

Drawing as a Visual Medium

Commentary on Cohn

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Key Words

Development • Drawing • Imitation

In “Explaining ‘I can’t draw’” Neil Cohn [this issue] ably revisits some of the exciting territory that energized Goodman’s founding of Harvard’s Project Zero in the early 1970s. The increasing popularity of comics and their elevation to the status of literature in the form of graphic novels that either stand alone as narratives told in sequences of pictures (e.g., Shaun Tan’s *The Arrival*) or rely on words to support a pictorial narrative (e.g., Art Spiegelman’s *Maus*) renders these earlier themes all the more relevant in our contemporary context. Cohn proposes that, like language, drawing functions as a ‘means of graphically expressing concepts’ (albeit the conceptual referents are largely iconic), is structured similarly to language with syntactical and grammatical requirements, and has an analogous developmental course including a critical or sensitive developmental period for exposure and practice in order to fully acquire the conventional system. The existence of distinct cultural styles and the systematic patterns in drawing style evidenced by adult artists further suggests to Cohn that, “like language, drawings are highly conventionalized,” with a lexicon of schemas that the artist can employ to create “innumerable novel images.” In this short piece, I cannot hope to address all of these bold proposals put forth by Cohn in his highly stimulating and provocative article. Instead, I contribute a broader context to the article by reviewing some of the research on children’s drawing that has specifically entertained the language-like properties of drawing. I focus more specifically on John Willats’s (2005) well-researched theory as additional background to inform Cohn’s use of Willats’s research.

Earlier approaches to the visual arts and to its developmental unfolding in children have used language as an apt metaphor for the visual arts, focusing on the visual vocabulary and grammar to be mastered by both artist and child. Such a system was laid out by Kepes [1949] for the artist in *Language of Vision*, where he noted that, in mastering the language of vision, “a playful manipulation of each element: points,

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shapes, lines – varying them in position, in color, in value and in texture – is the shortest way to an understanding of their interrelationship” (p. 23). The grammar Kepes described derives from gestalt laws of perception. Arnheim [1974] suggested that growth and differentiation in children’s drawings, from a “combination of basic elements” to their integration at a higher level into ‘more complexly structured units,’ have parallels to other mental developments, including language, concept formation, and music. Wolf and Perry [1988] argued for a repertoire of visual languages, each of which evolves with progressive growth in vocabulary and production rules during childhood. With development, children learn to differentiate among the “varied graphic formats” (e.g., drawings, maps, diagrams, graphs) offered by their culture, and they become sensitive to them when each language is best suited for conveying the required or desired information.

Goodnow and colleagues [Goodnow and Friedman, 1972; Goodnow and Levine, 1973] made a direct appeal for a linguistic approach to the study of children’s drawings. Citing scholars writing about aesthetics such as Arnheim [1969], Gombrich [1960] and Goodman [1968] and emphasizing the visual arts as a form of language, Goodnow and Friedman [1972] began from an interpretation of drawing development that “consists of learning to use certain forms and certain arrangements of lines as the graphic equivalents of objects and properties as ways of conveying meaning” (p. 10). By 6 years of age, they note, lines used by children are intended to stand for a visual equivalent, for example, a line at the base of the page stands for the ground while lines high up in the page stand for the sky. Paying attention to sequence and syntax of drawings children produce, Goodnow and colleagues noted similarities to the acquisition of language as the shift from one principle to another appeared to guide a developmental progression in figure drawing and shape copying. The action of drawing seemed to obey a set of rules governing the start and sequence of a drawing [Goodnow & Levine, 1973]. In Goodnow and Friedman’s [1972] study of figure orientation, children aged 3.9–5.7 years were given a circle with two dots (eyes) at different orientations relative to the bottom of the page and asked to complete a human figure. The authors were struck by the fact that children appeared to consider “some ways of drawing a face as ‘better’ than others,” although the criteria for what constituted a ‘better’ drawing varied somewhat among children. A general rule, however, emerged across children that there should be agreement among figure parts, with parts drawn early in a sequence placing constraints on parts drawn later. In a study of rules used to copy different shapes, Goodnow and Levine [1973] directly tested “... the feasibility of a rule-analysis” and “the possibility that left-right reversals are rule-related errors, similar to ‘regularizing’ errors in speech” with children aged 3.9–6.7 years and adults. The identified rules, such as “start at a leftmost point,” all related to production, while the few errors that occurred could be interpreted as attempts at regularizing. A linguistic approach, Goodnow and Friedman [1972] noted, allows researchers to get away from the idea that drawing errors are signs of perceptual deficits and “... that drawings in general may be profitably treated as forms of sequential behavior, amenable to syntactic types of analysis” (p. 16).

