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PRESCHOOL ATTENDANCE AS A FACTOR IN THE MOTOR SKILL DEVELOPMENT OF CHILDREN

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ABSTRACT
Purpose. The purpose of this study was to evaluate the motor skills of children who had already attended one year of preschool or had just begun their education. **Methods.** A total of 286 five- and six-year-old children were recruited from different preschools (eight preschools and three primary school preschool programs) in Gdańsk, Poland. A test battery was designed based on the children's preschool physical education curriculum and the motor skills that should be acquired at this age. The analyzed motor tasks included: 1) walking on a balance bench, 2) crawling on an inclined balance bench, 3) running then jumping over an obstacle with one leg, 4) catching and throwing a ball over an obstacle, 5) throwing a ball against the wall and catching it, 6) climbing on a gymnastic ladder, 7) jumproping. The children were tested twice in test-retest conditions, at the beginning and end of the school year. **Results.** The children showed the lowest level of skills in throwing, catching, and bouncing a ball against the wall and jumproping. **Conclusions**. No significant differences were identified as to children's physical abilities or between the 5-year-olds and 6-year-olds either beginning or continuing preschool.

Key words: infancy age, motor skills, physical activity

Introduction

One of the first scientific studies on the importance of early childhood comes from the work developed by Freud on how personality disorders arise at this point in time. According to Freud, the source of psychological problems in later life may stem from a troubled childhood. More recent research has further specified the interpretations of Freud. In clinical studies conducted on children from birth until reaching maturity, Erikson stated that "childhood is a stage where a human being begins to emerge as person, a place in which our individual talents and shortcomings slowly but noticeably begin to develop and be revealed" [1, pg. 62]. Many psychologists believe that the early school years, beginning from the second until the fifth year of life, belong to one of the most important or even the most important developmental periods of life. Functional analyses of these phases have reached the same conclusions, "where it is undoubtedly a period of life in which our most basic foundations are organized into a behavioral structure" [1, pg. 63].

In this regard, the preschool age, spanning from the third year of life until beginning school, stands as an early precursor for future development. However, the beginning of this developmental phase is difficult to determine. It has been assumed that it begins when a child is able to freely move (walk and run), communicate with others by talking, has all of their deciduous teeth, and is independent in many daily self-care activities [2]. According to Hurlock, the preschool age can also be labeled as early childhood, covering the period between the second and sixth year of life when a child begins to find ways to assume self control over their environment and wants to acquire social skills [1]. However, one of the most dynamic phases of motor development and child mobility occurs during early childhood (up to fifth/sixth year of life). One of the features behind a small child's motility is the strong need to satisfy their 'movement hunger' and 'hyperactivity'.

In terms of motor skills, children aged five years are considered to enter a 'perfected' state at the preschool age or the 'golden age' of childhood. This undoubtedly is a period of time that needs to be taken advantage of and cannot be wasted. This is especially important for preschool teachers and parents. At this age, children possess the ability to perform accurate movement patterns, therefore it is very important for them to not only learn correct form but also enrich their interest in physical activity through the use of games and appropriate equipment and organization. Children have the irresistible urge for physical activity, showing this in ways impossible to miss. However, children associate physical activity with spontaneous, wild movements that can be changed at will and adapted to whatever purpose.

As a result, the proper physical development of children is grounded on educating their psychomotor capabilities and furthering their motor skills. This can stimulate children to engage in various forms of physical activity whether independently or under supervision. Supervised physical activity should be tailored to children's capabilities and match their needs and requirements rather liberally depending on their motor abilities, creativity, and developed personality so as to not discourage them in case of failing to perform the outlined tasks. Furthermore, physical activity is only

effective when its frequency and intensity are adequate to the physical predispositions and capabilities of children at a given developmental stage.

Researchers commonly agree that the proper development of motor skills in children is associated with improved health, intellectual development, and social skills and leads to increased independence, better possibilities of gaining valuable life experience, and improved self-esteem [1, 2]. An appropriate level of physical activity combined with positive emotions experienced in childhood and adolescence can create a foundation for lifelong physical activity.

Woynarowska [3] argues that low levels of spontaneous physical activity in early childhood may be a sign of a developmental disorder or health condition, while limiting spontaneous physical activity can quite early and permanently suppress the need for physical activity, disrupt physical development, and create a health risk in later life. She feels these limitations ought to be considered as a form of child neglect and, in extreme cases, as a sign of abuse [3].

In a similar vein, if leading a healthy lifestyle during childhood is a deciding factor in maintaining it in later life, it can be assumed that other psychological and behavioral factors revealed at a young age will also be transferred into adult life. This transfer can be understood as various factors maintaining a relative position of influence over time. In other words, an individual with a risk factor with a high relative risk in childhood would have the same relative risk as an adult [4, 5]. Also of note is how adequate physical activity in childhood may provide beneficial biological and behavioral effects later in adulthood [6]. Physically active and fit children, who also have physically active parents, have been found to have a greater chance of maintaining a physically active lifestyle in adult life [7–9].

Regular physical activity in childhood is known to have a significant impact on immediate and long-term health. Current research on the physical activity of children recommends at least 60 min or more of moderate to intensive exercise per day [10]. Studies have found that the physical activity of children lasts in 5–10 min sequences [11]. Others suggest that the majority of physical activity by children is performed intermittently [12], rarely lasting more than 5–10 min [13, 14] and predominantly less than 5 min [15]. Other studies have observed that children aged 6–10 years showed a mean duration of uninterrupted physical activity of 20 s [16, 17]. These attributes should be taken into consideration as other recommendations stress that children should perform physical activity focused on the development of the locomotor system (induced by intensive physical effort) at least twice a week [18].

The preschool years are marked by an intensive development of physical fitness and improvement of movement technique. Movements start to become more precise, economical, and expedient. Every year brings significant differences in the technical level of performing such activities as running, throwing, and jumping [2]. According to Przewęda [2], children aged 3–4 years have the capability to walk, run, climb, overcome easy obstacles, jump, throw, hit, move, perform somersaults, roll, and perform activities that require a modicum of balance or rhythmic movement. All of these activities at approximately four years of age begin to improve, becoming more fluid and precise, increasingly faster and more agile, and become more purposeful and predictable. She described this period when "(…) a child begins to construct new movement patterns, where new skills begin to emerge and later on can be combined to perform activities that require simultaneous movements that form the so-called movement combinations (space chords)" [2, pg. 159].

