

A STUDY FROM A GEOGRAPHICAL AND PSYCHOLOGICAL PERSPECTIVE ON PRESCHOOLERS' REPRESENTATION OF TREES AS ENVIRONMENTAL ENTITIES

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ABSTRACT

The present paper deals with the analysis of 42 drawings on the topic "The tree". The drawings were created by 21 preschool children from at the Day-Care Centre in Dej, county of Cluj, Romania. The research was carried out over the school year 2013-2014. We mapped and analyzed the way children in the 4-5, 5-6, 6-7 age groups drew trees as spatial representations of their physical environment. We also analyzed children's drawings from a psychological perspective.

Keywords: *the tree test, drawing, perception, spatial representation*

INTRODUCTION

In classic psychology, representation was thought to be a schematized mental image of an object which is stored in one's memory even when the real object does not act on/ stimulate one's sense of sight organ. In cognitive psychology, representation is a mental imagery of external reality, a reflected image of an objective reality within one's subjective world, an image construed based on connections established between these two mediums. The process of building and mentally working on the symbolic or substitute images is also called representation (Zlate, 1999).

Being well aware of the fact that representation as a process and as a product has an essential role in developing children's ability to build concepts, we initiated this research project with the aim to focus on preschool children's representations relative to the environment they live in. The essential question we tried to find an answer to was: how do preschoolers come to represent environmental entities through drawing?

We should mention that, initially, we did not have in mind to approach the research also from a psychological perspective, but, as we did in-depth reading of specialist literature, a new question arose: is there any connection between the way in which children draw or shape environmental entities and their personality?

The main aim of our study was to analyze the end-products of a group of preschool children who were asked to draw trees.

The specific objectives of our study were as follows:

1) to analyze the trees drawn by children in the 4-5, 5-6 and 6-7 age groups as representations of environmental entities;

2) to analyze trees drawn by children in the 4-5, 5-6 and 6-7 age groups from a psychological perspective.

The research hypothesis was the following: if preschool children are involved in learning activities in which they systematically analyze environmental entities, they come to build high-quality representations of these.

The independent variable was the task set to preschool children (to draw a tree).

The dependent variable is the end-products created by preschoolers.

THEORETICAL BACKGROUND

The tree test is a projective personality test. The tree is a substitute for a character (Wallon et al., 2012, p. 114). Koch (1958) analyzed and interpreted 2,641 drawings created by 255 children aged 6-7 and 592 pupils in the 6-16 age range, based on the graphological input data. He identified 58 different types of lines and described 27 "primary shapes". Stora (1963) analyzed 4,832 drawings (2 drawings per child) created by children aged 4-15. He differentiated among 90 types of lines and 126 "psychological meanings". He defined a subject's personality through the medium of four drawings. Recent studies on the topic of the tree test have been carried out by Denise de Castilla (2004), Anca Rozorea and Mihaela Sterian (2000). Eva Crotti (2010, p. 153) thinks that the tree is a symbol of the self, its drawing being similar to making one's self-portrait. The tree illustrates one's character traits, an image of how someone perceives himself, his emotions, and the unique, unrepeatable personality characteristics of every single child.

In as far as the representation of tree as an environmental entity is concerned, we could not identify any studies of specialist literature relative to this topic. From the point of view of environmental geography, we should mention that there are several words closely related in meaning among which both children and adults easily confuse. These words are tree, arbour, bush/ shrub, small tree and (cultivated) fruit tree. A tree is a woody

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perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground; the branches form a crown. *Tree* is synonymous with *arbour* (as opposed to *shrub*) (DEX, 2009). *Arbour* is a generic term for any tall, strong, woody plant, bearing several branches with leaves which form a definite crown. In a limited sense, arbour can mean a fruit-bearing tree (DEX, 2009). A *fruit-bearing tree* is a generic term for any wild or cultivated fruit tree whose fruit is edible (DEX, 1998). It is a fruit-bearing "arbour" (in Romanian). The *Christmas tree* (or, in Romanian, "winter tree") is a fir-tree (or any other species of evergreen coniferous *trees*) decorated with ornaments and gifts, for Christmas and New Year holiday time celebrations (DEX, 1998). *Pome* is the fleshy edible fruit of the apple and related plants, consisting of an enlarged receptacle enclosing the ovary and seeds. The pome is the false fruit (or accessory fruit) of a fruit-bearing tree, with a leathery or stony case endocarp and a fleshy mesocarp, formed by the enlarged, modified receptacle of the flower (DEX, 1998). A *shrub* (*small tree*) is a woody plant, of relatively low height, having several stems arising from the base (root) and lacking a single trunk, without a definite crown. When much-branched and dense, it may be called a *bush* (DEX, 2009).

