CHANGES IN MOTOR PERFORMANCE IN EARLY SCHOOL-AGED ROMA CHILDREN

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Abstract: In their contribution, the authors approach the issue of the movement performance of Roma children of younger school age by following the trends in the development of somatic and movement characteristics over a 20-year period. Our research was attended by (668 children) from elementary schools from five cities in the East Slovak region. The aim of the contribution is to identify the current state and level of somatic and motor characteristics of Roma children in primary education in primary schools of the East Slovak region in relation to age and gender. To determine the level of movement skills, we used selected tests from the EUROFIT battery. We compared the achieved research results of all children in our research (File: R 2019) with the research results of twenty years ago (Horváth: R 2001). By analyzing and comparing the results, we point out development trends after a 20-year period and at the same time provide an analysis of the causes of possible changes.

Keywords: Diagnosis, somatic and motor characteristics, EUROFIT-test, movement skills, coordination skills, comparison, younger school age.

1 Introduction

We cannot imagine life in our schools without adequate physical activity. The child should be led to movement activities from a young age, because the first habits are already formed during this period. Children perceive their parents as role models, and when they notice that their parents are not interested in physical activity, we can assume that the child will also imitate their attitude. Knowing the state of movement abilities of children of younger school age in primary education contributes significantly to its positive influence in terms of prevention and the goal of the set requirements for children. By looking for effective models for the development of movement skills in physical and sports education, we will help children discover the benefits of movement activities and the possibilities of enjoying them. Their development should take into account and respect the age and individuality of each child. According to the author Ogden et al. (2012) the behavior and characteristics of today's children together with their genetics are determinants of their growth and development which affects their physical, mental and psychosocial health and their physical and cognitive performance. The technological progress of modern society has contributed to a sedentary lifestyle, which has changed the phenotype of children compared to the phenotype of 20 years ago. Today's children weigh more and have a higher body mass index (BMI) than their peers just a generation ago.

The authors (Güngör, 2014, Maile et al., 2015) state that an alarming increase in the prevalence of childhood overweight and obesity has been observed in recent decades, which is partly attributed to a lack of physical activity and has begun to become a public health problem. Reduced levels of physical activity in children lead to overweight or obesity, while excess energy intake together with unhealthy eating habits, and also a combination of both, leads to an excess of energy.

According to the author Abel et al. (2018) there are research findings that suggest high levels of obesity have a negative impact on physical fitness parameters. Research suggests that health-related fitness parameters - such as BMI, body composition parameters and flexibility - may vary with different levels of obesity and physical activity. Recently, a new generation of video games that require the body to move while playing is gaining popularity among researchers who hope to find effective approaches to solving the epidemic of childhood physical inactivity that is leading to the childhood obesity crisis.

In the US, the obesity crisis is evident in many health surveillance data sets (Sun, 2013). For example, the author Zapata et al. (2008) estimated that obesity rates have tripled since 1980 among youth ages 6-11. The rise of childhood obesity has become the biggest threat to health as research has shown that more than half of obese children will become obese adults in their lifetime. Many factors were identified as contributing to the obesity crisis. Sedentary activities are one of the most significant of them. Today, children and adolescents spend most of their free time in sedentary activities, such as watching television for hours, surfing the Internet continuously using a computer, or playing video game consoles non-stop. As children and adolescents are more likely to spend their free time in sedentary activities, active video games that allow players to physically manipulate and interact with the game show potential to engage youth in physical activit.

We believe that among the factors that influence the entire process of motivating children to physical education and sports are primarily the quality and quantity of understandable information in everyday life, the climate of school and home, the teacher, coach and family, but also the child himself. According to the author Horváth et al. (2010) somatic and movement testing has a wide scope and at the same time affects the individual, school, region, education and health departments, their orientation, with important goals for a healthy lifestyle for the whole society. The author Šimonek (2018) is of the opinion that when determining children's talent for sports, not only the level of motor skills should be monitored, but also the level of motor competences manifested in basic movements such as walking, running, jumping, throwing, rolling a ball, jumping rope, jumping over an obstacle etc. The state of gross motor skills usually reveals the quality of children's motor skills more than performance in tests of motor skills.

Several authors, e. g. Antala et al. (2018), Horváth et al. (2016), Merica & Barnáková (2021), Belešová (2022), Merica & Belešová (2022), Severini, E., Kožík Lehotayová, B., & Kuruc, M. (2020) Severini, Kožuchová & Brezovská (2021), Koreňová, Severini & Čavojský (2023) emphasize that teachers significantly influence the development of education system, upbringing and education itself. The importance of the teaching profession affects all areas of society's life. According to the authors Gunčaga, Žilková & Partová et al. (2019), Gunčaga & Belešová (2023), Kostrub (2022) Porubčanová & Zapletal (2022), Horecký, J., & Koreňová (2023) the teacher influences the character and quality of the relationship with the students, conditions the atmosphere in the classroom, stimulates the students' interest - including their relationship to sports and active physical activity, their experience of life at school, development of their knowledge and their entire personality. Other authors, e. g. Gregor (2013), Horváth (2001), Kampmiller & Vanderka et al. (2012), Petrikán (2021), Turek (1999) recommend physical activities as part of a healthy lifestyle and emphasize the need for regular exercise in children from the earliest school age.

