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Semiotic Structure of Traditional Japanese Rural Space: Hagikura Village, Suwa Basin

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Abstract

This paper analyzes the semiotic structure of rural space in a traditional Japanese village, with an economic base of agriculture and forestry, mainly before the end of the country's era of rapid economic growth. This examination defines the interrelationships among the domains of spatial classifications within the village: social space, land-use zones, folk taxonomy, places, village boundaries, symbolic space, and orientation. An abstract system of relationships can be regarded as the spatial deep structure (*langue*), in contrast to the surface-level structure of rural landscape (*parole*).

Keywords: rural space, folk classification, semiotics of space, landscape as sign, Suwa Basin

Introduction

A semiotic perspective regards the settlement space of cities and villages as a system of signs composed of landscape and its spatial elements (Brunet 1974:123; Foote 1985:160). Mainly in French, Italian, and English speaking countries, a number of semiotic scholars have discussed such settlement spaces (Foote 1985; Gottdiener and Lagopoulos 1986; Lagopoulos 1994).

A considerable number of studies have also examined the following semiotic elements of landscape and space in African, Asian, and Native American villages: social space (Evans-Pritchard 1969:113-117; Lévi-Strauss 1958:113-180; Tuan 1977:113-116); land folk taxonomy (Conklin 1967; Ohnuki-Tierney 1972:427-434); orientation and boundaries (Lagopoulos 1972; Ohnuki-Tierney 1972:439-445; Tuan 1974:13-29, 1977:118-135); and symbolic space (Needham 1962; Lagopoulos 1972; Tuan 1974:141-149). These studies mainly clarified the classifications and the cosmology of the villagers' living space.

However, as Yagi (1988a:64-65) pointed out in studies of Japanese village spaces, an important question remains unresolved: although scholars have intensively discussed each domain such as social space, land-use zones, folk taxonomy, places, orientation, village boundaries, and symbolic space, the interrelationships among these domains and their synthesis have not been sufficiently examined.

Traditional Japanese villages can be regarded as native Asian villages. Since the 1950s, the Japanese social sciences have taken up spatial semantic theories of Japanese villages with great controversy in such fields as folklore, cultural anthropology, human geography, history, religious studies, rural sociology, and architecture (Yagi 1998:7-18; Ichikawa 2001:9-41; Suzuki 2004:13-21; Imazato 2006:15-44). More recently, in the 1970s and 80s, French semiotics flourished in the humanities and social science departments of Japanese universities. In this context, some geographical studies tried to establish semiotic theories on such settlement spaces as ancient cities and villages (Senda 1980, 1982), historical landscapes (Suizu 1982, 1984), and religious places in villages (Shimazu 1989; Matsuoka

1992; Ohshiro 1992). However, these spatial semantic studies, as mentioned above, have tended to lack the perspective and logic needed to synthesize the domains of village landscape and space (Yagi 1988a:64-65; Imazato 2006:99).

Keeping such drawbacks in mind, this paper reveals the interrelationships among the spatial domains by introducing a semiotic theory of space, using as a case study the village of Hagikura in central Japan. Various methods and materials were used to pursue this aim: interviews, observations of landscapes and rituals, analysis of cadasters, cadastral maps, and local topographies.

Hagikura, a settlement reclaimed (*shinden-syuraku*) at the end of the seventeenth century, stands on a river terrace near Lake Suwa in Nagano Prefecture (Figures 1 and 2). It is now a mixed settlement composed of local farmers and newcomers who have arrived from the towns and villages along Lake Suwa since the end of Japan's rapid economic growth. In 1965, the village had only 65 households with a population of 275; by 1998, when the author did his fieldwork, the number of families had increased to 124 with a population of 408.

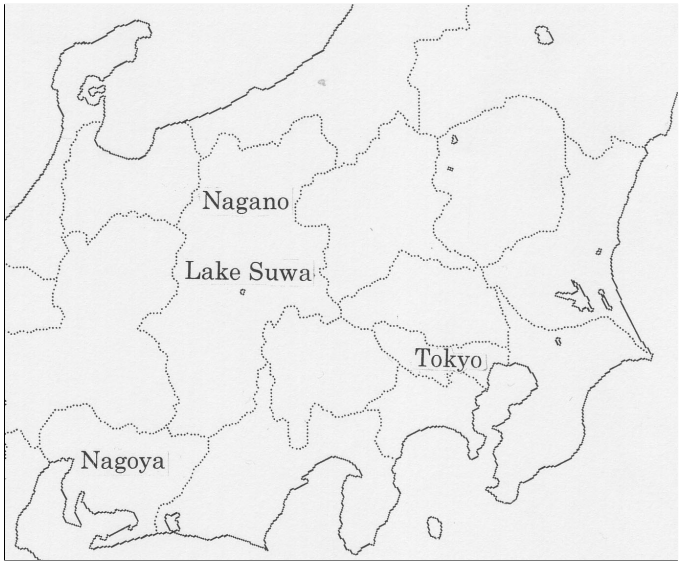

Figure 1. Study area

Hagikura's economy used to be dominated by the farming of rice, wheat, mulberries, potatoes, beans, and other vegetables. Raising silkworms, as well as forestry in the Imperial Forest east of the village, was also important. In recent times, most farmers have also commuted to the bigger towns along Lake Suwa to work in factories or offices.

This paper mainly examines the era before the end of the rapid economic growth in the 1970s, during which most people were engaged in the above agricultural and forestry work. However, most of the spatial classifications examined in this paper remain in use to this day.

Figure 2. Settlement landscape of Hagikura village
Source: Author's photo

Social space, land-use zones, and folk taxonomy

Generally speaking, in Japanese traditional villages, residents recognized that the entire territory of the village was divided into the following three zones of land use: *mura* (settlement or residential zone), *nora* (farmland), and *yama* (hill) (Fukuta 1980:222). These basic divisions can also be observed in Hagikura (Table 1, Figure 3).

Within the settlement zone of a Japanese village, the basic community is typically subdivided into ranks of subgroups (Yamano 1977:415-417). The settlement zone of Hagikura followed such a classification system of social space with the following four ranks: *kumi* (dual organizations), *tou-nakama* (mutual-aid groups), *han* (neighborhood groups), and *ie* (households). The two dual organizations were called the *wade* (upstream in the main river of *Ohkawa*) and *shimo* (downstream), which were units for fire prevention and fighting, selection of temple parishioner leaders, and so on. These dual organizations were each further classified into two mutual-aid groups, whose main responsibilities included funerals and preparing graves. Each of these groups was subdivided into two neighborhood groups. These eight neighborhood groups within the village were named by number (Group No. 1, No. 2, …No. 8).

In the farmland, the folk taxonomy consisted of the following four ranks: sub-zone, block, minor place, and patch. Each land-use zone was classified into sub-zones that had specific functions: residential, ritual, and vegetation (Table 1). These sub-zones were composed of blocks labeled with their own names. The names of such blocks (generally called *koaza*) were also registered in the cadasters of the town government for the collection of taxes. These were subdivided into minor places labeled with names that indicated smaller zones or specific points (Table 2). Such places were further classified into patches or sets of patches with folk names used only within each household.

Table 1. Upper ranks in folk taxonomy of subsistence space in Hagikura

	Rank 1 Land-use zone	Rank 2 Sub-zone	Rank 3 Lower sub-zone	Main land use or vegetation
1	*Mura* (Settlement)	–	–	Houses, vegetables, ritual
2	*Nora* (Farmland)	*Kage* (Behind fields)	–	Rice, wheat, mulberries
3		Covered category of a river	–	Irrigation
4		*Ideira* (Living plateau)	–	Rice, mulberries, vegetables
5		*Ohkawa* (Main river)	–	Irrigation, washing, fishing
6		*Mukei* (Opposite side)	–	Mulberries, wheat, rice, potatoes
7	*Yama* (Hill)	Covered category of hills	–	Grass
8		*Kageyama* (Back of the hill)	–	Grass, firewood
9		*O'ne-no-saka* (Ridge's slope)	–	Mushrooms
10		*Urayama* (Back hills)	Covered category	Firewood, lumber, mulberries
11			*Gobayashi* (Common hill)	Ritual, firewood, mushrooms
12			*Oyama* (Holy hill)	Ritual, mushrooms, bamboo
13		*Haba-no-yama* (Cliffs of a hill)	–	Climate adjustment, bamboo
14		*Mukouyama* (Opposite hills)	–	Grass, firewood, wild plants
15		*Okuyama* (Mountain depths)	*O'heishi* (Imperial Forest)	Firewood, lumber, wild nuts
16			*Yashima* (Highland)	Grass

Note: Each number corresponds to a number in Figure 3. [–] means that it is not classified.
Source: Author's fieldwork.

In the hill zone, the ranking system was somewhat different from that of the farmland: sub-zone, lower sub-zone, block, and minor place (Tables 1 and 2). This shows that the classification of farmland was more detailed than in the hills. If separated and noncontiguous farmlands existed within the hill zone, their ranking system was the same as that used in the farmland zone.

In short, as subcategories of land-use zones, the social space system classified the settlement landscape into every single house, while the folk taxonomy system classified the landscapes of farmland and hills into minute patches or wider places. These domains of social space, land-use zone, and folk taxonomy of space can be considered to function on the same dimension of spatial classification, although until now they have been regarded as different domains by scholars. They should be regarded as a combined single classification system of 'subsistence space' that consists of six levels from zero to five (Figure 4).

Table 2. Lower ranks in folk taxonomy of subsistence space: one household

	Rank 2 Sub-zone	Rank 3 Block	Rank 4 Minor place	Rank 5 Patch
2	*Kage* (Behind fields)	*Machiyashiki* (Plateau of waiting hut)	*Machiyashiki-no-ta* (Machiyashiki paddies)	*Kobbo-ta* (Small paddy field) *Oh-ta* (Large paddy field) *Maide-sanmai* (Front three patches)
			Itagasawa (Paddies along wooden board brook)	–
4	*Ideira* (Living plateau)	*Hagikura-daira* (Hagikura plateau)	–	*Maede* (In front of house) *Uchi-no-shita* (Under house)
		Tokorozawa (Brook at settlement)	*O'haka-no-ta* (Paddies near graveyard)	*Ni-maime* (Second patch from a road) *Nagai-ta* (Long patch) *Nawashiro* (Rice nursery) *Shiro-suna* (White sand ground) *Kurumi-no-ki* (Walnut tree on a ridge)
			Tokorozawa-no-hatake (Tokorozawa farm)	*Dotsubo* (Pile of silkworm dung) *Ume* (Plum tree on a ridge) *Kubo* (Hollow ground)
	Sub-zone	Lower sub-zone	Block	Minor place
11	*Urayama* (Back hills)	*Gobayashi* (Common hill)	*Tokorozawa* (Brook at settlement)	*Tokorozawa-no-yama* (Hill along Tokorozawa brook) *Oinarisama-no-yama* (Hill of clan's fox shrine)
14	*Mukouyama* (Opposite hills)	–	*Komokkawa* (Hills of straw mat brook)	–

Note: This list of patch names includes only some of the sample household. [–] means that it is not classified. ( ) indicates English meaning. Each number of sub-zone corresponds to a number in Figure 3.
Source: Author's fieldwork

Place, boundaries, and symbolic space

In a humanistic geography approach, the word 'place' often indicates points imbued by the local people with symbolic and social meanings (Tuan 1977:85-135). Three major systems of classification exist to define 'place' within the context of a traditional Japanese village.

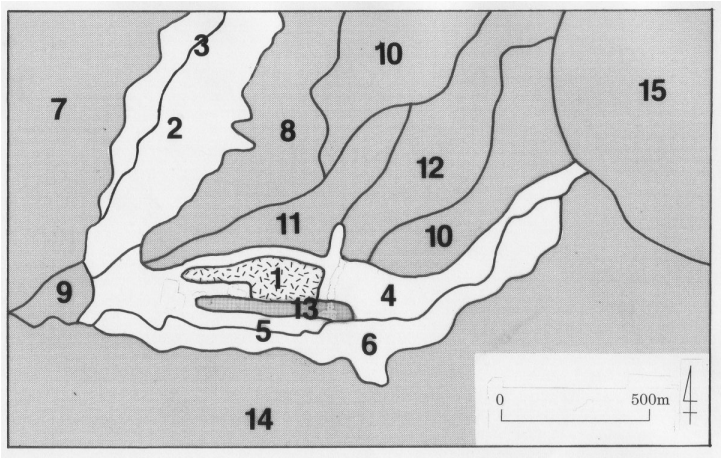

Figure 3. Locations of land-use zones and sub-zones
Note: The *Yashima* zone (No. 16) is east of the *O'heishi* zone (No. 15).
Source: Author's fieldwork, topographical maps, and aerial photographs

First, in Hagikura, Shinto and Buddhist facilities as well as public institutions can be regarded as places (Table 3, Figure 5). In the settlement and hills, a shrine or a series of shrines protect the people working in each land-use zone. Such sacred facilities functioned as the semiotic center of meaning: the main shrine of *Yonegami* (god of rice) in the settlement zone, the clan's *Inari* (fox god of agriculture) shrines in the farmland zone (Figure 6), and a mountain deity shrine of *Yama-no-kami* (forest god) in the hill zone. In the center of the settlement zone, important public facilities were located in an open space, which can be understood as the semantic 'center' of the entire village territory (Figure 5: 1-8).

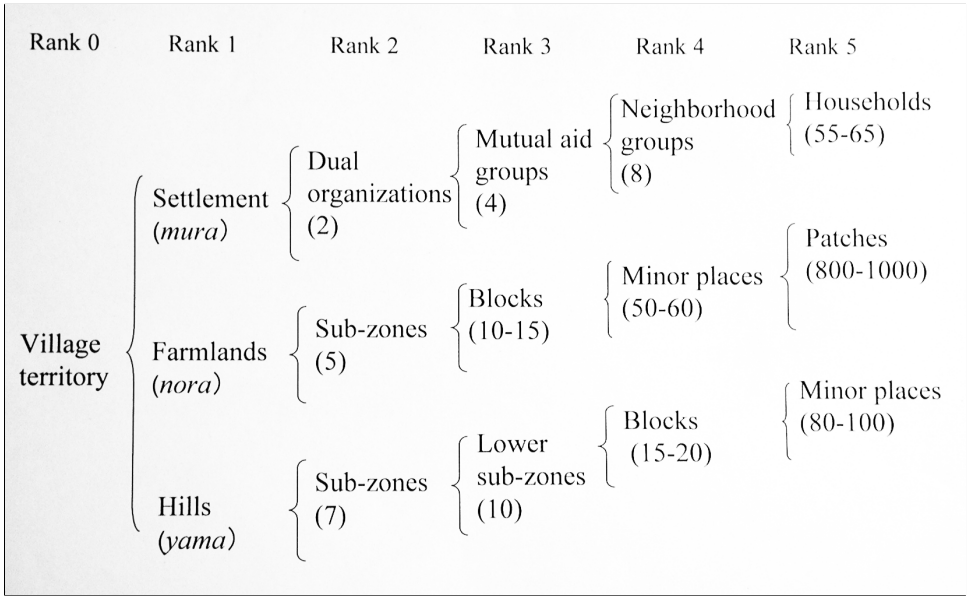

Figure 4. Folk taxonomy of subsistence space in Hagikura
Note: Parenthesized numbers show the number of categories. For minor places and patches, the numbers are estimated based on samples of one household, village cadasters, and cadastral maps.

Table 3. Places and their meanings in Hagikura

	Zone	Place	Main meaning	Onbashira logs
1	Settlement	*Yonegami* main shrine	God of villge and center of entire territory	Planted
2		*Yakushi-dou* temple	Open space and center of village	
3		Community center	Ditto	
4		Primary school	Ditto	
5		Fire-fighting center	Ditto	
6		Agricultural cooperative	Ditto	
7		*Dousojin* stone deity	God of traffic and transportation	
8		God's rice field	Field attached to the main shrine	
9	Farmland	Graveyard	Place of fear near an inner boundary	
10	Hill	Fox shrines of the clans	Gods of clan and their farmland	Planted
11		Mountain deity	God of hills	Planted
12		*Okuwasama* monument	God of ancestors' clearing	Planted
13		*Fudou* stone saints	Gods of mountain-based asceticism	Planted
14		*Oyama* stone saints	Ditto	Planted
15		*Hachiman* shrine	God of working in forests	
16		*Kiotoshi* shrine	Guardian of Onbashira ritual	
17		*Yokitate* shrine	Ditto	
18	Boundary	*Hazure* (without a landmark)	Downstream of inner boundary point	
19		Intersection with a brook	Upstream of inner boundary point	
20		Pine tree and stone deities	Downstream of middle boundary point	
21		Pine tree	Upstream of middle boundary point	
22		Stone deities	Main entrance of village	
23		*Fudaba* (without a landmark)	Back entrance of village	

Note: Each number corresponds to a number shown in Figure 5.
Source: Author's fieldwork

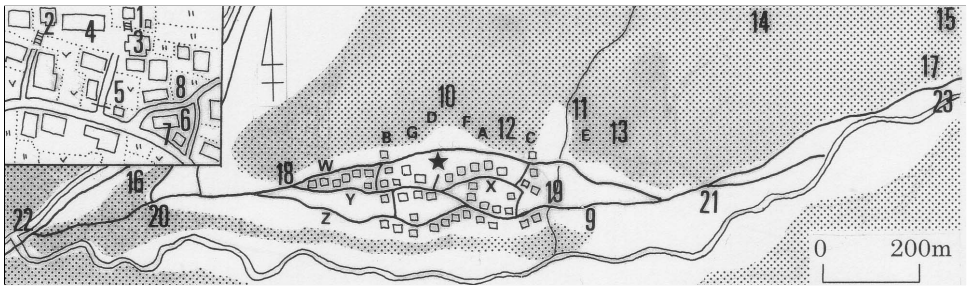

Figure 5. Locations of places and main roads.
Note: Each number corresponds to a number shown in Table 3. Star mark shows the main shrine. Each letter shows a clan's fox shrine (A-G) and one of four main roads (W-Z).

Figure 6. A clan's fox shrine
Source: Author's photo

Second, in contrast to such semiotic 'centers,' the people of Hagikura recognized six boundary points on the periphery of the village territory: inner points between the settlement and the farmland; middle points between the farmland and the hills; and outer points between the hills and the outside world (Table 3, Figure 5: 18-23). These boundary points were marked by such objects as stone statues and isolated pine trees and through varied ritualistic behavior on the main road. In the inner pair, boundaries were formed by a downstream point called *Hazure* (end of the houses) without any landmark and an upstream point intersecting the *Tokorozawa* brook near a common graveyard. In the middle pair, the downstream point was marked by a big pine tree, a few stone deities, and a stone monument to a poet; upstream, it was marked by another tall pine tree at a point where paths diverged. The outer pair's boundary points were regarded as the entrances of the village: downstream at an old national highway called the *Nakasendo* Road, where there were stone deities, a monument to a famous haiku poet (Matsuo Basho), and a tea stall; upstream the boundary point was called *Fudaba*, the entrance of the Imperial Forest. Some intersections of these six boundary points were also ritual places regarded as sacred places.

Third, these symbolic places and boundaries can also be contrasted between 'sacred places' and 'places of fear' (Shimazu 1989:212-213). In Hagikura, the former places are regarded as the six points of shrines or stone saints in which the people open the *Onbashira* (literally 'holy log') ritual: the main shrine, a series of the

clans' fox shrines, the mountain deity, and three areas of stone saints on the common hill of *Urayama* (Table 3). Onbashira, the most important ritual in the Suwa Basin, is held every six years, when people bring tall logs from the deep mountains of *Okuyama* and plant them around shrines (Figure 7). Local residents believed that the square zone around a shrine, surrounded by four holy logs, was the source of sacred power.

Figure 7. Onbashira planting ritual at the main shrine.
Source: Author's photo

By contrast, 'places of fear' were sites where ghosts, devils, and darkness lurked. In the village, such places were predominately concentrated in the boundary points mentioned above and in a periphery 'wilderness' zone of the hills. In Japan, such wilderness hill zones were also cultural spaces of daily subsistence and religion. These boundary points were therefore ambiguous places—both sacred and feared—generally observed in Japanese traditional villages (Yagi 1988b: 144).

Thus, each domain of place, boundary, and symbolic space can be included in a single classification domain of 'place' in the broad sense, although up to now they have been treated as different and separated domains.

Orientation

The Hagikura people also had their own system of folk orientation. The main shrine of *Yonegami* was located at the cardinal point of the axes of the north-south and east-west directions: the exact center of the entire territory. Based on the distance from the main shrine, they often used different orientation categories. When referring to locations closer to the settlement zone, they called the south river side *omote* (front), the north hill side *ura* (rear), the east upstream *wade* (upstream), and

the west downstream *shimo* (downstream). When referring to locations farther up the hill zone, they called the southward area *mukou* (opposite), the northward area *ue* (above), the eastward area *higashi* (east), and the westward area *nishi* (west). When indicating intermediate locations within the farmland zone, they used the same categories as in the hill zone, except for the south direction of the lower river terrace, which they called *shita* (under).