By the fourth and fifth year of life, the development process significantly accelerates, with changes that can be described as a developmental leap. This period is marked by the fastest motor development with greatly improved coordination, where "activities that have been mastered begin to show rhythm, fluidity, and harmony in both the entire movement and its phases, although there is still a lack of flexibility, precision, and anticipation. The harmony of locomotor movements is revealed around the age of five years, which is sometimes referred to as the golden age of motor skill development or the preschool period of equilibrium" [2, pg. 160]. Speed, agility, and overall strength increases, followed by the development of voluntary movements, specialized manual tasks, and deliberate and precise movements. Children begin to run more quickly and rapidly in a ways more economical and accurate, where by the age of five they are able to race and chase each other.

With growing maturation the respective centers of the cerebral cortex and neuromuscular system significantly advance the ability to maintain balance. Five-year-olds are able to stand on one leg for a considerable length of time, they can combine walking on a balance bench while crossing obstacles, move objects with only one foot, or perform the limbo. They are able to stand with one foot behind the other on their toes or perform a squat without using their hands.

Furthermore, motor development in 5-year-olds also includes significant advances in the ability to throw and catch objects. Children at this age are able to throw and catch a bag or ball while not only standing in place but also walking or even running. They can catch balls thrown to them, although the catching movement frequently requires the use of their whole body.

At six years of age, children feature even more rapid progress in motor skill development, becoming stronger and more efficient. They are characterized by greater movement dynamics, fluidity, and freedom, while at the same time their movement is properly matched to the task at hand and, therefore, becomes more economical. The behavior of 6-year-olds begins to show predictive

movements, such as shifting the trunk forward and extending the arms in order to catch a ball or when walking backwards.

This period also features the automation of simple movements such as walking, running, or hopping. This promotes further movement fluidity and freedom, allowing 6-year olds to easily combine them with other movements such as performing a running throw. Six-year-olds at this age can smoothly perform combination movements and can be motivated to perform more difficult exercises requiring greater effort. Throwing movements by 6-year-olds are now characterized by a smooth combination of the preparatory phase with the main throwing phase. They are also able to aim at targets 5 m away. Catching ability also improves, with 6-year-olds able to use their hands when catching objects without moving the entire body. However, activities requiring both catching and throwing may still pose difficulties.

With the growth of muscular strength and coordination skills, 6-year-olds exhibit greater freedom, dynamics, and fluidity when jumping and hopping. Additionally, when playing, children also begin to spontaneously introduce elements of resistance (pushing or pulling).

It is deemed that physical activity is a fixed component of human behavior throughout life. Research conducted during 2–3 year periods in infancy, adolescence, and adulthood have shown a fairly constant level of of physical activity [19]. It needs to be noted that the preschool age should be a period of conscious education by adults on the not yet fully formed attitudes of children on how their bodies are susceptible to positive and negative influences. This is a time when opportunities to form basic concepts on good health, fitness, and immunity to diseases should not be wasted. As a result, education in this regard should begin from the earliest years of life.

Extensive research on the physical fitness of preschool children was conducted by Sekita between 1981–1984 [20, 21]. She composed a battery of fitness tests in 1977 to assess motor development, which consisted of five tests: the standing long jump, throwing a 1 kg medicine ball, performing a 4 × 5 m shuttle run, running 20 m, and hitting targets on a special board within 20 s. On the basis of her results, it was concluded that age is a key factor in the development of physical fitness between 3–7 years of age and that changes between age groups are very clear. Sekita also found that children's motor skills developed at unequal rates, with agility developing the fastest and then speed, power and strength [20, 21].

Ugodowska in 1991 used Sekita's test battery to measure the physical fitness and mobility of 91 six-year-olds attending preschool [22]. The results allowed for the conclusion that physical education classes in preschool largely affect the motor skill learning characteristics of children and that a low level of its development was often evidence of neglect on the part of the family.

The aim of this research was to clarify the relationship between the motor skill levels of children attending preschool programs and the length of their attendance in preschool. The research problem that was posed was: are children beginning preschool at the age of 5 or 6 years characterized by lower motor skill levels than their similar-aged peers who had been attending preschool earlier (one year or more)? With this in mind, the following research questions were formulated:

1. What is the motor skill level of children who are beginning preschool at the age of 5 or 6 years and what is the level of children in the same age groups who have been attending preschool at least one year earlier?
2. Was there an improvement in the motor skill level of 5- and 6-year-olds after attending preschool for a year?
3. Was there an improvement in the motor skill level of 5- and 6-year-olds who were continuing their education in preschool?
4. Did teachers during the school year teach physical exercises similar to the ones used in physical fitness test batteries?

Material and methods

The population sample was chosen from preschools belonging to the Board of Education of Gdańsk, Poland. Preschools were deliberately chosen after analysis on the physical education environments they possessed, including preschools with both good and poor infrastructure. The final sample consisted of three public and two private preschools with good infrastructure for physical activity, two public and one private preschool with poor infrastructure, and three primary schools offering preschool programs. The study was conducted on a total of 11 preschools all located within the city the Gdańsk, Poland in September/October 2007 and again in May/June 2008.

All children attending the preschools were selected for inclusion. Written informed consent was provided by their parents or guardians, and the study procedure was performed in accordance with the guidelines outlined by the local ethics committee. The total sample included 286 five- and six-year-old children who were divided into two groups, those who had just begun attending preschool and those who were continuing their education (having previously attended preschool for at least a year).

Analysis was first made of the activities logs and educational programs of the selected preschools and how motor development was tested by the preschools or what types of motor skills children were considered to be necessary based on the preschools' educational programs The aim of analyzing the preschool programs was to assess what motor skills the children should possess. On this basis could a relevant test battery be designed

Table 1. Number of children included in the study

Attendance history	Beginning preschool		Continuing preschool		Total
	5-year-olds	6-year-olds	5-year-olds	6-year-olds	
Number of children	12	17	117	140	286

to determine the motor skill development of the participants. In the surveyed preschools a total of nine different preschool educational programs were being implemented. However, all had content that was similar to one another and allowed for the development of a motor skill test that would be universal for all examined children.

