



## EDUCATIONAL MATURITY AND MOTOR AND SOMATIC DEVELOPMENT OF KINDERGARTEN AND EARLY SCHOOL AGE CHILDREN

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### Abstract

*The proper physical development of a child is the last criterion for achieving educational maturity. It is often underestimated; however, it is very significant in school activities, since a healthy, physically fit, and properly nourished child will be less exhausted by sitting at a desk, walking to school, or performing various tasks which may often seem challenging. The purpose of the paper is to evaluate the school maturity of kindergarten age and early school age children and their somatic and motor development in the context of their commencing school education. While verifying these general rules, studies on a group of 628 girls and boys aged 6 and 7 years were conducted in the city of Opole. The test prepared for this survey consisted of 7 fitness tests and body height, weight, and fat measurements. The results obtained have been subjected to statistical analysis. An analysis of the morphological measurement results and fitness tests demonstrate that both the six-year-old girls and boys did not attain the same level of physical school maturity as their 7 years old schoolmates. This level of maturity would enable them to withstand the educational requirements of the primary school curriculum.*

**Key words:** educational maturity, physical maturity, ontogenetic development, school education, motor development

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### Introduction

At what age should a Polish child start their primary school education? Many educators, psychologists, scientists from various areas of social life, parents, and representatives of the Polish education system have tried to answer this question for years. Does the age of 7 or 6 imply, in their opinion, that a child is mature enough and school-ready? Based on the respective decisions and regulations of state authorities, at the present moment, according to the Act of the Education System of June 23, 2016, as of the start of the 2016/2017 school year, compulsory education covers children aged 7 and older. A 6-year old child will have the right to commence their education in the first year at a primary school as long as they have received pre-school education in the school year preceding the school year in which they are to start their school education. If the child did not attend a kindergarten, the parents can also register them for the first class. In such a case, however, an evaluation from a

psychological and pedagogical counseling facility on the possibility of commencing learning at primary school will be necessary. When moving from pre-school age to early school age, the child is exposed to changes regarding teaching methods. While pre-school activities were largely play-oriented, primary school activities are based around learning. To meet these requirements, a child should achieve school maturity. The notion of being school-ready has been defined by many researchers in professional literature. M. Kwiatkowska defines this notion as a child being ready to undertake new tasks imposed by the school, and to adapt to an unknown environment and to a generally different life situation [6,7]. S. Szuman [13] describes school maturity as the child achieving a sufficient level of physical, social, and mental development, as to be sensitive and prone to systematic teaching and upbringing within the primary school. M. Pilkievicz [9] describes school maturity as the readiness of a child to undertake a new social

role, along with all the duties it involves. School maturity includes three fields of a child's development: mental maturity, emotional and social maturity, and physical maturity. According to this author, school maturity includes three fields: mental maturity – it is believed that a mentally mature child is a child who is mature enough to study. They gladly learn to write, read, and count. The child's mental readiness to study is also determined by their development level in speaking, thinking, expressing their wishes, their own conclusions, opinions, and imagination suitable for the final pre-school age stage. The child's curiosity about the world and their activity influences, to a large extent, their mental development. This is reflected in the asking of numerous and frequent questions, which they cannot answer. To each question, he or she asks, the child should receive an answer which will help them satisfy their curiosity and expand their knowledge regarding life and the surrounding world. The child's mental maturity is demonstrated by their ability to listen and understand what others say, and to easily express themselves.

