

Comics, Linguistics, and Visual Language: The past and future of a field

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Introduction

Many authors of comics have metaphorically compared their writing process to that of language. Jack “King” Kirby, celebrated as one of the most influential artists of mainstream American comics, once commented, “I’ve been writing all along and I’ve been doing it in pictures” (Kirby, 1999). Similarly, Japan’s “God of Comics” Osamu Tezuka stated, “I don’t consider them pictures ... In reality I’m not drawing. I’m writing a story with a unique type of symbol” (Schodt, 1983). Recently, in his introduction to *McSweeney’s (Issue 13)*, modern comic artist Chris Ware stated overtly that, “Comics are not a genre, but a developing language.” Furthermore, several comic authors writing about their medium have described the properties of comics like a language. Will Eisner (1985) compared gestures and graphic symbols to a visual vocabulary, a sentiment echoed by Scott McCloud (1993), who also described the properties governing the sequence of panels as its “grammar.” Meanwhile, Mort Walker (1980), the artist of *Beetle Bailey*, has catalogued the graphic emblems and symbols used in comics in his facetious dictionary, *The Lexicon of Comicana*.

Truly, there seems to be an intuitive link between comics and language in the minds of their creators—a belief shared by several researchers of language who, with growing frequency, are discussing properties of comics in a linguistic light. Exploring these works can provide insight into what extent this comparison might hold, its limitations, and how it can guide future research.

In order to gain an understanding of the place of comics in linguistics, it remains necessary to examine what exactly is being (or should be) analyzed. Comics do not fall within the normal scope of inquiry for contemporary linguistics—not because they are an inappropriate topic, but because language is a human behavior while comics are not. Comics are a social object that is the result of two human behaviors: writing and drawing. Believing “comics” are an object of inquiry would be akin to linguists focusing on “novels” as opposed to studying English, the language that novels are written in. Analogously, the sequential images used in comics constitute their own “*visual language*” (details of which will be expanded on at length further on). Thus, the behavioral domains of *writing* (written/verbal language) and *drawing* (visual language) should be the object of linguistic inquiry, stripping away the social categories like “comics,” “graphic novels,” “manga,” etc.

Comics then become the predominant place in culture that this visual language is used, often paired along with writing (a learned importation of the verbal modality into the visual-graphic). That is, contrary to the metaphor used by their authors, *comics themselves are not a language*, but comics *are written in* visual languages the same way that novels or magazines are *written in* English. This makes comics potentially written in both a visual language and a written language—reflecting the multimodality of human expression found in co-speech gestures (e.g. Clark, 1996; McNeill, 1992, 2000) which have received much attention in linguistics (compared to only an emerging literature on text-image relations in the linguistic/cognitive sphere).

Overall, the guiding questions of linguistic inquiry can thus be applied to the study of the visual language that comics are written in:

1. How is the *form* of the expressive system organized?
2. How is *meaning* conveyed by a form?
3. How do perceivers encode both *form* and *meaning*?
4. How do perceivers draw connections between and encode *sequential units*?
5. How do perceivers *learn* all this given *cultural variability* across systems?

These are the fundamental motivating questions of various subfields of linguistics and all apply to the study of the expressive system used in comics (i.e. phonology, morphology, semantics, grammar, acquisition). While these questions have specific ways in which they are answered in linguistics proper, direct analogies between the verbal and graphic modalities (i.e., like “words = panels”) are less important than the fact that the same *questions* are being addressed in both the verbal and graphic forms.

Finally, the orientation of these questions will be situated as an examination of cognition. The approach outlined here seeks to understand how people comprehend the structures used in comics rather than examining the cultural trends present in the graphic form or the verbal text used within comics (though worthy endeavors in their own right). Rather, here commonality is examined between the understanding of verbal and sign languages and of the visual language used in comics—both with and particularly without written language—using the methodologies that linguistics uses to look at language.

Naturally, research in other domains of cognition (such as visual attention and perception) will be necessary for a complete theory of the comprehension and appreciation of comics. Indeed, there are numerous studies on comics from other fields of cognitive science, particularly in the fields of cognitive psychology, cognitive neuroscience, and developmental psychology. However, this discussion will mostly stay constrained to linguistic approaches, keeping in mind that other important and applicable cross-disciplinary work contributes to the overall endeavor as well. Given this focus, let’s first look at what work has already been done in the linguistic paradigm to examine comics.

Survey of Linguistic approaches to comics

Comics have been studied using many of the formalisms that span the history of modern linguistic inquiry, from structuralism and generative grammar to cognitive and applied linguistics. These approaches have framed their analyses within their own paradigms, so the contributions of each will be discussed in a broad overview of the linguistic research that has been done using comics.

Approaches to comics from a structuralist and semiological perspective emerged as early as the 1970s in Europe, summarized in Nöth (1990) and later in D’Angelo and Cantoni (2006) as well as in Mey (2006). Structuralism looked at “language” as a set of cultural codes, making comics one place that cultural codes could be found and reduced to minimal units. Comics are one of several types of art and media analyzed in this vein. Several authors aimed at describing the minimal units of comics’ representations at various levels of representation. Koch (1971) and Hünig (1974) both created taxonomies of unitization that build from the inner parts of comic panels’ graphic representations of characters, places, etc. (*logemes*) to whole panels (*syntactemes*), up through whole sequences (*texts*). Gubern (1972) also differentiates aspects of the form of representations (*morphemes*) with their color (*coloremes*). With more specific aims, several works in particular have attempted to identify morpho-graphemic minimal units using Charles Schulz’s *Peanuts*, highlighting how individual graphic elements of hands, eyes, noses, etc. combine to create differences in full-blown representations of various characters (Gauthier, 1976; Kloepfer, 1977; Oomen, 1975). Other approaches have focused on comics’ sequences by identifying elementary units of narrative functions, consistent trends in plots and

stories, and then comparing them with other narrative genres (Fresnault-Dervelle, 1972; Hünig, 1974). More recent works following from this tradition include Groensteen (1999) who has couched his approach within the equation that “comics are a language,” yet has eschewed the search for minimal units, while semiological approaches are used in dissertations by Dean (2000) and Miller (2001).

Aside from approaches looking at the structure of codes, some works have also used the philosopher C.S. Peirce’s (1931) “semiotics,” which focus on the expression of meaning through various types of reference. Peirce’s formulation of semiotic types—particularly his distinction between icons, indexes, and symbols—has been applied to comics in broad strokes by Magnussen (2000) and specifically to the differences between cartoony, realistic, and abstract representational styles by Manning (1998). Peirce’s philosophies also provides the framework for Cohn’s (2007, 2010b) work describing the semantics and other systematic patterns in the morphology of graphic expression.

