Handbook of Research and Policy in Art Education

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Robert, a 3-year-old, is seated at a table in a nursery class in London, England, facing a computer. He is starting to draw with electronic paint, using a mouse-driven, computer paintbox program. With this medium, marks do not appear on the surface against which he presses and moves the drawing instrument, the mouse, but on a separate monitor, vertically orientated in front of him. A few illuminated spots and dashes are already glowing on the screen, the product of his prior investigations. He is now trying to work out how he managed to achieve these visual effects. He is trying to coordinate the different actions necessary to produce a trace on the screen. Sometimes he presses the mouse button but forgets to move the mouse; sometimes he moves the mouse but forgets to press the button. He allows the mouse to come to rest, fingering it and looking up at the screen between times. He appears to thoughtfully study the device and ponder the problem. He does not utter a word, although he may be listening to the gentle advice of the investigator sitting next to him. Finally, using three very distinctive drawing actions, he manages to make colored traces appear on the screen. First of all he uses a vigorous arcing motion, the movement mainly issuing from his shoulder, the mouse moving repeatedly left and right. Then he makes several pushing and pulling movements, away from and toward his own body. Finally, he makes a continuous rotational movement, describing big ellipses on the table and causing segments of colored ellipses to whirl across the screen. While continuously moving the mouse in circles on the table, he looks intently at the colored lines as they furiously orbit the screen (Figure 13.1).

Here is another observation from another part of the world. Chinese children, between the ages of 2 ½ and 3 ½ years, sitting around a table in a childcare center in Singapore, are about to draw, using 2B pencils on A4 size, white cartridge paper. The children have been told that

1Note: In this chapter I have used the pronouns “she,” “her,” and “hers” throughout, except when I refer to the child’s caregiver, at which times I use the pronouns, “he,” “him,” and “his.”
FIG. 13.1. Robert, 3 years old, uses electronic paint.

they can draw anything they like. Some of them have not drawn before and a few of them hesitate, looking with slight bewilderment at the paper and pencils, and then up at the teacher. One such child apparently misconstrues the task to be one of writing. Her friend sitting next to her “explains,” not using speech, but only mimetic, elliptical, hand movements made in the air over the paper, suggestive of drawing rather than of writing.

The majority of the children, however, set off drawing immediately and with great enthusiasm. Many of them appear to investigate the properties of the medium, testing the pencil point against the paper surface and setting the pencil into motion, creating trails of graphite. Some the children stab the pencil repeatedly against the paper, making clusters of dots. Some markings are made with great speed, whereas at other times the children decelerate the pencil’s movement, studying closely the lines that appear. It is not long before carefully controlled shapes appear, not always made slowly, but that nevertheless appear to be the product of purposeful construction rather than of accident (Figures 13.2–13.6).

As the children draw, some of them call out in Chinese Mandarin. One child says her drawing is a “Mo gui”—a “ghost.” Another child cries, “Wo de fei ji fei le!” (“My aeroplane is flying!”) (Figure 13.3). Others join in, adding new ideas; for example, “Wo de fei ji zhao huo le!” (“My aeroplane is on fire!”) (Figure 13.5), or make vocalizations that sound like the sirens of an ambulance or a fire engine. Sometimes, a child will lift her drawing paper into the air and move it gracefully through space (Figure 13.4) (Matthews, 2003) (Figures 13.7–13.9).

TRIVIAL ACTIONS OR THE BEGINNINGS OF VISUAL EXPRESSION AND REPRESENTATION?

I begin with these two descriptions of very young children’s activities in order to initiate a discussion about the role of art in development and learning. I refer to all the visual and performing arts, but I am going to focus on the example of drawing. It is possible that, in a few years, PCs will become “boring” (Gurterl, 2001) and “useless doorstops” (The Economist, 2001, p. 12), but I think it is always going to be the case that making marks on two-dimensional surfaces, of one kind or another, is going to remain central to the way human beings think and live. I believe that analysis of early drawing episodes, like those described earlier, takes
Horizontal arcs and push-pulls, plus dots or points made by a vertical arc, or stab of the pencil, constitute First-Generation Structure. Shortly afterwards, in this drawing, the child also makes closed shapes into which points or dots are located. The topological relationship of inside and outside is encoded into 2D.

FIG. 13.2. Horizontal arcs and push-pulls, plus dots or points made by a vertical arc, or stab of the pencil, constitute First-Generation Structure. Shortly afterwards, in this drawing, the child also makes closed shapes into which points or dots are located. The topological relationship of inside and outside is encoded into 2D.

us straight to the heart of fundamental issues in art, education, representation, and human development.

In psychology, there is much controversy about the way in which very young children’s activities, like those described previously, should be interpreted. Should this be of concern to people interested in art education? Yes, because such trivial-seeming actions are in fact the beginnings of visual expression and representation. These actions signal the child’s discovery of semiotic systems, which will form the basis of later symbol use, without which thinking
FIG. 13.3. When horizontal arcs or push pulls are “opened-up,” as it were, a continuous rotation is formed.

is impossible. How we interpret the beginnings of children’s art also tells us a great deal about how we conceptually construe the development of artistic and aesthetic thought through later childhood and into adolescence. Conceptualisations about development and education are often tacit, unconscious, and unarticulated. Yet, these unquestioned assumptions have profound effects on the way we provide for what is crudely termed art education and how we understand its role in the development of mind as a whole.

IS THIS JUST SENSORIMOTOR EXPLORATION?

In considering the two previous observations, some people will allow that the children are learning to coordinate motor actions and use tools. This is probably as far as agreement will go. From here, there will be a dramatic divergence of opinions about the ways in which learning takes place and how this learning should be supported. For example, some people will argue that children learn to use tools (be they computers, pencils and paper, or anything else) only by imitation and instruction from adults around them, whereas other people might take the opposite stance, arguing that, although children may need some help (perhaps with complicated devices like computers), children more or less find out how to use tools, “naturally,” by themselves (for a new approach to children’s use of electronic and lens media, see Ma Ying & Leong, 2002, and Chan & Matthews, 2002, forthcoming).
FIGS. 13.4–13.8. These drawings represent the dynamic and configurative aspects of an airplane’s flight and subsequent crash. (It is important to note that, with the exception of Fig. 13.7, similar action representations, which record trajectory and moment of impact—including airplane crashes—occur prior to the September 11, 2001, tragedy.)

FIG. 13.4. This 3-year-old discovers the important structural principles of crossing lines, attaching lines to a baseline (especially at approximate right angles), attaching lines to the beginnings and endings of lines and making direction changes in continuous contact lines. He uses these dynamic structures to describe an airplane’s flight. “Wo de fei ji fei le,” he cries, in Chinese Mandarin (“My airplane flies.”). This then is an action representation; it encodes the movement of an object.

As for further levels of meaning, at least in terms of expression and representation, according to many theories both old and new, there simply are none. The vast majority of traditional and current studies on the development of children’s art, although acknowledging that such episodes signal the beginnings of tool mastery, claim that otherwise they mean nothing. Such theories profoundly and destructively influence education.

At this point it is important to note that there are a few writers who do not subscribe to the view that these episodes mean nothing. The work of Wolf and Fucigna (1983), Chris Athey (1990), Costall (1993, 1995, 2001), and Kindler and Darras (1997, 1997a, 1997b), for example, makes the point quite explicitly (in their different ways) that the beginnings of drawing are important. But these are the notable exceptions. Although many people might concede that the previously cited behaviors are expressive in a reflexive, hystrionic sense, most people would not consider the actions as the intelligent expression of emotion or the mindful representation of events and objects.

Yet, a deeper analysis of the drawings, both as process and artifact, reveals that they are elegantly orchestrated and have profound meaning. Some of the children make markings that appear to be the product of exploration of the materials in themselves. Other children produce shapes that might possibly be intended to represent something—though the representational
FIG. 13.5. In contrast, his friend sitting next to him draws a configurative representation of an airplane. He makes an elongated closure to represent the closed volume of the airplane. He captures the shape and structure of an object. He encodes inside and outside relationships. Perhaps the internal closures represent windows, or people, or both. Additionally, the child is able to elongate the closure to describe the salient length of the fuselage. After producing this drawing, he physically picks up the drawing paper and moves it gracefully through the air, as if “flying” his drawn airplane. This behavior forms another kind of action representation. He is trying to link configurative and dynamic aspects of the object.

intention is far from clear in terms of likeness to the shape of any physical object. One might also notice that in this single session, some of the children move from the former type of drawing to the latter.

For some people, it is tempting to account for this change in terms of an “age-stage” relationship, with children moving from “primitive” to “advanced” modes of drawing as they grow older. This notion derives from theories initiated over a century ago, including that of Sully (1895), reformulated during the 20th century by Buhler (1930), Piaget and Inhelder (1956), and Lowenfeld and Brittain (1970) and which continue to exert influence in more recent years (Cox, 1993; Selfe, 1983; Snyder, 2000; Snyder & Thomas, 1997; Thomas & Silk, 1990).

This is indeed the conventional wisdom, yet it turns out that there is a great deal wrong with this conceptualization, as we will see later. What is meant by the terms “primitive” and “advanced” (and other similar terminology) typically used to describe this staged development? What gauge of measurement is being employed? If, for example, the gauge implies developmental increments from supposedly inferior, chaotic-looking, haphazard “scribbles” to shapes more clearly defined in terms of line (and, therefore, supposedly “superior”), the theory straightaway runs into difficulties. In fine-grained analysis of children’s spontaneous drawing actions, like the episodes described previously, it is sometimes the younger children who form clearly delineated shapes, whereas some of the older children seem to make haphazard looking
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FIG. 13.6. A 3-year-old Chinese girl makes this closed shape and then, underneath it, some intense push-pull marks, while she cries out, “Wo de fei ji zhao huo le.” (“My airplane bursts into flame.”) In drawings like this, a contrast is made between the initial coherence and the integrity of a closed volume and its subsequent destruction, often represented as explosive marking.

configurations. Moreover, some other children, who commenced by producing clearly delineated shapes, seem to “regress” to make apparently haphazard drawings. Are such cases merely the “exception which proves the rule”; merely little dips in a developmental graph which, overall, steadily climbs toward the peak of “correct” representation? Or do they signal more serious flaws in a classical “stage theory” of development?

At a larger scale of analysis, it is often argued that there exists, in general, an overall stage-by-stage progression toward the goal of the “visually realistic” image. But what does this mean? In other studies I made, children between 2 and 4 years of age were presented with opaque and transparent cubes to draw (Matthews, 2001a). Although it might be said that, generally speaking, as the children grow older, they try to capture more view-specific information in their drawings—that is, information about the shapes of the objects as observable from their own stationpoint—the ways in which this is achieved are not predicted by stage theory (Matthews, 2001a & b) (see Figures 13.10–13.13).
FIG. 13.7. This 2-year-old uses both dynamic and configurative modes to represent a terrorist suicide plane about to impact against the side of a building. Again, she captures inside and outside relationships. The interiorized marks may represent a combination of windows and people. The explosive marking registers moment of impact. She also encodes the salient extension of the shapes of both objects, the tower building and airplane, along a longitudinal axis and a lateral axis, respectively.

Moreover, in contrast to the popular assumption, these and other observations often show that children seem to observe and encode the visible aspects of the objects in their earliest drawings. The representational approaches or systems children employ remain invisible to most observers because they are not described by conventional theory—nor can they be. Most developmental theories describe a progression from meaningless mark-making through a symbolic, rather than a representational, stage and finally to a visually realistic stage. This journey is usually described with important landmarks in representation reached at roughly similar ages.