Moreover, the four main roads through the village were referred to by this orientation system: north to south (Figure 5: W-Z), *Uwa-michi* (upper road); *Naka-michi* (middle road); *Hon-douri* (the main road); and *Shita-michi* (lower road).

In the village, people recognized that to the south they could view the sun in the sky, rice fields, and the opposite hills; in contrast, the north, the rear, was surrounded by woody hills. Almost all shrines also faced south, located on upper or superior sites of the settlement zone. Religious beliefs banned the establishment of shrines facing north. In addition to these sacred buildings, most traditional residential houses also faced south. In 1998, among the 58 traditional houses within the village, 58.6% faced south, 20.7% east, 13.8% west, and only 6.9% north.

In short, within the village a southerly direction was generally recognized as front and lower, in contrast to the north, which was rear and upper. This orientation principle was prescribed by a typical topography of *feng-shui* (literally 'wind and water') environmental thought developed in ancient China, whose front was a river plateau and whose rear was the surrounding hills (Higuchi 1981:106-131).

Conclusion

The following general conclusions could be derived from this investigation of Hagikura village. Considering rural space as a system of signs, spatial classification systems (subsistence space, place, and orientation) are abstracted as the logical and deep structure that reflects the tacit understanding of the villagers (Figure 8). This deep structure as *langue* prescribes the concrete and surface-level structure of landscape as *parole:* boundary markers (stone deities and pine trees), land-use forms (houses, public institutions, farmland, and woods), and the semiotic centers of land-use zones (shrines).

Previously, Japanese social sciences have considered land-use zones, folk taxonomy, dual organization, and villagers' cosmology, including orientation and boundaries, as different and independent classification domains (Yagi 1988a:64-65). However, the author identified the following five interrelationships among these spatial domains. First, land-use zones are the first rank of the landscape folk taxonomy of a village. Second, dual organizations can be considered the second rank of the social space system of a settlement zone. Third, the classification of orientation and boundaries is formed as a grid of coordinate axes and concentric circles, and villagers refer to this grid in their daily activities to orient themselves within the land-use zones. Fourth, the villagers' cosmology is formed by the deep structure or *langue* that includes all of the spatial systems discussed in this paper. Fifth, even though the abstract deep structure of these classification systems belongs to the syntax of rural space, a symbolic classification system based on the villagers' ideology is on the connotation level of semantics.

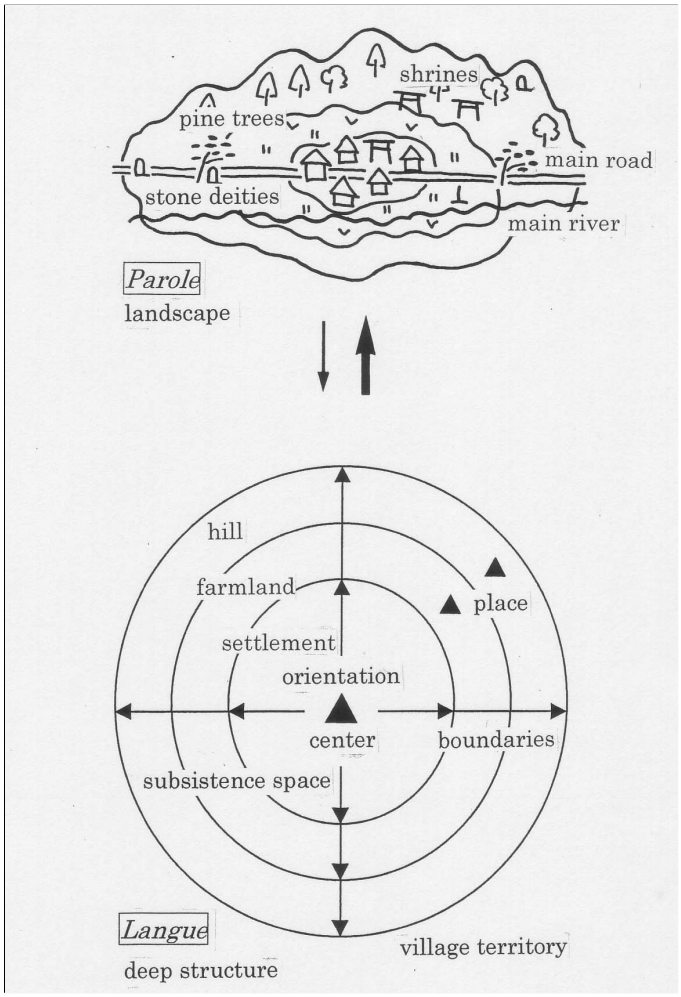

Figure 8. Hagikura's landscape and its deep structure

Beyond the case study reported here, however, some landscape and spatial elements in a village might seem contradictory to and excluded from such a deep structure of *langue.* In the future, we should examine in detail these folk classification systems of space in other Japanese villages and in other countries' villages to develop the synthetic perspective used in this paper.

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[J] *in Japanese;* [JE] *in Japanese with an English abstract.*

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Multimodal Metaphor in Ten Dutch TV Commercials[1]

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Abstract

Since the publication of Lakoff and Johnson's *Metaphors We Live By* (1980), conceptual metaphor theory (CMT) has dominated metaphor studies. While one of the central tenets of that monograph is that metaphors are primarily a phenomenon of thought, not of language, conceptual metaphors have until recently been studied almost exclusively via verbal expressions. Another limitation of the CMT paradigm is that it has tended to focus on deeply embedded metaphors rather than on creative metaphors of the kind that Black (1979) discusses. One result of this focus is that relatively little attention is paid in CMT to the *form* and *appearance* a metaphor can assume (cf. Lakoff and Turner 1989). Clearly, which channel(s) of information (language, visuals, sound, gestures, among others) are chosen to convey a metaphor is a central factor in how a metaphor is construed and interpreted. A healthy theory of metaphor as a structuring element of thought therefore requires systematic examination of both its multimodal and its creative manifestations. Conversely, research into non-verbal and multimodal metaphor can help the theorization of multimodality.

In this paper it is shown that creative metaphors occurring in commercials usually draw on a combination of language, pictures, and non-verbal sound. After an inventory of parameters involved in the analysis of multimodal metaphors, ten cases are discussed, with specific attention to the role of the various modes in the metaphors' construal and interpretation. On the basis of the case studies, the last sections of the paper discuss three issues that are crucial for further study: (1) the ways in which similarity is cued in multimodal, as opposed to verbal, metaphors; (2) the problems adhering to the verbalization of multimodal metaphors; (3) the influence of textual genre on the interpretation of multimodal metaphors.

Introduction

Lakoff and Johnson, the fathers of conceptual metaphor theory (CMT) usefully describe the essence of metaphor as "understanding and experiencing one kind of thing in terms of another" (1980: 5). CMT is committed to the view that human cognition is organized, in skeletal form, in conceptual schemas. Conceptual schemas "constitute cognitive models of some aspect of the world, models that we use in comprehending our experience and in reasoning about it. Cognitive models are not conscious models; they are unconscious and used automatically and effortlessly" (Lakoff and Turner 1989: 65-66). Such schemas are constantly enriched and, if necessary, modified by people's interactions with the world. Language draws on these cognitive models, but is not identical with them. Consequently, verbal metaphors are no more and no less than surface manifestations of metaphorical thinking, so that metaphor is " fundamentally conceptual, not linguistic, in nature" (Lakoff 1993: 244). Cognitivist metaphor scholars, many of them trained as linguists or literary theorists, have widely explored this issue (e.g., Lakoff and John-

[1] The videos can be viewed on the Flash version of this article:
http://www.semiotics.ca/issues/pjos-1-1.swf

son 1980, 1999, 2003; Lakoff 1987; Johnson 1987, 1993; Lakoff and Turner 1989, Kövecses 1986, 2000, 2002, 2005; Sweetser 1990; Turner 1991, 1996; Gibbs 1994, Gibbs and Steen 1999, Charteris-Black 2004).

A limitation of the work by CMT researchers is that they have almost exclusively restricted their investigations to language and paid little attention to non-verbal manifestations of conceptual metaphor. This neglect is unfortunate for at least two reasons. First, there is the risk that by exclusively focusing on verbal manifestations of metaphor, the modelling of the cognition level becomes a mere mirror of that of the verbal level, and will fail to reflect any characteristics that are found in non-verbal and multimodal metaphors but not in verbal ones. Clearly, only part of the knowledge that feeds into conceptual schemas is verbal in nature, or can easily be formulated in verbal terms. Conversely, CMT's potential as instrument in the analysis and theorization of multimodal representations, ranging from advertisements and feature films to instruction manuals and internet sites, currently remains underused.

This situation is slowly beginning to change. Research on pictorial metaphor has over the past 25 years yielded a fair number of theoretical studies (Kennedy 1982, forthcoming; Forceville 1988, 1994, 1996, 1999a, 2000, 2002a, 2002b; Whittock 1990; Kaplan 1990, 1992; Danto 1993; Carroll 1994, 1996; Rozik 1994, 1998; Maalej 2001, Rohdin 2003, Cupchik 2003; El Refaie 2003; Kennedy 1993 is exceptional in being informed by experimental findings). But purely pictorial metaphors – metaphors in which the signalling of the two terms of a metaphor, target (tenor, topic) and source (vehicle, base) is achieved by visual means only – are relatively rare. Once we leave the realm of the verbal, usually either or both of the terms are cued in more than one channel simultaneously. Indeed, one of the four types of pictorial metaphor distinguished in Forceville (1996, 2000), the "verbo-pictorial metaphor," in fact straddles two modes and is, in retrospect, better labelled a subtype of multimodal than of pictorial metaphor. Many, probably most, non-verbal metaphors are thus multimodal metaphors. A multimodal metaphor is here defined as a metaphor whose target and source are not, or not exclusively, rendered in the same mode. The five modes taken into consideration in this paper are (i) written language; (ii) spoken language; (iii) visuals; (iv) music; (v) sound. This list is not exhaustive or definitive: on the one hand these modes could be further subdivided (visuals comprise aspects of mise-en-scene, montage, as well as framing angles, and these arguably deserve the status of a separate "mode"); on the other hand certain sources of perceptual information, such as gestures, are not discussed here, while these may also lay claim to the label of constituting a "mode" (see McNeill 1992, Cienki 1998, Müller 2004). But the possibility of refining and extending the list of possible modes involved in multimodal metaphor does not affect the basic principles adhered to in this paper.

Makers' intentions are an important factor in discussions about metaphor. I subscribe to Gibbs' (1999) views on the centrality of intention in the interpretation of human artefacts in general. Such views are commensurate with Sperber and Wilson's *Relevance Theory* (Sperber and Wilson 1995; Wilson and Sperber 2004; see Forceville 1996, Chapter 5; 2005a for applications in the realm of pictorial and multimodal representations). Within the context of studies of non-verbal metaphor, both Kennedy (1982) and Whittock (1990) stress that the construal of metaphors typically presupposes some authorial intention: the author usually *wants* a certain combination of perceptual elements to be understood as a metaphor (rather than,

say, as nonsense, or as merely aesthetically pleasing). Imagine a cinematic shot of a giraffe, saliently accompanied by the trumpeting sound of an elephant in such a way that the trumpeting appears to emanate from the giraffe. Let us assume that the viewer-cum-listener believes that the filmmaker did not erroneously or whimsically give this impression, and that there is no good non-causal relation between the giraffe and the trumpeting sound (as would be the case, for instance, when the viewer understands the sound as being produced by an off-screen elephant that happens to trumpet at the same moment the camera shows the giraffe, for instance in a zoo). In such a case she would probably interpret the co-occurrence as intentional, and construe the multimodal metaphor GIRAFFE IS ELEPHANT – or perhaps ELEPHANT IS GIRAFFE – and search for a pertinent meaning. Since one of the terms is represented visually and the other sonically, the metaphor would be a multimodal one.

In this paper I will investigate multimodal metaphors in ten Dutch commercials, with the following aims: (1) to chart the minimal parameters governing multimodal metaphor; (2) to demonstrate that metaphors occurring in moving images usually draw on more than one channel of information; (3) to signal several issues pertaining to multimodal metaphor that require further consideration. The investigated representations will here, as in Forceville (1996), belong to the genre of advertising, because unlike for instance artistic representations, advertising has straightforward purposes: the bottom line is that it makes positive claims about a product or service (Forceville 1996: 104), however unglamorous or self-mocking it may be. This fact unequivocally steers and constrains the construal and interpretation of any meaningful element a commercial might contain, thus making commercials an exemplary genre for the development of a model of multimodal metaphor.

Multimodal versus pictorial metaphor

In Forceville (1996: 108) I argue that a phenomenon deserving the label "metaphor" needs to have at least the following characteristics: It has two terms that, in the given context, belong to different categories; one of these terms can be construed as the "literal" target, and the other as the "figurative" source; and one or more features of the source must be mappable on the target, which by this mapping is (temporarily) transformed. Adaptation of the categories and terminology in Forceville (2002) leads to the following types of pictorial metaphor, including one which was not yet distinguished in my earlier work (the old names are given in brackets):

(1) *Contextual metaphor* (*MP1*). One term is depicted; the other is not depicted but unambiguously suggested by the pictorial context. Removal of the pictorial context results in the disappearance of the second term, and hence in non-metaphor. In most cases the pictorially present term is, or refers metonymically to, the product advertised. While (mentally) removing the verbal context does not usually affect the identification of the two terms, such removal may render difficult or impossible their characterization as target and source – and hence make the interpretation of the metaphor as a whole problematic.

(2) *Hybrid metaphor* (*MP2*).Parts of both terms are pictorially represented, resulting in a hybrid phenomenon perceived as a single gestalt. Removal of the pictorial context – if present in the first place – still allows for identification of both terms. Removal of the verbal context does not affect the identification of the two terms, although it may render difficult or impossible their characterization as target and source respectively, and hence the interpretation of the metaphor as a whole.

(3) *Pictorial simile* (*Pictorial simile*). Both terms are pictorially represented in their entirety. Removal of the pictorial context – if present in the first place – still allows for identification of both terms. Removal of the verbal context again does not affect the identification of the two terms, although it may render difficult or impossible their characterization as target and source respectively, and hence the interpretation of the metaphor as a whole.

(4) *Integrated metaphor.* A phenomenon that is experienced as a unified object or gestalt is represented in its entirety in such a manner that it resembles another object or gestalt even without contextual cues. This type is identified by Van Rompay (2005) and Van Rompay et al (2005), in turn drawing on Lakoff and Johnson's work ("embodied metaphor" would be an appropriate name for this type, but given the strong and partly different connotations "embodiment" has in the Lakoffian tradition I prefer to avoid it here). An example is a Philips Senseo coffee machine, which is stylized in such a way as to represent a servant or butler. (I owe the example to Paul Hekkert. For more discussion, see Forceville et al., forthcoming; for examples and discussion of the other types see Forceville 1996: Chapter 6 and Forceville 2005b).

When contrasted to pictorial metaphors in printed ads and billboards, metaphors in television commercials (a commercial is here defined as "advertisement, announcement, spot or message aired on television, radio or cable which is paid for by an advertiser"[2] differ potentially in the following dimensions:

1. Since commercials unfold in time, target and source need not be represented (or unequivocally suggested) at the same moment; that is, they can be presented sequentially.
2. A metaphorical term (target or source) can be presented not only visually or verbally, but also sonically, by means of a musical theme or a non-verbal sound.
3. Framing and camera movements provide formal means to (help) establish metaphoric similarity not available to singular static images (although they are available to, for instance, multi-panel cartoons or series of pictures in comics).

Before turning to an examination of multimodal metaphors in commercials, a matter of terminology needs to be clarified. Just as verbal metaphors, pictorial metaphors are *monomodal metaphors*. Monomodal metaphors will here be defined as metaphors whose two terms are predominantly or exclusively rendered in the same mode. Hitherto mainly monomodal metaphors of the verbal and pictorial variety have been described and analysed, but there is no reason to rule out the possibility of monomodal metaphors of a sonic, musical, gestural, olfactory, or tactile nature. I will not go into detail, but here are some examples of what I have in mind. Imagine a mime artist on some touristy square briefly following passers-by and imitating their gait (as, for instance, in the opening sequence of Francis Ford Coppola's *The Conversation*, USA 1974). The mime could exaggerate people's step in such a way that the metaphor PASSER-BY IS A DANCER is cued, or PASSER-BY IS A DRUNK. Monomodal metaphor of a musical variety appears possible as well (see Johnson & Larson 2003 for references; see also Cook 1998). Thorau (2003) proposes that the relation between a musical theme and its variation

[2] http://www.nielsenmedia.com/glossary/terms/C/

can be metaphorical: The theme functions as target and its variation as the source. He gives the example of Ludwig van Beethoven's *Six Variations* op. 34 (1802), focusing on variation V, arguing that the Adagio theme (the "target") transforms into a "march" (the source). For the trained listener, thanks to the metaphorical coupling with the march variation, certain latent aspects of the theme have been made salient that had not been noticeable without it. For what we could consider a tactile metaphor, picture the following scene. An old, blind woman has developed excessive hair-growth on her arms. Her daughter wants her little son to stroke his grandmother, because the grandmother likes such physical intimacy with her grandchild. The boy, however, finds the hairy grandmother repellent. To help her son overcome his repugnance, the mother lets him first stroke his favourite fluffy pet bear, to feel its softness, and then encourages him to stroke his grandmother. I submit that this example would qualify as a tactile metaphor of the monomodal variety, to be verbalized as something like GRANDMOTHER'S HAIRINESS IS PET BEAR'S FLUFFINESS, with the pleasant, positive connotations of the source being mapped onto the target. A monomodal metaphor of the olfactory variety could be this: Two researchers in the lab of a perfume factory have been ordered to develop a new perfume, preferably one that will prove as commercially successful as Chanel 5. One of them thinks she has created an excellent *essence*. She first lets her colleague smell Chanel 5, and then the experimental *essence*. Let us assume that the latter has, as one of its olfactory layers, something that is strongly reminiscent of Chanel 5, but is nonetheless sufficiently different not to be disqualified as a copy. We could then say that the first researcher offers her colleague an olfactory metaphor, NEW PERFUME IS (LIKE) CHANEL 5, with "marketability" as the primary mappable feature. I will not pursue this line of speculation. What matters for present purposes is that monomodal metaphors contrast with multimodal metaphors, metaphors whose target and source are cued in two or more different modes. As the unusualness of the examples given above already suggest, outside of the realm of written verbal specimens most metaphors are presumably of the multimodal rather than of the monomodal variety.

As holds for any type of metaphor, the understanding of a multimodal metaphor begins with the awareness that two phenomena can or must be understood as being in an identity-relation. There must be a reason not simply to spot two different phenomena A and B as both "present" in a representation, but to process A *as* B, in one or more respects (Freriks 2004). As indicated above, an *intention* to produce a metaphor usually results in the provision of salient cues to that effect by the metaphor's producer. In the first place, some sort of similarity between A and B must be signalled. In the type of *ad hoc* metaphors that surface in advertising, this similarity is often not pre-existent, but created (Black 1979). The similarity may be of many different kinds: A and B may look similar, sound similar, occur in a similar space or, as in the giraffe-elephant case, be simultaneously signalled (see Forceville 2004, Bensdorp and Vergeer 2004, Victor 2004). A second type of cue that an A-as-B interpretation may be called for is that there is something odd or anomalous in the identification of A and B, because in the given situation A and B are experienced as entities belonging to different categories and do not normally constitute a single entity. The qualification "in the given situation" is necessary, for categorization is a goal-driven activity, and two entities that in one situation belong in the same category will in another situation be considered to be in different categories. Whether and, if so, how a metaphor is to be construed is to a considerable

extent governed by expectations pertaining to genre. A crucial genre convention in advertising is that a positive claim is made for a product or brand. Viewers of a commercial will thus routinely assume (a) that they will be able to identify a product or brand; and (b) that every meaningful element in a commercial that is not the product itself somehow helps facilitate the creation of a positive brand image. These assumptions combined will strongly steer viewers' interpretations.

Ten multimodal metaphors: descriptions

In this section, ten Dutch commercials, broadcast on Dutch television channels in 2004 are analysed that, I claim, all contain a multimodal metaphor. A link to an online version is provided when the commercial is discussed; and any translations into English are mine. The purpose of these analyses is to demonstrate, via real-life examples, what forms multimodal metaphors can assume. Each analysis begins with a description, and is followed by a consideration of the various modes involved in the cueing of the metaphor.

The recognition of a metaphor crucially requires the identification of a target and a source. For both target and source holds that it must be recognizable in one or more of the following ways:

1. It is *visually represented*, counting as such if it is either itself depicted, or one or more elements metonymically related to it are depicted.
2. It is *sonically represented*, counting as such if a non-musical, non-verbal sound unambiguously associated with it is used to cue its identification.
3. It is *musically represented*, counting as such if a musical theme unambiguously associated with it is used to cue its identification.
4. It is *represented in spoken words*, counting as such if an on-screen character or a voice-over identifies it, or if one or more elements metonymically related to it are voiced.
5. It is *represented in written words*, counting as such if it, or one or more elements metonymically related to it, appears in written form onscreen ("supers").

