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"No One's the Boss of My Painting:" A Model of the Early Development of Artistic Graphic Representation

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Abstract

This article reports on the most recent phase of an ongoing research program that examines the artistic graphic representational behavior and paintings of children between the ages of four and seven. The goal of this research program is to articulate a contemporary account of artistic growth and to illuminate how young children's changing understanding and execution of the graphic representational task lead them to use paint in ways that might be termed "artistic." The multidimensional model of "painting development" presented in this report, informed by the findings of a longitudinal study, describes changes along three parallel but functionally independent dimensions: symbolic intentions, pictorial concepts, and expressive use of material.

> The arts might require cognitive processes–that is, processes of knowing in many senses…. "Cognitive" is a rather ambiguous word. It is certainly more ambiguous than many works of art…. Think of the danger that implies. But also, the opportunity (Perkins, 1978).

An informal survey of periodicals, web sites, and public lectures concerned with art and the professional art world suggests that the medium of painting by far receives the most attention. Yet, if educational research agendas are any indication, there seems to be little interest in how people learn to paint "artistically." While painting is included in most school art curricula (even if funding for painting supplies is not), little empirical research has examined artistic graphic representational development in the medium of paint (Matthews, 2003; Smith, 1972). One notable exception is Nancy Smith's (1972) important study of the developmental origins of graphic symbolization in paint, which this research hopes to amplify.

"Artistic development" in any medium is a complex and difficult topic to address. Questioning the "epistemological appropriateness" of conceptualizing artistic development as a distinct phenomenon, Anna Kindler (2004a) calls for "a significantly revised approach to the developmental question" (p. 228). In a comprehensive review of models of artistic development, Kindler (2004b) notes the absence of "systematic and consistent criteria, requirements, or values against which [artistic development] could be assessed" (p. 233). She graciously acknowledges that even her own research has not specified "developmental mechanisms specifically responsible for artistic production as opposed to other kinds of pictorial imagery" (p. 241).

It is hardly surprising that Kindler and others (e.g., Freedman, 1997; Wilson, 1997) have difficulty with accounts of "artistic development;" the phenomenon is too abstract and complex to examine empirically. In light of Kindler's analysis of the problem of artistic development, I have approached the topic from a different angle, with more modest goals. Rather than situate artistic graphic representational development within the broad context of another generic and global account of "artistic development," I looked for how young children's changing understanding of symbolic graphic representation leads them to use paint in ways that might be termed "artistic."

Despite widespread dissatisfaction with traditional models of artistic development that describe artistic growth as a linear progression leading to a single endpoint of visual realism, I was unwilling to abandon a developmental approach. After more than a decade of researching artistic graphic representation in paint, preceded by several decades of teaching in classrooms, I concluded that the changes in young children's paintings and painting behaviors could not be satisfactorily described only in terms of a quantitative increase in the repertoire of

depiction skills. The qualitative changes that were evident in children's understanding and execution of the graphic representational task required a developmental explanation.

In previous articles (Louis, 2005, 2007), I reported the findings of a cross-sectional study of the painting activity of children between the ages of four and seven and sketched out the broad contours of an account of artistic graphic representational development. The present article adds shading and colors to the earlier conceptual framework, and further refines and revises the multidimensional model introduced in the previous publications. This revised model, informed by a three-year longitudinal study of 26 young children videotaped in weekly painting sessions, captures both the regularity and variability of artistic graphic representational development in the medium of paint. An overview of the longitudinal study and a comprehensive account of the model that emerged from it are reported at the end of this article.

In some respects, the model simply provides a different way of looking at the behaviors, productions, and verbalizations characteristic of early graphic representational activity that will be familiar to anyone who has spent time with young children. When children are given the opportunity to paint, the painting activity of the youngest and least experienced children is predominantly exploratory, and they often react with surprise at the visual effects of their actions. In contrast, older or more experienced children demonstrate increased sophistication in their pictorial strategies, and as they become more familiar with the expressive properties of paint, they use it in service of their representational goals.

Between the ages of four and seven, children's graphic activity becomes increasingly organized by their symbolic intentions, and children make use of their growing depiction skills and knowledge of the material to realize their graphic representational goals. The model presented in this article attempts to isolate the independent contributions of these three dimensions: symbolic intentions, pictorial concepts and depiction skills, and familiarity with and use of the material. While much previous research has identified each of these factors as relevant to graphic representational development, no research has identified them as functionally-independent dimensions, each with its own developmental trajectory, that contribute to children's changing understanding and execution of the graphic representational task.

Because traditional assumptions about development and art have been examined critically in the process of revising the model of painting development, it seems premature to simply present a quantitative analysis of the observational data using the model. This article therefore is concerned with the process of model-building, involving both the application of theoretical analysis and the use of observational data rather than the application of a model to conduct an

analysis of the data. A comprehensive account of the quantitative findings will be reported in a subsequent publication. What follows will be a discussion of the complex issues of how to account for both regularity and variability in the developmental process, how to talk meaningfully about "artistic development," and how these considerations have shaped the revision of a model of graphic representational development.

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Conceptual Framework (with Hyperlinked Examples)

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Before this model of artistic graphic representational development is presented, a consideration of the constituent components (symbolic graphic representation, development, and art) is necessary. The following discussion of each component is offered not as a scenic detour on the journey to exploring the model, but rather as a panoramic perspective of the overall context for the excursion. Videotaped excerpts from the data of the longitudinal study are offered to illustrate important points.

Symbolic Graphic Representation

A discussion of symbolic representation might begin with the warning "Abandon all hope, ye who enter here." The term "representation" refers to something that is not present literally, a "re-presentation" or re-telling of an idea, experience or object (Sigel, 1977). However, various disciplines use the term to refer to both the process by which human beings create or apprehend referential relationships, and the product of that process. Thoughts and memories are the products of a process that some researchers describe as "mental representation" (Mandler, 1998).[1] Mental representation is distinguished from the process of "symbolic representation," which uses external "vehicles" pictures, gestures, words to establish relationships with "referents" people, places, things.

