

IOSUD - "DUNĂREA DE JOS" UNIVERSITY OF GALAȚI

Doctoral School of Socio-Human Sciences



DOCTORAL THESIS

– ABSTRACT –

**INNOVATIVE METHODOLOGY FOR DEVELOPING THE
PSYCHOMOTOR SKILLS OF ELEMENTARY SCHOOL
STUDENTS THROUGH SPECIFIC PHYSICAL
EDUCATION ACTIVITIES**

Doctoral Candidate

BERDILĂ ANAMARIA

Scientific advisor,

Prof. univ. dr. hab. Laurențiu-Gabriel TALAGHIR

SSEF Series No. 3

GALAȚI

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INTRODUCTION

In the present, values, social norms, thinking patterns and lifestyles of physical activity practitioners are in a constant state of change, thus the process of school physical and sports education undergoes major changes that require the expansion of knowledge with practical skills of students in relation to current trends and specific curricular objectives.

Numerous studies have highlighted the role and benefits of practicing physical exercise from an early school age with a focus on the development of psychomotor capacity through varied and attractive means and methodologies. However, the level of approach to psychomotor capacity is still insufficient, which motivates us to approach this research topic from a new and prospective methodological perspective.

The study of movement and the relationship between the motor and the psychic has been an issue of permanent interest to theorists from different fields, philosophers, doctors and psychologists. The vision of the human being has been a unitary one, as an amalgam of biological, psychological and physical traits, which allow the child, later adult, to live together and integrate into a dynamic, progressive social system.

Psychomotor development is largely concerned with the individual's motor progress and acquisition, coordinated by mental activity, while at the same time conditioning creative, emotional and social development, in relation to the self and the environment in which it lives.

Psychomotor skills have been approached and explained from the two scientific perspectives, the theoretical and the practical, as a technique aimed at the training and development of motor capacity, of movement itself. Through movement, the child forms a series of representations on a psychological level, from simple running to more complex activities. In addition to harmonious physical development, psychomotor skills have a major influence in building and strengthening temperament, personality and appropriate social integration.

The range of psychomotor skills is vast, if we start from the premise that all movement also involves motivation, psychological input and feelings. This shows the favourable influence it has on the child's development in its entirety, in emotional, cognitive and social terms.

Psychomotor specialists have established that it meets human needs in terms of education, re-education and therapy, as it is a whole system conditioned by the interaction between child and adult, between education and maturation, between movement and mental functions.

Psychomotor skills benefit the child, who strengthens its relationship with itself (in terms of postural and coordination elements conditioned by reflexes in relation to spatial, rhythmic and energetic elements), its relationship with others (through tactical sense), its relationship with the environment, through discovery (through object manipulation skills).

Psychomotor skills must not ignore the moving parts of the body, which include the child's physicality, by which is meant communication with others, the circumstances, which include the space in which the child discovers new experiences and the objects with which the child develops and exercises his or her ego, and the world of others, which helps to define the child's psychomotor profile in order to satisfy vital and emotional needs.

When all three elements are glimpsed, they can provide a positive foundation for the child's gradual psychomotor development, ensuring the child's process of cognition, ability to explore and adapt.

In addition to the three harmonised elements, the degree of autonomy plays an important role in the development of the body schema. Educating psychomotor behaviour in relation to others can ensure the strengthening of autonomy. This idea is also supported by Vayer (1992, cited by Viscione et al., 2017, p. 172) and Juliano et. al (2016) who consider that psychomotor education will always be an important component to achieve a progressive autonomy of the child in relation to the world of others.

Psychomotor skills occupy a very important place in children's education, as it has already been shown that especially in early childhood there is interdependence between motor,

intellectual and affective development. There is no doubt that the concept presented is constantly evolving, changing and being studied.

In greater depth, psychomotor skills involve awareness of one's own body, the acquisition of balance, control and effectiveness of global and segmental coordination, control of voluntary inhibition and of the respiratory act, organisation of the body schema, spatial orientation, generating the greatest possibilities for adaptation to others and to the external world.

Psychomotor skills are based on the whole of the human being, mainly in childhood, with the core of development in the body and in the process of cognition resulting from it.

THESIS STRUCTURE

Theoretical research

Theoretical research allows the delineation of the key concepts of the present research, the components of psychomotor development, the factors that influence its development, the situations in which psychomotor development is inhibited or exacerbated, the interdisciplinary understanding of the interdependencies of the components of psychomotor development, the sociopsychological, cognitive, educational and conditioning factors likely to have an impact on psychomotor development.

Theoretical research also allows the assessment of the current level of scientific research in the field of psychomotor development, the understanding of the types of innovations and experiments possible or necessary and the delimitation of the present research effort, both methodologically and in terms of the contributions offered by the results of the research approach.

The theoretical research contextualizes diverse, distinct elements from the literature in order to establish the optimal, theoretically informed and methodologically rigorous path towards achieving the goal of the research approach.

Fact-finding survey

A particularly important element for the investigation of the general hypothesis is the ascertainment research, by which, with reference to tests that study various components of motor skills, it is possible to determine the average level of psychomotor skills in the studied age group, to ascertain the general situation by means of a series of distinct methodological measures, and to compose the results into factors that can best describe the general situation of psychomotor development in the studied age group. This can best be accomplished by applying several classical tests to determine the various components of psychomotricity on a large sample of participants, in order to eliminate any risk or doubt about the state of affairs that can be addressed with the third research component of the general hypothesis: the experiment.

Experimental research

In order to support the experiment, and based on the results obtained in the observational research phase, it is necessary to establish a control group and a group on which the experiment is to be supported, namely the model of scaling psychomotor components in primary school physical education lessons in the form of learning units, and to measure the results of this experiment in order to determine to what extent the scaling model has a statistically significant impact on the overall improvement of children's psychomotor level. The

rationale for the scaling model also requires the application of a battery of tests that can differentiate in depth between psychomotor components, rather than just in general terms as tests in the observational research phase do.

Finally, in investigating the general hypothesis, consideration should be given to the extent to which the impact of a theoretically grounded and experimentally tested scaling model on motor improvement can be replicated in other situations, given potential circumstances or limitations that may influence the results obtained, but also what aspects of the three research components of the general hypothesis can be improved to ensure optimisation of the researched scaling model, or the determination of a whole class of scaling models predictably responsible for improving psychomotor performance in children, both within and beyond the age group studied.

Chapter 1. Perspectives and components of psychomotor skills

Psychomotor therapy is a technique applied to correct posture and muscle coordination with physical exercises. In psychomotor practice, many techniques are brought together to meet the child's needs through physical activity, seen as a bridge to knowledge, improved relationships with others, and a 'healthy' way of controlling body movements.

Psychomotor skills prepare the child for life. This can prevent and avoid some of the possibilities of abnormalities developing, which unnoticed can cause cracks and difficulties in development. The child's preparation for dealing with the specific aspects of motor activity must be carried out stadia and under specialist guidance.

Psychomotor education must be a specialised and institutional process, carried out in relation to the specific objectives and the needs and particularities of children and pupils. Specialists must pay particular attention to the development of psychomotor skills in the early stages of training, as an optimal basis for the future motor development of the subjects.

Proper detection of disturbances allows for the interruption of both mild and severe cases, helps the body and the mind, provides benefit in intellectual performance and can result in a positive, fun, simple task that facilitates interpersonal relationships.

It can thus be deduced that psychomotor skills are equally addressed to subjects with normal development and those who suffer from motor disturbances. In this sense, "psychomotor skills is an approach to educational and therapeutic intervention whose objective is to develop motor, expressive and creative possibilities starting from the body, which encourages people to focus their activity on movement and action, including everything that derives from them: dysfunctions, pathologies, stimulation, knowledge, etc.". (Berruezo, 1995, p. 15-26)

In an attempt to understand the duality of psychomotor skills as theory and practice, Munian's concept (1997) is echoed by many authors today, such as Shingjergji (2013), Esteban et al. (2019), who consider that the degree of psychomotor development has an important impact on the child's education, placing greater emphasis on the child's integral development, especially for those with mental or physical impairments, and that psychomotor intervention is necessary to ensure proper integration and interaction with others.

Psychomotricity aims, as a general objective, to restore or develop individual capacities with the help of the body (through movement, posture, control, gestures), in other words, the body contributes to the development of the individual's aptitudes and potentialities in their motor,

affective-social, verbal-linguistic, intellectual-cognitive fullness. The objectives of psychomotor skills are complex and cover all its components in an integrated and effective approach.

In reality, psychomotor practice needs to be phased in over several objectives and adapted to the variety of situations that arise. The psychomotor plan must be based on a well-structured strategy in the form of a circular scheme, starting from an analysis of the situation, concrete objectives are set, which can be achieved using selected methods and means.

Specialists (Martinez and Anton, 2018, apud Berdilă et al., 2019) argue that the foundation of all human development is in the motor aspect through which one can check if other functions are properly stimulated. Movement provides the learning process and allows the achievement of real goals and orientation towards objective experiences, with the aim of improving self-awareness and the development of human competences.

It is a discipline on which the whole learning process is based and which helps the child to express his emotions with the help of the body, to experience different emotions and fears, to discover and face his limits, desires, to discover and overcome situations, to assume roles.

Psychomotor practice teaches the child the requirements of space, time, body scheme, putting him in concrete situations of emotional involvement with objects and people, to discover and discover himself, being the only possibility to integrate and acquire without difficulty the knowledge of his own body, space and time.

In order to ensure appropriate psychomotor development, Cobos (2006) considers it essential that the human being has a series of specific elements that are essential to optimise the process. It can be seen that a considerable number of children have psychomotor disorders or delays, certain difficulties in learning, reading, writing or in arithmetics. It is therefore important to establish methods of assessing these elements which provide information for intervening with a re-education plan and avoiding the emergence of aggravated problems.

Psychomotor components are interdependent in terms of their determination, relationship, development and manifestation in action contexts. In order to achieve its objectives, psychomotor skills have focused on certain concrete contents (Picq & Vayer, 1977), cited by Sugranes (2007) and should be part of the knowledge of all people who want to explore the field.

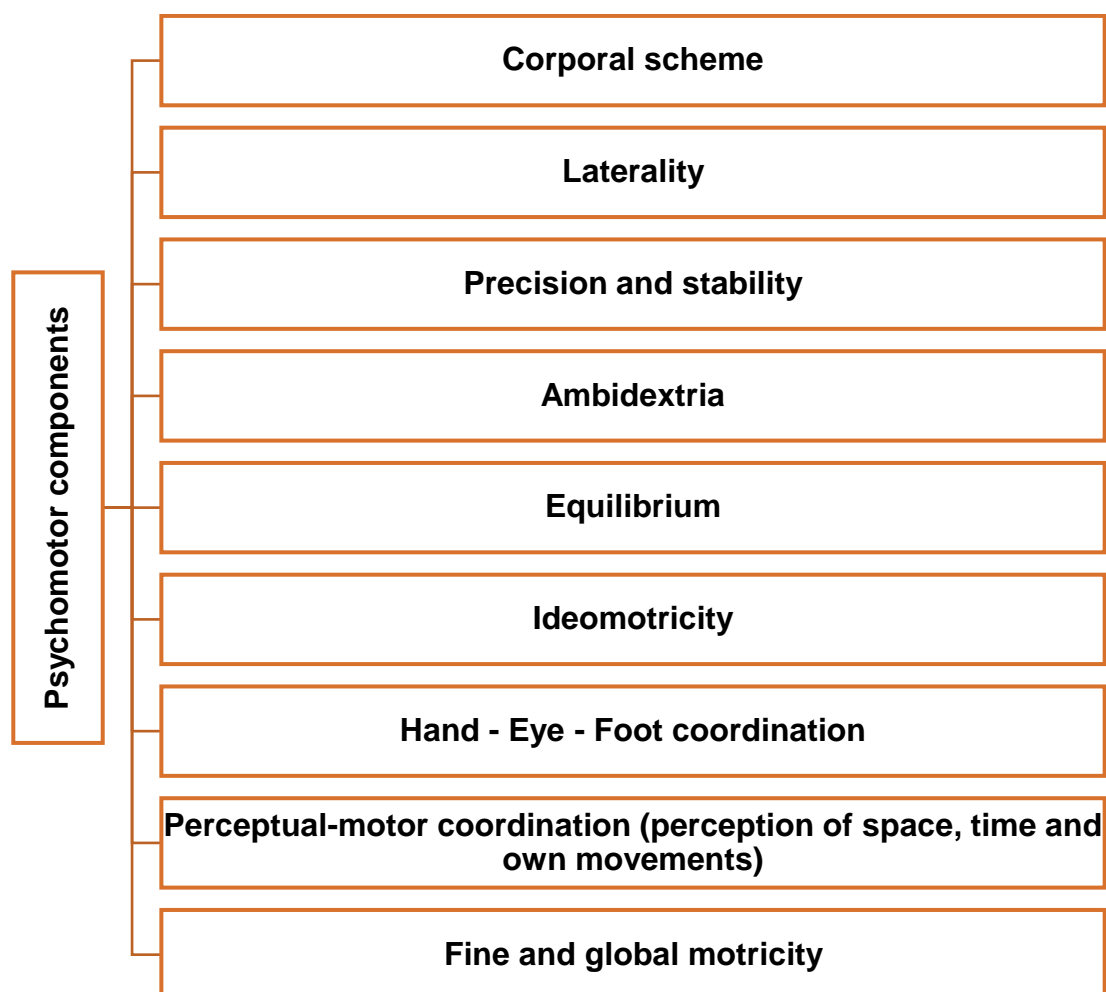


Figure 1. Components of psychomotor skills

Chapter 2. Methodological framework for conducting preliminary research

The research is based on premises that are grounded in the theoretical research stage of the present study, and are applicable, *sensu lato*, both to the premises of the research and to the structure of the objectives of the research, the hypotheses formulated in this stage of research.