A caveat pertains to the cultural context in which the metaphors originate. Certain connotations of the source domains appeal only to a Western, European, Dutch, or even Dutch-subgroup community – or may simply be idiosyncratically perceived ones, bearing out Sperber and Wilson's important insight that relevance is always relevance to an individual (Sperber and Wilson 1995: 142). Since this holds for all representations, this is not considered a problem; indeed, it will alert readers/viewers to how representations can be (mis)interpreted by certain groups or individuals in manners unforeseen or unintended by their producers.

Example 1. Gazelle bicycles. The Dutch dressage champion Anky van Grunsven (gold medal winner both at the Olympic games in Sydney 2000 and Athens 2004), dressed in her black coat, white breeches and top hat, tells us: "If you go for gold, you have to be seated well in the saddle.[3] … And I should know, shouldn't I?" The image track shows us cross-cuts from Anky sitting on a school horse, and Anky riding a Gazelle bicycle – an old and very familiar brand of bicycles in The Netherlands. She praises the beauty and excellent seating comfort ("zithouding")

[3] There is a pun here on the Dutch expression "vast in het zadel zitten," meaning something like "being well-equipped for whatever it is one intends to do."

of the bike and ends with "op zo'n raspaardje zit je dus altijd goed." This literally translates as "you are always well-seated on such a thoroughbred," but the word "raspaardje" ("thoroughbred") in Dutch has acquired the generic meaning of something or somebody with exceptional qualities, while the expression "je zit altijd goed (met)" means "you can't go wrong (with)." "Sorry Bonfire," she apologizes to the horse many viewers know is her championship-winning favourite who, at that time, has retired. The last shot before the pay-off features a gazelle (the animal), instead of a horse, in the stables, humorously suggesting Van Grunsven has now done with horses, and opts for gazelles instead. The metaphor promoted here is GAZELLE BIKE IS THOROUGHBRED. The features that can be mapped from Van Grunsven's horse to the bicycle comprise the alleged "seating comfort" and its physical beauty. More importantly, the relation of Van Grunsven and her prize-winning horse can be projected onto (future) Gazelle-owners and their Gazelles. This potentially bestows connotations such as glamour, prize-winning, fame etc. on the bike and its prospective user.

The metaphorical similarity is created first and foremost by the visual juxtaposition of the officially-dressed Anky on her horse and the officially-dressed Anky on a Gazelle bike, and partly by expressions like "being well in the saddle" and "thoroughbred." The fact that the brand name of the bicycle is the name of an animal further reinforces the similarity with Anky's horses. Although some clicking is audible when Van Grunsven adjusts the bicycle's saddle, this is insufficient in itself to suggest the identity of the object producing this sound – the Gazelle bicycle, or even "bicycles" generically – and hence the target cannot be considered to be cued sonically. The source "horse," by contrast, is recognizable thanks to the clip-clopping of its hooves and its snorting. Since Van Grunsven explicitly mentions the brand name Gazelle in her voice-over text, the target is represented in spoken form as well. The source domain is present in spoken form in expressions like "being in the saddle" (which of course also cues the target) and "raspaardje" ("thoroughbred"). The music, a quiet tune apparently produced by an electric guitar, does not cue either target or source. One other element helps cue the source domain, and that is Van Grunsven's voice, since it is well-known and uniquely connotes her. Hence, even apart from *what* Van Grunsven says, to a wide audience her voice alone evokes the domain of horse-dressage. Though in practice inseparable from the words she utters, Van Grunsven's voice thus can be said to constitute a sonic evocation of the source domain, just as the horse's hooves and whinnying do.

Example 2. Dove body lotion. In a fast montage of close ups we see white thread winding itself on a wooden spindle After a few seconds a female voice-over comments, "Silk reflects each ray of light. Hardly surprising, then, that it is so beautiful on your skin." The next shot shows the "spindle" standing upright, while the silk quickly unwinds to reveal a bottle of *Dove Silkening Body Moisturizing*, suggesting the metaphor DOVE BODY LOTION IS SILK. Mapped features are silk's potential to reflect light as well as, presumably, its softness. In addition one can be reminded of silk's status as a prestigious and expensive fabric.

The target is rendered both pictorially and verbally, the latter in spoken as well as written form (on the Dove bottle). The source, silk, is presented visually (although the white thread is not identified as "silk" until the voice-over labels it so) and orally: the female voice-over tells us the product contains pure silk, "for a natural glow and a silky-soft skin." The commercial features suave, eerie electronic sound

(music?) throughout. While it may be understood as enhancing the "softness" of the product, this sound does not seem to belong explicitly to either target or source.

Example 3. Philips Sonicare toothbrushes. The visual track shows a toothbrush slowly emerging vertically from the water. Beeping sounds are audible in the background. The female voice-over talks about the "next generation of electric toothbrushes by Philips, with patented sonic technology … a totally new brushing experience," and praises its technology, ending with the (originally English) pay-off, which also appears in written supers on the screen, "Stop brushing, start Sonicare." The toothbrush emerging from the water resembles a surfacing submarine, a resemblance reinforced by the similarity between the toothbrush's head and a submarine's periscope: hence the metaphor is TOOTHBRUSH IS SUBMARINE. Mappable features include submarine high-tech, while the notion of the toothbrush's novelty is reinforced by the "surfacing" of the submarine-toothbrush.

A phrase in the upper left hand of the screen specifies the metaphor's target: "Philips, the sonic toothbrush." The verbal track does not, by contrast, mention the word "submarine" or any words specifically associated with its semantic domain either orally or in written form. The "beeping sounds," however, probably help identify the source domain as something "high-tech." The sound track moreover has a choir singing "Aaaahhh," in a manner that in some viewers may evoke generic associations with science fiction scenes in which a good-natured extra-terrestrial creature or spaceship gradually becomes visible. This eerie, "alien" effect is further reinforced by the fact that when the toothbrush appears, the water does not ripple *outwards* from the toothbrush but, "unnaturally," inwards toward it (the original footage was, no doubt, played in reverse). Inasmuch as the science fiction association does not adhere to "submarines," it is not part of the metaphor, while still contributing to the overall potential meaning of the commercial.

Example 4. Citroen cars. The commercial under consideration is part of a series in which the protagonist is always the same Citroen salesman who, even when off-duty, cannot resist sharing his enthusiasm for the brand he sells. In the current version, he opens his front door at home to a man and a woman who ask him whether he has a little time for them. They are pleasantly surprised when he jovially invites them in for coffee. When seated, the man of the couple begins to say, "I would like to tell you something very beautiful about …" but he is rudely interrupted by the salesman, who begins to rattle off the qualities of the newest Citroen car model, never giving his interlocutor a chance to take the floor again. When the couple beats a hasty retreat the salesman tries to fob a pile of Citroen brochures on them, saying, "if you are going from door to door anyway …" The implied metaphor here is CITROEN SALESMAN IS EVANGELIST; the mapped feature is, say, the presumed zeal, authenticity, and passion with which evangelists preach their message. Moreover, the evangelists' "beauty" as pertaining to their religious message is humorously transformed (or perhaps one should say: perverted) into the beauty of the car.

Target and source are visually and verbally represented, although the Citroen salesman would probably not be identifiable as such without his spoken text – unless one were to recognize him from earlier commercials in the same series. It is to be noticed that when the couple hasten to leave the unstoppable salesman, it is the latter who puts his (stockinged) foot between the door to prevent it from being slammed – another subtle way of cueing the metaphor's source domain, and a hint

that he outsmarts the evangelists at their own game. The visiting man's face, his pious voice, and the couple's bland clothes help reinforce the cliché of evangelists.

Example 5. Airwick air freshener. A woman visiting a museum looks up closely into a reflecting modern sculpture as if it were a mirror, and walking backwards accidentally knocks another, glass sculpture from its pedestal, shattering it to pieces. She is horrified, but quickly fetches an aesthetically designed Airwick Crystal'Air holder from her bag, fills it with blue Crystal'Air freshener, and puts it on the pedestal. A female voice-over tells us that "New Crystal'Air Design is full of real perfume that spreads continually, day after day, during six weeks." In the mean time several other visitors have gathered around the "sculpture," commenting, "this work of art smells beautifully!" and "What a delicious smell!" The metaphor AIR-FRESHENER IS WORK OF ART allows for the mapping of "aesthetically pleasing" or "high-culture prestige" from the artistic sculpture to the air freshener.

Although the source domain art in the metaphor CRYSTAL'AIR IS A WORK OF ART is reinforced verbally by the comments of a visitor, the visuals have already cued it via the presence of the other sculptures in a typical, white-walled museum room. The sound we hear when the woman puts the Crystal'Air holder on the pedestal is that of a glass object being placed, subtly underlining the similarity with the – aurally cued – shattering of the glass art object. The respectful silence, in combination with the echoes of clicking shoes, further helps identify the source domain, as does the poster "Museum [of] Modern Art" on the wall at the far end.

Example 6. Brand Cuvée beer. A close-up shows a corkscrew that, at the end of a panning shot to the right, turns out to be a corkscrew-cum-bottle-opener. The device is picked up, and we hear a beer bottle being snapped open. A male voice-over comments: "A soft and supple taste. A clear but warm colour. And a fresh, but light, fruity aftertaste. Now try Brand Cuvée as well. One of the three *pilseners* from the Brand collection." Clearly, the metaphor suggested is BRAND CUVÉE BEER IS QUALITY WINE. Any positive characteristic of, and typical behaviour toward, a quality wine is potentially mapped on the beer: high cultural prestige, something to drink on a romantic evening, a drink to cherish, and something one is willing to pay more for than for your average alcoholic drink – such as ordinary beer. Whether these implied claims are to be taken at face value or as presented with deadpan, tongue-in-cheek humour is up to the viewer.

Most important for the cueing of the source domain WINE is the corkscrew. In addition, *Cuvée* is familiar to *connaisseurs* as a phrase used in wine names. Thirdly, the verbal references to the drink's colour and its "fruity aftertaste" typically connote wine-drinking. The allusions are sometimes picked up in a five-second reinforcement, shown a few commercials later, in which the voice over continues, "Order the real Brand glasses now, and you will temporarily receive the 'Taste guide' for free. Look on Brand.nl," while we see three types of beer glasses on the left of the screen and a shot of the "Taste guide" on the right. Another commercial in the series deploys the same metaphor: a man descends into what appears to be a wine cellar and carefully takes two bottles from a whole range of horizontally laid out bottles; only when they appear in close up we see they are Brand beer, not wine, bottles.

Example 7. Basics sports shoes. A pair of sports shoes stands on the floor in front of a TV set which, judging from the stadium sounds emanating from it, features a sports programme. Two male voice-overs, seemingly belonging to the shoes, are

involved in a dialogue. The details of this commercial, which has other variants in the same series, are not relevant here: the point is that the verbal soundtrack personifies the shoes, yielding the metaphor SHOES ARE MEN. This commercial, and others in the same series, was broadcast frequently in the weeks preceding and during the Olympic Games in Athens (2004).

The sports shoes are personified almost entirely through the voice-overs (with the combined aspects of conveying verbal information, i.e., spoken language, and the humanness of the producers of this information, i.e., sound) alone. They do not, for instance, move. We are tricked into believing that it is the shoes that are speaking by a combination of the following considerations: they are filmed continually, often in close-up, and there is no other possible source for the voices; the shoes' position in front of the TV suggests they are watching; during the first part of the commercial, the switch from one voice to the other in the dialogue coincides with a cut, which suggests something akin to shot/reverse-shot editing (Bordwell and Thompson 1997: 288). With the sound switched off, however, probably few viewers would be aware of the shoes' personification.

Example 8. Peugeot car. In a realistic big-cityscape we see, in a quick montage accompanied by a techno tune, the one non-realistic thing: all the cars are brightly-coloured toy cars. They are life-size copies of the type children play with – some plastic, some wooden, some with the passengers painted on the windows, some with a windup key sticking out. Many people look up, astonished, with envy, or admiringly, in the direction of the camera. The reason for this becomes clear once we realize that the camera shots are point-of-view shots taken from a car, namely from the Peugeot 407 that in sharp contrast with all the other cars is a *real* car. The commercial ends with three shots with the following supers: "The new Peugeot 407"; "At last a car again"; "You feel better in a Peugeot," accompanied by the Peugeot logo. The metaphor can be verbalized as NON-PEUGEOT CAR IS TOY CAR. The mapped feature is the source's artificiality and its status as meant for children.

The toy car domain becomes identifiable quickly, and its oddness in the realistic cityscape is immediately obvious, but it is not until the toy cars are explicitly juxtaposed to the Peugeot (first by a shot of it, and then elaborated on by the line "at last a car again") that we realize we need to construe a metaphor in which the toy cars constitute the source domain. It is to be emphasized that this metaphor does not have the product (Peugeot) as the target of the metaphor, but rather its antonym: the competitors whose products the viewer, according to the advertiser, of course does not want to buy.

Example 9. UWV job support. UWV is an umbrella organisation entrusted with assessing people's right to unemployment benefits as well as the height and duration of the payments, and is responsible for issuing them. In addition the organisation is charged with preventing unemployment and monitoring the reintegration of unemployed and disabled people. The commercial opens with a view of a wharf, where we see a welder at work. When he looks into the camera, a female voice over says "team player" and the word appears on screen simultaneously. In the same manner we see a man tarring a hull ("roll champion"); a man at a lathe ("magician"); and an overseer ("price controller"). In each case there are diegetic sounds pertaining to the target domain (e.g., the tarrer's rolling movements are audible, as is the lathe). The music consists of soft, unobtrusive guitar strumming. Over

a shot where all four workers together with some other colleagues look into the camera, the voice-over addresses employers thus: "Be careful with your capital. Consult with your employees and your ARBO-agent [a Dutch Occupational Health and Safety institution negotiating conditions under which employees with health problems can get back to work] how you can prevent disability." The last shot shows the UWV logo, the website address and the pay-off "Preventing is saving: prevent disability."

The commercial shows four multimodal metaphors of the verbo-pictorial variety; WELDER IS TEAM PLAYER; HULL-TARRER IS ROLL CHAMPION; LATHE-OPERATOR IS MAGICIAN; OVERSEER IS PRICE CONTROLLER. Arguably, in the fourth case there is not, strictly speaking, an incongruence between two different domains (an overseer can *literally* be a price controller), but the source domain still makes salient an aspect in the target that is normally is not, and in that sense invites the addressees (here: employers) to consider their employee in a new light. Such an example, incidentally, is a reminder that there may be a continuum between pure metaphors (A is B), in which two different domains are compared non-literally, and role-attribution (A IN THE CAPACITY OF B) – where it is significant that both are covered by the familiar characterization "seeing/understanding A-as-B."

Example 10. Harpic toilet brush. An excited male voice-over, accompanied by an upbeat tune exhorts us, partly using English words and phrases (here indicate by italics): " *Get set ready*… For the new Harpic Ready Brush. The new weapon in the realm of daily toilet hygiene. *Ready*, aim, and… *brush*!" and gives some more details about the product. The visuals show us how the three parts of the blue-and-white brush and the cartridge with the cleansing liquid assemble themselves. A blond woman is seen cleaning a toilet. The last shot has the super "Also in refill packaging." In the metaphor TOILET BRUSH IS WEAPON, the mappable features of the source domain presumably include a tongue-in-cheek heroism.

While the visuals alone hardly suffice to indicate that the construal of a metaphor is in order, the word "weapon" and the verb "aim" suggest TOILET BRUSH IS WEAPON. More specifically, the form of the brush and the way it is assembled and used – presumably the liquid squirts out of the brush – suggest TOILET BRUSH IS GUN rather than, say, toilet brush is SPEAR or SWORD (see Forceville, Hekkert and Tan, forthcoming, for an attested example of TOILET BRUSH IS SWORD).

What makes multimodal metaphor different from verbal metaphor?

The conclusion is thus that metaphors can have multimodal manifestations no less than monomodal ones. We have seen, moreover, that a specific mode (here: images, sound, music, spoken or written language) drawn upon in a commercial can contribute to the identification of the metaphor as well as help cue features that are to be mapped from source to target. Multimodal metaphors share with monomodal metaphors of the verbal variety – by far the best-researched type of metaphor – that which turns them into metaphors in the first place: two phenomena belonging to different categories are represented in such a way that we are forced or invited to understand and experience one of them in terms of the other. One or more features are projected from the latter (the source) upon the former (the target), which is thereby (temporarily) transformed conceptually. However, inasmuch as language is only one of the modes that may partake into multimodal metaphor, there are dif-

ferences as well as similarities between multimodal and purely verbal metaphors. Among the differences are the following:

The nature of the metaphorical "is" is non-verbal. The construal of verbal metaphors is aided by the rules of grammar and semantics. For one thing, the prototypical verbal metaphor has a "noun A is noun B" appearance; that is, target and source are linked by a copula. And where it is not (as happens in many cases; see Brooke-Rose 1958; Goatley 1997), grammar still often helps attest that a non-literal identification between two phenomena is proposed. In multimodal metaphors this awareness of metaphorical identification is cued by other means. The identification between two phenomena that turns them into a metaphorical target and source can be triggered in various ways. The ten cases discussed reveal the following mechanisms, separately or in combination, that contribute to the awareness that a metaphor is to be construed:

(a). Physical resemblance. This can only function as a trigger in the case of monomodal metaphors: only a visual representation can resemble another visual representation; only a sound can resemble another sound. An example of such physical resemblance is that between the toothbrush and the submarine and, arguably, that between the toilet brush and the gun. Clearly, context helps create this resemblance; there is no pre-existent similarity between target and source.

(b) Filling a schematic slot unexpectedly. The target domain – which in advertising usually is identical with, or metonymically connected to, the product – occurs in a place where one expects something else. Put differently, we encounter deviations from typical *gestalts* or schema's: Fully-dressed-up-Anky-on-her-dressage-horse is replaced by fully-dressed-up-Anky-on-a-bike; an unwinding silk thread reveals not the expected spindle but a plastic flacon; an air freshener on a pedestal, surrounded by sculptures, disturbs our schema for typical objects-exhibited-in-a-museum; toy cars in an otherwise completely realistic cityscape do not fit our expectations; information typically associated with wine turns out to pertain to beer. A similar subversion of a scenario occurs in the Citroen commercial: just as Anky-on-her-horse is replaced by Anky-on-a-bike, the expected enthusiastic religious testimony of the evangelists is replaced by the Citroen salesman's "testimony" of his car, by the salesman's sudden and rude interruption. That is, in the "slot" of the evangelists' testimony we get the salesman's promotion pitch.

(c) Simultaneous cueing. In the Basics and UWV cases, metaphorical identification is achieved by visually representing something or somebody in a salient manner and at the same time providing spoken (in the Basics case) or spoken and written (in the UWV case) cues pertaining to the same thing/person. In the Basics commercial the shoes are constantly centred in the frame, the camera circles around them, and there are no other candidates for being the producers of the "funny voices" dialogue we hear on the sound track. In the UWV commercial, the represented workers and the verbal qualifications – provided both orally and in written form – share the obvious feature of "humanness," while the workers are given prominence by being centred in the image. Moreover, they attract attention by looking into the camera.

Perceptually rendered targets and sources are highly specific. We apprehend not just "evangelists" – we perceive *these* evangelists, with *these* faces, coats, glasses, and way of moving, with *these* voices. We see *this* particular toothbrush (with a round head that perhaps more resembles a submarine's periscope than brushes with more elongated heads do), *these* silly-looking toy cars. In verbal metaphors, even

Homeric similes elaborating extensively on the nature of the mappings, readers have to imagine a lot of visual and sonic, sometimes gestural, detail. Drawing on conceptual schema's, they will retrieve from memory typical elements that belong in such schemas. In multimodal metaphors, many details need not be imagined or supplied, since they are already given. Such details are bound to evoke specific connotations, and hence will steer and constrain interpretation of metaphors in manners that are different from those cued in exclusively verbal terms. In order to gain more insight in the nature of these constraints, empirical testing is imperative.

Non-verbal communication is more easily comprehensible and has greater emotional appeal than verbal communication. Obviously, one needs to have at least some knowledge of a language to be able to construe and interpret a metaphor in that language. Metaphors whose targets and sources are cued wholly or partly via visual, sonic, or musical cues, may be understood, maybe in rudimentary fashion only, by an audience unfamiliar with the language of the country from which the metaphorical representation originates. This is not to say that non-verbal metaphors are always universally comprehensible, and if they are understood, that they are comprehended in the same way. As indicated above, cultural or national connotations adhering to a source domain are bound to affect interpretation (Kövecses 2005; (Forceville et al., in preparation a). Apart from their greater degree of comprehensibility, metaphors drawing on images, sounds, and music also, I submit, have a more intense, immediate emotional impact than verbal ones.