In contrast, new theoretical approaches reveal that children capture representational information about movement, structure, and vision in their earliest drawings, in a purposeful experiment with visual and dynamic structure. Moreover, the individual’s route through her developmental landscape is unique; dependent on a bewildering variety of factors that can never be described in advance by a simplistic, linear, stage theory. On the other hand, nor is it correct to think that development is totally idiosyncratic. It is equally mistaken to conclude that development is totally without “biases” or “values” (Edelman, 1987; Thelen & Smith, 1994; Thelen, Schoner, Scheier, & Smith, 2000, p. 184).
FIG. 13.8. The differentiation, permutation, and combination of structural principles, closure, and right-angular attachment allows this Chinese Singaporean 3-year-old to make this complex configuration. Developments of right-angular attachment, include core and radial (closed shape with radial lines attached at perimeter, to the right), and U shape on a baseline. These latter closures are elongated (perhaps representing “wings”) attached at approximate right angles to a single, elongated closure (perhaps representing airplane “fuselage”).

So is there a way to reconcile what appears to be, on the one hand, an orderly “stage like” development with these contrasting and contradictory variations? What determines the change the child makes from one moment to the next? Are the children moving from one drawing procedure to another with the passage of time; and if so, does this imply a sort of “developmental time,” implicit in most developmental theories, involving a mysterious, unseen process vaguely termed “maturation”? Or is it a moment-to-moment time, involving here-and-now practice within a social and cultural environment, with physical materials, which (in these
FIG. 13.9. A complex configuration that combines, closure, core, and radial right-angular attachment, and a development of crossing lines, its grids. This drawing also describes a complex narrative about the journey of an airplane.

examples) are themselves the product of human culture? We might suggest that these different time scales are one and the same. Yet, given that children clearly do not develop with a uniform, clockwork predictability, it is difficult to see how such a confluence can be possible. Here, as elsewhere, we will encounter curious paradoxes in accounts of development.

MEDIA DIFFERENCES

Further argument will pivot around the differences in the drawing materials used by the children: traditional versus electronic media. Are these to be considered completely distinct activities, each with its own unique characteristics and task demands? Do media differences cause substantially different patterns of development in visual expression and representation? The rhetoric of IT entrepreneurs would often have it so, yet there is no research evidence to justify this claim. For example, Robert, in the previous observation, in addition to using e-paint, uses traditional materials, including pencil on paper. There are, of course, obvious differences between his electronic painting and his pencil and paper drawings (Matthews & Jessel, 1993a, 1993b). Some of these media differences are rather startling and demolish certain cherished notions of staged development. For example, John Jessel and I found that, in contrast to children’s use of physical pigments, when practical and other constraints put a limit on the selection and number of colors children can use, when using a computer paintbox program, 3-year-olds may be capable of managing a palette of hundreds of colors. At least some abilities, once thought
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FIGS. 13.10–13.13. These drawings represent very young children's representation of a cube set placed before them. Although some of the very youngest children's drawings are unrecognizable as views of the objects, they are descriptions in which topological and dynamical features of the cube are represented in a process that captures the children's changing attention to the object in relation to the drawing process. Such drawing processes are not satisfactorily explained by simple classification into either intellectually realistic or visual realistic categories.

FIG. 13.10. Lee Mei Hong (2 years, 11 months) uses a line which bisects points along a route. This is an example of the use of the attractor, collinearity. She may use it to represent a surface which has significant landmarks along its route—corners or edges.

tied to a “developmental stage,” have more to do with the possibilities of the specific medium (Golomb, 1974, 1992, 1993).

Yet, despite significant differences among media, it is equally true to say that, in other respects there are some remarkable resemblances between Robert’s e-paintings and his pencil and paper drawings, for example, in terms of certain shapes and the actions used to produce them. For instance, he deploys a horizontal arcing, push-pulling action and a continuous rotation to trail colored lines around the screen. These are first-and second-generation structures we observe in the Chinese children’s use of pencil and paper. These seem to be deep structures found in children’s earliest drawings throughout the world (Matthews, 1999, 2003).

SOCIAL AND INTERPERSONAL CONTEXTS

What about the adult supervision of these activities? Do children need any? Some famous pioneers of children’s art make the claim that children need little adult supervision, and some go so far as to shun any adult help at all, insisting that this will “corrupt” a “natural” development (Cizek, in Derham, 1947, 1961; Kellogg, 1969; Viola, 1942). At the other end of the spectrum of
FIG. 13.11. Oh Kai Lun (4 years, 5 months) tries a variety of ways to represent the cube. He may be combining information about multiple faces of the object which join at vertices. This is achieved in two main ways: members of a new family or a set of structural principles. One way is to make a grid, which suggests joined multiple faces; the other way is drawing separate, discrete shapes and abutting them together.

FIG. 13.12. Chua Wei Li (3 years, 4 months). After drawing a front face of the cube as an approximate rectangle, Wei Li draws a separate, discrete, second face which she abuts to the first face. She manages to distort this second shape out of the rectangular, skewing it to the right. She may be trying to show the top face receding from the viewer.
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FIG. 13.13. Ang Yee Fong (4 years, 10 months) moves through a series of experiments, starting with undifferentiated closure, to the addition of faces, one to another, the shapes of which she carefully transforms in order to arrive at possible views of a cube. In this case, the denotational function of the line is changing to represent interior edges, in which faces are conceived as sharing boundaries rather than as individual, discrete shapes (Willats, 1997).

child-art pedagogy are people who maintain that children’s learning is dependent on imitation or instruction from adults (van Sommers, 1984; Cox, Cooke, & Griffin 1995).

During the drawing session with the Singaporean Chinese children, a kindly smiling teacher crouches down close to the children in turn and talks to them about their drawings. During Robert’s investigation of the computer, he receives advice from the adult sitting next to him. How, if at all, does adult intervention affect the childrens’ actions? Is there an optimal type of interaction that will assist development; and if so, of what does it consist?

Cultural exemplars that surround the child do indeed play a part in development (Martlew & Connelly, 1996; Wilson, 1985, 1997, 2000, and this volume; Kindler, Darras, & Kuo 2000; Kindler, this volume). This and other research show that the process through which development interacts with culture is subtle and complex and is by no means a straightforward copying or following of instructions. Robert finds ways of operating the mouse which have not been suggested by, or copied from, the adult companion (for example, a swivelling action of the mouse upon its own axis—Matthews & Jessel, 1993a, 1993b).

Similarly, the Chinese children find ways of using the pencil and paper medium that are neither advised nor even dreamed of by their teachers. In a later observation, these same children (between 3 and 4 years of age) produce images, the likes of which they could never have encountered in their visual and pictorial environment. Consider Figures 13.10, 13.11, 13.12, and 13.13, which represent cubes placed before the children, with the request that they draw these from observation (Matthews, 2001b). These drawings capture the structure of the object in relationship to the drawing surface and in relation to the child’s changing attention over time. Piaget might have termed these drawings “intellectually realist,” but a careful reading of his later theory shows that he did not intend a rigid dichotomy between “intellectual realism”
and “visual realism” (Beilin & Pufall, 1992) as today’s conventional wisdom has reduced his theory. The children use dynamic systems that capture the structure of the object irrespective of viewpoint and in relationship to the drawing surface and to their own changing perceptions and understandings of the objects. Note that many of the children are quite capable of drawing simple rectangles, and indeed this is the first solution to present itself to them. Significantly, although their teachers are delighted with this solution, the children clearly are not and persist in making drawings that are not like any known image of the object they could have seen before. The point I am making here is that, whereas drawings like this are habitually regarded as the consequence of some failing on the part of the children, to either perceive or produce the visual shapes of an object, on the contrary, the children are shown to be quite capable of producing rectangular shapes that may serve as analog for the visual array, which are found satisfactory by adults. However, the children themselves are clearly dissatisfied with this as the key to the solution of representing the object. They are clearly trying to do something else (Arnheim, 1954, 1974; Matthews, 2002). This “something” warrants their complete attention to the drawing task, from which they are almost completely indistractible.

**CULTURE AND RACE**

It is hard to conceive of a child’s encounter with visual media outside of a social context of some kind, and research does indeed show that children’s art is influenced by the images they see around them (Wilson, 1985, 1997, 2000, this volume). Nevertheless, it is crucial to grasp that a simple imitation model is insufficient to account for the process of development. The interaction between the social group development and the individual development involves systems we understand very little.

If we were to link these questions with other vexing ones about the differences between the races and cultures to which the children belong, the result would seem to be a complicated puzzle! Will there be a significant difference in the way you learn to use tools depending on whether you are a Chinese child living in Singapore or a young Caucasian living in London, or whether you belong to some other ethnic group from another place? If so, what are these differences? Are these differences of **content** (or “subject matter”); or are they differences in **structure** (by this term I mean the combination and permutation of lines, shapes, forms, colors, and actions as entities in themselves), or both? The effects of acculturation in children’s art, as revealed by research, demolishes any simplistic “universalistic” model of development (see Kindler, 1996a, 1996b, 1997, this volume; Kindler et al., 2000; Wilson, 1985, 1997, 2000, this volume). On the other hand, there is ample evidence to show (contrariwise) that, especially in infancy, some aspects of children’s drawing throughout the world are essentially the same, certainly in terms of structure and often in content too. How can both these apparently contradictory data be simultaneously true?

There is a striking resemblance between Robert’s drawings (both in electronic paint and in pencil) and those of some of his Chinese Singaporean peers, both in terms of shape and in terms of the actions that produced them. If some aspects of development seem universal, and other aspects seem to vary; what is it that develops, and what is it that varies? Does it make sense even to ask this question? That is, can we separate nature and nurture? How do we describe development in such a way as to resolve what appear to be irreconcilable conflicts among different interpretations?

At this point, some readers might be asking: Why make such a fuss about such trivial actions? What have they to do with either art or education? What difference will it make to their education if children do not do these activities at all? The answer to these questions is that actions such as those described previously play a fundamental role in development and
learning. These apparently trivial behaviors are emergent representation and expression. To suppress early modes of representation (representation here meaning the way we give form to objects and events) and expression (expression here meaning the way we give form to emotion) is to limit the extent and depth to which the child can make an infrastructural investigation of semiotic systems essential to her survival.

How you understand (or misunderstand) the development of art in childhood will set up a train of consequences in terms of how you plan learning experiences for children. Some designs for learning will stimulate and promote development. Some will not. This chapter argues for the need for a developmental explanation of that which we term children’s art; a theory that describes the changes which occur in children’s representation and expression, not in terms of a gradual adjustment to the requirements of the supposed content of the “subject-area” “art,” or in terms of the gradual “correction” of children’s of representational models, either external or internal, but in terms of a process spontaneously generated from within the child in relation to the physical and psychological environment; and in response to the properties of the medium; a process driven by the child’s own intentions, motivations, and priorities (Light, 1985).

THE IMPORTANCE OF CHILDREN’S SPONTANEOUS ART

I stress the need to understand and support the spontaneous art of children. The children described previously have not been given a set task. It is especially important at the present time to reaffirm the significance and meaning of children’s spontaneous drawing, painting, and other forms of representation and expression. Children’s spontaneous use and organization of visual and other media plays a central role in the development of intelligence; yet, tragically, there appears at present to be a general devaluing and downplaying of young children’s spontaneous art (Costall, 2001). The truth of this is easy to see if one considers any number of “national” curricular initiatives that, even though they might span occidental and oriental cultures, are curiously similar (Berliner & Biddle, 1995; Kelly, 1990; NIE Corporate Seminar, 2001; Simon, 1988).

A SCRIBBLING STAGE, OR THE BEGINNINGS OF EXPRESSION AND REPRESENTATION?

The observations with which this chapter started are of the phase of drawing which a classical model of development terms the scribbling stage. According to this traditional approach, these markings are not really drawings at all. They are usually considered meaningless. This, as we will see, turns out to be catastrophic misconception. This mistake undermines our understanding and support of the beginnings of representational thought and has serious repercussions on the way we understand and provide for later visual expression and representation in the arts.

As I noted earlier, a few people do appreciate the very beginnings of representational and expressive thought (including Athey, 1990; Costall, 1993, 1995, 2001; Darras & Kindler, 1997; Kindler & Darras, 1997a, 1997b; Wolf & Fucigna, 1983). However, these new theoretical approaches are exceptions to the general denigration and incomprehension of spontaneous early representation.