2 Methodology

Goal. The goal of the contribution is to find out and identify the state of level of somatic and motor characteristics of Roma children of younger school age from elementary schools in cities, villages and settlements in the East Slovak region and to find out the trends of their development by comparing our research (File: R 2019) with research from twenty years ago (Horváth: R 2001) and try to analyze the causes of the development based on the comparison. To determine the level of motor skills, we used selected tests from the EUROFIT by Moravec et al. (2002).

Tasks. Based on the goal we set, we set the following tasks: Select elementary schools in the East Slovak region where we will carry out our research, instruct teachers and explain the methodology of testing children. Select the test items from the EUROFIT-test that we will use during testing. Carry out planned testing of Roma children of younger school age in six primary schools in the East Slovak region. To compare the results of our research (File: R 2019) carried out on (668) Roma children of the Eastern Slovak region with the results of research (Horváth: R 2001), which was realized on (1093) Roma children of the Eastern Slovak region, of which there were (550) boys and (543) girls. Statistically process and evaluate the measured results.

Hypotheses. On the basis of the goal and tasks of the work, we set up the following hypotheses (H0-1, H1-1, H0-2, H1-2):

H0-1: We assume that there will be no statistically significant difference in somatic characteristics between the results of the Roma children from the research (Horváth: R 2001) and the results of the Roma children from our research (File: R 2019).
H1-1: We assume that between the results of the Roma children from the research (Horváth: R 2001) and the results of the Roma children from our research (File: R 2019) there will be a statistically significant difference in somatic characteristics in favor of the children from our research (File: R 2019).
HO-2: We assume that there will be no statistically significant difference between the results of the Roma children from the research (Horváth: R 2001) and the results of the Roma children from our research (Súbor: R 2019) in the individual tests of motor characteristics.
H1-2: We assume that there will be a statistically significant difference between the results of the Roma children from the research (Horváth: R 2001) and the results of the Roma children from our research (File: R 2019) in the individual tests of motor characteristics, and the results of the Roma children from of our research (File: R 2019) will be better.

Characteristics of the research object: Our research (File: R 2019) was attended by (668) Roma children of younger school age from six primary schools (ZŠ) of the East Slovak region in the cities, villages and settlements: Sobrance, Vranov n/Topľou, Rudňany, Veľké Kapušany, Jarovnice and Bardejov. Of these, there were (379) boys and (289) girls. They were students of the first, second, third and fourth grades. In our research (File: R 2019) we included: 7, 8, 9 and 10-year-old Roma children of younger school age, while for 7-year-olds we consider the decimal age 7.00-7.99, for 8-year-olds the decimal age 8 .00-8.99, for 9-year decimal ages 9.00-9.99 and for 10-year decimal ages 10.00-10.99.

Methods of data acquisition: We chose the following tests to determine the data we are tracking.
For somatic characteristics, we chose: 1. TV (body height), 2. TH (body weight), 3. BMI (Body Mass Index).
For motor characteristics, we selected the following items from the EUROFIT test:

1. Test (PRKL) –Forward bending with reaching while sitting. Factor: joint mobility and flexibility of the body of the sitting part of the body and the back of the legs.
2. Test (SKOK) – Long jump from a place. Factor: explosive power of the lower limbs.
3. Test (LS) – Sit up in 30s. Factor: dynamic and endurance strength of the abdominal, hip and thigh muscles.
4. Test (VZH) – Pull-up. Factor: static, endurance strength of the muscles of the upper body.
5. Test (CBEH) – Shuttle run 10 x 5m. Factor: running speed with changes of direction.
6. Test (VBEH) - Endurance shuttle run. Factor: running endurance.

Methods of processing and evaluating the results: We statistically processed and evaluated the measured data. We digitized the measured values recorded in the recording sheets as an input database, which we processed using the EXCEL program from the Microsoft Office package. The first step, before processing the research data, was the exclusion of extreme values (outliers). We evaluated somatic indicators using percentile charts. Since we want to test hypotheses about the statistical significance of file differences, we had to decide what type of test to use. When deciding between parametric and non-parametric tests, the deciding factor is the normality of the sets and whether the variances of the sets are not significantly different. We tested normality with the Shapiro-Wilk normality test, and variances were tested with the F test. Since normality was confirmed and the results of the F test did not show significant differences in the variances, we used the parametric T test, the so-called "one simple t test", to test the hypotheses. The formula that this t test is based on is

$$t = \left(\frac{x_{1999} - x_{2019}}{s}\right)\sqrt{n}$$

where x1999 and x2019 (are the arithmetic means of the sets), s (is the standard deviation), n (is the number of probands in the set). We compared the calculated value of t at the assumed level of significance α=0.05 with the table value of the Student's distribution at n-1 degrees of freedom tcrit. If t>tcrit, we reject the null hypothesis H0 and accept the alternative hypothesis H1. The use of several statistical methods can also be found in the authors Hendl (2006), Tomšik (2017), Gunčaga, Zawadowski, Prodromou (2019) and others.