MATERIAL AND METHOD

Place and time of the research. In order to answer the questions which generated the research project and to test the hypotheses formulated for our investigation, preschool children were involved in a learning activity designed to enable them to create representations of environmental entities, in our case, representations of a tree. The study was run at a kindergarten in an urban area, *the Day-Care Centre* in Dej, County of Cluj, during the school year 2013-2014.

Participants. A number of 21 preschoolers were selected for our study. They were divided into three homogenous experimental groups on the basis of age (eight children aged 4-5, nine children aged 5-6, and four children aged 6-7), but heterogeneous based on gender, level of geographical knowledge, and level of cognitive development. These preschoolers met the selection criteria for the experiment established through initial research design (age, kindergarten attendance). Parental consent to the use of drawings created by children for our research purposes was obtained under the obligation of respecting children's privacy. Alina Buzgău, preschool teacher at the above-mentioned day-care centre, was responsible for the implementation and management of the learning activity, application of tests and data collecting, whereas we carried out the analysis and interpretation of preschoolers' drawings.

Procedure. Participating preschoolers were involved in an experimental activity in order to achieve the aims of the research project.

We went through several stages in doing this activity.

Stage 1. Initial testing. Each child was given an A6 blank sheet of paper. They were requested to draw a tree which they saw at home, in the park, in the day-care centre garden. They were given 10 minutes to create their drawings.

Stage 2. Formative instruction. Preschoolers were involved in a class activity on the topic "The Tree" for 10 minutes.

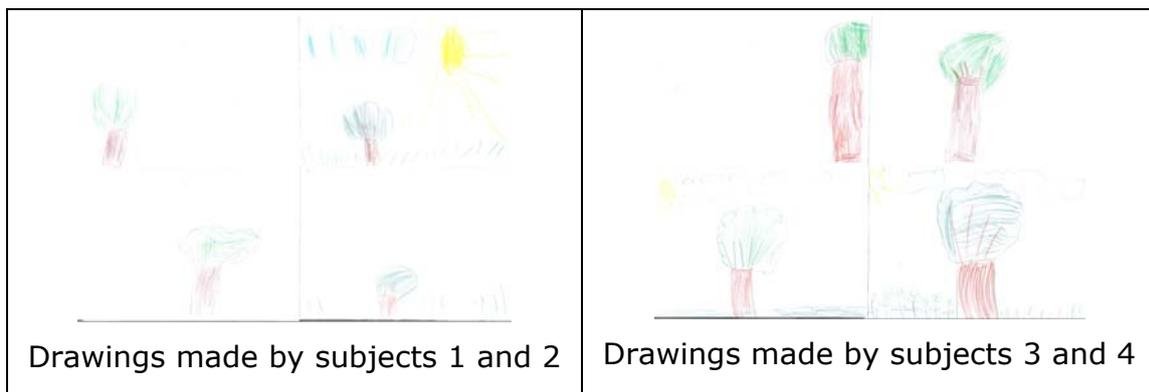
Stage 3. Final testing. Each child was given an A6 drawing sheet and asked to draw a tree. The time set for the activity was 10 minutes.

Research content. The material subject to research analysis was presented by the 42 drawings created by the preschoolers as a result of the instructional activity on the topic "The tree", used for the experiment.

Research methods. The methodology system used in developing our research study included the psycho-pedagogical experiment as the main investigative method. To collect data, we employed systematic observation, collecting drawings created by participants, individual and group interviewing. In order to analyze the drawings created by children, we used the method of content analysis, enumerative analysis and subjective analysis (Băban, 2002). We analyzed the drawings as spatial representations of the tree also from a psychological perspective.