Trouble-free communication with their surroundings should be facilitated by a large stock of words. The speech should be correct in grammatical and logopedic terms. Correct pronunciation is the basis for reading and writing. The mental maturity requirements for a child who begins their school education are also described by A. Klim-Klimaszewska [4]. The author emphasizes that a student should have such an amount of information and comprehend it to such an extent that they are able to benefit from the teacher's explanations and remarks. In addition, with the use of logical thinking, the child should connect the information provided together, and on the basis of it, make their own conclusions. According to the afore mentioned author, a person who is mature enough to study at school, quite quickly memorizes the information delivered and is able to recreate it in anticipated situations. The author pays attention not only to speech development in grammatical terms, but also to the fact that the child should distinguish the prosodic features of speech. She states that a person ready to study at a school must be aware

of accent and intonation, differentiate rhymes, and recognize the rhythm of speech. For A. Klim-Klimaszewska, what is important is not only the ability to differentiate letters graphically, but also the dependencies between the elements that constitute them. A child should recognize that letters "b" and "d" consist of the same elements – a dash and a circle, but also recognize the dependency that in letter "b", the dash is in front of the circle, and in letter "d", the dash is behind the circle. A. Klim-Klimaszewska also emphasizes that a school-ready child, especially when it comes to the ability to read and write, is a child who has correctly developed phonematic hearing [5].

A pre-school age child undergoes changes in its emotional and social development. Mood fluctuations occur in their emotional life. They react to positive and negative incentives by yelling, crying, or laughing. Interruptions bring changes in the nervous stability, which is reflected in the child's caprices or crying. Such a situation can often lead to conflicts with the surrounding world. This phenomenon changes at early school age. A child's emotional and social maturity is also demonstrated by their independence, resourcefulness in various situations, dutifulness, persistence in pursuing goals, but also acceptance of failure. A mature child has no problem in establishing contacts with other persons, or complying with the rules prevailing in the class. He or she is able to function in a group, and is disciplined. The emotional maturity level of a given person results from the emotional development level they have achieved, which is defined as the process of shaping specified emotional dispositions. The general collection of these dispositions is defined in turn as emotionality [6].

Physical maturity is most generally associated with the child's health and general fitness [6]. It consists of motor fitness, fatigue and infection resistance, correct eyesight and hearing and manual fitness. The basic biological need at kindergarten age is increased activity in the open air, namely activeness. Through activeness, a child improves fitness, and encounters the new or the unknown. Performing the same activities for a long time

may lead to fatigue, which may be dangerous for the child. The parents should control their child's physical effort and leisure. They should also provide correct nutrition to the child, namely proper vitamins and mineral components. Health is significantly influenced by hygienic lifestyle – activity in the open air at any time of the year, clothes adapted to the weather. Manual fitness is associated with the development of the muscles of the hands, fingers, and wrists, which serve an important role in the child's life. In order to develop it, the child must be provided with various appliances and materials to work with. A child may demonstrate problems with drawing, writing, or reading when care for senses such as hearing or eyesight is insufficient [6].

Bearing in mind the individual development of a child and the dynamic progress of civilization, we debate more often than before when to send a child to school. A growing number of parents of "six-year-olds" try to answer this question. Among the solutions are opinions from psychological and pedagogical counseling facilities. The opinions they issue only offer information about the school readiness level in intellectual and emotional terms. But the guidelines for physical maturity are insufficient. Why is the physical maturity level of a child who crosses the threshold of a school so important? A school child must have enough physical strength and resistance to fatigue. Sitting at a desk for many hours, carrying a heavy backpack and performing various mental tasks is difficult, even for a healthy, strong and fit child. A weak, sickly child who is held back in their motor development cannot participate in classes on equal terms with other children, gets tired and exhausted quickly, often skips classes, and finally struggles to master the required material. A demonstration of the undoubtedly great physical effort children undertake in the 1st class at a primary school are the results of a study concerning the weight of backpacks in primary schools in Opole and Opolskie Voivodeship, carried out by employees from the State Sanitary Inspectorate in Opole [16].

### **Aim of the study**

The purpose of the study was to evaluate the school readiness level in terms of the motor and somatic development of kindergarten and early school aged children in the context of starting their education at a primary school.