3 Results and discussion

Obtained results from the testing of somatic indicators and motor movement skills of Roma children of younger school age (n = 668) from six primary schools in the East Slovak region (in cities, villages and settlements: Sobrance, Vranov n/Topľou, Rudňany, Veľké Kapušany, Jarovnice and Bardejov), we present in tables and graphs taking a position on the individual four hypotheses. We note that the primary schools in Rudňany and Jarovnica are attended exclusively by children from the surrounding settlements. There were (379) boys and (289) girls in the group we monitored. They were students of the first, second, third and fourth grades. In Tab. (1) we present the number and composition of our monitored file of Roma children (File: R 2019) in the number of 668 children.

Tab. 1: Number and composition of files of Roma children (n=668) of younger school age: (File: R 2019)

	Boys					Girls					Sum
	7th	8th	9th	10th	Sum	7th	8th	9th	10th	Sum	
ZŠ Sobrance	15	15	15	15	60	15	15	15	15	60	120
ZŠ Vranov n/Topľou	15	13	9	18	55	16	17	14	17	64	119
ZŠ Rudňany	15	15	15	15	60	14	30	15	15	74	134
ZŠ Veľké Kapušany	19	20	20	11	70	22	15	20	20	77	147
ZŠ Jarovnice	15	15	15	15	60	15	15	15	15	60	120
ZŠ Bardejov	19	23	15	17	74	10	10	16	9	45	119
	98	101	89	91	379	92	102	95	91	289	668

3.1 Somatic characteristics of Roma children of younger school age

Approximately 450,000 Roma live in Slovakia, most of them in eastern Slovakia. If in the majority society there are 12% of children, in the Roma population it is 46% of children. This issue significantly affects a wide range of current and future problems of members of marginalized Roma communities - we mean the interrelationship between health status, socio-economic situation, school success and, consequently, applicability on the labor market, etc. Similar research has not yet been carried out in Slovakia in a long-term perspective. In the following tables (Tab. 2, 3) we present the somatic characteristics of Roma children of younger school age in our monitored group (File: R 2019) in number (n = 668), which we also specified for the category of 7- and 8-year-old children and for the category for 9- and 10-year-old Roma children.

Tab. 2: Somatic characteristics of Roma children of younger school age (7 and 8 years old): (File: R 2019)

Age			7						8					
			n	x	s	T	tkrit	T-test	n	x	s	T	tkrit	T-test
TV	B	2001	135	115,59	6,30	8,53	1,993	**	142	121,09	5,31	7,69	1,990	**
		2019	72	122,35	6,72				74	127,22	6,80			
	G	2000	136	114,84	6,71	8,91	1,990	**	132	120,47	6,40	7,79	1,987	**
		2019	74	120,12	5,90				87	125,86	6,45			
TH	B	2001	135	20,92	2,39	7,69	1,993	**	142	23,18	2,91	7,26	1,993	**
		2019	72	24,45	3,80				74	28,68	6,86			
	G	2001	136	20,78	3,10	5,69	1,993	**	132	22,64	3,00	8,74	1,950	**
		2019	74	22,10	2,89				87	26,75	4,38			
BMI	B	2001	135	15,66	1,51	8,49	1,993	**	142	15,81	1,56	5,25	1,993	**
		2019	72	16,29	1,80				74	17,62	2,94			
	G	2001	136	15,66	1,69	2,84	1,992	**	132	15,75	1,27	5,46	1,980	**
		2019	74	17,44	2,56				87	18,36	1,56			

*Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tkrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically significant difference of the T-test at the level of 0.05%).*

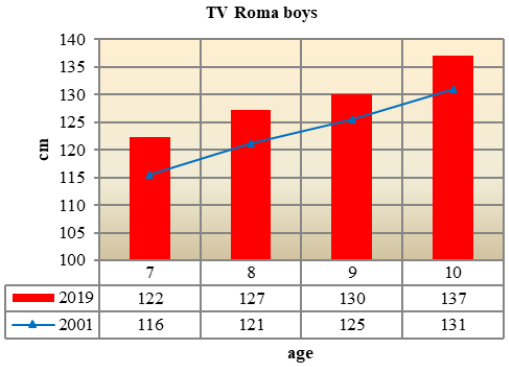
Tab. 3: Somatic characteristics of Roma children of younger school age (9 and 10 years old): (File: R 2019)

Age		9						10					
		n	x	s	T	tkrit	T-test	n	x	s	T	tkrit	T-test
TV	B	141	125,43	5,80	5,50	1,994	**	132	130,96	1,60	6,83	1,940	**
		72	130,14	7,21				72	137,06	7,52			
	G	133	124,50	6,56	7,87	1,993	**	141	130,23	7,30	10,33	1,990	**
		74	130,57	6,58				77	139,85	8,40			
TH	B	141	24,94	4,53	7,94	1,994	**	132	27,4	4,70	7,34	1,994	**
		72	32,04	7,54				72	35,93	10,2			
	G	133	24,31	3,56	7,67	1,993	**	141	27,4	4,80	9,82	1,990	**
		74	29,95	6,24				77	36,25	8,17			
BMI	B	141	15,78	2,20	7,167	1,994	**	132	15,85	1,94	6,76	1,954	**
		72	18,75	3,55				72	18,87	3,77			
	G	133	15,66	1,85	5,41	1,993	**	141	15,85	1,82	9,15	1,990	**
		74	17,44	6,70				77	18,37	2,40			

