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Brief Report

A new theory on children's drawings: Analyzing the role of emotion and movement in graphical development

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ABSTRACT

The aim of this paper is to develop a new understanding of children's drawings and to provide ideas for future research in early childhood. Starting from classic theories on child graphical development, we proceed to analyze them and provide our own views on the subject. We will also recount a number of relevant empirical studies that appear to validate our theory. Our belief is that emotion and self-expression through movement play a key role in the development of child art, and that this may be already visible during the scribbling stage of drawing.

Child art has long been an object of study for researchers in many fields. The pioneers of this discipline, such as Ricci (1887), began their research in the late 19th Century and viewed children's graphical productions as valuable insights into their mental life and cognitive development.

At the time, scholars focused on studying the evolution of drawing from what they considered a primitive stage (i.e., child art), to one of intellectual enlightenment (i.e., adult art). This concept was the foundation for famous child intelligence assessment tools such as Goodenough's "Draw-A-Man" test (1926), later reviewed and improved by Harris (1963). These theories were heavily based on the comparison between children's productions and adult drawings. During this early stage, no attempt was made to investigate deeper constructs like the child's personality or esthetic sense (Pinto, Gamannossi, & Cameron, 2011).

One of the first logical fallacies committed by many researchers of child art was the assumption that children had an innate desire for realism. Most of the early scholars (e.g., Luquet, 1913, 1927) deeply believed that young humans strove to represent reality in a uniquely naturalistic manner, but failed to because of cognitive limitations and immaturity. This is mostly owed to the structure of Western culture and esthetics at the time, which considered realism to be the highest achievement for artists (Golomb, 2002; Ring, 2006).

Slowly, this mindset changed, and researchers began to see that there was more to child art than what could be perceived at a first glance. They discovered that children had their own esthetic sense, and that a preference for abstract art did not necessarily imply a lack of development or a shortcoming of the child (Jolley, 2009). They also discovered that many "errors" appearing in children's drawings (e.g., transparencies, capsizements, differences in size, etc.) were actually problem solving solutions that the young artists had adopted to overcome the limitations of representing three-dimensional reality on a two-dimensional surface (Anning & Ring, 2004; Arnheim, 1954; Freeman, 1980; Matthews, 2003).

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After a brief summary of the most relevant theories concerning child art, we present our own model of analysis for child graphical development. The object of this study is twofold. The first aim is to reassess scribbling as a vital part of the child's graphical and cognitive development and imply its possible links with new cognitive theories, as suggested by Lange-Küttner (2014) and other authors (Uttal, Fisher, & Tsylor, 2006). Subsequently, we explain how we believe this concept evolves after the child has reached actual figurative drawing and its influence on it. We also suggest ideas for future research, should our theory be accepted. We believe that our study might aid and spark future research by providing a different, and much needed, change of perspective in a field that has been stagnant for too long.

1. The realistic perspective

The first researchers of child art concentrated on comparing children's productions to adult ones, and on wondering why the former were riddled with errors. Any misplacement was seen as proof that the child was not mature enough to reproduce reality correctly. Jean Piaget was among the first to study child art from a scientific point of view. He found that his four-stage developmental model (Piaget, 1929) could be applied to drawings, as well, and that children had an almost parallel development between their cognitive growth and their drawing abilities. The four stages of drawing had already been theorized by George Henri Luquet, a French art historian, who had carefully studied his daughter's drawings and had grouped them in four different stages: Casual Realism, Missed Realism, Intellectual Realism and Visual Realism (Lange-Küttner, 2009; Luquet, 1927).

Luquet (1927) believed that graphical activity gradually evolved from mere exercise to a form of structured play. In his view, the origin of graphical traces was spontaneous, but it was susceptible to adult influence. The child, found pleasure in both the motor discharge and in the lines created, which were viewed as an imitation of adult writing. The transition from scribbling as a motor activity to controlled scribbling and, subsequently, to actual drawing, where there was the expression of a representative purpose, happened spontaneously. When children began to notice some form of analogy between the traces they had left of the paper and the shapes of real objects, it led them to consider their drawings as genuine representations of the world, to the point of interpreting them (Morra, 2002).

Such a discovery is owed to a natural inclination of the child toward figurative drawing, or the reproduction of real objects. Children, around three years of age, casually discover a similarity between their drawings and real objects. This phase is called *Casual Realism*, and marks the passage between fortuitous and intentional graphical images by transforming scribbles into actual representations of objects. According to Luquet, *Figurative Drawing* is the graphical representation of the objective properties of what is being portrayed, and realism is an essential characteristic of children's drawings (Anning, 1999).

Missed Realism follows casual realism around ages three to five. Here we witness a clear intent of reproducing a graphically identifiable object; however, these drawings will actually attain realism only when children become five to eight years old. Children consider a drawing representative when it contains all the necessary elements that allow a successful identification of the object. This is called *Intellectual Realism* and it presents a couple of logical contradictions, such as the effects of transparency and capsizing. At this stage, children draw details that should not be visible (e.g., people inside houses) and do not use perspective (e.g., trees resting on the side of the road).