As Wolf and Fucigna (1983) point out, given discoveries made about other aspects of infant cognition, the misconceptualization about the beginnings of visual art is anomalous. Ingenious studies now reveal hitherto unexpected precocial competence of newborns in their perception of objects and events, and in their preverbal communication skills. Yet, no analogous level of infant cognition is considered applicable to very young children’s use of visual media. In
some respects, a recent theory of the modular structure of the brain, which posits specialized areas designated to particular functions rather mitigates against the idea of transference of skills from one domain to another. For example, Steven Pinker, arguing for the theory of neurological modularity and against the idea of the brain as a sort of all-purpose, symbol-making device, writes of the “grammatical genius” of very young children while simultaneously claiming that “...a three year old...is quite incompetent at the visual arts...” (Pinker, 1994, p. 1994). This view is shared by many; yet, it is both sad and ironic. As we will shortly see, children have visual systems of expression and representation long before speech but early painting and drawing episodes also share a similar structure with that of conversational language (Chafe, 1994; Matthews, 1999). These expressive and representational modes are emergent at the outset of development, and their structural possibilities are, like those of language, infinite. Although it seems to be the case that the brain is composed of systems dedicated to particular forms of processing, this turns out to be only half the story. It is not the separateness of these sensory and cognitive domains which is their most significant feature, but rather their cooperative interconnectedness (Thelen & Smith, 1994; Thelen et al., 2000).

At present, and albeit with a few notable exceptions (references as above), it remains true that early drawing or paintings are, at best, considered sensorimotor practice and preliminary investigation of materials, and random and meaningless in terms of expression and representation. Whether the materials derive from electronic media or from paper and pencil technologies, such exercises are usually considered motoric rather than mindful, physical rather than mental. This attitude stems from traditional developmental theories which assume the “intellectual” to be distinct from (and superior to) the physical, the dynamic, and the visual. According to any number of theories, increases in “cognitive maturation” gradually coupled with the “physical” mastery of objects will eventually allow “proper” drawing to take place (Lowenfeld, 1939, 1967; Peter, 1996; Piaget, 1956).

According to a classical model of development and its variants, the drawing episodes described earlier are the first faltering steps in a long march toward “accurate” representation. The earliest “mark-making” does not even win the uncritical and sentimental approval with which later childhood drawings are sometimes greeted, drawings which, albeit strange-looking to some adults, are at least recognizable as attempts to represent the shapes of things. This traditional model conceives of development in the visual arts as a progression from supposedly inferior, primitive forms of representation, through a sequence of successive “stages” to supposedly increasingly superior forms, until the final endpoint of “correct” representation is reached.

THE PARADIGM OF VISUAL REALISM

The presumed destination of this developmental journey varies from time to time and from culture to culture, but the reader should know about one influential terminus and the sequence of famous landmarks en route. This is the supposed journey toward “visual realism.” To readers acquainted with modern and contemporary art, it may seem anachronistic to measure children’s drawings in terms of how “visually realistic” they look. Many will argue that no sophisticated art educator nowadays expects educational outcomes in terms of photographic or linear perspective verisimilitude to external, physical reality. Some may claim that conceptual skills now replace the emphasis on the “retinal” and on the motor skills required to produce it.

Yet, the paradigm of visual realism, in various guises, remains persistent and pervasive. Despite recent research, curriculum guides based on the century-old premise that development moves from inferior to superior modes of representation and culminates in a visually realistic endstate, continue to be published today (e.g., Bates, 2000; Peter, 1996).
By describing this paradigm and the influence it continues to exert on the interpretation of “children’s art” sets the stage for a discussion about alternate approaches to development in the visual arts. Some of these approaches are radically different from the traditional model and its variants and resituate that which is termed art education, at the center, rather than at the periphery of the curriculum.

### THE STAGE THEORY OF DEVELOPMENT IN THE VISUAL ARTS

One classical stage theory of development in the visual arts derives from a hybrid of the work of Jean Piaget (Piaget & Inhelder, 1956) and George Luquet (1927, 2001). It runs something like this: A preliminary “scribbling” stage is replaced by a stage of “fortuitous realism” in which the child chances upon and then consciously tries to repeat what is initially the product of accident. This in itself an astonishing idea, because, in contrast to what we know about other aspects of development, the move to representation from no representation at all is, according to this theory, the result of accident.

There are a number of variations of the “happy accident” theory of children’s development. For example, in Rhoda Kellogg’s influential version, “scribbling” is significant only in terms of the accidental assemblage of a vocabulary of shapes which will at some later date (at around 3 years of age) serve a useful purpose of making controlled “designs,” “aggregates,” and pictures (Kellogg, 1969). In view of what we know about other aspects of the infant’s development, it would seem to be a bizarre situation for children to persist in an activity that has no purpose or meaning for them. Kellogg’s case also typifies another common error: that of the adult researcher herself projecting her own ideas into the child’s drawings. For example, her classification system has influenced several generations of scholars and educators; yet, careful inspection of the drawings of the very young reveals that the “twenty basic scribbles,” as categorized by Kellogg, do not, in fact, exist.

Maureen Cox notes that, in contrast to the folklore about children’s drawing, there is no evidence to support the idea that the beginnings of visual representation and expression are based on what are initially the products of accident (Cox, 1993, 1997). Unintended events do indeed play a vital role in all aspects of development, but this role is not explained in the terms of the traditional theory. It is ironic that the traditional approach, although mistaking “accident” to be the main mechanism of development, at the same time fails to see the true significance of the “accidental.”

### INTELLECTUAL REALISM AND VISUAL REALISM

Following the stage of “fortuitous realism,” so the story continues, children start to produce drawings that most adults still find strange but in which they think they recognize representations of objects. One characteristic of these drawings, and the main reason why adults find them difficult to understand, is that they do not show any possible view of an object (Willats, 1997). These drawings are often termed intellectually realistic drawings, the basic idea being that they capture what the child intellectually “understands” about the object, rather than the optical shape of the object projected to the eye held still at a fixed position. The idea here derives from an even older fallacy, which has no evidence to support it, that the basis of the human vision is a form of perspectival “retinal image,” somehow “corrupted” by conceptualization and perhaps involving language (Costall, 1993, 1995, 2001).

In its simplest form, intellectually realistic drawings are supposed to show what the child knows rather than what the child sees. Advocates of this theory might classify some of the
Although such drawings are crudely categorized as either intellectually realistic (object centered) or visually realistic (viewer centered), each drawing is extremely complex, combining many systems which capture visual, dynamic, kinesthetic, and haptic forms of information as well as logical, mathematical, and linguistic analogs of the object. Such systems are emergent at the outset of representational development, for example, in the drawings of cubes (Figures 13.10–13.13). Figures 13.14–13.19 are probably designed and organized with respect to imagined potential human actions, imagined lines of sight, and interrelationships between persons and objects. Each drawing uses different combinations of systems which capture different sorts of information about objects and events. The ways in which these systems are combined depends on the child’s priorities.

FIG. 13.14. An Australian child, Campbell (4 years, 7 months), draws people sitting around a table on which rest objects. In this drawing, the child preserves the rectangular shape of the tabletop and the relationship of the people sitting around it. Campbell also uses a *proto-occlusion* and *hidden-line elimination* to show the salient boundary at which people’s waists or bodies meet the table edge. Drawings like this are sometimes misleadingly termed *intellectually realistic* or *object-centered* drawings.

drawings of cubes produced by the Chinese Singaporean preschoolers (discussed previously—e.g., Figure 13.11) as “intellectually realistic.” According to this theory, the stage of intellectual realism is supposed to be finally replaced by the next stage, in which the situation is reversed, and the child now draws what he or she *sees* rather than what he or she *knows*. Drawings of the cube like that in Figure 13.13 might be enlisted to support this idea of development from the former “stage” to the latter stage. This idea, as we will see, is spurious. Development remains unexplained by the notion of a simple shift from knowledge-based drawings to drawings based on optical information. Rather, an entirely new approach is called for, which describes a series of intertwined dynamic systems deployed by the child and which are present, in embryo, as it were, from the outset of drawing (Figures 13.14–13.16).

The notion of two distinct types of drawing, one intellectually realistic, the other visually realistic, dates back over 100 years but was perhaps most fully articulated by Piaget (Piaget & Inhelder, 1956), who appropriated the ideas from George Luquet’s brilliant (1927, 2001) study of children’s drawing (first English translation, Costall, 2001). Luquet established a methodology of immense value to us today. Instead of merely studying finished drawings collected from school teachers (the favored method of other researchers at that time), and in preference to contriving experimental drawing tasks, Luquet made sensitive observations of children’s *spontaneous* drawing processes. He discovered that the child uses a range of different *modes of representation*, to which *the child, not the adult*, gives the sense and meaning. Such meanings are not always to be discerned within the finished drawing but can be detected by
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FIG. 13.15. A 6-year-old Londoner’s drawing of people standing near a table on which rest objects. Again, the child has captured information about some objects irrespective of viewpoint, including the table and some of the objects on it, for example, the cake with six candles on it (toward the right side of the table). Other configurations also capture major axes of the object represented but are more
canonical in their organization, in that they also capture an exemplar view of the object. Consider, for example, the sticky-tape dispenser near the bottom edge of the table at the middle. Unlike the human figures in the Campbell’s drawing, however, the figures here are all coordinated along an overall vertical axis. Also unlike him, she does not use occlusion and hidden-line elimination but superimposes configurations of people over configuration for table.

unobtrusive, supportive observations of the drawings as processes in time. The importance of this approach cannot be overemphasized.

Although Piaget, like other writers, arranged Luquet’s modes of representation into a tiered-stage hierarchy, with the supposedly most primitive at the bottom leading, step by step, to the supposedly most superior at the top, Luquet never intended this. On the contrary, he considered all modes equally valid and powerful approaches to representation (Costall, 1993, 1995, 2001). Piaget himself also appears to have changed his mind about the stage model, and in his later work, development involves change of emphasis within a dialectical relationship among perception, cognition, and representation.

Made in the same era and in the same country in which Picasso and Braque were inventing Cubism (apparently Luquet was not aware of this), Luquet’s discoveries are of equal importance to their pictorial revolution. The significance of Luquet’s work has yet to be grasped by the vast majority of contemporary psychologists, early childhood professionals; and art educators (Costall, 2001).

Although the terminology has been updated, so that, deriving from the work of David Marr (1982), “intellectual realism” becomes “object-centered,” whereas “visual realism” becomes “viewer-centered,” the theory remains essentially unchanged. There persists today the false dichotomy between a supposedly forerunning, inferior mode of object-centered intellectual realism, thought to capture the child’s “cognitive” understanding of the object, in terms of concepts and language (what the child “knows” about the object), followed by a supposedly
superior mode of “viewer-centered” visual realism, thought to convey “perceptual” information (what the child “sees”). Although rarely defined by its proponents, the basic idea is that the child finally manages to overcome her intellectualist tendencies and show the ‘true’ optical shape of the object in terms of the projection of the image, in light, from the object to the retina of the eye of a viewer observing the scene from a fixed position. This model, or one of its variants, underpins many recent experimental studies of children’s drawing and most descriptions of development in drawing. It continues to exert a powerful influence on the ways in which we evaluate and provide for children’s learning in the arts. So deep-seated is this concept, that some psychologists go to extraordinary lengths to support it, even enlisting as evidence the works of a handful of artistically gifted, autistic children (Eames & Cox, 1994; Freeman, 1987; Marr, 1982; Pariser, 1981; Selfe, 1977; Snyder, 2000; Snyder & Thomas, 1997; Winner, 1982). For an alternative approach, see Seow (2000).