It was decided that an assessment of the children's motor skills would be qualitative in nature and designed to determine the proportion of children that would have difficulties in the correct execution of elementary (for this age group) motor tasks. In this regard, a pilot study was performed to standardize the grading criteria used to evaluate the motor tasks. It was determined to assign scores from 0 and 1, where: 1 – correctly performed the task or with a small error that had no effect on overall task execution, 0.5 – performed the task with a large error, and 0 – was unable to perform the task at hand.

All trials were performed by the author in a school gymnasium or, in their absence, at a classroom suitable for performing all tests. All testing was performed at approx. 10:00 for each preschool on two separate occasions (test–retest), Test1 at the beginning of the school year in September/October 2007 and Test2 at the end of the school year in May/June 2008. Each motor task was demonstrated by the assessor before testing. The children were dressed in sports attire and all tests were performed in running shoes except for Tests I and II. The motor tasks that were assessed are outlined below:

Test I – Walking on a balance bench
Location: school gymnasium
Equipment: 3 m bench
Execution: Walking on a thin balance bench and performing a 360° rotation at the middle and maintaining correct placement of the feet
Scoring:
1 pt. – correctly performed
0.5 pt. – performed with a large error:
– lost balance and touched the ground (max. two times)
– squatted to regain balance (max. two times)
– walked very slowly
0 pt. – unable to perform the task

Test II – Climbing a gymnastics ladder
Location: school gymnasium
Equipment: gymnastics ladder
Execution: Climbing and descending 2 m on a wall bar while correctly grabbing the rungs with diagonal movement of the arms and legs
Scoring:
1 pt. – correctly performed
0.5 pt. – performed with a large error:
– climbed with incorrect leg placement
– lack of diagonal movement with arms and legs
0 pt. – unable to perform the task

Test III – Crawling on an inclined gymnastics bench
Location: school gymnasium
Equipment: 3 m bench
Execution: Crawling on an inclined gymnastics bench attached to an 80 cm ladder
Scoring:
1 pt. – correctly performed
0.5 pt. – performed with a large error:
– stopped (max. two times)
– crawled very slowly
0 pt. – unable to perform the task

Test IV – Running and jumping over an obstacle with one leg
Location: school gymnasium
Equipment: 5 m rubber rope
Execution: Running for a distance of 5 m and jumping over a rubber rope suspended 20 cm above the ground placed 3 m from the start
Scoring:
1 pt. – correctly performed
0.5 pt. – performed with a large error:
– made contact with the rope
– stopped in front of the obstacle and stepped over the rope
– jumped with both feet
0 pt. – unable to perform the task

Test V – Catching and throwing a ball over an obstacle
Location: school gymnasium
Equipment: 20 cm rubber ball and rope
Execution: Catching the ball thrown from a distance of 1.5 m with both hands and throwing it over a rope placed 1.5 m in front of the child at a height of 1.5 m using an overhead or one-handed throw or chest pass.
Scoring:
1 pt. – correctly performed
0.5 pt. – performed with a large error:
– unable to catch the ball
– ball went under the rope or did not reach the obstacle
– performed an underhand throw
0 pt. – unable to perform the task

Test VI – Throwing a ball against a wall and catching it

Location: school gymnasium

Equipment: 20 cm rubber ball

Execution: Throwing the ball with both hands using a chest pass against a wall at a distance of 1 m and catching the ball with both hands (one cycle); required to perform a minimum of four complete cycles

Scoring:

1 pt. – correctly performed

0.5 pt. – performed with a large error:

– incorrect catch

– incorrect throw

0 pt. – unable to perform the task

Test VII – Jumproping

Location: school gymnasium

Equipment: Jump rope with a length of 170 cm (adjusted to each child's height)

Execution: Performing a minimum of three jump ropes in any way

Scoring:

1 pt. – correctly performed

0.5 pt. – performed with a large error:

– jumped and stopped

– jumps performed fluidly, but stopped after two jumps and then continued

0 pt. – unable to perform the task

Results

The task that was correctly performed by the highest percentage of children was Test III, or running and jumping over an obstacle with one leg. Two of the groups of children, 5- and 6-year-olds beginning preschool, performed this test with 100% success at the end of the school year (Test2). A high percentage of children also correctly performed Test II, or crawling on an inclined gymnastics bench. Here, the group of 5-year-olds beginning preschool correctly completed the task during Test2. The tests with the highest percentage of children failing to complete the task were Tests VII and V, or jumproping and throwing a ball against a wall and catching it, respectively. The lowest presented motor skill level in six of the seven motor tasks was among the 5-year-old children beginning preschool during testing at the beginning of the school year (Test1).

Overall, the highest amount of correctly performed tasks by the largest number of children in each of the groups was by 6-year-olds continuing preschool during Test2 in climbing a gymnastics ladder, throwing a ball against a wall and catching it, and jumproping, which were tasks that were completed by only 13.6% of the total sample.

Figures 1–14 illustrate the motor skill levels of the 5- and 6-year-old children beginning or continuing preschool in completing each of the seven tasks:

Test I – Walking on a balance bench

Among the 5-year-olds beginning preschool, after a year of attending preschool no improvement in the performance of this task was observed. Among the 6-year-olds beginning preschool, testing performed after the school year (Test2) had four more children correctly finishing the task (Fig. 1B).

