Psychomotor education and school success: which practices and with which objectives?

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Abstract

Introduction: Psychomotor education has its roots in theories and practices of child development, psychology and motor skills. It is a pedagogical approach aimed at acquiring knowledge and facilitating school learning by using the child's motor experience, in particular for the concepts of space, time and energy, by combining the development of the nervous system and educational actions. The general objective of this study was to analyse the influence of psychomotor learning and its effect on the skills of the young child.

Methods: It consisted of a review of the scientific literature on the concept of psychomotor education and its impact on the child's preschool learning.

To analyse the data, we used a reading grid to describe the importance of psychomotricity in the acquisition of skills necessary for the development of children's abilities.

Results: The analysis of several articles on the subject made it possible to describe the impact of psychomotor education on the development of pre-school learning, particularly logicomathematics, writing and reading.

Conclusion: Our study allowed us to synthesize a large number of studies in order to analyze the close relationship between psychomotor education and preschool learning.

Index Terms— *Psychomotricity, school learning, reading, writing, logicomathematics, psychomotor education.*

I. INTRODUCTION

Before defining psychomotor education, we will look at the definition of education and the definition of psychomotricity.

According to Larousse, education is the conduct of training a child or an adult.

It is the training of someone in this or that field of activity; it is the whole of intellectual, cultural and moral knowledge acquired in this field by someone or by a group.

It is the knowledge and practice of good manners, the customs of society; savoir-vivre.

Psychomotricity is a discipline that uses the body, space and time, the objective of which is to allow the person to experience his or her body and immediate environment in order to act in an adapted way. (Delièvre & Staes, 2006) [1].

Psychomotricity is a paramedical discipline that deals with psychomotor disorders. These refer to neurodevelopmental disorders that affect the subject's perceptual-motor adaptation, such as coordination acquisition disorder (CAD) or attention deficit disorder with or without hyperactivity.

Psychomotor disorders are multi-factorial in origin and combine genetic, neurobiological and psychosocial factors. They manifest themselves in particular situations and hinder adaptation mechanisms, constituting a source of suffering for the carrier and the social environment. (Lauzon, 2001) [2].

The first formulation of psychomotor education belongs to E. Guilmain (1976) [3], who, strongly influenced by H. Wallon, refined the motor and psychomotor tests, corrected Ozeretsky's motor examination and managed to define types in relation to character and temperament (Capol and Walther,1986). [4]

Psychomotor education is concerned with the child's bodily activity as a source of fulfilment, as a means of acting on the environment and as a means of relating to others.

It aims at the overall development of the child through bodily activity, and has as its goal the development of bodily autonomy.

In the literature on psychomotricity, we talk about the global development of the person through movement, and we recognise that there is an interrelation between the cognitive, sensorimotor and socio-affective domains. (Vayer, 1976) [5].

According to Vayer, it is a way of approaching the child globally, it is a state of mind [1986]. It is therefore the

teacher's educational conception that is or is not psychomotor. When he abandoned the term psychomotor because it was a victim of its success and reduced to designating certain specific activities, it was again because of this concern for a global conception of the child apprehended in its functional unity. Lagrange (1974) [7] , who was more interested in simplifying and synthesising than in introducing new ideas, states that psychomotor education is an attitude of mind towards the problems of education in its global aspect. For De Lièvre and Staes, it is also an all-encompassing view that perceives the constant interactions between motor skills and the psyche and between the individual and the environment, but it is also a technique [20068]. This all- encompassing view is also expressed by Donnet, for whom psychomotor education recognises the child globally in an encounter between the body, movement and their affective significance (Donnet,1973) [9].

We can see that this notion of wholeness is used to describe the child, the way in which he or she is viewed, or education. If the child is considered as a unit, in its globality, it is certain that psychomotor education cannot be an isolated teaching discipline, juxtaposed with others that are not psychomotor. It necessarily concerns all education. It is a global, affective, practical and intellectual training (Lagrange, 1974) [10] and it is completely inconceivable that an education that is psychomotor and one that is not (Vayer, 1978) should exist side by side [11].

