there is a high homogeneity (Cv 6.76%) in 9th grade girls (Chart 2).

Table 4. Classification of subjects according to BMI, 9th grade, girls

BMI	No. subjects	Percent %
Underweight	0	0
Normal	28	80%
Overweight	7	20%
Obesity gr.1	0	0
Obesity gr.2	0	0
Obesity gr.3	0	0

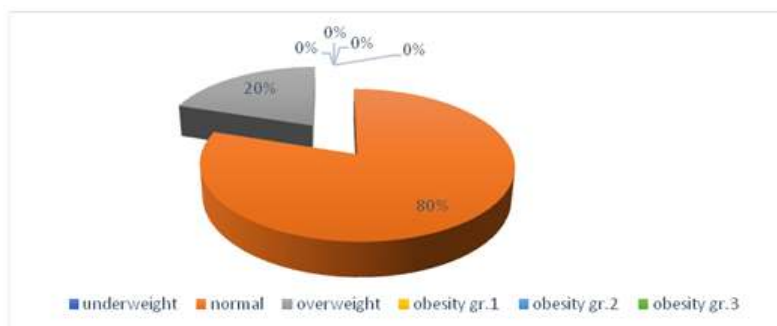
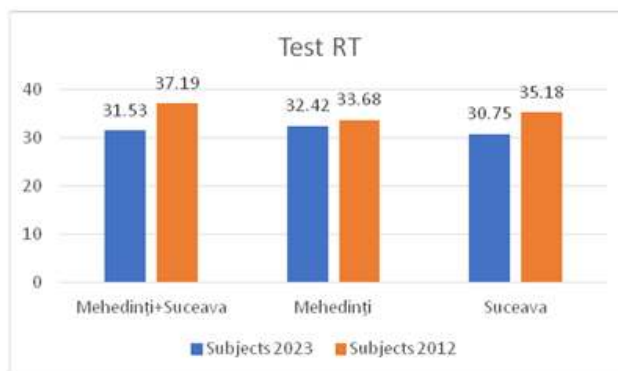


Chart 2. Representation of subjects' classification according to BMI, 9th grade, girls

Table 5. Statistical indicators of motor ability level, 9th grade boys

Statistical indicators	RT						Sl.f.e.					
	Subjects 2023	Study 2012	MH 2023	MH 2012	SV 2023	SV 2012	Subjects 2023	Study 2012	MH 2023	MH 2012	SV 2023	SV 2012
$\bar{X}$	31.53	37.19	32.42	33.68	30.75	35.18	1.71	1.85	1.71	1.84	1.71	1.92
S	2.62	2.13	2.61	2.13	2.38	2.12	0.17	0.27	0.18	0.22	0.16	0.22
C_v	8.33	-	8.05	38.79	7.75	34.70	9.96	-	10.54	12.38	9.43	11.89
t	8.36		1.26		5.24		3.18		1.88		3.67	
p	< 0.01		< 0.01		< 0.01		< 0.01		< 0.05		< 0.01	

The results obtained in boys at the level of motor capacity show that in RT compared to the results obtained at the national level we encounter a significant difference in favor of the subjects at the national level since 2012 at a threshold of $p < 0.01$. This shows that at the level of resistance strength at the level of the abdominal muscles the subjects of the target group are deficient. Significant differences also exist at the level of the two counties, for $p < 0.01$.



DChart 3. Representation of the values of statistical indicators in the RT test, 9th grade boys

In the Sl.f.e. boys test, the comparative analysis of the results between the two tests (2023 and 2012) shows a significant difference in favor of the subjects at the national level in 2012 at a threshold of $p < 0.01$. We find the same regression trend at the level of the two counties. We therefore find that at the level of explosive strength at the level of the lower limbs there is a regression also found at the level of the two counties. Thus, at the level of Mehedinți county, the recorded results indicate a significant difference at $t = 1.88$ for $p < 0.01$ and in Suceava county the difference is significant at $t = 3.67$ for $p < 0.01$ (Chart 4).