Children adopt multiple points of view when drawing and pay particular attention to representing each object in its *exemplarity*, that is, in its key features. In other words, they choose a specific perspective for each shape presented, thus identifying its "exemplary form". Exemplarity has been a primary object of study in this theory's perspective. Widlöcher (1965) considered it an emblematic particular, represented by those essential traits that allow the object to be easily recognized, much like the vertical lines that convey the idea of hair on a boy's head or the leaves of grass inside a field (Einarsdottir, Dockett, & Perry, 2009).

Canonical Representation is very similar to the concept of Representation. Hochberg (1972) defines canonical form as the angle at which the object must be turned so that all its characterizing elements may be seen. Freeman (1980) used the term Canonical Representation to indicate the form that best allowed an easy recognition of the object. In this view, a tree's canonical representation would be in frontal vision; whereas, a soccer field would be shown from and aerial point of view and a running man would be drawn laterally.

Going back to the development of drawing according to Luquet, Intellectual Realism is swiftly followed by *Visual Realism*, where children adopt a single point of view in accordance with the laws of perspective, relate all graphical elements between themselves and finally evaluate their productions in a critical manner. The abandonment of intellectual realism marks the end of child graphicacy (Thompson, 2002).

The realistic perspective formed its entire analysis of child art on the organization of graphical elements. Instead, more recent authors find it more useful to observe the moment of construction on paper and to evaluate to what extent the process of graphical activity is relevant in determining the final composition. In other words, they study the executive coefficients without changing the conception of drawings as translations of mental images and knowledge gathered.

Freeman (1980) has given a detailed account of the influence given by inherent difficulties on the procedure of building the final form of a graphical representation. Drawings do not reflect the knowledge that children have of objects; much of that knowledge remains unexpressed because of the complexity of the procedures and for the various obstacles encountered during the planning of the drawing. So, when a head is bigger than the rest of the body, in a drawing, this could mean that children believe that the head is the most important part to represent; or that they made an error in evaluating all the

parts of the body in respect to the size of the sheet of paper on which they chose to draw. Thomas and Tsalimi (1988) have validated Freeman's hypotheses. They have found that the exaggerated size of the head, when compared to the rest of the body, is the consequence of a failure in planning the drawing's execution.

The study on procedural factors and on the expedients used by children to solve problems of graphic execution still represents the most innovative factor in the study of child graphic art. Children who draw are graphically expressing and building an idea. Gaining knowledge of what mental strategies are used by children to translate such an idea can give us a better understanding of child graphical activity, and discourage any arbitrary interpretations of the content of the graphical product (Vinter, Fernandes, Orlandi, & Morgan, 2013).

More recent studies on child art, in the light of new discoveries in cognitive science, consider drawing as an authentic problem-solving exercise. Children, while drawing, have to deal with problems related to depth, spatial relations between the elements of the drawing, and the identifiability of the figures represented (Freeman, 1980; Vinter, Puspitawati, & Witt, 2010).

Finally, according to the realistic perspective, child art is the representation of real-world objects, represented by their physical-geometrical qualities. The perspective does not consider feelings, emotions or ideas expressed; that are, all the elements that could, potentially, transform graphical gestures into artistic signs. The basic assumption is that children's drawings are attempts of reproducing a realistic copy of things. To this day, scholars who apply this theoretical framework are researching the motives that could exhaustively explain the imperfections that children produce in their drawings (Thomas & Silk, 1990).

2. The artistic perspective

Lowenfeld (1952) was the author who gave the most detailed account on child art in relation to artistic expression. He believed that children's general development was linked with their creative development as well (Lowenfeld & Brittain, 1947).

The artistic approach moves the scholar's attention from "what" children are drawing to "how" they are drawing, that is, to the resources elaborated during the act of creation. According to this perspective, the object of study shifts from the graphical productions to the mental processes activated by children, with the purpose of acquiring a deeper understanding of the latter (Jolley, 2009; Lange-Küttner, 2011).

The artistic perspective also takes into account the pleasure that children experience while drawing, in relation to the traces they leave on paper. There is not just pure motor pleasure anymore, but esthetic pleasure as well, which is not linked to any representative intent.

Read (1958) argues that children have a kinesthetic imagination, that cannot be reduced to pure motor behavior and can be linked to the physiognomic and descriptive movement defined by Arnheim (1954). According to Read, children draw for their own obscure motives, and it is up to us to determine the nature of this independent activity (Callaghan, 1999).

Lowenfeld and Brittain (1947) divided the development of scribbling into two stages: *Disorganized Scribbling*, in which there is no visual control; and *Controlled Scribbling*, in which we notice a relation between movements and traces. Pleasure, at this stage, is not motor pleasure anymore; instead, it is caused by the awareness of being the cause of a movement and the author of a product. When children give a name to a scribble, they evolve from a kinesthetic mindset to an imaginative one (Pinto et al., 2011).

Although Lowenfeld and Brittain have evaluated children's drawings by referring to their artistic traits, they did not differentiate themselves from the realistic perspective when outlining child graphical development. Development was still marked by the gradual and progressive acquisition of knowledge, specific abilities and executive strategies that rendered graphical representation ever more similar to reality (Thompson, 2002).

The artistic perspective starts from the premise that children have an internal model from which they draw inspiration for their graphical products, and that it is not possible to reduce it to something of a merely intellectual nature. Every mental representation of reality is only the partial result of our knowledge of it, combined with our mental capabilities but, being a physical reality, it is also an elaboration of both the intellective and affective dimensions that belong to every human (Pinto et al., 2011).

