

Developing Spatial and Body Schema Orientation in Preschoolers and Primary School through Physical Activities

Mircea Ion Ene¹, Teodora-Mihaela Iconomescu², Laurentiu-Gabriel Talaghir³ and Adriana Neofit⁴

Faculty of Physical Education and Sport, University "Dunarea de Jos" from Galati, Romania

Telephone: +40755603144, + 40745651297, +40745033806, +40744596744

**E-mail: ¹<ticonomescu@ugal.ro>², <ieemircea@outlook.com>, ³<gtalaghir@ugal.ro>, ⁴<neoadriana@gmail.com>*

KEYWORDS Children. Games of Movement. Physical Activities. Psychomotricity Test

ABSTRACT The present research aims at studying, out of the content of psychomotricity, spatial orientation and the recognition of the body schema, which is basic in the extracurricular physical activity of normal children. In order to test the level of acquisition of these qualities in terms of psychomotor learning, subjects included in the research took part twice a week in physical activities based on movement games, having as the objective the improvement of psychomotricity. Their testing was achieved by adapting the test evincing the capacity of spatial orientation and body schema, which is grounded in evincing the capacity of spatial orientation and the degree of knowledge the child has of its own body, by acknowledging the spatial rapports and operating with specific language. After tests, it was observed that after going through physical activities with the proposed objectives, spatial orientation and bodily scheme had improved significantly, and there is a relationship between games of movement within the program of physical activities and the level of acquired skills on the orientation in space and body scheme.

INTRODUCTION

Motor anthropology is a branch of applied anthropology, which deals with movement as an effect of bio-psycho-social activity. Motor anthropology explores the effect of movement on the development and education of the human being (Cordun 2009: 18). A milestone in motor anthropology is constitutional typology somatosensory physiological, motor and psychic, correlated to sports activity requirements (Ifrim 1986: 24). From this perspective the researchers consider that the theme addressed in this study on children's psychomotor skills and the ability to improve them, through physical activity, fall within the human anthropology domain.

In the training activity with preschoolers and primary school, there are often cases when they show certain inabilities, placing them in an inferior position in comparison with their peers. Even if these inabilities are not made a fuss over and these children usually pass for "clumsy" or "untalented" for certain activities, these children

gradually develop an inferiority complex in relation to others. Some place importance on the difficulties they experience, and as they try to overcome, remove or hide them, they grow bigger. They become more and more obvious in school activities, where performance is constantly assessed and compared to other children. In general, these inabilities belong to the psychomotor area and manifest in the difficulty or impossibility of effecting well-coordinated movements during games or school activities, which require mobility, awareness and self-control. As a rule, preschoolers and primary school children are concerned with educating the motor skills involved in writing, their bodily self-awareness, localization in relation to themselves or others, and organizing their own movements into efficient actions.

Tolerating psychomotor difficulties in preschoolers or primary school children in the hope that they will eventually disappear in time, as the child grows older is a huge mistake. With the passage of time, difficulties increase taking into account the increasingly complex activities the child has to perform. That is why the researchers opine that the education of psychomotricity starting from a very young age should be one of the main concerns of parents and teachers, being also very important for older age groups.

Discussions with individuals in preschool and primary school confronted with the chil-

Address for correspondence:

Dr. Teodora-Mihaela Iconomescu
University "Dunarea de Jos" from Galati
Faculty of Physical Education and Sport
Department of Games Sports and Physical Education
Garii Street, No. 62-64, 800217, Galati, Romania
Telephone: +40755603144
E-mail: ticonomescu@ugal.ro

dren's psychomotor difficulties in the educational process led the researchers into the in-depth study of the issues of psychomotricity, by studying specialized literature. Unfortunately, it does not supply complete answers to the requirements of the practitioner who needs succinct theoretical information, concrete assessment tools and methods, as well as practical examples of psychomotor education.

The motor development of children provides mental, social and personality development. Children develop in a predictable way, from total dependence to adult, to personal autonomy and physical and social independence. The speed and rhythm of development, motor peculiarities and language peculiarities of all children are different, but the development mode is similar, with everyone going through the same predictive stages. Some children go through this evolution differently to their peers, and these differences manifest themselves by delaying the formation of habits, which then impede socialization and integration of the child in the group.

