

IMPROVING DRAW-A-PERSON TEST RESULTS BY DEVELOPING THE BODY SCHEMA DURING PHYSICAL EDUCATION AND SPORT LESSONS FOR STUDENTS AGED 6-7 YEARS

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Received 2022 July 18; Revised 2022 August 29; Accepted 2022 August 29;
Available online 2022 November 20; Available print 2022 December 20.

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ABSTRACT. Introduction: The physical education lesson in primary school can make an essential contribution to the psychomotor development of students. **The purpose** of this study is to highlight the progress made in the development of the Body Schema following the application of a specific intervention plan, progress verifiable in graphic form. **Material and method:** The target group consisted of 10 pupils (5 boys and 5 girls) aged between 6 and 7 years, pupils in the preparatory class who scored low and medium on the initial test. The experiment lasted 10 weeks, with 2 physical education lessons per week. The intervention plan included exercises and motor tracks focused on the development of the body schema. The “draw- a- person” test was applied. The scores were calculated for the Maturity Scale consisting of: Head Scale, Body Schema Scale and Clothing Scale. These scores underwent a qualitative interpretation of the differences between the initial and the final test. **Results:** There are visible differences of the “draw- a - person” drawings in the first and final tests of the students included in the study. The Body Schema was better integrated in the Maturity Scale, which means that the intervention program was efficient. **Conclusions:** Physical education and sports lessons with topics for developing the body schema were effective in recording the progress of this component.

Key words: psychomotor skills, body schema, maturity scale, exercises, drawing.

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REZUMAT. *Îmbunătățirea rezultatelor testului „omulețul” prin dezvoltarea schemei corporale în timpul lecțiilor de educație fizică și sport pentru elevii cu vârste 6-7 ani.* **Introducere:** Lecția de educației fizică la clasele primare poate avea o contribuție esențială în dezvoltarea psihomotrică a elevilor. **Scopul** acestui studiu este de a evidenția progresul înregistrat în dezvoltarea Schemei Corporale în urma aplicării unui plan de intervenție specific, progres verificabil sub formă grafică. **Material și metoda:** Grupul țintă este format din 10 elevi (5 băieți și 5 fete) cu vârsta cuprinsă între 6-7 ani, elevi în clasa pregătitoare care au înregistrat scoruri mici și medii la testarea inițială. Experimentul s-a desfășurat pe parcursul a 10 săptămâni, cu 2 lecții de educație fizică pe săptămână. Planul de intervenție a cuprins exerciții și parcurhuri motrice axate pe dezvoltarea schemei corporale. S-a aplicat testul „omulețul”. S-au calculat scoruri pentru Scala Maturității alcătuită din: Scala Capului, Scala Schemei Corporale și Scala Îmbrăcăminte. Aceste scoruri au fost argumentate printr-o interpretare calitativă a diferențelor înregistrate între testarea inițială și cea finală. **Rezultate:** Intre desenele efectuate la testarea inițială și cea finală se observă diferențe vizibile în cadrul desenului „omulețul” în cazul elevilor cuprinși în studiu. Schema Corporala este mai bine integrată în Scala Maturității, programul de intervenție fiind eficient. **Concluzii:** Lecțiile de educație fizică și sport cu teme de dezvoltare a schemei corporale sunt eficiente în înregistrarea progreselor acestei componente.

Cuvinte cheie: *psihomotricitate, schema corporală, scala maturității, exerciții, desen.*

Introduction

Body schema is a complex phenomenon that manifests itself both kinesthetically and kinetically (Jacob and Jeannerod, 2005). From a kinesthetic point of view, the body schema allows both the awareness of one's own body through which an individual differs from someone else and the awareness of one's own body in motion. From a kinetic point of view, the body schema allows the body to move consciously and unconsciously (Legrand, 2006; Tsakiris & Haggard, 2006) and the feeling of agency and being the subject of one's own actions (Rossetti et al., 2005; Tsakiris & Haggard, 2006; Tsakiris, SchultzBosbach, & Gallagher, 2007; De Vignemont, 2011). Furthermore, the body schema has a primary role in the child's evolution. It influences both the growth process and the development process of the individual. If the body schema is properly integrated, the individual will develop harmoniously, but if there are disorders of the body schema, they can negatively influence the growth and development of the child. The body schema is “an element that underlies the construction of the individual's personality,

being vital to this process and contributing to the increase of self-esteem” (Abalasei, B., Popescu, L., 2017, 9-10). Body schema also influences the motor development. It is a stage in which body movements and positions become known through contact with various objects in the environment. As a result, the body schema is considered the image that each person has about his own body in the relationship between body segments and the environment (Teixeira et al., 2015).