In order to implement the purpose of the study, the following research questions were asked:

- Which of the physical school maturity measures show the biggest change tendency?
- Do morphological features diversify 6 and 7 year-olds in terms of the school readiness level?
- Do the differences in the physical fitness measures depend on the age of the children being studied?
- Do the differences in the fitness measures depend on the gender of the children being studied?
- Can the results of the studies be a determinant of the physical school maturity of children aged 6 and 7?

### **Study Materials and Methods**

The study group consisted of girls and boys aged 6 and 7, 628 persons in total, including:

- in the six-year-old group, 255 persons:
  - 128 girls,
  - 127 boys,
- in the seven-year old group, 373 persons;
  - 183 girls,
  - 190 boys.

The studies were conducted in 10 kindergartens and 8 primary schools within the area of Opole. Kindergartens covered by the studies are free-standing buildings with playgrounds separated by greenery from traffic-loaded streets. Children staying here have very good conditions for playing in the open air, which is important for correct development and health.

The gardens are equipped with modern, safe, and colorful playgrounds. Apart from implementing the minimum teaching program at the kindergartens, a number of additional activities take place, among others: foreign language lessons, eurhythmics, sport classes, and also drama classes. The schools covered by the studies are also free-standing

buildings. All the conditions for classes are provided within them (lessons in classes, and sport). The schools have large, spacious sports halls, and external playing fields with green areas. The city of Opole is the capital of the Opolskie Voivodeship. The city's area is 96km<sup>2</sup> and the number of residents is about 126 000.

As the research tool, basic anthropometric measures were used to evaluate the morphological development. With the use of an anthropometer, an electronic scale, and a caliper, the following were measured:

- Body height with an accuracy down to 0.1cm,
- Body weight with an accuracy down to 0.1kg,
- The thickness of skin-fat folds with an accuracy down to 0.1cm:
- the fold under the knee – held vertically under the incisura poplitea on the back of the calf. A child being studied sat on a small bench, with the feet placed on the floor, and the knees bent at 90°,
- the fold on the biceps muscle – the fold held lengthwise, at the height of the fold measurement on the triceps muscle. The child being studied stood at attention, with the arms along the trunk,
- the fold on the arm held lengthwise, above the triceps muscle, half the way between the acromion and the olecranon. The child being studied stood at attention, with the arms along the trunk,
- the fold on the belly held crosswise slightly below (about 1 cm) the belly button, and about 5 cm sidewise. The

child being studied stood at attention, with the arms along the trunk,

- the fold under the shoulder blade held askew sidewise at the lower angle of the blade. The child being studied stood at attention with the arms along the trunk.

To evaluate the motor development, the specially prepared Physical School Maturity Test was used, which includes the following fitness tests:

1. Balance test – general balance of the whole body (standing on the toes)
2. Jump test – the explosive strength in the lower limbs (jumps in pairs left and right leg),
3. Functional strength test – arms muscle endurance (handing on a bar),
4. Upper limbs dynamic strength test (throwing a 1kg medicine ball forward in straddle sitting position),
5. Back muscle strength test (throwing a 1kg medicine ball backwards in straddle sitting position),
6. Trunk strength test – abdominal muscle endurance (bends on a physio wedge in 15s),
7. Running speed, agility test (figure 8 run).

During all stages of the studies, the same measuring equipment was used, the accuracy of which was periodically checked. For somatic measurements, children being studied wore sport outfits (barefoot). In the preparation of the material, the following statistical analysis methods were used: arithmetic mean, standard deviations, Student's t-test.

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**Table 1.** Statistical characteristics examined boys and girls