Among the 5-year-old children continuing preschool, in Test2 more children managed to perform this task

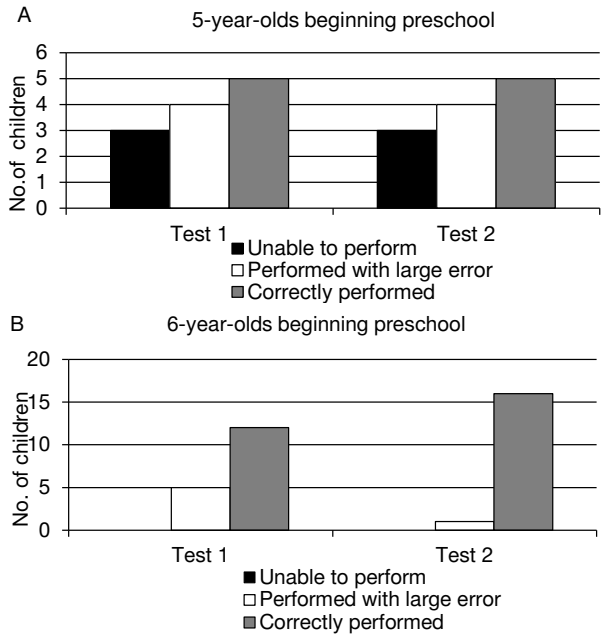

Figure 1. Test results of walking on a balance bench before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

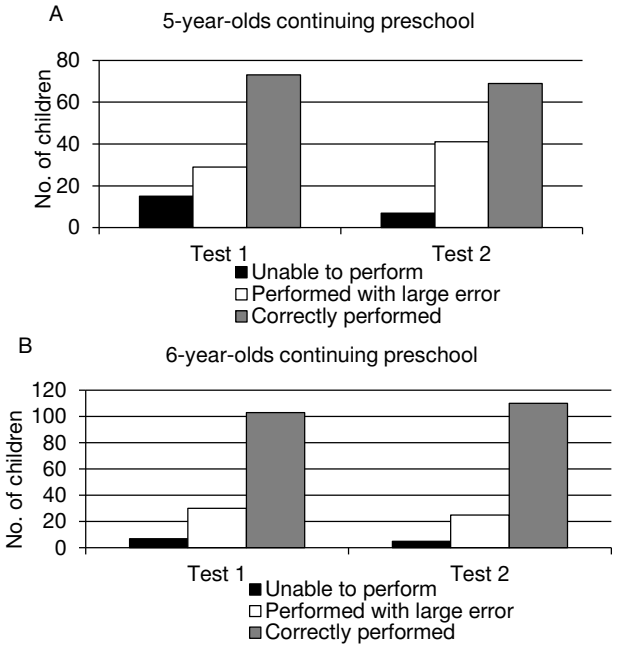

Figure 2. Test results of walking on a balance bench before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

without a large error. At the same time, there were six less children that were unable to perform this task (Fig. 2A). Six-year-olds continuing preschool showed a slight improvement in this task, with seven additional children being able to correctly perform this task in Test2 (Fig. 2B).

Test II – Climbing a gymnastics ladder

After attending preschool for a year, the 5-year-olds beginning preschool who were unable to perform this task in Test1 progressed enough to be able to perform it with a large error in Test2 (Fig. 3A). Similarly, the 6-year-olds beginning preschool, after attending school for a year, did not show a great amount of progress in this test. One child who was unable to climb the gymnastics ladder in Test1 performed the task with a large error in Test2, while another child who performed the task flawlessly in Test1 performed the task with an error in Test2 (Fig. 3B).

Among the 5-year-olds continuing preschool, improvements were seen across the entire group, with eight additional children being able to correctly perform the task in Test2 (Fig. 4A). The mean motor skill level of 6-year-olds continuing preschool slightly improved in the wall bar task in Test2. Additionally in Test2, there were no more children unable to perform the task and three additional children were able to perform the exercise without error (Fig. 4B).

Test III – Crawling on an inclined gymnastics bench

Besides one child, all of the 5-year-old children beginning preschool correctly performed this motor task

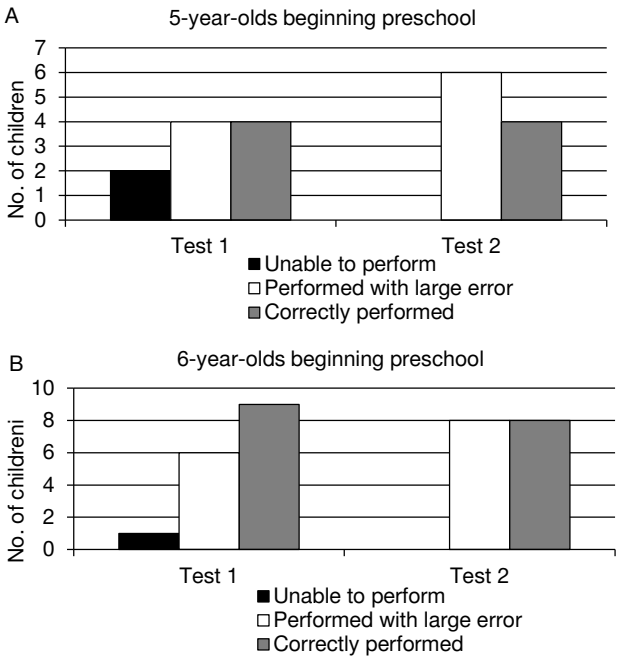

Figure 3. Test results of climbing a gymnastics ladder before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

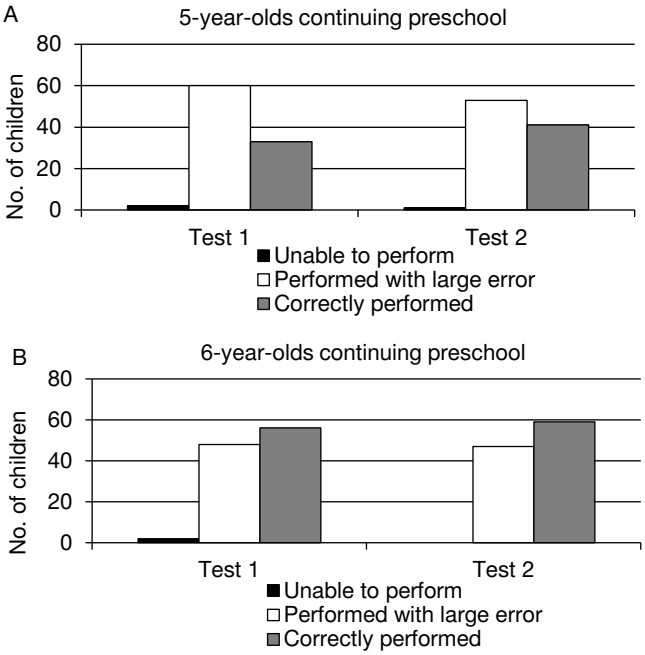

Figure 4. Test results of climbing a gymnastics ladder before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