While European work drew from structuralist traditions, contemporary works on comics in a linguistic light—both in America and abroad—have exploded since the publication of comic artist and theorist Scott McCloud’s (1993) graphic book *Understanding Comics*. In it, McCloud posited cognitive principles to explain the ways in which people understand both individual images and sequential ones. For example, McCloud proposes the principle of “closure,” where the mind “fills in the gaps” between panels in order to comprehend the sequence of images. McCloud characterizes the linear relationships between juxtaposed pairs of panels with a set of six types of “panel transitions” based on changes in actions, characters, or the environment, among others. He also quite overtly compares the medium to language, claiming that the “iconography” of graphic meanings constitutes the vocabulary and closure is the grammar.

McCloud’s approach has permeated nearly all linguistically-driven studies since its publication. Both Saraceni (2000) and Stainbrook (2003) focused their dissertations on adapting McCloud’s panel transitions to theories of verbal discourse studies, while Narayan (2001) compared them to cognitive theories about event structure. Similarly, Saraceni (2001), Bridgeman (2005), and Lim (2006) all invoke McCloud’s ideas in their discussions of multimodal texts that integrate images and words.

The analysis of comics has been the most prevalent in cognitive linguistics, which attempts to relate the comprehension of meaning in linguistic structure to aspects of general cognition. Cognitive linguistic research on conceptual metaphor (Lakoff & Johnson, 1979), which involves the mapping of one conceptual domain onto another, has been of particular interest to comic theorists. Forceville (2005) has examined the expressions of anger in *Asterix* comics, especially related to the metaphor “ANGER IS HOT FLUID IN A CONTAINER”—which in verbal form appears in sentences like “He was *steamed*” or “His rage *erupted*,” where concepts about anger map to aspects of boiling water coming out of a container. In the graphic form, this metaphor is visible in the common trope of steam coming out of the ears of angry characters, as if the emotion were bubbling over in the container of the head. A recent volume edited by Forceville looks at multimodal metaphor, including further examination of emotion in *Asterix* (Eerden, 2009) and similar metaphors driving emotion in Japanese manga (Shinohara & Matsunaka, 2009), as well as metaphor in other contexts such as political cartoons (El Refaie, 2009) and editorial cartoons (Schilperoord & Maes, 2009; Teng, 2009). Additional articles have examined metaphor in Neil Gaiman’s *Sandman* comics (Narayan, 2000), in McCloud’s

Understanding Comics (Horrocks, 2001; Narayan, 1999), in post-September 11th political cartoons (Bergen, 2004) and in comic strip advertisements for the *Chicago Tribune* newspaper (Cohn, 2010a).

Further studies of comics in cognitive linguistics are increasingly appearing in conferences, journals, and chapters in this volume. Though the event itself was canceled, the 2009 International Cognitive Linguistics Conference catalogue online listed three abstracts for studies on comics, ranging from metaphors and image schemas in superhero comics (Potsch & Williams, 2009), to an examination of the cognitive structures of motion (Nowak, 2009), to multimodal meaning-making (Narayan, 2009). Clearly, the study of comics has taken hold in cognitive linguistics, extending the field's intent to explore the connections in semantic systems between the verbal and other domains.

A wide variety of other linguistic methods have been drawn upon for diverse purposes as well. Cohn (2005) has argued for sociological distinctions for comics' underlying structure similar to the split between speech acts and the linguistic system made by de Saussure (1972) and the distinction between the internal cognitive understanding of a language and its external socio-cultural understanding made by Chomsky (1986). Chomsky's (e.g. 1957, 1965) approach to generative grammar—which hypothesizes that language's syntax is generated by hierarchic structures guided by a system of constraints—has been drawn upon by Cohn (2003) to describe sequential images in a different way than panel-to-panel transitions. Meanwhile, an approach to a “visual lexicon” (Cohn, 2007) has drawn upon theories of construction grammar (Goldberg, 1995; Jackendoff, 2010) with sensitivity to concatenation of form-meaning patterns stored in memory at sizes ranging from small scale graphic components to full multimodal sequences. Finally, Laraudogoitia (2008, 2009) has drawn on the computational linguistics methods of using computer algorithms to explore the patterns and structures of language in his examination of the sequential structures of comics.

Despite this growing trend of associating linguistics and comics, few of these disparate works are motivated by a central theory of language, graphic expression, or comics (acknowledged in D'Angelo & Cantoni, 2006). They all work under some intuition that linguistics is the proper discipline with which to study these phenomena. However, despite all tapping into the questions posed at the outset, nothing binds these works together. Moreover, few of them present any unifying vision to accomplish this, much less provide a gateway for future linguistic inquiry and/or connect graphic expression to the verbal or manual domains. At their best, these studies use comics as further support for particular linguistic theories (Forceville, 2005; Narayan, 2001), and at their worst, they make equations that “comics are a language” without grounding such claims with adequate contemporary linguistics knowledge (e.g. Groensteen, 1999).

However, a “unified theory” is possible, though it requires a deeper consideration of the object of inquiry. We turn to that now.

What is “Visual Language”?

In all of these cases, the graphic form used in comics is addressed with the methods used to analyze a linguistic system. Ultimately, this research contributes towards filling a gap in the cultural category regarding the channel of graphic expression. While verbal communication (“speaking”) is readily acknowledged as using a *system* of expression (“spoken *language*”), graphic communication

“drawing”) has no equivalent system recognized. While language is viewed as a rule-governed system acquired through a developmental period, drawing is looked at as a “skill” subject only to the expressive aims of the artist and their abilities, which are assumed to be developed through explicit instruction or practice. While sentences can be grammatical or ungrammatical, the predominant intuition is that there is no unacceptable way to structure images. However, there is no principled reason why these beliefs about the visual-graphic domain are held, and the growing literature discussing “comics” in linguistics points towards systematization the same as in language.

Indeed, humans only use three modalities to express concepts: creating sounds, moving bodies, and creating graphic representations. A theoretical extension can then be proposed: when any of these modalities takes on a structured sequence governed by rules that constrain the output—i.e., a grammar—that form becomes a type of language. This leads structured sequential sounds to be spoken languages of the world, structured sequential body motions become sign languages, and structured sequential images literally become *visual languages*. An analogy can then be made: individual manual expressions (which have no grammar) are to sign languages (that use a grammar) what individual drawn images (no grammar) are to visual languages (grammar).