Costall (1995, 1997, 2001) notes that the theory of a dichotomy between two modes of representation has a further dichotomy within it, for there exists an alternate version that, in direct contrast to the one described previously, regards the intellectually realistic mode as the authentic, child art; while perspective now becomes the corrupting influence. Several great pioneers of children’s art seem to have thought like this, for example, Cizek (in Viola, 1942), Derham (1947, 1961), Richardson (1948), and Lowenfeld (1939, 1967). This approach claims a more or less wholly natural, unfolding creativity isolated from cultural context. Generally speaking, this approach, which had its heyday in the earlier part of the 20th century, is now in decline, and art educators have more recently striven to reconceptualize art as a
teachable subject. The reason for this turnaround is due to the implausible developmental and pedagogical implications of a model that assumes development to be universal yet simultaneously individualistic and which fails to acknowledge the effects of social cultural context (Kindler, 1996a, 1996b, this volume; Kindler et al., 2000; Piscitelli, 2001; Wilson, 1985, 1987, 2000, this volume). It gives no clear role to the teacher, other than as a provider of materials. Indeed, in its most extreme form, this approach shuns any teaching of art to children, considering this a pollutant of a wholly natural, unfolding creativity (Wilson, 1985, this volume).

However, I feel it important to point out that nowadays it is often overlooked that early proponents of the natural, unfolding creativity of the child were not entirely wrong. They had good reason to oppose the repressive approaches to art education practiced in Europe and in the West in the late 19th and early 20th centuries. In recent years, a typical replacement of the “childhood innocence” model is equally ill-conceived and destructive. There now dominates an approach, which is ignorant and disdainful of children’s spontaneous art, and indeed, distrustful of all unsupervised learning (Matthews, 1996, 2003). Many contemporary curricula reflect paranoia about human freedom and plan its control right from the outset, even from preuterine life! (Bruce, 2002, personal communication). Sometimes, these interventions are well intentioned, and again range in their degree of sophistication. However, at their crudest, they overtly prohibit any actions of the child not prescribed beforehand by the teacher or the curriculum writers. At its extreme end, children are “sent to Coventry” for not obeying explicit representational rules (usually of the most trite nature), or even have their work torn up in front of the class (Neo, 2001). Other, more recent approaches take control of children’s activities in more subtle ways, appropriating, while at the same time distorting, key Vygotskyian ideas about “scaffolding” or “structuring” the child’s tasks, or else use terms like mediational intervention, or focusing the children’s attention. Such approaches, hijack key concepts of developmental education but, because they fail to understand them, distort them and misuse them. Whether subtle or crude, both have the same result. They take the intellectual and emotional actions out of the child’s hands, both literally and metaphorically. They both rob children of their own development. The former approach is merely semiliterate and cruel, whereas the latter one uses a more expanded vocabulary; that is all. They are both obsessed with the social control of knowledge. For those of you who still doubt me, take a look at the walls of early childcare centers and primary schools—See how much genuinely spontaneous children’s art is displayed. If it exists at all, it is done outside the cage of contemporary curricula.

It might, of course, be argued that “art” is not recognized as important enough to adopt any pedagogical approach that would require any systematic and purposeful action, and certainly this state of affairs exists and is equally destructive. However, just because a “subject”-led and “subject”-defined conceptualization of education allows what we crudely understand as children’s art to escape, by default, as it were, curricula guidelines, does not, in itself result in any freedom of expression or representation. Far from it. The vacuum created by this other form of ignorance simply allows the unquestioned prejudices and assumptions free reign—They come in by the back door, as it were.

Whether mild or heavy-handed, overt or covert, with some important and notable exceptions, an art training is adopted, based on adult conceptualizations about the “subject-area,” “art.” In the current (and sometimes ill-conceived) fervor for early years’ “intervention,” it is invariably overlooked that the early pioneers of children’s art, including Lowenfeld, Richardson, Derham, Kellogg, and Cizek, did have a point. There are important aspects of development that you should leave alone.

Both conceptualizations, the one based on a mythical innocence of children’s art, and the other, teacher-centered, task-orientated, subject- and examination-driven, are really flip sides of the same counterfeit coin. Both are based on the paucity of developmental theory and on the same fallacious dichotomy between visual perception and cognition. This confusion has been

In most interpretations of normal children’s drawing development, the “visually realistic” image is supposed to be finally recovered through a series of developmental “stages.” Again, there are two versions of this approach. In one story, one stage leads to the next stage, with visual realism growing out of intellectual realism. In the alternate version, visual realism is thought to be present all along, but repressed by intellectual realism, the product of the child’s developing cognition (Costall, 1993, 1995, 2001). Alan Costall notes that both versions of the story can be turned to use if you wish to denigrate the art of a range of cultures. Depending on which version you go for, both nonperspectival art and realistic cave painting can be insulted as “primitive.” When the early appearance in human history of visually realistic art threatens to disrupt a Western ethnocentric view of art history, it can be accounted for as the automatic product of an “innocent,” or even “autistic” vision; on the other hand, when intellectually realistic art is encountered, one can do an about-face and claim that, this too is the result, not of intelligent human effort and aesthetic decision making but is likewise the product of “child-like” (i.e., “unintelligent”) minds.

Variants of both stage or repression versions of this theory have had far-reaching effects on the interpretation of children’s development in visual representation. For example, much influential recent experimental work is based on this traditional notion of a dichotomy between these two modes: intellectual and visual realism. Often, it is the repression version that is assumed. The idea behind these experiments is that very young children in fact possess, all along, abilities to show views, unpredicted by the traditional stage theory of development, but that these abilities are repressed by an intellectually realistic tendency (Costall, 1995, 1997).

**EXPERIMENTAL STUDIES OF CHILDREN’S DRAWING**

From about the 1980s on, ingenious experiments about children’s drawing have been designed with the intention of teasing out children’s abilities to show view-specific information assumed repressed by the intellectually realistic mode (see Freeman & Cox, 1985). Typically, the child is asked to draw something set before her, and asked to show, in her drawing, a view of the object obtainable only from her position. Sometimes one object will be placed behind another, with respect to the child’s line of sight. In other experiments, a familiar object will be placed before the child, but with a characteristic feature concealed from the child’s point of view. For example, the experimenter might position a teacup in such a way that the cup’s handle is hidden from the child’s position (Davis, 1985). The criteria on which the child is judged to have achieved representation of view-specific information include the presence of occlusion, a view-dependent overlap of the further object by the nearer one, a relationship that can be shown in a drawing by omitting lines representing the hidden-edges of the further object (hidden-line elimination), or when the child succeeds in omitting a feature of the object that cannot be seen from her position.

Typically, very young children (those approximately 3 to 5 years of age) even when viewing one object in front of another, so that the farther object is partially occluded by the nearer, will avoid the use of occlusion and hidden-line elimination in their drawings, and draw both objects in their entirety. They preserve the continuous outline of the object, even at the expense of distorting this outline (Piaget & Inhelder, 1956; Willats, 1997; Matthews, 1997, 1999, 2001a). Or, if a salient feature of an object (e.g., the handle on the teacup) is hidden from the child’s line of sight, the younger child will persist in including this feature in her drawings.
Arguments abound about how this should be interpreted. It cannot be explained as a motor problem—Many children of 2 to 3 years of age possess the abilities to form the necessary shapes and line junctions (Phillips, Hobbs, & Pratt, 1978; Willats, 1981, 1985, 1997).

Intelligent decision making must surely be involved. One reason children avoid the use of occlusion and hidden-line elimination is because this violates their understanding of the object as a coherent solid with an uninterrupted surface (Piaget & Inhelder, 1956; Willats, 1985, 1997; Reith & Kuttner, 1995; Matthews, 1984, 1994, 1999a, 2002, forthcoming). However, this cannot be a sufficient explanation in itself, because there are instances in which even a three or four year-old will sacrifice the coherence of a boundary line in order to show a view (Matthews, 1999a). This occurs when occlusion and hidden-line elimination are even more salient to the child than the coherence of the object. For example, consider how Campbell draws people sitting around a table, ‘cutting off’ their configurations at their chests, in order to show the salient meeting of the table’s edge with the body (Figure 13.14).

Some writers have suggested that children are reluctant to omit characteristic features of objects (e.g., the handle of the teacup), even if these are occluded from their station point, because the children feel that doing so would make instant identification of the object by a viewer other than themselves too difficult. Psychologists of this persuasion argue that the child wants to show the best exemplar or canonical description of the object (Davis, 1985).

This idea has similarities with the intellectually realistic (object-centered) theory, but there is a subtle difference in emphasis between these approaches, which raises awkward questions. The object-centered description is supposedly based on the structure of the object irrespective of any viewpoint, including that of the young artist herself. The canonical description, on the other hand, suggests that the child is aware of the communication requirements of a notional viewer other than themselves. This “other” could be either a real person, present or not present, or a hypothetical person. Together with other data (which I will discuss later), and in contrast to popular opinion and traditional Piagetian theory, producing a canonical description suggests children have some understanding of the requirements of a viewer of the drawing.

Other internal conflicts in the model of intellectual and visual realism also tend to explode the theory from within. The object-centered (or intellectually realistic) drawing, strictly speaking, captures the true shapes and axes of the object irrespective of any particular viewpoint. Now, in many such intellectually realistic drawings, the represented object is easily identified. However, other drawings, also categorized as intellectually realistic or object-centered, are decidedly unrecognizable (see Figure 13.19). According to the theory of intellectual realism, this should not happen because, by definition, children are supposed to produce object-centered drawings precisely in order to capture the most recognizable axes and characteristics of objects. In contrast to the original Marrian definition of object-centered description (Marr, 1982), certain of these drawings assuredly do not capture the main axes of the object; yet neither do they capture a view of the object. Nor did Marr originally intend his theory of object-centered descriptions, which he described in terms of interiorized algorithms and rules, to form any kind of “image” or “picture” that could be set down on paper with a pencil. The classic theory is insufficient explanation for many different types of drawings all crudely lumped together under the category of intellectual realism. A totally new explanation is needed (Figures 13.17–13.19).

Left to their own devices, very young children tend not to draw objects from observation—at least not in the way in which adults typically define observational drawing, as a species of “still-life” drawing. However, as Alan Costall (1993, 1995, 2001) notes, it is not just the artificiality of the experimental situation that is in question. As with the experiments on neonate “cognition,” such experimental work succeeds in undermining the “age-stage” relationship postulated by Piaget and others but leaves no theory to replace it.
Although contemporary curricula may offer variants of this stage theory, what they have in common is that they all seek to control how people represent reality. Even though many enlightened educators have fought a lifetime for a more expanded version of what it means to be “visually literate” (Eisner, 1985, 1997, 1998, this volume), many teachers are often hampered by tight controls on how they conceptualize and provide learning experiences for their pupils. Many teachers are forced to comply to agendas fixed by people who know very little about development and education, and who talk in terms of the “skills and understandings” assumed the prerequisite for whatever kind of “objectives,” “attainment targets” are demanded to be reached in this “value-added,” “knowledge industry.” I have here used the terminology of England’s and Singapore’s National Curricular, but equivalent terms, extrapolated from consumerism, echo drearily in educational circles around the world. Although contemporary curricula may include approaches to art making derived from the contemporary art scene, and although the terms process and development are sprinkled like confetti throughout recent curriculum documents, in many, if not most contemporary curricula, “process” is not intended to mean transformational growth of intelligence, but merely the step-by-step assembly of an end product already preenvisaged in the mind of the teacher—or more accurately, in the mind of curriculum planners working under directives of a government. Hence, most purportedly “developmental curricula” are developmental only in the most trivial sense of the term. This applies to the teaching of many other subject areas, but in art, such “skills and understandings” derive from an approach to art making which retains a notion of “correct” representation at its center. Although, these days, this endpoint might not be visual realism in the strict sense of a linear perspectival, optical image; there invariably exists, buried in the heart of contemporary curricular, the supposition that development is a process in which the child gradually corrects severe deficits and shortcomings in her drawing until she achieves perfect adjustment to a representational norm. This may be disguised with a greater or lesser degree of sophistication. However, it makes little difference whether the curriculum is couched in premodern, modern, or postmodern terms, or in the third-rate science fiction rhetoric about the educational liberation...
FIG. 13.18. A 6-year-old Londoner’s drawing of horses in a field. Initially, the child tries to draw the structure of the object irrespective of viewpoint. A good example is the configurations for horse with the legs extended from the body (middle top and the bottom right). It is akin to Figure 13.15 in which the legs of the table are extended from each corner. In subsequent attempts, the child increasingly moves toward configurations designed to combine both the structure of the object and the notional views of the object (for example, the configuration for horse at middle left, which partially occludes legs that are farther from a notional viewer).
FIG. 13.19. This is a 6-year-old Londoner's drawing of a bicycle. The bicycle was present beside
the child. He interprets the object according to attractor systems which direct him to certain as-
pects, features, and characteristics of the object rather than to others. Although such a drawing is
often classified under the heading "object-centered" or "intellectually realistic," it is different the from
Figures 13.14, 13.15, 13.17, and 13.18, in that it cannot really be claimed that it captures the main
axes of the object but rather the axes of psychological interest to the child. These structures are
held together in a drawing process which unfolds in time and space, recording the child's attention
to axes of the object in relation to the drawing as an event.