Verbalizing multimodal metaphors

Verbalizations of the multimodal metaphor steer interpretation. Discussing non-verbal and multimodal metaphors in academic discourse requires formulating them in the prototypical A is B format, but verbalizing non-verbal or partly-verbal information is not always a simple and self-evident action. It is a consequence of the venerable tradition of focusing on its verbal variety that metaphor scholars tend to forget that while the A-is-B format on a conceptual level underlies all metaphors, irrespective of the medium in which they occur, it is only in language that the surface manifestation and the conceptual structure can be made to resemble each other ("John is an elephant" being a verbal surface manifestation of a conceptual metaphor that, since Lakoff and Johnson 1980, would be represented as John is an elephant). For one thing, we should not forget that this apparent resemblance is due to the (very handy) *convention* of representing concepts in language – how else could they be subject to interpersonal reflection and scrutiny? – but that it is unlikely that this is, in fact, the way in which a metaphor is mentally represented. For another, even in purely verbal metaphors, the conceptual A-is-B level is an inferred "verbal translation" from the surface level (e.g., from "John trumpeted the news around" to JOHN IS AN ELEPHANT or JOHN IS A TRUMPETER – although in such circumstances grammar and rules governing deixis and anaphoric references tend to give strong clues that a metaphor is to be construed.

A second issue pertaining to the verbalization of metaphors on the conceptual level is that the choice for the "A" and the "B" in the metaphor may not be self-evident. Does the phrase "he attacked me fiercely in the discussion" manifest the conceptual metaphor argument is war – see Lakoff and Johnson 1980:4 *et passim* – or rather ARGUMENT IS STRUGGLE, or DISCUSSION IS STRUGGLE? Whereas this already can be problematic in purely verbal metaphors this is a more thorny problem in multimodal metaphors inasmuch as often target and/or source are not

rendered verbally in the first place. That is, even more than in language, the analyst faces a choice in how to verbally represent the A IS B metaphor. Whatever formulation is chosen, it is never innocent inasmuch (1) it favours the activation of some mappings over others; (2) it suggests, possibly misleadingly, the incontrovertible presence of a metaphor as well as its stability.

Consider the Citroen commercial. Exploring the structural relationships (what Gentner and Markham, 1997 call the "aligned structure") in the domain EVANGELIST, a viewer may well derive the following analogy: the Citroen salesman is to the Citroen as the Evangelists are to the Bible, which may lead to various further elaborations of the metaphor. This means that while the formulation CITROEN SALESMAN IS EVANGELIST is a perfectly appropriate one, so is CITROEN IS BIBLE. For one thing, it is to be noted that the source, bible, unlike the source EVANGELIST, is no longer visually represented. More importantly, however, we should note that the two formulations of the "same" metaphor alert the viewer to different potential mappings. What ultimately matters, of course, is not so much how the academic analyst *formulates* the conceptual level of the metaphor, but how the metaphor is actually *processed* conceptually. In this respect Raymond Gibbs' warning to armchair theorists of metaphor is very pertinent to students of the multimodal variety as well. Gibbs points out that metaphor processing is not a monolithic event. "Many figurative-language theorists make the mistake of assuming that a theory constructed to explain one temporal moment of trope understanding can easily be generalized to account for *all* aspects of understanding" (1993: 256). Gibbs therefore proposes to distinguish metaphor processing into four phases: comprehension, recognition, interpretation and appreciation. The speed with which a person successfully completes each phase is bound to differ, varying from milliseconds to, potentially, years (for instance in the case of certain literary metaphors in poems, revisited throughout a lifetime). This issue requires extensive empirical research.

With regard to the "incontrovertible presence" of a metaphor suggested by the A IS B verbalization, we should reformulate the often-asked question whether "something is a metaphor" as the question whether "it is necessary/ possible/ useful to *construe* something as a metaphor." Indeed, Black already warned that "there is an important mistake of method in seeking an infallible mark of the presence of metaphors" (Black 1979: 36). I propose that there is a continuum from cases where metaphorical construal of two phenomena is virtually imperative because, in the given context, nothing but a metaphorical interpretation is an acceptable strategy to account for the odd juxtaposition of two phenomena, to cases where no metaphorical construal is necessary to make sense of this juxtaposition. In the latter case, the hints for metaphorical construal are so subtle that it occurs largely at the message addressee's own responsibility (see the discussion of "strong" versus "weak" implicatures as theorized by Sperber and Wilson (1995) and elaborated for a multimodal metaphor in Forceville, 1999a; see also Forceville 2005a). Consider, once more, the Citroen commercial. It is telling that the Citroen website, where the commercial is described, does *not* mention "evangelists" but, more generically, "sellers" going from door to door.[4] Having to verbalize the metaphor, as I had to do here in order to discuss it, necessitates an explicit identification that, in the "evan-

[4] http://www.citroen.nl/CWH/nl-NL/Corporate/Over+Citroen/Nieuws/20050429Huis+aan+Huis+wint+prijs.htm.

gelist" version will no doubt offend some people. While to me the visual cues for "evangelist" are inescapable, Citroen could rightfully say that this is merely my interpretation of the visual track.

Multimodal metaphors in commercials: generic dimensions

The metaphors discussed in this paper are not only characterized by their multimodal nature, they are also marked by the genre to which they belong: commercial messages. It is important to emphasize this, in order to avoid ascribing specific characteristics to their multimodal nature that are in reality due to their generic affiliation. Let me briefly elaborate on this aspect. As Ricoeur reminds us, Aristotle discussed metaphor both in his *Poetics* and in his *Rhetoric*, and while he saw no difference in structure in the two types of discourse, Aristotle emphasized that their respective functions are very different:

> Aristotle defines [rhetoric] as the art of inventing or finding proofs. Now poetry does not seek to prove anything at all: its project is mimetic; its aim… is to compose an essential representation of human actions; its appropriate method is to speak the truth by means of fiction, fable, and tragic *muthos*. The triad of *poiêis-mimêsis-catharsis*, which cannot possibly be confused with the triad *rhetoric-proof-persuasion*, characterizes the world of poetry in an exclusive manner (Ricoeur 1978: 13).

Clearly advertising belongs on the side of rhetoric rather than of poetry, and this codetermines our approach to it. For one thing, commercials promote a product, brand, or idea, and it is this that, as we have seen, is usually the metaphor's target. This also means that the target of the metaphor is somehow explicitly represented within the text itself; it is thus what Ricoeur calls a "metaphor *in praesentia*" (Ricoeur 1978: 186). Few TV advertisers would want, or dare, to dispense with visually representing their product or service. (See Forceville, 1996: 122-123 for an exception; note moreover that in the examples discussed here the products/targets are all represented pictorially – but it should be borne in mind that, theoretically at least, a product with a very specific sound could be rendered with a sonic target only.) Verbal metaphors in artistic contexts do not necessarily have an intra-textual target. That is, they can be metaphors *in absentia* (Ricoeur 1978: 186), as Lakoff and Turner demonstrate in their discussion of William Carlos Williams's poem "The jasmine lightness of the moon" (Lakoff and Turner 1989: Chapter 3). Similarly, multimodal metaphors may have targets that are to be supplied from extra-textual information, for instance in cases of censorship (for more discussion and some examples, see Forceville, in preparation b).

There is another remarkable element in the metaphors discussed that may be due to generic considerations rather than to their multimodality: In more than half of the ten metaphors the source domain is cued before the target domain. This finding at first appears somewhat puzzling, since this is different from standard versions of verba *l* metaphors, where the target typically appears *before* the source ("surgeons are butchers"/ "butchers are surgeons"). My intuition is that this "reversed order" is due to the fact that advertisers need to do whatever they can to keep viewers from zapping away during commercials. One way to achieve this is to intrigue, tease, or surprise viewers by presenting a source domain, which "comments" on the "topic" (i.e., the metaphorical target domain) before that topic – typically the product advertised – is actually identified.

A third characteristic of metaphors in advertising has been noted above: the features mapped from source to target are always positive ones – unless the target

is not the product advertised but a rival brand to be disparaged, as in the Peugeot commercial. That is, the source domain must, in the relevant dimension, have higher status than the target – the commodity advertised. Lakoff and Turner discuss the "natural" place of things in the world in terms of the mediaeval concept of the "Great Chain of Being": there is a pyramidal hierarchy with God at the top, the angels below, high-ranking officials coming next, followed by menial workers, animals, plants, and non-animate natural things, respectively. Within these hierarchies, there are further subdivisions: for instance, the lion is the king of animals, while insects are at the very bottom of the animal hierarchy (Lakoff and Turner 1989: Chapter 4). Strictly speaking, only two examples in the ten metaphors discussed display this unequivocal difference in status, namely those in the Gazelle and Basic commercials, in both of which a commodity is personified (if we take "personification" in the broad sense of according animate attributes to non-animate things). But even though in the metaphors under discussion usually both target and source are "things," and hence evade the self-evident hierarchizing governed by the Great Chain, we nonetheless see a clear division of value between the target and the source. Wine has more prestige as a drink than beer – at least to the audience at which Brand aims its premium beer advertising. Similarly artistic sculptures rank higher in cultural value than air fresheners. A gun bestows greater power on its user than a toilet brush. Something "natural" is, in our high-tech society, held in higher esteem than something "artificial" (Dove), as is a real thing than its toy equivalent (Peugeot). The technology of a submarine is more impressive, and commands more attention than that of toothbrush; and evangelists' testimony of the Bible's "Good Message" inspires more awe and respect than a salesman's attempt at persuading a potential customer to buy. The UWV case is less self-evident. Does greater prestige accrue to a "team-player" than to a "welder"; to a "magician" than to a "lather"? The answer probably is affirmative. The UWV admonishes employers that their employees are not merely skilled workers in a manner that makes them exchangeable for other skilled workers, but have qualities that pertain to the realms that have higher prestige: a "team-player" has social skills that a welder, by virtue of his skills alone, does not have; a champion excels in what he does; a magician makes things happen no ordinary person could, a price-controller has conceptual qualities exceeding those of an overseer.

All of these aspects (metaphor *in praesentia*; source before target; source "higher" than target in the Great Chain hierarchy) characterize multimodal metaphor in advertising in ways not necessarily shared by other genres. Hence it is very important that these aspects are systematically investigated and tested in other genres than advertising. This, of course, requires taking into account theories of genre as well (see Altman 1999 for an excellent introduction to "genre"; for other considerations of the impact of genre-attributions on reception, see Neale 2002; Forceville 1999b, 2005a; for a study of cinematographic metaphor in feature films, see Whittock 1990).

Other variables that potentially affect the construal and interpretation of multimodal metaphors are the cultural or group-specific environment within which metaphors occur (Emanatian 1995, Gibbs and Steen 1999, Maalej 2001, 2004, Özçaliskan 2003), and the materiality of the "carrier" (paper, stone, wax, internet page …) exemplifying the metaphor (see Kress and Van Leeuwen 1996: Chapter 7).

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A Visual Lexicon[1]

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Abstract

One of the most recognizable graphic components of the visual language of "comics" is the "panel," a demarcated frame of image content put into discrete sequences, thereby seeming to be the primary unit of expression. However, meaningful visual elements do exist that are both smaller and larger than this encapsulation of image and text. Spoken languages also have variation in sizes of lexical items above and below their primary sequential unit of the "word." This paper will address these varying levels of representation in visual language in comparison to the structural make-up of verbal language, to aim toward at what it means to have "visual lexical items."

Keywords: visual language, comics, lexicon, panels, construction grammar, morphology

Introduction

The units of language come in many sizes. Some pieces are the size of words, such as *coffee*, *jump*, and *fantastic*. Pieces smaller than words are morphemes like *re-*, *-ing*, and *un-*. There are also formalized patterns of words put together, including idioms like *kick the bucket*, *miss the mark*, and *hung out to dry*, or even grammatical constructions such as *What this X doing Y?* manifested as *What's this fly doing in my soup?* or *What is this scratch doing on the table?* (Kay and Fillmore 1999). Ray Jackendoff (2002) has proposed that all of these "constructions" can be included in the mental lexicon. This breaks step with previous approaches to the lexicon that insist on maintaining the level of the "word" as the sole purview of "lexical items," lying in wait to be pulled out into various types of grammatical patterns. The change from this view reflects the sentiments of the "construction grammar" movement in linguistics, which examines form-meaning pairings in language of varying sizes (Goldberg 2003). Here, Jackendoff (2002) departs from traditional models of grammar by denying a separate "lexicon" that exists outside other grammatical structures such as syntax and phonology. Rather, in this model the lexicon emerges out of the mutual interfacing of parallel structures of grammar: phonological, conceptual, and syntactic structures.

While Jackendoff deals with structures of verbal language (with sign language implicitly accepted), similar issues of size variations can be addressed in the visual-graphic modality as well. Indeed, drawing images joins the vocal creation of sound and gesticulation to form the only three channels of expressing propositional concepts available to the human animal. While semiotic expression can follow from other senses like taste or smell, they cannot produce conceptual information in any comparable capacity. Extending this observation, this project hypothesizes that whenever *any* of these conceptual expressing modalities takes on structured rule-bound sequences (a grammar), that form becomes a "language." Thus, we have a verbal language of sound, a signed language of body movements, and a *visual lan-*

guage (VL) of sequential images.[2] This visual language appears most commonly in the social objects of "comics" — essentially the *parole* to the visual *langue* (Cohn 2005b). Moreover, both sequential and non-sequential forms of these modalities can unite in multimodal combinations, as in speech-gesture (McNeill 1992) and text-image relationships (McCloud 1993).

Note that this hypothesis for "language" involves exactly the three structural features found in Jackendoff's Parallel Architecture: modality, concepts, and syntax. In this case, for a *visual* language, the modality component to Jackendoff's Parallel Architecture becomes "photological structures" to account for the principles necessary for recognizing and constructing visual representations as opposed to verbal ones. The addition of such a structure should already be crucial for the grammar anyhow, since "writing" requires stored memory of graphic representation that must link to the other aspects of grammar. Following the constructional definition of a "lexical item" as *a meaningful unit or combination of units of form-meaning pairing*, this paper will address the varying levels of representation in visual language to arrive at a general understanding of what it means to have "visual lexical items."

Attention Units

The most obvious unit of representation in visual language comes in the form of a "panel" or "frame," which is most often clearly demarcated by some sort of encapsulated border, be it a drawn frame or empty white space. As the primary components of the sequence, panels are the essential unit of *syntax* in this visual language. Following the linguistic definition, syntax is here conceived of as *a system of rules that govern the ordering and arrangement of units*. Though this definition might not have been followed, or even known of, various other approaches have addressed the topic of a "visual grammar."

Perhaps the most well known "visual grammar" is Kress and van Leeuwen's (1996) semiotic approach. As Forceville (1999) notes, Kress and van Leeuwen's model suffers from its strict orientation to 'social semiotics,' suggesting that they embrace a more cognitive stance. However, the importation of a notion of "grammar" from linguistics itself leads to problems. Though Kress and van Leeuwen's model outlines the compositional elements relationally juxtaposed by force dynamic vectors, in no way is it a "grammar" in any real linguistic sense. Indeed, they acknowledge the metaphorical quality of their use of the term on first page of the book. Nevertheless, it is worth examining why such a metaphorical usage leads to problems compared to what a real linguistic notion of visual grammar might offer.

Outright, their model lacks the requisite Saussurean (1972 [1916]) paradigmatic and syntagmatic relationships of substitutable elements that has grounded the field for nearly a hundred years, instead drawing its power only through spatially arranged semiotic components. True syntactic categories are assigned by distributional regularity within a discrete array, not simply by being semantic objects. That is, a "noun" is only a noun because it falls into certain distributional (*syntactic*) positions within a larger sentence; for instance, in English a noun can potentially follow a determiner (ex. *the, some*) and adjective (ex. *big, smelly*). A noun does *not* get its grammatical category because it represents a (*semantic*) "person, place,

[2] It should be noted that writing systems are not considered "visual languages," though they might be considered "visualized (verbal) languages." "Writing" is essentially the importation of the natively verbal structures mapped into the visual modality (see Cohn 2005a).

thing, or idea," of which there are innumerable exceptions, including *redness, concert, millennia,* and *finesse* (Jackendoff 2002).

This leads to the second issue with Kress and van Leeuwen's "grammar": it entirely lacks syntactic categories that outline specific roles played by individual units in relation to the sequential whole. This "visual grammar" only contains observable semantic components and their spatial relations, not rule-bound categories determined by their distributional arrangement (though they eschew the need for rules upfront, they dismissively admit that it is central to the notion of grammar). Indeed, their sense of "Actor" aligns well with the notion found in linguistic *semantics* of an Actor or Agent: an entity that carries out an action (e.g. Jackendoff 1990, "Agonist" in Talmy 2001). In this sense, Kress and van Leeuwen's approach is (admittedly by them) merely syntactic by metaphor, and should be treated as such. It is more useful for its commentary on compositional qualities of individual arrays than as a "visual grammar."

While not overt, the belief that syntax lies within a singular image assumes that an individual image is equal to a "sentence," since this is where syntax operates in verbal language. This equation is motivated again by semantic concerns: an image is as much if not more densely filled with information as a sentence. However, information structure does not necessitate syntax — only semantics. As stated previously, the approach herein takes panels to be the primary syntactic unit, though this does not equate to panels being a "word" in any sense of information structure. Quite clearly, pictures contain more conceptual content than words (a thousand or so, as the saying goes). Nevertheless, this "visual language" approach to panels as syntactic units acknowledges that they are subject to distributional regularities within a syntagmatic sequence in the same way that words are. That is, panels are not the visual equivalent of words (and neither are elements of an individual image). Rather, both words and panels play similar structural roles within the confines of their own systems of grammar. Any visual display that lacks the requisite sequence needed to have distributional regularities thereby does not have any qualitative *syntax*, and is thereby also not *linguistic* either.

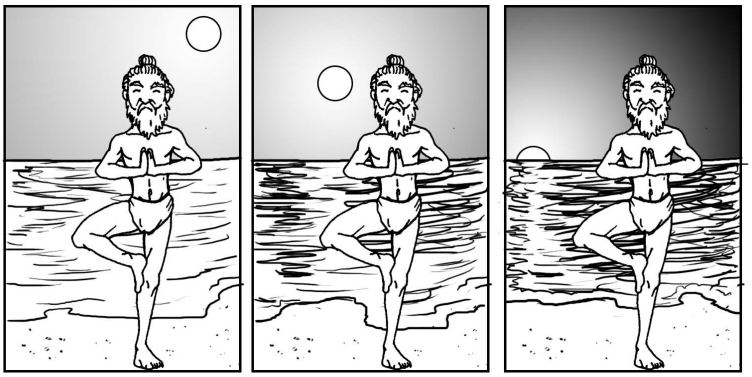
Perhaps most well known of the direct approaches to visual syntax pertaining to "comics" sequences is McCloud's (1993) taxonomy of "panel transitions," which actually did attempt to define specific roles played by panels, though he limited these relations to apply only to immediate constituents. Both Saraceni (2000, 2001, 2003) and Stainbrook (2003) attempt to expand on McCloud (1993) by associating it to concepts in applied linguistics and discourse theory. However, these approaches again assume the "sentence level" for panels,[3] hence pursuing the track of discourse theory, but leaving the same problems intact. Indeed, by expounding broader descriptions of coherence between panels, they skirt the advantages McCloud gained through an explicit formulation of relational panel roles.

McCloud's own approach suffers from a variety of problems as well. However, addressing these more syntactic theory oriented issues and proposing an alternative model of visual grammar are ancillary to the concerns needed for exploring a "visual lexicon" alone. For the present discourse, visual grammatical categories will be glossed as "narrative states." The important point here is what *visual syntax* of

[3] Saraceni (2000:96) uses the Kress and van Leeuwen model overtly, and provides a chart weighing the pluses and minuses of comparing *paragraphs, sentences, clauses,* and *phrases* to panels. Conspicuously absent is the level of the "word," though he no doubt assumes it less worthy than a *phrase* for which he states, "the information level never equates with that of the panel."

a visual language must entail. Following its linguistic meaning, visual syntax is taken as *a system of rules that govern the distributional ordering and arrangement of units within a syntagmatic whole,* thereby requiring a *discrete array* of units and excluding the compositional qualities of individual images. With this broad foundation for visual grammar, let us return to examine the properties of its primary unit, the panel.