RESULTS

In Figure 1, the drawings created by children aged 4-5. For each participating child, the drawing created in the initial test is the one placed on the left, whereas the drawing created in the final test is the one on the right side. The drawings were made using coloured pencils.



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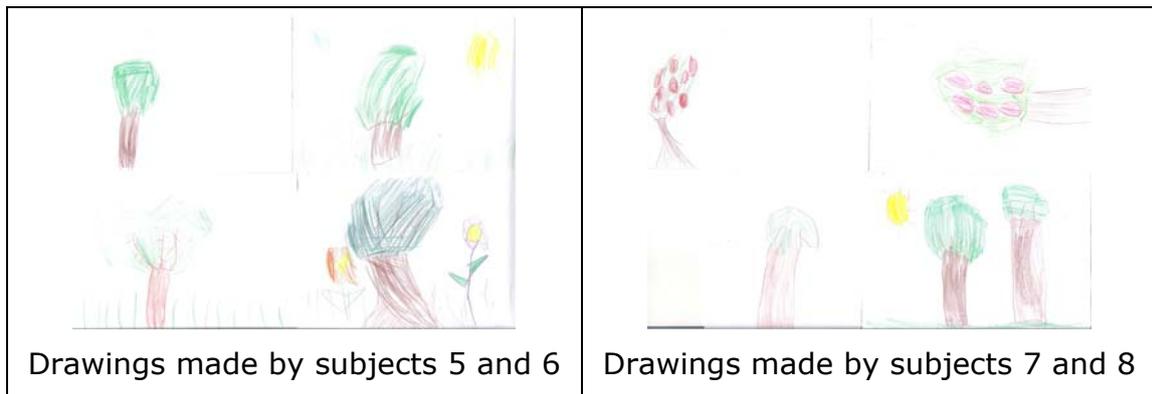
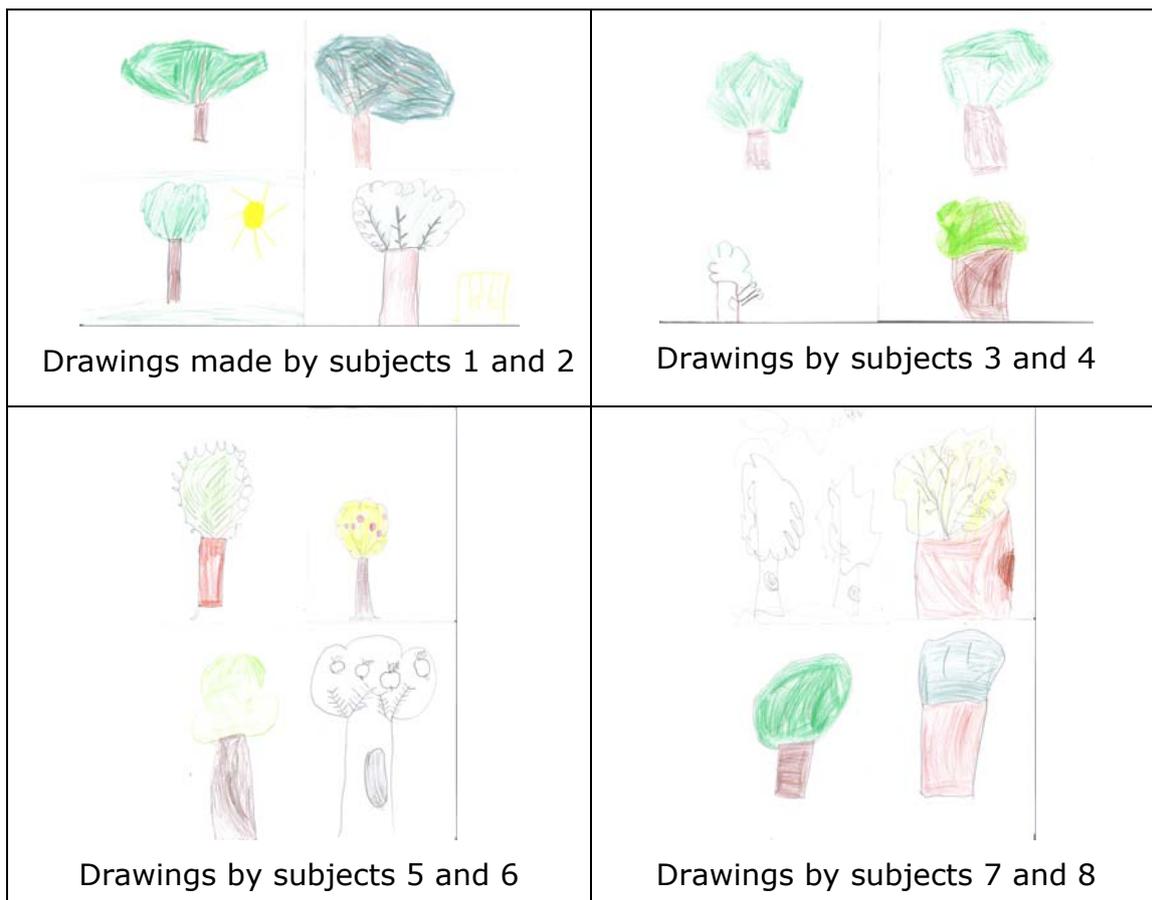