Given the aims and objectives of the observational research, in particular to identify, adapt, apply, and analyse the results of common tests that reflect the values of psychomotor components, the premises of the observational research are that psychomotor development is important, that the current level of psychomotor development is deficient, that there is opportunity, both in theory and in practice, of improving this level, and it is therefore important to assess the current state of psychomotor development in primary classes to determine to what extent it is deficient, and therefore to what extent it could be improved, and how its level can be identified by using and adapting familiar and easily integrated tests into classroom work. At the same time we consider how an assortment of such tests and adaptations can be used, in a modern view, to determine the psychomotor level of primary school pupils.

The main *purpose* of the observational research is to determine the general level of psychomotor development for primary grades by means of measurements that are within the reach of any teacher supporting physical education.

We are interested in determining the level of psychomotor development of the study participants, through several tests, and what general characteristics this level has, what profile in relation to the basic components of psychomotor development.

Research objectives

A direct subgoal of this goal is to obtain a sufficiently large and diverse sample to eliminate errors in some cases in which an unidentified co-factor is not attributed to psychomotor development.

A secondary, and particularly important, objective was to identify a balanced solution for combining classical tests that would reach all the psychomotor components and to implement this solution.

This objective has a number of subsidiary objectives: choosing the most representative psychomotor tests, combining and adapting them to obtain a balanced measure of psychomotor skills, applying the solution and testing the psychomotor capacity of primary school pupils, determining the level of psychomotor development of the subjects tested, and evaluating the results in a balanced way. The balanced solution should combine simple, accessible tests in a configuration adapted to the main purpose of the research, possibly to be used as a composite indicator, by which the general level of psychomotor development can be determined.

Preliminary hypotheses of the survey

We establish some framework hypotheses, which will be adapted later in the statistical research process (formulation and testing of research hypotheses).

Preliminary hypothesis 1:

Testing a large number of subjects selected for representativeness from the target population (students in grades I-IV who also meet all other selection criteria) will yield results that reflect the general population situation with regard to the tests applied.

Preliminary Hypothesis 2:

It is possible that an assortment of classical tests (Denisiuk, Matorin, Flamingo, Romberg, Bass, Unipodal, Alternate Hand Wall Toss and self-contribution, Bridge Dominance „6 Fences“) can be used to model the level of psychomotor development among primary school students.

Preliminary hypothesis 3:

The general level of psychomotor development of primary school pupils is inadequate in the sense that it does not meet a level of development that can be considered sufficient for their age.

Research methods

- scientific documentation method;
- statistical-mathematical method;
- graphic method.

In the preliminary research we selected and applied standardized tests to assess the components of psychomotor ability.

To this end we have selected and applied the following standardised tests aimed at assessing psychomotor ability:

General coordination:

- *Denisiuk test;*
- *Matorin test;*

Static balance:

- *Unipodal test;*
- *Flamingo test;*
- *Romberg test.*

Dynamic balance: *the Bass test;*

Body schema: *sample A. de Meur;*

Hand-eye coordination: *Alternate Hand-wall Toss test;*

Laterality: the "6 Fences" Podial Dominance Test.

The subjects included in the research were selected from schools in the South-Eastern area of Romania, namely Galati county (42.23%), Braila county (22.01%), Vrancea county (10.91%), Bacau county (7.15%) and Iasi county (17.70%).

Chapter 3. Results of the preliminary fact-finding research

The results obtained from the constant research of the subjects subjected to the research on the tested samples is shown in Table 1.

Table 1- Results of the constant research samples using the One Sample t-test statistic

Probe	Reference value.	t	p.value	dg. Freedom	conf.low	conf.high
Flamingo	9.10	1.29	0.019	4919	8.94	9.27
Romberg	46.05	2.00	0.004	4919	46.00	46.11
Unipodal	71.33	0.75	0.045	4919	70.46	72.20
Bass	47.36	2.07	0.003	4919	47.01	47.70
AdeMeur	6.94	-4.26	0.000	4919	6.91	6.97
DPGR	3.58	-17.37	0.000	4919	3.53	3.63
DPGL	2.41	17.37	0.000	4919	2.36	2.46
Denisiuk	5.09	2.67	0.000	4919	5.02	5.16
Matorin	3.38	37.47	0.000	4919	3.36	3.40
Hwall	3.59	-16.36	0.000	4919	3.54	3.64

Reference value for the student test, estimated from normally distributed values for the study population

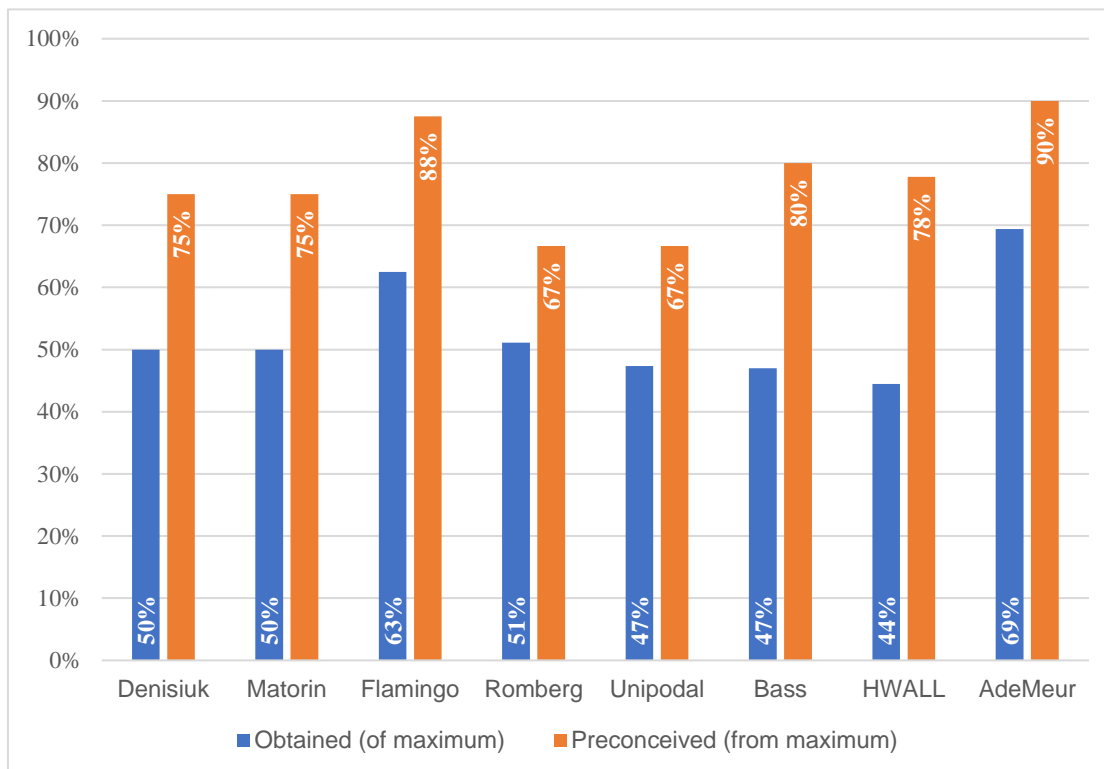


Figure 2. Average Level of Subjects - scores compared between the obtained and expected results, with reference to the maximum for each test

In order to value the results obtained, we look at the difference between the average values determined per component concerning two essential references: the expected values, based on the generally accepted standards for each of the tests used, as presented in the interpretation keys of these tests (and subsequently recomposed into component dimensions for determining psychomotor development), respectively the maximum achievable values for each of the dimensions (based on their scaling according to the interpretation keys of the individual tests used in the preliminary research).

In order to view them congruently with their variability, we track the deficit, as a measure against the expected, respectively the expected, as a measure differentiated from the maximum possible. In the graph above, we thus track, for general coordination, a negative difference of 33% from the expected level (i.e. subjects are 33% deficient from the level appropriate for their age, and simultaneously we can track the achievable difference to the maximum of the examined dimension of 25%.

For clarity, we follow the same results, with reference to the maximum possible for each of the tests, in the following graph, in which we compare the actual and expected values obtained, both measured at maximum.

We chose percentage reporting to the maximum possible scores in order to be able to compare results from different tests, with different interpretation keys, without having difficulties due to their lack of congruence.

As we can see, the values obtained in each of the tests are about half of the maximum possible scores, with the lowest score obtained in the "Alternate Hand Wall Test" at only 44%, on average, of the maximum possible, and the highest score obtained in the "A. de Meur" at 69% of the maximum possible.

However, the difference between these scores and the expected level is the best indicator of the low level of psychomotor development of the subjects, and consequently of the population studied. The largest difference between recorded and predicted values is 33% of the maximum possible score for the Bass test, and the smallest difference is for the Romberg test, only 16% of the maximum possible score.

Chapter 4. Preliminary research findings - final remarks

The level of psychomotor development of the subjects can be considered poor, below the expected results, based on all tests administered. Even though almost 1/6 of the subjects have results in the vicinity of those expected (or even exceed this threshold), most of the results are at a clear, significant distance.

Determining the level of psychomotor development through non-integrated tests, however well established, carefully selected and applied, is limited. Non-integrated tests, in any composition, do not provide an instrument with sufficient precision to truly track the impact of an experiment that aims at psychomotor development and the tracking of this development in various pre-determined components, as can a battery of integrated tests specifically designed for such an endeavour.

However, the observational research has identified several elements of interest for the present research: it has become clear that any non-integrated test that measures, in whole or in part, a component of psychomotor skills, will provide as a result, both on average and overall, by the way the values are distributed, by their dispersion, a firm indication of the state of development of psychomotor skills in primary grades.

Thus, the subjects tested show results below the expected ones (those of normality for the test applied and the age of the participating subjects) in terms of general coordination, static balance, dynamic balance, body scheme and oculomotor coordination, despite the fact that the very large sample and the selection methods included in the research only neurotypical participants, representative of primary school students.

The model obtained by compositing the unintegrated tests fails to consistently profile reality because its main components seem disconnected, in particular laterality does not seem to have a direct participation in the model, as can be seen from the results of the correlation tests. However, the approach of integrating classical tests can be valuable in the sense of exploratory tracking of the level of psychomotor development based on data already determined by existing tests: the model can be used, with a very large sample, to predict or determine whether the level of psychomotor development is deficient, and whether this deficit is remediable, as well as how the level of psychomotor development varies over time or in the absence of data resulting from the application of a battery of tests specifically developed to determine the level of psychomotor development of test subjects.

In conclusion, a very large number (more than 80%) of the subjects tested recorded values well below the expected level, enough to demonstrate a psychomotor deficit, or a substantial, significant difference between what would be appropriate for the age of the subjects, as a level of psychomotor development and the values recorded. These results can be much better identified and delimited in terms of psychomotor components methodologically differentiated into components characteristic of integrative test batteries, which is why the testing in the experimental part of the present work will be carried out in this way.

Preliminary research indicates the prevalence of poor levels of psychomotor development, a worrying phenomenon given the importance of psychomotor development for cognitive development and functioning in relation to general adaptive skills and functioning in society throughout the lifespan of the subjects. There are a number of possible reasons why the level of psychomotor development is so low in the population studied, in particular the context of digitalisation, isolation caused by the COVID-19 pandemic and the limitation of situations in which psychomotor development can take place within traditional parameters or those characteristic of normal situations. In the absence of data confirming the historicity of a deficit in psychomotor development, we can only propose the argument that the level of psychomotor development is below that expected at the present time, and in the experimental research we will follow up whether interventions in physical education classes can lead to a remedy or improvement in the level of psychomotor development of the subjects in a significantly different way from the practices characteristic of physical education classes as they are currently conducted.

Chapter 5. Methodological framework for conducting experimental research

The aim of this study is to develop and experimentally test a way of working in the form of phased learning units on each psychomotor component targeted, using modern and attractive means to improve the psychomotor side of young school-age children, and to identify psychomotor acquisition, i.e. improvement of coordination (gross motor), hand-eye coordination, balance, reaction-agility and ambidexterity by applying standardized tests.

In the observational research we have already established that the level of psychomotor development of primary school students is deficient, in the experimental part of the present research we aim to analyze to what extent it can be intervened. The experimental part has two key components: the applied intervention that will develop the subjects' skills related to the key psychomotor components and the testing protocol, through which the impact of the intervention will be measured, analysed and extrapolated to the general population.

Specific objectives of the final research:

- Development of an applied initiative, a model of didactic design with psychomotor content that trains psychomotor skills in physical education classes in an improved manner compared to the school curriculum, structured in episodically structured classroom activities.
- Develop, implement and test the content and structure of the model work throughout each activity, following up rigorously on the lesson plans developed;

- Carry out initial and final tests to highlight the level of psychomotor development of the content elements adopted in the psychomotor content instructional design model by applying the BOT 2 test battery;
- Analysis of the formative impact of the implemented psychomotor content instructional design model with reference to the components of the applied test battery;
- Comparison and analysis of the results of the final research groups in order to highlight the relevant aspects of the model of didactic design with psychomotor content in primary school students.

The actual experiment took place during the school year 2020 - 2021.

The school year consisted of 18 weeks in semester 1 and 17 weeks in semester 2.

Chapter 6. Innovative-applicative intervention in experimental research

The novelty of the research is the development of a rigorous preliminary research of a design model with psychomotor content in the primary school physical education lesson. To do this, we carried out the phasing of learning units for the psychomotor components we wanted to study. These were:

- gross motor skills;
- hand-eye coordination;
- responsiveness and agility;
- ambidexterity;
- static and dynamic balance.

The psychomotor content design model includes psychomotor-specific means, application directions and accessories to be implemented with the aim of improving the psychomotor level of the participants in the experiment. We mention that such a psychomotor content design model in the form of a learning unit with specialized content and focused on psychomotor education has never been implemented and tested in Romania. The aim of this approach was to identify the psychomotor benefits acquired by the students participating in the research.

The learning units had 6 lessons each for the gross motor, hand-eye coordination, reaction and agility and ambidexterity components and 8 lessons for static and dynamic balance.

For each psychomotor component, activities have been created and coded to take place during the lessons in the learning units.