This notion of a “visual language” fills the gap in categorization for describing the cognitive system at work in graphic expression. When individuals acquire or develop systematic patterns of graphic representation, along with the structures necessary to string them into sequences, they are effectively using a visual language. Just as spoken language does not have a universal manifestation, visual language varies by culture. We would expect diverse cultural manifestations of visual languages throughout the world, perhaps even not resembling comics at all (such as the sand narratives used by native communities in Central Australia¹). This provides a context to explain why, for example, Japanese and American comics feature varied graphic styles and sequential patterns (Cohn, 2010b): they are written in different visual languages, used by differing populations. However, while “Japanese Visual Language” and “American Visual Language” feature patterns that are unique to their speakers, they all still feature patterned sequential images expressing concepts that contribute toward their inclusion in the broader “visual language” the same way that English and Japanese are both types of “verbal language.”

Thus, the questions posed to research at the outset of this paper—and the growing literature in linguistics—are all situated within the approach of studying this system of visual language. Next, what might this new formulation yield in terms of future research?

Future Research: “Visual Linguistics”

If visual language is to truly be studied as a language, research can easily involve all the traditional areas of linguistic inquiry framed by the questions posed at the outset of this paper, though re-understood for the graphic modality. The various areas of study can thus follow the major branches of linguistics that address these questions: *graphemics*, *photology*² (visual-graphic analogues to *phonetics* and *phonology*), *morphology*, *semantics*, *grammar* as well as *multimodality* and *acquisition*. Note that each of these fields address the questions posed for research at the outset of this discussion. For each field described, the framing of the overall

inquiry will be described, followed by some pertinent existing research that fits into this endeavor. Following this, suggested research endeavors will be outlined.

At the outset of this discussion of components of visual language, it is important to reinforce that the intent is *not* to force equivalencies between the structures used in verbal and visual forms (i.e. *not* “words = panels”). The goal is not to make direct mappings between spoken and visual language, but rather to understand how the two systems use analogous functions and units of organization. In some cases, correspondences should flow naturally (semantics could apply the same to aspects of meaning no matter the modality) while in others, a rigid analogy is wholly inappropriate (the graphic form likely has no “phonology,” but has a “photology” with its own properties that suits the visual-graphic modality). That said, the labels used from linguistics are ultimately less important than the functional roles that they describe within the system as a whole.

Graphetics

The place most disparate between visual language and verbal or sign languages is the modality itself—the visual-graphic channel is quite different from both the verbal-auditory and visual-manual domains. For example, while the verbal form is conveyed temporally, the graphic form is (in most cases) static. The auditory form mandates “linearity” to the expression, while the analog nature of vision leaves linearity to be guided by specific properties of layouts of panels. However, both systems have physical form through which the information is conveyed. As such, both spoken and visual languages have constraints on form, and that is the topic for this level of analysis. There are two major issues that concern the investigation of the form of visual language expression: 1) examination of the physical manifestation involved in graphic comprehension and 2) study of the organization of the units of form. In verbal language, these goals are met by the fields of phonetics and phonology, while corresponding fields of “graphetics” and “photology” can apply to the visual-graphic form.

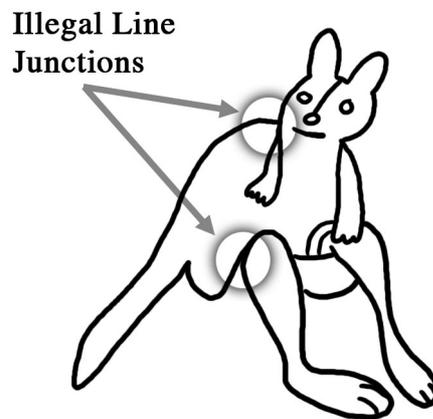
The study of graphetics should first seek to describe what sorts of information are encoded such that drawings can be produced and perceived. Verbal language uses “phonemes” of sound (*k, l, m, a, e*) that are created by physical points of articulation in the human vocal tract. Similarly, basic “graphemes” are used and combined together to form larger representations. Such basic shapes like dots, lines, and spirals combine to form angles, squares, circles, etc. that have been described as the basic shapes of various graphic iconography which are then deployed in drawn representations (Liungman, 1991). However, there is far more variability in the articulation of the hands (or feet, or elbows, etc.) to create graphic forms—there are many ways to draw a line with a finger or to hold a pen. In most visual languages, drawers have as much time as they need and have a nearly limitless array of media and techniques at their disposal. This contrasts with verbal and manual languages, which are produced in a rapid manner and are a direct trace of the articulatory gestures used to create the signal via the hands or mouth. Thus, while the physical production of verbal and manual language has great importance for encoding, for visual language, articulation appears to have little bearing on the final graphical structure.

Nevertheless, there are important constraints on the perception of visual language. Viewers must be able to recognize the objects that are depicted in the scenes, meaning that the elements of visual language must be drawn in such a way as to facilitate visual object and scene perception. Drawers must thus be constrained by

the general principles of object recognition—panels must depict scenes that follow for example, Gestalt principles of organization (Palmer, 1992; Palmer & Rock, 1994; Wertheimer, 1923), principles of figure and ground, and others.

Some work has described rules for grapheme combinations that resemble phonological constraints. For example, illegal combinations of sounds are restricted in all languages of the world—such as how “tlk” or “mp” cannot appear at the beginning of words in English. Similarly, Willats (2005) draws upon the work of Huffman (1971) and Reith (1988) to formulate acceptable versus ill-formed combinations of lines in drawings based on the rules allowing types of configurations of line junctions. For example, Figure 1 illustrates that the circled portions near the shoulder and leg of the kangaroo appear have awkward line junctions that do not accurately show the occlusion of objects. Thus, graphetics must be concerned with making sure that the graphical units combine to form recognizable objects and scenes.

Figure 1. Ungrammatical line junctions in a child’s drawing of a kangaroo. Adapted from Reith (1988).



The limitations on graphics shown here are purely involved with the graphic form—they have little effect on the meaning of either the parts or whole representation. While the comprehension of graphic elements must to some degree rely on general aspects of perception, these restrictions appear based on purely graphical components. Thus, research is charged with identifying the restrictions on structure in the graphic form, as well as where they depart from, and are similar to, general aspects of vision. To this end, as with phonetics, graphetics is the part of the cognitive architecture that interfaces most seriously with processes from other domains (here, visual perception; in phonetics, motor programming, acoustic perception).