John Willats [2005] has put forward perhaps the most thoroughly supported and elegant theory of drawing development with the claim of strong parallels to language. Willats, an artist himself, taught sculpture and drawing before taking his PhD in experimental psychology. He was profoundly influenced by Noam Chomsky’s

work on language and by the perceptual theories of David Marr, both of whom were involved in groundbreaking studies when Willats embarked on his own developmental studies of drawing.

Willats noted that Marr [1982] identified two types of stored internal descriptions of objects: (a) viewer-centered internal descriptions of how objects and scenes appear from particular points of view, including occlusions and shapes as distorted by perspective, that are necessary to navigate about in the world, and (b) object-centered internal descriptions of the three-dimensional shapes of objects that are independent of viewpoint and stored in long-term memory. These are derived from the mutable viewer-centered descriptions registered on the retina and allow recognition of objects from any point of view and under diverse conditions. Willats proposed that children and even naïve adults derive their drawings from these latter object-centered descriptions, even when they produce realistic drawings or life drawings. This should not be unexpected, because, according to Marr, extracting object-centered descriptions from views is a primary function of the visual system¹. Yet drawings cannot be direct representations of these object-centered descriptions because these are three-dimensional and cannot be transferred wholly onto a two-dimensional picture plane. Learning to draw, therefore, is a process of discovering "... ways of mapping these three-dimensional internal descriptions of objects on to a two-dimensional surface," and children do this by "... acquiring increasingly complex and effective drawing rules" [Willats, 2005, p. 5]. Guiding children in this search is the goal of producing a more effective representation, more effective in the sense that a viewer is able to clearly and unambiguously 'see in' the drawing the object or scene it is intended to represent [see Wollheim, 1977]. Willats identifies several conditions of drawings that qualify as effective representations: (a) they must represent possible views of objects or scenes; (b) objects or scenes should be shown from a general direction of view, one that preserves the important shape properties; (c) defining or canonical features of objects or scenes should be portrayed; and (d) full-line drawings are more effective than silhouettes.

Children begin representational drawing, therefore, by reflecting general views of objects, those that reproduce nonaccidental shape properties in the pictorial image such as the extendedness of objects. According to Willats, it is the representational system the child uses that develops rather than the drawing schema, which changes because of advancements in the representational system. The denotation and drawing systems a child uses evolve through their interaction with production and perception such that, with development, the *meaning given to* a mark changes. A line that initially functions to denote a boundary later functions to denote an edge; an enclosed region that at first stands for an object's volume later takes on a "true shape" of the object to denote the possible view of an object's face. Willats provides ample experimental evidence for this developmental progression. A similar progression was also observed in my longitudinal studies [Milbrath, 2010/1998] of the spontaneous drawings of children with talent in drawing, although these children experimented with and shifted the denotative function of a line at relatively younger ages

¹ See Palmer's [1999] description of the four current proposed stages of visual processing: image-based, surface-based, object-based, and category-based.

than their less talented peers and children observed by Willats. Perception is key in Willats's view, not because it provides visual models for drawing, but because perception provides critical feedback about the emerging pictorial image during the sequential process of drawing that guides a drawing's production. Although in some cases children may be guided by a two-dimensional view when drawing, in most cases children learn to draw effective representations through the application of "increasingly complex and powerful transformational rules to internal object descriptions" [Willats, 2005].

Once new pictorial systems are mastered, a child can combine them to create new drawings not attempted before. Underlying this evolution is a child's dissatisfaction with a drawing, setting in motion an active search for a more effective solution and motivating the discovery of new rules. Unlike the developments in language for which children must socially interact with other language speakers, Willats views the developments in drawing as consequences of the more solitary interaction of production and perception because, unless children grow up in households with artists, they are unlikely to acquire drawing rules by watching others draw. Willats [2005] notes further that, while in theory, through such solitary interaction a child could achieve full-line drawing as a denotation system and oblique projection, or even perspective as a drawing system, in practice children may need a pictorial-rich environment as well as explicit instruction given at the right moment for such advancement.