Symbol systems differ in the nature of the correspondence between a vehicle and a referent. Language establishes an arbitrary or conventional relationship between spoken or written words and the things to which the words refer (with the exception of onomatopoeic words like "boom"). As Eisner (1994) observed, the word "pain" has one meaning in English and another in French, a confusing circumstance of which many language students are painfully aware (p. 54). Graphic symbols pictures, prints, photographs, hieroglyphics, maps, and graphs communicate through an associative or "motivated" correspondence, a perceptual or

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[1] Mental representations are assumed, variously, to be innate or to arise in infancy from perceptual imagery, action or language (Mandler, 1998).

conceptual similarity between vehicle and referent.[2] A picture of a loaf of French bread, for example, refers to a physical loaf of French bread, even to an English speaker.

Following the practice of DeLoache (2004), the term "symbol" will be used generically in this discussion to refer to words, gestures, sounds, and images that serve a communicative purpose. Symbols are used to construct objective and subjective reality; to transmit culture; and to consolidate, extend, or create new knowledge (Eisner, 2002, 1979; Werner & Kaplan, 1963). While the understanding of symbols based on social codes and conventions such as words requires considerable prior and specific exposure, motivated symbols such as pictures are recognized immediately and effortlessly (Grill-Spector & Kanwisher, 2005). Recognition of motivated symbols is largely determined by structural characteristics such as shape, edges or volumetric properties, with surface characteristics such as color and texture playing a secondary role (Biederman & Ju, 1988; Hummel, 1995). The following example of 6-year-old Dominique's "whale drinking," an oblong shape with three curved lines at the top, illustrates this point.

While the capacity to recognize pictures is an arguably innate characteristic of both humans and animals, the capacity for symbolic representational thought and communication is uniquely human and evolves during the course of an individual's cognitive development.[3]

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[2] The extent to which even "motivated" correspondence is mediated by previous experience with graphic representations and by social conventions is an issue on which no consensus has been established (Bovet & Vauclair, 2000; Chandler, 2002; DeLoache, 2002, 2004), as are the similarities and differences between the perception of three-dimensional objects and the perception of markings on a two-dimensional surface that depict objects (Ittelson, 1996). To make matters more confusing, the scholarly work on the connections between ideas or experience and sounds, gestures, and pictures is fraught with pervasive terminological ambiguity. Some commentators use the term "symbol" to encompass all referential vehicles while others use it in very specific ways (Chandler, 1997; Deacon, 1997; DeLoache, 2002, 2004). Developmental psychologist Jerome Bruner (1965), for example, employed the term "symbol" to denote a representation that has no visual, or "iconic," similarity to its referent; while psychoanalyst Carl Jung (1962), semiologist Roland Barthes (1964, 1968), and philosopher Maurice Merleau-Ponty (1942, 1963) all used the term "symbol" to identify referential vehicles that are motivated by a perceptual or conceptual correspondence to their referents (Chandler, 2002).

[3] There is some controversy regarding the perception of motivated symbols such as pictures by animals and humans. The abilities of birds, non-human primates, and human infants to discriminate among two-dimensional representations and to recognize the similarity between pictures and the objects they represent continue to be the focus of research in comparative and developmental psychology (Bovet & Vauclair, 2000; Fagot, Thompson, & Parron, 2010). It is, however, generally accepted that the ability to differentiate between an object and its graphic representation is a uniquely human capacity. The intentional use of "dual representations" *(DeLoache, Pierroutsakos, & Uttal, 2003)* emerges in the course of cognitive development during the first year of life. A consideration of artistic graphic representational activity in early childhood thus requires a consideration of the concept of development.

Therefore, an examination of artistic graphic representational growth in early childhood must be situated in the context of understanding the process of cognitive development.

Development

A meaningful discussion of "artistic development" presupposes some clarity about the meaning of the term "development" which, like "intelligence," is a problematic psychological construct fraught with untenable assumptions and unsavory political overtones. The numerous objections to the notion of "development" that have been raised over the past several decades are largely in response to the frequent equation of all developmental models (including models of artistic development) with Piaget's (1926, 1952) influential theory of stages of intellectual development.

In the early part of the 20th century, Piaget articulated a constructivist and interactional approach to cognitive growth that still provides the paradigm for much developmental theory and research. However, Piaget also proposed a specific model of stages of cognitive development according to which all cognitive activity is determined by domain-general knowledge structures that emerge in a fixed sequence. All children of a certain age or developmental level in any culture would theoretically understand and execute all cognitive tasks the same way. These assumptions have been challenged on both conceptual and empirical grounds (Haith & Sameroff, 1996; Wellman & Gelman, 1992). While Piaget has made an enduring contribution to our appreciation of how children actively and adaptively construct their own understanding of the world, his assumptions about the linear, universal, and culturally-independent nature of children's growth and development have rendered the notion of broad developmental stages as out of fashion as a polyester leisure suit.
It has been suggested that Piaget, whose primary interest was epistemology rather than psychology, has been misread (Fischer & Silvern, 1985; Lourenco & Machado, 1996). Nevertheless, developmental psychology is generally regarded as having entered a "post-Piaget era" (Gopnik, 1996, p. 221). Much research conducted over the past 30 years reflects an understanding that development involves more variability than Piaget's theory can account for (or perhaps more accurately, as it has been understood or misunderstood) (e.g., Carey, 1988; Siegler, 1996b, 2005, 2007; Wellman & Gelman,1992). Rather than being culturally independent, developmental change is now understood to be powerfully affected by external mediating influences, including culture. Rather than being domain-general and "monolithic" (Siegler, 1996a, p. 179), development is recognized as being more local than global, with changes in one specific content area functionally independent of changes in other areas. Perhaps most importantly, development is no longer conceptualized as a unitary, linear progression or an immutable sequence of stages of psychological organization with specific endpoints that dictates children's understanding of any and all tasks.

