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Psychomotor development on preschool child through movement games

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Abstract

Problem statement: the game, considered as a form of general and motor activity, is the main instrument in the formation and development of human personality. Purpose of study: the research aims to see the degree by which movement games teaching, applied within the Romanian educational program raises the psychomotor skills of preschool children: coordination, balance, rhythm, precision of movement, laterality. Methods: in conducting this research were used the survey method, the direct and indirect observation method, the measurement and evaluation method and the statistical and mathematical method. Data was collected during 18 months from 136 children, aged from 3 to 5 years (±3 months) and enrolled in 3 kindergartens. A custom developed Protocol was applied to the experimental group, while the control group received the classical educational program. Findings and Results: Descriptive statistics for the collected data indicate a statistically significant effect for the following variables: vertical jump $F(1,133)=1.563$, $p=.213$, $MSE=15.824$, $\eta^2=.012$; speed running $F(1,134)=7.206$, $p=.008$, $MSE=8.320$, $\eta^2=.051$. Independent t test results showed significantly higher average values for the experimental group versus the control group, for the variables: vertical jump t tests in the intermediate stage ($t=2.668$, $p=.009$); speed running t tests in the intermediate stage ($t=2.261$, $p=.025$) and final stage, ($t=3.906$, $p=.001$). The obtained results show a positive effect due to the Evaluation – Intervention interaction, significantly higher for the variables: vertical jump $\eta^2=.11$, running speed $\eta^2=.11$, trunk bending $\eta^2=.16$, trunk extension $\eta^2=.23$.Conclusions and Recommendations: educational sport activities and movement games raise the level of driving skill development and psychomotor qualities, based on the biological factors - motor education interaction and a greater involvement in the correct performance of sport activities.

Keywords: preschool children, movement games, development, psychomotor;

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1. Introduction

Pedagogical reforms initiated in Romania after 1989 refer to transformations in the structure and functioning of the education system, both vertically and horizontally: vertically, by ensuring continuity between curricular cycles and preparing the transition between them with appropriate pedagogical methods and horizontally by design content into an intra-, inter- and transdisciplinary perspective, open to specific values of lifelong education.

The new preschool education curriculum focuses on three major issues when we talk about innovation and reform, namely: integrated activities, active-participative strategies and experiential domains.

Referring to preschool education reform, we note that the overall objectives focus on socialization, on the acquisition of autonomy, on the harmonious physical and psychomotor development, on communication and reading/writing, on encouraging curiosity, on building the habits to gather information and to solve simple problems.

The curriculum for experiential domains allow interdisciplinary and integrated scroll of the proposed content and provides freedom for the teacher to plan daily activities with preschoolers.

Due to integrated approach of activities in kindergartens, the boundaries between types and categories of activities disappear and the chosen theme for study is investigated by methods borrowed from more sciences.

Active and participative strategies encourages placement of the child in a position allowing him to explore and become independent. Learning situations, activities and adult-child interactions must correspond to individual differences in terms of interests, skills and abilities of the child (Daley, 2009; Peng, Lin, & Crouse, 2011; Rasberry, Lee, Robin, Laris, Russell, Coyle & et al. 2011; Howiew & Pate, 2012; Sun, 2012; Tapola, 2013).

Children have different development levels, different development and learning rates and also different learning styles. These differences must be considered in designing activities that stimulate the child to develop self-esteem and a positive feeling towards learning. At the same time, teaching must take into account the life and learning experience of the child, in order to appropriately adjust the learning tasks (National Association for Sport and Physical Education, 2004; Gao, Hannan, Xiang, Stodden, & Valdez, 2013; Hwang, Yang, & Wang, 2013; Sun, 2013).

For experiential areas of the curriculum preschool setting out the objectives pursued (Projects Management Unit for School Education, 2008):

- Training and skills development of basic motor and applicative tool
- Boosting the quality of the intellectual and emotional to apply independently the acquired skills
- Knowledge of hygienic habits to maintain health

The year 2000 brings a new vision of preschool education, seen in the educational program "Organization pre-primary education 'as a first step for young and specialist training tomorrow. Thus, early years and education at this age have become crucial issues for the further development of every person.