According to Paoletti (1974) [12], the fundamental aims of psychomotor education are to apprehend reality, to develop motor skills and personality and to increase autonomy.

In the educational system, play is a tool for good learning, exponentially adding to the learning process, as well as influencing social relationships. Paoletti (1999) argues that the interaction of children's motor skills, through touch, sight and hearing, is essential for their integral development [13].

So how does psychomotor education influence the child's preschool learning?

II. MATERIALS AND METHODS

Our study consisted of a review of the scientific literature.

To analyse this review, our selection criteria were: articles, reviews, reports, memoirs, oral presentations, conferences, web pages...); published on the subject of psychomotor education in English or French; whose title or keywords contained at least one of the terms of the research or, failing that, strongly evoked psychomotor education.

Areas" that did not correspond to our research area were excluded.

III. RESULTS

To analyse the data, we used a grid to describe the impact of psychomotor education on the young child's skills.

Each article was read and analysed using a grid developed specifically for the study and corresponding to each of the objectives.

The analysis of articles 35 on the subject has made it possible to identify the relationships between reading, writing, logicomathematics, spatio-temporal structuring, laterality, rhythm and perception of the body, which will have an impact on the preschool life of the young child.

A. Learning to write:

Writing is a long process of learning that results from many skills.

According to Rodrigo and Merege (2012), children spend several years experimenting and exercising their graphomotor production skills through scribbling, drawing and

This is a "pseudo-writing" process, before handwriting can be acquired [14].

The child goes through three stages of learning:

-Stage 1: from scribbling to the birth of the first shapes

-Stage 2: Becomes aware of the shape

-Stage 3: He masters his route

The child's ability to create and control the movements necessary to make a trace is linked to the dynamic adjustment of his posture and his different support points. Indeed, the stability of his position will gradually allow him to free his writing arm and his hand. Rigal (2003) studies the movement involved in the graphic act, its form and content, in order to highlight the motor and perceptual origins that enable drawing [15]. This movement is therefore possible thanks to multiple requirements, including the coordination of the multiple joints of the hand, wrist, elbow and shoulder, which will enable the formation of letters, numbers and symbols. In addition, in order to hold a pen and guide it across the page, sensory signals from the skin, joints and muscles of the hand allow for the necessary adaptation to the friction of the pencil on the paper. Finally, writing activities are improved over time, automated and stored in memory as a motor programme. (Huguet, 2017) [16].

a. Writing and the perception of the body:

It is interesting to rely on the perception of the body in the sense that the child must have a good awareness of his or her body schema to understand the spatial organisation of writing. It is important that they know what the joints involved in the act of writing are and how they fit together. At the beginning of the learning process, the whole body is involved in the act of writing, and then the child will use his hand and fingers electively. In addition to the acquisition of the body schema, the child must distinguish between left and right, which will later define his or her lateralization (around the age of 7), in order to be able to approach writing correctly. (Georges, 1976) [17].

The development of the body schema is therefore essential to acquire the capacity for abstraction, which is "the intellectual operation that consists of isolating by thought one of the characteristics of something and considering it independently of the other characteristics of the object". (Batie, 2016) [18]. This operation is necessary for the appreciation of distances, directions as well as shapes and therefore for graphic realisation.

b. Writing and spatial structuring:

The acquisition of spatial organisation must be solid so that the child can construct topological relationships and, more globally, a perceptual space in order to be able to grasp the meaning of letters, their shapes and to have internalised the trajectories and the different writing areas. Knowledge of the orientation of letters is crucial and movement informs this spatial character.

c. Writing and laterality:

Fixed and operative laterality also builds a stake in access to writing. Experience enables lateral dominance to be fixed and stabilised and helps the child to find the hand with which he or she is able to write most effectively. Moreover, tactile sensitivity must also be solicited before writing in order to leave impressions of perceptive activities and improve the holding of the writing tool.