Physical education classes in primary school are important in the process of psychomotor development of pupils. Thus, the introduction in school curriculum of some elements of psychomotor skills will contribute to the cognitive development of pupils. There are numerous studies that analyze these aspects (Hillmam, Erickson & Kramer, 2008; Mas, Jiménez & Riera, 2018; Piek, Dawson, Smith & Gasson, 2008; Camargos & Maciel, 2016; Mas & Can, 2016). These studies reveal that the specific means of physical education contribute to the development of basic cognitive psychic processes: attention, perception, memory, thinking and imagination, developing maturity.

The body schema is the basic component of psychomotor behaviors, along with laterality and space-temporal orientation (Albu & al., 2006). The poor development of the pupil’s body schema will also influence the development of laterality or space-temporal orientation. This process will have effects on the whole learning process. So, the role of physical education at a young age exceeds the limits of the physical field and intertwines in the cognitive one, with direct effects on school learning.

Graphics evolve in children depending on the stages of development at which they are. Drawing, also called “wordless language” (Lefebure, 2006) is one of the first forms of expression of children and appears very early in the process of their development. Drawing provides a way to get to know children in terms of their personality, their level of development, the disorders they may suffer from or their feelings (Luquet, 1927). At the age of 6-7, children are able to synthesize all the elements that characterize an object. They will try in a drawing to express everything they know about the object so that the person to whom they show it will be able to recognize that object (Luquet, 1927). Characters represent over 75% of children’s drawings (Baldy, 2010). In the evolution of drawing between the first tests applied to children in the early twentieth century (Luquet, 1927) and today, there are no differences (Baldy, 2010). The drawing of the human body by children allows, among other things, the analysis of the evolution of the development of the body schema or its integration disorders.

The purpose of the research is to analyze the evolution of the integration of the body schema in the maturity scale of the students participating in the study after the application of the intervention plan to the physical education and sports lesson.

Materials and Methods

Participants

The study was part of a larger research, which involved 150 pupils, divided into 2 groups, the experiment group (76 pupils: 32 boys and 34 girls) and the control group (74 pupils: 31 boys and 33 girls), all aged between 6 and 7 years. These were all pupils in the preparatory class of the same school. 10 pupils (5 girls and 5 boys) that had low or average results in the initial testing were chosen from the experiment group.

The pupils in the experiment group followed a special program that lasted 10 weeks. Physical education in primary education is allocated a number of 2 lessons per week. This program consisted of introducing specific themes for the development of the body schema. These exercises were performed either separately or in motor tracks.

Measurement

In order to measure the level of development of the pupils' body schema, they underwent the Draw-a-Person Test (Goodenough, 1957; Royer, 1977) both before and after the application of the intervention plan. This test was applied collectively, in class. Each pupil received a set of 7 colored pencils (blue, green, red, yellow, purple, brown, black), an eraser and a sheet of A4 paper, placed vertically. The pupils were given the following guideline: "On this sheet of paper you will draw a little man, as beautiful as you can, if you want you can also color it." Students were left free to choose the location of the drawing on the page, the size of the drawing, the change of the position of the sheet, the sex of the drawn character, the chosen colors or the refusal to choose the colors. They were not given any help, criticism, appreciations or suggestions. The undecided students were encouraged with the formulas: "Very well, keep going" and those who were asked questions received the answer: "Do as you wish / as you please".