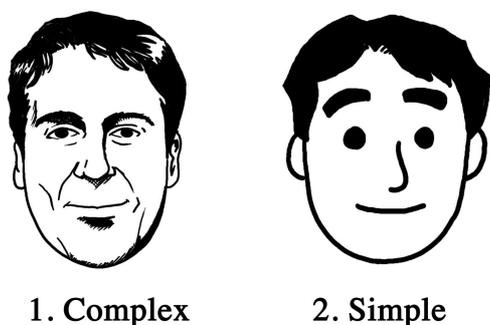
Finally, the graphic patterns used in visual language can be explored within individual drawers and within broader cultures. Given that a “language,” culturally speaking, is essentially the grand average of similar patterns in individuals’ heads, identifying such patterns can lend towards the documentation of graphic dialects. For example, consistent patterns are recognizable between the authors of most Japanese *manga* such that it can be called a “Japanese style” (big eyes, pointy chins, big hair), though with distinguishable subgenres that vary on this “Standard” (Cohn, 2010b). These distinctions can be understood as accents or dialects of the broader Japanese Visual Language; similar research can be undertaken for all visual languages.

Photology

Beyond identifying basic units, research must also describe how these units of combine together and the cognitive principles that motivate such combinations. For these qualities in sound, this would be the endeavor of phonology. By analogy, “photology” is charged with the study of the organization of the graphic modality. Early structuralist approaches looked at how basic graphemes combine to influence meaning. Particularly, studies investigating the morpho-graphemic structures in *Peanuts* (Gauthier, 1976; Kloepfer, 1977; Oomen, 1975) frame the issues of searching for consistent patterns of graphic representations similar to looking for phonemes—a practice that goes all the way back to Töpffer’s ([1845] 1965) analysis of the regularities of his own drawings.

This level of organization, however, should not relate to the basic needs of object recognition, but should rather be more arbitrary. This notion may best be demonstrated with an example. Note the two faces in Figure 2.

Figure 2. Variation in photology

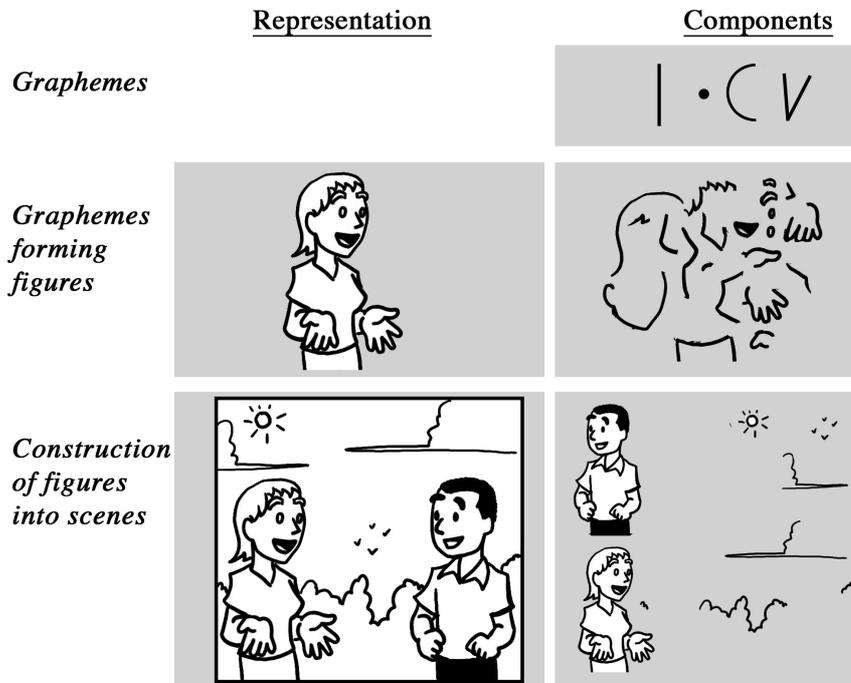


Here, the Simple representation is drawn with simple lines and negligible detail. The Complex face, however, appears to use three-dimensional depth and his eyes, nose, hair, and ears all are depicted with detail. Crucially, note that even though the Complex face is drawn with nostrils and the Simple one is not, we are not supposed to infer that the Simple drawing has no nostrils. Rather, the *photology* of the Simple face allows a single graphical element such as a line to depict a lip or a nose, whereas the graphology at work for the Complex face requires more complicated configurations. One way to describe this difference would be to postulate a “minimality constraint” that dictates the minimum number of graphical elements that can be used to depict an object. While the Simple graphology allows single graphical elements to be a unit of representation (e.g., a circle for an eye, a line for a nose), the Complex face’s graphology requires more than one, i.e., requiring the nose and eyes to be more than a single line. This restriction would be similar to prosodic minimality constraints observed in natural languages that dictate the minimal size that words can take (e.g., English and Dutch morphemes must consist of at least a heavy syllable—a syllable with a long vowel or a short vowel followed by a consonant (Booij, 1995; Hammond, 1999)). Notice that this constraint has nothing to do with object perception—both faces are easily recognized as such. Rather, these are arbitrary rules for the way graphical elements may combine.

The study of photology must account not only for the combination of individual graphemes to form basic shapes, but also individual characters all the way up through full scenes. Just because combinations might build to form objects and full scenes, it does not necessarily mean that they involve morphology—there still must

be an accounting for the comprehension of the purely visual-graphic aspects of the modality at various levels of processing, as shown in Figure 3. This is similar to sound in verbal language, which features phonological combinations within words, sentences, and even discourse with aspects of intonation, prosody, and metrical structure.

Figure 3. Various levels of photological constructions



As in the verbal and manual domains, in building larger levels of graphic structure, we might expect the mind to encode units of schematic information (both of simple graphemic shapes and combined chunks of them) that can be combined together using systematic rules. Research must characterize this schematic information, its combinatorial system, and how this purely graphic information maps to conceptual structures (be it through iconic or symbolic reference). One approach to this issue has been posed by investigation of children’s drawings. Along with subsequent research supporting that most children imitate drawings from other sources (Lamme & Thompson, 1994; Smith, 1985; Wilson, 1988, 1999), Wilson and Wilson (1977) have hypothesized that drawing pulls from schematic encodings of these imitated graphemic structures, which then become “averaged” in production to create novel forms. That is, a drawer either acquires (from imitating external sources) or creates schematic patterns of graphic representations and then produces them in a generative fashion to create novel drawings.

Working out the mechanisms guiding these combinations is the primary challenge to a field of photology. As with graphetics, photology must interface with the concerns of general studies of vision and perception. Exploring the relations between these fields—as well as how they depart—will provide an explication of the cognition guiding the form of visual language.