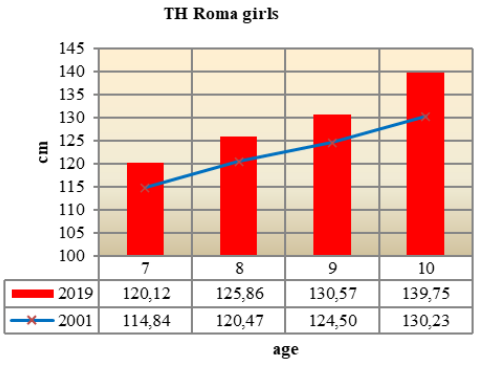
*Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tkrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically significant difference of the T-test at the level of 0.05%).*

By testing the hypotheses with the Student's T-test, we verified the hypothesis H0-1 that there will be no statistically significant differences between the results of our research (File: R 2019) and the results of the research (Horváth: R 2001). When analyzing the results of the T-test (Tab. 2, 3), we can state that the results of the T-test disproved this hypothesis and confirmed statistically significant differences in somatic characteristics in both Roma boys and girls in all age groups of the research (File: R 2019). We will graphically discuss these differences with the help of a graphic representation.

Graph 1: Body height: Roma boys (n = 379)

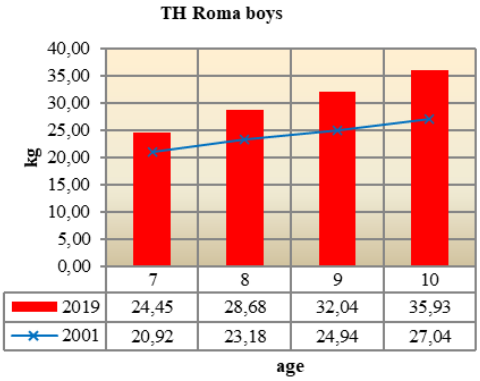


Graph 2: Body height: Roma girls (n = 289)

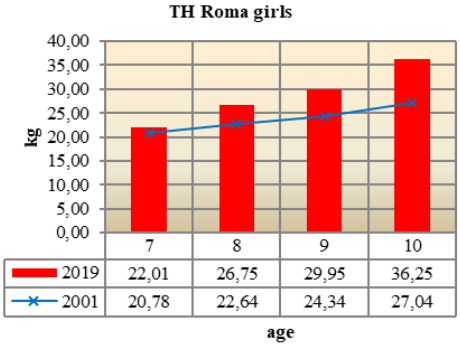


When analyzing the values (Graph 1, 2) of the somatic characteristic: Body height (TH), we see that the Roma boys from our research (File: R 2019) are taller than the Roma boys from the research (Horváth: R 2001) in all age categories and it is on average up to 6 cm. In the research (Horváth: R 2001) we see that the lag behind the majority population was up to 3 years. Today, although Roma boys are shorter than their peers, this lag is no longer so striking and is also genetically conditioned. The same applies to Roma girls. The biggest difference is observed in 10-year-old girls, where this difference is up to 9 cm.

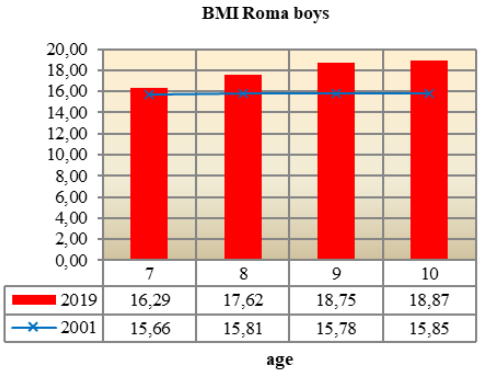
Graph 3: Body weight: Roma boys



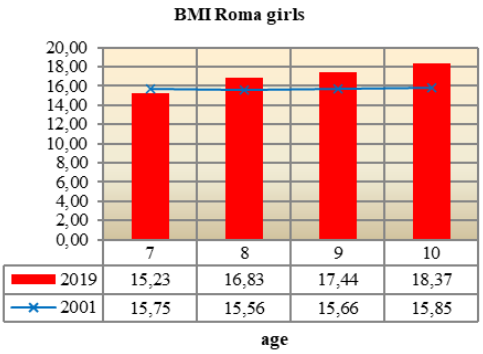
Graph 4: Body weight: Roma girls



Graph 5: Body mass index (BMI): Roma boys



Graph 6: Body mass index (BMI): Roma girls



When analyzing Body Weight (TH) monitoring, it is significant (Chart 3, 4) that the differences between both sets of Roma children, boys and girls, increase with increasing age. The author (Horváth: R 2001) states that Roma children lag behind their peers from the majority society by 2 to 3 years. In our research, we see that in higher age categories, the differences decrease. For 10-year-old boys and girls (File: R 2019), the difference compared to their peers (Horváth: R 2001) is up to 8 kg. Of course, this fact (Chart 5, 6) is also reflected by the Body max index (BMI). While 10-year-old boys and girls in the research (Horváth: R 2001) were on the percentile graph in the malnutrition zone, boys and girls (File: R 2019) are in the 20th percentile.