In 2002 was initiated the "generalization of Romanian preparatory preschool" and within it, in accordance with amendments to the Education Act (establishing compulsory education for 10 years and lowering the school age from 7 of 6 years), was revised the curriculum of educational activities in kindergarten and were made correlations with grades I- IV program.

Later, in years 2005-2006, it was developed the strategy in early education of the Ministry of Education, with UNICEF support. Achieving a coherent system of early childhood education in Romania it was considered a necessity arising from global priorities and national education strategies.

The Convention on the Rights of the Child, the Millennium Development Goals that 189 United Nations member states or employee Special Session on Children in May 2002, to meet by 2015, the Romanian Government program (2005-2008) National Reform Program and strategy of the Ministry of Education, with projection to 2013, traces the basic coordinates early education system that wants to promote it.

According to the Global Monitoring Report on Education for All (2007), early education supports the survival, growth, development and learning of children from birth to entry into primary education (formal, informal, non-formal), including health, nutrition and hygiene, cognitive development, social, physical and emotional them.

Early education incorporates the idea that young ages is the basis of personality, and for the child 's educational success should be all agencies involved with child influences, from family to community educational institutions (Perron, Graham, Feldman, Moffett & Hall, 2011).

During this period education is a holistic process that focuses both on the physical and on the cognitive, socio-emotional and consists of activities and experiences that influence the full development of the child (Grosu, 2008; Donnelly & Lambourne, 2011; Song, Peng & Lee, 2011).

2. Methods

2.1. The Research Design and the Experimental Conditions

Research design used is a mixed 3x2 design intervention based on such variables we defined two groups: the experimental group and the control group.

Research methods: survey method, direct and indirect observation method, method of measurement and evaluation, statistical and mathematical method.

Data from measurements and evaluation tests used were registered to the individual and collective files in order to centralize, process, compare and discover relationships between them.

2.2. Participants

The research was conducted on 136 subjects children aged 3 to 5 years. The groups already formed were combined and mixed in age and sex, a group of 68 preschoolers being experimental and another 68 preschoolers were control group.

The experimental sample (N = 68), which consists of 34 boys (10 aged 3, 12 aged 4 and 12 aged 5) and 34 girls (10 aged 3, 12 aged 4, 12 aged 5) attending kindergartens.

The control sample (N = 68) consists of 34 boys (10 aged 3, 12 aged 4 and 12 aged 5) and 34 girls (10 aged 3, 12 aged 4 and 12 aged 5).

Participants in the research are part of the state educational institutions in Cluj-Napoca, Cluj County. The researchers have the parental consent for making studies on the minor children.

2.3. Measurements

2.3.1. Bio-motor Potential Measurements

By evaluating the bio-motor potential we obtain valuable information about the physical development of the individual, the existence of any musculoskeletal poor attitudes and physical condition information (characterized by hints of manifestation of strength, endurance, coordination, balance, speed in various forms, suppleness etc.) thereof, which, in our view constitute a platform for the manifestation of other forms of health (Cojocaru et. al., 2011).

They fall into three categories: somatic measurements made on targeted body measurements: waist, bust, thoracic perimeter and body mass; functional measurements that reveal values of functional parameters (respiratory); driving measurements using an evaluation sheet.

In order to establish age and sex particularities, potential bio-motor typical preschool period and orientation of future intervention by the established protocol, we used the following methods of measurement and evaluation (Câmpeanu, 2004).

Height - is denoted by T. Tools straightedge / frame anthropometric, weight and height measuring scale. Definition: the distance from the vertex point halfway between the two pterions. Measuring technique: standing issue, maintaining all body segments in anatomical position. It marks the vertex and halfway between the two pterions then performs precision measuring instruments in centimeters.

Weight - is denoted by W. The resulting weight of the sum of the components of the human body that skeletal mass, muscle, adipose tissue, mass of internal organs, the amount of water. Weight, the skeleton is 15-20%.

The weight varies during the day. These variations can be between 200g / day in young children and infants, up to 1 kg and 600 grams per adult, given the degree of filling of the bladder and water loss during the day, sweating, sleep after exercise.