Lowenfeld (1945) made a distinction between two different manners of creative expression: Visual and Haptic. Visual persons observe reality as mere spectators and limit all contact with the outside world to sight. Haptic persons, on the other hand, are more attuned to their corporeal perceptions, experiences and feelings, and they tend to be more engaged with their surroundings.

Rudolph Arnheim is an important figure in this field; in his work "*Art and Visual Perception*" (1956), he studied child art in its cognitive, emotional and perceptual aspects. Arnheim asked himself: "Why do children draw like they do?" He based his work on studies of Perception; examining visual images from the point of view of Gestalt Psychology (Lange-Küttner, 2009, 2013).

Arnheim (1954) believed that every general notion we have of an object is derived from perceptive observation. He went beyond the distinction that had been made between perception and conception. The act of perceiving cannot be reduced to simply combining all particulars, while operating some form of abstraction. The idea of a dog, for example, would then be perceived before the single defining traits of any and all dogs (Longobardi, Pasta, & Quaglia, 2012). If perception cannot

be separated from conception, it might be possible to understand the nature of children's drawings. Children represent the essential traits of an object, its general form (i.e., its overall qualities and not its specific ones).

Furthermore, Arnheim did not ignore children's personal dispositions and emotional states in his analysis; he believed that they gave graphic gestures their expressiveness. According to Arnheim, hand movements have a physiognomic and descriptive character (Arnheim, 1954).

Arnheim's teachings have inspired several researchers, such as Goodman (1976), Goodnow (1977), Gardner (1980, 1982), Golomb (1990) and Golomb (2002). These scholars have tried to improve his theories by further studying the development of drawing, investigating its figurative and cultural aspect, and analyzing the transitions between stages, in the light of the problems of artistic expression (Ebersbach, Stiehler, & Asmus, 2011).

3. The esthetic perspective

Kellogg (1955, 1969) was partially influenced by Arnheim's work. Kellogg believed that the search for order and proportion was the basic principle for the disposition of figurative units into complex combinations. The scholar noted that, between the numerous scribbles, diagrams and combinations that children experiment with, the units that appeared more frequently were those that possessed good visual form or proportion. Kellogg considered these forms of visual order attractive by nature. They imposed themselves because of a primary visual order that existed in the minds of every human. For Kellogg (1955), visual interest is a primary and essential component of scribbling (Pinto et al., 2011).

When analyzing the casual interaction between signs that had been traced by children, Kellogg (1955) noticed a number of primitive shapes or structures. She then proceeded to extract and catalog the configurations that presented themselves more frequently in the drawings of children from different cultures (Kellogg, 1970). The discovery was perfectly in line with the Gestalt theoretical framework, which states that perceptive experiences and any other cognitive processes, structure themselves into configurations where "The whole is other than the sum of the parts". Children, while scribbling, mentally organize points and lines into shapes, that are endowed with sense. According to Kellogg (1955), scribbling is not just a perceptual action, but it is also a mental action as well; in other words, every perception is regulated by a number of criteria, of which one is the principle of *Good Gestalt*, according to which, visual stimuli tend to organize themselves in symmetrical and regular forms, that are considered "Good" (Köhler, 1929; Lange-Küttner, 2009).

Kellogg (1969) also believed that the graphic shapes she had discovered, which were recurrent in many cultures, could be considered Archetypal Images. Archetypal Images are universal images that are common to all humanity, have similar manners of expression and have existed since ancient times (Jung, 1954).

With Kellogg, scribbles are no longer characterized by their relationship with the authors' temperament and creativity; instead, their status of Drawing Alphabet acquires primary importance (Kellogg, 1955). Kellogg identified 20 basic scribbles, true primary structures that are the foundation of all graphic images one may create. These basic elements are combined in various ways until they form, around three years of age, the first rudimental diagrams, that are scribbles in which we witness the crossing over of a number of lines; this should signal the beginning of planning and intentionality in child art. Diagrams are later developed into combines (i.e., the union of two diagrams) and aggregates (i.e., the union of three or more diagrams). With aggregates, the combines are multiplied and the graphic variations become infinite. Combines and aggregates, typical of children aged three or four, characterize the stage of Formal Composition as children begin to draw their first figures. After reaching four years of age, children reach the figurative stage in a definitive manner (Lange-Küttner, 2014).

Although Kellogg's studies have had a vast resonance and have spiked the interest of the whole scientific community, her vision of child art has remained an essentially personal one. The results obtained in her studies have not been confirmed by later analyses. As a matter of fact, Golomb (1990) did not obtain the same results reported by Kellogg, when she conducted her own study.

4. The dynamic and esthetic perspective

4.1. The scribbling stage

Early graphical activity is often considered a mere consequence of the gesture (Papandreou, 2014; Wallon, 1950), but we believe that it is something more than a random act; we see it as something that can be exchanged inside a relationship, a way of communicating (Quaglia & Saglione, 1976). Like any activity that is essential to a child's development, drawing is generated and thrives inside a relationship that is emotionally rich and stimulating. The pleasure of creating traces would soon consume itself if someone, at some time, did not recognize and welcome it. Dunst and Gorman (2009) discovered that collaborative drawing activities were associated with increased child scribbling and that they served as a reinforcement for this activity. Yamagata (1997) has stated that mother – child interactions during scribbling act as a sort of scaffolding and aid early child graphical development. In a nutshell: no pleasure can be generated and thrive inside emotional nothingness. Children draw if they are stimulated by adults or peers, or if they decide to imitate adults (Longobardi et al., 2012; Quaglia & Saglione, 1976).