3.2 Evaluation of motor tests

In the following tables (Tab. 4, 5) we present the mgotor characteristics of Roma children of younger school age (n=668) of our monitored group (File: R 2019), which we also specify for Roma children of younger school age (7 and 8 years old) and Roma children of younger school age (9 and 10 years old).

Tab. 4: Motor characteristics of Roma children of younger school age (7 and 8 years old): (File: R 2019)

Age			7						8					
			n	x	s	T	tkrit	T-test	n	x	s	T	tkrit	T-test
PRKL	B	2001	135	11,31	5,10	5,30	1,990	**	142	15,43	6,33	9,22	1,990	**
		2019	72	19,59	6,53				74	18,71	5,34			
	G	2001	136	18,79	5,47	9,26	1,990	**	132	19,41	5,30	14,11	1,990	**
		2019	74	13,83	5,49				87	14,83	5,40			
SKOK	B	2001	135	94,46	19,20	4,65	1,990	**	142	106,34	17,61	5,50	1,990	**
		2019	72	83,13	20,70				74	116,30	16,83			
	G	2001	136	81,50	17,10	2,35	1,990	**	132	95,99	16,59	3,49	1,990	**
		2019	74	76,31	18,95				87	102,55	17,62			
LS	B	2001	135	10,17	4,29	1,14	1,990		142	12,25	4,49	8,81	1,990	**
		2019	72	9,60	4,25				74	16,24	3,87			
	G	2001	136	7,54	3,93	0,21	1,990		132	9,17	4,72	12,20	1,990	**
		2019	74	7,61	2,95				87	14,28	3,91			
CBEH	B	2001	135	39,21	5,89	8,49	1,990	**	142	28,99	5,85	4,90	1,990	**
		2019	72	25,75	5,49				74	25,32	3,50			
	G	2001	136	39,21	4,64	12,7	1,990	**	132	30,68	6,71	13,73	1,990	**
		2019	74	29,66	6,47				87	25,35	3,62			
VBEH	B	2001	135	11,48	4,57	3,90	1,990	**	142	17,31	11,54	4,90	1,990	**
		2019	72	13,39	5,24				74	14,14	5,53			
	G	2001	136	11,48	3,19	1,48	1,990		132	13,10	4,55	1,49	1,990	
		2019	72	10,71	4,05				72	13,81	4,65			

*Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tkrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically T-test significant difference at the 0.05% level*

The motor tests in the tables (Tab. 4, 5) and in the graphs (Graph 1 - 12) are marked with abbreviations that mean: 1. Test (PRKL): Forward bending with reaching while sitting. 2. Test (JUMP): Long jump from a place. 3. Test (LS): Sit up in 30 seconds. 4. Test (VZH): Pull-up. 5. Test (CBEH): Shuttle run 10 x 5m. 6. Test (RUN): Endurance shuttle run.

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Tab. 5: Motor characteristics of Roma children of younger school age (9 and 10 years old): (File: R 2019)

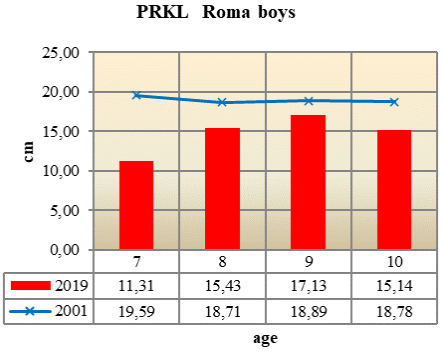
Age			9						10					
			n	x	s	T	tkrit	T-test	n	x	s	T	tkrit	T-test
PRKL	B	2000	141	18,89	4,98	1,86	1,990		132	18,78	4,25	3,47	1,990	**
		2019	72	17,13	7,95				72	15,14	8,82			
	G	2000	131	18,12	4,32	2,96	1,990	**	141	18,78	4,50	3,64	1,990	**
		2019	74	15,35	7,97				77	15,39	8,12			
SKOK	B	2000	141	108,34	22,44	0,373	1,990		132	108,51	19,84	3,92	1,990	**
		2019	72	107,60	16,50				72	117,06	18,34			
	G	2000	131	97,75	15,31	2,98	1,990	**	141	108,51	16,90	1,49	1,990	
		2019	74	97,65	17,27				77	105,51	20,25			
LS	B	2000	141	14,21	4,90	4,49	1,990	**	132	12,13	4,74	13,27	1,990	/**
		2019	72	16,56	4,39				72	18,65	4,14			
	G	2000	131	11,69	4,86	5,41	1,990	**	141	12,13	4,46	8,85	1,990	**
		2019	74	14,38	4,24				77	16,57	4,36			
VZH	B	2000	141	13,84	10,90	0,07	1,990		132	8,67	6,50	7,93	1,990	**