Reflecting a similar dissatisfaction with existing explanations of graphic representational and/or drawing development (e.g., Gardner & Winner, 1982; Lowenfeld, 1943), a number of studies have demonstrated that children's visual productions fail to conform to a linear sequence of stages (Cox, 1992; Karmiloff-Smith, 1992; Kindler & Darras, 1998; Picard & Vinter, 1999). Alternative contemporary perspectives on artistic growth suggest that artistic development is better understood as a journey along one of many possible pathways rather than as a relentless march towards the single endpoint of visual realism (Freedman, 1997). "Pluralistic" models (Duncum, 1999) emphasize the variability of children's graphic activity. They identify evolving representational "repertoires" rather than "endpoints" (Wolf & Perry, 1988) that are used like "tools" from a "toolbox" (Parsons, 2003) to serve the communicative demands of the specific context (Kindler, 1999; Kindler & Darras, 1998) in order to make experiences and relationships meaningful (Burton, 2000; Eisner, 2002; Matthews, 2003; Smith, 1983).

The variability in children's graphic productions, drawings and paintings, reflects their evolving intentions. In terms of artistic growth, this means their repertoire of developing depiction skills and expertise with art media is put in the service of a changing understanding of the graphic representational task itself. In the following example, Samantha puts what she has learned about pictorial conventions and discovered about color mixing in the service of attaining her previously declared graphic representational goal, a ghost inside a pumpkin ("Come here fast!").

What, then, is the point of talking about growth and change—artistic or otherwise—in terms of "development" if children's behavior varies so dramatically under different conditions and in different domains? Why not simply describe the myriad domain-specific "learning" processes involved in the acquisition of knowledge or the mediating influence of social and cultural resources and leave it at that?

Variability within consistent systematic change. To be both theoretically sound and educationally useful, developmental explanations of growth must provide some organizing principles that account for systematic change while also allowing for behavioral variability. Classical developmental theories describe change in terms of replacing one limited set of responses by another limited, albeit more sophisticated set of responses, without accounting for variability. Learning theories and cultural-context explanations, by contrast, acknowledge the increasing variability of children's behavior as their repertoires grow, but do not account for systematic change. The reality is that children are not "slaves of their cognitive structures" (Siegler, 1996a, p. 4; cf. Johnson, 2003, pp. 102-104) or passive recipients of instruction, nor are they mere consumers and reproducers of cultural imagery.

The contributions of Heinz Werner might help to sort out this conceptual conundrum (Raeff, 2011; Werner, 1957). A contemporary of Piaget, Werner characterized development not in terms of a succession of supra-individual cognitive structures, but as a process by which the individual recognizes a wider range of possibilities while making choices that are increasingly dictated by longer-term goals and priorities. Werner observed that developmental change is characterized by increased differentiation—recognition of a wider range of possibilities—and increased integration actions that become more organized and goal-directed. With development, according to Werner (1957), the individual has a "clearer understanding of the possibility of employing substitutive means and alternative ends…a greater capacity for delay and planned action…[and is] better able to exercise choice and willfully rearrange a situation…" (p. 127). Notice the difference, for example, in Andrew's painting which records the action of moving paint around the page, ("I'm [racing the red](#)!") and Deonte's painting which records an imaginary event involving "Sponge Bob when it's Halloween and he's [walking over to Patrick's house](#) to tell him something that would scare him off."

Much current developmental research reflects the implicit influence of Werner's conceptualization of development as a process of differentiation and integration (Siegler & Chen, 2008; Siegler, Thompson, & Opfer, 2009). Siegler (2005) noted that children, after initial success, employed a variety of strategies to solve a similar problem, precisely when a conventional theory of learning might predict they would stick with successful strategies (p. 772). Rather than attributing the changes in children's strategies to context, content, instructions or other task variables, Seigler identified children's shifting choices as the source of their variable responses. As children recognize a wider range of options and as conscious intentions increasingly dictate their choices, their approach to cognitive tasks becomes, in Wernerian terms, more "differentiated" and "integrated."

Siegler's observations suggest a way of thinking about artistic growth that can accommodate variability without abandoning the possibility of identifying meaningful developmental regularity with all its significant educational implications. Graphic representational development then can be conceptualized as a process in which children's responses reflect a wider range of options, with their choices guided by evolving and increasingly stable intentions. Taking children's symbolic representational intentions into consideration reframes the discussion of what indicates artistic growth and change. Instead of searching for endpoints, describing repertoires or determining aesthetic worth, we can direct our attention to children's decisions, and look for indications of artistic development in their changing understanding of the graphic representational task itself.

To illustrate this point, compare the ways two of the study's young subjects name the subject matter of their paintings. Younger, inexperienced Jeffrey named and re-named his work

during and after the process of making an "eyeball." More experienced Isaiah in contrast announced his intention to "make a nice gorilla" in advance, and was faithful to those intentions while painting. Children's creative activity as guided by their evolving and increasingly stable intentions represents a clear developmental trend.

Nevertheless, as anyone spending time with children knows, even if they announce a representational goal in advance, sometimes their initial intention yields to a desire to "mess around" with a material and see what happens. Becoming intentional does not preclude being intentionally improvisational, as Andrew's robot and Anthony's raindrops illustrate. That said, the choice of an experienced painter to paint non-referentially is very different from the exploratory efforts of a pre-representational child who has not yet discovered the referential possibilities inherent in the paint.

What's Art Got to Do with It?

"Art" is a broader, more elusive, and problematic term than "development." If the domain of visual art includes drawing, painting, collage, printmaking, sculpture, as well as performance, eco, and conceptual art, it is not surprising that the goal of articulating a coherent account of artistic development remains elusive. The precise boundaries of visual "art" are indistinct. Kindler (2010) identified a continuum of definitions: at one end, "a discipline defined by its experts"; at the other, "any, even the most naïve, forms of human engagement with the visual" (p. 2). To complicate the issue, much of contemporary art is intended to transgress the implicit, if somewhat fuzzy boundary between what is art and what is not. Not only is there disagreement about a definition of art, but also about whether a definition is necessary or even possible (Kaufman, 2007). Nevertheless, the very difficulties of specifying the criteria for what the term "art" means reflect its vital and dynamic nature as a cultural phenomenon.