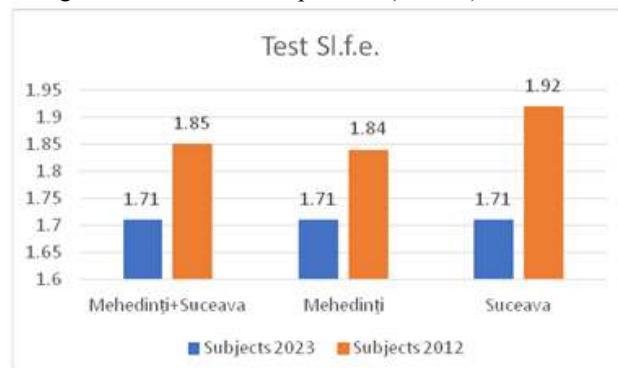


Chart 4. Representation of the values of statistical indicators in the Sl.f.e. test, 9th grade boys

Table 5. Statistical indicators of the level of motor capacity, 9th grade boys

Statistical indicators	Shuttle						Run 1000m					
	Subjects		Study		MH		SV		MH		SV	
	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012
X	22.88	20.09	23.01	17.46	22.76	19.54	4.29	4.31	4.21	4.59	4.36	3.97
S	2.93	4.34	2.39	3.01	3.33	2.23	0.23	0.70	0.31	1.00	0.09	0.43
Cv	12.82	-	10.39	17.25	14.63	11.43	5.58	-	7.57	21.81	2.06	10.77
t	3.68		6.05		2.72		0.33		2.98		10.92	
p	< 0.01		< 0.01		< 0.01		> 0.01		< 0.01		< 0.01	

The analysis of the difference between the results recorded by the boys and the national results in the Naveta test indicates a significant difference in favor of the subjects at the national level since 2012 at a threshold of $p < 0.01$. The same regression trend is also recorded at the level of the two counties. We therefore find that at the level of motor quality speed there is a regression at the level of the two counties: in Mehedinți county it is significant at $t = 6.05$ for $p < 0.01$, and in Suceava county at $t = 2.72$ for $p < 0.01$ (Chart 5).

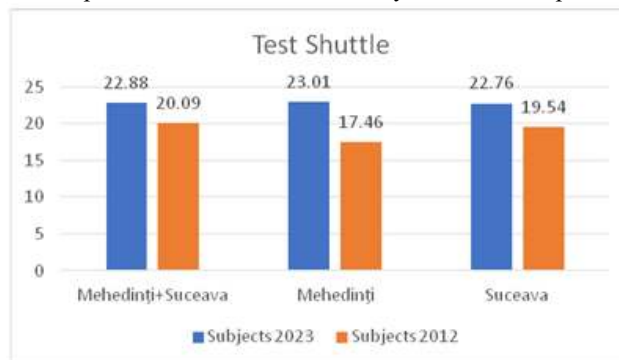


Chart 5. Representation of the values of the statistical indicators in the Naveta test, 9th grade boys

The results obtained in boys at the level of motor capacity show that in the Al.1000m test compared to the results obtained at the national level, there is an insignificant difference at $t = 0.33$ for $p > 0.01$. At the level of Mehedinți county, in this test there is a significant difference between the two tests at $t = 2.98$ for $p < 0.01$ as well as at the level of Suceava county at $t = 10.92$ for $p < 0.01$. We note that at the level of aerobic capacity there are differences at the level of the two counties in favor of the subjects at the national level (Chart 6).