These multiple parameters are necessary and they support the idea that a body in movement as a whole is a support for learning to write. Indeed, the movements of writing participate not only in the representation and memorization of letters and therefore also in their visual recognition. (Dailly and Moscato, 1984) [19].

d. Writing and tone/Posture:

Tone is largely responsible for posture. It gives a certain body resistance which allows postural straightening and conditions the availability of the different parts of the body involved in the graphomotor action. According to Bullinger (1988) [20], the correct development of the graphomotor action requires postural and tonic support points. The overall body posture and tone of the child involved in a graphomotor task change with age. Ajuriaguerra, Auzias and Denner (1971) [21], observed a development towards a progressive straightening of the head and trunk, and a decrease in the support of the trunk, forearm and wrist on the table, in children between 5 and 14 years of age. In addition, they observe a gradual increase in the importance of movements performed by distal joints compared to more proximal movements. Bullinger refers to this in terms of a gradual shift from an initially global motor investment to a more local investment that ultimately mobilises only the relevant body segments.

According to Ajuriaguerra (1951) [22], a writing posture must necessarily be asymmetrical. In fact, the weight of the body must be shifted at the level of the upper body onto the dominated side at the level of the forearm, in order to free the dominant writing limb. There is also a consensus on the distance to be left between the sheet and the face of the scribe, which is around 20-30 cm, to allow the best possible visibility, without constraint.

B. Learning to read:

Reading is the perception of graphic symbols with a significant value. As in ordinary perception, lexical perception goes through phases of inability to fix or attach to the object, which here is the letter. The field of graphic perception is not a field of free choice. It is subject to rules of direction, seriation and division in a narrowed space. As a result, the general rules of object perception and exploration take on a special character here, and the general rules of oral ordering interfere with these perceptual phenomena.

Learning to read is part of the general framework of all learning. It implies complacency in the activity and effort in the work. This learning takes on affective values of play or donation. (Galifret- Granjon1994) [23].

a. Reading and rhythm:

In reading, as it is a movement in space, there is a rhythmicity, a meaning, a particular orientation to the perceptual-oculo-motor process. But as an expressive language (reading is very often the comprehension of a language verbalised by the reader), reading, like oral expression, takes place in a "rhythmic-melodic phrasal mould" (Piaget and Inhelder, 1948).24

b. Reading and laterality:

Since reading is a visuomotor habit, the acquisition of the corresponding dynamic schemas is based on the prior organisation of the body schema and is directly dependent on it. (Bergeron,1991). [25]

Lateralization for both reading and writing must already be acquired by the child, whose development is proceeding normally. The educator should even encourage its consolidation.

The child's learning disabilities and a problem with lateral hand-eye dominance suggest poorly defined manuality and difficult academic learning. The determination of manual preference at the brain level is thought to be influenced by the concentration of the language, reading and writing control centres in one hemisphere.

Thus, difficulties in manual dominance and a laterality disorder may affect reading performance. These difficulties in identifying right from left would result in errors of inversion or right/left confusion, hence the importance of a good body map.

A bilateral and symmetrical brain would register the same shapes with opposite right-left orientations in each hemisphere. Like laterality, reading develops and improves differently from one young person to another. Not all children who have difficulty with laterality have problems with reading.

c. Reading and spatial structuring:

The organisation of space, the activity of spatial structuring, evolves with age. With age it becomes more precise and capable of encompassing more elements. Initially its development seems to be confused with the development of intelligence itself.

But Ducret (1984) [26] shows well, in his book on the representation of space in children, that very early on, the construction of spatial relations is pursued simultaneously on two distinct levels, the perceptual-motor level, and the representational level.

Learning to read will require the child to value orientations and spatial relationships, and to differentiate very fine structures.