Measuring technique - after checking scales, the subject completely naked or with minimal clothing sits on the scales. It avoids the subject on the scales balance. The contact must be made with whole sole and both legs. Performing such measurements is preferred morning, before eating and after emptying the bowels and bladder. To have a complete picture of the development of the matter, the weight will be reported to the waist. It is expressed in kilograms and grams. For children, however, the formula after which a ratio of weight and size is that of Lorentz (De Landsheere, & De Landsheere, 1999), shown as: children between 2 - 6 years: $W = (T-100) - [(T-123) \times 0.7]$

Bust - Tools straightedge / frame anthropometric metric tape. Definition: the distance from the vertex point to bi-ischial line from a sitting position on the subject. Measuring technique: the subject seated, keeping all body segments in anatomical position. It marks the vertex and bi-ischial line and the meter is placed between the two landmarks in centimeters.

Respiratory Rate Definition: The amount of oxygen necessary vital body processes is ensured through breathing. Breathing consists of a rhythmic inhalations and exhalations succession. In normal condition, breathing is calm without any effort. Chest movements are symmetrical, rhythmic and barely visible. Items to be tracked to measure respiratory rate:

- Respiratory type
- Symmetry of respiration
- Amplitude of respiratory movements
- The frequency of respiratory movements

The thorax perimeter - or chest thickness measured in centimeters. Tools- metal band. The technique of measurement: metric tape placed below the top of the scapula posterior and anterior based xiphoid appendix, for men and at joint 4th coast sternum in women. Measure the dimensions of the maximum inspiration thoracic perimeter, thoracic perimeter in forced expiratory.

We used the battery of tests used in national testing, composed of five anthropometric measurements: size, weight, bust, chest perimeter in inhalation and exhalation.

2.3.2. Motor Ability Testing

At all ages we applied 5 tests used in national testing: speed, cardio-respiratory resistance, overall skill, expansion force on upper and lower limbs.

2.3.3. Motor Measurements

I used 10 tests on children aged 5, which were: expansion force on lower and upper limbs, speed, overall skill, joint mobility and muscle flexibility, muscle endurance under force, cardio-respiratory resistance and lasting running.

Were made measurements and potential somatic motor of children born in 2009 and 2010 (3-4 years), applying 4 samples driving, which consisted of Detention arm, speed, overall skills, cardio-respiratory resistance.

2.4. The Procedure

Study duration was 18 months; repeated measurements were made, yielding a total of three sets of data on which the analyses were performed.

In the first phase from October 7 to October 18, 2013, were applied in preschool initial evaluation tests after a preliminary assessment, the groups selected subjects (136 subjects).

Preliminary assessment at 3 years old children was performed by test A. De Meur (Albu, Albu, Vlad, & Iacob, 1999), aimed at developing the body scheme. The tasks were driving body movements and body parts made by imitation. The sample represented a preliminary verification.

Preliminary verification was done in the first stage, by observing the children was intended, first, the answer instructed children to sit side by side on two banks, one after the other. Once all the children were sitting on the bench, indicated formation of a circle of children and educator in the middle of the classroom, holding his hands. After amounted circle, placing children in line indicated in a row, with sidearm and reaching fingertips. First settled educator, and children were encouraged to sit in formation.

Next to the children's motor response followed by imitation. The sequence of movements was performed in standing in line in a row, arms at your sides, at an interval of about two arm lengths to order and urge examiner in front of the group. May run slowly, the following sequence of motions: time 1-2, carrying arms overhead and placing hands on the head, one over another and return with arms along the body; times 3-4, putting hands on hips and back; times 5-6, carrying sidearm, return; times 7-8, carrying an arm stretched up and down the other side, while comeback.