The traditional structure of the physical education lesson, which involves the development of the lesson in 7 moments, was modified in the experimental research. We proposed a lesson consisting of 5 moments. Of these, 4 moments belong to the traditional lesson (the organizational moment, preparing the body for effort, selective influence of the locomotor apparatus and the body's recovery after effort), and the content part, which we called "psychomotor moment", is our proposal for the development of physical education lessons in the lower primary cycle (preparatory class - 2nd grade). Within this "psychomotor moment", the activities proposed in the learning units with specific psychomotor themes were practiced. This moment represented 20 minutes of the total time of the lesson. The experiment was carried out in the „Ștefan cel Mare” Secondary School in Galați, with the pupils of the second class (four

classes of pupils) who were divided into the control group and the experiment group. The control group is the one that carried out the physical education lessons according to the traditional model in terms of structure and content. The experimental group was the one in which the lesson was carried out based on our proposed intervention, with the modification of the traditional lesson structure and the implementation of the psychomotor content moment.

The research included 114 children, aged 8-10 years old, students at the „Ștefan cel Mare" Secondary School in Galați. In the research itself, four classes were involved: 2nd, 2nd B and 2nd C, designated experimental group, and 2nd A and 2nd D, designated control group. The four classes have the following distribution:

- *the experimental group* - class II C and B , with 57 pupils, 28 boys representing 50% and 29 girls representing 50% of the sample participating in the proposed work programme.
- *control group* - class II A and II D, with 57 pupils, 30 boys representing 52.63% and 27 girls representing 47.37% of the participants

The experiment started at the beginning of 2021, when a measure of the Romanian Government established that the teaching activities with primary school students should be face-to-face. As a result, the initial testing started on 6 January 2021. The test to validate psychomotor acquisition was the „Bruininks - Oseretsky Test" version II (BOT-2). Due to the special nature of this test, data collection was spread over 2 weeks during which 8 students were tested per day, including Saturdays and Sundays. Parental consent to participate in the research was obtained for the testing, as well as the consent of the school management.

After the initial testing, the implementation of the psychomotor content instructional design model as designed at the beginning of the school year began. The implementation of this model was completed by the end of the school year. At the end of this period the final testing of students was carried out in the same manner as the initial testing.

From the point of view of the content of the activity, various means were selected in accordance with the particularities of the psychomotor components that we included in the experimental research.

The resources proposed to the students were divided into 3 categories, namely individual and pair exercises, workshops and relays and movement games.

Standardized test batteries validated in the preliminary experiment and in previous studies were used in the final experiment.

To this end, we selected and applied the following tests aimed at assessing psychomotor ability in the final research:

Psychomotor capacity systematized in 4 motor areas (according to the BOT-2 user manual): fine motor, manual coordination, gross motor, agility and strength.:

Bruininks-Oseretsky test (2nd edition - BOT-2, 2005):

- fine motor skills: precision test, graphic integration test;
- manual coordination: manual dexterity test, upper limb coordination test;
- gross motor skills: laterality test, static and dynamic balance test;
- agility and strength: speed and agility test, strength test.

The working model was applied during the school year 2020-2021, i.e. January 2021-June 2021. Initial testing was conducted during January 2021. Final testing was conducted in June 2021, extracurricularly, on Saturdays. Since, "Ștefan cel Mare" Secondary School Galati was in the process of rehabilitation and expansion during the research period, the research venue was moved to the Galati School Sports Club.

The location has a gymnasium counterpart to the hall where physical education lessons are held at the "Ștefan cel Mare" school.

Chapter 7. Analysis of experimental research results following the implementation of the application initiative

As can be seen in the graph below, the average difference between the estimated and the actual age indicates a clear average difference of 1.37 - 1.79 years in favour of remedial education gap remediation for the experimental group at the final test. The difference between 1.37 and 1.79 is driven by differences between the estimated and the actual ages differentiated and undifferentiated by gender. Consequently, we aim for a composite result between them, and use it as a stable reference with a lower degree of error than previous approaches. We have, unequivocally, a clear example of the difference recorded for the experimental group in the final test.

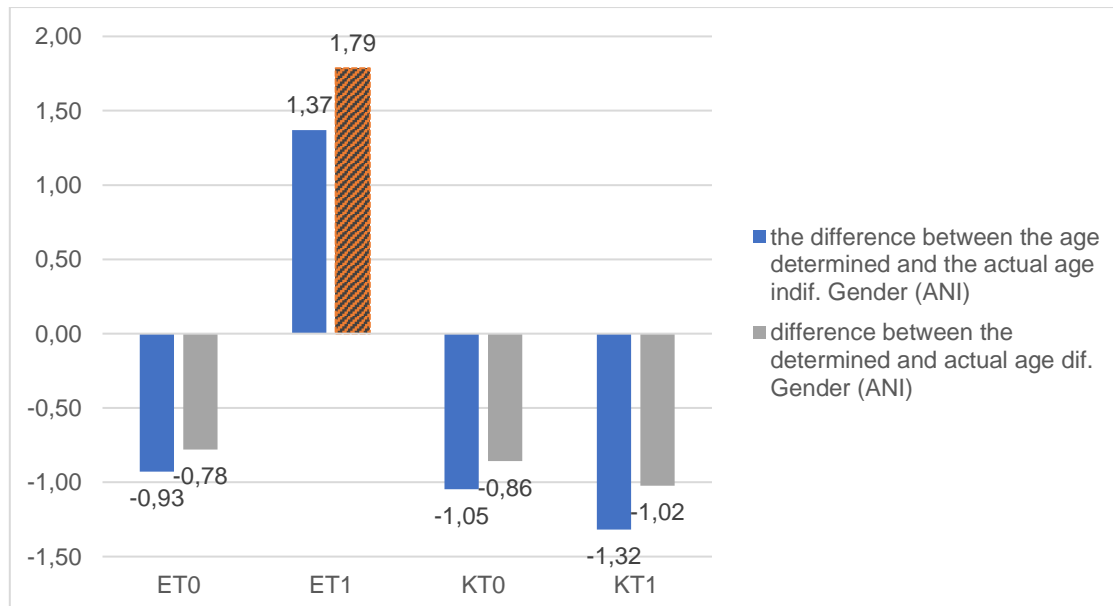


Figure 3. Average difference between estimated and actual age (negative values represent psychomotor development deficit)

It is clear that the result of the experiment is an average recovery of the psychomotor development deficit, a remediation or even a surpassing of the average performance for that age. The recovery of the deficit on the components delimited in the theoretical part of the present research approach can be seen in the following graph for the experimental group.

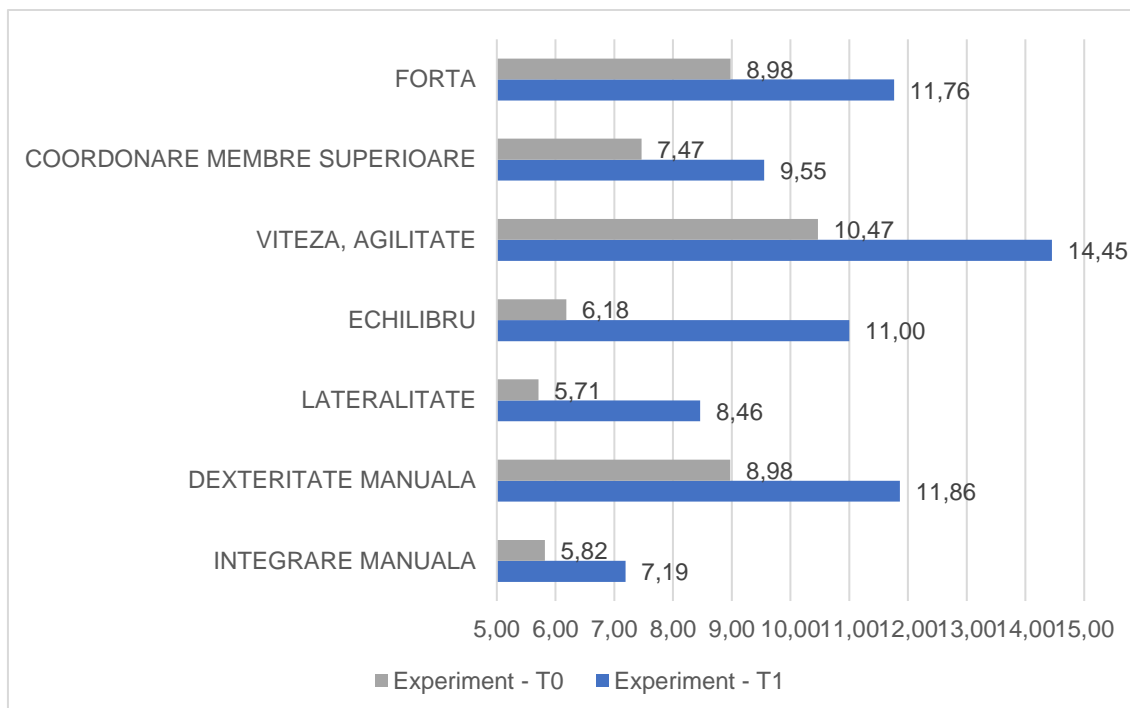


Figure 4. Recovery of deficit on psychomotor components - Experimental group (in ANI)

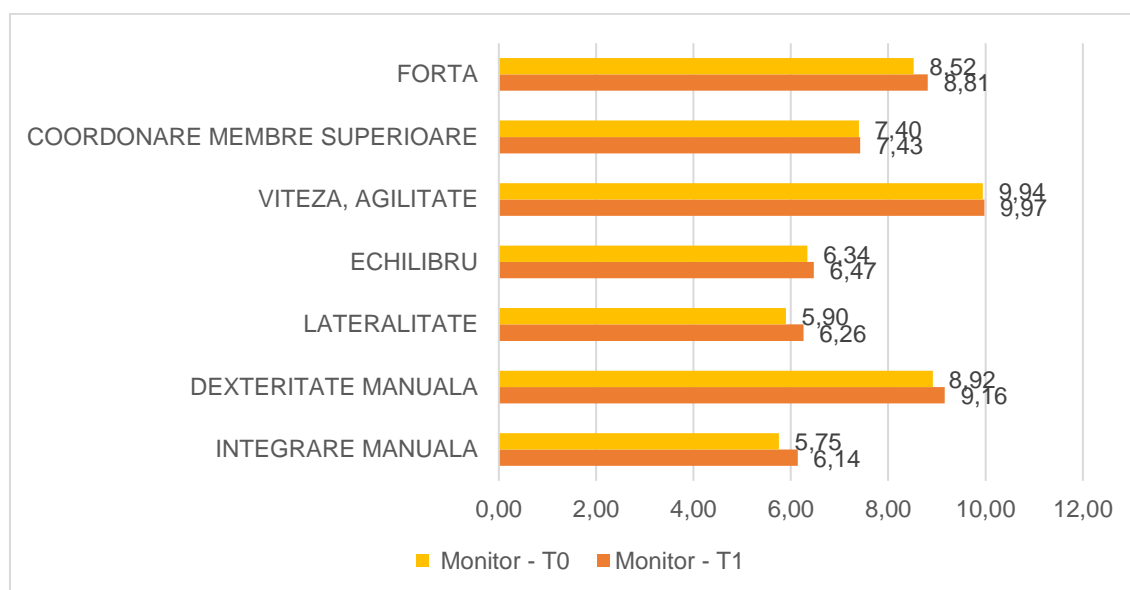


Figure 5. Recovery of deficit on psychomotor components - Control group (in ANI)

The relative impact analysis of the recovery of psychomotor developmental deficit follows the difference caused by the normal passage of time as recorded in the control group. More specifically, we aim to compare the difference between the two tests in the values obtained in the experimental group with respect to the values obtained in the control group, in order to highlight the increase strictly based on the experiment carried out, ignoring the normal increase in the level of psychomotor development as observed in the control group.