"Art" may then be as much a meaningful, if indefinable, cultural domain, as it is a category too broad to organize and direct educational research effectively. If "what is art?" is an unanswerable question, Goodman's (1984) question, "when is art?" (p. 142) might be more germane to a discussion of artistic graphic representational development. This question invites a consideration of when the choices children make in a specific medium exhibit attributes of the "artistic."

Repleteness. Goodman (1968) argues that images and forms are artistic when they are "replete" and make use of a range of graphic and conceptual options to capture the sensory and experiential qualities of the referent or establish social meaning. Replete images are "rich in the features and qualities that are relevant to conveying symbolic meaning" (Silvers, 1979, p. 35). Repleteness can be thought of as a kind of "thick description" (Geertz, 1973, pp. 6-10) in that it takes the viewer beyond the literal and establishes a context and/or states the

intentions and meanings that organize an act (Denzin, 1989, p. 33). To return to our loaf of French bread, a supermarket circular might include a photograph of a loaf of French bread, but a photographic layout of French breads in a magazine such as *Bon Appétit* would undoubtedly be more replete. The magazine layout not only shows what the bread is a baguette as opposed to a pullman loaf but also captures the experiential potency of how bread is soft and crusty evoking the smell, taste, and perhaps even memory of a pleasant dining experience. Replete representations elicit a variety of responses to both the intrinsic physical qualities of what is being represented and a wider range of connotative meanings.

Consider also the following replete representation that involves vastly different but equally vivid visual imagery of loaves of bread: Walter Kuhn's (1934) painting "Bread and Knife" of a loaf that has been sliced open. Kuhn used color and brushstroke to create contrasts in density and texture between the crust and the interior, offset by the soft, undulating tablecloth and the rigid steel knife. In addition to robust visual imagery, the painting communicates on a symbolic level, eliciting broader and/or deeper aspects of human experience such as the comfort of everyday events, among other possibilities.

However one defines art, it is likely that this definition would encompass Kuhn's painting. But what about the *Bon Appétit* photograph? Someone trained as a "commercial artist" produced it. Is that "art?" Fortunately, this question need not be answered here. It is enough to say that the photograph is replete, which is one, and only one, way of being "artistic." Goodman's notion of "repleteness" may be one promising criterion of the "artistic," but the term is embedded in dense and unwieldy theories of representation and aesthetic meaning that have "achieved notoriety rather than acceptance" (Arrell, 1987, p. 41).[4] Given that educational practice is more pertinent here than aesthetic theory, Goodman's term "replete" will be respectfully borrowed and applied to a limited degree to an examination of young children's changing understanding and execution of artistic graphic representational tasks. To address how young children come to use paint in ways that might be termed "artistic," the

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[4] Goodman's theories of representation and his concept of "repleteness" have been employed by Gardner and Winner (1982) in their studies of children's creation and evaluation of art. Their approach has been criticized as privileging conventions of Modernism (Kindler, 2010; Pariser, Kindler, & van den Berg, 2007). The stylistic conventions of Modernism may make certain types of "repleteness" more salient, particularly to the culturally-sensitized viewer. However, it is a mistake to confuse expression with Expressionism, and assume that the work of artists such as de Kooning is "more," rather than "differently," replete from that of Vermeer or Hokusai. Gardner and Winner's developmental model was linear rather than pluralistic, and their use of "repleteness" was evaluative rather than descriptive, and so it is assumed that many of the difficulties commentators found with their work will not be encountered here.

term "replete" will be used to refer to the contributions to and influences of the art material itself in conveying symbolic meaning.

While virtually any material can be used to achieve repleteness, even cow dung (OfiIi, 1999), this examination of artistic graphic representational development in early childhood concerns the medium of paint. Paint is a viscous substance, a pigment that is soluble in a binder that can be spread, mixed, thinned, and layered. These intrinsic properties endow paint with the potential to be used repletely and put to expressive ends. For example, Elkins (2000) describes how Rembrandt relied on the physical properties and expressive qualities of paint to capture various perceptual and experiential features in a 1659 self-portrait:

> Consider what is happening in the paint, aside from the fact that it is supposed to be skin. Paint is a viscous substance, already kin to sweat and fat, and here it represents itself: skin as paint or paint as skin, either way. It's a self-portrait of the painter, but it is also a self-portrait of paint. The oils are out in force, like the uliginous oozing waters of a swamp bottom. The paint is oily, greasy, and waxy all at once…. On the nose it's rude, but appropriate the paint is semi-solid, as if the nose were smeared with phlegm or mucus. There is drier paint around the eyes, and the bags under the eyes are insipissated hunks of paint, troweled over thin, greyish underpainting. The grey, which is left naked at the corner of the eye and in the folds between the bags, is the imprimatura, and the skin over it is heavy, thick, and clammy.… Rembrandt's thin mustache is painted with wiggles of buttery paint, almost like milk clinging to a real moustache…. (pp. 114-115)

Elkins refers primarily to the artwork of adult masters to illustrate the essential, even "alchemical," role of paint in conveying artistic meaning. However, his reference to the "expressive force" of paint (p. 7) is as relevant to this discussion of young children's artistry as it is of Rembrandt's. For example, 7-year-old Isabel may not be self-consciously trying to make "art," but intentionally or incidentally, she uses the material repletely to symbolically convey "it's getting dark," and her behavior and production can arguably be called "artistic." The notion that a representation is "artistic" when it is replete provides art educators with an epistemological "get out of jail free" card. If repleteness can be thought of as a sufficient, if not necessary, condition for the "artistic," then art educators no longer need to agonize about whether 4-year-olds (not to mention chimpanzees and elephants) can make "art." It is enough to say that young children explore a particular medium and then integrate what they have discovered in the service of representing their ideas and experiences artistically.