Imitative Scribbles (ages 1–2 years) are produced by children who imitate their parents when they are writing; they are characterized by horizontal and wavy lines. They are the very first stage of scribbling. However, children rapidly evolve from this stage as soon as they begin to play with the graphic and expressive qualities of the line with some level of intentionality.

This second phase is called *Expressive Scribbling* (ages 2–3 years). Here, the line is used to describe trajectories, explore a space, model it and play with it. Scribbles are, at such an early phase, real experimental attempts, similar for many aspects to the Tertiary Circular Reactions theorized by Jean Piaget (Morra, 2002; Piaget, 1929). The sheet of paper becomes a sort of a laboratory, where children experiment with lines. The line's expressiveness at this stage is owed to young children's dynamic perception of reality (Knight, 2008; Werner, 1940) and child animism (Lange-Küttner & Reith, 1995; Piaget, 1964). For children, a line that ends up outside the sheet of paper "Is gone!"; a line that is interrupted by the breakage of the pencil's tip "Is dead!"; a line that is traced rapidly "Is running!"; a line that is interrupted by the breakage of the sheet of paper itself "Fell down the hole!" (Longobardi et al., 2012).

Therefore, during Expressive Scribbling, lines *express* emotional states. Since the oldest and most archaic emotional states are linked to either wellbeing or discomfort, graphical traces seem to acquire two expressive forms that are connected to the emotional behaviors of gratification and frustration: in the former, there is a prevalence of light and round lines; in the latter, thick and broken lines prevail. Quaglia and Saglione (1976) have identified these two forms, respectively, as *Good Scribbles* and *Bad Scribbles*. These types of scribbles are universal and archetypal (Kellogg, 1970), although no author until now has distinguished them into "Good" and "Bad". Nonetheless, many studies, both anthropological and psychological (e.g., Golomb, 2002; Matthews, 2006), have noticed these two opposite manifestations of the line, and reported that each was used to represent certain objects and not others (e.g., thick and broken lines represent thunder or waves, and rounded, light lines represent hills); we believe that this choice may be owed to the emotional symbolism intrinsic to these two styles.

Expressive Scribbles, however, do not tend to represent objects of the real world; but, instead, they express the "good" or "bad" qualities of these objects through the shape that children give to their lines (Longobardi, Negro, Pagani, & Quaglia, 2001).

On the basis of the dynamic and esthetic qualities perceived in drawings, we can identify various developmental stages in drawing, hence the name of this Perspective. Estheticism has various stages.

4.2. Moral estheticism

The moral aspect of child art, according to this perspective, concerns the evolution of criteria on the basis of which children will determine the sense of the agreement that establishes itself between their need to draw and the products of their activity. All drawing, including part of figurative art, is characterized by a phase defined Moral Estheticism, which is further divided into primary and secondary moral estheticism. Moral estheticism has to do with the expressive qualities of lines, that can be summed up into "good" and "bad" qualities. In moral estheticism, judgment is not autonomous and the categories of good and bad are merged with their ethical equivalents (Longobardi et al., 2012).

Primary Moral Estheticism (Quaglia & Saglione, 1976) more or less dominates the whole period of scribbling (ages 0–5 years), during which, agreement is expressed in an immediate manner and the lines are merged with the gesture of drawing and visually express its dynamic qualities. Lines can be fast, slow, sad, happy; they walk or run, depending on how they are drawn. Lines express emotional states like sadness, happiness, melancholia, etc., because they reflect them and, in a way, they also embody them, because children perceive them as intentional and living.

Secondary Moral Estheticism (Quaglia & Saglione, 1976) marks the transition from scribbling to figurative drawing (ages 5–6 years). Esthetic categories are not autonomous yet; however, with the appearance of children's first schematic drawings, we observe that the categories of good and bad do not refer to the physiognomic characteristics of the line, anymore, but to the objects of the external world that are represented on paper. The drawing of a mother is nice because a mother is good and caring; the drawing of a wolf is ugly, because a wolf is mean and scary (Quaglia & Saglione, 1976). Graphic form is shifted from the lines to the contents of drawings. The expressiveness of the line has merged with the represented object. Children become less connected with their expressive gesture and emotionally distance themselves from their drawings. Beauty and Ugliness are no longer the specific properties of lines, but they have become the properties of the objects that are represented. Moral estheticism will evolve into Practical Estheticism, first, and Conventional Estheticism, second, when children learn to distinguish between the content of their drawings and the way in which it was executed, as we will explain further on.

To illustrate this process better, we will present and discuss a series of drawing episodes that we have selected from a series of observations that we have made during our previous researches in various educational settings.

Stefano (boy, age 2 years and 4 months), after having hit his head against the table, named his scribble, composed of thick, superimposed and pointy lines: "Ugly table". It is clear that he did not intend to evaluate his own graphic rendition of this subject, instead he meant to identify as ugly, or bad, the table graphically represented. In this drawing the child has represented in a good, satisfying manner, the ugliness of the table, and showed he was quite happy of the way the drawing had turned out. This is an example of Primary Moral Estheticism.