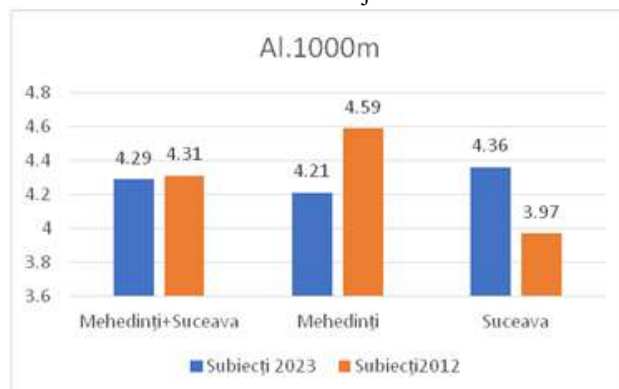


Chart 6. Representation of the values of statistical indicators in the Al.1000m. test, 9th grade boys

Table 6. Statistical indicators of the level of motor capacity, 9th grade girls

Statistical indicators	RT						Sl.f.e.					
	Subjects		Study		MH		SV		MH		SV	
	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012	2023	2012
X	26.54	32.46	25.11	30.26	28.05	32.52	1.30	1.56	1.34	1.59	1.27	1.59
S	3.80	12.84	3.49	11.64	3.52	12.53	0.12	0.24	0.13	0.20	0.11	0.20
Cv	14.33	-	13.91	38.48	12.55	38.53	9.90	-	9.98	13.14	8.85	13.07
t	9.12		5.10		4.68		12.77		7.75		11.61	
p	< 0.01		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01	

The results obtained in our research subjects (girls) show that in the trunk lift test from supine position (RT) compared to the results obtained at the national level, a significant difference is found in favor of the subjects at the national level since 2012 at a threshold of $p < 0.01$. And at the level of the two counties there is a significant difference between the two tests for $p < 0.01$. We therefore find a depreciation in the level of strength in resistance mode at the level of the abdominal muscles (Chart 7).

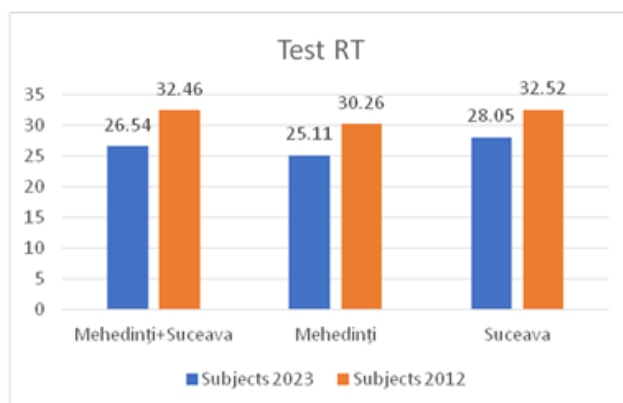


Chart 7. Representation of the values of the statistical indicators in the RT test, 9th grade girls

In the SI.f.e. test, the analysis of the results between the two tests (2023 and 2012) shows a significant difference in favor of the subjects at the national level in 2012 at a threshold of $p < 0.01$. The depreciation is also observed at the level of the two counties at a threshold of $p < 0.01$, which means that at the level of the lower limbs the explosive force is in decline in the subjects tested in 2023 (Chart 8).

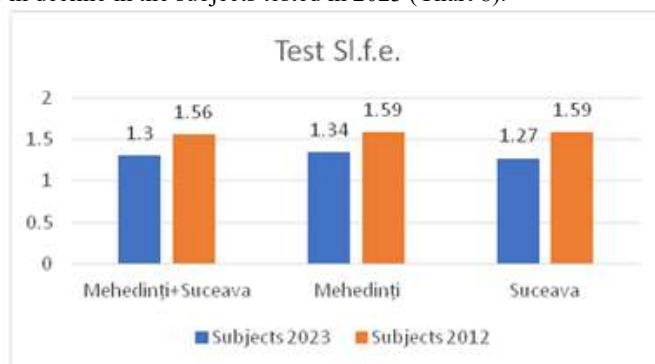


Chart 8. Representation of the values of statistical indicators in the SI.f.e. test, 9th grade girls