Driving behaviors were tested by the following items and performance indicators:

- To execute the verbal command: walking "dwarf", 5-7 steps; Toe-walking, 5 to 7 steps; frog jumping, 3-5 jumps; riding "horses", a few meters. In total 8 points, 2 points for correctly executed sequence
- Easy running to pass more than 5 obstacles (frames or blocks with a maximum height of 15 cm) located at 0.5 m distance; climb the climbing gym sitting on the bench with one end leaning on a pedestal 1 – 1.20 m high; by climbing down from the pedestal; throwing a ball the size of rounders' and they roll on the ground, 5-7 m with his right hand and then with his left hand, crawling under four tables. In total 10 points, 2 each for each sequence correctly executed

Psychomotor parameters were tested by the following items and performance indicators:

- On one foot standing ("Stork"), then the other. Prior to testing children , were shown maintenance of standing on one leg , the other being raised or bent at the knees, arms raised side. The timer starts when the foot is lifted off the ground and stops when it returns to standing on both feet
- Walking along one gymnastics bench or on two benches put together, middle turn 360 °, lowering jump back through 180 °, went back 5-7 steps up to a line on the ground, walking with hands on eyes 5-7 m, to the right of a landmark (line, box, pole, etc.) predetermined, two rolls of squatting in the squat. 18 points, 4 for each sequence correctly executed

The assessment criteria and parameters for motion behavior psychomotor were very good - 18 points; Well - 10 - 16 points; satisfactory - 6 -10 points; unsatisfactory - under 6 points.

In this first stage, after preliminary assessment was conducted the initial assessment, which consisted of anthropometric measurements, measurements on motor capacity measurements in children 5 years driving, driving measurements in children of 3-4 years.

The second phase covered the period October 28 2013 to May 16 2014, was applied to the experimental group (68 subjects) "protocol" established with the following objectives: coordination enhancers static, dynamic coordination of hands enhancers, improvers general dynamic coordination, increase the speed of movements improving basic motor skills luggage in close correlation with the level of bio-motor development, stimulating attention, memory motive , motivation during construction, incorrect body posture prevention . The objectives were achieved through the training program and teaching strategy in two sessions per week.

The control group (68 subjects) was applied to classic teaching program.

In the third stage, May 19 to May 30 2014, we applied intermediate testing (according to established protocol) in both groups: experimental and control. We recorded the record sheet data subjects.

In the fourth stage, October 6, 2014 - March 27 2015, was applied to the experimental group (68 subjects) protocol established by teaching sports game situations, according to the results achieved in the intermediate testing. The control group (68 subjects) was applied to classic teaching program.

For the period: 30 March to 10 April 2015, the final evaluation was carried out of the potential driving force both groups of subjects (136 subjects), followed by period: April 13 to April 24, 2015, in which to process and interpret the data drawn from the experiment.

2.5. Data Analysis

According to design, data analysis had the following course: was applied a 3 x 2 mixed ANOVA to quantify the degree of significance of main effects (effect of time of testing and effect of the intervention) and composite effects (interaction between research and intervention time). An independent variable intra-subject has three ways: pre-intervention and post- intervention interim evaluation. The second type is variable between- independent two ways: intervention and control.

Global tests were followed by Fisher LSD post-hoc analysis (least significant difference) (Lyman & Longnecker, 2010), to highlight the differences between how the variable "time of evaluation".

If the interaction effect was different, t tests was used to describe the interaction. Inferential statistical analysis was complemented by an estimate of effect size. Inferential statistics were preceded by univariate descriptive statistics.

3. Results

The results of this study support the efficacy of "protocol" in the preschool program of activities. One important note was that preschoolers of both groups had better results at post- test assessment than pre -test, after going through the "protocol" intervention. The size effect confirmed that preschoolers have developed operational plans proposed by the driving qualities, taking into account the objectives set according to the results of the initial evaluation and intermediates. In this study, the experimental group was applied "protocol" for action (didactic sport games), while the control group was applied classical program of sports activities for participants' age.

The superior results obtained in the experimental group, seem to suggest that their level was determined by the specific context of the Protocol or content differences. The results showed the effect of interaction, between the two variables Evaluation*Intervention statistically significantly higher in variables: vertical jump η^2=.11; speed running η^2=.11; torso bending η^2=.16; torso extension η^2=.23; tractions η^2=.21; wall push-ups η^2 = .53.