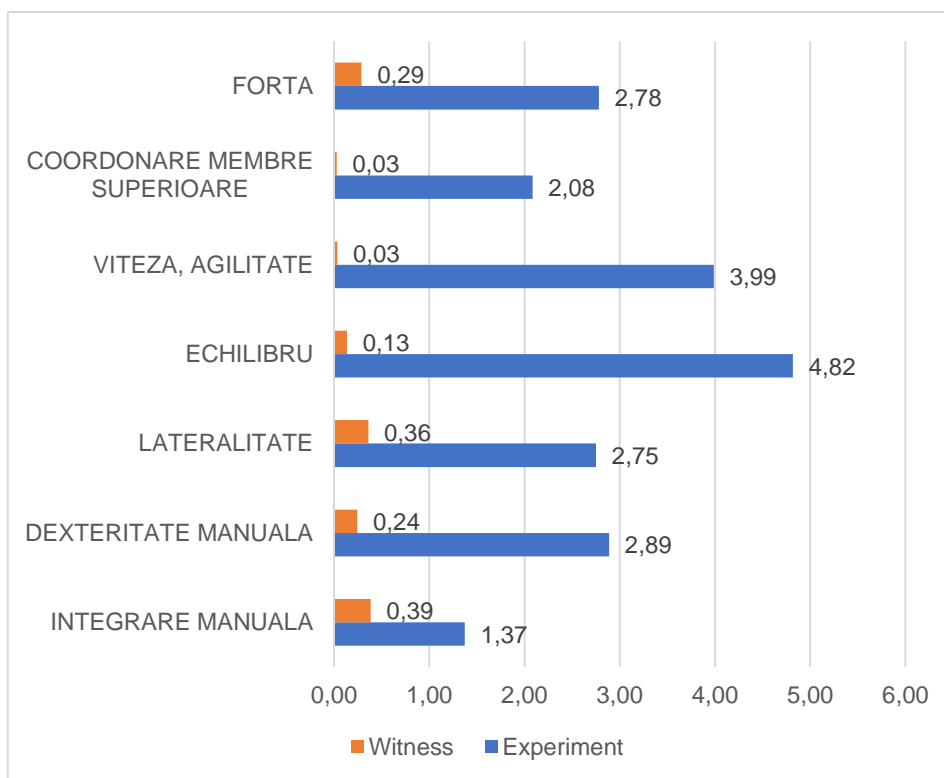


Figure 6. Recovery of psychomotor development deficit - relative impact analysis

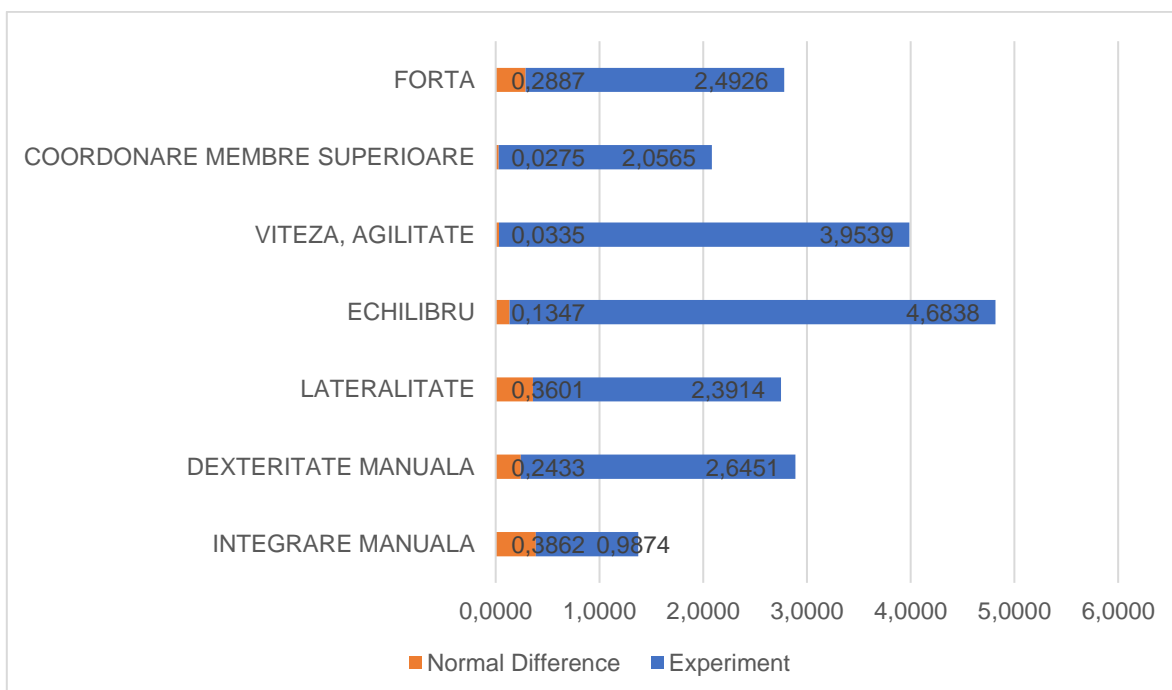


Figure 7. Recovery of psychomotor development deficit - relative impact analysis

In the relative impact analysis we look at how the „normal" values for natural growth over the 6 months of the experiment as recorded in the control group. Both values are weighted against total growth. The increase is also evidenced by the increase in the total composite

motor score for the experiment group and the control group, undifferentiated by gender and differentiated by gender, shown in the following two graphs.

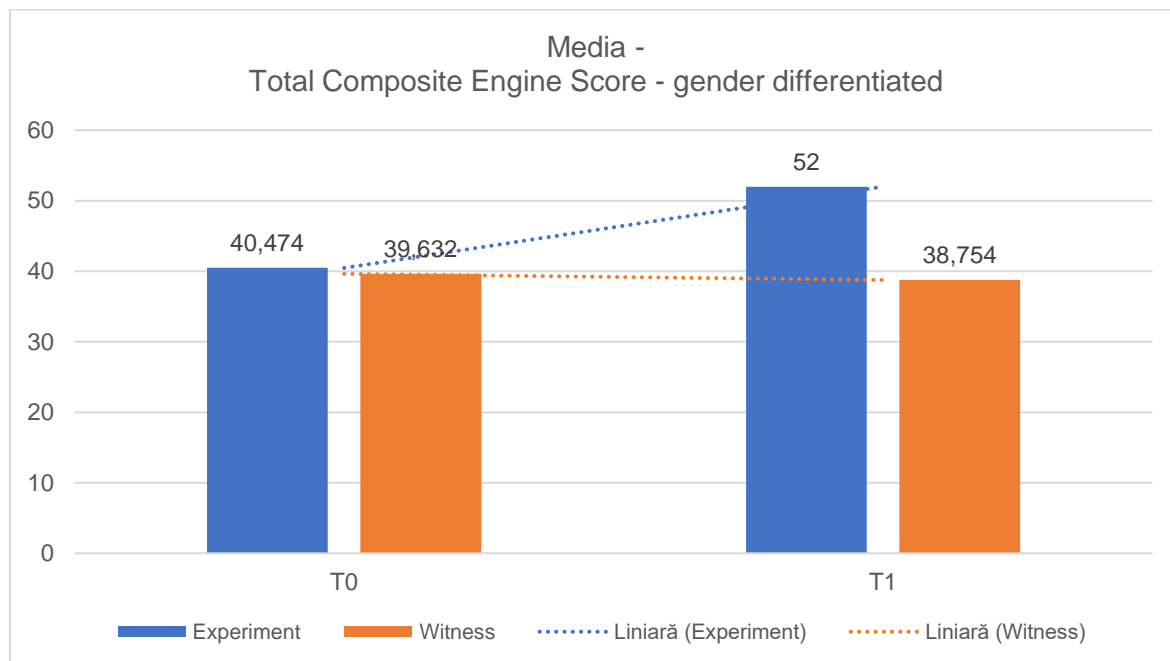


Figure 8. Composite Motor Score-Differences between the two tests differentiated by gender

The evolution of the composite motor score for the two groups shows the progress of the experimental group in the final test. The efficiency of the implemented working model is supported by the increase recorded by the experimental group, i.e. from 40.474 points at the initial test to 52 points at the final test.

The component comparison itself shows a clear increase in the final test compared to the initial test for the experimental group compared to the control group. The only significantly increased values within the psychomotor development level components are also recorded for the experimental group at the final test (Figure 10).

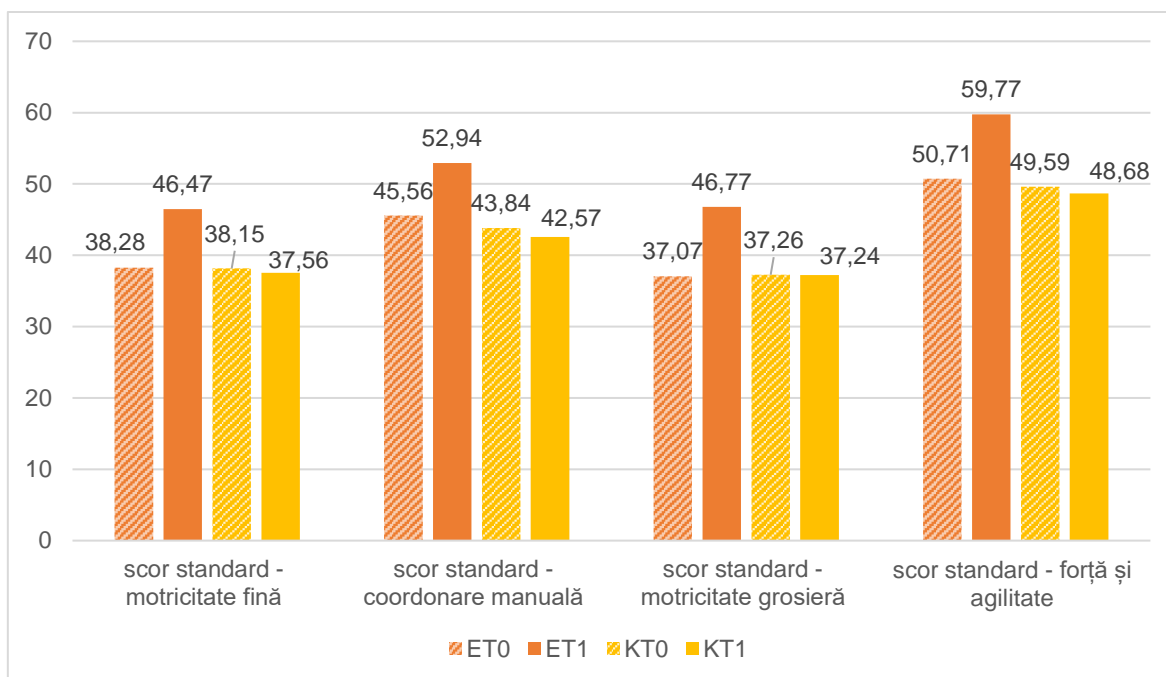


Figure 9. Impact of the experimental approach on psychomotor development - by component between the two groups

Chapter 8. Conclusions drawn from the observational and experimental research

Psychomotor skills and the development of psychomotor skills are particularly important for achieving the human potential of each individual, and it is especially important to follow up their possible development in physical education classes, which cannot be taken over or made the responsibility of any other subject in the school curriculum.

Both preliminary and experimental research demonstrate the low level of development of psychomotor skills among primary school pupils and although a number of causes influencing this phenomenon can be presented or argued, the present research aims to see to what extent there are solutions that can be used to improve or ameliorate the low level of development.

Psychomotor development deficit - general characteristic of the level of psychomotor development of primary school pupils

In conclusion, we can consider that through this research we have highlighted both the presence and the characteristics of psychomotor development deficit among primary school students, the prevalence of this deficit among the population studied, but also the way in which it can be intervened, structured, measurable and verifiable, to remedy the situation.

In fact, pupils enrolled in primary education have a lower level of psychomotor development, potentially affected by the suite of transformations in the educational process as affected by the recent pandemic situation.

The level of psychomotor development of pupils can be improved with characteristic methods and practices, which have been described in experimental research, with results demonstrating a substantial impact in the recovery of psychomotor development deficits, a

result that would recommend the implementation of similar measures at national level, with the proviso that such an initiative also requires the pursuit of other research directions, clarifying aspects relating to the optimisation of measures, but also the impact of neuroplasticity of primary school pupils in relation to adaptation to direct or indirect training of skills or abilities that also develop psychomotor skills.

Chapter 9. Original contributions

Changing the structure of the physical education lesson

Through experimental research we proposed a new approach to the structure of the school physical education lesson for primary school, replacing its current form. To this end, a form of teaching activities structured in 5 moments of the lesson (lesson sequences) was proposed. These moments are: organisation of the group, preparation of the body for the effort, selective influence of the locomotor apparatus, psychomotor activities (called psychomotor link by us), conclusion and evaluation of the lesson. The novelty of the psychomotor link is that it lasts between 20 and 25 minutes, which will be adjusted according to the school timetable and the special situations that may arise in the structure and development of teaching activities in primary school.

Modelling the content of physical education lessons in primary school

Based on the idea that the appropriate period for the development of psychomotor aspects in pupils corresponds to the school age in the primary cycle (and especially in the lower school age), we considered that an intervention proposing specific activities is necessary. In this respect our approach was favoured by the analysis of the current curricular content for this age level. We thus found that the content elements have a strong sporting character, which is not based on previous motor acquisition. Also, the existing provisions referring to psychomotor skills do not correspond to this concept as it emerges from the literature. As a result of these findings, the novelty lies in the development of a phased programme model in the form of learning units with psychomotor content. The learning units have been constituted according to the specifics of the psychomotor components addressed: gross motor skills, reaction and agility, hand-eye coordination, static and dynamic balance, ambidexterity. The learning units had a number of 6 to 8 lessons for each psychomotor component and were applied in the two semesters of the school year. Their content consisted of movement games, applied trails, workshops and exercises performed individually or in pairs. The effectiveness of this work programme is supported by the results of the experimental research.

Proposing new forms of evaluation

The novelty proposed in this direction concerns the possibility of using the BOT-2 standardised test in whole or in part in primary school physical education lessons. It specifically assesses the profile of pupils by psychomotor areas, components and subcomponents expressed by a score corresponding to their chronological age in relation to their psychomotor age range. The implementation of such an assessment is in line with the formation of general competences provided for by the school curriculum for the primary cycle offering full support for the valorisation of psychomotor acquisitions in the maintenance of health and harmonious physical development, the practice of motor skills and abilities according to individual psychomotor capacity or participation in organised or spontaneous motor games and activities.

The psychomotor age range of pupils may also be a prerequisite for recommending organised or recreational sporting activities.

We believe that the selection of assessment forms targeting psychomotor subcomponents is beneficial for the process of assessing the level of manifestation of psychomotor skills of primary school students. This highlights the actual level of content acquisition in practical lessons in relation to the existing assessment at this time.

Laterality test - podal dominance

In order to ensure a balanced test for laterality at the preliminary research stage (using non-integrated tests), we developed a laterality test that aims to record podalic preference in an obstacle running event. The element of originality consists of the test itself and its inclusion alongside other non-integrated tests in a test set to balance how the results of these tests complement each other to be modelled into a composite measure to determine the level of psychomotor development of subjects.

Modelling of classical (non-integrated) tests

Modelling classic tests (used for testing psychomotor components and found in the literature) in order to obtain a composite score or result that serves as a rough indicator of psychomotor development, on the basis of which a decision can be made to apply more elaborate tests, such as test batteries, is an element of originality in research that also serves as an evaluation tool for future research. This indicator will be called the BERTA indicator.

With such a composite score of non-integrated tests, future researchers can track results already recorded on standard tests and determine the course of psychomotor development, contextualize it without intervening with more advanced tests, or conversely, intervene with more advanced tests to isolate a situation or track an effect. They can also pursue any other objective, the instrument being able to provide them with a reference against which to conduct experimental research with at least a partially studied preliminary basis.

Chapter 10. Methodological and educational proposals

Introducing a psychomotor testing practice using classical methodology - non-integrated tests

The high prevalence of classical forms of testing for various elements related to skills or abilities or performances of any kind that can be considered related to psychomotor components makes it possible to use them to model a dynamic reality, to understand the phenomenon of psychomotor development, of variations in the level of psychomotor development, among primary school students, who are at a stage of psychomotor development that can be characterized as a real window of opportunity to maximize the psychomotor development potential of each individual.