Table 7. Statistical indicators of the level of motor capacity, 9th grade girls

Statistical indicators	Shuttle						Al 800m					
	Subjects 2023	Study 2012	MH 2023	MH 2012	SV 2023	SV 2012	Subjects 2023	Study 2012	MH 2023	MH 2012	SV 2023	SV 2012
X	22.49	21.64	21.71	18.54	23.31	21.07	4.36	4.36	4.36	4.50	4.36	4.06
S	3.31	4.19	2.53	4.19	3.81	2.45	0.06	0.73	0.65	0.96	0.06	0.42
Cv	14.75	-	11.69	22.59	16.35	11.64	1.53	-	1.48	21.29	1.57	10.39
t	1.51		5.01		2.41		0		0.87		14.67	
p	>0.01		<0.01		<0.01		>0.01		>0.01		<0.01	

The analysis of the difference between the subjects tested in 2023 (girls) and the national results from 2012, in the 5x 10m shuttle test, indicates an insignificant difference between the two tests at $t = 1.51$ for $p > 0.01$. At the county level, however, a significant difference is recorded between the two tests for $p < 0.01$. This fact shows us that at the level of motor quality, speed, a regression is recorded between the two tests (Chart 9).

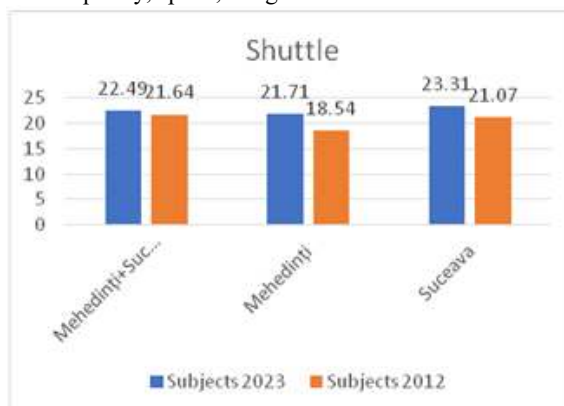


Chart 9. Representation of the values of the statistical indicators in the Naveta test, 9th grade girls

From the results obtained at the level of the subjects' motor capacity in 2023, it appears that in the Al. 800m test, compared to the results obtained at the national level, there is an insignificant difference at $t = 0$ for $p > 0.01$. At the level of Mehedinți county, there is an insignificant difference between the two tests at $t = 0.87$ for $p > 0.01$. At the level of Suceava county, the differences are significant at $t = 14.67$ for $p < 0.01$, which means that at the level of this county, the aerobic capacity of the students is in decline (Chart 10).

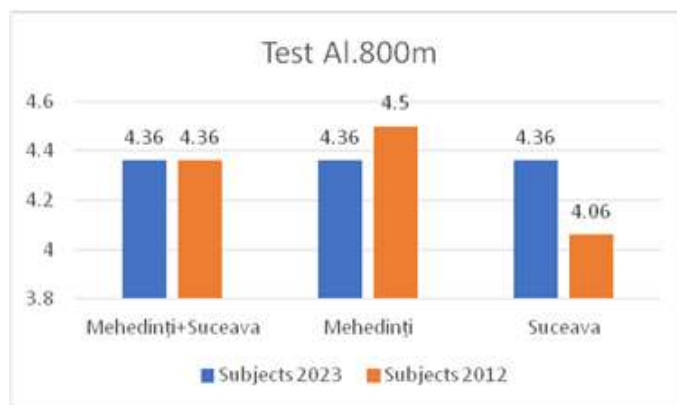


Chart 10. Representation of the values of the statistical indicators in the Al. 800m. test, 9th grade girls