If we ask children to draw something nice, they are able to do so at any age; but if we ask them to make a bad or ugly version of the same drawing, they have a hard time executing such a task before they reach age six. Children aged six and seven, instead, show that they have understood the task, but generally refuse to carry it out. The assignment is simply unacceptable for them because, at this stage, the categories of good and bad are still linked with the content of a drawing, and it would be unacceptable to draw a "bad" version of something that is known to be good (e.g., a mother). This is Secondary Moral Estheticism.

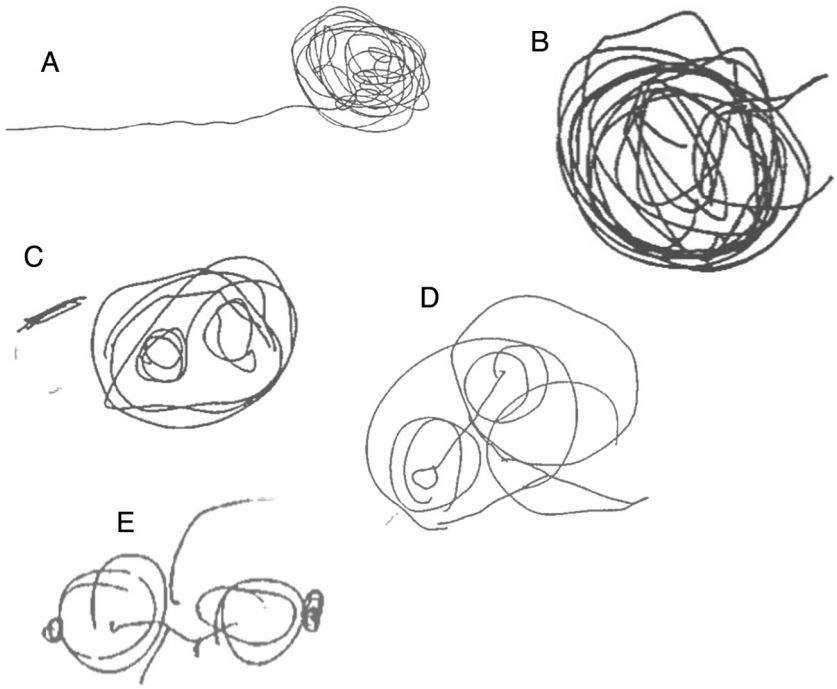

Fig. 1. The development of Stefano's motorcycle drawing through its various phases. (a) and (b) are examples of onomatopoeic scribbles (age 2 years 4 months), while (c) and (d) are the first attempts at a structural depiction of a motorcycle through its moving parts (age 2 years 8 months). (e) represents the final evolution of figurative scribbling (age 2 years 10 months), where the dynamic quality of the represented object have been relegated to specific parts (e.g., the wheels).

4.3. Onomatopoeic scribbles

Suddenly, scribbles receive names by their authors. Anna (girl, age 2 years 9 months), after having drawn a "bad" scribble, claimed that it represented Enzo, a "mean boy who hit other children" (Longobardi et al., 2001, p. 11). Anna noticed a similarity between the expressiveness of her own scribble and her peer's behavior. The first scribbles that were named by Stefano (boy, age 2 years 4 months), were composed of a simple circular trace and labeled "Motorcycle" (Quaglia & Saglione, 1976, p. 22) (see Fig. 1a and b).

> "We had observed that the child, right before the appearance of his 'Motorcycle' scribble, had begun to draw traces whose execution was frequently accompanied by the onomatopoeic sound 'Vroom, vroom', with which, actually, the boy indicated both motorcycles and cars" (Quaglia & Saglione, 1976, pp. 22–23).

Onomatopoeias do not have the sole value of identifying objects, but they also express one of their qualities, which is indicated by the noise made by such objects. From a formal point of view, with the appearance of onomatopoeic expressions, we see no important changes to the traces themselves, when compared to previous scribbles; however, something has changed in the use of these traces: we begin to see a change in the relationship between children and the objects they have drawn on paper.

Expressive Scribbles were the immediate translation of an internal condition of the artists or of an experience that they had lived. With the appearance of onomatopoeic scribbling, subjects begin shifting their attention from their own internal world to the outside world (Quaglia & Saglione, 1976). Onomatopoeias are the means through which children represent an activity carried out with a specific object. Children have discovered graphic play, and do not reproduce real-world objects but their characteristics, instead.

There is still no actual representation of reality in these scribbles (Longobardi et al., 2012), but the onomatopoeia, a dynamic trait of the object, can be seen as a *pars pro toto* (i.e., a single quality that represents the whole object), in harmony with the expanded perceptual organization of the child (Werner, 1940). Actually, children have no interest in the objects themselves: their interest is more oriented toward what they have *experienced* with the represented object. In other words, onomatopoeic scribbles are Transitional Objects as described by Winnicott (1971): they are no longer simple motor-emotional discharges, but they have become drawings of objects with parts that are connected between themselves and that exist independently from the artist, and help him or her in understanding and facing reality by mediating with it through paper.