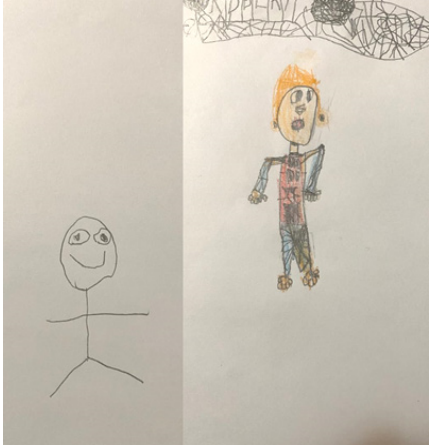
"Draw-a-Person" Test



It contains 51 items according to which the drawing of man was assessed (Goodenough, 1957). The total score obtained served as a basis for the establishment of a Maturity Scale. In order to establish this Maturity Scale, in addition to the 51 items, the evolutionary signs were also considered, bringing the total to 70 items (Royer, 1977). Three scales were analyzed: Body Schema Scale (it includes 33 items: torso, legs, arms, etc.), Head Scale (it includes 23 items: head, eyes, mouth, nose, etc.) and Clothing Scale (it includes 14 items: shoes, belt, etc.). Color were also added. Each item present was rated with 1 point.

Results


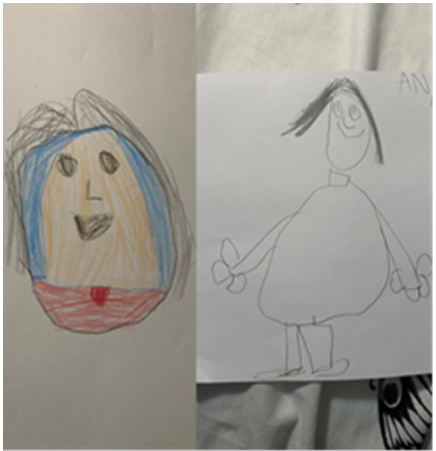
The students' drawings from both the initial and the final tests are presented below, as well as the scores registered at the Maturity Scale and at the 3 scales that compose it (Head Scale, Body Schema Scale, Clothing Scale) and the qualitative analysis of these results.


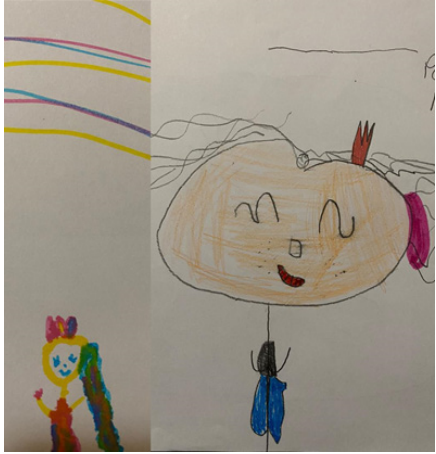
Table 1. "Draw-a-Person" Test' results

No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
1		F/6 T=16/52 SC=3/16 SSC= 13/26 SI=0/10	<p>In the graphic representation there was a better awareness of the body schema, from a visual point of view but also kinesthetically. From the point of view of the 3 scales we noticed a significant improvement through the details added to each scale.</p> <p>Head Scale: the appearance of the hair, the presence of the nose, the realistic color of the face, of the mouth of the nose.</p> <p>Body Schema Scale: we noticed good proportions of the head, the appearance of the shoulders, palms, toes, the presence of the feet and their correct position, the outline of the drawing in black.</p> <p>Clothing Scale: we noticed the presence of clothes.</p> <p>Color Scale: the appearance of colors: yellow, red, blue.</p> <p>Added details: various added elements can be seen on the clothes. At the top of the drawing there is a sun and various elements that can be found on clothes.</p>


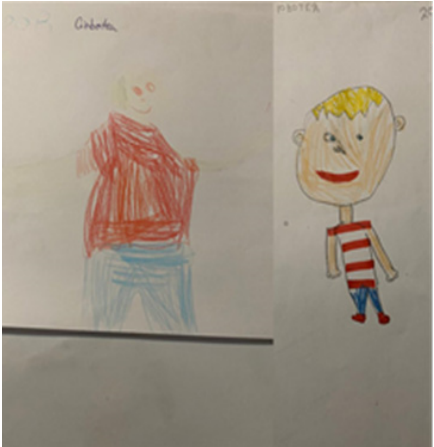
No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
2		F/6 21/36 SC=10/16 SSC= 11/16 SI=0/5	Comparing the presence of the items of the 3 scales we noticed a significant improvement in the drawing from the final test, with the details added to each scale. Head Scale: showed the appearance of hair, the presence of the nose, the realistic color of the face, the mouth, and the nose. Body Schema Scale: showed good proportions of the head, the appearance of the palms, toes, the presence of the feet and their correct position, the outline of the drawing in black. Clothing Scale: we noticed the presence of clothes. Color Scale: showed the colors red, brown, pink, green and the background of the blue drawing compared to the yellow color from the initial testing. Added details: note the presence of red colored earrings but also a crown on the head.
3		F/6 14/41 SC=6/11 SSC=6/25 SI=2/5	Head Scale: we noticed the appearance of the hair, the presence of the nose, the realistic color of the face, of the mouth of the nose. Body Schema Scale: good proportions of the head, the appearance of the palms, toes, the presence of the feet and their correct position, the outline of the drawing in black. Clothing Scale: we noticed the presence of clothes. Color Scale: the appearance of red, purple, yellow, gray. Added elements: a colored crown and the clothes had some colored elements.