Fig. 1. Drawings created by preschoolers aged 4-5 (1-4)

In Figure 2, the drawings created by participating children aged 5-6 are illustrated.



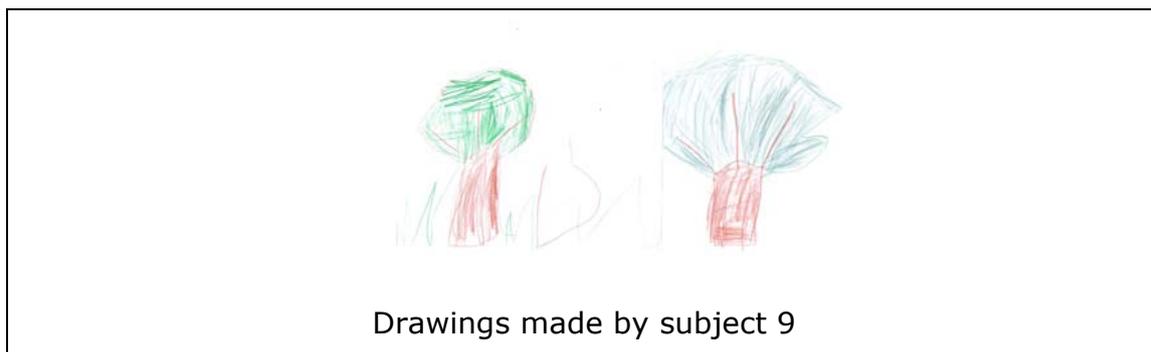


Fig. 2. Drawings created by children aged 5-6 (1-4)

In Figure 3, drawings created by participating children aged 6-7 are shown.