Artistic Graphic Representation in Early Childhood

Having taken at a number of scenic detours in our journey of context, we have now arrived at this paper's destination: a consideration of how young children's representational efforts in paint become artistic. The argument thus far is that a developmental explanation of artistic growth using paint must take into account children's changing understanding and execution of the graphic representational task. As children grow and learn to recognize the range of graphic representational options available to them, their intentions change. They discover an increasing number of ways to create symbolic vehicles that have inherent perceptual or conceptual correspondence to the referent. Some of these "motivated" correspondences take advantage of the physical properties and expressive qualities of art materials to achieve repleteness and thus might be considered "artistic."

Young children's drawings and paintings reflect the idiosyncratic richness of their experience and cannot be fully appreciated in visual terms alone. The sensory, motoric, and affective qualities of objects and events are more salient for young children than for adults, whose experience and communication are increasingly dictated by rationality, and social convention. The "sun" is a good example of how young children's configurations and images capture expressive features that are intrinsic to their experience of the object. Although the sun "travels" from horizon to horizon, young children almost always depict this ubiquitous symbol at the apex of its trajectory in their drawings and paintings. The front-and-center placement of what art educators term an "enclosure" not only conveys essential visual and spatial information such as directionality (up/down) and location (inside/outside); it also connotes broader aspects of daily experience such as the security and comfort of a familiar object that is "always there."

Burton (2005) argues that this kind of "sensory logic" originates in young children's embodied responses to exploring materials such as paint, clay or drawing media (p. 20). Early symbolic reference is strongly linked to children's discoveries about materials in that their interaction with paint or pencil moves thinking forward (Burton, 1980, 2005; Eisner, 2002; Matthews, 2003; Smith, 1979). As children explore the physical properties (capacity to leave a trace, viscosity), visual features (linearity, color), and the expressive qualities of various media, they discover similarities between their sensory and affective experiences with the materials and their world experience. These perceptual and conceptual insights into the mediating role of materials open up new representational options for children. In this example to illustrate, 5-year-old Philicia is beginning to match the visual effects she has made (shape, color, transparency) with the experiential aspects of her subject matter, being at the beach (Biederman & Ju, 1988; Burton, 1980, 2005; Smith, 1979, 1983).

Of course, the visual effectiveness of these early associations and the increasingly world-aware correspondences that are to come depend on young children's already-established graphic repertoire and their experience with the material. For instance, when young children draw the sun, they generally begin by outlining a round shape, an enclosure, at the top of the page or in an upper corner. Defining details such as lines radiating from the circumference are frequently added. If crayons or markers are used, the inside of the sun might be filled in with yellow, but usually only after the defining contours of its circumference have been delineated. It is not surprising that young children's drawings of the sun are composed primarily of lines, contours, and shapes enclosed by outlines. One obvious reason is that drawing tools tend to be pointed, and linear marks are what pencils, markers, and crayons do best. Another reason is that lines serve the symbolic intention of young children for what Arnheim (1954) termed "structural equivalence" rather than resemblance (Eisner, 2002, p. 101).

By contrast, tempera paint offers young children a wider range of representational options. When painting the sun, young children can call upon color, surface, and transparency, as well as lines, dots, and outlines to show shape, detail, and volume. Tempera paint is a viscous liquid, a suspension of pigment in a binding agent that is soluble in water. In addition to making lines, shapes, and marks, paint can be mixed, spread, thinned or layered. Paint is a material that offers young artistic beginners a rich array of graphic means and many opportunities for thick description.

This is not to suggest that young children's drawings—even those using paint—are necessarily less "artistic" than paintings, but that paint offers special features that crayons and pencils do not. Young children are less likely to use the physical properties of a drawing material "repletely," as defined in this paper. While repleteness is only one way of being artistic, it is usually easier to achieve in paint than in drawing materials for artistic beginners (Louis, 2012). A drawing might convey the sensory, affective, and visual qualities of the physical world through the weight of a line or the gesture of a mark, but these techniques are usually beyond the technical, and often conceptual, capacities of artistic beginners. As children become more experienced using drawing materials, they discover how various depiction techniques can capture sensory, affective, and visual characteristics of their subject matter and make more replete correspondences. However, this tends to be a subsequent learning.

The juxtaposition of drawing with painting is more concerned with educational practice than aesthetic theory. Most research on the development of pictorial or graphic representation focuses on drawing (see Kindler, 2004b, for overview), perhaps because it is not as messy as painting. However, "care must be taken to distinguish between the development of graphic competence and the development of artistic competence" (Pariser, Kindler, & van den Berg,

2007, p. 294). While research on drawing has contributed significantly to our understanding of graphic representation, it has hijacked the broader discussion of artistic graphic representational development. The consequence of conflating artistic growth with drawing development, and "iconicity" with resemblance, is that it hones in on advancements in pictorial concepts—occlusion, baselines, figure differentiation—and overlooks other indicators of growth such as symbolic intention or descriptive use of materials.

What if investigations of artistic growth were conducted using a broader variety of expressive media, as Golomb (2004, p. 331) and others (Burton, 2000; Matthews, 2003) have suggested? Would a wider range of indicators of artistic graphic representational development emerge, and might some of these be described as "artistic" or rich in features that capture the sensory, experiential, and visual qualities of the subject matter?

In one of the few empirical studies on artistic learning using a medium other than drawing, Smith (1972) observed that young children employed a wide variety of pictorial devices in their early paintings. In addition to lines, dots, and enclosures, the young children in Smith's study also spread, layered, and mixed colors to match certain physical properties of the paint with defining characteristics of the object, person or experience being represented. It is hoped that the following developmental model of early artistic graphic representation, informed by a longitudinal study of 26 young children, amplifies Smith's innovative and seminal work and elaborates upon her original insights.

Model of Painting Development in Early Childhood

The following schematic of the model of artistic graphic representation, hereafter called "painting development," is offered to orient the reader. A detailed version of the model with hyperlinks to videos from the data follows on pp. 18 – 22, after a brief discussion of the longitudinal study that informed it.