Morphology

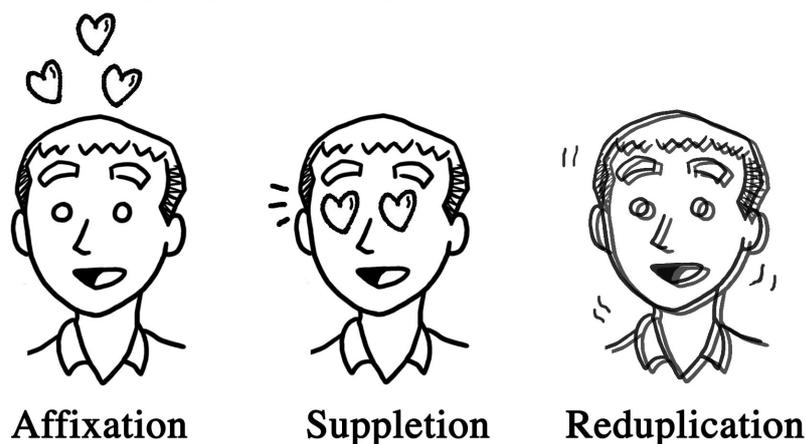
In all modalities, morphology is the study of how meaning is encapsulated in explicit forms. Unitized meaning in visual language can be divided similarly to

standard linguistic understandings, with productive versus non-productive morphemes, open and closed classes, and varying levels of lexical items. Following the construction grammar view that a lexicon is the cognitive encoding of stored units of form-meaning pairings in the linguistic system (Goldberg, 1995; Jackendoff, 2010), Cohn (2007) described the overview of a “visual lexicon” that ranges from individual meaningful emblems³ (such as symbolic word bubbles or lightbulbs over heads) to fully productive and patterned representations at the level of full panels, even beyond to constructional patterns of sequential images.

Among the straightforward work necessary in visual morphology, one topic might include cataloging the graphic emblems used in various cultures visual languages. Though humorous in intent, Walker (1980) has provided perhaps the most extensive collection of signs, while others have recently begun to emerge. (Forceville, 2011; Forceville, Veale, & Feyaerts, 2010). Several works have noted the differences in morphology between cultures, particularly the disparities in Japanese and American emblems (Cohn, 2010b; McCloud, 1993). Shipman (2006) has also used case studies contrasting the signs used in certain comics by American and French authors. Still further contrast comes from visual languages that are found outside of the cultural objects of “comics,” such as Aboriginal Australian sand narratives which carry their own morphological systems (Green, Forthcoming; Munn, 1962, 1966, 1986; Wilkins, 1997).

Like verbal languages, visual languages appear to use distinctions between of attachment and binding to other signs that follow bound forms versus free forms. For example, words might affix a morpheme that cannot stand on its own like “-ness” to a root like “happy” or “sad” to make “happiness” or “sadness.” Similarly, focus can be given to the combinatoriality of various morphological signs in the graphic form (Cohn, 2007). For example, speed lines and speech balloons are “bound morphemes” that cannot appear without affixing to a root object like someone running or speaking. They cannot appear on their own and even imply a root if one is not shown. Other bound signs might have more restrictive areas of binding, such as those that appear above individuals’ heads (lightbulbs, hearts, rainclouds, etc.), but not to the side of the head or body, as in Figure 4. These above-the-head signs also require a degree of “agreement” with the facial expression—a happy face with rainclouds or an angry face with a lightbulb would be an ungrammatical combination. Again, it is important to emphasize that these graphic components are not implied as being equivalences to roots and affixes in verbal language, but that both types engage similar relationships in their concatenation of bound and free forms.

Other morphological processes are similar to language as well. Some signs use “suppletion”—the substitution of all or part of an entire morpheme as a variant for another, such as “people” or “men” for the plural of “person” or “man.” Graphically for example, hearts, stars, dollar signs, etc. can be substituted in place of a character’s eyes to add meaning (see Figure 4), or full form suppletion of dotted lines for all the lines of a character’s body to stand for invisibility. Reduplication is also a common process where morphemes repeat to create expanded meaning, as in the repetition of the second morpheme in the Hebrew “klavlav” for “puppy” expanded from “kelev” for “dog” (Moravcsik, 1978). A similar process is used graphically when the lines of a character or object are repeated and layered on top of each other to show shaking, as in Figure 4.

Figure 4. Morphological processes in graphic form

Again, it is important to remember that these processes involved in the combinatorial strategies of graphic morphology are not necessarily viewed as direct unit-to-unit analogues to the verbal form (i.e. there is no search here for the graphic equivalent of a “word”). However, the same general strategies are used in both the graphic and verbal forms. Both modalities attach meaningful elements together (affixing), substitute them within each other (suppletion), and repeat them (reduplication) to varying effects on the meaning of an expression. Exploring the constraints mediating these usages in the graphic modality echoes morphological research on other types of languages.

Further, work should be done on the complex relationships between elements within an individual image. Studies in semiotics have sought to do this by describing the vectors between semantic roles of characters in an image (Kress & van Leeuwen, 1996). However, others have also argued that generative approaches to individual images can also work for examples such as maps and diagrams, meshed with morphological cues (Engelhardt, 2002; Sonesson, 2005). Further study of this domain must seek to explain how both semantic and formal aspects of individual images facilitate understanding, as well as how the comprehension of individual images might differ from general visual perception.

Semantics

Semantics may be the field of linguistics shared the most clearly between all modalities. Beyond the categorization and combination of meaning in stored morphological signs, meanings in visual language can take on a number of more complex representations. One track for this can involve directly exploring the features of emblems and signs, such as Cohn’s (In Press) treatment of the semantic features underlying word balloons and thought bubbles. Other explorations of semantics can no doubt take on much greater complexity, such as the cognitive linguistics approaches to conceptual metaphor and blending in both individual images (e.g. Bergen, 2004; Forceville, 2005) and sequential images (Cohn, 2010a) as reviewed above.

Common semantic phenomena like metonymy and synecdoche also appear in the graphic form (Cohn, 2010a; Kennedy, 1982; Kukkonen, 2008). Metonymy can take various types, especially the substitution for one thing to mean a related thing. For example, in the sentence “*The White House* issued a statement,” it is accepted that “The White House” stands for the administration that works in that building, not the

building itself. Similarly, this same metonymy is commonly used in the comic *Doonesbury*, which shows word bubbles coming from the White House to represent things said by people inside the building. Synecdoche, referring to the whole through the parts, also appears graphically. For example, anytime a panel uses an “extreme close-up” of a person or object, it uses a sliver of information about that entity to refer to the whole. Further exploration of these types of conceptual correspondences will inform existing research on metonymy in the graphic form.

Finally, a primary focus of semantic research of visual language has focused on *inference*, the drawing of non-provided meaning from the existing forms. Inference has been a motivating notion in discourse studies particularly, as how in the sentences “The fireman sprayed the water on the house. Smoke rose from the building.” the reader derives the meaning that the house was on fire and it went out, though such concepts are never mentioned overtly in the text. Essentially, McCloud’s (1993) invocation of “closure” as the process of “mentally filling in the gaps” is a view setting inference between every pair of panels. However, inference may happen *within* a particular panel. For example, note the fifth panel of the sequence in Figure 5.