promised by Information Technology (IT). Whichever variant is adopted, the ghost of this old
theory continues to haunt much of present-day pedagogy. This is because contemporary plans
for art form a small part of a political agenda for education overall. Most of the rhetoric of IT
entrepreneurs push the use of electronic media toward simulation of a reality that is desirable
only to them and to their highly lucrative businesses. Thus, what passes for "progress" in
IT likewise reflects an obsolete paradigm of simulation and replication; all that has changed
is that the desired endpoint is the "virtually real." Rarely are children allowed to investigate
electronic media freely, for their own purposes (for an exception to this, see Matthews & Chan,

Although visionary educators like Seymour Papert (2000) and Mitchell Resnick (2002), in
their use of electronic media with children, advocate truly child- and learner-centered education
based on principles first introduced by Froebel (Papert, 2000; Resnick, 2002), use of electronic
media in schools is sometimes decidedly uncreative. The electronic blackboard has merely
replaced the physical one. Children merely become slaves of a new, electronic sweatshop.

THE NEED FOR A DEVELOPMENTAL ACCOUNT
OF CHILDREN'S ART

As Alan Costall (1993, 1995, 2001) points out, we still require a developmental explana-
tion of children's art. If traditional staged models have proved inadequate, then, so too have
accounts which merely invoke “cultural influence” while failing to offer any explanation of the mechanisms through which the child might select from society’s images. Clearly, children do change as they get older! One week the infant cannot walk; the next week she can. How has the child achieved this? One day, the child produces a particular type of drawing; the next day, a rather different one. How—and why—does the child move from one mode of representation to another?

New approaches to development begin to address these questions. Early drawing processes described in the observations made earlier involve the children generating complex ideas about representation and expression. These ideas are neither preformed in the brain, nor are they stumbled on or learned after abandoning (perhaps with some coercion from adults) a series of false trails until the “correct” solution is reached. Rather, right from the beginning of life, the infant discerns and exploits the expressive and representational possibilities of her body actions, which are then amplified and extended with various media (Bruner, 1964, 1972). These media may include drawing, painting, and other “art” materials, but they essentially consist of anything she can get her hands on (Kress, 1997), even spilt milk or regurgitated food (Matthews, 1984, 1994, 1999, 2002, forthcoming). This is a self-generated, seamless continuum of expressive and representational modes in which children work out how symbols, signs, and representations encode ideas, thoughts, feelings, objects, and events.

Before discussing new approaches to children’s art, it is important to consider more closely some important theories of intellectual and emotional development.

TRADITIONAL STAGED THEORIES OF HUMAN DEVELOPMENT

Although aspects Piaget’s theory are misleading, some of its central ideas and tenets remain powerful and germane. In his early work, he developed a powerful, naturalistic methodology in which he carefully observed and interpreted the actions of his own children. As with Luquet’s naturalistic methods, the importance of this approach cannot be overstated. Piaget revealed that children were not miniature adults but had their own characteristic ways of knowing the world which were different from those of adults. Piaget’s theory offers a powerful description of the child’s intellectual and emotional development. He conceived of development in terms of successive revolutions in cognition in which the child radically revised her ways of knowing.

THE IMPORTANCE OF SELF-LOCOMOTION

Especially important is the central place in cognitive development Piaget accorded the infant’s self-initiated, self-directed, and self-controlled movement. That development emerges from actions of the body remains a crucial insight. Piaget’s theory established children’s learning as a dynamic, rather than as a passive process. The child learned and developed through a continuous, self-initiated interaction with the environment. This idea radically changed approaches to education, especially for the early years and at primary school level. It is also at the core of certain new understandings of children’s art. The essential point here is that action is self-initiated, self-directed, and self-controlled. Research shows that passive movement does not stimulate cognition. For example, classic experiments involving the passive movement of cats, when they are wheeled on trolleys around environments instead of being allowed to explore the environment by themselves, show that passive movement fails to initiate development in visual systems in the cats’ brains (Held & Hein, 1963). More recently, studies show that infants with independent crawling and walking experience develop spatial understandings quicker than those without (Bertenthal et al., 1984; Bushnell & Boudreau, 1993; Thelen,
Schoner, Scheier, & Smith, 2000; Thelen & Smith, 1994). Self-driven by curiosity, they move around the environment and find out about surfaces, contours, edges, and textures of things. They discover what the backs of things look like, what lies hidden behind or inside other things, and how one can use things. Following on from the importance of self-locomotion, Piaget has another extremely cogent hypothesis that action is gradually interiorized in the brain to become thinking.

It is true that some aspects of his theory have been seriously challenged. Piaget thought of the brain as an all-purpose, symbol-making, and problem-solving device; whereas contemporary neuroscience provides evidence that it is composed of modular structures, each one designated a particular function. However, as I mentioned earlier, there are shortcomings with the modular approach too, in that it vastly underemphasizes the interconnected cooperation of perceptual modes. We will return to this issue, for it has an important bearing on development and learning.

As we will shortly see, recent experiments in neonate perception, sensorimotor actions, and interpersonal skills reveal that newborns have hitherto unsuspected abilities, which seem to confound Piaget’s age-stage relationship. Even if we modify this relationship, trying to account for individual differences, questions remain about how the child moves from one stage to another. Piaget himself came to acknowledge this problem in his later work, when he reconceptualized development as a spiraling, rather than as a steplike process (Beilin & Pufall, 1992). Other basic problems remain, however. Does the theory really mean that development is universal, despite differences in social and cultural contexts? So many data contradict this notion. For example, unlike Piaget’s account of the development of spatial representation, it is certainly not the case that people generally end up producing linear-perspective drawing! Even if we take any truly basic skill, achieved at a roughly predictable time in development, we find stunning variation in onset, manner, and timing. For example, studies show that the developmental trajectory of learning to walk is unique to each individual infant. From a distance, as it were, development might seem stagelike, orderly, and linear; when looked at in close-up and in greater detail, we discover astonishing and complex variations among individuals within the same culture, before we even get on to consider “cultural variation” (Thelen et al., 2000; Thelen & Smith, 1994).

As was mentioned near the beginning of this chapter, neither can development be explained as totally idiosyncratic, completely context related, or utterly reliant on imitation from culture. Nor does the compromise position, so often trotted out, of “interaction between nature and nurture,” resolve these problems (Thelen et al., 2000; Thelen & Smith, 1994), because it perpetuates a false dichotomy between what are presumed to be two separate processes, supposedly joined together (in a bewildering variety of combinations), in ways as yet unknown.

**Vygotsky and the Interpersonal Dimension of Learning and Development**

Piaget was interested in the development of interiorized schemata within individuals, and many writers have criticized him for underestimating the impact of the cultural and social contexts on development and learning. In fact, a close reading of Piaget shows that he considered the interaction between unfolding schemata and the social and interpersonal environment essential. He thought that in this open system, any novel experience opened up a set of possible futures.

This would, of course, include social and interpersonal experiences. It is this interpersonal, social, and cultural dimension of development and learning that is stressed by the great Russian psychologist, Lev Vygotsky (1966). Vygotsky’s theory postulates a “zone of proximal development,” in which the direction the child’s development is moving becomes the key issue. Vygotsky showed that what the child achieved with some help was more significant than what she achieved unaided. The role of the adult caregiver thus becomes crucial because he is
required to understand, anticipate, and support the child’s development toward a potential future developmental state. Bruner, and his colleagues too, significantly added to our understanding of the importance of adult support for early learning and how culture and its various technologies “amplify” naturally unfolding abilities of infants (Bruner, 1964, 1972). That mediated involvement with tasks of representation causes sustained gains in cognition is convincingly evidenced by position emission tomographic and magnetic resonance imaging of the development of cortical and subcortical structures in the brain (Klein, 2001).

However, not all Vygotsky’s predictions are borne out by close observation of children’s actions. It can be shown that children form structural and representational understandings, not by induction into adult models but through a process they generate by themselves, which is, technically speaking, “creative” (Chomsky, 1980, pp. 222–223). Currently, there is a danger that the role of the adult, in terms of his guidance of the child, has been overemphasized and in ways that Vygotsky never intended (Bruce, 2001, personal communication). The current stress on the supposed necessity of “focusing the child’s attention” toward educational endpoints in the mind of the adult is a serious misunderstanding of the role of the adult companion (Klein, 2001). This distortion of the interpersonal dimension of children’s development ignores crucial aspects of Vygotsky’s theory that show the creative and self-generative character of children’s play and its centrality in the development of symbolic thought (Vygotsky, 1966). Play will be discussed later in this chapter.

THE INTERPERSONAL DIMENSION OF DEVELOPMENT

Recent studies of mother and baby diads have offered further insights into the interpersonal dimension of development (Klein, 2001; Trevarthen, 1995). These new studies reveal that the neonate is able to participate in acts of communication with the caregiver. Such studies have important implications for our understanding of children’s cognitive development. It may be that these “protoconversations” are the precursors of expressive and representational thought (Trevarthen, 1975, 1988, 1995). Infants assign representational and expressive values to objects and events within a psychological envelope formed between infant and caregiver. When parents play with their babies, they tend to naturally exploit the multimodal linkages among different sensory information (Thelen et al., 2000; Thelen & Smith, 1994). This not only assists the infant’s conceptualization of events and objects by helping the infant coordinate, sight, sound, touch, and movement, it also simultaneously reinforces the analogic or metaphoric aspects among different perceptual domains which are to play a crucial part in visual representation (Matthews, 1999, 2000).

This has important implications for the growth of children’s art and its interpersonal support. Far from being passive recipients of culture, blank pages on which culture is to be written, studies show that babies take part in the “creation of culture” (Trevarthen, 1995; Trevarthen & Grant, 1979, p. 566). What is more, most parents behave as if their baby’s actions had meaning. We will return to this later, for this offers insights about the origin and growth of creative thought, and how it might best be supported in the interpersonal and social environment.

INFANTS’ UNDERSTANDING OF EVENTS AND OBJECTS

Recent experiments on neonate perception suggest that babies are not born as “tabula rasa,” or blank slates. They seem to respond intelligently and with purpose toward objects and events that they have never experienced before. Elizabeth Spelke (1976, 1990) and others, who made these ingenious experiments, originally interpreted these precocial abilities as evidence that the neonate comes into the world equipped with rudimentary concepts of volumetric solids and
their movements in space and time. However, more recently, some investigators have questioned this idea. Theories about innate ideas are problematic, for they entail internal representations which preprogram development (Thelen et al., 2000; Thelen & Smith, 1994). It may be that, in contrast, to nativist theory, repeated experiences form attractor systems in the baby’s brain causing developmental pathways to be carved. Each new encounter either slides into and deepens a preexisting attractor (if the experience is similar) or changes it (if it is dissimilar). As each attractor system is triggered into action, so it offers opportunities for further structural and representational possibilities, and so on, until, eventually, the developmental landscape is etched with paths, some of which overlap, forming what we call concepts. I believe that this is what Piaget intended by his theory of schemas. According to this approach, nothing is preshaped in the brain, nor is knowledge a static thing, but is the result of continuous interaction within a context, a “dynamic assembly” made in real time and space (Thelen & Smith, 1994, pp. 90, 166).

