

# DIFFERENCES OF MORPHOLOGICAL AND MOTOR STATUS OF RURAL AND URBAN CHILDREN OF THE FIRST GRADE OF PRIMARY SCHOOL IN KRALJEVO

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# Introduction

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Morphological characteristics are considered to be the primary information related to the psychosomatic status of a person, which determines the system of basic anthropometric latent dimensions, regardless of whether these are dimensions developed under the special influence of the external environment or not. The most common morphological characteristics of the anthropological status of a person are information related to his body dimensions (Perić, 2011). With the factor approach, it is possible to claim with significant certainty that the morphological space is essentially four-dimensional. Namely, it is possible to talk about the model of the structure of morphological characteristics composed of four primary morphological factors:

1. longitudinal dimensionality of the skeleton (responsible for bone growth in length);
2. transverse dimensionality of the skeleton (responsible for bone growth in width);
3. body volume and mass (responsible for total body mass and volume);
4. subcutaneous adipose tissue (responsible for the total amount of fat in the body) (Malacko and Radjo, 2004).

# Introduction

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Motor abilities are traits that participate in solving motor tasks and which can be measured and include strength, speed, flexibility, coordination, precision, balance, and agility. Strength is the ability to overcome various resistances and consists of explosive strength – the ability to give maximum acceleration to a body or object; static forces – the ability of maximum isometric contraction; repetitive forces – long-term work that requires overcoming external resistance; absolute repetitive forces – overcoming external loads. Speed is the ability to react quickly and perform one or more movements on a certain section in the shortest possible time interval. Flexibility represents the ability to perform various movements with large amplitudes. Coordination is the ability to control the movements of the whole body or parts of the body and is read in the fast and precise execution of complex motor tasks, or quick solutions to motor problems. Precision is the ability to hit or aim at a specific static or dynamic target at a certain distance. The balance represents the ability to keep the body in balance for as long as possible, while agility represents the ability to quickly change the direction of body movement (Bala, 1981).

# Research metod

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The aim of this research was to determine the differences between the morphological and motor status of rural and urban children of younger school age in Kraljevo.

The sample consisted of 130 students in the first grade of primary school - 75 students in urban areas and 55 students in rural areas. All respondents participated voluntarily in the study. The research was conducted during November and December 2021 in the elementary schools "Dimitrije Tucović", "Svetozar Marković" and "Jovo Kursula" in the city and the elementary schools "Živan Maričić" in Žiča, "Petar Nikolić" in Samaile and "Jovan Cvijić" in Sirća in the village.

# Research metod

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Prior to the measurement, in accordance with the Helsinki Declaration on Biomedical Research, all parents of the analyzed children signed written consent for the research.

Measurements of anthropometric variables were conducted in accordance with the International Biological Program (IBP). To assess the morphological status, the measurement of 12 morphological measures was applied:

1. longitudinal dimensionality of the skeleton: body height, leg length, arm length;
2. transverse dimensionality of the skeleton: pelvic width, elbow joint diameter, hand joint diameter;
3. body volume and weight: body weight, an extension of the upper arm, chest circumference;
4. subcutaneous adipose tissue: skin fold on the back, skin fold of the abdomen, skin fold of the upper arm.

# Research method

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A battery of 12 motor tests was used to assess motor skills. The battery contains the following tests:

1. to assess the mechanism of movement structuring: taping with the hand against the wall (20"), conical running 4 x 10 m, running 6 m;
2. to assess the mechanism of regulation of muscle tone and singer regulation: deep forward bend on the bench, standing on one leg with open eyes, standing on one leg with closed eyes;
3. to assess the mechanism of regulation of the intensity of excitations: long jump from a place, running at 20 m with a flying start, squat jump (20 ");
4. to assess the mechanism of regulation of the duration of excitation: endurance in the joint, straightening the trunk (arms on the abdomen), straightening the torso (arms on the back).

# Research method

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Among the respondents in the urban environment, the measurement of morphological variables was performed in the morning, while the measurements of motor variables were included in the daily schedule. The rooms in which the measurements of the envisaged variables were realized (halls for physical culture) had to have optimal conditions in terms of size, lighting, temperature, and hygienic conditions. The room temperature was between 19 and 22 °C, to make the respondents feel comfortable.

During the measurement, the respondents were in shorts, t-shirts, and barefoot, ie they were trained and shod as required by the procedures and conditions for measuring certain variables.

# Research metod

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It is known that there are no physical education halls in rural schools, so the measurement of morphological variables was performed in the morning in one of the school premises adequate for our needs, while the measurement of individual motor variables was performed and adjusted depending on weather conditions.

During the measurements, the respondents were trained and shod as required by the procedures and conditions of certain variables, but also in accordance with the outside temperature if the variables are measured outside in the field for physical culture,

The order of measuring the variables of the urban respondents was such that morphological and then motor variables were measured first, while the order of measuring the variables of the rural respondents depended on the weather conditions.



# Research method

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Statistical data processing included the calculation of descriptive statistics of variables: arithmetic mean (AS), standard deviation (Sd), minimum (Min) and maximum (Max) values of measurement results, coefficient of variation, standard arithmetic mean error and range, and then discriminability was applied tests. T-test was used to calculate differences in arithmetic means between samples, and one-way analysis of variance was used to calculate differences between variances.

# Research results

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The average height of the boys in city area was 127 cm, while the average body weight was 25 kg. The average breast circumference is 62.5 cm. In terms of motor characteristics, the average speed in conical running 4 x 10 m is 13 s, in running at 60 m the average speed is 14.5 s. When jumping far from the place, the average is 107 cm, while the average endurance in the bend is 15 s.