Discussion

The results from the somatic measurements of ninth-grade boys and girls reveal significant differences between the tests performed in 2012 and 2023. Nationally, data from 2023 show increases in waist circumference, body mass, and BMI compared to 2012. This upward trend in anthropometric indicators points to a growing tendency toward overweight among adolescents, raising serious concerns about their physical health in the short, medium, and long term. Data from 2023 indicate an increasing trend towards overweight and, consequently, a decline in adolescents' physical health compared to the 2012 cohort. This development reflects the impact of modern lifestyle factors such as increased consumption of processed foods, decreased physical activity, and greater screen time. Over the long term, these anthropometric changes may contribute to the development of metabolic syndrome, type 2 diabetes, and other chronic diseases (Lobstein et al., 2015; Han et al., 2010). The results from the Ruffier test applied to ninth-grade students in 2023 show a decline in effort capacity compared to national data from 2012. This finding aligns with a wider national and international trend of progressive deterioration in adolescent functional health. Ortega et al. (2008) showed that cardiovascular fitness was a strong indicator of overall health in children and adolescents. The observed decline, coupled with increasing sedentary behavior and juvenile obesity, is well documented in recent studies (Tomkinson et al., 2019; Lobstein et al., 2015). In the Romanian context, Mihăilă, Rusu, and Dragomir (2018) reported a gradual decline in functional physical performance among high school students between 2005 and 2015, attributing this trend to reduced physical education hours and changes in leisure activities. Similarly, Popkin and Hawkes (2016) describe a global nutritional transition and lifestyle shift marked by increased energy intake, poor diet quality, and decreased regular physical activity, all of which negatively impact the functional capacity for exercise.

Last but not least, the WHO warns that the decline in physical capacity during adolescence has direct implications for long-term health, being associated with an increased risk of early cardiovascular and metabolic diseases (World Health Organization, 2022).

Therefore, the results of our study confirm the conclusions of these previous studies and highlight the need for systematic and urgent interventions at both the educational level and in public health policy.

The assessment of motor capacity among ninth-grade students was performed using four standardized tests. The 2023 results reveal a significant decline compared to the national reference values recorded in 2012.

Thus, in boys, all four tests—reaction time (RT), long jump (SLJ), shuttle run, and 800 m endurance run—show average values lower than those recorded a decade ago. This indicates a widespread decline in motor skills, affecting explosive strength, speed, and endurance.

For girls, the results are partially similar: performance in the RT and SLJ tests has declined, while results in the shuttle test and 800 m run from 2023 are relatively similar to those from 2012, with no statistically significant differences. These results align with trends reported in specialized literature, which highlight a progressive decline in motor skills among adolescents owing to an increasingly sedentary lifestyle, the digitalization of daily activities, and reduced participation in organized sports (Tomkinson et al., 2019; Ortega et al., 2008). Multiple studies from Romania and Central Europe confirm that basic abilities—strength, speed, and endurance—steadily decline between ages 12 and 16 if not maintained through regular physical activity (Mihăilă et al., 2018; Jürimäe et al., 2007). Notably, performance gaps between boys and girls are amplified by the lower engagement of adolescent girls in extracurricular physical activities.

Conclusions

The development of effort and motor capacities in ninth-grade students must consider each student's individual characteristics and developmental level. Contemporary physical education trends advocate for diversified training methods, focusing on functional exercises and promoting a stimulating learning environment. Ongoing assessment and the adaptation of content to students' actual needs play a crucial role in cultivating active, balanced, and motivated young individuals. A carefully designed physical education program can effectively improve not only motor skills but also personal and social values.

This study emphasizes the importance of individualizing physical activities and promoting an active lifestyle from the beginning of high school. It offers a somatic, functional, and motor profile of ninth-grade students from the surveyed areas, revealing concerning signs regarding the normality of somatic and functional development, as well as a considerable decline in motor skills compared to previous generations.

Given these conditions, a coordinated intervention involving education stakeholders—schools, families, teachers, and authorities—is essential. This intervention should focus on increasing awareness among young people about the health risks of a sedentary lifestyle and encouraging their participation in recreational physical activities, which are crucial for maintaining health and preventing various diseases.

The results emphasize the urgent need for curricular intervention by either increasing physical education hours or adapting their content to match the actual motor capacity of students. Continuous monitoring of motor performance is crucial, which can be achieved through the annual administration of standardized motor test batteries. Active involvement of parents, the community, and digital platforms is essential to promote a culture of movement and counteract the observed decline in motor skills.

The study confirms a negative national trend in the somatic development of ninth-grade students, consistent with findings from international research. This trend is driven by multiple factors, including sedentary lifestyles, unhealthy diets, the lack of systematic school interventions, and broader social and technological influences.

Conflicts of interest - If the authors have any conflicts of interest to declare.

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