Components of the Model

The model of artistic graphic representational development in paint reflects the fact that most complex activities, such as painting, utilize a number of cognitive capacities. It can therefore be assumed that a particular graphic response of a particular child at any particular time is determined by more than one factor. The model identifies three levels of nested components that characterize early painting development: "dimensions," "indicators," and "options" (see Table 1). The broadest component or category is dimension. One of the three dimensions, *pictorial concepts*, concerns picture-making and depiction strategies. The remaining two dimensions of painting development, which have not previously been considered as independent factors, are *symbolic intentions* and the *expressive use of paint*.

The model identifies specific, observable behaviors—options—that reflect manifestations of particular aspects of graphic representation—indicators—within the three dimensions. These characteristic behaviors have been described in the literature on art education and developmental psychology, and will be familiar to teachers. The finest-grained component of the model, the options, reflects the increasingly differentiated and integrated nature of change for each indicator. These representational responses—behaviors, productions, and verbalizations—were identified from the data of a longitudinal study of 26 young children that is briefly described below. The options were assigned relative value, making it possible to describe the children's responses in relation to each other and to arrive at inferences about their representational thought and actions.

It may seem surprising that a model of artistic graphic representational development does not address the impact on children's artistry of external mediating factors such as visual culture or social interaction. The three dimensions identified in this model are not assumed to exhaust the range of possible contributory factors of painting development. I made a methodological decision to limit the study's scope to offer greater detail of the developmental aspects of change. Representational intention and activity are understood to be mediated by cultural, social, and environmental factors (Ballengee-Morris & Stuhr, 2001; Duncum, 1999; Freedman & Stuhr, 2004; Kincheloe & Steinberg, 1993, Kindler & Darras, 1998; Thompson 2003; Wilson & Wilson 1977, 1997, 2004).

Table 1   ***Multi-dimensional Model of Painting Development in Early Childhood***

Dimension l: Symbolic Intentions: The child's purpose or representational goal

Indicator 1: Relationship - How the painting corresponds to the phenomenon or experience.

Options

- Experiencing: A record of action ("I'm racing the red!")
- Re-experiencing: A record of something happening in the moment. ("Look! He's running.")
- Recording: A record of real/imagined experience (walking over to Patrick's house.)

Indicator 2: Idea Stability - The extent to which subject matter ideas are held stable in relation to the sensory pull and/or salience of the material.

Options

- Post Hoc: Fluid naming of changeable subject matter, after the fact: (an "eyeball.")
- Ad Hoc: Subject matter stabilizes once named, during the process ("The Little Mermaid.")
- Antecedent: Formulates subject matter idea, names it before the fact ("a nice gorilla.") parentheses added

Indicator 3 : Shared Meaning - The extent to which comprehensibility is important.

Options

- Idiocentric: Little or no interest in shared meaning ("He's in jail, he's in jail.")
- Egocentric: Presumes others will understand ("Look teacher! Rainbow boats.")
- Allocentric: Makes meaning for self and others ("Hey Missus Come here fast!")

Dimension ll: Pictorial Concepts: Graphic repertoire, depiction strategies, visual syntax

Indicator 4: Graphic Structure - Compositional relationships, relationship of whole to parts.

Options

- Global: Parts are distributed across the page (An orange patch is "the Halloween.") added period
- Segmented: Page is organized area—top/bottom, inside/out ("caged gorilla sitting down.")
- Cohesive: Page is a picture plane—baselines, white space ("walking to my neighbor's.")

Indicator 5: Graphic Elements - Pictorial details, relationship of parts to whole.

Options

- Nonspecific: Provides minimal distillation of visual features (Play Station II.)
- Salient: Provides one or two distinguishing visual details ("It's a whale drinking.")
- Defining: Provides personal/physical/cultural relevant visual features (a bat.)

Dimension lll: Being in the Material: expressive use of possibilities/limitations of the material

Indicator 6: Efficacy - Confident and competent management of material and tools.

Options

- Exploration: What the material does ("chocolate sauce"/Water play.)
- Discovery: What you can do with material ("blue on the bottom.")
- Mastery: Confident and competent use of tools and material ("No white.")

Indicator 7: Descriptive Use of Material - How paint captures sensory/experiential qualities.

Options

- Participating: Paint takes part in the representation ("sleeping robot"/drop, drop, drop.")
- Telling v. showing: Painting needs supporting explanation ("It's a beach.")
- Showing v. telling: Painting speaks for itself ("These colors mean it's getting dark.")

The Longitudinal Study

A brief overview of the three-year longitudinal study that involved the revision of the multi-dimensional model of painting development in early childhood is offered here to provide context. A comprehensive presentation of the methodology and a quantitative analysis of the data and discussion of the findings will follow in a subsequent publication. The emphasis in this article of my ongoing investigation of painting development is the revision of the model itself. A forthcoming publication will describe how the model was used to codify the data and determine if the indicators and options can be considered consistent criteria with which to assess painting development (Kindler, 2004b, p. 233).

The young subjects of this longitudinal replication study were in pre-school when the investigation began and in first grade when it ended. The original sample consisted of 27 volunteers—10 boys and 17 girls—ranging in age from 4.1 to 4.9 years of age. Twenty-one children—6 boys and 15 girls—continued in the second year and 7 boys and 12 girls completed the entire 3-year study. The children were videotaped once a week during the school-calendar year for three years in a natural setting, either their classroom or their school's cafeteria. Videotapes were made of the weekly painting sessions, hereafter called "painting events," in which four or five children painted in small group. Although I was identified as a "teacher" to the children, my role was limited to that of active participant-researcher, not mentor or instructor.

At the beginning of each painting event, the children were directed to "make the best painting you can today." If they needed additional encouragement, they were prompted with open-ended, non-referential questions such as "Which way will you hold your paper?" and "What color or shape will you start with?" An informal exit interview was held when the child indicated he or she had finished. The questions were always the same: "Is this exactly the way you want it?" and "How do you know [it is the way you want your painting to be]?"