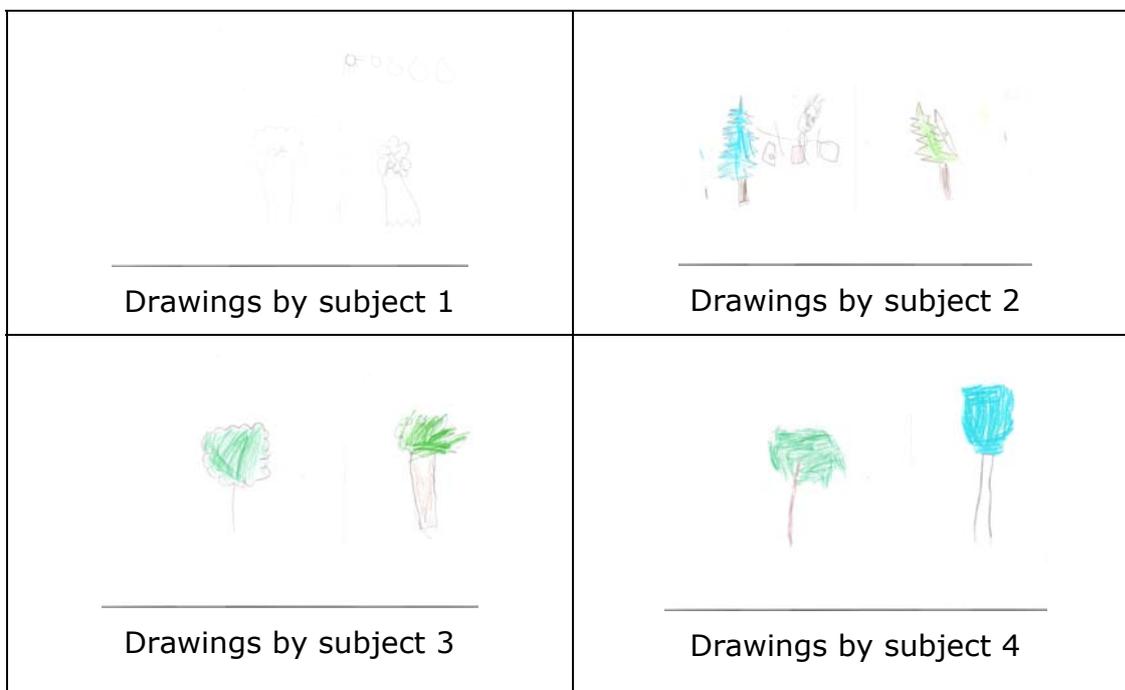


Fig. 3. Drawings created by preschool children aged 6-7 (1-4)

DISCUSSIONS

1) The analysis of the drawings of trees created by the children aged 4-5. We analyzed 16 drawings created by eight participants. Croti (2010, p. 153) states that a child is able to draw a tree even if he or she has never seen a plant, a bush or a shrub, or a small tree and that a complete mental scheme of a tree is developed around the ages of 4-6 years old.

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The representation of the parts of a tree. All children drew the trunk and crown of a tree but none drew the roots. Evi Crotti (2010, p. 166) mentions that representation of trees without roots is indicative of a person's introvert character. However, we think that with preschool children the representation of a tree without its roots is due to the fact that they cannot perceive or represent themselves these parts as they are not visible. Children drew thick vertical tree trunks which is indicative of a well-structured, self-assured personality. A definitely outlined tree trunk signifies physical strength, resilience which enables someone to cope with obstacles in life (according to Crotti, 2010, p. 158). A child drew a trunk which is thinner in the upper part, which indicates less strength of overcoming difficulties and the need of help and protection from the adults' part (Crotti, 2010, p. 158).

In both drawings created by a child, the crown of the tree is similarly shaped, which makes author identification easy. The crown signifies "autonomy and reaching out to the surrounding world; branches spread and extend beyond the outline of the crown, showing openness to (or refrain from) communication, adaptability, solidarity and love of the world" (Crotti, 2010, p. 158). Comparing this with the interpretation given by Denise de Castilia (2004, p. 43) to a drawing made by a 16 year-old girl, we could infer that these preschoolers are introvert, show a certain degree of shyness, anxiety, fear of living and have a tendency to exaggerate the difficulties of life. Children thickened the outline of the crown: this may mean they set a limit between themselves and the rest of the world.

The crown of the tree without branches represented by a child in both drawings signifies introversion (Crotti, 2010, p. 166). Seven children drew green or brown line-like branches, in a fan-shaped pattern. These representations may be indicative of the children's beginning to open themselves to the world even if the branches do not shoot out of the outline of the crown (Crotti, 2010, p. 166). A fan-shaped pattern of the branches may also signify tenderness, fragility, sensitiveness, or apathy (Rozorea, Sterian, 2000, p. 42).

Red fruit drawn by a child (Subject 7) in the tree crown, not on branches, in both drawings, could suggest melancholy, low self-esteem and inhibition (Crotti, 2010, p. 163), but also fear (p. 167).

Representation of environmental entities. Two children represented environmental entities in the initial test: the sun and clouds (one child), blades of grass (one child). The sun is related to male figure, the father, therefore, it seems that this child is proud of his or her father, but the presence of clouds may indicate that there are some problems in relation to the father. In the final test, six children represented environmental entities: the sun (four children), clouds (three children), blades of grass (five children), a grass covered earth line at the basis of the tree (two children), flowers (two children). The large yellow sun, symbolizes an ideal strong father (Crotti, 2010, p. 35). The horizontal line delineating the earth's surface drawn by two of the children signifies adaptability (Crotti, 2010, p.