The possibility of analysing psychomotor level through classical, non-integrated tests is also valuable because of the evolutionary access to situations and studies from recent decades in which results of classical, non-integrated tests are provided, which could serve as a basis for a comprehensive quantitative analysis of psychomotor development level at international level.

However, the use of classical tests only allows for the tracking of aspects, facets of psychomotricity, and the attempt to use integrated classical tests (which are, by their nature,

non-integrative - there is, by design, no test pathway, no design, an assembly of them into a congruent test consortium in the way test batteries are designed from the outset) cannot pursue a unified practice without a guide or protocol whereby attention to some test methods or procedures, in the classical sense, allows identification of components which, assimilable into a new model, can serve as an indicator of the level of psychomotor development for the test subject.

The present research approach sought, as a secondary objective, to determine the possibility of using non-integrated tests in an integrative context, and the result, presented in the preliminary research, promises a possible solution of combining classical tests (or pre-existing results of them), which in fact is not ideal, and which can serve at best as a tool with limited accuracy for measuring the general level of psychomotor development of a population.

Classical tests, however, have the advantage that they can also be used in practice as educational activities characteristic of the physical education class, and can often be applied without requiring the test-taker to work individually with the test subject, as in the case of test batteries. This advantage allows the regular use of classic tests to determine the general level of psychomotor skills, a pre-testing whose main purpose is to identify the need for a test with a different level of accuracy, but with a different consumption of resources.

Introduction of psychomotor testing practice through integrated test batteries

Given the particularly important role of psychomotor development levels in everyday life, in an individual's ability to realise their potential, and the fact that remedying psychomotor development deficits becomes less possible as individuals age, the introduction of integrated tests to determine psychomotor development levels may be the only solution to remedy psychomotor development deficits in present and future generations.

It is therefore particularly important to test this level regularly, in an organised framework, structured around clear operational objectives, in order to monitor the appropriateness of intervention in psychomotor development through regular testing to indicate existing problems and estimate their impact, as well as to inform decisions about the necessary measures that need to be taken.

Bibliography

- [1] Albu, A., Albu, C., *Psihomotricitatea- la vârsta de creștere și dezvoltare*, Ed. Polirom, Iași, 1999;
- [2] Barros, J.S.V., Lima M.V.M., Sampaio N.A., Rocha S.M.B.M., Dantas P.M.S, Batista S.R.A, Silva R.P.M. *Analysis of Motor Capacities in the Maturational Stages of Female Adolescents*, Journal Human Growth Development, 27 (2), 2017, p. 206-212;
- [3] Bocanegra Esparza, O., M., *La psicomotricidad en el aula en el nivel inicial*;
- [4] Carmosino, K., Grzeszczak, A., McMurray, K., Olivo, A., Slutz, B., Zoll, B., ... Brahler, C. J., *Test items in the complete and short forms of the BOT-2 that contribute substantially to motor performance assessments in typically developing children 6-10 years of age*, Journal of Student Physical Therapy Research, 7 (2), 2014, ARTICLE 1.
- [5] Miller, A., Galanter E., Pribram , K., *Plans And The Structure Of Behavior*. Ed. A. Holt Dryden, 1960, New York
- [6] Olana Rey. R., *La psicologia genetica/didactica de Henri Wallonw*, 1993;
- [7] Ababei, R., *Învățare motrică și sociomotrică*, Editura PIM, 2006, Iași;
- [8] Abălașei, B., Popescu L., *Body scheme- fundamental component of growth and development*, Gymnasium- Scientific journal of education, sports and health, 2016, No. 2, vol XVII;
- [9] Ahmad, A.S., Silva E., *The contribution of pshychomotricity in children's education*, publicat în 6 august 2013;
- [10] Ahsanullah, M., Kibria, B. M., & Shakil, M., *Normal distribution*, Normal and Student st Distributions and Their Applications (pp. 7-50). Atlantis Press, 2014, Paris;
- [11] Akin, S., *Fine Motor Skills, Writing Skills and Physical Education Based Assistive Intervention Program in Children at Grade 1*, Asian Journal of Education and Training, Vol. 5, No. 4, 2019, 518-525;
- [12] Albu, A., Albu, C., *Psihomotricitatea - bazele generale ale psihomotricității*, Ed. Spiru Haret, 1999, Iași;
- [13] Albu, C.; Albu, A.; Vlad, T.L.; Iacob, I., *Psihomotricitatea. Metodologia educării și reeducării psihomotrice*, Institutul European, 2006, Iași;
- [14] Alexe, D., I., *Implicațiile psihomotricității în manifestarea echilibrului la pubertate*, Ed. Performantica, 2012, Iași;
- [15] Ambegaonkar J.P., Caswell S.V., Winchester J.B., Shimokochi Y., Cortes, N., Caswell, A.M., *Balance comparison between female dancers and active nondancers*, Research Quarterly for Exercise and Sport, 2013, Vol. 84, p.24-29;
- [16] Arcan, P., Ciumăgeanu, D., *Copilul deficient mintal*, Ed. Facla, 1980, Timișoara;
- [17] Ardelean, T., *Psihomotricitatea în cadrul motricității umane. În volumul Sesiunii internaționale „Evaluare și valorificare în cultura fizică și sport”, 16 iunie 2006, București*;
- [18] Armstrong, M. E. G., Lambert, E. V., & Lambert, M. I., *Physical fitness of South African primary school children, 6 to 13 years of age: Discovery vitality health of the nation study*. Perceptual and Motor Skills, 113 (3), 2011, 999–1016;
- [19] Aucouturier, B., Darrault, I., & Empinet, J. L., *La pratica psicomotoria. Rieducazione e terapia*, Armando, 1995, Roma;
- [20] Aucutier, B., *La práctica psicomotriz: reeducación y terapia*. Ed. Científico-medica, 1985, Barcelona;

- [21] Aviles, J.I., Balsalobre, FJB, Sanchez GFL, Suarez, AD., *Design and validation of a psychomotor profile evaluation scale in early childhood education*, Human Sport and Exercise, 13 (S), 2018, S421-431;
- [22] Aviles, JI^[1]; Balsalobre, FJB^[1]; Sanchez, GFL^[1]; Suarez, AD., *Design and validation of a psychomotor profile evaluation scale in early childhood education*, Human sport and exercise Volume: 13, 2018, Pages: S421-S431, Supplement: S;
- [23] Bădău, D., *Identification of general coordination level according to laterality in handball. 1. specific rhythmic gymnastics skills acquisition conditionality in preschool*, 71;
- [24] Balint, N., T., *Proiectarea activității de predare, învățare, evaluare a capacității motrice la vârsta preșcolară*, Teză de doctorat, Universitatea din Pitești, 2008, Pitești;
- [25] Balint, N.T., Dobrescu, T., Cristuță, A., M., Anghel, M., *Comparative Study on Genders Regarding the Dynamic Balance Disorders in a School Age Population Segment*, în T. Ciulei, G. Gorghiu (eds.), *Communicative, Action & Transdisciplinarity in the Ethical Society*, 2018, pp. 27-37;
- [26] Bândila, A., Rusu, C., *Dicționar selectiv. Psihopedagogie specială. Defectologie medico-socială*, Ed. Pro Humanitate, 1999, București;
- [27] Barbosa, R. O. M., *Between the psychomotricity and human development: the importance of physical education in early childhood education*. Efdeportes, Buenos Aires, year 17, no.169, jun. 2012.
- [28] Barbu, C. G., Teleman, M. D., Albu, A. I., Sirbu, A. E., Martin, S. C., Bancescu, A., & Fica, S. V., *Obesity and eating behaviors in school children and adolescents—data from a cross sectional study from Bucharest, Romania*, BMC Public Health, 15 (1), 2015, 1-9;
- [29] Benos, J., *L'enfant inadaptée et education psycho-motrice*, Ed. Maloine, 1972, Paris;
- [30] Berdilă, A., Talaghir, L. G., Iconomescu, T. M., & Rus, C. M., *Values and Interferences of Psychomotricity in Education--a Study of the Domain-Specific Literature*, Romanian Journal for Multidimensional Education/Revista Romaneasca pentru Educatie Multidimensională, 11, 2019;
- [31] Berdilă, A., Talaghir, L.G., Iconomescu, T.M., Rus, C.M., *Values and interferences of Psychomotricity in Education- a Study of Domain - Specific Literature*. Revista Românească pentru Educație Multidimensională, 11 (4 Supl 1), 2019, 22-42;
- [32] Berruazo, P.P., *El cuerpo, el desarrollo y la psimotricidad*, Psicomotridad, Revista de estudios y experiencias, nr. 49, 1995, 15-26;
- [33] Bessa, L.A.S., Maciel, R.M., *A importancia da psicomotricidad na desen-olvimento das criancas nos anos iniciais*, Revista Cientifica Multidisciplinar Nu-cleo do Conhecimento, Volume: 12 Issue: 1, 2016, Pages: 59-78;
- [34] Bizouard, P., *Developpement psychomoteur du nourrisson et de l'enfant*, La Revue du Praticien, 1995, Paris;
- [35] Bloomfield, J., & Fisher, M. J., *Quantitative research design*, Journal of the Australasian Rehabilitation Nurses Association, 22 (2), 2019. 27-30;
- [36] Boardley, D., & Pobocik, R. S., *Obesity on the rise*, Primary Care: Clinics in Office Practice, 36 (2), 2009, 243-255;
- [37] Bogdan, T., Bogdan-Tuciciv, A., *Când trebuie începută preocuparea pentru dezvoltarea psihică a copilului?*, Revista de Pedagogie, nr.9, 1984;
- [38] Bolduc, J., Gosselin, N., Chevrette, T., Peretz, I., *The impact of music training on inhibition control, phonological processing, and motor skills in kindergarteners: a randomized control trial*, *Early Child Development and Care*, 2020. DOI: 10.1080/03004430.2020.1781841;

- [39] Bora, L.B., Cardoso, V.T., de Toni, P.M., *Left-right asymmetry and Human Neuropsychomotor Development*, Revista ces psicologia, Volume: 12, Issue: 1, 2019, Pages: 54-68;
- [40] Borges, M., F., Rubio, J.A.S., *A Educacao Psicomotora como instrumento no Processo de Aprendizagem*, Revista Eletronica Saberes da Educacao, Volume: 4, Issue: 1, 2013, Pages: 1-12;
- [41] Botez, I., M., *Neuropsihologie clinică și neuropsihologia comportamentului*, ediția a II-a, Ed. Medicală, 1996, București;
- [42] Brown, T., *Structural validity of Bruininks-Oseretsky test of motor proficiency*, Second edition brief form (BOT-2-BF), Elsevier, Research in Developmental Disabilities 85, 2019, 92-103;
- [43] Brown, T., *Construct validity: A unitary concept for occupational therapy assessment and measurement*, Hong Kong Journal of Occupational Therapy, 20 (1), 2010, 30–42.
- [44] Bruininks, R. H., *Bruininks-Oseretsky test of motor proficiency*. Circle Pines, 1978, Minnesota: American Guidance Service;
- [45] Bruininks, R. H., & Bruininks, B. D., *Bruininks-Oseretsky Test of Motor Proficiency Second (Edition manual)*, Pearson Assessments, 2005, Minneapolis, MN;
- [46] Cachón-Zagalaz, J., Sánchez-Zafra, M., Sanabrias-Moreno, D., González-Valero, G., Lara-Sánchez, A. J., & Zagalaz-Sánchez, M. L., *Psychomotricity and Development of Emotional Bonds Between Parents and Children in Early Childhood*. In P. Gil-Madrona (Ed.), *Physical Education Initiatives for Early Childhood Learners*, 2021, pp. 121-141. IGI Global. <http://doi:10.4018/978-1-7998-7585-7.ch008>;
- [47] Camargos, E. K. de; Maciel, R. M.. *The importance of psychomotricity in children education*, Multidisciplinary Core scientific journal of knowledge, Year 1, Vol. 9. 2016, pp. 254-275, October/November 2016. ISSN. 2448-0959;
- [48] Camargos, E., K., Mendes, R., *The importance of Psychomotricity in children education*, Multidisciplinary Core Scientific Journal of Knowledge, Vol. 9. 2016, p. 254-275;
- [49] Cappellini, A. C., Mancini, S., Zuffellato, S., Bini, F., Polcaro, P., Conti, A. A., Molino Lova, R., & Macchi, C., *Environmental effects on school age child psychomotricity*, Minerva pediatrica, 60 (3), 2008, 277–284;
- [50] Carantină, D., *Program terapeutic pentru educație psihomotrică a copilului handicapat sever*, S.S.H., Institutul Național de recuperare și educație specială a persoanelor cu handicap;
- [51] Cebalos et al., *Leisure activity as a means of child development*. Ef deportes.com, 2011, Buenos Aires;
- [52] Çetin, O., Beyleroğlu, M, Bağış, Y.E., Suna, G., *The effect of the exercises brain on boxers' eye-hand coordination, dynamic balance and visual attention performance*, Physical Education of Students, Vol. 22 (3), 2018, p.112-119;
- [53] Chatzopoulos, D., Galazoulas, C., Patikas, D., Kotzamanidis C., *Acute effects of static and dynamic stretching on balance, agility, reaction time and movement time*, Journal of Sport, Science and Medicine, 13 (2): 2014m 403–409;
- [54] Cho, E.H., Yun, H.J., So, W.Y., *The validity of alternative hand wall toss tests in korean children*, Journal of Men's Health, Vol. 16 (1), 2020, pp.10-18;
- [55] Cioni, G., & Sgandurra, G., *Normal psychomotor development*, Handbook of clinical neurology, 111, 2013, 3-15;
- [56] Cojanu, F., Vișan, P., *New perspectives to develop psychomotor capacity for romanian childrens from primary school*, edu world 7th international conference, Book Series: European