Sixty-three painting events were videotaped in the first year of the study; in the second, 87; and in the third, 66; or a total of 216 painting events. At an average of 30 minutes per painting event, including exit interviews, the study yielded approximately 108 hours of videotaped data of young children painting. With at least 4 children participating in most of the painting events, the 216 events yielded more than 860 episodes of children making and talking about their paintings. The videotapes produced three sources of raw data: actual paintings, painting activities, and exit interviews. After repeatedly viewing the videotapes and making field notes, I used my observations to revise the model.

Two experienced art educators not involved with the study were recruited to join me in reviewing the random selection of painting events. Given the volume of raw data, a random

20% of the 216 painting events, ranging over the 3 years of the study, were selected for analysis. Each of the selected painting events was condensed into "data segments"—self-contained and self-explanatory paintings (MAKE), statements (SAY), or actions (DO). Each of us identified 10 data segments per painting event that we felt were intuitively meaningful and highly significant in terms of representational choices made by the children. We sorted these observable behaviors, productions, and verbalizations by dimensions, and then by the one indicator within a dimension that seemed to be the best fit. Finally, we assigned relative value to the data segments using the options for each indicator as a three-point Likert Scale.

An audit revealed a high degree of agreement between the judges on which data segments were most significant and to which dimension a particular data segment belonged. There was less agreement about which specific indicator within a dimension best described the data segment, but nearly unanimous consensus on the relative level of an option. The implications of this audit will be discussed shortly.

In light of the model-building rather than model-testing focus of this article, the remainder of this report details how close observation and rich description of the young subjects' graphic choices and responses were used to revise the model. The model and data of this study enjoyed a dialectical relationship rather than a uni-directional one in which the model dictated the a priori categories used to code the data. Videotaping the painting sessions allowed me the luxury of refining the model to better account for what the children did, said, and made rather than simply coding observations according to a pre-arranged scoring system. In light of these priorities, *the refinement of the model itself was the most important outcome of the study.*

Detailed Description of the Model

Dimension l: Symbolic intention. This dimension is concerned with children's experience of themselves as conscious visual communicators, and of their awareness of what they know or need to learn to realize their representational goals. As Siegler (2005) and Karmiloff-Smith (1992) have each noted, children's intentions will determine how they utilize the knowledge they have acquired. Change within this dimension can be observed by the nature of the relationship between the vehicle—configurations, designs, or images—and the referent—real or imagined objects, figures or events. Growth in this dimension can be observed in the choices and decisions children make across three indicators.

> *Indicator 1: Relationship* - The correspondence between the image and the phenomenon/experience being referred to. This indicator addresses the extent to which children differentiate marks, shapes, and color fields from the actions, experiences, and narratives that produce them (Matthews, 2003).

- Experiencing: *The painting is a record of a child's physical action.* Using both hands to hold the brush, 4-year-old Andrew vigorously spreads paint on his paper and announces he is "<u>racing the red</u>!"
- Re-experiencing: *The painting is a record of something a child perceives as happening in the moment.* Five-year-old Isaiah stops painting, looks up, points to his work, and announces, "Look! <u>He's running</u>."
- Recording: *The painting is a record of a child's experience, real or imagined.* Deonte, 6½ years old, describes his painting as "Sponge Bob when it's Halloween and he's <u>walking over to Patrick's house</u> to tell him something that would scare him off."

Indicator 2: Idea Stability - The extent to which children hold their subject matter idea stable in relation to the sensory pull and/or salience of the material (Burton, 1980, 2005; Smith, 1984).

- Post Hoc: *Fluid naming of changeable subject matter, after the fact.* Exploring the paint's viscous nature, 4½-year-old Jeffrey overhears a classmate announce that he is going to "make a rainbow," so Jeffrey quickly declares "Me too." The rainbow quickly becomes "my Daddy," then "Andrew," then, "you, Deonte" (his tablemate), and finally an "<u>eyeball</u>."
- Ad Hoc: *Subject matter stabilizes once it is named, usually during the process.* When describing her painting, 5½-year-old Carolina points to a blue patch and calls it "a girl." Then after identifying another shape as "the water," the "girl" becomes "The <u>Little Mermaid</u>."
- Antecedent: *A subject matter idea is formulated and named before the fact.* After listening to a story in his classroom, 5-year-old Isaiah walks purposefully to the painting table and announces he will "make <u>a nice gorilla</u>." He carefully selects a long brush, mixes brown, and makes a three-lobed shape. He encloses the shape with a line and explains, "He's in a cage and the zookeeper has the key."

Indicator 3: Shared meaning - Addresses the extent to which children are concerned with comprehensibility and being understood by others (Smith, 1979b, 1983).

- Idiocentric: *Has little or no demonstrated interest in being understood by others, is internally referential.* Five-year-old Mondy makes a figure and begins to surround it with bang dots, declaring to no one in particular, "He can't get out!" Then she chants in time with banging her brush, "He's in jail, <u>he's in jail</u>."
- Egocentric: *Presumes others will understand, is self-referential.* After several minutes of making multi-colored shapes by loading his brush with

several colors at once, 6-year-old Fernando looks up and says, "Teacher look! Rainbow boats."

- Allocentric: *Makes meaning for self and others, is externally referential.* After discussing Halloween plans with her tablemates, 6-year-old Samantha encloses a shape and cries out excitedly, "Come here fast!" Then she explains her idea about a ghost inside a pumpkin.

Dimension ll: Pictorial concepts. This dimension is concerned with the children's graphic repertoire as well as what they know or need to learn about denotative systems and depiction techniques/strategies. Change within this dimension in early childhood includes the incorporation of culturally-encoded graphic conventions into one's graphic repertoire in order to show an idea. This dimension has been examined in much greater detail in other studies (e.g., Freeman, 1980, 1995; Willats, Kindler, & Darras, 1997). It is hoped that these indicators regarding changes in pictorial concepts distill rather than dilute the findings of other studies. Growth in this dimension can be observed in the choices/decisions children make across two indicators.