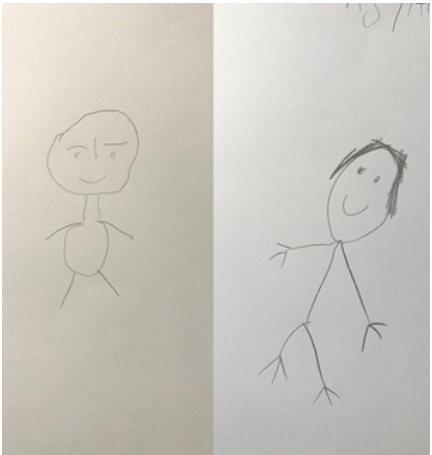
IMPROVING DRAW-A-PERSON TEST RESULTS BY DEVELOPING THE BODY SCHEMA DURING PHYSICAL EDUCATION AND SPORT LESSONS FOR STUDENTS AGED 6-7 YEARS

No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
4		<p>F/6 15/38 SC=3/9 SSC=12/25 SI=0/5</p>	<p>Head Scale: we noticed the presence of the nose, eyes, hair, mouth, the realistic color of the face, the mouth of the nose.</p> <p>Body Schema Scale: the little man was identifiable, good proportions of the head, the presence of the neck, the presence of the torso, the appearance of the shoulders, arms and legs drawn with two lines, the presence of palms, toes, the presence of oversized feet and their correct position, contour drawing in black.</p> <p>Clothing Scale: we noticed the presence of clothes.</p> <p>Color Scale: showed the appearance of green, brown and black compared to the yellow in the first drawing.</p> <p>The presence of grass can be seen at the top and bottom of the leaf.</p>
5		<p>F/7 24/34 SC= 13/16 SSC= 11/14 SI= 0/4</p>	<p>By analyzing the items of the 3 scales we noticed a significant improvement through the added details. Improvements appeared starting from the Body Schema Scale, the little man being identifiable, good proportions of the head, the presence of the neck, the presence of the torso, the appearance of the shoulders, arms and legs drawn with two lines, palms, toes, the presence of the feet and their correct position. black. At the Clothing Scale and the Head Scale the results were not remarkable. At the Color Scale, at the initial test there were four colors (gray, blue, orange and red) compared to gray as the only color present in the drawing from the final test.</p>

No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
6		M/6 9/29 SC=3/10 SSC= 6/16 SI= 0/3	Head Scale: the presence of the nose, the realistic color of the face, the mouth of the nose. Body Schema Scale: the little human was identifiable, good proportions of the head, the presence of the trunk, the appearance of the shoulders, arms and legs drawn with two lines, palms, toes, the presence of the feet and their correct position, the outline of the drawing in black. Clothing Scale: we noticed the presence of clothes. Color Scale: orange and purple were added The details include the addition of a bag and shoes.
7		M/6 27/39 SC=8/11 SSC=13/17 SI= 6/11	The graphic representation highlighted a better awareness of the Body Schema from a visual point of view but also kinesthetically. By analyzing the human perception according to space, we noticed a better layout on the page in drawing 2, but the head is oversized. The presence of clothes could be seen on the Clothing Scale. On the Color Scale, more colors were observed at the initial testing (yellow, green, red, pink, purple) than at the final testing (blue, pink and orange). As details, the presence of a crown was observed, proportioned in the first drawing and disproportionate in relation to the size of the head in the second drawing.