		2019	72	13,91	8,16				72	19,15	11,13			
	G	2000	131	7,76	4,64	0,35	1,990		141	8,67	5,66	2,95	1,990	**
		2019	74	7,55	4,94				77	11,79	9,21			
CBEH	B	2000	141	27,35	6,12	7,47	1,990	**	132	28,83	5,12	17,71	1,990	**
		2019	72	23,85	3,95				72	22,22	3,15			
	G	2000	131	29,74	5,77	9,19	1,990	**	141	28,83	5,79	13,89	1,990	**
		2019	74	25,79	3,76				77	24,52	2,71			
VBEH	B	2001	141	14,57	3,70	2,3	1,990	**	132	18,17	5,22	2,56	1,990	**
		2019	72	15,23	4,50				722	17,50	3,89			
	G	2001	131	14,17	5,20	3,5	1,990	**	131	18,17	4,89	3,15	1,990	
		2019	74	14,23	4,80				74	16,13	3,15			**

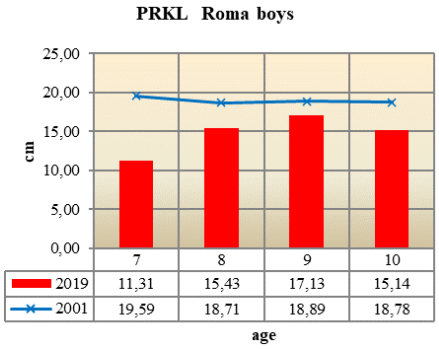
*Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tkrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically T-test significant difference at the 0.05% level)*

In the next part (Chart 7 - 12) we present the results of individual motor tests of Roma children (Roma boys and Roma girls) of younger school age, including the attitude towards individual hypotheses.

Graph 7: Forward bending with reaching (PRKL): Roma boys (factor - joint mobility of the upper body)

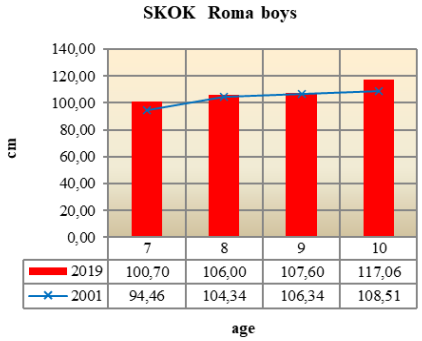


Graph 8: Forward bending with reaching (PRKL): Roma girls

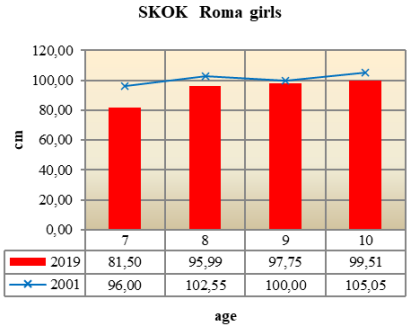


In the test item: Forward bending with reaching in a sitting position (PRLK), which represents the joint mobility of the upper body, we observe large differences between the measurement (Horváth: R 2001) and our research (File: R 2019). The biggest differences are for boys and girls in the 7-year-old and 10-year-old age categories (Graph 7, 8). We do not have an explanation for this situation, we believe that there may also have been non-compliance with the measurement methodology (e. g. failure to bend the knees during measurement).

Graph 9: Long jump from place (SKOK): Roma boys (factor - explosive power of the lower limbs)

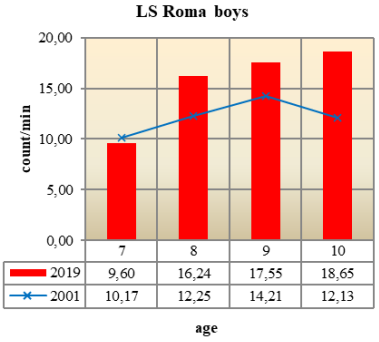


Graph 10: Long jump from place (SKOK): Roma girls

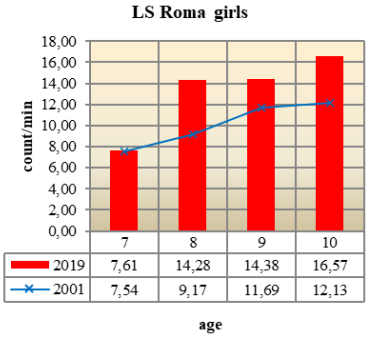


Long jump from the place (SKOK): this test evaluates the explosive strength of the lower limbs. For boys, there are statistically significant changes in all age categories except for 9-year-old boys. In all age categories (Graph 9, 10), boys from our research have better results (File: R 2019). The situation is different for girls, in all age categories girls achieved better average values from the measurement (Horváth: R 2001).