4.4. Figurative scribbling

The first drawings of graphic objects do not have well-defined contour lines, but they are generally formed by a combination of different scribbles and traces that are organized between themselves according to spatial relations, in a manner very similar to the one suggested by Kellogg (1970). In other words, the resemblance between a drawing and the object represented is not obtained on a plain of formal structures, yet, but on a topographical one. We can observe the drawing of a face in which all the key elements, such as the eyes, ears, mouth and nose are represented by and equal number of scribbles (Quaglia, 1997). Therefore, observing the development of Stefano's "Motorcycle" drawing, we can see that scribbles of various shapes and sizes represent the wheels, handlebar and seat, and that the relation between them is mostly spatial (Quaglia & Saglione, 1976) (see Fig. 1c–e).

Briefly, the first figures created by children are not based on schemas that indicate the various parts of static objects, but they are, instead, combinations of scribbles, in a spatial relation between themselves, and they express dynamic qualities.

4.5. The achievement of figurative drawing

Children do not live in a static world, composed of static objects; they live in a dynamic world, where objects move and interesting things happen all the time. This is why we agree with Werner (1940) that, in the beginning, children are mostly interested in the dynamic properties of objects and not in their static ones (Lange-Küttner & Vinter, 2008).

Children do not discover an "analogy of appearance" (Luquet, 1927) between a line and an object, but, instead, they discover that the line composing the scribble – either good or bad, depending on its curvy or broken shape – can transform itself in the properties of an object that is good or bad, nice or ugly (Quaglia & Saglione, 1976).

Stefano (boy, age 2 years, 3 months), after playing with a crab on the beach, that was then taken away by the waves, drew a few traces with round and soft lines (i.e., a Good Scribble), which he called: "Crab" (Longobardi et al., 2012). The scribble showed no similarities between the traces made by the artist, and the subject of the drawing; but there was a noticeable correspondence between the quality of the lines he had drawn and the nature of the experience the boy had with the crab on the beach. To confirm such link, there was also a series of scribbles named "Bad waves", formed by very heavy lines, both horizontal and vertical, typical of Bad Scribbles. There was a clear reference to the waves that his mother had described as "bad" because they had taken away the crab, scaring and saddening the child.

In this phase, similarities between traces and objects are not children's principal worry, this is because their perception of the world is still physiognomic and not geometric (Lange-Küttner, 2011; Werner, 1940). Their gestures do not recreate objects, but they express emotions. At this stage, drawings are, first and foremost, graphic narrations of emotional states. Children do not recall random objects; they recall those objects that have animated their experiences in a pleasant or an unpleasant manner, and choose to reproduce their dynamic qualities and not their formal characteristics when they draw. Children perceive reality as a series of good or bad interactions with objects (Longobardi et al., 2012). Their priority, when drawing, is the evocative reproduction of an event, *through* the object and not *in* the object itself. In the drawing of the crab, which was recreated several times, Stefano (boy, age 2 years, 3 months), relived the pleasure of playing with the animal; and, similarly, by scribbling the bad waves he relived the unpleasant experience of losing it, thus gradually elaborating the experience (Longobardi et al., 2012).

Subsequently, the shape of the objects gradually increases in importance, substituting the representation of their dynamic qualities. Graphical traces slowly become the outline that encloses the object of an experience. In other words, children no longer describe what objects *do*, but describe instead what they *know* of the object; this is possible because they have interiorized the objects' dynamic traits (Quaglia & Saglione, 1976).

Figurative drawing, or the representation of objects as static shapes on paper, becomes possible when children develop, and begin to interiorize movement without feeling the need to recreate it on paper. The dynamic properties of objects are moved from the paper and into the mind's eye, where children can continue to imagine and conserve their movements.

4.5.1. Practical estheticism

As we have stated before, children, ages six to 11, no longer use the content of their drawings to determine if these are good or bad, but instead evaluate them on the basis of their formal execution and the respect of motivated logical rules.

In the elementary school of a seaside location, Quaglia (1997) showed two different drawings of boats to the children. On the first drawing, the boat had been drawn on the line of the horizon; in the second drawing, it had been drawn slightly under this line. The difference was justified by telling the children that one boat was closer to the shore than the other. The participants were asked to decide if the boats had been drawn correctly. All the participants answered that the second drawing, with the boat closest to the shore, was wrong. They said that the boat looked like it had sunk because the sea must stay under boats and not over them; if this happens it means that they are underwater.

Children adopt graphical logic in the execution of their drawings that can only be valid in a two-dimensional space; this accounts for all the phenomena that characterize children's drawings (e.g., transparencies).

We define this phase Practical Estheticism because esthetic criteria are individuated and defined in conformity with an apparent logic that evaluates immediate results and, based on the respect of such logic, drawings can be right and nice or wrong and ugly.

We shall supply a number of examples of practical logic. Quaglia (1997) showed children aged six, seven and eight years old, a drawing from Luquet's personal collection, entitled: "Potato Field", which exemplified the concept of transparency. Here, the potatoes had been drawn on the surface of the field and the drawing had no contour line. The participants were also shown a second drawing, by the same title, and were told that this drawing was also a potato field, but that the potatoes could not be seen because they were underground (the picture showed furrows, but there was no contour line and no potatoes appeared in plain sight). The participants had to choose which drawing was better. Everyone, without exception, chose the first drawing, and said that the second one was "wrong". They explained that it could not represent a real potato field because none could be seen; and also stated that someone could inadvertently draw something else over such a bare drawing. In regards to the absence of the contour line, the participants noted that a drawing that has no end is not a drawing (Quaglia, 1997).