167). We clearly notice the progress made by children in the number of environmental entities they represented in the second round of drawing trees as compared to the first.

The size of the tree. Two children represented small-sized trees in their initial test. The small size of the tree in relation to the paper indicates shyness and introversion of a child who is happy to play alone, to choose quiet friends and to be cuddled (Crotti, 2010, p. 159). In the final test, three children drew small-sized trees. The rest of the children drew large-sized trees, an indication of their enthusiasm, extrovert character and sociability (Crotti, 2010, p. 159).

Placement of the tree on the page. Four children positioned the tree in the centre of the page, on the bottom line, typical of their age. Drawing the tree in the centre of the page indicate children's desire to be the centre of attention (Crotti, 2010, p. 158). In the initial test, two children positioned the tree on the left side of page, on the bottom line, which may mean regression (Crotti, 2010, p. 167). In the final test, four children positioned the tree on the left side of page. All children positioned their trees on the bottom line of the page, a typical characteristic of their age.

The use of colours. All children coloured the crown of the tree in the same nuance of green; this was probably because it was the single nuance available to them, which limited their representation choices. In order to colour the tree trunk, some children chose a dark nuance of brown, others used a lighter nuance of the same colour. The bold, vivid colours used by the children shows effusiveness and enthusiasm (Crotti, 2010, p. 166). The colours used are similar to the ones of real tree crowns in summer. The red colour (used for fruit or flowers in the drawings of Subject 7) indicates exuberance.

Colouring surfaces. Children hatched the surfaces of tree crowns they contoured with random lines that looked like a tangled mess. They drew the outline of the crown with a fine green or black line, but they also drew lines extending outside the crown. The lines were of different thickness, blends of soft and firm lines. All children coloured the tree trunk using vertical lines. Colouring the tree trunk using vertical hatch lines signifies a certain melancholy (Crotti, 2010, p. 167). Two children used several layers of horizontal lines to colour the trunk, and two children hatch-filled the tree trunk with slant lines.

The lines of blends of soft and firm strokes as children did not press uniformly the pencil tip on paper while colouring. The lines drawn are more or less continuous, with softer or firmer strokes. Children cannot control well the movements of their hands and are not familiar with hatching as a drawing technique. The preschool teacher insisted on their paying attention to keep filling with colour only within the outline of the objects drawn.

2) *The analysis of the drawings of trees created by preschoolers aged 5-6.* We analyzed 18 drawings made by nine children of 5-6 years old.

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The representation of the parts of a tree. All children drew the crown and trunk of a tree, ignoring the roots. One child represented two trees in his/her drawing. In the initial test drawings, six children drew trees with thick vertical trunks, revealing a structured personality, self-confidence and physical strength (Crotti, 2010, p. 158). In the final test, three children represented trees with sturdy trunks. Six children drew trees with thicker trunks and one child drew a tree with a thinner trunk in the final test in comparison to the ones represented in the initial test, which indicates certain fluctuations in asserting their personality, their self-confidence. Two children drew trees with thinner trunks than their peers' drawings, which may signify that they are less resilient in coping with difficulties and need adults' help and protection (Crotti, 2010, p. 158). Another child (Subject 6) represented a tree trunk which is wider at the base and growing thinner towards the crown. The darkened knotholes on the tree trunks either outlined in black in the first drawing (Subject 6) or in brown in the second is indicative of a possible traumatic experience in the past (Denise de Castilia, 2004, p. 141).