Indicator 4: Graphic structure - Describes the compositional relationships within the pictorial elements of the painting, and the depiction strategies used to visually establish surface and space (Freeman, 1980, 1995; Kindler & Darras, 1997; Willats, 1997).

- Global: *The various parts of the painting — lines, patches, color fields — are distributed across the surface of the page without apparent regard to their relationship to each other in space.* Six-year-old Carolina points to an orange patch, calling it "the Halloween," then points to her name written across the page, and finally to "the fun place."
- Segmented: *The surface of the page is broadly divided into quadrants/sections that define space — up from down, inside from outside—and loosely relates the constituent parts to each other within an actual or implied frame.* In 5-year-old Isaiah's painting of "a nice gorilla," a "tree," the "caged gorilla sitting down," a "stick," and "Sponge Bob" are arranged next to each other on the page.
- Cohesive: *The page is a picture plane where graphic conventions such as baselines and white space unite the parts into a whole.* In a painting of "me walking to my neighbor's house," 6-year-old Deonte shows himself on a baseline with a house and a car nearby.

Indicator 5: Graphic Elements - Describes the extent to which children include defining or salient visual characteristics of various pictorial elements that are relevant to them (Burton, 2000; Kindler, 2010; Smith, 1979a).

- Nonspecific: *Minimal or basic features are described*. In a painting of "things he would do on a snow day," Deonte, now almost 7 years old, uses a rectangular enclosure to symbolize his Play Station II.
- Salient: *Details with affective as well as visual relevance are provided.* Six-year-old Dominique points to an oblong shape with three curved lines at the top and says, "It's a whale drinking."
- Defining: *Distinguishing visual characteristics (age, gender, relative size) are provided that include personally and/or culturally relevant details*. Jocelyn, 6½ years old, explains that her bat is trick or treating.

Dimension lll: Being in the material. This dimension is concerned with children's awareness of the representational possibilities and limitations inherent in paint, and how they use their knowledge of color, viscosity, or solubility to construct meaning. Change within this dimension is guided to a large extent by children's discovery of the visual consequences of their physical actions; that is, by changing the material, the visual effects are also changed and these can be put in the service of representation. This dimension has received less systematic empirical attention than the dimension of pictorial concepts (Louis, 2007; Smith, 1972). Growth in this dimension can be observed in the choices/decisions children make across two indicators:

Indicator 6: Efficacy - Describes how confident and competent children are mixing colors, handling brushes, and applying paint to the page.
- Exploration: *Children find out what the material can do*. Four-year-old Mondy smiles with obvious delight as she picks up a saturated sponge and squeezes it into the water container. Chuckling to herself, she repeats the process of dunking and squeezing while tablemate Anthony makes "chocolate sauce" by mixing all three primary colors together in one container.
- Discovery*: Children find out what you can do with the material*. Declaring excitedly that he had made "light blue," 5-year-old Anthony pauses, picks up the corner of the paper, and looks underneath as if to prove that "I put blue on the bottom and white on the top."
- Mastery: *Children declare/share what they know about the material.* Eager to demonstrate her own insights and expertise, almost 7-year-old Kadiann gives Samantha some unsolicited advice about mixing all three primary colors to get brown. "No white," she insists.

Indicator 7: Descriptive use of material - Describes the extent to which children use their knowledge of the possibilities and limitations of paint to capture the sensory and experiential qualities of the subject matter.

- Participating: *The paint participates or has a physical presence in the representational process.* After announcing he is going to make a robot, 4-year-old Andrew makes a figure in a square enclosure. He then spreads paint over the image and shouts, "Hey look! I'm covering it up. The robot has to go to sleep so I had to close the window." Anthony notices that his painted bang dots look like drops and says under his breath, "drop, drop, drop."
- Telling vs. showing: *The painting needs a supporting explanation (verbal or written) to be comprehensible.* Five-year-old Philicia makes the sun and a variety of shapes using a wide brush when she pauses and points to a bright yellow patch calling it a beach. When encouraged to expand, she tells us, "…and people was going swimming under the water."
- Showing vs. telling: *Painting speaks for itself and is visually self-sufficient and replete (rich with features that convey symbolic meaning).* Seven-year-old Isabel points to swaths of purples and violets and explains, "These colors mean it's getting dark."

Final Thoughts

Conceptual models should provide us with useful ways of sorting things into different buckets rather than forcing square pegs into round holes. A useful model of painting development should then help us make sense of the changing ways children understand and execute the representational task. A conceptual model whose development is outlined in this article was formulated to address the limitations of traditional accounts of graphic representational development, particularly to carry on the legacy of Nancy Smith, whose singular contribution to identifying the importance of materials in art-making has been overlooked (the exceptions being the work of John Matthews and Judith Burton). In this article, I have adopted a Wernerian approach to cognitive growth that provides for the increasing differentiation and integration of children's graphic representational activity without positing a fixed and linear sequence of stages. The model allows for increasing variability of children's behavior as their range of intentional choices and repertoire of depiction strategies grow and their mastery of paint as a material increases, rather than assuming that emergent behaviors replace prior responses. In response to Kindler's critique of existing accounts of artistic development, I have attempted to specify observable indicators of changes in children's representational intentions, graphic concepts, and use of paint as a material. Finally, to avoid the pitfalls of formulating a theory of "artistic development," I have argued that a more conservative approach might be to consider when, in the course of graphic representational development, children's activity might be described as "artistic."

In its application to organizing the data from the longitudinal study briefly described in this article, the model appears to have some deficiencies in that the raters did not consistently agree on which particular indicator was most significant in a given data segment. The high degree of agreement among the raters on the dimension and level of option suggests that while the distinctiveness of the indicators within a dimension is not sufficiently strong, the model captures the distinctiveness of dimensions themselves and the developmental progression reflected in children's activity. A deeper analysis of the data from the longitudinal study, which will be reported in a forthcoming publication, will reveal whether the specific predictions dictated by the model are confirmed: the functional independence of the three dimensions and the shift with age in distribution of selecting the level of option.

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