Proceedings of Social and Behavioural Sciences, Volume: 23, 2017, Pages: 1423-1431, DOI: 10.15405/epsbs.2017.05.02.174 Published: 2017;

- [57] Cojocaru, A., *The effect of some martial arts exercises on the balance and flexibility to the elderly*, Gymnasium, 2012, Vol.13;
- [58] Constantin, A.M., *Importance of psychomotor tests in tehcnical execution of throws, ages 8-10 years old*, Gymnastium, no.1, 2015, vol. 16, 249;
- [59] *Coordination test for children*, 2nd ed., Weinheim: Beltz Test GmbH;
- [60] Cornish, R. D., *Effects of neurological training on psychomotor abilities of kindergarten children*. The Journal of Experimental Education, 39 (2), 1970, 15-19;
- [61] Cosmovici, A.; Iacob, L., *Psihologie școlară*, Ed. Polirom, 1998, Iași;
- [62] Cosmovici, A., *Psihologie generală*, Ed. Polirom, 1996, Iași;
- [63] Costa, H., J., T., Abelairas-Gomez, C., Arufe-Giraldez, V., Pazos-Couto, JM); Barcala-Furelos, R., *Influence of a physical education plan on psychomotor development profiles of preschool children*, Journal of human sport and exercise, volume: 10, Issue: 1, 2015, Pages: 126-140;
- [64] Cucerzan, M., C., *Dezvoltarea abilităților psihomotorii la elevii de vârstă școlară mică cu dizabilități intelectuale integrați în învățământul de masă*, Revista Română de Terapia Tulburărilor de Limbaj și Comunicare din 15/10/2016;
- [65] D'Elia, F., *La valutazione motoria nella scuola primaria. [Motor assessment in primary school]*. Scuola Italiana Moderna, 4 (dicembre 2014), 81-84;
- [66] Da Silva, G., R., Reis, A., M., da Oliveira, J., B., C., Neiva, C., M., dos Santos D., *Revista ibero-americana de estudos em educacao*, Volume: 12, Pages: 313-331
- [67] Dailiz, R., Moscato M., *Lateralisation et latéralité chez la jeune enfant*, Bruxelles, 1984, p.13
- [68] Demeter, A.; Gagea, A.; Firea Elena, *Metodă complexă și practică pentru studiul modificărilor tranyitorii ale reactivității organismului elevilor care parctică educația fizică și sportul*, Rev. EFS. nr. 8, 1975;
- [69] Descartes, R., *Meditationes metaphysicae*, 1641, Paris;
- [70] Dragnea, A., C., Bota. A., *Teoria activităților motrice*, Ed. Didactică și Pedagogică, 1999, București;
- [71] Dragnea A, Teodorescu S, Bota A, Stănescu M, Șerbănoiu S, Tudor V., *Educație fizică și sport. Teorie și didactică*, FEST Bucurelti, p. 26;
- [72] Dragnea A., *Măsurarea și evaluarea în educație fizică și sport*, Ed. Sport-Turism, 1984, București;
- [73] Drzał-Grabiec, J., Snela, S., Rykała, J., Podgorska, J., & Rachwal, M., *Effects of the sitting position on the body posture of children aged 11 to 13 years*, Work, 51 (4), 2015, 855-862;
- [74] Dugas M., Velin J., Mouren Mc et al., *L'examen en psychiatrie de l'enfant*. Encycl Med Chir, 1983, Paris, Pediatrie;
- [75] Dumitrescu R., *Metodica educației fizice II - Educație psihomotrică*, Editura Universității din București, 2008, București;
- [76] Ellis, Y. G., Cliff, D. P., & Okely, A. D., *Childcare educators' perceptions of and solutions to reducing sitting time in young children: A qualitative study*, Early Childhood Education Journal, 46 (4), 2018, 377-385;
- [77] Emandi, A. C., Puiu, M., Gafencu, M., & Pienar, C., *Overweight and obesity in school age children in western Romania*, Rev Med Chir Soc Med Nat, Iasi, 117 (1), 2013, 36-45;

- [78] Ene, M.I., Iconomescu, T.I., Talaghir I.G., Neofit, A., *Developing Spatial and Body Schema Orientation in Preschoolers and Primary School through Physical Activities*, International journal of educational sciences, Volume: 15, Issue: 1-2, Pages: 27-33, Special Issue: SI, Published: jul-aug 2016;
- [79] Epuran M., *Motricitate și psihism în activitățile corporale. Prolegomene la o metateorie a activităților corporale*. Volum I, Editura FEST, 2011, București;
- [80] Epuran, M., *Reglarea psihică*, Institutul de Educație fizică și sport, 1984, București;
- [81] Epuran, M., *Psihologia educației fizice*, Ed. Sport Turism, 1976, București;
- [82] Epuran, M., *Motricitate și psihism în activitățile corporale. Prolegomene la o metateorie a activităților corporale, ludice, gimnice, agonistice, recreative, compensatorii*, volumul 2, Ed. FEST, 2013, București;
- [83] Epuran, M., Stănescu, M., *Învățarea motrică-aplicații activități corporale*, Ed. Discobolul; 2010, București;
- [84] Epuran, M., *Motricitatea și psihism, Psihomotricitate*, Fascicola 2, FEFS, Universitatea din Oradea, 2002, Oradea;
- [85] Esposito M, Gimigliano, F., Ruberto, M., Marotta, R., Gallai, B., Parisi, L., Lavano, S.M., Mazzotta, G., Roccella, M., Carotenuto, M., *Psychomotor approach in children affected by nonretentive fecal soiling (FNRFs): a new rehabilitative purpose*, Neuropsychiatr Dis Treat. 2013; 9:1433-1441;
- [86] Esteban, M.D.H., Avi, M.R., Zamora, E.G., Muniz, M.J.I., Gomez, J.M.G., de la Fuente, N.G., *Psychomotor intervention in children with Attention Deficiency and 2019Hyperactivity Disorder (ADHD). Evaluation of the results through a mixed method*, Revista de educacion inclusiva, Volume: 12, Issue: 1, Pages: 267-290, Published: 2019, jun;
- [87] Faber, I.R., Oosterveld, F.G.J., Nijhuis-Van der Sanden, M.W.G., *Does an Eye-Hand Coordination Test Have Added Value as Part of Talent Identification in Table Tennis? A Validity and Reproducibility Study*, Plos One, Vol. 9 (1), 2014, e85657;
- [88] Famose, J., P., Durand, M., *Aptitude et performance motrice*, Editions Revue, 1988, Paris;
- [89] Fernandes, J., *Das abordagens emergentes em psicomotricidade as atualidades da pratica psicomotora*, Atualidades da practica psicomotora, 2015, Pages: 19-28;
- [90] Fernandes, J., Guttieres P.J.B., de Rezende, A.L.G., *Psychomotricity, play and body-in-relation: contributions to intervention*, Cadernos brasileiros de terapia ocupacional-brazilian journal of occupational therapy, 2018, 26:702-709;
- [91] Fernandes, J., M., G., D., Guttieres, P., J., B., de Rezende, A., L., G., *Psychomotricity, play and body-in-relation: contributions to intervention*, Cadernos brasileiros de terapia ocupacional-brazilian journal of occupational therapy, Volume: 26, 2018, Pages: 702- 709;
- [92] Fernandes, J., *Das abordagens emergentes em psicomotricidade as atualidades de practica psicomotora*, Atualidades da practica psicomotora, 2015, 19-28;
- [93] Ferre-Rey, G.; Dueñas, J.M.; Camps, C., *Differences between the Dynamic and Normative Psychomotricity in Child Development*, Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 21 (81) 2021, pp. 47-62;
- [94] Fischer, H., *A history of the central limit theorem: From classical to modern probability theory* (pp. 1-10), Springer, 2011, New York;
- [95] Fonseca, V., *Manual de observação psicomotora. Significação psiconeurológica dos fatores psicomotores*, Porto Alegre: Artes Médicas, 1995;

- [96] Gabriel, T. L., Anamaria, B., & Mihaela, I. T., *Study regarding psychomotor aspects approached by Romanian authors*, Journal of Physical Education and Sport, 19, 2019, 2297-2304;
- [97] Gallagher, S., „*Neurophenomenological Research on Embodied Experience*”. *Essays in Celebration of the Founding of the Organization of Phenomenological Organizations*, Ed. Cheung, Chan-Fai, Ivan Chvatik, Ion Copoeru, Lester Embree, Julia Iribarne, & Hans Rainer Sepp. Web-Published at www.o-p-o.net, 2003;
- [98] Garcia, Adriana da Conceição, *The play and the psychomotricity*. Monograph (postgraduate degree in Psychomotricity) Universidade Cândido Mendes, 2007, Rio de Janeiro;
- [99] Gardner, H., *The mind the new science: a history of the cognitive revolution*, Basic Books, 1985 New York;
- [100] Gavojdea, A.M., *Study Regarding Balance in 9-10 Years Old Gymnasts*, ICPEK, 5th edition, 2015, p.218-225;
- [101] Gentier, I., D'Hondt, E., Shultz, S., Deforche, B., Augustijn, M., Hoorne, S., ... & Lenoir, M. *Fine and gross motor skills differ between healthy-weight and obese children*, Research in developmental disabilities, 34 (11), 2013, 4043-4051;
- [102] Glushkov, I, Pacheva. P., *On the problems of children space orientation*, Research in Kine-siology Volume: 4 Issue: 1, 2014, Pages: 88-97;
- [103] Gordon, W. A., *Structura și dezvoltarea personalității*, Ed. Didactică și Pedagogică , 1991, București;
- [104] Gorgos, C., *Dicționar enciclopedic de psihiatrie (voi. MV)*, Ed. Medicală, 1987-1992, București;
- [105] Grigore V., *Gimnastica artistică. Bazele antrenamentului sportiv*, Ed. SemnE, 2001, București;
- [106] Grigore, V., *Logevitate de gimnastică*, Editura Atlantis, 1999, București;
- [107] Grosu E.F., *Psihomotricitatea - suport de curs*, anul I, 2009, Cluj-Napoca;
- [108] Grosu, E., F., *Teste de evaluarea capacităților coordinative*. În volumul conferinței științifice naționale „Nevoia de cercetare științifică a domeniului educației fizice și sportului”, 2000, București;
- [109] Guillarme, J., J., *Education et reeducation en psychomotricité*, Ed. Sermap, Hatira, 1985, Paris;
- [110] Gulap, M., *An Experimental Study Regarding the Influences of Sport Disciplines on the Psychomotricity of the Students from the University of Bucharest*, ICPEK, 2015, 5th International Congress of Physical Education, Sports and Kinetotherapy, Published by Future Academy, 2015, București;
- [111] Gupta, A. K., *Estimation of the mean and standard deviation of a normal population from a censored sample*, Biometrika, 39, (3/4), 1952, 260-273;
- [112] Holton, E. F., & Burnett, M. F., *The basics of quantitative research*, Research in organizations: Foundations and methods of inquiry, 2005, 29-44;
- [113] Horghidan, V., *Metode de psihodiagnostic*, Ed. Didactică și Pedagogică R.A., 1997, București;
- [114] Horghidan, V., *Problematika psihomotricității*, Ed. Globus, 2000, București;
- [115] Iconomescu, T., Ciapa M., *The development of spatial orientation and laterality in physical education classes from the countryside- pilot test*, SHS Web of Conferences, 37, 01071, Erpa 2017;

- [116] Iconomescu, T., M., Mândrescu, V., M., Talaghir, L., G., *The importance of motion games in the psychomotor development of pre-schoolers during the physical education class*, ERPA International Congresses on Education 2017 (ERPA 2017), SHS Web of Conferences, Volume: 37, Article Number: 01070;
- [117] Iconomescu, T., M., Ciapa, M., *The development of spatial orientation and laterality of physical education classes from countryside-pilot test*, SHS Web Conf, Vol. 37, 2017, p.1-6;
- [118] Imbernón, S., Martínez, A., & Díaz, A., *Psychomotricity and Infant Education: Proposal for Evaluation and Intervention for Children of 3, 4, and 5 Years Old*. In P. Gil-Madrona (Ed.), *Physical Education Initiatives for Early Childhood Learners* (pp. 280-305). IGI Global. 2021, <http://doi:10.4018/978-1-7998-7585-7.ch016>
- [119] Ionuț, S. G., & Luminița, G., *Research on the optimization of the curricular repertoire for children with intellectual disabilities through the implementation of training programs with multimedia support*, Ovidius University Annals, Series Physical Education and Sport/Science, Movement and Health, 20, 2020, 335-342;
- [120] ISPE-GAE. Instituto Superior de Psicomotricidade e Educação e Grupo de Atividades Especializadas. : <http://www.ispegae-oipr.com.br>, accesat în februarie 2019
- [121] Jirovic, J., Musalek, M., Mess, F., *Test of motor proficiency Second Edition (BOT-2): Compatibility of the complete and short form and its usefulness for middle - age school children*, Frontiers in pediatrics, vol. 7, 2019, article 153;
- [122] Joseph, S., Dyer, C., & Coolican, H., *Means and standard deviations explained*, Counselling and Psychotherapy Research, 5 (3), 2005, 256-257;
- [123] Juliano, A., D., Bersch A., A., S., Piske, E., D., Garcia, N., M., Cousin, C., *Psychomotor relationship in child education: belonging and reflections of relations with the environmental education*, Remea - Revista eletrônica do mestrado em educação ambiental, Volume: 33, Issues: 3, Pages: 198-212;
- [124] Karachle, N., Aspasia, D., Fotini, V., *Effects of a recreational gymnastics program on the motor proficiency of the young children*, Science of Gymnastics Journal, Vol. 9, Issue 1: 2017, 17-25;
- [125] Kiphard, E. J., & Schilling, F., *Körperkoordinationstest für kinder [Body]*, 2007;
- [126] Klein, D., Türk, S. and Roth, R., *Outdoor Psychomotor Activities: Bringing Children to Nature*. Advances in Physical Education, 8, 246-252. doi: 10.4236/ape. 2018; 82022;
- [127] Kleinder, A., *Agnozii și apraxii*, Ed. Academică, R.S.R., 1977, București;
- [128] Lappiere, A., *Le education physique*, vol. 1, J.B. Bailliere, 1972, Paris;
- [129] Le Boulch, J., *O desenvolvimento Psicomotor*, Artes Médicas, 1982, Porto Alegre;
- [130] Le Boulch, J., *A Educação Psicomotora: a psicocinética na idade escolar*, Artes Médicas, 1983, Porto Alegre;
- [131] Le Boulch, J., *L'éducation par le mouvement*, E.S.F., 1966, Paris;
- [132] Le Boulch, J., *Educação psicomotora: a psicomotricidade na idade escolar*, Artes Médicas, 1987, Porto Alegre;
- [133] Le Boulch, Jean., *O desenvolvimento psicomotor: do nascimento aos 6 anos*. Tradução de A. G. Brizolara. 5. ed., Artes Médicas, 1988, Porto Alegre;
- [134] Le Boulch, J., *Psychomotor education: school age psychokinesis*. Trad. Jeni Wolff, Medical arts, 1987m Porto Alegre, p. 356;
- [135] Le Cam, L., *The central limit theorem around 1935*. Statistical science, 1986, 78-91;