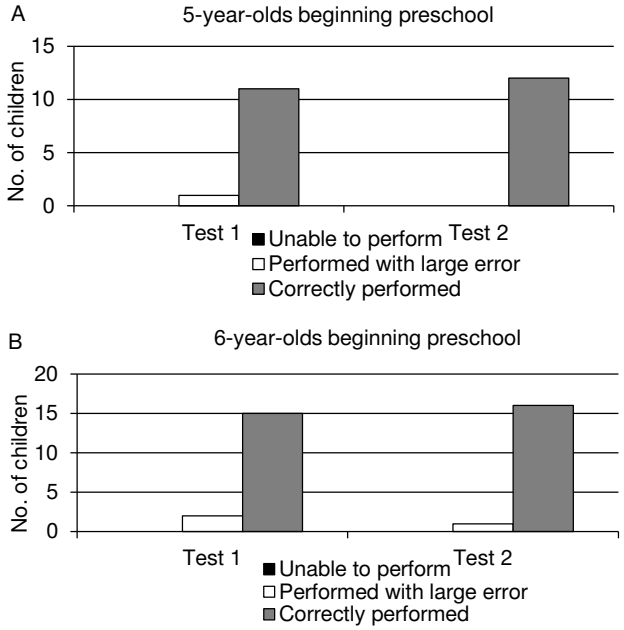

Figure 5. Test results of crawling on an inclined gymnastics bench before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

(Fig. 5A). Additionally, almost all of the 6-year-olds beginning preschool correctly performed this test.

Only two of the 5-year-olds continuing preschool in Test1 were unable to perform this task. However, in Test2, five children performed the exercise with an error (Fig. 6A). Among the group of 6-year-olds continuing preschool, eight children in Test1 performed the text

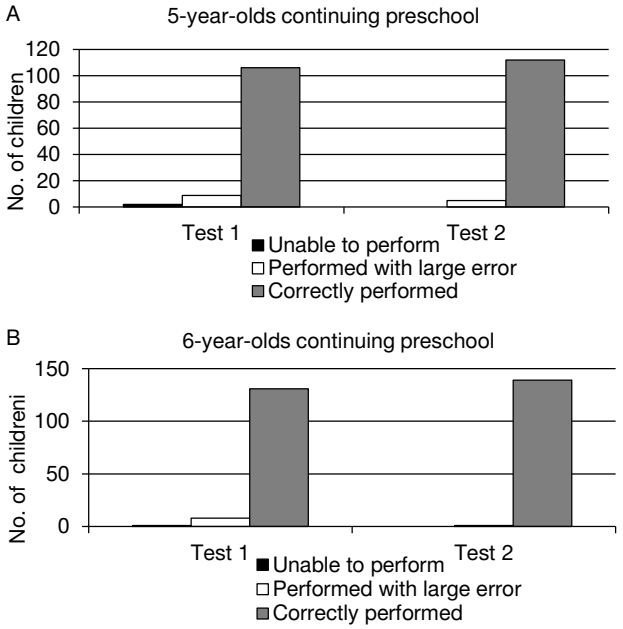

Figure 6. Test results of crawling on an inclined gymnastics bench before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

with an error. In Test2, only one child was unable to perform the exercise (Fig. 6B). Both the 5- and 6-year-olds beginning and continuing preschool showed a high motor skill level in crawling on an inclined gymnastics bench.

Test IV – Running and jumping over an obstacle with one leg

Only two 5-year-old children beginning preschool were unable to run and jump over an obstacle with one leg in Test1 (Fig. 7A). After attending preschool for a year, all of the 5- and 6-year-olds correctly performed this task (Test2).

An improvement was noted in Test2 among 5-year-olds continuing preschool, where only five children completed the task with an error; the rest correctly performed the test (Fig. 8A). Only two of the 6-year-olds continuing preschool did not complete this task, while 10 our of the group of 140 children performed this test without error in the beginning of the school year (Test1). In Test2, seven less children finished the task with a large error and there were no children who were unable to perform the task (Fig. 8B).

Test V – Catching and throwing a ball over an obstacle

The majority of 5-year-olds beginning preschool performed the test measuring catching and throwing a ball over an obstacle with a large error. After attending preschool for a year, only three children were able to correctly perform this task (Fig. 9A). In the case of

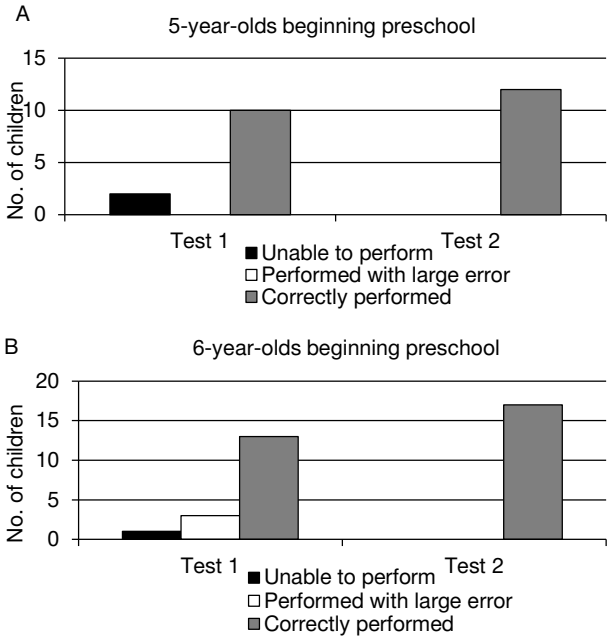

Figure 7. Test results of running and jumping over an obstacle with one leg before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