Montessori claims that motor education is part of the very life of children, linking it to the everyday activities and games of children, by introducing education of movement in a single and indivisible whole of the training of infant personality. The child is in continuous motion, and in childhood, the child feels constantly the need to move, and this situation is blurred with the development of inhibition capacity that, together with motor impulses, begins to build tools for listening to the will (Montessori 1977: 144).

The psychomotor education of the child is a transdisciplinary action, pedagogical and physical education, the purpose of which is the systematic education of different behaviors, starting from living the motility, bodily scheme and leading to operate with notions.

Maite and coauthors (2015) consider that the concept "psychomotricity" contains the "psycho" term, which refers to the psychological activity at the cognitive and affective levels, and the "motricity" term, which refers to movement (Maite et al. 2015: 1616).

Specialized literature by Coler et al. (2010), Lupu (2011), Shingjergji (2014) and Glushkov et al. (2014) is generally centered on the psychomotricity of special needs children, and much less on normal children with a psychomotor inability manifest through the non-recognition of the body schema or the impossibility of spatial orientation.

Psychomotor development comprises seven components whose development is interrelated. These are gross motor skills, fine motor skills, bodily scheme, laterality, perceptive organization, spatial organization, time management and the evolution of rhythmic sense.

Motor skills' training is dependent on the evolution of psychomotor components, which together constitute the level of psychomotor development (Horghidan 2000: 46).

Psychomotor specialists Mascarenhas et al. (2011) and Trouli (2008) have established as a result of longitudinal studies, a stage of age named by them as the "optimum interval of educability", which is located between 6 and 10 years, during which psychomotor skills can be developed to the maximum.

Despite the requirement that the child has to move, his motor skills often are not explored during childhood, causing changes in their psychomotor development, which will be reflected in adulthood.

These cases are due to lack of exercise, having a sedentary lifestyle, such as a static life in front of the computer or television. Children no longer run out in the open, no longer play various games of childhood on the street in front of the house and do not practice exercise.

Children in kindergarten have an educational program in which the focus is not on psychomotricity, but just on the acquisition of language, communication, drawing, music, with the physical exercises having a percentage of just ten percent of the weekly educational program.

All these shortcomings of educational activities for kindergarten children, but also those enrolled in primary school (sedentary lifestyle, computers, television, gadgets) lead to deficient psychomotor development at their age. Given those facts mentioned regarding kindergarten and primary school, one can say that physical inactivity, sedentary life and general lifestyle influence the motor development of children. Therefore, the researchers consider that by knowing the level of psychomotor development of children, one can propose and implement programs of motor development that meet the needs of different groups of children (kindergarten, primary, secondary). These programs should be designed to allow children to perform necessary motor activities throughout life.

The research aims to promote psychomotor development through playful activities

specific to the age of the children undergoing research, and the level of the individual possibilities. Individualization comes to capitalize the diversity of identities mental, physical and experiential of children, respecting the child in the educational process.

METHODOLOGY

Population and Sample

The population of this research constitutes children aged between 4 and 6 years old, and belongs to preschools and primary schools from Galati, Romania.

Research Model

The purpose of the research was to improve the components of psychomotricity (spatial orientation and body schema recognition) in normal children aged between 4 and 6 years old (preschoolers and primary school), by movement games (ludic activities) performed within the framework of physical activity.

The research took place in the 2013-2014 academic year with subjects aged between 4 and 6, participating in a program of physical activity twice a week.

The subjects' evaluation was performed at the beginning and end of the research through testing the orientation and spatial abilities, and the level of awareness of the children's own bodies.

The materials used were objects familiar to the children (ball, notebook, pencil, toy, book) placed in relation to the child in order to test the following spatial relations (far-close, up-down, front-back, outside-inside, above-below, right, left, hand, foot, on, and under). The test by orientation and spatial abilities belongs to Comsa et al. (2006) and contains a set of 20 requirements.