- [136] Lenik, P, Przednowek, K., Śliż, M., Bobula, G., Lenik, J., *The impact of exercises with a reaction ball on the hand-eye coordination of basketball players*, 11th International Conference of Kinanthropology „Sport and Quality of Life”, 2017, p.347-358;
- [137] Leon, J., E., Pelayo, R., *Aprendizaje significativo* en <http://www.psicopedagogia.com/definicion/aprendizaje%20significativo> Recuperado 22 noviembre de 2014,
- [138] Leontiev, A., *O desenvolvimento do psiquismo, O Homem e a Cultura*, Horizonte, 1978, Lisboa, p. 261-284;
- [139] Leuciuc, F.V., *Effect of 12 Weeks workout on women's physical fitness*, Gymnasium, Vol. 20 (1), 2019, p.57-67;
- [140] Lopes, L., Santos, R., Pereira, B., & Lopes, V. P., *Associations between sedentary behavior and motor coordination in children*, American Journal of Human Biology, 24 (6), 2012, 746-752;
- [141] Lovric, F., Clark, C., Jelaska, J., Eyre, E., *Bilateral tests for the assessment of manipulative skills In children: development, reliability, and validity*, Human Movement, 2019, p. 1-9;
- [142] Lozano, B., A. Et all., *Teoria de Henri Wallon (Curso 2014-2015)*, Universidad de Castilla-Mancha, Facultad de Educacion, 2014-2015, Castilla-Mancha;
- [143] Lussac R., M., P., *Psicomotricidade: história, desenvolvimento, conceitos, definições e intervenção profissional*, Revista Digital-Buenos Aires-Ano 13, No. 126, Noviembre de 2008;
- [144] Macri, A., C., *The role of the improvement of the psychomotricity components in the development of the pupils*, Sp Soc Int J Ph Ed Sp 2014, Volume 14 - Special issues;
- [145] Maite, M., Asuncion, A; Almuedo, M; Lluesma, A; Rodriguez, A; Merce, X., *Different perceptive qualities for the psychomotricity*, American Journal of Educational Research Volume: 3 Issue: 12, 2015, Pages: 1615-1617;
- [146] Mănescu, S., Tanasescu, GH., Ursoniu. C., *Tratat de igienă*, Ed. Medicală, 1986, București;
- [147] Manno, R., *Bazele teoretice ale antrenamentului*, Ed. E.P.S., în S.D.P., Nr. 371-374/1996, 1992, București;
- [148] Manole, V., Manole, L., *Teste pentru evaluarea condiției fizice a handbalistelor de performanță*, Gymnasium, nr.12, 2008. p.163-169;
- [149] Marouli, A., Papavasileiou, G.E., Aspasia, D. Fotini, V., *Effect of a psychomotor program on the motor proficiency and self-perceptions of preschool children*, Journal of Physical Education and Sport, 16 (4), 2016, pp. 1365 – 1371;
- [150] Martinescu, F., *Psychomotricity role in military career training*, Bulletin of the Transilvania University of Brașov, Series IX: Sciences of Human Kinetics, Vol. 9 (58) No. 1 – 2016;
- [151] Martínez-Bello, V. E., Bernabé-Villodre, M. D. M., Lahuerta-Contell, S., Vega-Perona, H., & Giménez-Calvo, M., *Pedagogical knowledge of structured movement sessions in the early education curriculum: Perceptions of teachers and student teachers*, Early Childhood Education Journal, 49 (3), 2021, 483-492;
- [152] Martinez, V., Anton. A., *Effects of a psychomotor intervention programme in preadolescents with Down syndrome*, Infancia y Aprendizaje, Volume: 41, Pages: 2018, 165-199;
- [153] Mavrovouniotis, F., Proios, M., Argiriadou, E., & Soidou, A., *Dynamic balance in girls practicing recreational rhythmic gymnastics and Greek traditional dances*, Science of Gymnastics Journal, 5 (1), 2013, 61-70;

- [154] Mavrovouniotis, F., Proios, M., Argiriadou, E., & Soidou, A., Dynamic balance in girls practicing recreational rhythmic gymnastics and Greek traditional dances. *Science of Gymnastics Journal*, 5 (1), 2013, pp. 61-70;
- [155] McIntyre, F., Parker, H., Thornton, A., Licari, M., Piek, J., Rigoli, D., ... Hands, B., *Assessing motor proficiency in young adults: The Bruininks Oseretsky Test-2 Short Form and the McCarron Assessment of Neuromuscular Development*, *Human Movement Science*, 53, 2017, 55–62;
- [156] Mecu, C., Rusan, I. (coord), *Psihomotricitatea, concept, obiective ale integrării și terapie în școala ajutătoare*, Probleme de defectologie (coord. E.Varza), Univ. București, 1988, București;
- [157] Medeiros, A.R., Sousa, A., Santos, S., *Body Notion, Lateralization and Space-Time Structure Between Goalball Athletes and Non-athletes*, *Desporto e Atividade Física para Todos*, Vol. 2, N.o 2, 2016, pp. 15 – 23;
- [158] Meilă, P., Milea, S., *Tratat de pediatrie*, vol. 6, Editura Medicală, 1988, București;
- [159] Melcherts, Hurtado Johann Gustavo Guillermo. *Educação Física pré-escolar e escolar: uma abordagem psicomotora*. 5ª. ed. Porto Alegre: Edita, 1996;
- [160] Mendoza , V., *Dessarollo infantil. La teoria de Wallon, Mexico*, Asociacion Oaxaquena de Psicologia A.C. 2007;
- [161] Merida-Serrano, R., Olivares-Garcia, M.D., Gonzalez-Alfaya, M.E., *Discovering the world through the body in the childhood. The importance of materials in the child psychomotricity*, *Retos-Nuevas Tendencias En Educacion Fisica Deporte y Recreacion*, 2018, p. 329-336;
- [162] Merleau-Ponty, M. *Fenomenología de la percepción*. [1945]. Trad. Jem Cabanes. Barcelona; Ciudad de Mexico; Planeta-Agostini, 1997, Buenos Aires;
- [163] Miclea, M., *Psihologie cognitivă*, Ed. Polirom, 1999, Iași;
- [164] Ministero dell'Istruzione, dell'Università e della Ricerca, *Indicazioni Nazionali per il Curricolo della Scuola dell'Infanzia e del Primo Ciclo d'Istruzione*. [National Guidelines for the Curriculum of the nursery school and the primary school], 2012;
- [165] Mitrache, G., Tudos, S., *Psihomotricitate și limbaj*, Ed. Cartea Universitară, 2004, București;
- [166] Mocanu, G. D., *Correlation analysis of the coordination testing of students of the faculty of physical education and sports in galati*. *Annals of the University Dunarea de Jos of Galati: Fascicle XV: Physical Education & Sport Management*, (2). 2013;
- [167] Moldovan, E., & Enoiu, R., *Study regarding psychomotricity and its role in the sporting preparation process of the basketball player*, *Bulletin of the Transilvania University of Brașov*, Series VIII: Art, Sport, 4 (53), 2011, 137-146;
- [168] Monsalve, A.M.S., Sanchez L.F.M., *Psychomotor learning in the area of Physical Education, Recreation, and Sports, mediated by the use of educational software*, *Retos - nuevas tendencias en educacion fisica deporte y recreacion*, Issue: 36, 2019, Pages: 302-309;
- [169] Monteiro, V. A.. The psychomotricity in physical education classes. 29 p. 2006; Monograph (lato sensu in *Psychopedagogy and Psychomotricity*) – Centro Universitário Salesiano, Lorena, 2006, São Paulo;
- [170] Moșoi, A., A., Balint L., *Poziția specialiștilor asupra psihomotricității – studiu în România*, *Revista Sport și Societate – Revistă de Educație Fizică, Sport și Științe conexe*, Special Issue, Octombrie 2015;

- [171] Moșoi.A.A., Balint L., *Psychomotor skills – a general or specific approach?, Palestrica of the third millennium-Civilization and Sport*, Vol.16, no. 2, 2015, p.144-148;
- [172] Motet, D., *Psihopedagogia recuperării handicapărilor neuromotori*, Ed. Fundației Humanitas, 2001, București;
- [173] *Movement Time*. Journal of Sport Science, 13 (2), p. 403-409
- [174] Munian, J.L., *Noción/definición de psicomotricidad. Psicomotricidad*. Revista de Estudios y Experiencias, 55, 1997, 53-86;
- [175] Mușu L., Taflan, A., (coord), *Terapie educațională integrată*, Ed. Pro Humanitas, 1999, București;
- [176] Myra, Z., Lopez, *Test psihologic*, 1989;
- [177] Nathan, T., *Psychotherapies*, Ed. Odile Jacob, 1998, Paris;
- [178] Neagu, N., *Teoria și practica activității motrice umane*, Ed. University Press, 2010, Târgu-Mureș;
- [179] Ochiană, G., *Ludoterapia în recuperarea disabilităților psihoneuro-motorii ale copiilor*, Edit. Performantica, 2006, Iași;
- [180] Ochoa-Pachas, J., *Descriptive studies are quantitative and can carry hypotheses*, Academia Letters, 2. 2021;
- [181] Olaya, B., Moneta, M. V., Pez, O., Bitfoi, A., Carta, M. G., Eke, C., ... & Kovess, V., *Country-level and individual correlates of overweight and obesity among primary school children: a cross-sectional study in seven European countries*. BMC Public Health, 15 (1), 2015, 1-12;
- [182] Oliveira, G., *Psicomotricidade: Educação e Reeducação num enfoque Psicopedagógico*. 5ª edição, Editora Vozes, 2001, Petrópolis;
- [183] oliveira, J. A.. Fundamental patterns: implications and applications in physical education for children. Interaction, Centro Universitário do Sul de Minas, v. 6, no. 6, 10. 2002, Sul de Minas;
- [184] Oltean, A., Damian, M., Teodor, D.. *Approaching psychomotricity in rhythmic gymnastics training*, International Congress of Physical Education, Sports and Kinetotherapy. Education and Sports Science in the 21st Century, 2019, p. 413-422;
- [185] Onofreiciuc, T., *Noul component a învățării, adjuvant al performanței*, Revista Marathon, Volum IV, Nr. 2 din 2012;
- [186] Pantelimon, G., Verza, E., Zlate, M., *Psihologia copilului*, Editura Didactică și Pedagogică, R.A., 1993, București;
- [187] Papp, E., G., Neagu, N., Szasz, S., Bako, A., T., *Contributions to the psychomotor development of preschool children, through specific kinetoprophylactic exercises*, Palestrica of the third millennium – Civilization and Sport, Vol. 15, no. 4, October-December 2014, 312–316;
- [188] Parikh, R., Mathai, A., Parikh, S., Sekhar, G. C., & Thomas, R., *Understanding and using sensitivity, specificity and predictive values*. Indian journal of ophthalmology, 56 (1), 2008, 45;
- [189] Păunescu, C., Mușu I., *Psihopedagogie special integrată, handicap mintal, handicapul intelectual*, Ed. Pro Humanitate, 1997, București;
- [190] Păunescu, C., Mușu I., *Recuperare medico-pedagogică a copilului handicapat mintal*, Ed. Medicală, 1990, București;
- [191] Păunescu, C., *Deficiență mintală și organizarea personalității*, E.D.F., 1977, București;
- [192] Pendefunda, Gh., Ștefăneche, F., Pendefunda, L., *Semiologie neurologică*, Editura Contact Internațional, 1992, Iași;