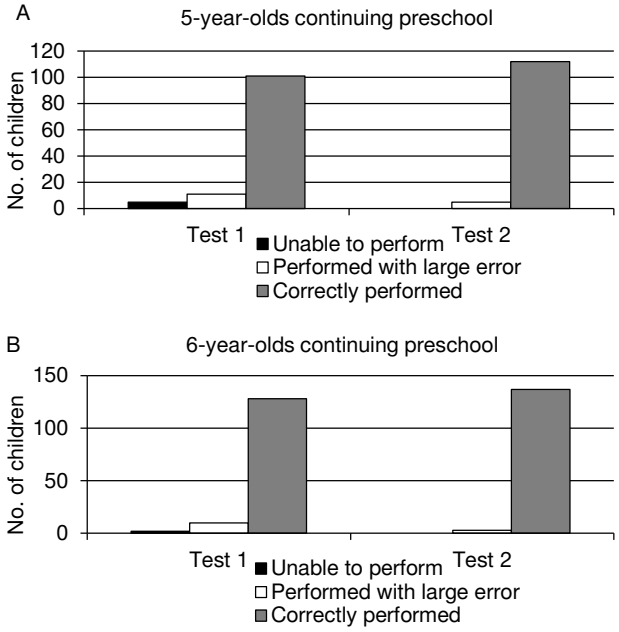

Figure 8. Test results of running and jumping over an obstacle with one leg before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

6-year-olds continuing preschool, performance worsened in this group in Test2 (Fig. 9B).

There were four less 5-year-olds continuing preschool that correctly performed this task at the end of the school (Test2). At the same time, four children who did not perform the task in Test1 were able to perform the test with a large error (Fig. 10A). No improvement was seen in the group of 6-year-olds continuing pre-

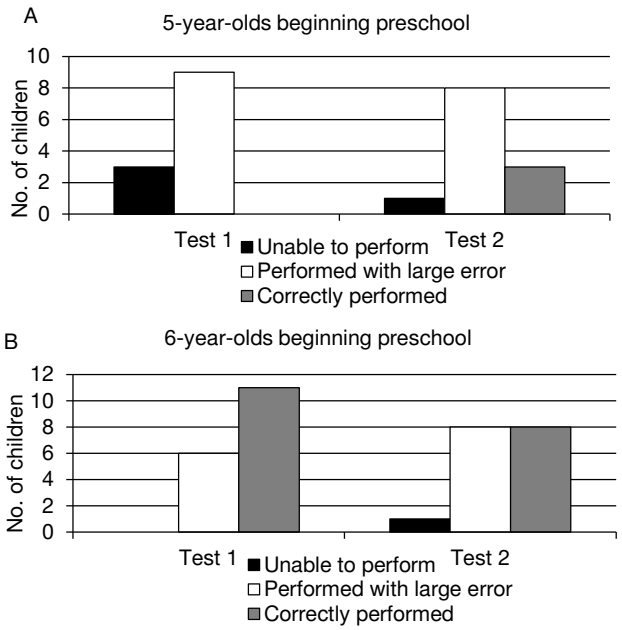

Figure 9. Test results of catching and throwing a ball over an obstacle before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

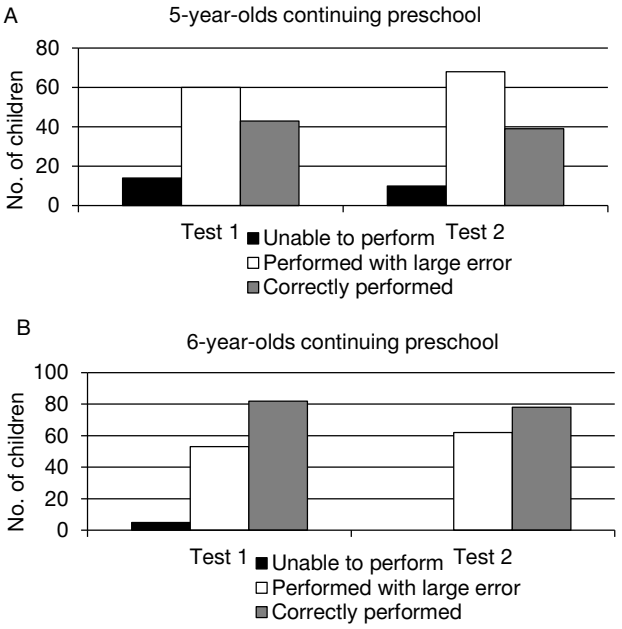

Figure 10. Test results of catching and throwing a ball over an obstacle before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

school. Five children who were unable to complete the task in Test1 performed the test with a large error in Test2. However, four children who correctly performed the task in Test1 completed the test in Test2 with a large error (Fig. 10B).

Test VI – throwing a ball against a wall and catching it

Testing performed at the beginning of the school year found only one 5-year-old beginning preschool that was able to perform the task albeit with a large error, the rest of this group failed to complete the task. A slight

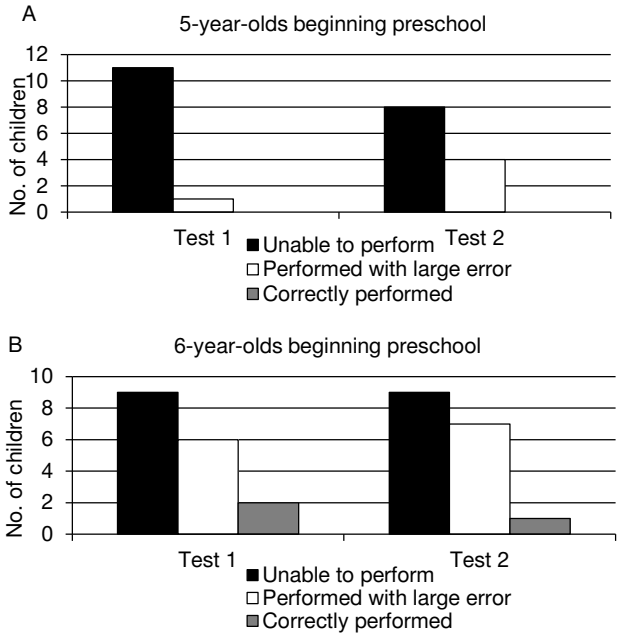

Figure 11. Test results of throwing a ball against a wall and catching it before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