Methodology

The test is applied individually, requiring the child to respond to the following items:

- Item 1: Lift the right hand/bend the left hand
- Item 2: Turn right/left
- Item 3: Place the right hand on the right shoulder/place the left hand on the left shoulder
- Item 4: Name two objects on your left/right
- Item 5: Which child is the closest to you/farthest from you?

- Item 6: Name an object in front of you/behind you
- Item 7: Name an object on/under the desk
- Item 8: Name two objects above/below
- Item 9: Name an object outside/inside the box
- Item 10: Where is the sky/the ground in relation to a house?

Grading

1 point is awarded for each accurate answer. The evaluation was performed through next scoring:

- 18-20 points: Very good
- 15-17 points: Good
- 12-14 points: Satisfactory
- Under 14 points: Unsatisfactory (Comsa et al. 2006: 32).

The playful physical activities performed during the research have consisted in realization of movement games with psychomotor objectives, including spatial orientation and bodily schema recognition.

Statistical analysis was performed using SPSS for the Windows version 20. Frequency statistics were used to calculate the group comparisons as a whole. For this the researchers use the contingency coefficient χ^2 (Chi-square).

Procedure

The subjects participated in a program of physical activity twice a week for a period of 40 minutes (the 4 and 5-year-olds) and 50 minutes (the 6-year-olds).

The physical activity program was aimed at improving the spatial orientation and body schema by movement games (dynamic games) with the following objectives:

1. Using and building open or closed figures (spaces) (that is, irregular or regular shapes, by means of cubes, laces, wire and rope).
2. Acknowledging where they are in relation to a certain space/object in space (in the room, outside the room, on the chair, under the table, near their classmates).
3. Handling objects over, on, above, below, inside, outside a certain space/object given or built by themselves.
4. Recognizing and using the proper language for these spatial relations, that is, on, under, in, over, above, below, inside, outside, close, far, closer, farther, the closest, the farthest, near me, here and there.

5. Identify the main corporal segments (one's own, the partner's, on dummies, on images).
6. Identify the missing elements (dismembered toys, gapped images with increasing difficulty degrees).
7. Decompose and recompose the body from constituting segments (gradually increasing in difficulty). So, the game becomes a method, means, and form of organization, with or without competition, adapted to the motor and mental skills of the pupils. Psychomotor activities achieved by the movement games allow the child to know, explore, interiorize or exteriorize states and feelings, interact with his/her own body, the game partners and the environment.

RESULTS

The sample comprised 96 children (50 boys and 46 girls) aged 4-6 years. The groups were composed of 30 subjects of 4 years (14 boys and 16 girls), 34 subjects of 5 years (18 boys and 16 girls) and 32 subjects of 6 years (18 boys and 14 girls).

Statistical analysis of the scores obtained by the group of 4 years highlights a significant difference between the expected and observed frequencies in the two tests, both girls and boys. In statistical terms, the level of acquisition of orientation in the space and bodily scheme is

significant due to the scores presented in Table 1. The scores obtained by girls was $\chi^2 = 5.33$, $df = 1$, $p < .05$ and by boys $\chi^2 = 9.54$, $df = 1$, $p < .05$.

By participating in the physical activity, the group of 4-year-olds has significantly improved spatial orientation and awareness of the human body, due to motion games with specific themes during the course of the research.

The 5-year-olds in terms of psychomotricity are able to use various body notions, imitate certain characters, and have a good visual discrimination of the different body parts.

Statistically speaking, at this age there is no significant association between physical activity and the development of the psychomotor components under study. The results obtained are presented in Table 2 and contains statistical analysis scores obtained by girls $\chi^2 = 3.69$, $df = 1$, $p > .05$ and boys $\chi^2 = 2.81$, $df = 1$, $p > .05$.

The initial test evinced that the subjects up to 5 years of age (boys and girls) did not have issues of psychomotor inability, being normally developed from a psychomotor point of view. In the initial test, ninepercent of the subjects showed a psychomotor inability. By observing the final test it was found that these subjects also got normal scores, which is why the statistics did not evince the relation between physical activity and the improvement of the psychomotor components.