Cohn calls attention to the structural resonance between his own ideas and Willats's theory, but these ideas also differ in several important ways. Willats finds his theory of drawing as fundamentally a visual medium on the interaction between denotation and drawing systems and the interplay of perception and production during the drawing process. Developments in drawing rely on the discovery and learning of new drawing rules that combine the basic marks or elements of a drawing in increasingly more successful ways as more effective denotation systems and drawing systems emerge. Cohn's premise is that graphic representation is organized much as verbal language, relying on the building up and retrieval of a "lexicon" of schematic models from memory for scores of drawing topics. This lexicon includes simple graphemes (lines, dots, shapes, etc.) akin to Willats's picture primitives, schematic parts of images (e.g., hands), and even whole representations such as a house or stick figure. However, the developmental process by which these parts and larger schemas are constructed or acquired remains vague. Cohn links the mental image held in working memory of an intended drawing to the 2.5-dimensional sketch described by Marr and notes that this 'image' image interfaces with the graphic lexicon and with syntax, which specifies combinatorial rules for drawing. The graphic schemas are linked to Marr's 3-dimensional model in the visual system to derive their meaning, although simple graphemes, like simple phonemes, have no conceptual meaning. The perceptual system, therefore, appears to play a crucial role both in generating a near two-dimensional model of the topic of a drawing and in giving a graphic schema its meaning. Drawing production is described as a script linked to the motor system that includes the order of parts in a drawing. A drawing thus involves the retrieval from a person's graphic lexicon of schemas stored in long-term memory and the combination of these schemas using rules from the person's graphic syntax. This combined information of schemas and syntax rules is stored in working memory as the 'image' image. While drawing from memory appears to

proceed directly from the 'image' image to a production script, life drawing is more of a challenge since it involves inhibition of the graphic lexicon in order to draw the 2.5-dimensional sketch (perceived surface vision) directly. Willats's theory, in contrast, does not constrain a drawing beforehand, because the drawing process is always an evolving production that interacts with perceptual feedback about the pictorial image as the drawing progresses. Rules that tie the denotation system to meaning (i.e., use lines to denote an edge) and selection of a drawing system (e.g., orthographic projection) are used to construct the drawing instead of using an image in memory ('image' image). Note also that, for Willats, meaning is tied to the denotative meaning of the marks including picture primitives, not to an internal model. While Willats argues that instruction may be necessary to teach some advancements in drawing such as the rules of perspective, Cohn states that copying drawings and imitation of other graphic sources, 'not necessarily explicit art instruction,' are of benefit because the drawer stands to learn both the production script and, through imitation, the drawing schema. Cohn points out that in Japan, where children acquire the visual vocabulary of comics (i.e., Manga) through imitation, most children as young as age 6 are proficient at "drawing complex graphic narratives in comics." It is worth noting as well that copying or imitating a two-dimensional drawing obviates the need for more complex transformational rules that serve to map three-dimensional object descriptions onto a two-dimensional plane.

Cohn's skillful use of the cultural conventions in drawing that motivate Japanese children and adolescents reintroduces the significance of cultural graphic influences to the discourse on children's drawings. In many western societies, children are thought to be primarily motivated by acquiring cultural conventions that favor visual realism, to the exclusion of other graphic styles. Many of us studying children's drawing have done so from this western tradition, although there are obvious exceptions, and Cohn makes reference to some of these scholars. Cohn's view also draws attention to cultural differences in emphasis on drawing and art education among contemporary societies. Although western societies have no paucity of available graphic images, in interpreting drawing as a language, Cohn stresses the necessity for interaction with the drawing process for graphic fluency and a "fully acquired conventional system." This requirement of intense engagement is borne out by my own studies of talented drawers and their less talented peers [Milbrath, 2010/1998]. In my study, the exceptional graphic fluency of talented drawers was a product of many, many hours of drawing, although these children did not appear to copy until preadolescence at a point when they were already proficient drawers. The talented children, however, did seem to consider an effective representation as one in which depth and perspective could be seen, but a few of them also excelled at comics using stereotypical features and borrowing from and freely imitating the American Disney conventions [Milbrath, 1995].

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