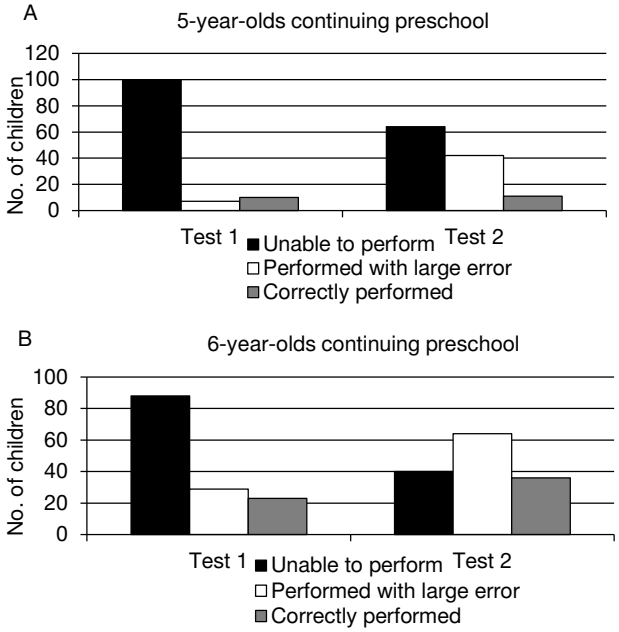

Figure 12. Test results of throwing a ball against a wall and catching it before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

improvement was noted in Test2, with three additional children able to perform the task with a large error (Fig. 11A). Among the 6-year-olds beginning preschool, testing performed after attending school for a year had only one child that was able to correctly throw and catch a ball (Fig. 11B).

Among 5-year-olds continuing preschool, the number of children who performed the task with a large error increased by 36 in Test2. Only one child tested at the end of the school year correctly performed the task (Fig. 12A) Among 6-year-olds continuing preschool there were 13 more children who correctly performed the task (Fig. 12B).

Test VII – Jumproping

Five-year-old children beginning preschool were unable to perform the jump over a jump rope exercise. Even after a year of school, only one child was able to correctly jump rope (Fig. 13A). Among 6-year-olds beginning preschool, only two children correctly performed the task (Fig. 13B).

Among the 177 5-year-olds continuing preschool, only one was able to correctly perform the task in Test1 and two in Test2 (Fig. 14A). Among 6-year-olds continuing preschool, seven additional children correctly performed the jump rope test in Test2 (Fig. 14B).

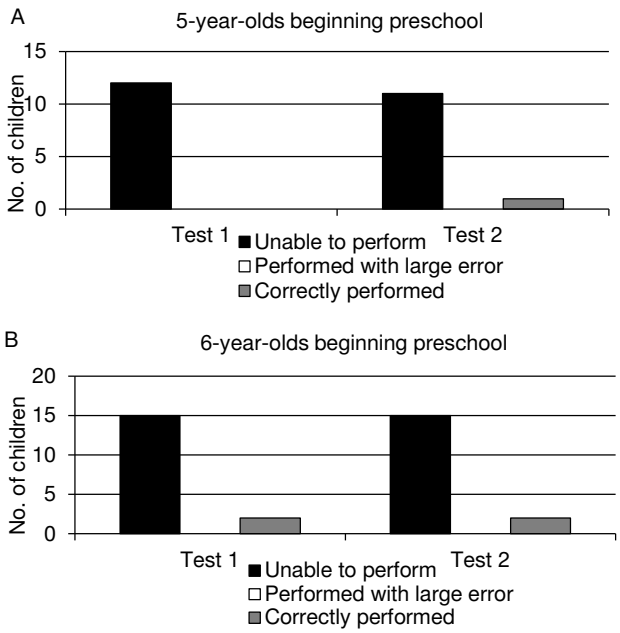

Figure 13. Test results of jumproping before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) beginning preschool

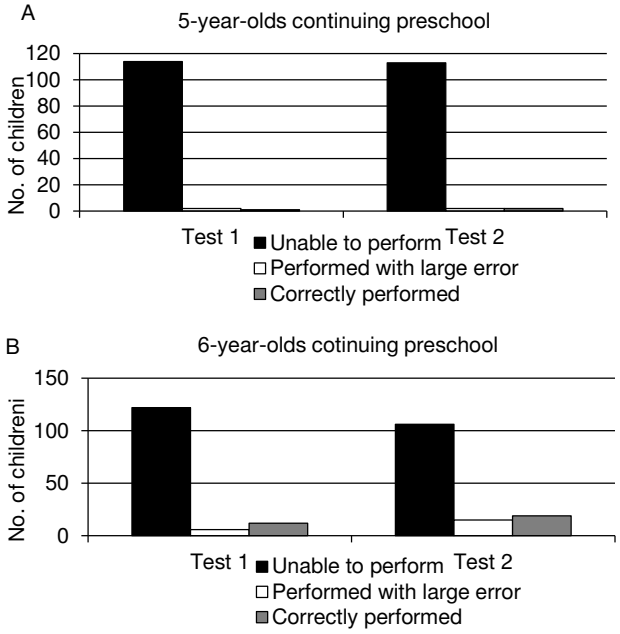

Figure 14. Test results of jumproping before (Test1) and after (Test2) the school year for 5-year-olds (A) and 6-year-olds (B) continuing preschool

Table 2. Analysis of physical activity logs of the selected preschools for exercises performed within the scope of the applied test battery and based on the preschool curriculum

Preschool	Balance bench exercises	Wall bar exercises	Crawling	Running with jumping	Ball exercises	Jump rope exercises
1	–	2x	–	–	2x	–
2	–	–	–	–	–	–
3	–	–	–	–	1x	–
4	–	1x	–	–	1x	–
5	–	–	–	–	–	–
6	–	–	–	–	–	–
7	–	–	–	–	1x	–
8	–	–	–	–	1x	–
9	–	–	–	–	–	–
10	–	–	–	–	–	–
11	–	–	–	–	–	–

Analysis of the physical activity logs of the selected preschools at the end of the school year in June found that out of the eleven schools only five had at least once conducted exercises similar to the tasks assessed by the test battery (which in turn was based on the preschool physical education curriculum). In six preschools no exercises of a similar nature were conducted. Although all of the participating children's teachers were informed that the battery was to be re-administered at the end of the school year, it was found that only a few of the exercises were taught by teachers throughout the school year. Examination of the logs found that those exercises similar to those in the test battery were rarely performed, where, for example, one preschool administered ball exercises for 5-year-old preschoolers only in January and for 6-year-olds in September, or, in another preschool, only in October and then November, whereas in February the children practiced hanging from a ladder and in April ball throwing and climbing a gymnastics ladder. In another preschool, records showed that in a group of 6-year-olds only in February did they perform various related exercises – climbing a gymnastics ladder and catching and throwing a ball.