Graph 11: Sit up (LS): Roma boys (factor - dynamic and endurance strength of the abdominal, hip and thigh muscles)

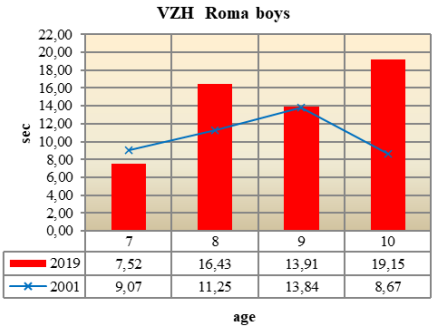


Graph 12: Sit up (LS): Roma girls

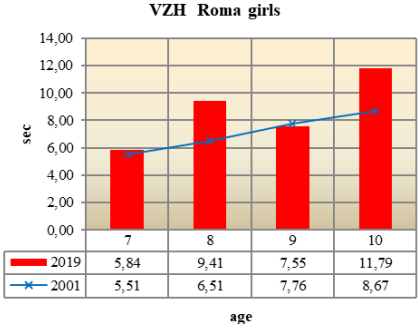


With the test item: Sit up (LS), we test the dynamic and endurance strength of the abdominal and hip-thigh muscles. When analyzing the results (Graph 11, 12), we can state that in the age category of 7-year-old boys and girls, the results of both studies are almost identical. In the age category of 8, 9 and 10-year-old boys and girls, the probands of our research have statistically significantly better results (File: R 2019). We noticed the biggest differences in 10-year-old boys and girls.

Graph 13: Pull-up (VZH): Roma boys (factor - static and endurance strength of the muscles of the upper body)

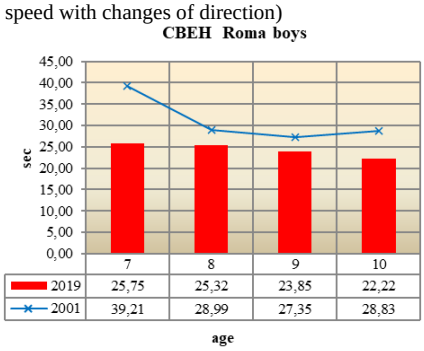


Graph 14: Pull-up (VZH): Roma girls

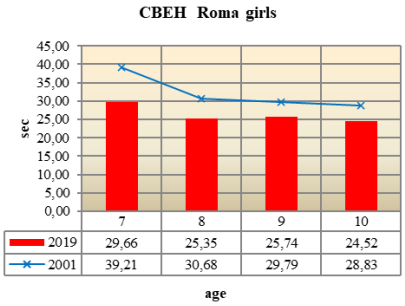


Pull-up (VZH) evaluates the static and endurance strength of the muscles of the upper body. Even in this test item (Graph 13, 14) we see minimal differences in both 7-year-old boys and girls between the monitored groups. We noted the biggest differences in 8- and 10-year-old boys and girls. In these age categories, the probands from the research achieved significantly better results (File: R 2019).

Graph 15: Shuttle run 10 x 5m (CBEH): Roma boys (factor - running speed with changes of direction)

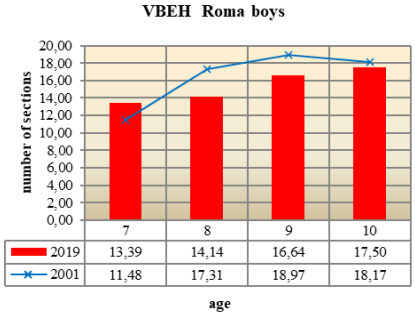


Graph 16: Shuttle run 10 x 5m (CBEH): Roma girls

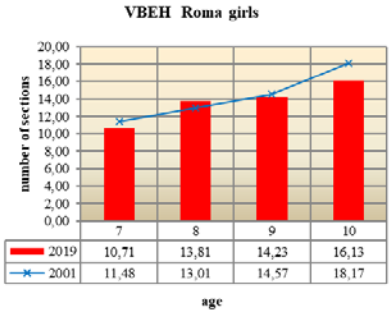


When analyzing this test item: Shuttle run 10 x 5m (CBEH), which characterizes running speed with changes of direction (Graph 15, 16), it is clear that better results were achieved by children from the research (File: R 2019) in all age groups in boys also in girls compared to research (Horváth: R 2001).

Graph 17: Endurance shuttle run (VBEH): Roma boys (factor - running endurance)



Graph 18: Endurance shuttle run (VBEH): Roma girls



Test item: Endurance shuttle run (VBEH), which represents running endurance ability (Graph 17, 18). Here we recorded the

following results: in the category of 7-year-old boys, better results were achieved by boys from the research (File: R 2019), in other age categories better results were achieved by Roma boys from the research (Horváth: R 2001). For Roma girls, 7, 9 and 10-year-old girls from the research ran more sections (Horváth: R 2001), only in the 8-year-old category did the girls from the research achieve better results (File: R 2019).

3.3 Opinion on hypotheses and discussion

In the null hypothesis H0-1, we assumed that there would be no statistically significant differences in the somatic characteristics between the results of the somatic characteristics of Roma children from the research (Horváth: R 2001) and the results of our research (Súbor: R 2019). We disproved this hypothesis with a T-test and the alternative hypothesis H1-1 is valid, that there are statistically significant differences in the somatic characteristics of the children from the research (Horváth: R 2001) and the results of our research (File: R 2019), which applies to all age categories for both boys and girls. Roma children of younger school age from our research (File: R 2019) have a higher weight, height and Body mass index (BMI) than Roma children from research (Horváth: R 2001).