The same children (ages 6–11 years) were also asked to evaluate two figures of a man riding a horse, portrayed in profile (Quaglia, 1997). The first man had been drawn with two visible legs, even though of them should not have been; the second man had been drawn with only one visible leg. In this case, also, the participants claimed that the second drawing was wrong because the man with only one leg could fall from the horse. When we explained to them that the man had two legs, but one was not visible because the horse's body was hiding it from view, the children were not convinced, and insisted that the man in the second picture had only one leg.

A potato field exists if it contains potatoes, and a man may only ride a horse if he has two legs. Drawings must be on a sheet of paper to exist; missing particulars cease to exist and cannot be imagined at this stage. Hence, the explanations given by children make it clear that they willingly choose to avoid representing on paper all the details they know about specific objects, but prefer to adopt different strategies to make their drawings as real as possible. Real, here, does not mean an identical recreation of reality, but it means that an object becomes real when it its representation contains all the key characteristics that allow it to be recognized beyond doubt.

In another experiment conducted by Quaglia (1997), the children (ages 6–11) were presented with the drawing – made by a peer – of a mother with a visible baby in her belly (an example of Transparency). No child had any doubt about the meaning of the drawing. Together with this drawing, the participants were also shown a second drawing, similar to the first, but with no fetus in sight; it appeared that the woman had a big belly. The participants were told that the woman in the second drawing was also a mother, and that she carried the baby in her womb, so it was naturally hidden from view. All participants answered that this could not be possible and that the second woman must have simply been fat and that she surely could not be carrying a child; for this reason, they considered the second drawing to be wrong (Quaglia, 1997).

Transparency is a phenomenon that is caused by the lack of depth of a two-dimensional medium. Children know that potatoes normally grow underground and cannot be seen in a field; they also know that you cannot see both feet of a horseman or fetuses in their mothers' wombs. If adults transfer three-dimensional objects onto a two-dimensional medium, children expect them to observe the laws of two-dimensionality, which state that if something is not represented, it does not exist. On a two-dimensional sheet of paper, it would be wrong to imagine something that does not appear directly; and things hidden behind other things do not exist, because they would have nowhere to hide on the paper.

There is one more peculiarity of children's drawings to which we want to bring attention: canonical representation (Freeman, 1980). Having previously defined this concept, we now wish to discuss it further.

In one of their most notable experiments, Freeman and Janikoun (1972) presented children, ages five to nine years, with a mug whose handle was not visible from their point of view, and therefore, was not presented canonically. On the other hand, the flower painted on the side of the mug was clearly visible when they placed the object in front of the participants, and asked them to draw what they saw. Participants up to seven years of age drew the mug with the handle and without the flower on its side; while participants aged eight and nine drew the mug without the handle and with the flower on the side. Freeman and Janikoun (1972) believed that this experiment showed that younger children preferred to draw key structural details that define the object, even if they are not visible from the artist's point of view.

Children do not neglect the visual elements of objects but, because their perception is dynamically characterized, and because their ability to learn is dynamic and not static (Werner, 1940), they also tend to consider the movements that a subject may act out on the object, when they are planning what to draw. For example, the handle of a mug, according to the dynamic and esthetic perspective, is not just a characterizing element of the object, but it is also its dynamic element (i.e., the element that makes the mug recognizable because of the action that a subject can perform with it) (Longobardi et al., 2012). Young children perceive objects with reference to what can be done with them: a mug without a handle suggests children the kind of movement similar to what they would perform with a glass. Therefore, in our perspective, canonical representation is also a *dynamic* representation of objects (Longobardi et al., 2001).

Dynamic Representation is defined as the type of representation in which actions, and not information, are what render the object's shape recognizable. The frontal vision of houses or people, and lateral vision of animals and vehicles in general, overall express dynamic qualities and not just static ones. These visions present the side of the object that allows the best comprehension of the movement that one may engage with it (e.g., the door to a house is frontal, a car's door is lateral) (Longobardi et al., 2001).

What Longobardi et al. (2001) have discovered on dynamic representation could help in understanding this construct a little better. The study involved 150 participants, ages five to seven years. The participants looked at three different drawings: an elephant, a mouse and a sheep. All animals were shown both frontally and laterally, at the same time. The participants were asked to point out in which of the two pictures the animal seemed to be moving. Of the participants interviewed, 80.9%

pointed out, immediately and without hesitation, the animals in lateral presentation. The animals in frontal view, according to the children, were static, as if they were waiting for someone of something (Longobardi et al., 2001).

Longobardi et al. (2001), asked 280 participants, ages four to nine years, to draw the picture of a butterfly in flight. The instructions given were the following: "Imagine that you're in a field and draw a beautiful butterfly that is flying towards you." The instructions suggested a frontal representation of the butterfly, which also happens to be considered a static form. However, no child drew the butterfly in frontal view. Ninety percent of the participants drew the butterfly as seen from an aerial point of view, and 10% opted for lateral representation. During the interview that followed the task, when participants were asked how they could tell if a butterfly was moving, they answered: "When you can see its wings clearly". The youngest children in the sample, also drew, beside the butterfly, a scribble that had the purpose of graphically indicating flight.