- [193] Perron, R., *Deficiența mintală și reprezentarea de sine*, în „Debilitățile mintale” (coord R.Zazzo), E.D.P., 1979, București;
- [194] Pfeifer, L., I., Anhao Gomes P., P., *Body perception of preschoolers children: a psychomotricity purpose*, Revista do Nufen, vol. 1, 2009, p.155-170;
- [195] Philips, D., Hennermann J., B., Tyłki-Szymanska, A., Borgwardt, L, Gil-Campos, M., Guffon, N., Amraoui, Y., Geraci, S., Ardigo, D., Cattaneo, F., Lund, A., *Use of the Bruininks-Oseretsky test of motor proficiency (BOT-2) to assess efficacy of velmanase alfa as enzyme therapy for alpha-monnosidosis*, Elsevier, Molecular Genetics and Metabolism Reports, 2020, vol.23;
- [196] Piaget, J., *La psychologie de l'intelligence*, Librairie Armand Colie, 1947, Paris;
- [197] Piaget, J., Barber, I., *Psihologia copilului* (traducere Liviu Papuc), Ed. Cartier, 2005, București;
- [198] Piaget, J., *Psihologia inteligentei*, Ed. Științifică, 1965, București;
- [199] Picq, L., Vayer, P., *Education psycho-motrice et arrieration mentale*, Ed. Doin, 1971, Paris;
- [200] Pieron, H., *Vocabulaire de la psychologie*, PUF, 1968, Paris;
- [201] Popescu-Neveanu, P, *Dicționar de psihologie*, Ed. Albatros, 1968, București;
- [202] Popovici, I.M., Abălașei, B.A., Moraru C.E., *Role of Psychomotor Conducts in Bodily Modelling*, Proceedings of the 4th International Conference of the Universitaria Consortium (ICU 2018): The impact of sport and physical education science on today's society, 2018, Pages: 287-292;
- [203] Preda, V. (coord.), *Dinamica educației speciale*, Presa Universitară Clujeană, 2010, Cluj-Napoca;
- [204] Preda, V., *Intervenția precoce în educația copiilor deficienți vizuali*, Ed. Presa Universitară Clujeană, 1999, Cluj-Napoca;
- [205] Preda, V., *Grădinița altfel*, Editura V&I Integral, 2003, București;
- [206] Preda, V., *Particularitățile explorării vizuale ale capacității de organizare și structurare spațială la debili mintal.Implicațiile lor în activități didactice și corectiv-compensatorii*, în „Metodologii contemporane în domeniul defectologiei și logopedicii” (coord E.Verza), Univ. București, 1987, București;
- [207] Preja, C., A., *Didactica educației fizice și psihomotorii-învățământul preșcolar și primar-note de curs*, 2014;
- [208] Pricopie, E., Popovici, C., Mihaiu, C., Grosu, V.T., *Methods to develop coordination, ambidextria, spatial-temporal and chinestezic orientation in physical educationnc classes for students with mental deficient*, Educatio Artis Gymnasticae, vol. 3, 2009, p.61-66;
- [209] Prodea, C., *Relațiile dintre capacitatea de orientare în spațiu a deficienților vizuali și performanțele în jocurile sportive*, Editura Casa Cărții de Știință, 2012, Cluj-Napoca;
- [210] Rabelo, K.I.L., Aquino, G.B., *Relacao entre psicomotricidade e desenvolvimento infantil: um relato de experiencia*, Revista Cientifica da Faminas, Volume:10, 2014, Pages: 109-123;
- [211] Radu D.I., Ulici Gh., *Evaluarea și educarea psihomotricității*, Ed. Fundației Humanitas, 2002, București;
- [212] Radu, D., I., *Educație psihomotorie a deficienților mintal. Îndrumător metodic*, Ed. Pro Humanitate, 2000, București;
- [213] Radu, Gh., *Psihopedagogia școlarilor cu handicap mintal*, Ed. Pro Humanitate, 2000, București;
- [214] Raftery, A. E., Gilks, W., Richardson, S., & Spiegelhalter, D., *Hypothesis testing and model. Markov chain Monte Carlo in practice*, 1995, 165-187;

- [215] Ragupathi, K., Krishnaswamy, P.C., *Comparative Analysis of Physical Growth and Coordinative Abilities Among Rural and Urban School Boys*, International Journal of Scientific Research, Vol, 2 (5), 2013, p.525-527;
- [216] Raj, S.G.E., Nagarani, N., Thirumoorthi, G.S., *A comparative study to find out the effectiveness of reaction ball training to improve hand-eye coordination and reaction time between continues training and interal training among novice cricket players*, Global Journal for Research Analysis, Vol.8 (1), 2019, p. 11-13;
- [217] Rață, B. C., Rață, M., & Rață, G., *The Influence of Exercises in Athletics on Teaching Speed and Coordination in 7-8-Year-Old Children*, Gymnasium, 21 (2), 2021, 5-24;
- [218] Raveica, G., Principii de biomecanică în kinetoterapie. Biomecanica mersului, Editura PIM, 2006, Iași;
- [219] Reddy, A., Arunacalam, R., Anitha, A., *Correlation between core muscle strength and hand-eye coordination in non athletes*, Int.J. Physiother, Vol. 4 (5), 2017, p.291-295;
- [220] Rigal, R., *Education motriz y education psicomotriz en Preescolar y Primaria*, Inde Publicationes, 2006;
- [221] Rosenthal, R., & Jacobson, L., *Pygmalion in the classroom*. The Urban Review, 3 (1), 1968, 16 – 20;
- [222] ROSSI, A., *Considerations about the psychomotricity in children's Education*, Valley Voices Magazine: academic publications, UFVJM, no 1, year 1, 18 p., may 2012. Reg. 120.2.095-2011 PROEXC/UFVJM
- [223] Rouques, D., *Psychopedagogie des debiles profonds. Recit d'une experience realisee aupres de fillettes d'age scolaire*, Ed. Fleurus, 1969, Paris;
- [224] Saha, S.N.B., Chong, R.N.R., *Effectiveness of Alternate Hand Wall Toss Test on reaction time among archery, shooting&fencing athletes*, International Sport Science Students Conference, University, 2013, Kuala Lumpur;
- [225] Sanjeev, K., Sampa, R., Pradeep, K., *Effect of two training programs on hand eye coordination in children with deaf and dumb disorder*, Indian Journal of Physical Education, Sports Medicine and Exercise Science, Vol.15 (1, 2), 2015, p. 37-40;
- [226] Saoji, V.S., *Comparison of hand-eye coordination of female baseball and softball players of Amravati District*, International Journal of Yoga, Physiotherapy and Physical Education, Vol. 2 (2), 2017, p. 20-22;
- [227] Šarabon, N., & Omejec, G., *A novel testing tool for balance in sports and rehabilitation*. 11th Mediterranean Conference on Medical and Biomedical Engineering and Computing 2007 (pp. 998-1001). Springer, Berlin, 2007, Heidelberg;
- [228] Sbenghe, T., *Kinetologie profilactică, terapeutică și de recuperare*, Editura Medicală, 1987, București;
- [229] SBP. Sociedade Brasileira de psicomotricidade. www.psicomotricidade.com.br, accesat în februarie 2019;
- [230] Scheuer, C., Herrmann, C., Bund, A., *Motor tests for primary school aged children: A systematic review*, Journal of sports sciences, Routledge Taylor &Francis Group, 2018, p.1-17;
- [231] Șchiopu, U., (coord), Dicționar de psihologie, Ed. Babei, 1997, București;
- [232] Șchiopu, Ursula; Verza, Emil, *Psihologia vârștelor. Ciclurile vieții*, Editura Didactică și Pedagogică, 1997, București;
- [233] Shalit, L., & Hanțiu, I., *The impact of exercise based on the Eshkol-Wachman movement notation on general coordination*. Palestrica of the Third Millennium Civilization & Sport, 2014, 15 (1);

- [234] Sharma, F. M. of V., *Psychomotor development in childhood*. Centro Universitário de Maringá, 2012, Maringá-PR;
- [235] Shingjergji, A., *Psychomotor education, an aspect of general formation of pre-school children*. Journal of Education Culture and Society, 1 (12), 2013, 121-132;
- [236] Shingjergji, A., *Psycho-motor education of the pre-school children - a possibility for qualitative training*, International Letters of Social and Humanistic Sciences Volume: 6, 2014, Pages: 74-80;
- [237] Sibilio, M., *Le abilità diverse. Percorsi didattici di attività motorie per soggetti diversamente abili. [The different skills. Educational projects of physical activities for people with disabilities]*. Esselibri, 2003, Napoli;
- [238] Sillamy, N., *Dicționar de psihologie*, Ed. Univers Enciclopedic, 1996, București;
- [239] SILVA, D. A., *The importance of psychomotricity in children education. Work of conclusion of course (graduation in physical education)*. College of education and health sciences. Centro Universitário de Brasília, 2013, Brasília; Available in: <<http://repositorio.uniceub.br/bitstream/235/4588/1/tcc%20daniele%20araujo.pdf>>.</http:>
- [240] Simon, D.K., Koku, A.M., *A comparative study of motor skills performance level of students with hearing-impairment and students without hearing-impairment in the Hohoe municipality*, International Journal of Physical Education, Sports and Health, Vol. 4 (6), 2017, p.216-225;
- [241] Sirian, V., *Procedee pentru stimularea coordonării manuale la handicapatul mintal, în "Elemente de psihopedagogia handicapatilor (coord. E.Verza)*, Univ. București, 1990, București;
- [242] Sirian, V., *Psihomotricitatea și educarea ei la elevul deficient de intelect, în "Probleme de defectologie (coord. E. Verza)*, Univ, București, 1988, București;
- [243] Sopa, I.S., Szabo, D.A., *Testing agility and balance in volleyball game*, Research Gate, 2015;
- [244] Springer, A.B., Marin, R., Cyhan, T., Roberts, H., Gill, N.W., *Normative Values for Unipedal Stance Test with Eyes Open and Close*, Journal of Geriatric Physical Therapy Vol. 30, 2007, p.8-15;
- [245] Straker, L., Howie, E., Smith, A., Jensen, L., Piek, J., & Campbell, A., *A crossover randomised and controlled trial of the impact of active video games on motor coordination and perceptions of physical ability in children at risk of developmental coordination disorder*, Human movement science, 42, 2015, 146-160;
- [246] Șuneii, M.C., Nagel, A., Petracovschi, S., *Development of the body scheme in children in primary education: a systematic narrative review of the influence of an intervention plan on this psychomotor component*, Timișoara Physical Education and Rehabilitation Journal, Volume 14, 2021, Issue 26;
- [247] Texeira-Costa, H., J., Arufe-Giraldez, V., Abelairas-Gomez, C., Pazos, C., *Influence of a physical education plan on psychomotor development profiles of preschool children*, Journal of Human Sport and Exercise, Vol.10, 2015, p.126-140;
- [248] Tianero, G.E., Orag, E.L., Garnad, A.G., Agpawa, I.H.P., Darskit, D.H., *The level of fitness of volleyball players*, Asian Scientific Journals, Vol. 1 (1), 2014;
- [249] Țurcanu, F., Ionescu, M., *Dezvoltarea echilibrului dinamic prin mijloace specifice jocului de volei*;
- [250] Ungureanu-Dobre, A., Bică, C., *The development of psychomotor activity of students with mental disabilities from special schools*, Gymnasium, No. 2, 2016, Vol. 17;

- [251] VAYER, P., *Une conception globale de l'éducation psychomotrice*, Education Physique et Sport, nr. 85, 1967, Paris;
- [252] Venetsanou, F., & Kambas, A., *Environmental factors affecting preschooler's motor development*, Early Childhood Education journal, 37 (4), 2010, pp. 319-32;
- [253] Venkateshan, A.G., Ramesh, P., *Impact of hand-eye coordination and shoulder strength on volleyball serving ability*, Asian Journal of Applied Research, Vol.2 (9), 2016, pp.1-5;
- [254] Vîgotosky, L., S., *Opere psihologice alese*, Ed. Didactică și Pedagogică, 1972, București;
- [255] Viscione, I., D'elia, F., Vastola, R., Sibilio M., *Psychomotor assisment in Teaching and Educational research*, Athens Journal of Education - Volume 4, Issue 2, 2017, pp. 169-178;
- [256] Visicone, E., D'Elia F., Vastola R., Sibilio M., *Psychomotor Assessment in Teaching and Educational Research*, Athens Journal of Education, Volume 4, Issue 2, 2017, pp.169-178;
- [257] Vital, C. T., *The importance of the psychomotor activity in physical education classes in early childhood education*. Monograph (postgraduate degree in Psychomotricity) – Universidade Cândido Mendes, the Master Institute, Rio de Janeiro, 2007, Rio de Janeiro;
- [258] Vlad, E., *Evaluarea în actul educațional terapeutic*, Ed. Pro Humanitate, 1999, București;
- [259] Wallon, H., *Evoluția psihologică a copilului*, Editura Pro Humanitate, 1975, București;
- [260] Wallon, H., *Psicología y educacion del nino, Una comprensión dialéctica del desarrollo y la Educación Infantil*, Visor-Mec, 1987, Madrid;
- [261] Wallon, H., *La evolucion psicologica del nino*, Ed. Psique, 1979, Buenos Aires;
- [262] Wallon., H., *La vida mental*, Ed. Critica, 1985, Barcelona;
- [263] Wilson, M., *Six Views of Embodied Cognition*, Psychonomic Bulletin & Review 9.4, 2002, 625-636;
- [264] Xisto, P.B., Benetti L.B., *A psicomotricidade: Uma ferramenta de ajuda aos professores na aprendizagem escolar*, AGO, 2012, pp. 1824-1836;
- [265] Zazzo, R., *Evoluția copilului de la doi la șase ani*, în: Debesse Maurire (trad.), *Psihologia copilului. De la naștere la adolescență*, Ed. Didactică și pedagogică, 1970, București;
- [266] Zazzo, R., Galifret-Grajon N., *Genes et formules de la lateralite*, Batterie Piaget-Head, Ed. Delachaux et Niestle, Neuchatel
- [267] Zazzo, R., *Une recherche d'equipe sur la debilite mentale*, Enfence, nr.4-5, 1960;
- [268] Zazzo, R., *Dezabilitățile mintale*, Ed. Didactică și pedagogică, 1979, București;
- [269] Ziegler, D., *Educație psihomotorie. Programă proiect pentru clasele I-IV*;
- [270] <http://p1cktest.blogspot.com/2013/06/henri-wallon.html>;
- [271] https://ro.wikipedia.org/wiki/Teoria_lui_Piaget;
- [272] <https://www.academia.edu/6398476/6-jean-piaget>;
- [273] <https://www.ispegae-oipr.com.br/us/home>;
- [274] <https://www.scribd.com/doc/180826000/Teorii-ale-dezvoltarii-Piaget-Vigotski-pdf>;
- [275] <https://www.sk.com.br/sk-piaget.html>;
- [276] <https://www.universalis.fr/>;
- [IBE – Brazilian Institute of education. Psychomotricity. Lato sensu graduate studies. 2010.: <http://www.institutoibe.com.br/arquivos/tk-50cf10f7007dc.pdf>.</http>;](http://www.institutoibe.com.br/arquivos/tk-50cf10f7007dc.pdf)