Figure 5. Inference generated by an Action Star (Mahfood 2002: 36)



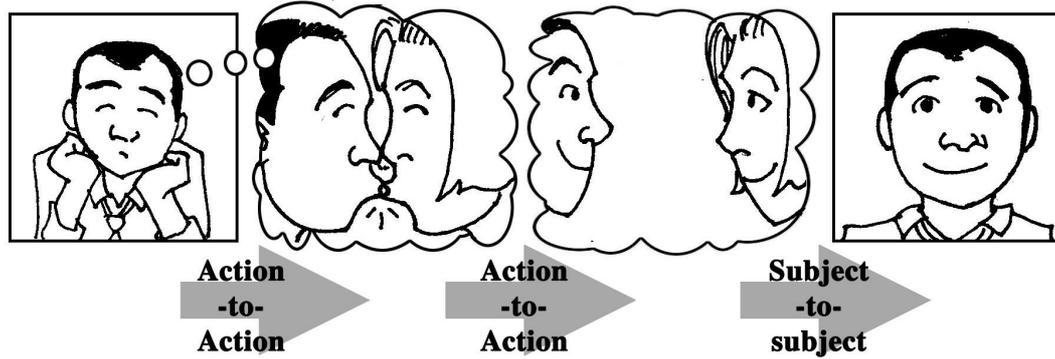
The fifth panel here uses the morpheme of an “action star” to take up the entire panel (Cohn, July, 2009). By only showing the action star, the actual event of the security guard being hit by the backpack is never shown and only implied. Studying how comprehension deals with making predictable inferences (as here with the information of the backpack being thrown) versus cases that are less predictable seems a formidable task for any study of visual language semantics.

Grammar

Grammar has been a central part of linguistic research since the 1950s, and must also factor importantly into research of visual languages. At the outset, this inquiry was posed as “How do you draw connections between and encode sequential units?” More directly for the graphic form we can ask “what are the constraints placed on sequential images that allow some sequences to be acceptable and others not (at the very least between “normal” narrative sequences and purely random panels)?”

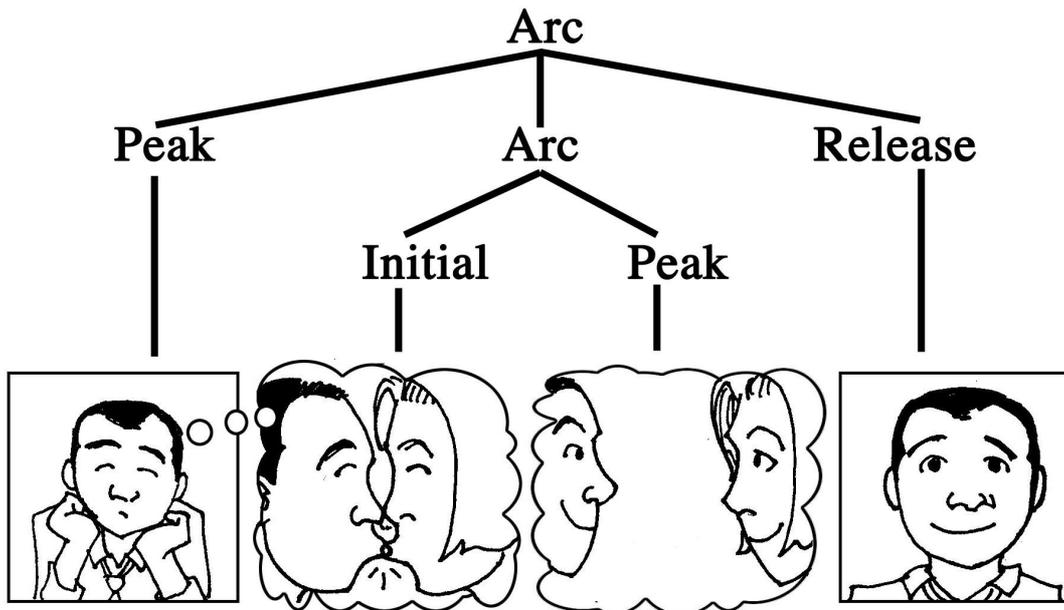
Semiological European approaches addressed this sequential structure by analyzing elementary narrative functions, often related to types of plotlines and their components (Fresnault-Dervelle, 1972; Hünig, 1974), while the first theory presented with any sort of cognitive aim in mind was in McCloud’s (1993) panel transitions. These transitions characterized various ways in which panels linearly connect to their juxtaposed neighbors, as in Figure 6, which uses Action-to-action transitions to describe a progression of an action between panels.

Figure 6. Panel transitions analyzing a sequence of images



Cohn (2003, 2010c) has criticized transitional approaches relying on individual panel relationships and has presented an alternative perspective drawing upon tools of generative grammar. This hierarchic approach has been used to show that juxtaposed panel transitions are not enough to account for distance dependencies and structural ambiguities (Cohn, 2003, August, 2007, Under Review). In verbal language, distance dependencies arise when one unit must connect to another much further unit, such as in “My roommate, who is a total bore, watches TV all day” where an embedded clause separates the subject “My roommate” from its predication “watches...” Similarly, Figure 7 shows an embedded clause with a hierarchic approach in contrast to the analysis of panel transitions in Figure 6.

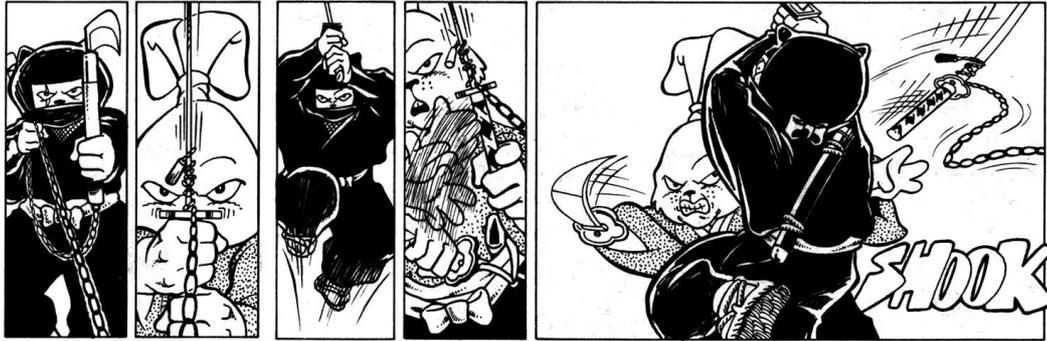
Figure 7. Sequential images with center-embedded clause analyzed with a tree diagram highlighting the narrative structure. Within the maximal node of an Arc, categories describe different roles played by panels in the overall architecture. The culmination of a predication occurs in Peaks, the initiation of an interaction in the Initial, and an aftermath of the predicate in a Release.