Within panels there are two distinguishable characteristics with regard to their relationship to the overall grammatical sequence: positive and negative entities. "Positive" or "active" elements make up the figures and focal action of a panel, while "negative" or "passive" elements are the background information (Natsume 1997). Since visual syntax is concerned with the sequential relations of panels, active elements become the "grammatical entities" involved in the actions or events of the visual sequence. A similar notion is provided by Talmy's (2001) Figure/ Ground distinction, drawing upon Gestalt psychology. He describes the Figure as "a moving or conceptually movable entity" contrasted by the Ground which is "a reference entity… that has a stationary setting relative to…the Figure's site, path, or orientation" (Talmy 2001: 184). Due to the difference between iconic and symbolic expression, in visual form, the Figural entities repeat across sequential units rather than become presented as an isolated unit within the sequential array. As a result, it is out of this sequence that active entities find their definition. While active and passive elements seem to prototypically correspond respectively to foreground characters and the environment that they are in, ultimately such assignment comes through the *sequence* itself, and not compositional arrangement. For instance, in a sequence like this, the environment is positively charged and the person becomes negatively charged:



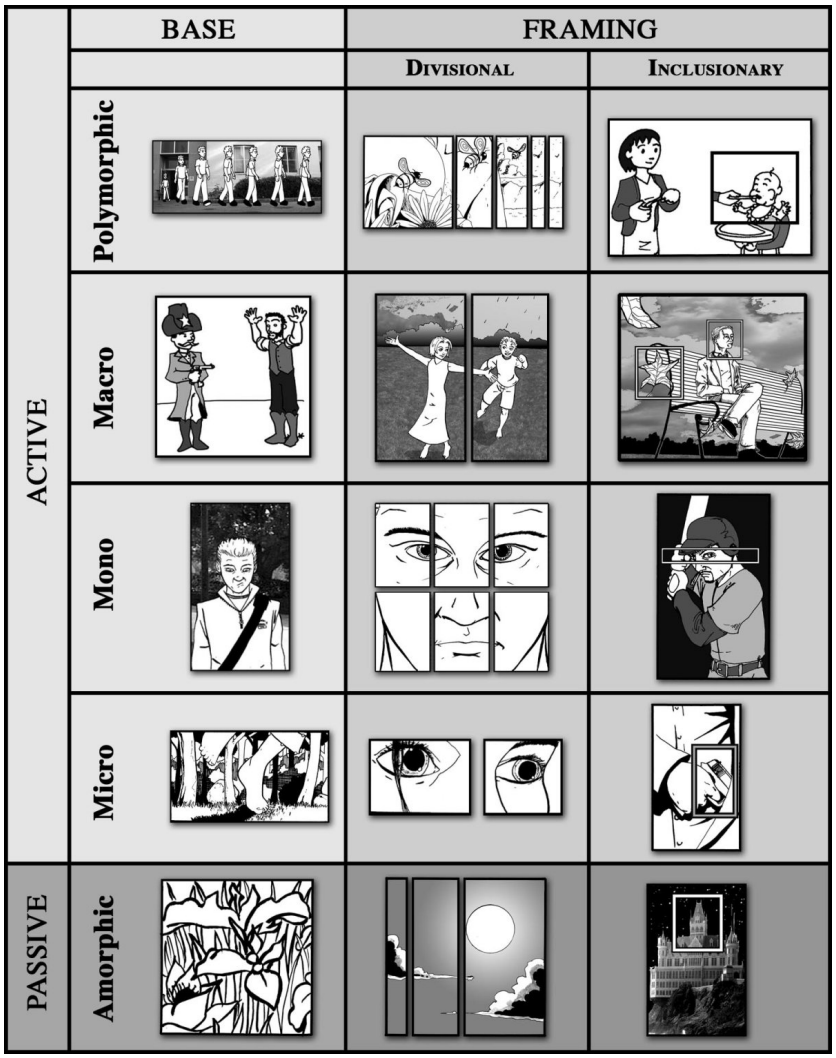
(1)

While the sunset changes the environment, the ascetic stands still. Granted, like facets of most passive features, the man is not completely negligible for his *semantic* value. The sequence does convey his resolve to stand in one place over a long period of time, and that is undeniably an important aspect of the sequence's *overall* meaning. However, despite this importance semantically, the man in this sequence does not affect the *syntax,* which must deal with the functional relations of panels to the whole. The event in these panels depicts the sun setting. Thus, the syntax is determined wholly by the *movement of the sun* and the effect it has on the surrounding environment, becoming the positively charged Figure to the negatively charged Ground of the man. Though a predisposition might exist for considering

compositionally foreground elements as the prototypical positive elements of the scene, such distinctions are not absolute.

Moreover, because of the necessity for recognizing relationships across sequences, a single panel must not be overloaded with positive elements. If too many positive elements exist in each panel, it becomes more and more difficult to parse the syntactic change. This is not necessarily a structural restriction per se, but can be likened to a maxim of conversational Quantity (Grice 1967), where only the sufficient information is required to achieve communicative success. Panels do not intrinsically limit including more positive elements than are necessary, though they may burden the efficacy of the visual communication. In sum, while active and passive elements add up to create the semantic whole for the sequence, it is only the active elements that engage in the syntax.

Based on the amount of positively charged entities they depict, paneled representations can be categorized in a *Lexical Representational Matrix* (LRM).[4]



The highest level features *Polymorphic* panels, which allow for event representation to exist within the boundaries of a singular frame through the *repetition of*

[4] As true classifications are determined by a panel's place within a sequence, the examples given in the LRM are reasonably prototypical.

a single entity at different stages of an action. Below this are *Macros*, containing more than one grammatical entity — a positively charged element determined by its role in the sequence. *Monos* are one level lower, with panels that depict only a singular entity. At the bottom of the Active tier of the LRM are *Micros*, which feature less than one entity and often come in the form of "close-ups." Finally, at the very bottom of the LRM is another Passive tier, holding *Amorphic* panels that have no active entities whatsoever. These are commonly views of environmental features, though they can also include animate objects depending on the context of the sequence.

The vertical axis shows a progression from full actions to scenes, to one entity, to less than one entity, and finally down to no entities at all. The Framing Tier set to the right takes these Base distinctions and applies varying paneling options to them. *Divisional* panels divide a single image into image constant parts, while *Inclusionary* panels use frames within frames. Since these framing devices break up Base assignments their componential parts might belong to categories lower than the whole category. Thus, a Divisional Macro might end up featuring two Monos, while a Divisional Mono might feature multiple Micros.

While they might intersect, the rankings within the LRM should be clearly distinguished from filmic notions of "framing" (see for instance Bordwell and Thompson 1997). Though cinematic framing such as "long shots" and "close-ups" might correspond prototypically to Macros and Micros respectively, ultimately these categories are not a one-to-one mapping. Notions of filmic framing certainly can apply to the depictions in panels, and function to crop information within the enclosed space of a cinematic screen. However, the determination of ranking within the LRM — and a "grammatical entitiy" —is based not only on the quantity of information within a panel, but also on the relational qualities of a panel to its sequence. Filmic shots might specify *how* the elements of a frame are shown, but the LRM measures *what* in the frame is important to the broader sequence in the first place. In this way, a close-up may also be a Macro because it has more than one acting entity, and a long shot could be a Mono by showing a single acting entity. While a close-up of an eyeball might be a Micro for a sequence of a *person studying*, it could be a Mono for a sequence of an *eye blinking*. Again, LRM rankings are wholly relative to content of a panel and its sequence. Take for instance this chase sequence from Scott Chantler's *Northwest Passage* (2005:2-3):

Figure 2.

This sequence shows a Native American running from angry frontiersmen. In the first panel we see multiple frontiersmen, the second just the Native American, and in the third we see both frontiersmen and (very small in the upper middle) the running chief. Throughout the latter two panels, the forest setting serves as the passive entity to the active people. The final panel can easily be identified as a Macro, because it shows both interacting entities: the Native American and the frontiersmen. The second panel contains one lone active entity in it, the Native American, and is thereby considered a Mono, though it uses a long shot to show

the action. Now, despite the fact that there are multiple "characters" in it, the first panel is also considered a Mono because the interacting "entity" is the *group* of frontiersmen as a whole. As dictated by the *sequence*, the frontiersmen function as a unified collection of individuals[5] in relation to the truly lone Native American chief. If another hypothetical sequence showed members of that group individuated and interacting (say, talking to one another about their chase), then they would become distinct entities unto themselves. Thus, like the assignment of active entities and LRM position, the whole of what constitutes an entity in the first place is also determined by the context of the sequential structures.

While syntax does occur to fuse the understanding of linear panels, they are not necessarily minimal "syntactic units" unto themselves. Take for instance adjacent Mono panels featuring different entities, which can potentially be combined into an "environment" into the same functional "narrative state" (i.e. "grammatical category"):

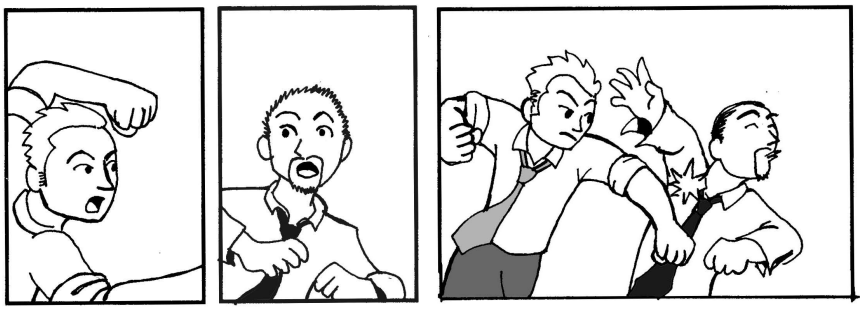


Figure 3a. Mono - Mono - Macro

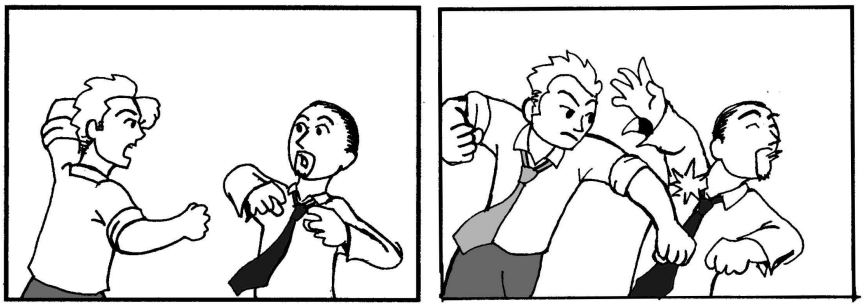


Figure 3b. Marco - Macro

Though two Monos are used in (3a), the amount of information here equates to that of a Macro, as evidenced in the distributional equivalency in (3b). To accomplish the single environment that (3b) shows in one panel (3a) must somehow fuse the first two panels together in order to connect with the final panel. I have named this process "E(nvironmental)-Conjunction" since it unites disparate units into a common conceptual environment. Further examples of this phenomenon occur below, with panels engaging in E-Conjunction bracketed for clarity:

[5] In Jackendoff 's (1991) terms, this entity of "group" would be a bounded concept with internal structure: it has no boundary limits, and distinct internal components could be separated from it yet retain the same concept. In contrast, the chief (and individual members of that category "group") would be bounded *without* internal structure: a person has a boundary limit and is not divisible into smaller parts of itself.

Figure 4a. (Samura 2004:26)

Figure 4b. (Sakai 1987:28)

In (4a), the first two panels serve to set up the interaction that occurs in the final two panels. They both reflect a common function of establishing the context of the overall event. A similar effect is achieved by the first two panels in (4b), but continues into the second set of panels where the action is initiated. The final panel in both features a Macro where the entities unite to fulfill the predication of the interaction.

Because Mono panels such as these join within a singular narrative function, panels cannot be considered as minimal syntactic units alone. E-Conjunction shows that panels can be grouped into functional constituents that interact with the larger sequential whole.[6] Rather, panels seem to play a role as "attention units" (AU)[7] for the overall schema of the interrelation, since they *focus the attention* of the reader on particular elements of the sequence. A Macro panel focuses the attention on larger displays, while Monos and Macros hone that focus to more precise elements of the interrelation. In this light, E-conjunction breaks up a singular narrative "moment" (i.e. grammatical category) into multiple AU to achieve certain representational intents. This could be helpful, for instance, in that E-conjunction can aid in upholding the maxim of Quantity that prevents the overloading of a single panel with too many active elements by breaking up narrative segments into smaller more manageable parts per unit.

Beyond E-conjunction, Polymorphic panels allow for grammatical structures to occur within a single panel, potentially carrying syntax of a phrasal level or higher. The attention unit in these panels becomes cast much wider, to show the pieces

[6] Incidentally, this grouping of panels into functional "chunks" also provides evidence against McCloud (1993) and others (e.g. Saraceni 2000 and Stainbrook 2002) transitional models of visual syntax, since those larger constituents must connect to each other, transcending the direct linear relationships.

[7] Thanks go to David Wilkins for contributing this term.

of an action or event all at once. Note this example where a figure jumps from building to building in a singular panel (Dixon and Johnson 2003:11):

Figure 5.

Here, an event structure unfolds in full within a singular Polymorphic panel by repeating the singular entity of the martial artist multiple times to show movement. For both E-Conjunction and Polymorphics, the level of the panel cannot be assumed as equivalent to a single narrative segment. In this way, panels serve to facilitate what Leonard Talmy (2001) calls the "windowing of attention." While certain elements in verbal sentences will be considered at the core of the interrelation, others may be pushed to the periphery. By highlighting different parts of the conceptualization, speakers "window" aspects of the overall event frame. A "maximal windowing" allows the full conceptualization of an event to be included into a sentence, though different portions can be "gapped," as shown in these of Talmy's examples (2001: 269):

a. *With maximal windowing*
    i. My bike is across the street from the bakery.
    ii. Jane sat across the table from John.
b. *With medial gapping*
    i. My bike is across from the bakery.
    ii. Jane sat across from John.
c. *With initial gapping*
    i. My bike is across the street.
    ii. Jane sat across the table.

Polymorphic panels can serve to maximally window event frames, while the selection of other levels vary based on the intended representation. For instance, breaking up of a single environment into multiple panels through E-Conjunction can bring focal attention to each of the entities involved, rather than to the scene as a whole. This windowing can be exemplified quite literally by the use of Inclusionary panels, which embed a panel into another panel. While these can be used for many

grammatical purposes, including E-conjunction, marking off a section of a whole image focally distinguishes that element from the larger scene, as in this example (Miller 2000):

Figure 6.

The enclosed panel in this instance literally "windows the attention" by demarcating a space within the representation to focus upon. However, it could equivalently been drawn as a separate Micro panel modifying the initial Macro scene. The enclosure of this modifier within a larger panel — instead of separated in its own panel — again shows how single panels can contain more than a single unit of syntax. In this case, the modifier and "modified" use two panels on a single image.

Thus, while they form the level of analysis for syntax, panels themselves do not represent isolated syntactic units. Regardless of the grammatical role they play — whether as segments of a scene, modifiers, or whole events — panels serve to focus attention on various parts of the conveyed information.

Smaller Than Syntax

Panels may be the most noticeable unit of encapsulation in VL, but very rarely are panels maintained as fossilized wholes that repeat in usage the way that we consider words to be units of a vocabulary. That is, a "visual dictionary" listing of panels might seem impossible to create, since most of them are distinct and unique. By and large, the internal structure of panels seems to change constantly, though productive elements within them might stay the same.

While this creative capacity for panels is dominantly true, some consistent panel forms do exist. This systematization is most exemplified by *Wally Wood's 22 Panels that Always Work*, a "cheat-sheet" of panel compositions created by the legendary comic artist for making "boring" scenes of lengthy dialogue more visually interesting (Johnson 2006):

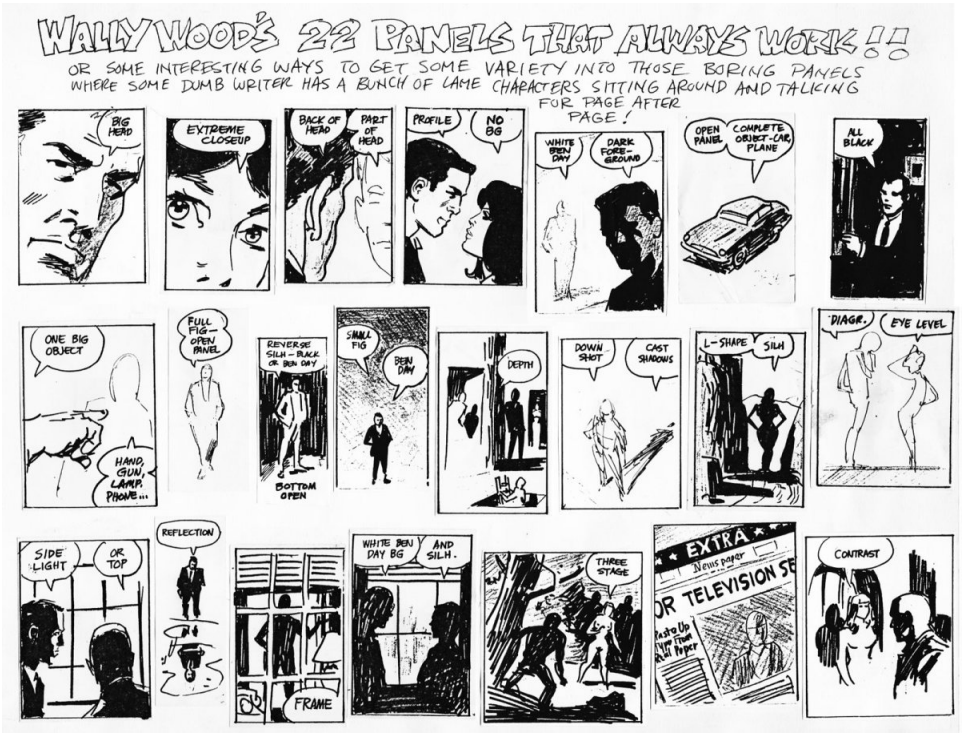


Figure 7.

Years after its creation, an editor at the Marvel Comics company made a paste up of Wally Wood's originals to disseminate to other artists, resulting in countless copies floating around the industry (and now Internet) for several decades (Johnson 2006). While no formal studies have confirmed the reach of these schemas, the spread of this cheat-sheet has led to an acknowledged pervasive use of these panel compositions across authors' works.

While *Wally Wood's 22 Panels that Always Work* provide systematized panel sized units of expression, most remain unconventional in their make-up. As discrete syntactic units, the internal structure of panels is unlike *analytic* languages like English, where morphology — the internal structure of "words" — plays a fairly small role and word forms are both consistent and enter syntax. Rather, VL panels can be regarded somewhat akin to *synthetic* languages like Turkish or West Greenlandic where smaller productive elements combine to form units that enter syntax in various ways. This is not to say that paneled visual languages *are* synthetic or analytic, but that they exhibit a similar method of chunking information into workable units rather than letting meaningful information stand alone as units unto themselves. These two strategies run on a gradation, from those that feature conventionalized syntactic units (*analytic*) to those that use smaller combinable parts to create larger unconventional syntactic units (*synthetic*) (Haspelmath 2002).

Here again emerges the usefulness of not thinking about a lexicon comprising its own structure in the grammar, because parallel processing allows meaningful units to depart in size and be assembled productively in a variety of ways based on the features of the system. This is especially useful for an iconic lexicon, which can vary the representation of entities across panels, though visual features will remain constant. For instance, in this example the same characters persist through many of the panels, and most of the graphic linework for each of them is consistent though it changes in each panel with different perspectives, sizes, and poses (Kibushi 2004, excerpted):

Figure 8.

Even though the overall AUs vary — the unit at the level of syntax — there is still a consistent representational structure depicting the internal parts. These parts have a level of *productivity*, allowing for *creative alteration from a base form* that can then *combine with other forms into a compositional whole* (Haspelmath 2002). These malleable schemata are what seem to be stored in long-term memory, as opposed to full panel units that seem to be constructed online. Perhaps this is one of the reasons that consistent costumes have been favored in superhero comics, because they conventionally schematize an aspect of the character into long-term memory that still allows for variable productivity with regards to the rest of the representation (not to mention across different drawers). This free-form variability departs greatly from limitedly productive signs such as heart symbols or dollar signs, which have relatively little flexibility in their representations (to be discussed shortly).

Not all visual languages are like this though. In the sand narratives of the central Australian Arrernte community (Wilkins 1997), very little additive morphology seems to exist, and most visual signs appear in fixed representations. For instance, because their system maintains a consistent aerial view, a person is consistently drawn in an upside-down U-shape to show the iconic shape of an individual's imprint in the sand. The main variation to this sign occurs when depicting a person lying down, shown instead with a narrow oval (Wilkins 1997:141):

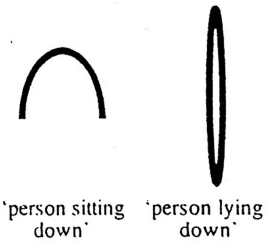


Figure 9.

Because the sand narratives are drawn in real-time, each sign is created and used on its own. From all indications, no synthetic-like conglomerations into attention units seem to exist in Arrernte, and individual signs represent lexical items. Indeed, in this regard Arrernte is closer to English-type morphology than the visual languages that use panels. Based on productive time demands alone, this makes sense. Given the print cultures that panel-using VLs exist in, no demands on interactivity exist for the "visual speaker" to communicate quickly with the "visual listener" (Grice's maxim of Manner), allowing them to create as detailed representations as they wish. In Arrernte, the conventionality and simplicity of the signs aligns with the speed burdens enforced by real-time interactivity, not to mention adapting to the canvas of sand, which does not allow for high degrees of detailed representation anyhow. In contrast, pencil and ink on the portable surface of paper facilitate a vastly different relationship between producer and receiver. These aspects of time demands and media of expression bring up important concerns regarding the ecological and pragmatic contexts affecting the structure of the visual lexicon.