Table 1: Comparison of the results component of psychomotricity by Chi-square test for the group of 4 years

Component of psychomotricity	The difference between the initial testing and final testing			
	Girls (n=14)		Boys (n=16)	
	χ^2	Significance	χ^2	Significance
Orientation in space and bodily scheme	5.3	.021*	9.5	.002*

Note: * $p < .05$

Table 2: Comparison of the results component of psychomotricity by Chi-square test for the group of 5 years

Component of psychomotricity	The difference between the initial testing and final testing			
	Girls (n=14)		Boys (n=16)	
	χ^2	Significance	χ^2	Significance
Orientation in space and bodily scheme	3.6	.055*	2.8	.094*

Note: * $p < .05$

Table 3: Comparison of the results component of psychomotricity by Chi-square test for the group of 6 years

Component of psychomotricity	The difference between the initial testing and final testing			
	Girls (n=14)		Boys (n=16)	
	χ^2	Significance	χ^2	Significance
Orientation in space and bodily scheme	4.2	.040*	4.1	.042*

Note: * $p < .05$

Following the statistical analysis the researchers may conclude that the skills of the 6-year-olds included in the research were acquired, given the significant results and the existence of differences between the two tests. The differences did not occur at random, but they are due to the activities classified according to the didactic purpose intended. Statistical analysis scores obtained by girls was $\chi^2 = 4.20$, $df = 1$, $p < .05$ and boys $\chi^2 = 4.14$, $df = 1$, $p < .05$. Table 3 shows the differences in the scores occurring pre- and post-test.

DISCUSSION

Difficulties in body schema may also occur in children with normal physical and intellectual development, but who are deprived of an appropriate sensorial stimulation and education, or have certain afflictions (not considered as special needs) preventing their optimal sensorial operation.

The body schema is formed and consolidated as the child gains control over his/her own body, and by means of this body, over the surrounding objects and environment. A series of aspects of the child's mental development depend on the acquisition of the body schema, among which is the development of psychomotricity, a child with a well-integrated body schema will walk harmoniously, have certain, firm movements, be able to carry his/her body with grace and ease, so that his/her motor behavior will not be affected by clumsiness, hesitation or slowness. In addition, she/he will not have an inharmonious, asynchronous physical appearance, and the speed and amplitude of his/her movements will be normal and natural). On the other hand, children who have not yet totally integrated their body schema will display slowness or clumsiness in movements, lack of coordination in simple physical activities (for example, in ball games focusing on adroitness), un-

certainty in gestures and deficient interpretation of successive sequences in simple movements or activities. As a result, these children will have difficulty in learning simple dance steps, in reproducing physical activity movements, simple short successions of movements or gestures, even by immediate imitation.

This study aimed to investigate the influence of a physical activities program based on movement games for the motor development of children. These results justify the rejection of the null hypothesis and the acceptance of the conclusion that the differences between the two tests on the subjects of the research are significant and not due to random sampling variation. This allows the conclusion that there is a relationship between playful activities with objectives specific to psychomotricity and the level of acquired skills concerning spatial orientation and bodily scheme.

That is why the researchers consider that physical activity through its specific exercises and objectives may help overcome the psychomotor inability shown by preschoolers and primary education at some points.

Researches done in Brazil (2011) which evaluated the psychomotor diagnosis motor age of preschool children, have shown that the kindergarten program class is not always properly planned. In physical education activities the researchers were able to find many movement games but these were not adapted for the age or particularities of each class. The authors consider that this could not happen because different activities require different levels of teaching. Because of this teachers do not make a contribution to the overall development of their students.

In Spain, a study run by Teixeira and co-authors (2015) observed the increasingly low psychomotor skill levels in pre-school aged children. They have shown that children who do not receive adequate motor skill instructions and

practice may show a development delay in their abilities and recommend increasing the time of physical activity engagement and playing time for pre-school children in early learning settings.

Researchers have noticed the same thing in this research about the level of motor development of pre-schoolers. Previous research has demonstrated that decreasing the physical activity is an important factor in increasing obesity and is associated with the cognitive function of children and school performance.