		<b>PUBLIC PRIMARY SCHOOL OPOLE</b>	<b>NON-PUBLIC PRIMARY SCHOOL OPOLE</b>	<b>OPOLSKIE VOIVODESHIP (IN TOTAL),</b>
<b>Number of schools studied</b>		1	1	25
<b>Number of classes studied</b>		1	2	38
<b>Number of students studied</b>		28	32	492
<b>BOYS</b>	Student average body weight	28.60	27.31	27.63
	Average weight of backpack with content	5.00	2.99	3.07
	Average weight of books	1.78	0.38	0.80
	Average weight of exercise books and notebooks	0.29	0.57	0.64
	Average weight of books, exercise books and notebooks	2.08	0.94	1.32
	Average weight of empty backpack	1.05	0.44	0.93
<b>GIRLS</b>	Student average body weight	26.77	27.14	27.07
	Average weight of backpack with content	4.77	2.85	3.13
	Average weight of books	1.85	0.36	0.81
	Average weight of exercise books and notebooks	0.33	0.69	0.66
	Average weight of books, exercise books and notebooks	2.19	1.04	1.35
	Average weight of empty backpack	1.08	0.48	0.88

## Results

When analyzing the results obtained from the measurement of the basic somatic features, i.e. the body height and weight of the group being studied, the difference between the average results of girls aged 6 and 7 years can be observed. The girls attending the first class at primary school are, on average, 4.84cm taller than the one year younger girls who attend kindergarten. Statistical characteristics were prepared with the use of Student's t-test ( $t = -7.537$ ), where the significance index  $p = 0.000$  demonstrates the dependency between the groups being studied (Tab. 1).

When evaluating the results obtained in the measurements of the body weight of the

group being studied, differences between the average results of 6 and 7 year old girls are noticeable.

The average results obtained by six-year-old girls are, on average, 3.06 kg lighter as compared to the seven-year old girls. Statistical characteristics were prepared with the use of Student's t-test ( $t = -5.369$ ) where the significance index  $p = 0.000$  demonstrates the difference between the groups being studied. In analyzing the fat level studied, more developed fat tissue was observed in all the measurements in the seven-year old girls, and there was no statistical difference observed in the skin-fat fold under the shoulder blade alone (Tab. 1).

**Table 2.** Statistical characteristics of measurements (body height, weight, and fat measurements in 6 and 7 years old girls. Significant indices at a level of  $p < 0.05$  are printed in bold font

Subsequent measurements	Test	Group of girls	$\bar{X}$	Max result	Min result	s	Student's t-test	
							t	p
1.	Body height [cm]	six-year-olds	121.351	139.7	107.8	5.241	-7.537	<b>0.000</b>
		seven-year olds	126.199	140	110.2	5.798		
2.	Body weight [cm]	six-year-olds	23.534	40.4	16.3	4.365	-5.369	<b>0.000</b>
		seven-year olds	26.599	51.6	18	5.320		
3.	Skin-fat fold under the knee [mm]	six-year-olds	14.574	34	9	3.947	-4.904	<b>0.000</b>
		seven-year olds	16.903	38	9	4.232		
4.	Skin-fat fold of the triceps muscle [mm]	six-year-olds	13.932	31	5	4.067	-2.833	<b>0.004</b>
		seven-year olds	15.195	34	8.5	4.240		
5.	Skin-fat fold of the biceps muscle [mm]	six-year-olds	8.824	20	3	3.974	-2.439	<b>0.015</b>
		seven-year olds	10.005	22	2.5	4.348		
6.	Skin-fat fold under the shoulder blade [mm]	six-year-olds	9.285	27	3	9.413	-1.070	0.285
		seven-year olds	10.203	35	3	5.639		
7.	Skin-fat fold on the belly [mm]	six-year-olds	8.785	31	5	5.232	-2.000	<b>0.045</b>
		seven-year olds	10.054	34	8.5	5.668		

Table no. 2 shows an analysis of the measurement results for the body height of the boys studied, in which a clear difference between the average results of the boys aged 6 and 7 is noticeable. The average results obtained in this measurement favor the seven-year old boys, who achieved 7.316 cm more. The statistical characteristics performed with the use of Student's t-test ( $t = -11.683$ ) demonstrate that the seven-year old boys obtained on average a higher (12.698cm) statistically significant difference ( $p=0.000$ ) in the body height.