At the same time though, sand narratives are not wholly restrictive to the possibility that larger concatenations of signs can occur. Anthropologist Nancy Munn (1986) reports that the Australian Walpiri community use a very similar system to that of the Arrernte. She describes that certain element combinations occur at great frequency. For instance, while elements such as the U-shaped person might be used on their own, they also might be consistently paired with an object to create what Munn calls an "actor-item" (1986: 81). While these pairings might be as simple as a man with a spear, others become more complex to convey a large amount of narrative information. Sometimes, particular combinations of elements are highly idiomatic with specific fixed meanings, such as a specific way of drawing a man throwing a spear at a kangaroo, while other patterns on their own are ambiguous to their broader meaning without the context provided by the multimodal narrative. These complex patterns and basic actor-item pairs hint at some degree of morphology and idiomaticity in sand drawings.

Additionally, visual languages contain less malleable signs that cannot enter into syntax directly at all. These visual signs range from word balloons and thought bubbles to stars or hearts hovering above heads to show pain or love respectively, to sweat drops to show exasperation. Since these types of signs are often highly conventionalized, they often vary per culture (McCloud 1993:131, Shipman 2006), though they also might connect to deeper level cognitive processes (Talmy 2001:125, Forceville 2005).

While some focus has been given to identifying these conventions (see McCloud 1993, Walker 1980), little work has probed how these signs interact with and modify others. While most productive signs simply combine in ways that reflect iconic scenes, like other linguistic aspects of morphology, many of these conventional

signs alter an already existing sign, either through replacement or attachment. For instance, path lines affix to objects, appearing most often to show the progression of motion as "speed lines." These are "bound morphemes" since they cannot exist independently of a root object that they are modifying:

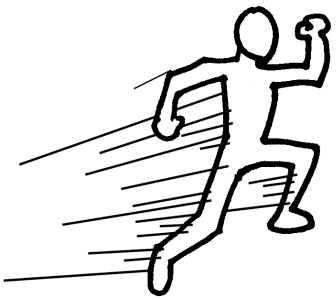


Figure 10.

Without connecting to a "moving root," speed lines could not convey the meaning of movement. In some cases, this depends on the depiction though. Path lines placed in the middle of a panel with no object might seem unusual, but those extending into the side of the frame might index that the root has gone out of view of the panel.

Path lines represent unseen aspects of the visual representation, and can range from depicting a trajectory attached to a moving object, to the fictive representation of smelly objects with wavy lines, to lines emerging from a mouth to show the path of air traveled in a breath. All of these elements are "invisible" in any "realistic" visual sense, emerging graphically only as conventionalized symbols (McCloud 1993).

Other "invisible" bound morphemes include types of "Carriers" such as speech balloons or thought bubbles, which link to a Root "speaker" or "thinker" through a Tail (Cohn 2003). These types of interfaces between word and image integrate the content of the Root and the Carrier to create a unified semantic bundle.

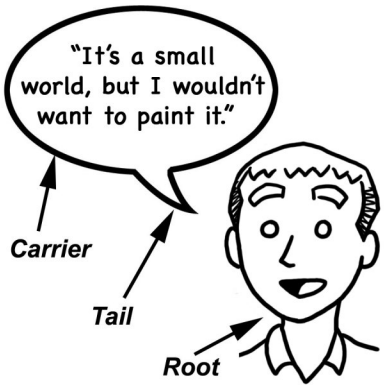


Figure 11.

Indeed, since Carriers can convey the expressive power of an entity's thoughts or speech, they are able to distribute animacy to anything they attach to. A thought bubble connected to a rock or chair immediately makes that object a "thinking being." This is different from interfaces that use Carriers unattached to any Root in the image, appearing as "narrative captions," and therefore are "free floating morphemes."

In contrast, heart symbols have much greater flexibility than Carriers in the way they enter into representations, though they present non-perceptual abstract concepts. Hearts can float around people to convey the general emotion of love or they can serve as the shape of an entire panel as an overarching semantic modifier. They can also be substituted into the eyes of a character to reflect desire felt for the object in vision, yet the syntactic component is still the entire figure, as in these examples by Derek Kirk Kim:

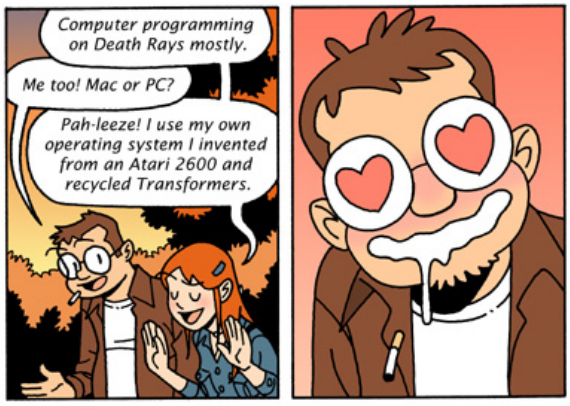


Figure 12a. (Kim 2001)

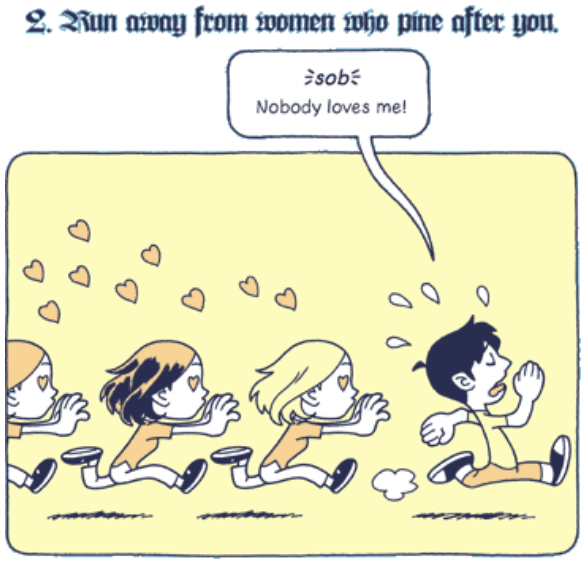


Figure 12b. (Kim 2004)

In all cases, the heart symbols contain semantic information that is important to the overall meaning yet does not directly influence the overall structure of the scene, which is still dominated by the iconic features. Of course, this could change if the *whole* positive element was a heart that underwent some sort of predication (such as a heart in one panel getting an arrow shot through it in the next), yet this seems to be an exceptional case to regularized usage. Note that this sort of "grammaticizing" of a morpheme would seem very odd if applied to an abstract and fully bound morpheme such as path lines. Turning speed lines into "characters" would be far more difficult than creating a grammatical entity out of a heart symbol.

The productive sign of the human body often allows several places into which parasitic signs can provide extended meanings. Besides hearts, "suppletion" into the eyes can use various signs, including Xs (lack of consciousness or pain), spi-

rals (hypnotism), stars (desire of fame), and dollar signs (greed). The space above the head also allows several attached signs beyond hearts, like stars (pain), gears (thinking), exclamation marks (surprise), question marks (curiosity), circling birds (wooziness), dark scribbles or rain clouds (bad mood), bubbles (drunkenness), or light bulbs (inspiration). All of these signs use a specific place to modify the meaning of the base sign of a person, and none of them could do so without being attached to that root. Indeed, the distribution of where signs are put can change the meaning of the sign. While hearts retain the meaning of love or lust no matter where they are placed, stars mean different things based on whether they are in the eyes (desirous of fame) or above the head (feeling pain).

This distinction between productive signs (like human figures) and conventional symbols (like heart symbols and speed lines) can be likened to the linguistic distinction between open and closed class lexical items (Talmy 2001). Morphemes that are considered to be open are usually in a large class that is augmentable, while a closed class is generally limited and fixed. The difference here is usually drawn between "lexical" morphemes such as nouns and verbs, which are open and productive, while "grammatical" morphemes like prepositions belong to a closed class that is small and unchanging. While they do not necessarily play the same roles grammatically as Talmy's observed categories, broadly conceived, productive signs clearly seem to belong to an open class of visual signs while conventional symbols occupy a closed class, making the VL lexicon similar to other forms of language.

By and large, in the context of VL, these two classes of lexical items seem to take on semiotic peculiarities as well. For instance, closed class items such as hearts, speed lines, and word balloons all contain a higher degree of symbolism than far more iconic images of the human figure. It should be unsurprising that more iconic (and productive) elements tend to fall into an open class, since perceptual input can provide an unlimited array of potential objects and/or variations on those objects. Though icons can allow conventionality (such as the *smiley face* ☺, or many Arrernte signs), symbolic signs *must* be conventional.[8] Indeed, altering symbolic signs would be far harder than altering iconic ones, since they draw their meaning from communally agreed upon conventions. As a result, symbolic signs are forced to be more entrenched, and thus fall into a closed class category of morphological items.

Again, these components of individual images are not proposed as the equivalent to verbal words or morphemes, but the signs that construct panels and those that build words both constitute meaningful units below the level of larger syntactic units within their respective systems. In both cases, these signs might attach within or outside of other signs to alter the overall meaning. In the case of the visual signs, these elements contribute to the construction of the panel sized attention units (with limited productivity in the Australian signs), while in and of themselves they are below the level of syntactic analysis. Yet, as form-meaning pairings that contribute to the meaningful expressions of visual language they still remain a part of the visual lexicon.

[8] See Peirce's (1931) distinction between Legisigns and Sinsigns for more on the distinctions in conventionality of symbols versus icons and indexes.

Constructions

Constructions are form-meaning patterns in language that vary in size, and can include lengths longer than individual words. For example, the productive construction *verb - Noun Phrase - away* licenses both a verb and a direct object, manifesting in sentences such as *Bill slept the afternoon away* and *We're twistin' the night away* (Jackendoff 1997). Constructions can even reach the size of full length sentences, such as *The more you think about it, the less you understand*, which has an awkward syntactic pattern that seems to be stored in long-term memory (Goldberg 2003).

At present, not enough is known about visual language grammar to be able to identify any visual-only constructions similar to those in spoken language. While Polymorphic panels do enter the grammar at a higher level of syntax than Monos or Macros, they are still not constructions in the same way as idioms or other patterns since they are still generally built productively. That is, Polymorphic panels are not entrenched patterns. However, this does not mean that the potential for constructions does not exist in visual language, and we now turn to examining some contexts that herald this likelihood.

One consistent pattern across bimodal text/image syntagms seems to have emerged in what comic artist Neal von Flue has coined as the "set-up – beat – punchline" (SBP) pattern for comic strips (von Flue 2004). It begins with one or two panels "setting up" the humorous dialogue or situation, only to then give a "beat" or "pause" with a panel that has no text in it. Finally, the last panel delivers the punchline of the joke:

Figure 13a.

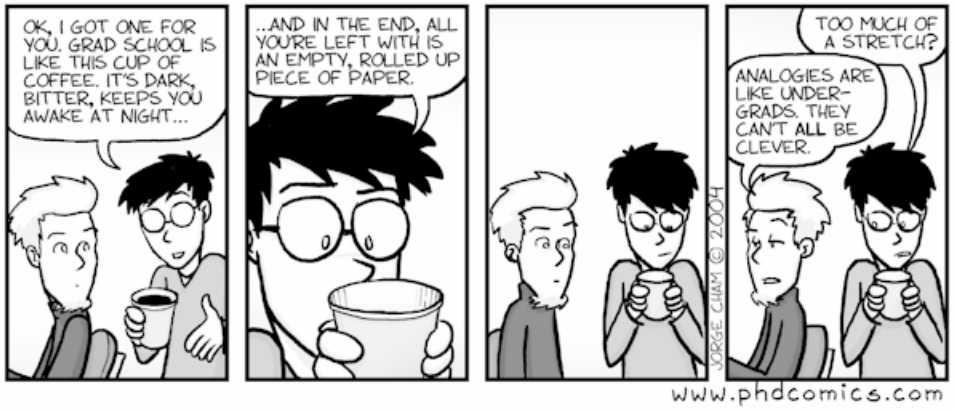


Figure 13b. (Cham 2004)

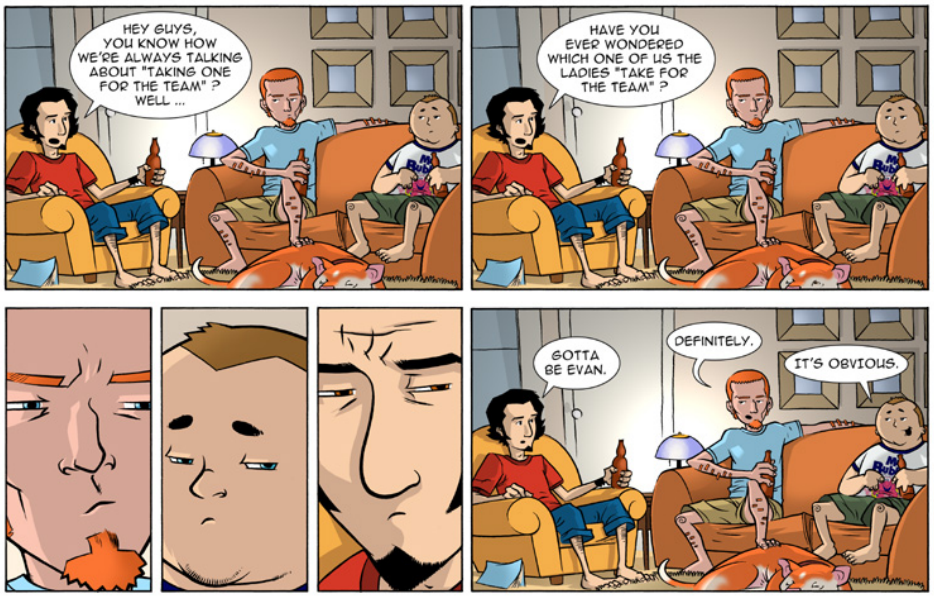


Figure 13c. (Pérez and Coughler 2003)

By all indication, it is difficult to state outright that the SBP pattern matches any pairing just between VL grammatical categories and an overarching constructional frame, because of the heavy meaningfulness of the text. However, it does still seem subject to certain syntactic principles. For example, in (13c) the beat segment is broken up into three separate panels for each of the different characters in the scene. Here E-conjunction seems to function with regards to this bimodal narrative pattern. Indeed, it would be difficult to identify visual syntactic categories since the first, second, and last panels are nearly identical — thereby lacking any *visual* syntax through change between them — which allows the text to dominate the semantics completely (see Cohn 2003). Moreover, the construction itself relies on the text for its effectiveness: the beat being the distinguishing characteristic of the construction and *defined* by the *absence* of text. This intertwining of the narrative pattern with syntactic phenomena and bimodal expression hints to close connections between these structures, and bears investigating in future research.

Though constructions dominated by visuals have yet to be discovered across a broad usage, the potential for their creation is certainly apparent in local contexts. For instance, in early 2005 the *Chicago Tribune* launched an advertising campaign that utilized several comic strips to convey the usefulness of different sections of their newspaper. All of these strips followed the same pattern, with the first panel proposing an initial state, the second panel showing the character reading the newspaper (which is marked with the only text in the sequence), and the final panel providing some alteration to the first image. A small sample of these include the following (Chicago Tribune 2005):

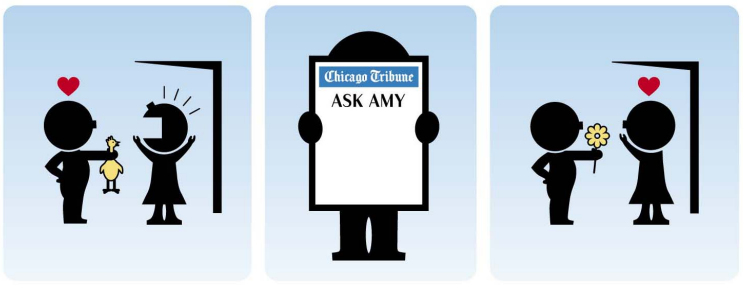


Figure 14a.

Figure 14b.

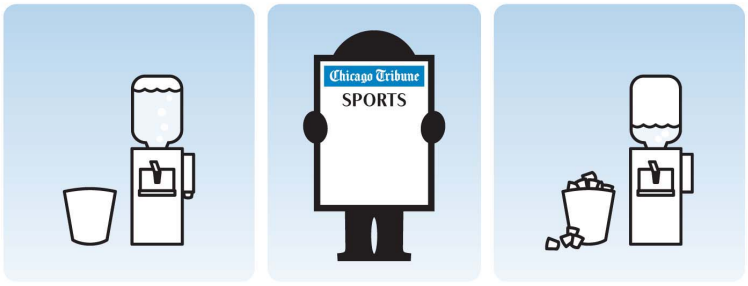


Figure 14c.

The constructional makeup of these examples should be clear. The first panel sets up the situation, the second represents a causative force, and the third the resultant effect of the causation. Schematized, it could look like this:

Initial state — Causative [reading of paper section] — Resultant state

Although the strip does contain text that is essential to its overall meaning, it is still dominated by the visual syntax. Once the pattern is understood, familiar readers can make expectations about the relationship between the first and last panels, knowing that the second panel always expresses some causative force based on the section of the newspaper. This becomes evident just in these examples. While (14a) and (14b) depict a clear narrative progression with individuals and their actions permeating every panel, (14c) does not have as transparent a reading. The character with the newspaper in panel two only appears in *that* panel, and the watercooler serves entirely as a metonymic representation for the overall concept conveyed in the strip: “if you want to have something to talk about at work, read the sports section.” Here, the second panel only has a causative meaning to it, giving the strip as a whole a conceptual rather than narrative basis of semantics. Without that causative meaning, the apparent narration is that a man reads the newspaper while the watercooler becomes emptied — hardly a connected event. Truly, the figure in panel

two does not represent an individual either; it stands for a conception of people in general who could read the paper, especially since more than one person is required for watercooler chatting. If constructions are possible, these strips might hint at the type of routinization necessary for such entrenchment to occur.

Based on these examples, the potential for constructions in visual language and across bimodal visual/verbal language seems quite evident. Indeed, since VL in actual usage most often occurs with writing, it would make sense that bimodal constructions might be possible, yet bears further investigation. No matter what though, they show that patterned representations beyond individual panels does exist in the graphic form.

Conclusion

In sum, like spoken language, visual language contains a variety of sizes of "lexical items" that combine across several levels of grammar to create meaningful units and constructions. This approach to visual language has strived to avoid stating that graphic structures are likened to surface features of verbal language, instead attempting to note the functional similarities in base structure within each respective system. As such, nowhere has this visual language been directly equated with the verbal constructs of "word" or "morpheme." Rather, a "lexical item" is defined as *a meaningful unit or combination of units of form-meaning pairing* that can be either productive or non-productive. Note that in "form-meaning" pairings, there is no restriction on the semiotic quality of the signs. A lexical item can potentially be symbolic, indexical, or iconic, all of which occur in visual (as well as verbal and sign) language, and motivate inclusion into either open or closed classes of morphemes based on their potential for manipulation. As would be expected, productive signs create a far larger class of lexical items than those that are less malleable.

In most visual languages of the world, panels are attention units built out of a large amount of rich productive morphology that can combine in various ways, though this is not absolute. Systems like Australian sand narratives feature highly conventional signs that seem to stand on their own as syntactic units. Finally, like patterns pointed out in construction grammar approaches to linguistics, VL also seems to show the potential for form-meaning pairings of lengths greater than individual formatives.

The comparison of the graphic form to language has often grappled with how best to equate one to the other. However, perhaps more fruitful than searching for words and sentences within images is to examine how words and sentences function as structural elements *within their own system* and compare *that* to the graphic form. Doing so not only could reveal correspondences between forms that appear to have very different semiotic characteristics on the surface, but might also provide windows to broader functioning of the human cognitive system to which language, graphics, and semiotics all belong.

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Semiotic Machine

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Preliminaries

A semiotic machine, no matter how it is embodied or expressed, has to reflect the various understandings of what the knowledge domain of *semiotics* is. It also has to reflect what methods and means support further acquiring knowledge of semiotics. Moreover, it has to express ways in which knowledge of semiotics is tested, improved, and evaluated. Given the scope of the endeavor of defining the semiotic machine, the methodological approach must be anchored in the living experience of semiotics. Accordingly, the cultural-historic perspective, which is the backbone of any encyclopedic endeavor, is very much like a geological survey for a foundation conceived from a dynamic perspective. The various layers could shed light on a simple aspect of the subject: At which moment in the evolution of semiotics does it make sense to make the association (in whatever form) to tools and to what would become the notion of a machine? Reciprocally, we would have to explain how the various understandings of the notions *tool* and *machine* are pertinent to whatever was the practice of semiotics at a certain juncture.

Yet another reference cannot be ignored: The reductionist-deterministic view, celebrated in what is known as the Cartesian Revolution. Since that particular junction in our understanding of the world, the reduction of semiotic processes to machine descriptions is no longer a matter of associations (literal or figurative), but a normative dimension implicitly or explicitly expressed in semiotic theories. Given this very intricate relation, we will have to systematize the variety of angles from which various understandings of the compound expression *semiotic machine* can be defined.