On the other hand, it should be understood that development cannot just go anywhere. The infant’s actions are driven by biases or values (Edelman, 1987) and as the systems evolve so they create a history and a set of potential futures that unfold in certain directions rather than in others. Given a generalized human situation, the child is likely to encounter new experiences in a certain sequence, and that is why development may assume a stagelike regularity. If so, why, in experimental situations, does the infant appear to display “knowledge” or capabilities not normally seen? Some investigators now think that this is not the result of the liberation of preformed ideas normally repressed in the brain. Rather, these unanticipated capabilities may be the consequence of a seamless and continuous interaction of cooperative systems that have encountered atypical, carefully tailored situations. This theory helps resolve the apparent contradictions between universal development and its variations. What we call “children’s art” is a stunning example of this process.

Whichever way neonate perception is interpreted, it has great significance for people interested in the development of children’s art. The neonate’s interests in movement, position, and shape are the emergent concepts on which children’s early forms of representation will be based (Athey, 1990; Matthews, 1994, 1999, 2003).

Although these studies of neonate cognition have altered our understandings of the abilities of infants and young children, the mysteries about development are deepened rather than explained. The evidence of precocial abilities in infants may challenge traditional stage theories, but they nevertheless remain part of, and share a bias with, a research tradition initiated by Piaget, Vygotsky, and Bruner. This bias has, to some extent, distorted our understanding, not only of children’s art but also of cognitive development overall.

What these theories, old and new, have in common is that they assume that development is essentially a moving away from “here and now” actions in a sensorially rich, perceptual world, toward an evermore disembodied, abstract, formal, and therefore superior mode of thinking (Thelen & Smith et al., 2001; Thelen & Smith, 1994). This notion has had enormous consequences, not only for the way in which we interpret children’s development in art but also for the way in which intellectual and emotional development, as a whole, is conceptually construed. In an important sense, the confusion about, and devaluing of children’s art merely mirrors a misconception about learning and development overall.

**RECENT DEVELOPMENTS IN EARLY CHILDHOOD EDUCATION**

It is within early years’ education that the theory of a learner-centered and developmental curriculum is most fully articulated. In the subject-orientated curriculum, the transmission of the “knowledge” within the discipline or subject domain is assumed to automatically confer
intelligence to the student. It will surprise many readers to learn that there is no scientific evidence to support this conventional wisdom (Blenkin & Kelly, 1988, 1996). In contrast, there is overwhelming evidence that developmental curricula defined by Athey (1990), Bruce (1987, 1991), Blenkin and Kelly (1988, 1996), and Katz (1992) and early mediation between caregiver and infant (Klein, 2001) produces sustained gains in intelligence, caring, sharing and happiness.

The developmental curriculum is planned with reference to processes of human development. Early childhood education is, at best, an approach to learning not tied to the transmission of any particular culture or body of knowledge. In such a curriculum, what is available within the subject area is significant only insofar as it contains process, instruments, and experiences, which might stimulate and promote human development (Blenkin & Kelly, 1996). Researchers including Chris Athey, Tina Bruce, Lilian Katz, Geva Blenkin, Vic Kelly, Lisl Steiner, and Victoria Hurst reevaluate the ecological and developmental niche of early childhood and prepare learning experiences designed to map onto and nourish an unfolding development spontaneously generated from the child. Although recent studies reveal capabilities of babies and infants, unpredicted by earlier psychological theory, Lilian Katz (1992) enquires about what young children should be learning rather than merely what they are capable of learning in contrived situations.

There are important recent developments in the pedagogy of early years. There is a concern about the child’s personal individual development and the social and interpersonal aspects of learning, including a renewed interest in the work of Vygotsky (Abbot, 2001). A multi-professional approach stresses the caring and emotional side of education (Bruce, 1987, 1991, 2001). Regimes in the best nursery and childcare centers are no longer based on regulatory aspects of behavior or controlling conflict but on promoting human development (Abbot, 2001).

In Britain, after about 20 years of suppression of the developmental dimension of children’s learning, in favor of the transmission of information, and after years of what really amounts to systematic persecution by successive governments of early years’ theorists and practitioners, the penny is finally starting to drop that the curriculum for the very young cannot, and must not, be a watered-down version of endstate-orientated, subject-driven teaching, but has to acknowledge processes of human development (Blenkin & Kelly, 1996, 2001; Bruce, 1991, personal communication, 2001; Simon, 1988).

It will take some time for this idea to really sink in. Governments tend to flip developmental theories around so as to turn them, from descriptions, into stage-by-stage requirements of children. This strategy echoes a tendency in developmental theory itself that, by a sleight-of-hand, often turns descriptions of development into explanations for it (Thelen & Smith, 1994). Hence, education is often misconceptualized in terms of the construction of the “ideal” adult. Typically, a curriculum, originally designed for the older child and adolescent, is diluted down to a simplified form, in the forlorn hope of making subject-driven, exam-orientated teaching palatable to ever-younger children. This simply has the effect of “damaging the disposition to learn” in early childhood (Katz, 1992). Likewise, many parents are persuaded—by entrepreneurs of the simplistic, “quick-fix” method—to think of early years’ education as a premature “hot-housing” of shallow cognitive skills, word recognition, and recitation. Pushed to its extreme, the transmission model of teaching causes suicidal stress in very young children.

THE SUPPRESSION OF THEORY ABOUT THE ART OF THE VERY YOUNG

There persists a pervasive ignorance about the meaning and significance of children’s spontaneous drawing, painting, and of children’s expressive and representational uses of other media.
Children’s spontaneous drawings are often devalued in favor of either prescriptive, “cottage industries” in which children are prematurely trained in diluted versions of still-life practice or else are led, step by step, toward a banal, stereotyped end product preenvisaged in the mind of the teacher (or more precisely, in the mind of a government-controlled curriculum designer). It hardly matters if this endpoint is a Christmas angel made from yoghurt cups and cotton wool, or a pastiche of Monet’s water lily pond, the destruction to development is identical. Many governments’ crude conceptions of development and learning (most of which have proved ineffective, if not disastrous) have exacerbated tendencies to teach toward inappropriate paradigms of visual expression and representation which only succeed in undermining development. However, there are signs that the tide is beginning to turn. We have increasing evidence about development in infancy that confirms the need for a developmental, learner centered education, supported by adult companions. Hopefully, this is beginning to ameliorate the worst effects of the “aims and objectives” model. There is a long way to go, however.

PLAY

Ironically, although contemporary (and traditional) education has been told repeatedly by its controllers that it must prepare pupils for the future, this is precisely what it fails to do. As Partington and Grant (1984) point out, these plans invariably involve children being prepared for contemporary goals that are obsolete before the children leave school. Only by supporting the hypothetical realities children construct in play and representation will children be able to cope with whatever “probabilistic future” unfolds (Partington & Grant, 1984, p. 76).

It is within early years’ education that the significance and meaning of play in human development and learning is most fully realized. There is an important relationship between play and children’s use of art media, because it is within play that the child discovers and exercises skills in symbolization, representation, and expression; skills that are carried over—or “transported”—to use Dennie Wolf’s terms (Wolf & Fucigna, 1983, p. 1), to visual and other media.

Play is crucial for the child’s understandings and use of symbols, signs, and representations. Yet, with some important exceptions, notably in Scandinavian and some North American early childhood education, where the concept of play is central to development and education, in many parts of the world, play is not generally well supported by education systems. When, if at all, play is mentioned, it often turns out that the term play is misused to mean adult-supervised and adult-dominated tasks designed to extrapolate those aspects of learning the adult deems important. The child needs opportunities for complete freeware, in order to temporally un-couple means from ends in tasks, allowing her to investigate processes as entities of interest in themselves and worthy of repeated investigation, replication, and combinatorial variation. In Vygotskian terms, play allows the child to separate words from objects, and actions from meanings (Vygotsky, 1966). This has some important consequences for learning. By releasing objects and actions from their usual functions and meanings, the child is able to detect characteristics not otherwise revealed when these objects, and the actions performed on them, are tied to adaptation to object-mastery.

When objects and action are set free from their constraints in adaptation to reality, this allows the child to form the combinatorial flexibility noted by Bruner (1964) so necessary if a deep reading and use of semiotic systems are to occur. Children’s use and organization of art media are a part of this process. Ludic activities allow hybrid families of thoughts and ideas to be formed within hypothetical or analog realities in which they can be tested. It allows
Sexism in the Nursery

By far the most serious mistake made in early years’ education is the systematic repression, by the dominant female workforce, and as a matter of policy, of many important aspects of symbolization and representation—almost invariably singling out these in the play of boys. Boys’ play is catastrophically misinterpreted as indicative of male hegemony and violence. A review of how the play of boys and girls in early years is studied and interpreted reveals breathtaking assumptions about the supposed “gendering” and “sex-typing” of play simply accepted as obvious truths, or “givens,” neither requiring—nor allowing—any challenge or query as to their veracity. These unquestioned assumptions are damaging to both boys and girls (Matthews, 2003, forthcoming). This problem is exacerbated by the paucity of men involved in early childhood education. In Australia, for example, early childhood teachers number 98% women, a figure echoed roughly throughout the world (Sumison, 1999). As Sumison points out, men have only “visitors’ rights” in the early childhood setting. Yet, although gender equality is discussed constantly in early years education, the major, and usually only, topic on the agenda, is how to stop boys from “dominating” play space, time, and equipment! For example, Pat Gura talks of boys play with blocks in terms of “...a self-perpetuating cycle...inextricably bound up with territory and dominance” (quoted in Cubey, 1999, p. 14). Such bleak and negative terms have been accepted without question for a decade or more.

Boys’ play is almost invariably interpreted as nothing more or less than male domination of play materials and the beginning of male domination of females. Pat Cubey, writing about how, in the name of gender equality, “this problem was addressed” has this to say: “…there was a change…. Differences between structures boys and girls built could no longer be detected” (my italics) (Cubey, 1999, p. 15). This statement is staggering, not only in its implicit sexism but also (ironically) in its assumption that, either, there is no difference between boys’ and girls’ play, or that this induced homogeneity is in fact desirable. No recognition seems to be made of the overall setting in which this mythological male domination is supposed to take place. A learned blindness seems to prevent the researcher (usually female) seeing the overall context, which is that of a workplace, designed by females, run by females, for females.

Yet, girls also suffer badly because of this misreading. The kind of play in question is typically multilayered in terms of meaning and function. The first level of play deals with structural relationships within objects and scenes and causal relationships in events. At this level, geometries of lines of sight are organized within hypothetical worlds in which space, depth, mass, trajectory, and velocity are organized as components of imaginary, overarching, spatiotemporal realities. In this freeplay, temporal and spatial events may be arranged and rearranged at will. At a superficial level, many of these plays seem to involve warlike or aggressive themes. However, every time a pretend missile is launched, the child works out the characteristics of its trajectory within a gravity field, its point of arrival, or moment of impact in an allocentric world. Sometimes, this play emulates the behavior of objects within a 1G field, like the one in which human beings usually live. At other times, it is a hypothetical reality. Whichever is the case, the child’s questions about where things come from, where things go, and what eventually happens to them remain part of a powerful substrate for the child’s theory about reality. The subject matter of such games may be imaginary events: Spider Man, for example, swinging from building to building; or they may be representations of the possibly real, anything from a car crash to a sneeze. Or, they may represent the actually real,
for example, terrorist suicide planes exploding against the side of a building (see Figure 13.6) (Matthews & Chan, 2002; forthcoming; Ma Ying & Leong, 2002).

A second level of play involves the understanding of psychological states which, to a great extent, hold together the structure of events and objects. This is an imaginary world peopled by imaginary agents, who have their own intentions and motivations. The child has to learn, not only about what makes objects “go,” but also about what makes people “go.” Sometimes the former is dependent on, or linked in complex ways, to the latter. This play reality analogs the real world and helps the child know how it is glued together by forces that are both physical and psychological.