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No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
8		<p>M/7 26/44 SC=5/12 SSC=19/28 SI=0/3</p>	<p>Body Schema Scale: good proportions of the head, the presence of the neck, the appearance of the shoulders, palms, toes, the presence of the feet and their correct position, the outline of the drawing in black. Clothing Scale: we noticed the presence of shorts and a blouse. Head Scale: we noticed a regression, at the final test the nose, eyebrows and ears are missing, elements that appeared in the initial test. No progress is made on the Color Scale. As added details, the presence of a butterfly on the initial test and of the glasses on the final test was observed.</p>
9		<p>M/7 19/61 SC=6/20 SSC= 10/30 SI=3/11</p>	<p>Head Scale: we noticed the appearance of hair, the presence of the nose, the realistic color of the face, the mouth of the nose, the palms. The head was oversized compared to the rest of the body. Body Schema Scale: good proportions of the head, the appearance of the shoulders, palms, toes, arms and legs drawn with two lines, the presence of the feet and their correct position, the contour of the drawing in black. Clothing Scale: we notice the presence of clothes. Color Scale: it went from 2 colors (red and blue) to four colors (red, yellow, orange and blue). Added details: the shirt in white-red lines.</p>

No.	"Draw-a-Person" Drawing Initial Test/ Final Test	Gender/Age Score TI/TF	Analysis of Head Scale/ Body Schema Scale/ Clothing Scale/ Added Details
10.		M/7 22/26 SC=7/6 SSC=15/20 SI=0/0	Body Schema Scale: good proportions of the head, the appearance of the shoulders, palms, toes, the presence of the feet, the outline of the drawing in black. Head Scale: we noticed an uncertainty, on the final test, the nose and the eyebrows are missing elements that appeared in the initial test, but the hair that is missing at the initial test appears. Head Scale: uncertainty Clothing Scale: no representative items that show an uncertainty about the detailed knowledge of the graphic representation. No progress is observed on the Color Scale.

Discussions

The subjects targeted in this study had a visible progress in the graphic representation, given the fact that the intervention was on the visual and kinesthetic side. This highlighted a better awareness of the body schema. The appearance of new elements (shoulders, neck, fingers, etc.), the proportion of adequate body parts and the central positioning on the sheet showed signs of incorporating the body schema in the self-representation of these pupils.

The type of character drawn by the children also varied. The guideline received at the beginning of the test was to draw a little human. Studies showed that in children's drawings there were characters of the same gender with them (Baldy, 2010). It was found that the boys drew a male character while only 3 girls drew a character that can be interpreted as female. The remaining 2 girls drew a male character.

Regarding the Color Scale, some studies showed that the most colorful detail in the drawing was actually the most important thing for the child (Thoulon-Page, 2002). Regarding the dominant colors, it was statistically found that for girls it was blue and for boys it was red (Royer, 1977). In the case of our study, the colors were diverse and no conclusion could be drawn on a dominant

color or by gender. However, one could see the evolution of the appearance of colors in the drawings, in 7 of the 10 situations analyzed from the initial testing to the final one. In these drawings, the contour of the body is made first with the pencil and the colors are added later. The chosen colors were related to personal choices and not to the realism of the drawing, something specific to the age of 5-7 years. For children who did not color their drawing, this could be a sign of inhibition, the refusal to express their feelings or anxiety (Toulon-Page, 2002). Each drawing was colored with a number of colors that ranged from 3 to 5, which was considered normal for this age. The use of all 7 colors was an element that had to be considered as in the case of non-colored drawings (Royer, 1977).

Conclusions

By analyzing the 10 drawings, a considerable improvement of the human drawing could be observed after the application of the intervention plan. The 10 students (5 girls and 5 boys) chosen for this study were the ones who recorded the lowest scores in the initial test on the Maturity Scale. The present analysis was a qualitative one, in which the 3 component scales of the Maturity Scale were analyzed, namely the Head Scale, the Body Schema Scale and the Clothing Scale. The Color Scale is incorporated in each of the 3 scales mentioned. Even if the scores were calculated for each student, we considered it important to show through this study the evolution of the drawing of the little human in graphical form rather than through a quantitative analysis. Each scale evolved.

Thus, in the initial testing, the Head Scale generally recorded the presence of the eyes, nose and mouth. After applying the intervention plan, there were new added elements, such as: hair, eyelashes, eyebrows, teeth, ears. If in the initial test, the head was just a circle marked with different lines and dots, in the final test the little human's head shows a person with a contoured identity.