In our days, such understandings cover a multitude of aspects, ranging from the desire to build machines that can perform particular semiotic operations to a new understanding of the living, in view of our acquired knowledge of genetics, molecular biology, and information biology. That the computer—a particular form of machine—as an underlying element of a civilization defined primarily as one of information processing, could be and has been considered a semiotic machine deserves further consideration.

Cultural-historic perspective

Whether the implicit semiotics of the earliest forms of human interaction (pre-language), or the more identifiable semiotics of the most rudimentary representations (in found objects, artifacts, or notations), as well as the semiotics implicit or explicit in tool-making and tool usage, conjures even the thought of a device associated with producing it is a matter of conjecture. Let us agree that a mold, the most rudimentary medium for reproduction of any form of expression, is a tool that contributes to the change from the unique (such as footprints) to the shared and repeatable. For all practical purposes, such a mold is a semiotic machine to the extent that it is deployed to stabilize the nature of human interaction (Haarman 1990; Nadin 1998: 81-88). Sameness in expression (regardless of whether we re-

fer to images, objects, or alphabets, for example) is conducive to and supportive of sameness in action. The timeframe referred to is in the order of 50,000 years, during which language and writing emerged.

The awareness of distinctions between what is represented and why a certain representation (to give but one example, the concreteness of hieroglyphic signs, around 3100 BCE up to around 400 CE) better serves a certain purpose (contracts, teaching and learning, memory) is expressed in the tools utilized for reaching the respective goal. This semiotic awareness is initially implicit in the act of using signs. When semiotic means, in their most rudimentary form, become part of what we call learning, semiotic awareness becomes explicit: how to generate signs better adapted to the task at hand. While we do not suggest that at that time there is an awareness of the machine—a concept to emerge well after writing is acknowledged—there is definitely an understanding, through the use of tools, of how to transcend differences in order to achieve sameness, based on which a more effective pragmatics is possible.

The emphasis is on tool-based operations that make something possible, that enable, that assist. When the words that eventually lead to *machine* appear, as an expression of the pragmatics they will embody, such words—as in the Ionic Greek *macho*s, or *macham*a in the Doric Greek—will refer to *way* (of doing something), *assist, be able*. They are an extension of the tools deployed in a variety of human activities. Eventually, the Greek words were assimilated into the Latin (*machina*), and from there, to our days, into many cultures and languages. As testimony of that particular time makes plentifully clear, the emphasis on the use of means—what today is called *media*—is on making sameness possible, and ensuring that learning is facilitated.

Epistemological perspective

Pragmatics—the same factor that leads to dealing with representations, as well as with experienced reality—leads also to the progressive awareness of what eventually becomes semiotics (in its many variations). That is, we focus precisely on what individuals and groups do, i.e., on their practical activity (Nadin 1998). This unfolds predominantly in the physical-object (e.g., the lever extends the arm) and direct-action domains. It also extends over a relatively long time (anthropologists count ca. 10,000 years between the first rudimentary tools and the initial use of representations (Gombrich 1954) inthe realm of sign-based activities (without an underlying concept of sign, of course). The evolutionary advantage of any form of mediation—the "something," material or non-material, between the subject of activity and the individual(s) involved in an activity—is not self-evident. Therefore, the process through which sign-based practice expands is also relatively slow. But in each representation, those generating and using it express knowledge. This knowledge is mainly short-lived and pertinent to the circumstances. But this does not change the fundamental fact that what we call *epistemological motivation* is dominant among many other factors, such as communication intent, initial social instinct, and sexuality.

The dominant epistemological motivation is also confirmed by the need to share. This is a major factor in the progressive increase in the efficiency of human activity, and thus, also of evolutionary impact. If indeed knowledge acquisition drives, in very limited ways, the semiotic animal (*zoon semiotikon*, cf. Hausdorf 1897:7), it follows that the sign gains the status of a conceptual tool. Moreover, every tool,

as an expression of knowledge pertinent to the action in which it is utilized, is a machine *avant la lettre*, at least in the sense of the very initial understanding expressed in the words from which our concept derives. The assistance provided by a conceptual tool, its way of aiding in the action, is easy to assess, even in retrospect, if we consider how imagery, sound (rhythms, in particular), tactility, smell, and taste partake in the "semiotics in action" of our early ancestors. Each semiotic instance is one of knowledge—explicit or implicit—and of interaction, including the interactions that result from sharing, stabilizing, comparing, learning, and teaching. The *quipu* of the Incas (Ascher and Ascher 1981) or the Ishango bone (Zaslavsky 1979; Bogoshi, J. et al 1987:294) cannot be compared to Napier's bones (an abacus using rods, cf. Napier 1617). Neither can the primitive semiotic machine embodied by a mold, or by the bamboo slips (dating back to 2200 BCE) used for record keeping in China (cf. People's Daily On Line, 2005) be compared to the computer. Still, they have in common the epistemological status of the practical human activity that made them possible at a certain moment in time. They testify to the knowledge of the persons using them. The connection between the ontological and the epistemological dimensions of human existence justifies the attention we give to the prehistory of the semiotic machine.

Gnoseological perspective

The abstraction of knowledge and the ways of acquiring knowledge are not the same as knowledge, as such, involved in our practical activity. The difference is more evident when the knowledge is generated not only in direct interaction with the surrounding world, but also from the mediated semiotic effort *per se*. In the process of deriving knowledge from representations, human beings not only become aware of their own abilities, they also affect these abilities. They witness their own change, since working with signs affects their own cognitive condition. The fact that human beings are existentially their own signs leads to a genetically enforced cognitive and neuro-anatomical condition that makes the semiotic component part of the thinking identity of the species (*homo sapiens*). But to think is to process, and in hindsight, a machine is nothing more than an embodied processing function, or several such functions, somehow coordinated. Among the first sign-tools, the lever, like the wheel, enables those conceiving them to perform some operations otherwise close to impossible (e.g., lifting heavy objects), and also to reproduce such operations for the same or similar purposes, in different locations, using different levers or wheels. The lever as a sign stands not for similar pieces of wood, but for similar actions (i.e., of leveraging, involving an extended "arm"). The entire history of early semiotics (Plato, Aristotle, the Stoics, cf. Borsche 1994) is one of repeated confirmations of the practical nature of the sign-focused experience. Water, fire, and wind afford the energy that drives elementary tools as these turn into semiotic devices, too. The studies of signs in the Middle Ages (Augustine, Boetius, Anselm of Canterbury, Roger Bacon, William of Ockham) accommodate a conception of the sign in which signification and how this is produced take the center stage (cf. Borsche 1994; Engels 1962; Fuchs 1999; Howell 1987; Jackson 1969; Jolivet 1969). They are the "elements" making up the world, and the subject of all those changes brought about since ancient times to the living environment. When relatively late in time (1673) machine means "a device for applying mechanical power," and "appliance" (for military purposes), the semiotics is embodied in various parts (e.g., levers, wheels, pulleys) synthesized in an entity that

never existed before. It was produced with the help of a form of thinking impossible without the underlying semiotics of representations. Again, the many meaning variations—around the same time, *machine* even defines the components of a sexual act—are ultimately a testimony to the gnoseological effort, and also to what it actually afforded in terms of new knowledge and new practical experiences.

The pendulum is a machine that compresses knowledge on gravity, the close cosmos (day and night cycle), numbers, levers, wheels, transmissions, and friction, among many others aspects. It is also a semiosis (sign process) that embodies a particular characteristic of the abstraction of time, i.e., duration, interval. The pendulum serves many functions. It can be programmed (even in its most primitive form), and it can even learn, as the most ambitious clocks of the time show. Still, there are many layers of discontinuity between such very early machines and our new understanding of the machine. Moreover, a fundamental gap, represented by a conception of the world as ambitious as that expressed in Descartes' *Method* (1637), along with the animistic view of the world expressed by Aristotle and his followers, marks the change from an intuitive empirical understanding to a systematic gnoseological approach defined as rationality.

A beginning and an end

Amply documented, the Cartesian Revolution can be summarized as

1. a method—reductionism—for dealing with complexity;
2. a conception—determinism embodied in the cause-and-effect sequence;
3. a unifying view—the machine as a prototype for the living. In this respect, Julien Offray de La Mettrie (1748) is even more radical than Descartes.

These aspects need to be understood in their unity. They seem to be as far removed as possible from semiotics; and upon superficial examination, they might appear irrelevant to it. Indeed, in projecting an understanding of the world that corresponds to an advanced model of physical reality, Descartes deals with knowledge, and its acquisition, from a deterministic perspective. The reader of his work is eventually confronted with what Descartes (1684) called *mathesis universalis* (in the "Fourth Rule for the Direction of the Mind;" from the Greek *mathesis*: science, and the Latin *universalis*:), which "explains everything," involving in the procedure not only numbers, but also shapes, sounds and any object whatsoever. The philosopher and mathematician let us know that he hoped "that posterity will judge me [Descartes] kindly." This continues to be the case, even as science reaches the limits of his encompassing conception of all there is, and criticism of the Method increases.

Indeed, when things become complex, reduction to constitutive parts helps. Again indeed, many sequences of a clear-cut cause followed by an effect confirm his conception. Moreover, the machine metaphor successfully guided humankind into the Industrial Revolution, and into the civilization that benefited from the "machine of literacy" (Nadin 1998:231-239). But within this encompassing model, semiotics was either integrated in the *mathesis universalis* or in logic; or it was reduced to linguistics. And the implicit understanding of the semiotic machine, as an instantiation of knowledge acquisition and dissemination, was subjected to the exigencies of mechanical functioning as opposed to living processes.

This is by no means the place to restate the various forms of criticism to which reductionism and determinism are exposed in our days. This is, however, the place

where one can and should realize that the notion of *machine* since Descartes is very convincing in respect to functions related to the physical, but void of the fundamental characteristics of living processes. Semiotics-based human activities are representative of the entire being, not only of its physical substratum. In fighting for the emancipation of philosophy and science from the *force vitale* that explained the living, at least since Aristotle, Descartes and the scientists who followed him adopted a view of the world based on a rather limiting form of rationality. The limited understanding of causality was acceptable in a context of minimal interactions. After Descartes, signs could not be more than or different from what the senses conveyed to a mind—he did not know of the brain; his drawings point to the "pineal gland." And the mind would operate like the machines of his time. In this respect, the Cartesian perspective is a beginning, anchored in the world of perceptions and apparent causality.

Hence, Descartes' *mind* could not conceive of comprehensive sign-based processes reflecting the complexity of human interactions. The sign processes in the Cartesian tradition cannot be other than those we associate with the rudimentary machines of his time. This is why, in examining semiotics and its epistemological condition, we must realize that the entire development of a theory and practice of signs shaped by Descartes is unavoidably reductionist and deterministic; and the semiotic machine associated with it is accordingly limited in scope. This statement does not exclude the various attempts, known from the history of science and philosophy, in particular the history of semiotics, to render the Cartesian view relative, or even to attempt alternate views (reference is made here to developments such as quantum mechanics, genomics, and to views advanced by Leibniz, Locke, and Peirce, to name only three semioticians).

In the Encyclopedic tradition, acknowledgment of the Cartesian perspective is a necessary condition for understanding the successive definitions of *semiotics*, *machine*, and *semiotic machine*. Within the same line of thinking, we need to take note of the elimination of the final cause (*causa finalis*) from among those pursued in the rationalism inspired by Aristotle's work. While the analytic dimension of semiotics is marginally affected by the elimination of a teleological dimension of the sign (the possible causations), the generative dimension becomes rather limited. Purpose is removed from the realm of the possible to that of the contingent. The machine, in its physical embodiment, accepts the future only in the form of failure. The breakdown of any part of the machine brings the whole to a stop; that is, the future state affects the machine's current state as a potential action, not as an effective factor. In this respect, the Cartesian view is an end. While we can indeed explain, to a satisfactory degree at least, the physical world as one determined by its past, the living is determined by its future, as well. Diversity in the living is never the exclusive result of deterministic processes. Non-determinism explains the implicit creativity of the living as a never-ending process of producing identities that never existed before (cf. Elsasser 1998:91-95).

All these considerations are meant to guide the reader in further examining the many different understandings of *semiotic machine* within the variety of semiotic endeavors leading to current semiotics.

Historic perspective

Along the diachronic axis of semiotic doctrine, the focus continuously changes from the sign in its generality (reflecting the variety of sensory perception) to the

sign of language. The most impressive progress was actually made in linguistics, to the detriment of any other domain involving or facilitating sign processes. For this entire development, it makes sense to point out that the syncretic semiotic machine becomes a linguistic machine. Ferdinand de Saussure's admirable work in linguistics guided him towards the observation that the sign might be a concept of an abstraction higher than the abstractions he used in dealing with language. He introduced *semiology* (at the end of the 19 th century and the beginning of the 20 th, taking a decisive step best defined in his own scarce words. Today, cognitive scientists are hard at work in dealing with semiotic matters, even when they are not explicitly identified as such. It might not have crossed Saussure's mind that there could be a science whose knowledge domain would transcend the various kinds of signs on whose basis the human being engages in practical experiences. But he was aware that, at least from his linguistic perspective, the language system of signs was dominant (Saussure 1983:15-16).

The paradoxical nature of the relation between the two sides of a coin, one signifying and the other being the signified, leads to an unexpected view, not necessarily beyond the Cartesian model, but definitely challenging it. The arbitrariness of the signs and their mutual formal relations—making up a language—are sources of change in the system. In some unexpected ways, this two-sided relation can be associated with a machine yet to be defined—the Turing theoretical construct, of later years, a hypothetical computer with an infinitely long memory tape. But we do not want to add to Sausurrean mythology. The scientific condition of linguistic elaborations, for which he argued in a context in which language was mainly a subject of history-based analysis, justifies the thought expressed above. Furthermore, the many contributions that his initial ideas prompted (the famous Prague School of Functional Structuralism, the Tartu School, Russian Formalism, among others) justify *a posteriori* the suggestion made in relation to the Turing machine. It should come as no surprise that this aspect will eventually lead to a "cultural machine," or "text machine," endowed with self-control functions (inspired by Norbert Wiener's cybernetics). Yuri Lotman (Tartu School) paid quite a bit of attention to modalities of cultural productions, i.e., generative procedures (Lotman 1990). Indeed, when using the metaphor of the machine after Descartes, we no longer relate to *assistance*, *means*, or *enabling procedures*, but to generative processes. More than anyone else, Noam Chomsky, definitely not inclined to acknowledge any intellectual affiliation with semiology or semiotics, gave the notion of generative procedure a more effective embodiment (Chomsky 1959).

To rewrite the history of semiotics from the perspective of the semiotic machine might afford some surprises. One is the realization that Saussure's paradoxical metaphor is *in nuce* equivalent to a Turing machine. Another is that generative thought, extended from the sign to vast sign systems (such as culture, or text) suggests that, epistemologically, the machine metaphor remains a powerful representation that can assist us in a constructivist understanding of such complex systems. But in the end, the historic account of variations changes the focus from the semiotic machine as such to the variety of embodiments manifested over time, and frequently practiced without questioning the premises on which such embodiments were based. In retrospect, the tradition of semiology reveals that its implicit dualistic structure leads to a synchronic perspective, and therefore the semiological machine is of limited dynamics. Without bunching together what remains distinct in many ways, neither Hjelmslev (1968: 175-227) nor Greimas (1966), nor the French

school (Barthes *et al* 1964) transcended this model in their elaborations. One semiotician, Roman Jakobson (1979:3-18), with a tent set up both on the continent of synchronic semiology and on the dynamic semiotics, realized the need to bridge between the two.

We can only suggest that, in order to deal with the implications of the semiotic machine that emerges from Peirce's semiotics, every effort should be made not to repeat the error of making his ideas less complex, and hope that they thus become more palatable. Morris (1938) was the first to trivialize Peirce; and since the time of his elaborations, many scientists (some of undisputed reputation) worked on a version that resembles the original as much as articles in the *Readers Digest* resemble those from which they were derived. The triadic-trichotomic sign definition (and structure) makes references to the icon, or symbol (the representamen domain) absurd. There is no such thing in Peirce. A semiotic procedure, described in detail, is used to generate the ten classes of signs (cf. Peirce 1931, 2:264, MS 540-17). Accordingly, a semiotic machine of triadic-trichotomic resolution is actually available in the Peircean text. Formal descriptions of the procedure have been given (Marty (1990); Richmond 2005; Nadin 1978, 1981; Farias and Queiroz 2003:165-184), thus providing all there is necessary for actually constructing such a semiotic machine. Parallel to this line of thinking, there are dimensions of the Peircean system, in particular, Peirce's phaneroscopic categories, and moreover his diagrammatic thinking elaborations, conducive to different types of machines. And there are various articles inspired by the early attempts to build actual machines, as inference engines or logical machines, in respect to which Peirce (1871:307-308, see also Ketner 1975) articulated a position of principle in 1871 impossible to ignore in our age of infatuation with machines.

In some ways, with Peirce's semiotics we reach the core of the subject, with the still vague realization that the age of computation—i.e., of the dominance of a certain machine—is the age of the *semiotic engine*. Of equal interest, although of less notoriety among semioticians, is the contribution of George Boole (1854; cf. Boole 1958:24-39). In a chapter dedicated to the notion of the sign in general, he started with what he perceived to be an undisputed statement: "That Language is an instrument of human reason, and not merely a medium for the expression of thought, is a truth generally admitted." It is a system "adapted to an end or purpose," he wrote, suggesting the systematic approach to signs, regardless of whether we regard them as "representative of things and of their relations, or as representative of the conceptions and operations of human intellect." The formal equivalence between these two conceptions points to a "deep foundation" exemplified, as he put it, in the "unnumbered tongues and dialects of the earth," against the reassuring background of the "laws of the mind itself," (cf. Boole, 1958:24-25).

His definition is constitutive of the mind as the semiotic machine: A sign is an arbitrary mark, having a fixed interpretation, and susceptible to combinations with other signs in subjection to fixed laws dependent upon their mutual interpretation. The three classes Boole defined make the operational nature of his semiotics even more evident.

Class I: Appelative or descriptive signs, expressing either the name of a thing or some quality or circumstance belonging to it.

Class II: Signs of those mental operations whereby we collect parts into a whole, or separate a whole into its parts

Class III: Signs by which relations are expressed, and by which we form propositions.

Not unlike the mind, any machine modeled on Boole's Propositions (which are rules) turn out to be semiotic machines operating in a universe of clear-cut distinctions between Truth and False (conveniently symbolized by 1 and 0). As we know by now, computers are the unity between a language consisting of only two letters and the logic describing the relation between any statements in this very precise, but minimally expressive, language. It is, no doubt, yet again a case of reductionism, from natural language to one of the strictest mathematical formalisms. But it is also the threshold between the materially embodied machines of the Cartesian viewpoint and the first immaterial machine. This machine processes not things, but information, representing "in some form or capacity" (to allude to Peirce's sign definition) things, or even, as our knowledge advances, information about *a lower level of information* and so forth (*ad infinitum*).

At this juncture, it becomes evident that the four letters of the DNA alphabet (A, C, G, and T, standing for Ademine, Cytosine, Guanine, and Thymine, respectively; Watson and Crick 1953: 737-738) represent yet another modality to describe processes, in this case, the intriguing genetic code, and to model the "fabrication" of entities, in the realm of the living, with known or desired characteristics. Descartes abolished the teleological dimension. The genetic engine—yet another embodiment of a particular semiotic engine (coupled to a knowledge domain expressed in the four letters of the genetic alphabet and the generative rules that guarantee the coherence of the genetic semantics)—while not explicitly affirming a final causation, cannot exclude it either. Many other specialized semiotic engines are articulated, as more generative mechanisms, such as the ones characteristic of unfolding stem cells, are discovered and put to practical use.

Accordingly, we have an interesting question to address: If semiotics is a universal science (THE universal science, a statement that, of course, irritates mathematicians), shouldn't the semiotic engine be universal? Or can we consider the variety of semiotic engines, corresponding to particular semiotic descriptions, as part of an open-ended set of machines, each embodying the particular knowledge to be deployed in a particular field? The latter is not a trivial question, to be addressed lightly. The circumstances—i.e., the state of computation and knowledge today—should not prevent an answer that transcends the opportunistic inclination to justify the current paradigm. The methodological aspects to follow will serve as a guide as we further investigate the subject.