The crowns of trees represented by children have different shapes. All children made an outline contour sketch of the crown, which symbolizes a delineation between the self and the external world. Tree crowns with no branches represented by three of the children are indicative of introversion (Crotti, 2010, p. 166). The broken lines which shape up the outline of the tree crown may signify potential aggressiveness and anxiety (see the drawings created by Subjects 2, 5, 7) (Denise de Castilla, 2004, p. 141). Children (four out of nine in the initial test and four in the final test) represented the branches of a tree by brown or green lines arranged in a fan-shaped pattern, a detail which may reveal the beginning of the subjects' opening to the world, even if the lines do not extend beyond the outline of the tree crown (Crotti, 2010, p. 166). These fan-shaped patterns of tree branches may mean tenderness, fragility, sensitiveness, or apathy (Rozorea, Sterian, 2000, p. 42). Two children (Subjects 2 and 6) represented branches with symmetrically and asymmetrically arranged twigs. This representation and display of twigs reveals an analytical way of thinking, exceptional oral communication abilities, a capacity of processing information based on logical reasoning and drawing aptitudes (Rozorea, Sterian, 2000, p. 42).

Subject 7 represented a crown tree with several branches in all directions (multiple lines intersecting in the crown), this indicating a potential undisclosed anger, or some difficulties in his/ her relationship with his parents (De Castilla, 2004, p. 44), but it might as well signify thoroughness in work, accuracy, an organized methodical individual, detachment (Rozorea, Sterian, 2000, p. 43.). From the perspective of environmental geography, we could explain that they perceived and represented the branches as a logical consequence of their involvement in the learning activity.

The fruit drawn by three children in the second series of drawings represent the undisclosed desire to eat (Denise de Castilia, 2004, p. 104),

but we can also interpret this as the outcome of building up new mental representations by experiencing the learning activity set in the classroom. The apples hanging in the crown of the tree drawn by a child point to the subject's melancholic state of mind, low self-esteem, inhibition (Crotti, 2010, p. 163), even fear (p. 167), especially because there is also a brown oval shaped knothole on the trunk of his/ her tree, which may be indicative of an older emotional traumatic experience.

The size of the tree. Two children (one in the initial test, the second in the final test) represented small-sized trees, an indication of shyness, introversion, the need to be coddled (Crotti, 2010, p. 159). The rest of the children drew larger-sized trees, which indicate enthusiasm, extroversion (Crotti, 2010, p. 159). Seven children drew trees of a larger size in their final test than in the initial test, a thing which may illustrate some progress made in developing their personalities.

Placement of the tree on the page. Four children positioned the tree in the centre of page in the initial test and one did so in the final test, thus emphasizing their desire to be the centre of attention (Crotti, 2010, p. 158). One child positioned the tree on the bottom line to the left of the page, which may symbolize regression (Crotti, 2010, p. 167). Most of the children positioned their trees on the bottom line of the page, which is typical of their age.

The representation of the environment. Generally, the children did not represent other environmental entities than the tree. Three children were the exception to the rule: one of them drew large blades of grass, one drew curved horizontal black lines and the third hatched in green horizontal lines the area at the basis of the tree to illustrate a field covered with grass. The lines marking the earth's surface can symbolize adaptability (Crotti, 2010, p. 167), but in these two cases, we are uncertain of the meaning inferred.

The use of colours. The bold vivid colours (red, green, brown) used by children are an indication of expansiveness and enthusiasm (Crotti, 2010, p. 166). The option for using green, the most frequently apparent choice in colouring their drawings, illustrates restlessness. This colour related to natural environment may act like a tranquilizer on the nervous system. Colour green may also indicate a tendency to inhibition, sometimes anger, outbursts of fury (Crotti, 2010, p. 167). Red (the fruit or flowers represented in one of the drawings) symbolizes exuberance.

Colouring surfaces. Children represented the edge of the tree crown by a thin green or black line. They drew few lines extending beyond the edge of the crown. They used various soft and firm lines to hatch the shapes they outlined. Texturizing the tree trunk using vertical lines can mean a certain degree of melancholy (Crotti, 2010, p. 167). Four children cross hatched the tree trunk with a blending of slant, vertical and horizontal layers of lines which may indicate certain emotional traumas (Crotti, 2010, p. 167). In as far as filling surfaces with colours is concerned, no significant differences could be identified in the drawings of the children in this group of age as compared to those in the 4-5 age group. They did not draw

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uniform lines. The lines are long and continuous, softer or firmer pencil strokes are employed, with lighter or heavier pressure applied to the pencil. They did not control well their hand movements and were not familiar with various types of pencil strokes. It should be noted that children drew few lines extending beyond the edges of the objects they coloured.