Independent t test results showed that the preschoolers in the experimental group, the mean values were significantly higher than those of preschool children in the control group, for the following variables: vertical jump t tests show significant differences between experimental and control group stage interim study, t(134) = 2.668, (p=0.009). For variable speed running, t (134 degrees of freedom) indicates significant differences between the experimental and control in the intermediate stage (t = 2.261, p = 0.025) and the final one for the study, t = 3.906, (p=0.001); during initial phase differences are insignificant (p>0.05); If t-tests variable torso lift (for 114 degrees of freedom) indicate no significant differences between the experimental and control group in all three phases (p>0.05) (see Figure 1). For variable traction, t tests (for 114 degrees of freedom) indicate differences in the final phase of the study, t =5.252, (p=0.001); in the first two stages are no significant differences (p>0.05); If the second test Running variable t (for 134 degrees of freedom) show significant differences in the final phase of the study, t = 4.504, (p=0.001); in the first two stages are not significant differences (p>0.05).

Moreover, data collected descriptive statistics indicate a statistically significant effect (medium to large) of the following variables: throwing tennis balls F(1,134)= 0.751, p= 0.388, MSE= 11.167, η^2=0.006; vertical jump F(1,133)= 1.563, p= 0.213, MSE= 15.824, η^2=0.012; speed running F(1,134)= 7.206, p= 0.008, MSE= 8.320, η^2=0.051; commuting F(1,134)= 35.029, p= 0.001, MSE= 27.297, η^2=0.207; torso bending F(1,114)= 41.762, p= 0.001, MSE= 309.25, η^2=0.268; torso extension F(1,114)= 27.409, p= 0.001, MSE= 476.541, η^2=0.194 (see Table 1.); tractions F(1,114)= 26.084, p= 0.001, MSE= 1674.769, η^2=0.186.

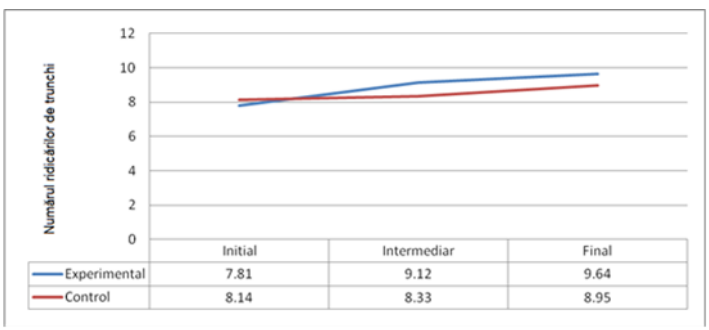

Figure 1. Torso lift evolution for the two groups

Table 1. Descriptive Statistics for Torso Extension

	Intervention	Mean	Std. Deviation	N
Initial	Control	4.84	1.663	58
	Experimental	4.47	1.809	58
Intermediary	Control	6.62	1.981	58
	Experimental	6.14	2.188	58
final	Control	42.78	51.001	58
	Experimental	6.88	2.217	58

Thus, it was observed that the average value in the experimental group was located in the center of the target range, while the average in the control group was in the bottom of the target range. These results suggest further concluded that the protocol was applied to ensure preschool children increased from medium to large motor skills.

As applied to the experimental group intervention protocol (didactic sports), while the control group was applied classical educational program, the effect of the program was the one who made the difference, being an important contributor to -the effect size values indicating the interaction between the Evaluation*Intervention two variables statistically significant medium to large in variables throwing tennis balls η^2=.07; vertical jump η^2=.11; speed running η^2=.11; torso bending η^2=.16; torso extension η^2=.23; tractions η^2=.21; wall push-ups η^2 = .53.

4. Limits

It should be observed that during the results interpretation we have encountered situations that are not statistically significant due to the fact that the subjects were not randomized. For this reason, it might bring about the replication of the study with randomized subjects and lead the research to other possible directions.

5. Implications: practical significance

Following the development and application of "intervention protocol" in order to increase the driving capabilities, the conclusions that can be drawn are as follows:

By analyzing the first hypothesis, we believe that preschool educational activities, which include several sports game teaching situations provided by the "intervention protocol", raise the motor skills development level.