Discussion

The aim of this study was to evaluate the motor skills of children in two age groups and those who had either already attended one year of preschool or had just begun their education at the beginning and end of the school year. This allowed for an assessment of what gains in their education were made, or what has also been termed as 'educational value added'.

Summarizing the motor skill levels of the analyzed 5- and 6-year-old children after performing exercises based on the physical education programs of their preschools, it appears that the children easily coped with exercises that were based on running and crawling. This was evidenced by the high results when running and jumping over an obstacle with one leg and crawling on an inclined gymnastics bench. On the other hand, tasks such as throwing, catching and bouncing a ball of the wall, and jumping rope were the least successfully completed by this group of children.

In a study named 'Six-year-olds in Poland', Cieśla et al. found that children were able to throw a ball with both hands at a very high level [23]. Almost half of the analyzed children who were attending preschools obtained a grade of 'good' in test-retest conditions. Similar results were obtained by children attending a primary school preschool program. Here, 'very good' results were obtained by about 40% of the preschoolers in the first test and 37% in the retest. Only about 1% of the children could not perform the throwing task in both the test and retest. Similar results were obtained in a test measuring performance when catching a ball with both hands. The largest group children performed this task with 'good' results (44% of children attending preschool in the first test and 44% in the retest; 43% of children attending a primary school preschool program in the first test and 46% in the retest). Only 3% of the children attending preschools or preschool programs were unable to complete the task in the first test; in the retest 5% of preschoolers and almost 5% of children attending preschool programs could not complete the task [23]. In the present study, the results of the test involving throwing a ball against a wall and catching had 20.4% of 6-year-olds unable to complete this task when tested at the beginning of the school year and slightly more, 23.6%, at the end of the school year. The difference between the results of Cieśla et al. [23] and the present study may stem from the fact that the motor tasks herein were more difficult to perform. They involved a combination of catching and throwing or throwing and catching movements and not standalone tasks.

The weakest skills of the children were evidenced in jumproping. Only a handful of individuals were able to jump rope. Subjective reporting by the children who did jump rope revealed that they did not learn this skill in their preschool. This was confirmed by analysis of the preschools' physical fitness logs, finding that none of the teachers administered any exercises with a jump rope, or in fact administered exercises that involved balanced walking on a balance bench, crawling, or running while jumping over low obstacles. This is regrettable, as it is naturally difficult for young children to acquire skills that are neither introduced nor developed in preschool. Brańska [24] stressed that education is the process of supporting (stimulating) the individual development of children and that its essence lies in the communication and mutual participation of both teacher and student in the educational process, where "children learn from their teacher and the teacher learns from their children [and thereby the] quality of education is progressively dependent on the teacher, classroom conditions, and the curriculum" [24, pg. 8]. Although following an educational program is not the only or most important condition for properly stimulating the individual development of a child, it can be helpful in the everyday life of teachers only if it provides suitable ideas that teachers would want and know how to implement.

Conclusions

The motor skill level of 5-year-old children beginning preschool was the highest in Test III, crawling on an inclined gymnastics bench, and Test IV, running and jumping over an obstacle with one leg. Five- and six-year-olds continuing preschool also performed the best in Test III, crawling on an inclined gymnastics bench, Test IV, running and jumping over an obstacle with one leg, but also in Test I, walking on a balance bench. All groups performed Tests III and IV with rela-

tive success, although 6-year-olds both beginning and continuing preschool showed a high motor skill level in Test I.

In all four groups, the largest percentage of children that was unable to complete one of the tasks was in Test VI, throwing a ball against a wall and catching it, and Test VII, jumproping. It was noticed that, in Test VI, the motor skills of the children did not progress enough to perform this task even after a year of preschool. One of the reasons can be attributed to the children not realizing enough exercises and games played with a ball. Similarly, in effect none of the children showed the ability to jump rope (Test VII), which may result from the complete lack of this kind of exercise in preschools.

The largest percentage of 5-year-olds beginning preschool who made a large error when performing the tasks was in Test V, catching and throwing a ball over an obstacle, and in Tests V and II (climbing a gymnastics ladder) by 6-year-olds. The group of 5-year-olds continuing preschool had the largest problem with performing Test II, climbing a gymnastics ladder, and Test V, catching and throwing a ball over an obstacle, while 6-year-olds continuing preschool only had problems with Test II.

After completing a year of preschool, the 5-year-olds beginning preschool featured improved motor ability in Tests II, climbing a gymnastics ladder, IV, running and jumping over an obstacle with one leg, V, catching and throwing a ball over an obstacle, VI, throwing a ball against a wall and catching it, and VII, jumproping. In contrast, 6-year-olds beginning preschool improved only in Tests I, balanced walking on a balance bench, and IV, running and jumping over an obstacle with one leg.

It is worth noting that the performance ability of the 6-year-olds beginning preschool in Test V, catching and throwing a ball over an obstacle, worsened after attending school for a year. After a year of school, the group of 5-year-olds continuing preschool improved their performance in Tests II, climbing a gymnastics ladder, IV, running and jumping over an obstacle with one leg, and VI, throwing a ball against a wall and catching it. Among the 6-year-olds continuing preschool, this group improved in Tests VI, throwing a ball against a wall and catching it, and VII, jumproping.

Research also found that the teachers of the examined preschoolers did not follow the physical activity exercises included in their curriculum. The fact that some of the children appeared to show a regression of the skills tested in the study after a year of preschool should be assessed negatively. It is felt that blame must not be cast on the curriculum but on the lesson plans developed and implemented by the teachers, as teachers and their instruction methods are the most influential in improving the various developmental spheres of children.

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