3) *The analysis of the drawings made by children in the 6-7 age group.* We analyzed eight drawings made by four children in this age group.

The representation of the parts of a tree. All children represented the crown and the trunk of a tree. One child represented a tree with a thick vertical trunk in both the initial and the final test drawings, which may indicate a positively balanced personality, based on self-assertiveness, physical strength. Two children drew trees with thinner tree trunks in the initial test as compared with the ones in the second series of drawings, which may show weaker resilience in coping with difficulties and the need of adult support and protection.

The crowns of the trees represented have various shapes. All children drew the outline of the crown, which can signify that they set a boundary between themselves and the external world. Three children did not draw branches in the tree crown, a fact that may suggest they are introverted personalities. One child (Subject 2) drew a fir tree in both the initial and the final test. The option to represent a fir tree suggests shyness, a need for affection, peaceful environments, safety (Crotti, 2010, p. 158).

The size of the tree. Children drew medium-sized trees, which may be indicative of some enthusiasm and extroversion (Crotti, 2010, p. 159).

Placement of the tree on the page. In four drawings, children positioned the trees in the centre page, emphasizing their desire to be the centre of attention (Crotti, 2010, p. 158).

The use of colours. Children coloured their tree crowns in green. Opting for green probably signifies a lack of inner peace, a tendency towards behavioural inhibition, restlessness, outbursts of fury (Crotti, 2010, p. 167).

Colouring surfaces. Relative to filling outlined shapes with colour, there are no significant differences between the children of this age group and the children in the other two groups of age, previously analyzed.

CONCLUSIONS

As shown in the findings discussed here with respect to children's drawings of trees, from the perspective of spatial representation, we could draw several conclusions.

- Representations of the parts of a tree drawn by the participating children are typical of their age groups and similar to the ones presented in specialist literature available to us so far. This enabled us to approach the interpretation of drawings in the same way.

- No significant differences could be noted in the manner in which the preschoolers in different age groups represented the parts of a tree or in how they coloured the shapes drawn. Therefore, we could not identify a typology of representing trees depending on age. The fact that these preschoolers attend kindergarten classes and get involved in several similar instructional activities influence their level of cognitive development.

- In the drawings made by preschoolers there are several representation features similar to the real life ones; thus, trees have thick brown vertically oriented trunks; the crown of the trees have similar shapes, are coloured in green, although, in the real world, tree crowns are of different colours in autumn and when the trees are in bloom.

- The drawings suggest that preschoolers have clear representations of trees as a whole, but less clear or no representations of details in a tree (branches, leaves, flowers, fruit).

- Preschoolers generally represent what is visible to them (trunk, crown) and not what is invisible or hidden (the roots of a tree).

- They represent the objects in two dimensions, not in depth, in three dimensions.

- Preschoolers find it difficult to internalize (construe mental representations of) larger chunks of reality, which may include the tree and the environmental entities around it. Therefore, we are sceptical about an integrated approach to complex environmental topics, such as the forest, the village, the town, or the farm.

- Many preschoolers positioned trees on the bottom line of the paper, which is typical of the children in the 4-7 age group.

- We cannot clearly state that the research hypothesis was confirmed by the instructional experiment carried out in our research project, since no significant changes could be observed in the final test drawings as compared to those in the initial test. A reason for this, we reckon, was the learning context features: too many pictures were presented to preschoolers in the learning activity. These pictures were not sufficiently explored or worked on. Children were introduced too many concepts at a time and could not grasp them in such a short time (10 minutes). Finally, the activities were more teacher-centred rather than learner-centred.

The analysis of children's drawings of trees from a psychological point of view and the direct observation of children's behaviour enable us to claim that connections exist between the manner in which children represented trees and their personality traits, the relationships they establish with other people and the environment they live in, as these are described in specialist

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literature (Rozorea, Sterian, 2000; De Castilla, 2004; Crotti, 2010; Langevin, 2012).

The further research we intend to initiate will focus on the way in which preschoolers perceive and represent small environment entities (vegetables and green herbs, fruit, flower plants), following an inductive cognitive approach of teaching and learning, from simple to complex, from currently mastered knowledge to new knowledge acquisition, from a species of trees to a forest.

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