Additional ideas related to grammar have come from construction grammar, which describes schematic patterns at the various levels of language grammar (Goldberg, 1995; Jackendoff, 2010) including syntax. For example, the pattern “Verb-

ing the TIME Away” construction (Jackendoff, 1997) appears in “twistin’ the night away” or “lounging the afternoon away.” This same approach has led to proposals of schematic patterns in this visual language grammar (Cohn, 2007, 2010a). For example, sometimes a scene might flip back and forth between panels showing each character individually before coming together at a panel that shows both together in the same panel, as in Figure 8.

Figure 8. “Environmental Alternation” construction from a sequence in *Usagi Yojimbo* by Stan Sakai (Sakai 1987: 28)



As described, the pattern here flips back and forth between panels depicting only the ninja and the samurai rabbit before both characters are depicted together in the final panel. This pattern of “Environmental Alternation” appears prevalently in sequential images, and could possibly be explained using a schema such as:

Environmental Alternation:
 $[[(A)(B)]^{Xn} [(AB)]]$

Environmental Alternation in Figure 8
 $[[[(Ninja) (Rabbit)] [(Ninja) (Rabbit)] [(Ninja Rabbit)]]$

Here, square brackets represent clauses, parentheses represent panels, while A and B stand for different characters. The construction begins with a clause X with panels just showing A and B, that can repeat n number of times before coming together in a panel with both A and B. In the case of Figure 8, there are two clauses of individual panels prior to final joined panel. With further understanding of the visual grammar as a whole, additional constructions like this can be identified and described using the formal tools of linguistics.

Future study of visual language grammar must seek to explain the rules and restrictions that guide graphic sequences, while also addressing the elements from semantics and morphology that may motivate grammatical categorization. For example, in the verbal modality nouns can be nearly any semantic class (objects, events, etc.), though adjectives are most often properties (Jackendoff, 1990). Comparatively, the visual-graphic form may have correspondences to meaning that limits the roles that panels play in a sequence. For example, the action star in Figure 5 is able to substitute for a full event, but would seem awkward at the start of a sequence; what are the semantic properties that motivate it to take the sequential role that it does? Additionally, study of this grammar must involve identifying and codifying types of grammatical patterns (such as Environmental Alternation), as well as diagnostic tests for their constraints (such as that in Figure 8, switching the order of

the third and fourth panels would result in a less felicitous reading: why?). Finally, like other fields, beyond understanding the cognitive system itself, this study will benefit aim at cross-cultural comparisons, such as McCloud's (1993) contrasting of panel transitions in American, European, and Japanese comics. Like syntactic categories in the verbal form, it may be the case that the same grammatical elements are used cross-culturally in diverse ways.

Multimodality

Most speech in discourse contexts often appears with gesture, just as most visual language does not appear on its own, occurring in conjunction with written language. Again, Australian sand narratives can provide a good contrast, since their production not only accompanies speech, but also with an auxiliary sign language in interactive multimodal exchanges (Green, Forthcoming; Wilkins, 1997). Since the graphic form does not involve temporal co-occurrence the way that speech and gesture do, various interfaces are required to achieve unified expressions in the spatial form. Cohn (Cohn, 2003, In Press) has described these various ways in which the verbal and visual modalities interface, focusing especially on how text and image can combine to form singular units of expressions. More attuned to the expression of meaning in multiple channels, McCloud (1993) has outlined a general taxonomy for the interactions between modalities, while Cohn (In Preparation) has expanded this to investigate the contributions of cognitive structures in multimodal expressions of all types.

The study of multimodality must not only seek to understand how different modalities interact in expressions and their regularities, but also how cognitive structures contribute to such interactions. Do modalities share a common conceptual structure? Are there constraints on how much each modality contributes to the whole of meaning? What is the architecture of a grammatical model that can distribute semantics into various modalities at the same time? A great challenge here is posed to approaches of semantics that can be expressed by numerous modalities concurrently.

Acquisition

Beyond just knowing how the structures of a language work, it is also important to understand how a child can acquire them. Research on how children learn to draw and their abilities to create sequential images has largely been addressed by the field of Art Education, with minimal focus from linguistics and developmental psychology. However, the expectations of a focus centered on advising education are different than those aiming simply to describe the processes of cognitive development.⁴ Nevertheless, among this work several insightful works can importantly inform the Visual Language paradigm, especially since the development of drawing appears to have similarities to that of language. For example, like language acquisition, drawing begins with a period of "babbling" before progressing to increasingly complex forms (Kindler & Darras, 1997; Willats, 2005). Additionally, drawing does appear subject to a critical learning period. It has been well established that American children (and those of most cultures) show a "drop off" in the development of drawing skills at puberty (Davis, 1997; Kindler & Darras, 1997). However, this drop off does not occur in Japan (Toku, 1998, 2001), where children imitate and draw Japanese comics throughout childhood (Wilson, 1999; Wilson & Wilson, 1987). In this light, such a "drop off" appears to be the apex of a critical developmental period, in which American children do not receive adequate stimulus to overcome, but Japanese children do.

Some theories of child drawing are particularly appropriate to mention for their comparisons of the structure and acquisition of drawing to language. For example, Willats (2005) outlines a trajectory of development for children's drawings that is tied with the perceptual theories of Marr (1982) and inspired from ideas in generative grammar. Also key are the insights of Brent and Marjorie Wilson, who have compared the acquisition of graphic schemas to language (Wilson & Wilson, 1977), and have described numerous places in which cultural knowledge and imitation factor into drawing ability both for individual images (Wilson, 1988, 1997, 1999; Wilson & Wilson, 1979) and sequential images (Wilson & Wilson, 1987). Additional work has looked directly at the comprehension of both sequential images and text in comics, particularly with a focus on how age and expertise influence comprehension (Nakazawa, 2002, 2004, 2005; Nakazawa & Nakazawa, 1993a, 1993b; Pallenik, 1986). While many other studies are worth exploring, such research can lay a foundation towards understanding how children acquire graphic abilities, and thereby feed back into an understanding of the visual language itself.