If we look at the visual behaviour of the young child reader, we can see that it is significantly different from that of the adult or experienced reader: eye movements are more frequent and more disordered, especially for line breaks, which often require numerous saccades of readjustment. Moreover, young children do not only use their eye mobility to read, but also, as in any exploration of space, joint movements of the head, hands and eyes.

For Bullinger this aspect "is fundamental: hand and head movements over the text provide a set of proporioceptive redundancies that allow eye mobility to be spatially organised and to make sense", and Bigras Bouchard, note that the constraints of immobilising the head or suppressing the tracking of text with the finger can disrupt, rather than improve, reading. (1997)[27].

C. The influence of psychomotor development components on logicomathematical performance in young children:

Logic can be defined as the science of reasoning. It is useful as a tool for thinking about operations, geometry, problems and all branches of mathematics. Rigal (1976) [28], considers that "the role of logic is not only to found mathematics, and even less to duplicate it, it is to bring out all the elementary structures, in particular those which precede mathematisation".

The child learns to study the abstract properties of objects (numbers, figures) as well as to organise and structure his or her space (classification, seriation) in order to access the logic required to carry out mathematical operations. Then, after training, he/she is able to use his/her logical hypothetico-deductive thinking to good effect.

Perceptual-motor development is a key factor in a young child's ability to learn.

In education, we speak of psychomotor awakening activities that include visual, auditory, proprioceptive, tactile and kinaesthetic perceptions and their interaction. Piaget (7197) [29], considers that visual perception exercises are essential for learning mathematics, as they allow the analysis of various components and their relationships in order to avoid confusion between certain numbers, such as "6" and "9".

Furthermore, he considers that the acquisition of spatio-temporal perception also plays a prominent role in logicomathematical learning. According to Mélanie (2017) [30], this acquisition requires orientation in space "an appreciation of distances and intervals, a perception of the third dimension and a space-time relationship", and it proposes a certain awareness of the notion of grouping as well as coordination, mental representation and

memorization in this same awareness.

However, the influence of the different components of psychomotor development (laterality, right-left orientation, spatial and temporal organisation, body schema) on the learning of logicomathematics has been little studied from an experimental perspective. Only the relationship between digital agnosia and mathematical performance has received special attention. The studies took into account the Gerstmann syndrome which showed that digital agnosia was translated into acalculia, which underlines the importance of finger knowledge in the acquisition of numeration. The work of Cécile (1971) [31], carried out with children aged 3 to 5 years, showed that the acquisition and conservation of numbers is first based on the fingers before being generalised to objects. In mentally retarded adults, a relationship has been established between digital gnosticism and mathematical results: subjects who distinguish their fingers better also obtain higher scores in mathematics.

Altman (1967), reported similar results with university students using a five-finger drawing test [32]. For Trouil et al (2008), there would be an independence between digital knowledge, right-left discrimination and mathematical results [33].

This is based on the study of these factors in normal children aged 8 to 12 and in children aged 13 to 20 with learning difficulties in mathematics.

It can be noted that 9-year-olds generally already have excellent finger knowledge (Sprenger- Charolles, 1986) [34]and it is true that children use their fingers at the beginning of learning to count, from the age of 9 onwards this means becomes accessory. Furthermore, the lack of variation in the results of the finger knowledge test could not lead to other conclusions. A study by Lyle (1969) [35] with children aged 5 to 12 years on the same concerns led him to the conclusion that good finger knowledge does not necessarily translate into higher mathematics scores.

CONCLUSION

In the early years, the human being systematises knowledge by seeking new experiences. Psychomotor education is an instrument to support this process, as it develops motor, affective and psychosocial aspects. Through playful games, children discover their own bodies.

Psychomotor education foresees that the child can overcome various obstacles in the social environment. Joking awakens the desire for discovery and exploration, as a direct way for the child to express his or her emotions.

It can be said that the practice of psychomotor education in preschools appears to be necessary for the overall development of the child, since it allows for the improvement of certain dimensions of gross motor skills and meets the needs of the practitioners.

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