In the null hypothesis H0-2, we assumed that there would be no statistically significant differences between the results of the children from the research (Horváth: R 2001) and the results of our research (File: R 2019) in the tests of motor characteristics in the individual test items. This hypothesis was unequivocally refuted by the T-test, and the alternative hypothesis H1-2 is valid, that between the results of the Roma children from the research (Horváth: R 2001) and the results of the Roma children from our research (File: R 2019) there are statistically significant differences in motor characteristics tests in individual test items.

We assumed that the results in the motor characteristics of the children from our research (File: R 2019) would be better than the results of the Roma children from the research (Horváth: R 2001). This hypothesis was confirmed, but not for all test items, not for all age categories of boys and girls. The assumption that the results of Romani children from our research (File: R 2019) would be better in tests of motor characteristics than the results of Romani children from research (Horváth: R 2001) was not confirmed for all test items. This assumption was clearly confirmed in the LS, VZH and CBEH test items, in the VBEH and SKOK items, where the results were ambiguous depending on the age categories and gender of the children. In the PRKL item, both boys and girls had better results in all age categories from the research (Horváth: R 2001).

However, it is important to point out that when evaluating the results of Roma children, we must take into account the specifics of the life of this ethnic group. The increase in body weight and BMI, which we evaluated negatively in children of the majority population, must be evaluated differently in the case of Roma children. In research (Horváth: R 2001) it was stated that Roma children lag behind children of the majority population by 2-3 years in somatic characteristics. Roma children were on the borderline of malnutrition when analyzing BMI. This has changed in our research (File: R 2019) and Roma children are in the 40th percentile of BMI, which is positive news. Apparently, this testifies to the higher standard of living of some Roma families. According to the atlas of Roma communities, Roma in Slovakia live in cities, on the outskirts of towns and villages, and in settlements outside villages. The results of our research (File: R 2019) also depend on the percentage of children from each environment that made up the sample we examined.

When evaluating the motor characteristics of Roma children, we note that the results of Roma children in our research (File: R 2019) show better results than the research (Horváth: R 2001), although not statistically significant for all items. When analyzing these results, we assume a certain correlation between improved somatic characteristics and motor characteristics. Here, however, it is important to point out that the results of Roma children depend on the composition of the compared groups (Roma children from cities, villages and Roma children from marginalized communities in settlements) and with an unequal percentage composition of the compared groups, the results can be significantly distorted.

When evaluating the movement activities of Roma children, it is also necessary to be aware that they are mostly dependent on natural movement in nature. Two hours of physical education at school, often without a gym only in the corridors, cannot be enough for the healthy development of children. Only for some Roma children living in cities can have sports clubs at school.

Approximately 45,000 Roma live in Slovakia, most of them in eastern Slovakia. If in the majority society there are 12% of children, in the Roma population it is 46% of children. The purpose of our work is to contribute to the updating and expansion of existing empirical and scientific knowledge about basic socio-bio-physiological characteristics and differences in the development of Roma children of younger school age. This is an issue that significantly affects a wide range of current and future problems of members of marginalized Roma communities (we mean the interrelationship between health status, socio-economic situation, school success and, consequently, applicability on the labor market, etc.). The aim of the work was to determine the current state of somatic and motor characteristics of children of younger school age from Roma communities using anthropometric methods and the application of a modified EUROFIT-test. In order to determine the development trend of somatic and motor characteristics in Roma children, compare them with data from 20 years ago, which was processed by the author Horváth (2001). Similar research has not yet been carried out in Slovakia in a long-term perspective.

4 Conclusion

In our contribution, we tried to approach the issue of motor performance of Roma children of younger school age by following trends in the development of somatic and motor characteristics over a 20-year period. To determine the level of motor skills, we used selected tests from the EUROFIT battery. We compared the achieved research results of all Roma children with the research results (Horváth: R 2001). By analyzing and comparing the results, we point out development trends after a 20-year period and at the same time provide an analysis of the causes of possible changes.

(668) Roma primary school children from five towns in the East Slovak Region participated in our research. The aim of the paper was to identify the current state and level of somatic and motor characteristics of children in primary education in primary schools in the East Slovak region in two selected groups: research (Horváth: R 2001), which carried out research on a sample of (1093) children, and our research (File: R 2019), implemented on a sample of (668) Roma children - in relation to age and gender.

Based on the obtained results, we noted a statistically significant increase in somatic characteristics, especially weight, in our research (File: R 2019) among Roma children of younger school age compared to the research (Horváth: R 2001). For Roma children of younger school age, however, we consider this as positive, since the Roma children from the research (Horváth: R 2001) were at the border of malnutrition in that period and lagged behind children of the same age category and gender of the majority society by up to 2 years.

In most of the motor characteristics of the Roma children from our research (File: R 2019), we recorded better results than the children from the research (Horváth: R 2001), although not always statistically significant. We also assume that the improvement of motor characteristics is correlated with better somatic characteristics. However, it is important to point out that the results of Roma children depend on the composition of the compared groups (Roma children from cities, villages and Roma children from marginalized communities in settlements) and

with an unequal percentage compgosition of the compared groups, the results can be significantly distorted.

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Primary Paper Section: A

Secondary Paper Section: AK