Based on the obtained results, it can be concluded that positive asymmetry in the morphological space occurs with the parameter for the assessment of voluminous dimensionality: the circumference of the outstretched upper arm and with the parameter for the assessment of subcutaneous adipose tissue - skin fold on the back. Negative asymmetry is observed in the motor space, in the test for the assessment of explosive power - long jump from a place and in the test for the assessment of endurance of a local character - endurance in the joint.

# Research results

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The average height of the rural area is 126 m, which means that they are on average 1 cm lower than their peers from the urban area. As for body weight, it averages 25.5 kg, while the average breast circumference is 61 cm. From the above, there is a slight difference in body weight and about a 1.5 cm difference in breast circumference in favor of urban children. In terms of motor characteristics, the average time in the 4 x 10 m conical run is 13 s, and in the 60 m run 15 s. When jumping far from the place, the average is 105 cm, while the average endurance in the bend is 15 s. The mentioned data shows that urban children are better in the second and third variables, while the results in the other two mentioned variables coincide.

Positive asymmetry is observed only in the morphological space in the parameters for the assessment of transverse dimensionality – the diameter of the wrist and in the parameters for the assessment of subcutaneous adipose tissue – skin fold on the back and skin fold of the abdomen.

# Research results

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The results of testing arithmetic means and variance of urban and rural boys indicate significant differences in the parameters of transverse dimensionality – elbow joint diameter at 0.00 and body weight at 0.03, then in the parameter of voluminous dimensionality – upper arm circumference at 0, 00, as well as in the parameter for the assessment of adipose tissue – skin fold on the back at the level of 0.01, whereby boys in urban areas have a better result in morphological space compared to their peers from rural areas. In the motor space, significant differences occurred in the test for assessing the structuring of movement – tapping hand against the wall at the level of 0.00, in the tests for assessing speed – running at 60 m at 0.03 and running at 20 m with a flying start at level 0,00, in the test for assessing dexterity – standing on one leg with eyes closed at the level of 0.05 and in the test for assessing explosive power – jump (20") at the level of 0.00. In tests of motor skills, boys in urban areas show better results compared to boys in rural areas.

# Research results

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In urban girls, the average height is 127 cm, body weight averages 24 kg, and breast circumference averages 59 cm. In terms of motor skills, we can see that in the 4 x 10 m conical run, the average is 13 s, while the girls from the city center run the 60 m track in 15 s on average. When jumping far from the place, the average is 105 cm, and when enduring in a bend, the average is 16 s.

Based on the assessment of the discriminative distribution of results, it is concluded that urban girls have all the characteristics of the population except a certain grouping of results in the zone of positive asymmetry in the parameter for assessing subcutaneous adipose tissue - skin fold on the back – in morphological space, as well as positive asymmetry in explosive power test long jump from a place – in the motor space.

# Research results

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The average body height of rural girls is 125 cm, which means that rural girls are on average 2 cm lower than their urban peers. The average body weight is 25.5 kg, while the chest circumference is 59 cm. From the above, it can be concluded that girls in rural areas are approximately 1.5 kg heavier than girls in urban areas and that there is practically no difference in breast circumference. As far as motor space is concerned, girls in rural areas need an average of 12.5 s to run 4 x 10 m, and they need 14 s to run 60 m. The average in the long jump is 105 cm, and the average in endurance in the joint is 18 s. Based on the above, it can be noticed that girls in rural areas, in all the mentioned variables, have better results compared to their peers from urban areas, except in the parameter long jump from the place where the result is the same.

The assessment of the discriminative distribution of the results indicates a positive asymmetry in the parameters for the assessment of subcutaneous adipose tissue – skin fold on the back, skin fold of the abdomen and skin fold of the upper arm – in the morphological space. In the motor space, positive asymmetry can be seen in the test of endurance of a local character - endurance in the joint.

# Research results

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Based on testing of arithmetic means and analysis of variance for girls in urban and rural areas, it can be concluded that in morphological space there are significant differences in the parameter of longitudinal dimensionality – arm length at 0.02, in the parameter of transverse dimensionality – pelvic width at 0.04 and parameter for the assessment of subcutaneous adipose tissue – skin fold of the abdomen at the level of 0.02. These differences in morphological characteristics are in favor of rural girls, especially in the variable skin fold of the abdomen, which is explained by the fact that rural girls spend most of their time at home, with daily chores, helping mothers in the kitchen, and their measures especially healthy food and fresh air.

Statistically, significant differences are also noticeable in the motor space in the test for assessing the structuring of movement – tapping the hand on the wall at 0.02, in the tests to assess dexterity – standing on one leg with open eyes – at 0.02, in the test for mobility assessment – deep forward bend on the bench at the level of 0.02, in the test for speed assessment – running at 20 m with a flying start at the level of 0.02, in the test for assessing explosive power – long jump from the place at the level of 0.05 and in the test for the assessment of endurance of local character – endurance in the joint at the level of 0.00. In the first three variables, urban girls have better results, while in the other three variables, rural girls have better results, which means that urban girls are more agile, and rural girls are faster, more mobile, and stronger.

# Conclusion

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The results obtained by the research show that in terms of 1) morphological characteristics there are statistically significant differences in the variables: arm length, pelvic width, and skin fold of the abdomen in favor of girls in rural areas; and in the variables: diameter of the elbow joint, body weight, the circumference of the outstretched upper arm, skin fold of the back in favor of urban boys; 2) in terms of motor skills, there are statistically significant differences in the variables: tapping with the hand against the wall, standing on one leg with open eyes, standing on one leg with closed eyes in favor of urban girls and deep forward bend on the bench, running at 20 m with flying start, long jump from the place, endurance in the fold in favor of rural girls and in variables: tapping with a hand against the wall, running at 60 m, running at 20 m with flying start, standing on one leg with eyes closed, squat-jump (20 ") in favor of urban boys.