Only after children have reached eight years of age, the representation of movement becomes a mental task, that is, the dynamic qualities of objects are merely imagined. During the figurative drawing stage, shapes gradually lose their dynamic traits from a graphical point of view, and become more organized and stylized. The movement is transferred from the paper to the world of fantasy and imagination, through a process of interiorization.

4.5.2. Conventional estheticism

Upon reaching adolescence, child art transforms itself, progressively losing its characteristics and peculiarities. Gradually, children begin to submit themselves to perspective and adopt a single point of view when drawing. Objects acquire depth and organize themselves inside a newfound three-dimensional space, projected inside the paper. Luquet (1927), as we have previously stated, saw the passage to a more realistic drawing style as a form of intellectual development. Young people choose to limit themselves to representing a small portion of space, as it appears to the observer. Drawing as a copy of reality marks the ending of child graphicacy.

Adolescents confront themselves with the awareness of a shared reality that has its own laws, to which they must submit. Their drawings would not be understood anymore if they did not represent a common reality, with which anyone can interact. Besides perceptual development, there is also the awareness of new criteria that justify graphical representation for the purpose of effective social communication. The necessity of representing reality following the laws of perspective, which are conventionally established, substitutes itself to the devices that children had used up until then to represent a two-dimensional reality in a logical manner. At this new stage, a nice drawing becomes one that reproduces reality and its objects in the most correct manner possible. The new esthetic categories are accuracy and good composition. The images that were once created by emotions are substituted with those created thanks to the precise knowledge of the formal aspects of the objects of the outside world.

However, in this phase, the impoverishment of the imaginative and fantastical life that manifests itself in drawings does not reflect the impoverishment of the adolescent's internal world. On the contrary, part of the loss of expressiveness can attributed to adolescents' newfound ability to fully interiorize the dynamic qualities of objects. If children had felt the need of graphically representing objects for the purpose of externalizing and experiencing them, adolescents are now capable of mentally experiencing the various qualities of objects.

The question that many researchers have asked is: "Why does drawing seem to lose its expressive capacity and is usually abandoned by adolescents?" We believe that young people are aware that they do not have the correct tools for clearly expressing their new internal world, which has suddenly become complex and incomprehensible. What children saw as good or bad, ugly or nice; adolescents now experience in more complex ways (Longobardi et al., 2012). Concerning drawings, simple lines are not enough to express these new feelings anymore, and most adolescents are not taught how to use lights, shadows, colors and configurations to communicate their new emotions. In the youth population, hence, art becomes an ideal, and artists become exceptions. Golomb (2002, p. 45) believes that: "There are likely to be diverse reasons and competing interests that lead to this decline of artistic activity. Above all, alternative outlets for self-expression can be found in the widening horizons of middle childhood that afford access to sports and music, chess and computer games, and the opportunity for social activities. For some children, the technical problems associated with more advanced pictorial strategies spell the end of their pictorial explorations".

Despite its huge educational potential, drawing has always been an underrated pedagogical tool, and it has not been used generally as a learning aid or to foster the development of artistic taste or personality.

5. Conclusions

In this paper, we have reported and analyzed the most relevant theories on child graphical development, adding our personal interpretation of this phenomenon. Overall, children have a desire to realize themselves, and do so by employing all the tools they have in their possession. They have the necessary resources, at every level of development, to recreate their own existence on paper in a satisfying manner; adults need only to appreciate and support whatever children decide to create. As researchers and psychologists, we can decide to leave child art – as it has always been done – as a relatively uncultivated subject, considering it nothing more than a playful activity; or we can help to discipline it, like all other instructive activities, and make it the object of precise art education. A third option is to educate children to drawing, by simply letting them draw freely. Freedom here is not to be intended as lack of interest on behalf of the adults, but it implies supporting and favoring such a spontaneous activity by providing the correct tools and motivation.

The new discoveries in Psychological Science and the different approach we have proposed for the study of child art leave plenty of questions that require answers, such as: If drawing activity is reinforced by relationships, how does the different nature of a relationship influence this link? For example, most studies focus on mother – child interactions during drawing sessions, or on children's drawing activities at school, in the company of their peers, but what about fathers? Fathers have variable presences in the lives of their children, which range from being actively present and sharing parenting duties equally with their partners, to being practically absent. It would be interesting to investigate *how* and *if* father – child drawing sessions are influenced by the nature of the relationship between these two agents.

Moreover, if scribbling is dynamic and emotional, are there empirical ways to demonstrate this point further? Can we conduct empirical studies to see how this activity influences cognitive development? And, lastly, if both of the points stated earlier are correct, would it not be time to construct better and more precise assessment tools that exploit the link between scribbles, the external world and children's emotional perception of it, for the purpose of identifying early markers of child distress or other emotional manifestations?

Usually, graphical tests are administered from age four onwards and, before then, they are not employed. However, if we accept the notion that scribbles are representative of children's relationships with reality, we could already apply graphical tests at least from age three onwards and reap the benefits of the additional information that they would provide.

Our paper had the goal of highlighting the emotional and relational aspects of child graphical development, which are often overlooked in favor of a focus on the cognitive aspects of this phenomenon. Our aim was to bring these aspects to the attention of educators and other figures that play an important role in the lives of children today, thus providing them with yet another tool that they may use for understanding their complex world.

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