Further inquiries

The fields described above are merely broad strokes aiming at how an orientation of "visual linguistics" might proceed, though really any subfield of linguistics proper should apply to the visual form. These might include (though are not limited to):

- *Linguistic typology* – What is the range of variation in the languages of the world and are there consistencies that lead to underlying universals?
- *Historical linguistics* – How might the structure of a language change over time and what are the properties of languages no longer in use?
- *Comparative linguistics/Language contact* – How does the structure of a language change with exposure to another, and might existing languages share historical roots?
- *Anthropology* – What are the characteristics of the cultures that arise around languages of the world?
- *Sociolinguistics* – How is a language used in socio-cultural settings, and how does it frame a person's identity? What biases does that engender towards the perceptions of other dialects?
- *Neurolinguistics* – What are the brain areas associated with the processing of structures of language and how might those brain areas be similar or different from those used in other linguistic and non-linguistic domains?
- *Computational linguistics* – How might statistical modeling be used to study the properties of a language?
- *Cognitive deficits* – What can cognitive impairments (aphasics, genetic disorders, etc.) teach us about the biological and neural structuring of language?

The questions that motivate all of these fields apply equally to verbal, sign, and visual languages. Insofar as visual language is a real and actual linguistic system, research in nearly any domain related to language should both be conceivable as well as possible.

In addition to applying to the subfields of linguistics, visual language has the ability of being analyzed using nearly all types of linguistics schools: generative, cognitive, applied, computational, etc. In some sense, visual language can be seen as an equalizing force between such schools of linguistics, since all are applicable given

the proper goals in mind for the research. Truly, the theory of visual language not only applies to linguistics, but can serve to unify such disparate research as that of comics with that of sand narratives, and in fields as diverse as art history, linguistics, cognitive science, and art education. This broad accessibility is a testament to the linguistic status of visual language and the potential for a future “visual linguistics” across the entire field of the study of language.

Visual Language versus Comics

Having discussed these various fields of inquiry into visual language, it is worth reiterating the relationship between comics and linguistics, particularly the importance and ramifications of the difference between “visual language” and “comics.” While “visual language” is the biological and cognitive capacity that humans have for conveying concepts in the visual-graphic modality, “comics” are a socio-cultural context in which this visual language appears (often in conjunction with writing). By dividing the mode of conceptual expression from the socio-cultural artifact, it creates a definition of comics that is not founded on structural properties. This split is in direct contrast to approaches that define comics by features of images and/or text, such as the requirement of sequential images by McCloud (1993), the dominance of images in Groensteen (1999), or the need for multimodal text-image interactions by Harvey (1994).⁵

By recognizing “visual language” as a system divorced from its predominant socio-cultural context, a “comic” can use any combination of writing and images: single images, sequential images, some writing, no writing, dominated by writing, etc. In fact, all permutations of these combinations do in fact appear in objects that are identified as “comics” (Cohn, 2003, 2005). Indeed, such a division also allows visual language to be used outside of the cultural institution of comics as well, such as the appearance of sequential images in instruction manuals, illustrated books, and various other socioculturally disparate contexts that are not labeled as “comics.” Indeed, illustrated books and comics both use sequential images and/or writing to (most often) tell stories, but they play far different roles in culture, not to mention carrying different stereotypes. Both may use visual languages, but both are not called “comics” because they belong to different cultural contexts.

Making this separation between “comics” and the “visual language they are written in” should also lead to various entailments about their consideration. For example, it should halt the recasting of the modern label of “comics” onto historical instances of sequential images like cave paintings, medieval carvings, or tapestries (Kunzle, 1973; McCloud, 1993). Rather than call these artifacts historical “comics” (or “protocomics”), these cases can be viewed simply as visual language usage, tied to their own unique and specific cultural and historical contexts (Horrocks, 2001).

This split between the sociocultural object/context (“comics”) and the structural/cognitive system (“visual language”) is the key to future research of the graphic form in the linguistic sciences. It also changes the spotlight of inquiry: the focus is not just on “comics,” but on the system they are written in and how the mind works to create meaning through various modalities, particularly graphic expression and its relation to other systems.

Truly, the ultimate object of inquiry in linguistics is not physical or social phenomena “out in the world” at all. Rather, the units of investigation are the abstract representations and principles in the human mind that motivate comprehension of various domains, from the understanding of the form and meaning to its use in social

settings. These principles are not tied to any sociocultural context like comics, and indeed may be cognitive artifacts abstract enough to engage both the verbal and visual domains. Thus, while glossed over as the study of comics, really the linguistic study of this visual language illuminates the links between domains that can paint a broader picture of the nature of human expression.

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Notes

1. Native communities in Central Australia, particularly the Walbiri (Munn, 1962, 1986) and the Arrernte (Green, Forthcoming; Wilkins, 1997), use language-like systems of sand narratives in combination with both speech and auxiliary sign languages. While the most elaborate sand drawings are used in specific storytelling contexts, this system is not conceived of as an auxiliary communicative system and is also used in daily conversation: Wilkins (1997) describes the use of this system as integrated to the Arrernte's notion of everyday "speaking." These graphic systems use highly systematized signs that maintain an aerial viewpoint and are drawn into the sand. For example, the prevalent sign for "person" looks like the letter "U", representing the imprint that people make in the sand (Munn, 1986; Wilkins, 1997). Both Cox (1998) and Wilkins (1997) have noted interesting ramifications of children's reconciling of the differences in sand drawings and Western representations. Sequentially, sand narratives unfurl temporally in a single area, as opposed to a discrete sequence of images as in comics. Wilkins (1997) notes that this difference leads to the Arrernte having strained comprehension of comics, with their being unable to make meaningful connections between static images. By all accounts, this system would fall under the scope of what is meant by a "visual language," though its properties are vastly different than those in the visual languages used in comics around the world.

2. Or, alternatively, "graphology." My personal preference is asymmetric, with "photology" to describe the field and "graphemes" for the minimal graphic units (and thus "graphetics" instead of "photetics"). I leave it to future researchers to ultimately make this labeling decision. Note though that sign language researchers have opted to just maintain "phonology" for the structure of the manual modality and its articulation. For the graphic modality this seems inappropriate. If the study of a language's modality used a "domain-neutral" term instead of "phon-" referencing sound, differing names for fields would likely be unnecessary.

3. "Emblems" is here borrowed from gesture research (McNeill, 1992) to mean a conventional expression of meaning that cannot enter into sentences as a unit unto itself. In gesture this might include the "thumbs up," "Okay," or "middle finger" hand positions, which are used individually but not as novel productive gestures. In graphic form, emblems would include thought bubbles, word balloons, smoke emerging from someone's ears, hearts for eyes, and other conventionalized signs.

4. For example, art education has traditionally frowned upon imitation in learning for much of the twentieth century (Willats, 2005; Wilson, 1988; Wilson & Wilson, 1977), while language development must use imitation (if only to acquire the spoken language provided to a child).

5. It is notable that such a split between “comics” and the “language they are written in” was forecasted by Horrocks (2001) in his analysis of McCloud’s (1993) definition.

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