The results of body weight measurements in the same group suggest quite

a large difference between the subjects. The average results obtained in this measurement favor the seven-year old boys, who achieved results better on average by 3.98 kg (Fig 2) than the six-year-old boys. As in the body height measurement, a statistical dependence was also observed here (Tab. 2).

Based on an analysis of the data related to the fat level in the six-and seven-year olds, included in Table no. 2, it can be concluded that in all the measures, the higher fat level was observed in all the cases; however the statistical dependence is confirmed by the measurements under the knee and on the triceps muscle.

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**Table 3.** Statistical characteristics of measurements (body height, weight, and fat measurements in 6 and 7 years old boys. Significant indices at the level of  $p < 0.05$  are printed in bold font

Subsequent measurements	Test	Group of boys	$\bar{X}$	Max result	Min result	s	Student's t-test	
							t	p
1.	Body height [cm]	six-year-olds	120.382	135.8	104.6	5.658	-11.68	<b>0.000</b>
		seven-year olds	127.698	145.5	113	5.350		
2.	Body weight [cm]	six-year-olds	23.278	39.9	15.7	4.134	-7.04	<b>0.000</b>
		seven-year olds	27.259	48.9	16	5.417		
3.	Skin-fat fold under the knee [mm]	six-year-olds	13.835	34	8	4.092	-5.26	<b>0.000</b>
		seven-year olds	16.321	34	6	4.148		
4.	Skin-fat fold of the triceps muscle [mm]	six-year-olds	12.523	30	6	3.755	-2.402	<b>0.016</b>
		seven-year olds	13.667	33	6.5	4.420		
5.	Skin-fat fold of the biceps muscle [mm]	six-year-olds	8.630	23	2	8.979	-0.239	0.810
		seven-year olds	8.810	26	2	4.259		
6.	Skin-fat fold under the shoulder blade [mm]	six-year-olds	7.484	31	3	4.374	-1.728	0.084
		seven-year olds	8.421	36	3	4.969		
7.	Skin-fat fold on the belly [mm]	six-year-olds	7.246	26	2	4.602	-1.448	0.148
		seven-year olds	8.102	39	2.5	5.522		

The statistical characteristics of the measurements in particular fitness tests for the girls aged 6 and 7, confirmed by the results from Table 3, indicate that seven-year old girls in all the tests obtained on average better results than the one-year younger girls.

The statistical analysis was performed with the use of Student's t-test demonstrating a significant dependence in five measures. In the arms muscle endurance test, such a dependency was not observed.

**Table 4.** Statistical characteristics of measurements in particular fitness tests for 6 and 7 year old girls. Significant indices at the level of  $p < 0.05$  are printed in bold font

Subsequent measurements	Test	Group of girls	$\bar{X}$	Max result	Min result	S	Student's t-test	
							t	p
1.	Whole body general balance [s]	six-year-olds	185.023	89.9	1.4	158.593	-3.30	<b>0.001</b>
		seven-year olds	257.595	96.8	1.2	209.994		
2.	Lower limbs explosive strength [cm]	six-year-olds	134.13	192	45	29.12	-7.06	<b>0.000</b>
		seven-year olds	158.34	231	83	30.14		
3.	Arms muscle endurance [s]	six-year-olds	267.34	90.8	5.3	168.246	-1.99	0.464
		seven-year olds	306.497	82.6	4.8	171.162		
4.	Upper limbs dynamic strength [cm]	six-year-olds	196.48	280	100	38.17	-5.67	<b>0.000</b>
		seven-year olds	222.21	360	110	40.25		
5.	Trunk strength [number of repeats in 15s.]	six-year-olds	13.65	20	8	2.15	-3.32	<b>0.000</b>
		seven-year olds	14.46	20	10	2.11		
6.	Running speed, agility test [s]	six-year-olds	162.73	22.4	12.7	17.28	6.8	<b>0.000</b>
		seven-year olds	149.22	20.8	12.1	17.2		