This level is linked with the symbolization of internal energy and power, some of which may be sexual, but which is also concerned with issues about viewpoint, lines of sight, the characteristics of trajectory, and moment of impact or point of arrival (Athey, 1990; Matthews, 1999, 2003). Supposed “gunplay” is part of a family of representational modes concerned with the causal relationships within events.

At a further level, the meanings of play will have to do with the affirmation of personal power, of being an agent who can affect the world as well as control her own feelings toward it. These levels will be connected to expression and organization of sexual energy (of both boys and girls). These will be levels concerned with the the interiorization and resolution of internal emotional conflict. They will feel their own aggression and need to do something about it, but they will also have to understand the aggression (both overt and covert) of others around them. The child has to deal with her own anger and the anger of others. The internal struggle between forces of good and evil is a way of working out themes of justice. These themes are rarely recognized by those who think in terms of “war” or “gun play” and how to stamp them out.

Play may also reflect actual physical and mental violence the child witnesses or endures within the family or the social setting. This violence may be that which the child receives from her parents, but may also be the beatings and batterings her parents inflict on each other. Or, again, the violence may be of the more discreet, veiled variety, where, for example, parents disguise their own perpetual state of war with social niceties. It is impossible to say which kind is worse for the child to deal with.

Nor is this play simply an imitation of adult exemplars. The notion that children merely copy what they see on television or film is an illusion created by poor theories about development and learning. Such blinkered vision effectively conceals the true meaning and purpose of children’s play. Children take from available imagery only those aspects that fit into their own unfolding agenda of representational concerns.

The use of superhero and superheroine play is part of a continuum of representation and metaphor that commences in babyhood. These imaginary beings are really “Fantasy Guardian Angels” (Partington & Grant, 1984, p. 76) essential for children’s development. They range from the “Teletubbies’ and the ‘Powerpuff Girls’ of infancy, to “CatDog” and “Harry Potter” of later childhood, and, in adolescence, to “Superman,” “Coldplay,” “Britney Spears,” and “Kylie.” In adulthood, they may take the form of great scientists, artists and politicians, religious leaders, and so on. For example, it must be apparent that I admire Piaget and Vygotsky. I do not say no to watching Kylie, either!

At a deep level of description, children’s play is about control and understanding of personal power, and superheroes or heroines play an essential role. Imaginary superheros and
superheroines are psychological devices for coping with imaginary problems and crises in hypothetical realities. These mythological beings are transformed and interiorized through development to become part of the makeup of adult mental life necessary to cope with real-life situations.

Aside from the extraordinary situation of very young boys being required to pay the price of (supposed) adult male violence, any approach that seeks to suppress forms of “gun” or “fighting” play is fundamentally and dangerously flawed. It is true that some kinds of play are disruptive, repetitive, noisy, and even boring to some adults.

The reason for this is that “fighting” play does not usually receive proper support and so remains at an impoverished level. Far from receiving the support that would deepen and enrich the level of play, players encounter active discouragement and disapproval. This dislike communicates itself to children and tends to distort, limit, and impoverish their play. When one participates in and supports this type of play, communicating to the children an understanding of it, they are delighted. Men are often good at this kind of interaction.

At this point, it is vital to note that the adult participation in play I intend is not be confused with the kind used to subvert its real meaning toward sanitized, socially sanctioned aspects. The intention should be not of changing the representational values of the forms used, but of developing play in its own terms. The fundamental principle for interaction and provision is to identify the mode of representation taking place, beyond descriptions of its surface content.

Children know perfectly well that they are pretending. In essence, they understand that they are symbolizing—long before they would ever use this word. It is a tragic irony that adult teachers apparently fail to understand what the 3-year-olds in their care understand perfectly. Girls also play these games of violence, yet it remains invisible to the largely female workforce. The term “gender equality” in early-years’ education is, at present, just a joke. A nonpartisan study of play is vital. There is really no point in young children—boys or girls—attending nurseries or under-fives centers unless this real violence to children’s representational plays stops. Grownups might confuse reality with representation, but children, as a rule, do not.

NEW APPROACHES TO CHILDREN’S DEVELOPMENT IN THE VISUAL ARTS

Play is linked to the ability to form expressive and representational thought in art materials, and it is to children’s use and organization of visual media in infancy and childhood we now turn. In contrast to traditional approaches, recent studies suggest a far different model of development in expression and representation (Athey, 1990; Duncum, 1993, 1999; Kindler & Darras, 1997; Matthews, 1994, 1999, 2003; Smith, 1983; Wolf & Fucigna, 1983; Wolf & Perry, 1988).

We are also indebted to Norman Freeman and Maureen Cox’s (1985) experimental work, which has spurred other writers (sometimes by disagreement) along promising avenues of research (Freeman & Cox, 1985).

This chapter has focused especially on the visual arts, but there exists new research into the beginnings of dance and musical understandings (e.g., Young, 2000). Some of these new approaches no longer measure children’s development against an unquestioned adult paradigm of what is assumed to constitute a “correct” or “accurate” representation. Rather, they attempt, in their different ways, to identify the modes of representation employed by children as consequences of children’s own intentions, motivations, and priorities (Kindler & Darras, 1997; Light, 1985). In some of these recent accounts, the development, use, and organization of visual media are seen as a dialectical relationship among the thinking child, the representational or expressive intention, the unfolding possibilities afforded by the medium, and the interpersonal environment (Matthews, 1994, 1999; Wolf, 1984). The pedagogical implications
are enormous. It is only by identifying and supporting children’s emergent modes of expression and representation that their creative thinking will be nurtured and encouraged.

CHILDREN DRAWING ATTENTION: DEVELOPMENT OF VISUAL REPRESENTATION AND EXPRESSION AS A DYNAMIC PROCESS

The traditional staged theory has it that, as children grow older, the changes that occur in their drawings reflect changes in their interiorized mental models, as these are successively adapted to match an external reality. Although, as mentioned previously, many would deny adopting “visual realism” as a learning end state, we are justified in claiming that the old-fashioned model remains behind the scenes, because, however updated the curriculum is from the original, “retinal” model, the notion that there is one reality to which everyone must conform, one developmental endpoint toward which all must be coerced, remains central to contemporary pedagogy as directed by controlling power groups.

The evidence from recent research suggests that the developmental route children take in visual representation and expression is complex and involves a progression through a series of dynamical systems. These systems involve an interaction between an infrastructural inquiry of visual and dynamic structure for its own sake plus its expressive and representational uses. The visual structures children generate may follow one of a number of pathways through an epigenetic landscape which allows representational experiments in which children recover the structure of objects and events. That many children resolve the indeterminacies in their drawings through an increased coordination of view-specific information is just one of an infinite series of possible developmental pathways.

The first generation of structure is shaped by the natural oscillations of the skeletal and muscular frame (Smith, 1983) and consists of three basic marking actions: horizontal arc, vertical arc, and the push-pull (Matthews, 1984, 1994, 1999, 2002, forthcoming). This first generation of structure is clearly seen in the previous observations of the Chinese children and of the English boy, Robert, using e-paint. Depending on the convergence of a variety of developmental trajectories and on the number of ways these might interact, further generations of structure emerge. Right-angular structure, parallelism, colinearity, connectivity, and closure are among the first. Beginnings and ending, rising and falling, higher and lower, inside and outside, hollowness, boundary, and connectivity are forms and relationships that quickly follow. As these structures are simultaneously differentiated, combined, varied, and reiterated, extremely complex forms are created. As children develop, they realize a further level of representation and metaphor, along with mathematical and linguistic analogs. For example, in the Singapore nursery, connectivity among forms manifests itself in the drawing of right-angular attachment of wing to aircraft. In other drawings, topological characteristics of the airplane as a closed volume with a continuous surface, plus inside and outside relationships are recovered in terms of closures with nuclei. In addition to the importance of recovering the location and shape of an object, very young children are concerned with its movement. Some of the Chinese children represent going around, going up, going down, going into from outside, getting outside from inside, and the journey from “a” to “b”, in terms of either discrete displacements or continuous line.

An example of the latter action representation is when one child, while synchronizing rising and falling musical vocalizations, waves his drawing paper into the air and moves it gracefully through three dimensions of space and the dimension of time, as if representing the airplane’s flight. These dynamic understandings are also encoded on the drawing surface. The beginnings and endings of journeys are demarcated by marking the beginnings and endings of lines. The interest in trajectory and point of arrival are combined with other emergent understandings,
including those of ascent and descent, which may be mapped onto the two-dimensional surface in rising and falling arcs. In the previous observation of the Chinese children, the interest in the trajectory and destiny of objects sometimes manifests itself in terms of descriptions of air disasters which encode an airplane’s trajectory in space–time and its moment of impact (Chan & Matthews, 2002; Matthews, 1984, 1994, 1999). As shown in the observations of the young Chinese Singaporeans, such dynamic representations are often accompanied by spoken narrative and onomatopoeic vocalizations which underscore and analog the visual sequence.

These understandings are carried across media domains and combined together. The permutations are, literally, endless. From the beginning, the child realizes the multilayered possibilities in semiotic chains of meaning (Atkinson, 2003). This is where children’s visual and dynamic representation links with other aspects of cognition.

**EMERGENT WRITING**

Writing also develops on the drawing surface. Children set themselves the task, often with little adult assistance, of differentiating between a range of semiotic systems; those that specify immediately to the visual system three-dimensional relationships and those that are encoded in a different ways, for example, letters, words, and numbers.

It is as if the child is asking, how is it that the shape of objects and events can be represented, with a pencil, on the flat surface, side by side with shapes representing the sounds that come out of people’s mouths? How is it that the groups and sequences of marks can stand for words and ideas? How can things in the world be assigned values or “numbers,” in yet another system? How is it that these very different phenomena can be encoded equally well in two dimensions?

To gain this understanding involves the child’s differentiation and organization of family of semiotic systems. The child has the task of working out internal relationships within selfcontained systems and how these different systems interrelate with each other as well as representing things, events, actions in the world, plus ideas, thoughts, and feelings inside people’s brains. We can see this process happening continuously in the drawings of the very young. Sometimes children receive help from their peers—an important but little discussed aspect of mediated learning. For example, in the Singaporean observation cited previously, one child, using mimetic hand movements, explains to her friend that their task is one of drawing rather than writing!

That making these differentiations is a profound undertaking is borne out by the ongoing controversy among “grownup” semioticians and linguists. Language, for instance, has traditionally been assumed to be arbitrary and conventional. Whereas pictorial images specify directly to the visual systems the form of things in the world, this does not appear to be the case with language. But the distinction between the written and drawn may not be clear-cut. We see this in the children’s early experiments with the representation of both writing and speech. In two dimensions, plus the dimension of time, they capture the oscillating, rhythmical structure of both sound waves and handwriting or, as a queue of discrete configurations, in terms of print.

On a macro scale too, languages seem to coordinate a range of different devices. One example is Chinese, which combines both pictorializations and abstractions which themselves can be further subdivided into different classes of sign. Additionally, some writers suggest that the time-honored distinction between the arbitrary or conventional and the pictorial is a false one. Fascinating new work suggests that language may also have natural origins and be rooted in action and perception (Allott, 2001). The topological, geometrical, and dynamic understandings formed in the drawings of the Singaporean Chinese children referred to previously, are among the dynamic metaphors in which language is first embedded (Johnson, 1987; Matthews, 2001; Thelen & Smith, 1994).
LOGICOMATHEMATICAL THOUGHT, MUSIC, AND DANCE

While coordinating, in a two-dimensional world, the causal relationships within events, mathematical understandings are formed. Emergent counting occurs when one-to-one correspondences are made between action and sound and image. The child might, for example, make empathic vocalizations to coincide with and underscore impacts of brush or pencil. This synchrony also forms rhythmical, musical, and dance understandings. Later on they may call out number names, albeit not always in the correct sequence (“...one, two, fourteen,” says Hannah as she carefully counts three marks—Matthews, 1999) but nevertheless grasping that an arbitrary “numeron” may be tagged to an action (Gelman & Gallistel, 1983).