Computers are semiotic machines driven by semiotic engines

There are machines that are cranked manually; others are activated by falling water, steam, or gravity; others are activated by electricity. There are biological machines, where processing is the result of biological processes. Given the laws of thermodynamics, machines are not reversible. Processing takes energy; reverse processing would contradict the laws of energy conservation. Together with the expectation of processing, embodied in the machine, comes the expectation of automation—processing that takes place on its own, without the participation of the human being. By no accident, the most abstract machine—the mathematical machine—is expressed in automata theory. An automaton is a mathematical machine that accepts an input, has a set of inner states, and produces an output. For all practical (and theoretical) purposes, this machine is reversible on account of

cognitive energy: that is, it can work in both directions. In proving the equivalence between automata and sign processes (in Peirce's defnition, since all other known definitions are particular cases), a methodological foundation for the entire discussion regarding the semiotic machine has been established (cf. Nadin 1977, 1978, 1981). In a summary of the proof, we can establish that Peirce's definition can be formally expressed as

$$S = S(R, O, I, o, i), \text{ which is equivalent to } A = A(X, Y, Q, \alpha, \beta),$$

in which S stands for sign processes resulting from the open relation among objects, representamina, and the interpretant process; A stands for automata processes; X and Y, respectively, for the signs of input and output; and Q for the set of states. The transition function and the output function describe how output is generated from a certain input. Every automaton is a generative semiotics. Once the equivalence was proven, it henceforth justified the introduction of a notion many times quoted, but never really understood: The computer is a semiotic engine.

A generative semiotics, which is the same as describing a machine that can output sentences and texts, as well as semiotically meaningful visual and acoustic sequences or configurations (Nadin 1982:79-88) can be conceived as a formal description of a variety of alphabets and syntactic and semantic rules. The validity of its output is always pragmatic, i.e., in reference to the human being's practical performance. If a physician, well versed in the semiotic identifiers of an illness, as expressed in medical classifications, can perform effective pattern recognition, we have as output the semiotically relevant entity called a *diagnosis*. Alternative examples: the legal *diagnosis* (performed by officers of the justice system), the weather forecast (generated by meteorologists), and evaluation of the political situation (done by more and more professionals, ranging from journalists to various types of advisors and pollsters). It is by no means surprising that all kinds of analytical performance (such as literary or art criticism, real estate appraisal, military operations, mechanical diagnostics of cars and very complicated machinery, etc.) fit within the same procedure. The more complex operations of generative semiotics—such as how to convey a message using multimedia; how to generate a story, what it takes to make a good game, for one player or for massively distributed situations—also belong to the functioning of the semiotic engine. Synthetic semiotics—e.g., synthesizing new materials while working with chemical symbolism and symbolic processing methods, or synthesizing life from the inanimate, if at all possible—also falls within the scope of the subject. In the final analysis, generative semiotics is the "engineering" of a "semiotic machine" for a given purpose.

After this broad image of what the discussion of the semiotic engine encompasses, it is time, for the sake of implicit goal of any encyclopedic attempt, to focus on the characteristic ways in which computation can be understood as the concrete functioning of a semiotic engine.

Problem solving. Problem generation

Computation—which means processing of semiotic entities—comes in many forms: digital, analog, algorithmic, non-algorithmic, serial (von Neumann's paradigm), parallel, interactive, numeric, symbolic, centralized, distributed—the list is open. To leave these distinctions to scientists and engineers and to focus exclusively on the outcome of computation is probably appropriate, as long as one positions himself or herself in the now established role of user. It should be remarked

from the outset that 80% of what is defined as computation concerns users. Word-processing is the user application that takes the lead; but desktop publishing (which involves text, layout, and computer graphics), database applications (from pre-programmed tax return calculations to keeping records such as addresses, recipes, financial information, to advanced datamining), and more recently networking (e-mail, Websites, Web-publication, remote teaching, cooperative projects, and so much more) make up an increasing complementary set of applications. Some of these applications assume a user different from the one limited to word-processing, but in the end still not a computation professional. Such a professional translates questions (from trivial to scientific) into programs or procedures. Embedded computation, or ubiquitous computing, effectively overwrites the role of the user, and extends the significance of the semiotic machine into the realm of the artificial.

Again, one would be better off leaving a comprehensive evaluation of these particular applications in the hands of those who invented them, since, for better or worse, all that users have to say is that one or the other program still does not work as well as expected, or that the price-performance ratio is in some cases better than in others. Computation users are merely the most cost-efficient quality control agents ("debuggers") of a very interesting science and technology that the term *computation* denotes, but by no means describes. Ideally, computation is an expression of knowledge, in the forms of algorithms, processing procedures, interactions, programs, etc., subjected to a wide variety of tests. It embodies the positivist expectation of validity, effectively erasing the distinction between science and humanities. It claims universality and is, together with its twin sibling genetics, constitutive of an epistemological horizon of unprecedented characteristics.

As has been established so far, a semiotic engine drives the computer. Boole's contribution to this was already highlighted. If the assertion that the computer is ultimately a semiotic engine, or machine, should be of any consequence both to semiotics and to computer science, the initial limitations of the proof of equivalence between the most general sign description and the automaton need to be overcome. Moreover, the consequences of such a statement should become clear, if indeed there are consequences to be expected beyond giving semiotics that much needed boost of credibility, without which its future relevance outside academic endeavors remains, as always, doubtful. Let us address these two requirements, not only for the sake of addressing them—intellectual goals often end up becoming relevant in themselves, but of no consequence for anything else—but foremost because, if they can be clearly pursued, neither semiotics nor computer science will remain the same. This assertion is of a tall order and poses many challenges to those interested in and willing to pursue its consequences.

Indeed, the semiotic machine as *problem-solver* gives the correct answers to questions of well-defined relevance: the red light means "Stop;" a company's brand carries information about its various dimensions (e.g., local or global, trustworthy, market acceptability); a text unfolds around its narrative focus. When we solve problems, we are often after a rationalist justification. But there is also the *problem-generation* component to semiotics, enlisting empirical testing and triggering behavioral change. In the rationalist domain, we focus on generating new ways of thinking and new values expressed in behavior. Algorithmic computation is problem-solving. Interactive computation is based on empirical ways of acquiring and expressing knowledge. The semiotic engine, as the unity between the two, handily

transcends current computer implementations that are not yet capable of unifying the two modes of acquiring and expressing knowledge presented above.

Computation is knowledge

Regardless of the type of computation considered, there is one characteristic that they all share: the outcome is an expression of something that could not be explicitly identified before the process took place. All the ingredients in the process—digital alphabet, Boolean logic, data, instructions, memory management, process and user interface—can be described in detail, and still the outcome cannot be predicted. (Otherwise, we would not go through the effort of producing it.) What matters is the process. Therefore, to compute means to design a type of processes fundamentally different from those we are familiar with from physics, chemistry, biology, and other sciences. Computation can unfold on virtual or on real machines, in machine-based time or in (almost) real time, in single or multiprocessing sequences in sequential or parallel machines, in neural networks or in a genetic medium (DNA or genetic computation). What counts is its inherent dynamic condition, as well as the fact that knowledge is generated at the intersection between the semiotics leading to human cognition and the semiotics underlying machine-based cognitive functions.

This knowledge can be of various kinds, like human knowledge itself. To be more specific: word-processing is the knowledge of all the elements involved in generating and disseminating texts. It is primarily a comprehensive theory of all the variables involved in the human or machine experience of generating texts in a context of acknowledged rules that embody grammar, syntax, etymology, linguistics, as well as rules for structuring and presenting ideas in written form. This theory, still in the making, is embodied in particular programs that allow for spell checking, for instance, or stylistic refinement, or for various visual forms of structuring (through layout rules, for instance). Its use is neither more no less than the test of the text knowledge embodied in the model of a specific computational word-processing implementation. As people use this knowledge, they test it beyond everything a particular person or group (developers) could even imagine.

However, at this moment in the development of computation—a relatively young discipline, whose main products are still rudimentary—knowledge generated in computation processes is predominantly acknowledged outside the process, i.e., in the interaction between human beings and the machines supporting these processes. In other words, like the abacus, the computer does not know right from wrong, and even less, significant from insignificant, meaningful from meaningless.

Instead of revisiting the formal descriptions of the various types of computation known so far (many more will come, if we consider the extraordinary multiplication of means and methods dedicated to computation), and inferring from such descriptions to sign processes (in Peirce's sense, or in some alternative fundamental concepts of semiosis) and vice versa, let us take an alternative path. Under the assumption that computation is knowledge pertinent to a new moment in the evolution of the species, and in the knowledge that there are no known cognitive processes whose underlying principle is not semiotic, it follows that the statement, "The computer is a semiotic machine," does not need to be formally further pursued, since it is the necessary consequence of the condition of computation. Granted, the assertion might be weakened if someone could come up with a type of computation that is not knowledge-based, but even if one could produce such an example, it

would not automatically exclude semiotic processes, but rather prompt more adequate definitions of what we call *semiosis*.

The point we are trying to make is far from trivial. Many scientists, technologists, and semioticians consider computers a technology, and what happens in a computer, a matter of moving electrons, heat dissipation, and electromagnetism, i.e., physical processes. They are not totally wrong. After all, computation as process does not happen in a vacuum (after the disappearance of vacuum tubes, this sentence holds true even in the literal sense), but with the participation of matter (organic or anorganic), or better yet, at the meeting point between matter and human cognitive capabilities.

In one of his famous statements (probably quoted as frequently as his theory of relativity), Einstein declared: "It would be possible to describe everything scientifically, but it would make no sense. It would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure." Up to a certain point, Einstein was right. Indeed, electronics—the science and technology of all that made computers possible—is a necessary but no sufficient condition for computation. All the circuits can be perfectly designed and produced, the power supply in good order, and the input and output devices correctly integrated, and still there would be no computation at this stage. Something else, of a higher order (if we agree to accept that abstraction is of a higher order than the concreteness of matter) makes the function of computation possible. Alternatively, a situation in which we have no machine whatsoever, but in which we conceive a program and execute it mentally or on paper (granted, slowly, step-by-step, with many intermediate steps), can be seen as computation, insofar it is part of a cognitive process involving a representation, a logic, data, and instructions applied to them. "No machine whatsoever" does not mean that the biological *machine*—to use the old machine metaphor—which we humans are, is not the substratum of the process. The Turing machine is an example. The demonstration (Nadin 1977) that the mathematical category describing it is equivalent to the mathematical category describing sign processes only confirms why one can claim that the engine of the Turing computation is semiotic. On this account, let it be noticed that Turing did not reduce the human being to a machine. He wrote: "We may compare a man in the process of computing a real number to a machine which is only capable of a finite number of conditions," (Turing 1936:230-265). This is a fundamental position, very little noticed in the computing community, and almost never discussed by the semiotic community.

As we focus on the semiotic machine, our subject is computation, not only as a technological process, but as semiotic process unifying the algorithmic and the interactive. The qualifier *semiotic* means that a sequence of interpretations is generated in each and every computation. By this, we understand that much more than permutations, and even more than tractability—i.e., whether one transcends the time limitations by which humans live (finite intervals) in order to compute—need to be considered.

If computation, regardless of its nature (algorithmic or interactive), is not reducible to electric, or quantum, or DNA processes, but involves semiotic entities, the question is: What are they? A short answer would be: The same entities that make cognitive processes possible. Somewhere along the line, we end up at the one and only culprit of semiotics: the sign. Thus we close the infamous circle: The sign as an underlying element of thinking = The sign as a product of thinking, which

Boole alluded to while describing language. Computation has it easier. Bits and bytes (which are only strung-together bits) are processed, but not necessarily defined, through computation; rather, they are defined beforehand, as a condition of computation.

As a measure of information, the bit describes quantities. As a unity among what is represented, the representational means, and the infinite process of interpretation, the sign emerges as individuals constitute themselves through whatever they do. The bit itself was generated in such an experience of generating, transmitting, and receiving information. As a sign, the bit can be seen at the syntactic level as the string of letters *b, i, t,* or as whatever the syntax of the information it embodies is; at the semantic level, as the univocally defined unit of information pertinent to the simplest imaginable choice (heads or tails); at the pragmatic level, as the relation between the information it describes, the many ways in which it can be expressed, and the infinity of actions it can trigger, or, alternatively, inhibit. Insistence on clarifying concepts at this juncture stems not from a pedantic instinct typical of the spirit of the *Encyclopeadia,* but from a pragmatic necessity: If the relevance of semiotics to computation is to be established, then it is obvious that one more analytical tool will be exactly what other analytical tools are, i.e., perhaps an instrument of validation, a method for evaluating, or, at best, an optimizing procedure. There is nothing against such possibilities, which semioticians took advantage of, producing lectures, articles, even books about analytical semiotics. However, the nature of computation is such that semiotics belongs to its premises, and, accordingly, a legitimate semiotic approach can and should be part of the computation, not only of its validation after it was finished.

In more detail, what this means is nothing other than the rethinking of computation in semiotic terms, and their effective integration in the means and methods through which knowledge is computationally expressed. That involves transcending the quantitative level of the bit and integrating qualitative signs, with the implicit understanding that quality is not reducible to quantity. This major understanding is far from being trivial, especially in a context of technological innovation within which some aspects of qualitative distinctions were successfully translated into quantitative distinctions. Point in case: music. Thus Einstein's assertion on representing Beethoven digitally comes back to haunt us. Indeed, the high generality of the bit, as opposed to the concreteness of wave pressure differences, explains the perfect digital rendition of a Beethoven symphony, without, of course, making it identical or equivalent to a live performance (in a studio or before an audience). We can even imagine an automated performance, by virtual musicians, directed by a virtual conductor, faithful to Beethoven's musical text to any extreme we can think of. But that again is Beethoven as quantity, measurable and controllable, while a performance, with its implicit deviations, results as a living product and ceases in this definition once the performance has taken place. This is not an elaboration on music, or on the arts. It is an elaboration on what happens when the semiotic engine *human being* is replaced, or even complemented, by a semiotic engine of a different nature. Feigenbaum's confessions to calculations he performed in his mind, and which resulted in valid outcomes different from that of computation by powerful computers, is but one example of how the means of representation are not a passive constituent of the semiotic processes in which they are used.

Semiotics brings to computation the awareness of the fact that sign processes depend on the nature of the signs, that they are constitutive of new realities, and as

such, not unlike notation systems (e.g., numbers, letters, colors, shapes), they are present not only in the input (what goes into a sign process, what goes into computation), but also in the output. A digital rendition of a Beethoven symphony could be as fascinating as any other we can think of, provided that it can make possible the closure through which representamina are integrated in an interpretant process. Circumstances for this to happen are provided. We experience a fundamentally new pragmatic framework, i.e., of semiotically driven human experiences. Indeed, the species moved another notch away from its natural condition to its human, i.e., semiotic, condition. To elaborate on this, as the many aspects of the semiotic engine are described, would be presumptuous. We are actually trying to determine how computation can be grounded not only in electronics, logic, algorithms, mathematics, etc., but can also integrate the enormous semiotic experience that the species has acquired so far.

Computation as semiosis

To nobody's surprise, semiotic considerations in respect to computation were first articulated in respect to so-called man-machine interaction (Nadin 1983). Considerable experience originating from past challenges posed by all kinds of artifacts used by individuals was brought to the table. Even line editors—precursors of the current interfaces—were subjected to semiotic scrutiny. Commands had to be abbreviated, made as clear and univocal as possible, presented in legible form, and according to cognitive principles pertinent to the human processing of words. But this is prehistory. Iconic interface was a definite semiotic statement, inspired, as we know, by trivialized semiotic terminology. To its fame, and to its shame, semiotics contributed to the desktop metaphor—a huge step forward in making new forms of computation available to a large number of users, but also a dead-end street in which computation has remained stuck to our day.

Much more interesting was the attempt to enlarge the notion of computation itself to include varieties of signs extending from those elements making up the elusive domains of the visual, the aural, and multimedia. In the virtual realm, much more than in the pseudo-3D realm, all kinds of semiotic devices found their usefulness in, or contributed to, the periodical moments of confusion that mire computation. To a lesser extent, semiotic considerations were present in neural networking, biocomputing, and molecular and quantum computation, to name a few fields. But it remains to be seen whether this situation will eventually change. In some areas, extremely intricate semiotic considerations, though rarely identified as such, are a dominant component. Datamining, the magic formula of the networked computation dedicated to the use of information leading to more individualized forms of interaction (dissemination of the new, e-commerce, healthcare, culture, etc.) is, after all, the embodiment of abductions, in the strictest sense of Peirce's definition, carried out by the semiotic engine. Almost all known inference engines deployed today encode semiotic elements, although at times, those who designed them are rather driven by semiotic intuition than by semiotic knowledge.

To start a search on the Web today is literally to start sign processes, to either watch how these unfold or to affect their unfolding by controlling the syntax level, the semantic involved—still the dominant dimension of any Web activity—or the pragmatics in cooperative projects, remote learning, and interactive publishing. These forms of computation as semiosis will continue to attract more and more

people. Their efficiency can be improved only if more methodical, and more professional, semiotic elements will be integrated and fine tuned in their use.

Semiotic awareness and the semiotic machine. The future.

The semiotic community has shown interest in the subject of the semiotic machine especially in view of the hope that it will give currency to research seen more extraneous than significant in the current context. Since the early 1990s, several authors have dealt with various aspects of machine semiosis (Andersen, Nake, Siekenius de Souza). Others (Zemanek, Nake, Andersen, R.W. Floyd) focused on semiotic aspects of programming, beginning with formal languages and program evaluation and ending with automatic programming. Referring to Jean Petitot Cocorda and Per Age Brandt, but avoiding Peirce, Albertina Laurenci focused on intelligent systems (Agile Software Development). Gabriele Gramelsberger tried to define the sign (as a digital particle), while examining the building blocks of virtual worlds. Coming from the computer science community, Gomes, Gudwin and Queiroz (2003:69-79, 2005) have tried to sketch an introduction to computational semiotics. As they see it, computational semiotics "seeks inspiration in semiotics." But to realize what they have in mind, one has to realize that the notion of semiotics might not be automatically accepted within the semiotic community: "a tradition in the philosophy of mind dealing with concepts of representation and communication from a more technical perspective. Their contribution is helpful in identifying the work of Dmitri Pospelov—a Russian scientist specialized in intelligent control theory—and Eugene Pendergraft—author of a so-called "self-knowing" machine (the Autognome). They also make reference to Gerd Döben-Henisch (1996), who tried his hand in defining a semiotic machine as a "device able to reconstruct the common structures of human experience in terms of sign processing." Döben-Henisch worked on a knowledge robot (*Knowbot*; 2002: 59-79), an agent-based implementation of his ideas concerning semiotic machines. Jack A. Shulman (1996), a very active computer professional, goes as far as to present the idea rhetorically: "Imagine a machine which can think like a human. A semiotic machine." He provides some details for what he calls "implementational protocols of thought" (conveniently abbreviated as IP) and defines "four fundamental mechanisms used by the mind"—called a Cognitive Abstraction Inference Induction machine (CAII)—each being a basic pre-semiotic process. Shulman states that "implementation protocols and semiotic processes are two sides of the same coin," which is more than an allusion to Saussure's distinction between the *signifiant* and *signifié*.

While such elaborations, from non-semioticians, are indicative of the level at which semiotics permeates other sciences, more significant ideas are offered for debate by philosophers, such as Lauro Frederico Barbosa da Silveira, and by historians of semiotic ideas, such as Winfried Nöth. Da Silveira is focused on Peirce's philosophy as a broad, unified conception, impossible to understand unless taken in its totality. Learning is what a semiotic machine would have to perform in order to "progressively" modify its way of functioning. Such a machine would have to be endowed with a "generalizing capacity." It is clear that such in-depth surveys will have to guide future attempts dedicated to understanding how the implicit notion of semiotic machine changes over time. Nöth (2002): 5-21) takes this challenge and proceeds acrimoniously in his overview of more recent, but by no means exhaustively reported, concepts pertinent to the subject. The scholarly quality of

the overview is unimpeachable. One need not agree with all assertions, especially those relative to semiosis, in order to profit from the vast body of work referenced. Jonathan Swift's Academy of Lagado, in *Gulliver's Travels,* caught Peirce's attention, as well. The machine described could be used even by "the most ignorant person, at a reasonable charge" to "write books on philosophy, poetry, politics, laws, mathematics, and theology, without the least assistance from genius or study." Nöth is alarmed by the perspective, but does not think that the writings on the semiotic machine subject might qualify as such work. This is mentioned here because, in dealing with the subject of the semiotic machine, the community of semioticians can benefit from the awareness of interactivity, which is not a characteristic of the machine.

As we know, semioses, regardless of their nature, are dynamic sign processes. Through semioses, minds interact, and thus become identified in a course of action (pragmatics) definitory of their characteristics (cf. Nadin 1991). As we move towards evolutionary computation, with evolvable hardware, we need to make sure that the semiotic engine on which they are by nature based is designed having in mind the requirements of semiotic processes as we know them from human interaction. It is beyond dispute that new classes of such semiotic processes might evolve. However, as sign-based, they will reflect the epistemological nature of the sign, and thus replicate semiotic awareness. Indeed, a semiotic engine is not pure and simple an engine, but one with a certain self-awareness. The bits processed are bits that know where they are and to which string they belong. More precisely, the operation to which they belong—which is a semiosis— is not mechanical, but semiotic, that is, with the mechanism of self-interpretation embedded in the process. When representations of digital circuits are placed at the level of the chromosome—as it takes place in our days—a foundation is laid for computation that involves and facilitates self-awareness.

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