A tendency similar to the one in the results for the girls is noticeable in the group of boys which is confirmed by the results from Table 4. While the results for the arms muscle endurance test were on average better for the seven-year old boys, they did not demonstrate a statistical dependence. On the other hand, the results for five other tests, through their significance index, which was lower than 0.05, indicate that there is a statistical dependence. To sum up, it can be clearly concluded from the

results obtained and their analysis that the physical fitness level of 7 years old children is clearly higher than that of their one-year younger school mates. On this basis, an evaluation of the physical maturity level of 6- and 7- year old children can be undertaken. The level of the somatic and motor features of 6-7- years old children in the area of Opole unambiguously indicates in terms of the physical school maturity that older children have higher chances in early school education.



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**Table 5.** Statistical characteristics of measurements in particular fitness tests in 6 and 7 year old boys. Significant indices at the level of  $p < 0.05$  are printed in bold font

Subsequent measurements	Test	Group of boys	$\bar{X}$	Max result.	Min result.	S	Student's t-test	
							t	p
1.	Whole body general balance [s]	six-year-olds	180.086	95.3	1.3	166.929	-3.04	<b>0.002</b>
		seven-year olds	246.410	93.3	1.6	204.093		
2.	Lower limbs explosive strength [cm]	six-year-olds	149.669	271	42	33.577	-6.53	<b>0.000</b>
		seven-year olds	176.786	270	23	37.894		
3.	Arms muscle endurance [s]	six-year-olds	267.921	85.2	4.8	160.526	-1.69	0.091
		seven-year olds	299.536	82.7	4.8	164.625		
4.	Upper limbs dynamic strength [cm]	six-year-olds	201.929	300	110	40.503	-10.09	<b>0.000</b>
		seven-year olds	251.842	370	130	44.836		
5.	Trunk strength [number of repeats in 15s.]	six-year-olds	14.307	20	8	2.029	-3.73	<b>0.000</b>
		seven-year olds	15.210	22	7	2.167		
6.	Running speed, agility test [s]	six-year-olds	160.322	22.5	12.8	17.198	7.97	<b>0.000</b>
		seven-year olds	145.031	21.7	11.6	16.397		

## Discussion

The physical maturity of a child, as one of the school readiness elements determined by physical skills, motor capabilities, and thus by physical fitness, has been researched by many authors for years [W. Wilgocka-Okoń, S. Szuman and others]. School maturity is understood as the full development of the body. According to W. Wilgocka-Okoń [14], maturation is not the only factor responsible for the development. It includes biological, environmental factors, and learning. On the other hand, when speaking of school readiness, she means a certain development level of a child at which the child can cope with their school duties. In the opinion of W. Okoń [8], educational maturity is the child's achievement of a mental, emotional, social, and physical development level, which will make it possible for them to participate in school life and to master the first class program. W. Okoń's understanding of school readiness is similar to

that of S. Szuman [12], who writes that when a child obtains the mental, physical, social, and emotional development level, it is possible for the child to systematically learn and adapt to education in the first class at primary school. These authors have jointly expressed the view that the motility development is an important factor for the child in establishing social contacts. They also try to prove that good physical fitness demonstrated in games and in playing during breaks and classes makes it easier for children to join the group and to be accepted by their peers. Physical fitness level was also assigned a significant role in shaping autonomy, self-confidence, and independence in action. Such predispositions, among others, should be shown by a child who ends their pre-school education and, following its completion, when starting their primary school education, they should have the following skills in the scope of their health and physical fitness education:

- care for their own health, have basic understanding of healthy nutrition,
- recognize the connection between illness and treatment, submit to treatment (e.g. they know that it is necessary to take medicines and injections),
- be physically fit, or fit for their capabilities, if they are less able physically,
- participate in physical classes, plays and games, in a park, on the playground, or in the sport hall.

Szewińska describes school maturity as a development level that is necessary for the child to adapt to the conditions prevailing in education in the first class [11].