The Body Schema Scale was the most integrated in the drawing. Its evolution was observed by the appearance in the drawing of different parts of the body (shoulders, contoured upper and lower limbs, fingers, toes, etc.). In some situations, there was an oversizing of some parts of the body (head, legs).

The greatest progress was observed in the Clothing Scale. If in the initial test the little human was represented by lines that defined the torso or the limbs, in the final test the appearance of the clothes could be observed (with one exception): pants, long-sleeved blouse, skirt, dress. The Color Scale also registered progress, from the gray pencil drawing to the use of colors at both the Clothing Scale and the Head Scale.

In conclusion, the little human test was a simple and useful tool to use even for physical education and sports teachers in primary school. By using it they could understand the stage of development that the pupil was at.

REFERENCES

- Abalășei, B., Popescu, L. (2017). Body scheme-fundamental component of growth and development, *Gymnasium*, Bacău, 17 (2), 2-10.
- Albu, C., Albu, A., Vlad, T. L. & Iacob, I. (2006). *Psihomotricitatea*, Editura Institutului European.
- Baldy, R. (2010). *Dessine-moi un bonhomme – Dessins d'enfants et développement cognitif*, Paris: In Press.
- Camargos, E.K., de & Maciel, R.M. (2016). The importance of psychomotricity in children education, *Multidisciplinary Core scientific journal of knowledge*, 1 (9), 254-275.
- De Vignemont, F. (2011). A self for the body. *Metaphilosophy*, 42 (3), 230-247.
- Goodenough, F. (1957). *L'intelligence d'après le dessin : le test du bonhomme*, Presses Universitaires de France.
- Hillmam, Ch. H., Erickson, K.I., & Kramer, A.F. (2008). Be smart, exercise your heart: Exercise effects on brain and cognition, *Nature*, 9, 58-65.
- Jacob, P. & Jeannerod, M. (2005). The motor theory of social cognition: a critique. *Trends in Cognitive Sciences*, Elsevier, 9 (1), 21-5.
- Lefebure, F. (2006). *Le dessin de l'enfant: le langage sans parole*, Paris: L'Harmattan
- Legrand, D. (2006). The Bodily Self: The Sensori-Motor Roots of Pre-Reflective Self-Consciousness, *Phenom Cogn Sci* 5, 89-118.
- Luquet, G-H. (1927). *Le dessin enfantin*, Paris : F. Alcan.
- Mas, M.T. & Can, J.C. (2016). Psychomotricity improve cognitive abilities in infants?, *Revista de Psicologia, Ciències de l'Educació i de l'Esport*, 34 (1), 65-70.
- Mas, M., Jiménez, L., & Riera, C. (2018). Systematization of the psychomotor activity and cognitive development, *Psicología Educativa*, 24, 38-41.
- Piek, J.P., Dawson, L., Smith, L.M., & Gasson, N. (2008). The role of early fine and gross motor development on later motor and cognitive ability, *Human Movement Science*, 27, 668-681.
- Rossetti, Y., Rode, G., Farne, A., & Rossetti, A. (2005). Implicit body representations in action. In: H. Preester, V. Knockaert (ed.), *Body Image and Body Schema: Interdisciplinary perspectives on the body* (pp. 111-125). Amsterdam/ Philadelphia: John Benjamins Publishing Company
- Royer J. (1977). *La personnalité de l'enfant à travers le dessin du bonhomme*, Bruxelles: Editest.
- Teixeira, Hélder J. et al. (2015). Influence of a physical education plan on psychomotor development profiles of preschool children, *Journal of Human Sport and Exercise*, 10 (1), 126-140.
- Tsakiris, M. & Haggard, P. (2005). Experimenting with the acting self, *Cognitive Neuropsychology*, 22 (3/4), 387-407.
- Tsakiris, M., & Haggard, P. (2006). Having a body versus moving your body: How agency structures body-ownership, *Consciousness and Cognition*, 15 (2), 423-432.
- Tsakiris, M., Schutz-Bosbach, S., & Gallagher, S. (2007). On agency and body-ownership: Phenomenological and neurocognitive reflections, *Consciousness and Cognition*, 16, 645-660.
- Thoulon-Page, C. (2002). *La rééducation de l'écriture de l'enfant: pratique de la graphothérapie*, Paris: Masson.
- Witt-Mitchell, A. (1998). Body scheme theory, *Physical & Occupational Therapy in Pediatrics*, 17 (4), 5-23.