According to several studies, the level of physical activity is minimal at an early age, so children who do not develop their psychomotor skills may experience a delay in cognitive and social development. It is therefore essential to remove the generally accepted idea often sustained by teachers that children are spontaneously active.

CONCLUSION

The main objectives of physical activity involve a harmonious coexistence of body and mind, a balance between what the body expresses and what the mind believes. Unfortunately, the objectives of physical education in public education at preschool and school are not well defined. Physical education is taught in an inappropriate manner, without the necessary involvement and without providing sufficient attention to each student.

The role of early childhood education is essential in the development of the child. At this stage, teaching practices should stimulate children, given their individual characteristics and their needs, to assist in the acquisition and development of more skills and abilities essential in everyday life.

When investigating the components of psychomotricity it was possible to find that the subjects of the present research, 4 to 6-year olds, did not acquire laterality (which is typically acquired around 5 or 6 years of age), do not know spatial positions and coordinates and neither the objects positions in relation to the axis of their own body, nor the position of their body in relation to external points of reference.

In other words, the lack of total integration of the body schema results in serious difficulties in spatial orientation and identification and recognition of the position and localization of other objects and even one's own body. More

often than not, these children cannot differentiate between right and left, up and down, and front and back.

All these problems are solved by psychotherapy through psychological therapies centered on the ludotherapeutic method.

Ludotherapy, or game therapy, is a psychotherapeutic technique applied to children, based on the functions of mental and intellectual exercise, reality integration, mental assimilation of events, socialization, and unloading.

By carrying out the present research the researchers managed to evince another method of solving the psychomotor inability in normal children. This method is based on physical activity, movement games (dynamic ludic activity), performed in natural conditions, that is, the reality in which the children carry out their daily activity.

It determined the nature of the researchers' proposal, which is that the educational activities with preschoolers and primary school children should include physical activities (movement games) centered on improving psychomotor skills.

REFERENCES

- Coler A, Santos G, Fernandes J 2010. The effects of relational psychomotricity on pre-school children. *International Journal of Developmental and Educational Psychology*, 2: 63-70.
- Comăa G, Mihai C 2006. *Cunoașterea Copilului La Intrarea În Clasa întâi*. București: Pandora M.
- Cordun M 2009. *Kinantropometrie*. București: CD Press.
- Glushkov I, Pacheva P 2014. On the problems of children's space orientation. *Research in Kinesiology*, 4(1): 88-97.
- Horghidan V 2000. *Problematica Psihomotri-citatii*. București: Globus.
- Ifrim M 1986. *Antropologie Motrică*. București: Editura Științifică.
- Lupu E 2011. The Role of Motric Activities in the Psycho-Motric Development of Pre-school Children – Future Pupils. *International Conference on Education and Educational Psychology (ICEEPSY 2010), Procedia-Social and Behavioral Sciences*, 457-464, doi:10.1016/j.sbspro. 2011. 02. 056
- Maite M, Asunción A, Almuedo M, Lluesma À, Rodríguez A, Mercè X 2015. Different perceptive qualities for the psychomotricity. *American Journal of Educational Research*, 3(12): 1615-1617. DOI: 10.12691/education-3-12-19
- Mascarenhas JL, Dos Reis JD, Trema VS, Estrazulas JA 2011. Motor assessment in preschool children: A comparative study. *FIEP Bulletin*, 81: 323-327.
- Montessori M 1977. *Descoperirea Copilului*. Timisoara: Banat.

- Shingjergji A 2014. Psycho-motor education of the pre-school children - a possibility for qualitative training. *International Letters of Social and Humanistic Sciences*, 6: 74-80. DOI: 10.15503/jecs 20131-121-132
- Teixeira Costa HJ, Abelairas-Gomez C, Arufe-Giráldez V, Pazos-Couto JM, Barcala-Furelos R 2015. Influence of a physical education plan on psychomotor development profiles of pre-school children. *Journal of Human Sport and Exercise*, 10(1): 126-140. doi: 10.14198/jhse.2015.101.11
- Trouli K 2008. Psychomotor education in preschool years: An experimental research. *European Psychomotricity Journal*, 1(1): 23-27.