The child makes the discovery that everything is countable, from pencil marks to steps and hops. Children may also start grouping objects in little heaps at designated locales: a pile of toys on a chair or a heap of orange peelings in granddad’s shoe. This is really an aspect of spatial and temporal ordering (Athey, 1990). The children are essentially classifying. Later on, this classification will be encoded into drawing systems; for example, when Joel, at around 2½ years, groups marks according to type inside a closed shape, and when, later on, he physically partitions the closed shape with lines forming gridded subdivisions. As children group marks and shapes according to their characteristics, so we see the beginning of mathematical set theory.

AESTHETICS

None of these emergent understandings can be separated from the child’s senses of composition, design, and aesthetics (see Freeman, 1995, and this volume). However, in many studies of children’s development in representation, these are often considered as separate, complicating issues which may be safely neglected. Of course, for purposes of analysis, it is sometimes necessary to separate different aspects of representation. Ultimately, however, the way children design the object with reference to the picture surface involves aesthetic sensibilities (Costall, 1991, personal communication). Some children appear to have an aesthetic response to the effects and qualities of the movements, marks, color, and space in their own work. This drives what they do next.

Piecemeal identification of particular devices and structures children use in their work is not in itself sufficient; one has to try to ascertain what holds together these interrelated devices and strategies. As Claire Golomb (1992) has noted, this aesthetic dimension is not an optional “extra” to research. It is an integral driving force of children’s art, deriving from bursts of attention to events and objects of extreme emotional significance (Trevarthen, 1995). This is in stark contrast to the traditional notion that children only become aesthetically aware at around middle childhood. Dennie Wolf (1984, 1989) and Claire Golomb (1974, 1992) have noted that infants are perfectly aware that, though drawing may correspond with reality, it is simultaneously a lawful, self-sufficient structure, in no way reliant on physical laws of the “real” world or the “linear derivatives of objects” (Rawson, 1982).

EXPRESSION OF EMOTION

Additionally, children use media to express, and to come to terms with, their own desires and fears; the joy and pain of being alive. These are not separate items but part of a seamless and continually interacting dialectical relationship, set in motion as soon as the baby starts to exploit the expressive possibilities of her own body actions. These expressive actions are formed
within an interpersonal “bubble” of space formed between the infant and her caregiver (Stern, 1977, p. 29). Eventually, this bubble extends into both the physical and the psychological environment as well as becomes interiorized, forming an analog space, in which hypothetical realities are constructed, built on axes based on understandings of human motivations and intentions originally constructed within the psychological interpersonal envelope.

Far from “scribbling,” the flight of the pencil across the two-dimensional surface forms a representational attractor into whose orbit many other aspects of the child’s actions, thoughts, and feelings are swept. My studies show that young children’s attention immediately alights on the structural opportunities that emerge on the drawing surface, detecting those that best allow representational inquiry into the nature of unfolding events, the structure of objects, and the motivations of people.

Many drawings crudely classified intellectually realistic are based on the imagined intentions of imagined human agents in imagined worlds. A thinking, feeling, and human pilot, constructed in the child’s mind, controls the airplane drawn in the Singaporean nursery. Perhaps the airplane contains passengers. If it crashes, the imaginary rescuers of the injured will also be motivated by imagined human emotions. The drawing event becomes a spatiotemporal theater, complete with vocalized ambulance sirens and related narrative. All of this signifies a powerful empathic identification on the part of the child with events unfolding on the drawing surface. Some of these children are drawing for the very first time, yet in their ephemeral tracings, a hypothetical world is built, in which events, objects are organized with respect to the child’s understanding of physical and causal relations and human psychology.

These understandings form the basis for symbolization and representation, without which entry into the expanded world of semiotic systems children will encounter in school and in society will be impossible. The concept of children’s art is a fairly recent one. It is a useful concept in the sense that it has put children’s emergent representation on the map, but it has also created definitional problems (Fucigna, 1983). What I term children’s art includes the representational and expressive aspects of all the actions of children. It is not simply a question of whether art makes you “smart”; in the sense of improving your child’s literacy and numeracy, rather, without that which is crudely termed children’s art, no thinking at all is possible.

ADULT AND CHILD COMPANIONS AS INTELLECTUAL ADVENTURERS

Although, like language acquisition, the beginnings of representational thought are self-initiated in early infancy, representation will never fully develop unless certain optimal interpersonal conditions prevail. This is true of all semiotic systems. For example, lacking adequate support from the interpersonal environment, language ability is severely curtailed and remains at a primitive level (Pinker, 1994). The interpersonal and social conditions are the crucial factors in determining whether creativity is fostered or stunted.

Earlier on, I remarked that, in contrast to the general demeaning of children’s early representation, there exists a group of people who do appreciate it and offer support. Among this number are parents. They do not give marks out of 10 for walking, talking, and drawing (though in repressive societies, there is a concerted effort to make parents think like this).

FIELDS OF WONDER AND HAPPINESS

The interesting question is, why, exactly, do some parents delight in the first signs of representation, for example, marks made on a scrap of paper which may not remotely resemble the
shape of anything in the world, which are despised by so many, and which count for nothing in education? Why do many parents praise their child for stabbing a piece of paper with a pencil, and excitedly saying “ducks,” or “people,” or ‘bees’, or any number of other imaginary object or creature, not to mention events like the wind blowing or a balloon bursting?

The answer is, the value that “good-enough” parents (Bettelheim, 1987; Winnicott, 1971) place on their children’s actions. The importance of this answer is that it helps us understand the beginnings of representation within an interpersonal context and offers a clue about how this development might best be fostered. Parents generally interact with their babies with the certainty that their babies’ actions have meaning.

This interplay is held together by a field of emotion between the partners, in which each is sensitive to a universal, biological rhythm in which any variation in tempo, cadence, and stress becomes significant in terms of affect (Trevarthen, 1995). Each partner tunes into the rhythm of the other’s actions, timing his or her own contributions to fit into the other’s momentary pauses, in an elaborate dance of face, eyes, arms, and hands. It is within this interpersonal envelope of space, that actions, shapes, and objects are given representational and expressive value.

It is crucial to note, however, the subtle distinction between intervention and interference. Parents do not teach their children to speak; rather, they try to understand what their babies are trying to tell them (Pinker, 1994). The same is true of many parents’ relationship with other forms of their children’s emergent representation. They look, listen, and learn. “Scaffolded” or “mediated learning” may not involve a great deal of words on the part of the parent. Nor does it mean that the adult physically takes over the child’s tasks of construction. Although the adult might minimally help the child with physical mastery, his or her real support is the way he or she helps the child hold the task together psychologically. I have seen brilliant teachers, apparently doing nothing, sitting, quite still, like Buddha, next to a child. Yet their apparently minimal involvement, as “light as a butterfly” (Hart, 1968), has been crucial to the development of child’s autonomous and creative thought.

The process is a seamless flow in which all manner of random disturbance is incorporated into the dialog among adult, child, and the construction medium, whether this be pencil and paper, electronic paint, the use of a videocamera, or the transient movements of the body in time and space alone. The patterning and structure of these interactions offer hope and suggestions for how the beginnings of expressive and representational thought might be developed. Early interaction between parent and child, in which they embark side by side on an intellectual adventure, forms the basis of education.

CONCLUSION: THE SIGNIFICANCE OF CHILDREN’S ART

In contrast to traditional, classic accounts, development in visual representation is not best described as primarily an adaptation to a visual reality presumed to exist in some absolute sense independently of any forms of representation. Rather, the child seems to generate possible realities on the drawing surface in a manner akin to the way hypothetical realities are constructed in pretend play. In the case of drawing, the structures generated in this medium act as attractors that guide the child’s attention to certain forms, relationships, and features within the environment. In contrast to the theory that the basis of human vision is a retinal, perspective image, recent theories, including those of computer vision, suggest it more likely that it consists of the structures we encounter in very young children’s drawings (Biederman, 1987; Gibson, 1975).

The developmental sequence is very variable and flexible, suggesting a process not driven by preformed, internal representations or program but set into motion by the generation of
“attractor” systems (Lorenz, 1963), which, with repeated experiences (supported by adult companions), converge in real time and space and in doing so create opportunities for further structural discoveries (Thelen & Smith, 1994). The ways in which initially independent developmental trajectories might intertwine are infinitely complex (Matthews, 2001).

There are no “stages” of “scribbling,” “intellectual,” or “visual realism.” The “dynamic assemblies” launched in infancy are the beginnings of a seamless trail which incorporates a range of sensorial information and emergent language right from the outset (Thelen & Smith, 1994, pp. 90, 166). Similar modes of representation and expression are applied to a range of media, from regurgitated milk to electronic media. Each unique situation not only offers up different and immediate effects but also presents further crossroads of potential developmental routes. In a recent study, Rebecca Chan and I distributed videocameras to 2- and 3-year-olds. The ways in which these new media will impact on development cannot, as yet, be known—There is no history of how children develop in their use of moviemaking. Yet we are already witnessing another example of how available media interact with an unfolding process of development.

We found that these very young children explore these new media with emergent concepts they are forming with other media. For example, the emergent concept of “going through” a bound volume or tube is applied to the “virtual” tube of the camera’s viewfinder. Understandings forming in other situations about lines of sight and point of view are further stimulated by the use of the videocamera. The child finds out about her individual viewpoint, and how it is determined by her movement and position. She makes the paradoxical discovery, which forms the basis of all understanding, that her own individual viewpoint is, at one and the same time, unprivileged yet unique.

These concerns are similar to those that are represented in drawing. Many psychologists start from the unquestioned assumption that drawing, by definition, is the recording of what James Gibson terms a “frozen” visual array (Gibson, 1979, p. 71). Such psychologists behave as if this paradigm were transparently obvious to the child. Nothing could be further from the truth. In the beginning, the child has not yet conceptualized the drawing surface as representing a window opening out onto a momentary glimpse of the object as if seen from one fixed position at one moment in time. Similar to the movie making described previously, though in an entirely different form, the process of drawing records the child’s own process of attention to objects and events, imaginary or real, in relation to the medium over time.

Nor does this dynamic relationship disappear as the child grows older; rather, it undergoes transformation, so that, by about roughly age 4 or 5, she starts to realize not only the possibilities of the drawing surface for showing views of the object from a notional viewpoint but also the use of the objects as “pivots” (Vygotsky, 1966, p. 546) around which chains of metaphoric and structural analogy may be formed in emergent drawing rules (Willats, 1997).

Although some drawings may show object-centered and/or viewer-centered information, this is best understood as a consequence of an empathic identification the child makes with the unfolding representational opportunities emerging on the drawing surface, a process that began in infancy when dynamic systems of representation were set in motion.

Although, as they grow older, many children do produce drawings that increasingly specify three-dimensional relationships, this is an imaginative construction formed along a continuum which started with the first markings. The child’s resolution of three-dimensional space into the two-dimensional surface is one of an infinite number of solutions to the problem of resolving internal conflicts and ambiguities that arise on the drawing surface. This sorting out of structural indeterminacies on the surface of the paper may, in turn, at a deeper level, reflect both the resolution of internal conflict and the wonder of being alive.

The conclusion of this chapter consolidates the main ideas about the significance and meaning of children’s art and its role in human development. It reaffirms children’s representational
and expressive actions as members of a unitary cluster of modes that interact together in a dialectical relationship and drive development.

There is a vital need to reevaluate the role of childhood, the ecological niche it occupies, and how best the beginnings of intellectual and emotional life might be supported. An important part of these beginnings is the emergence of representation and expression. For, within deceptively trivial-seeming actions performed by very young children on a range of objects and materials are located the beginnings of representational thought. The child will use anything that comes to hand to launch a project about the representation of events and objects and the expression of feeling. Intertwined with this, an infrastructural inquiry is set in motion which will form the basis of the child’s later encounter with symbols and signs. Children’s ability to deep-read the various ways in which their worlds are written may, to a great extent, be dependent on the formation of early representation in infancy and how well this has been supported and nurtured.

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