M. Przetacznikowa evaluates a child as school-ready, if:

- they have reached a sufficient physical and motor level,
- they have sufficient knowledge,
- they can communicate by speech,
- they engage in performing tasks and implement them to the end,
- they can cooperate with others,
- they control their emotions [10].

Why is the physical maturity level of a child who crosses the threshold of the school so important? A school child must have enough physical strength and be resistant to fatigue. Sitting at a desk for many hours, carrying a heavy backpack, and performing various mental tasks is difficult, even for a healthy, strong, and fit child. A weak sickly child who is challenged in their motor development cannot participate in the classes on equal terms with other children, they get tired and exhausted, often skips classes, and finally they struggle to master the required material [15]. The middle childhood period, also known as the pre-school age, in the opinion of M. Kielar-Turska [3] lasts from the 4th to 6th years of life, while according to A. Klim-Klimaszewska and M. Żebrowska, it lasts from the 3rd to 7th years of life [4,16]. The name pre-school age originates from the fact that this period precedes the child's school duties. Some children attend a kindergarten during these years, which in our system is the first level of education. However, the chronological limits of this period are relative

and fluid, just like those of the other periods. At each stage, features of the earlier one can exist, disappear, and new ones develop, specific to the given age, or such that are typical only later in life. It is worth pointing out that children develop at a different pace, in different conditions, and this means they are different than their peers, both physically and mentally. There are three-year olds who are not ready to participate in a pre-school group, and children who can be enrolled at school before reaching the age of 7. In all children, changes in their psychological and physical development occur, typical exclusively of the pre-school age. Apart from the common development features for this period, changes can be distinguished which show the dynamics of the child's cognitive processes, and the transformation in the emotional and social sphere of their mental development. M. Żebrowska distinguishes the following phases in the pre-school period [16]:

1. Early phase, 3- 4 year olds,
2. Middle phase, 4 - 5.5 year olds,
3. Late phase, 5.5- 7 year olds.

In the opinion of Paprotna [9], the pre-school age is a period of intensive development, and of children opening themselves to the surrounding reality; at the same time it should be a time of happiness and positive experiences associated with discovering the world. The experience that remains in people from this period in life is often the basis on which they build their personality, their attitude towards themselves, others, and the world. The physical and motor development of kindergarten age children is characterized by a progress that is ordered and logical, as Cudak notes [1].

An alternative related to this problem can be the set of physical maturity tests being discussed for 6-year-old children. The tool created for the purposes of the studies is a set of 6 fitness tests for evaluating: the whole body's general balance, running speed (agility), the lower limb explosive strength, the arms muscle endurance test, the upper limbs dynamic strength, and the trunk strength. In addition, each child covered by the study was subjected to measurements of the basic somatic features, namely the body weight and height, and measurements of skin-fat folds. The tests are simple exercises that do not require any special

physical abilities, which can be performed by children both in preschool, school, or domestic conditions, supervised by a teacher or a parent [16]. To confirm this thesis, similar studies are still in progress, using the same research tool in other regions of Poland. Bearing in mind the presented deliberations of many authors, it seems justified to continue studies on the physical development of children in early school education.

### Conclusion

- The arms muscle endurance of 6-7 year old children, namely the functional strength of their arms, was the only test performed that did not demonstrate statistically significant changes, although the average results obtained by the girls and the boys favour seven-year olds.
- The morphological characteristics diversify between the tested groups in terms of their school readiness level;

the development age of the seven-year olds directly affects the higher development level of their body height, weight, and fat in relation to their one-year younger school mates.

- The age of the children being studied directly influences the development of the seven-year olds' physical fitness. In all the tests conducted, the children attending kindergartens, namely the six-year-olds, obtained worse results.
- The gender of the children being tested in the development period being discussed has no impact on the results of the studies. The change tendencies are noticeable only within the same gender, favouring the older children.
- The higher physical fitness level and a significant increase in the somatic features demonstrate that physical fitness of 7-year old children can be a determinant of physical school maturity.

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