Based on the interaction between biological (internal) factors and motor education, it is concluded that:

- The individual peculiarities related to age and sex are necessary, as they follow individual routes together with psychomotor learning
- In terms of driving and psychomotor development of children, it goes through alternating phases in its evolution, so the result is different
- The subjects showed normal values in terms of somatic, functional and motor parameters. The themes were developed in line with the age particularities but also taking into account the development of somatosensory and motor function of the subjects

The results reported for the anthropometric dimensions were as follows:

- in terms of waist size, for the boys during initial testing was recorded a minimum of 100.27 cm, a maximum of 103.4 cm, with the mean value 101.83 cm; for the girls was recorded a minimum of 94.53 cm, a maximum of 99.45 cm and a mean value of 96.99 cm. During the final testing for the boys was

recorded a minimum of 90 cm, a maximum of 116 cm and mean value of 102.46 cm; for the girls the minimum was 92 cm, the maximum was 114 cm, the mean value being 101.5 cm.

- in terms of weight, during initial testing for the boys was recorded the minimum value of 13.7 kg, the maximum value 19.1 kg, with a mean value of 16.3 kg; for the girls the minimum recorded value was 13 kg, the maximum was 18.8 kg and the mean value was 15.58 kg. For the boys final testing there was a 14.9 kg minimum, a 19.5 kg maximum and a mean value of 16.13 kg; for the girls final testing the minimum value was 12.5 kg, the maximum was 20.9 kg and the mean value was 16.44 kg.

- with regard to bust size, the initial testing for the boys had a minimum of 52 cm, a maximum of 61.5 cm and a mean value of 57.53 cm; for the girls was measured a minimum of 51 cm, a maximum of 62 cm and a mean value of 57.91 cm. During the final testing for the boys was measured a minimum of 52 cm, a maximum of 63 cm and a mean value of 57.32 cm; for the girls was measured a minimum of 53 cm, a maximum of 63 cm and a mean value of 59.05 cm.

- the initial testing measurements for the boys chest perimeter in inhalation had a minimum of 52 cm, a maximum of 64 cm and a mean value of 57.66 cm; for the girls the minimum value was 51.1 cm, the maximum was 59 cm and the mean value was 54.15 cm. During the final testing on boys the measured minimum value was 53 cm, the maximum was 62 cm and the mean value was 58.12 cm; on girl measurements had a minimum of 51 cm, a maximum of 60 cm and a mean value of 54.09 cm.

- the initial testing measurements for the boys chest perimeter in exhalation had a minimum of 50 cm, a maximum of 61 cm and a mean value of 56 cm; for the girls the measurements had a minimum of 51 cm, a maximum of 55 cm and a mean value of 52.61 cm. The final testing revealed for the boys a minimum of 52 cm, a maximum of 64 cm and a mean value of 59.06 cm; for the girls the minimum value was 51 cm, the maximum was 60 cm and the mean value was 54.09 cm.

In terms of anthropometric measurements, the results are confirmed by a number of pediatric studies, of which we remember those incurred by Dr. Bauer Bela in Transylvania and Vasilov in Moldova (2001).

By analysis of the two hypotheses we find that the degree of involvement of preschool children is higher in the correct performance of activities under the "Protocol", the driving qualities are improved. Therefore, effect of the program is an important contributor to the size of values indicating the interaction between variables Rating* Intervention statistically significantly higher in variables throwing tennis balls η^2=.07; vertical jump η^2=.11; speed running η^2=.11; torso bending η^2=.16; torso extension η^2=.23; tractions η^2=.21; wall push-ups η^2 = .53.

In this context, educational goals supported by functions of design, anticipation, guidance, organization and control can help improve the quality and efficiency of training of preschool children;

Correct development of educational objectives based on the requirements of modern civilization and individual characteristics age and sex, can lead to a harmonization of quality relationship - efficiency.

Shaft generative goals (content, strategy, assessment) obviously lead to increased efficiency and quality of instruction. These goals are achieved both in teaching and trainer belonging often learning process - learning through play, which belongs to preschoolers. However, the existence of an evaluation tool (measuring) allows routing process control training.

The final conclusion was reached as follows: the game has motor formative education purposes, is used in the integrated psychomotor activities at the preschool. This conclusion is supported by the large effect of the intervention program applied in this study.

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