

SEMIOTIC FOUNDATIONS OF THE COGNITIVE PARADIGM

1. The Cognitive Paradigm: A Challenge to Semiotics?

The language sciences have come under the reign of the cognitive paradigm. Beginning in the early 1960s with psychology and linguistics, the cognitive turn in the humanities has meanwhile united under the umbrella term of *cognitive science* such diverse disciplines as psychology, philosophical epistemology, anthropology, evolutionary biology, the neurosciences, computer sciences, and the language sciences. Within the latter branch of the humanities, there is now not only a cognitive syntax and semantics (cf. Rudzka-Ostyn, Ed., 1988), but also a cognitive theory of discourse (Rickheit & Strohner, 1993), of narratives (cf. Ryan, 1991), metaphors (Indurkha, 1992), literature (Hobbs, 1990; Zwaan, 1992), and aesthetics (Bever, 1986; Parsons, 1987).

As far as its transdisciplinary appeal and its potential for a unifying scientific perspective are concerned, cognitive science has affinities with another transdiscipline which was also once envisioned as providing a unifying point of view to the sciences (Morris, 1939: 1), namely semiotics. Is semiotics one of the paradigms that have been replaced by cognitive science, has the cognitive turn in the humanities resulted in a paradigm shift within semiotics, or has semiotics remained unaffected by the cognitive turn? If we can trust Parret (1990: 484), the possibility of the replacement of semiotics by the cognitive paradigm and the ensuing fear of the end of semiotics in the face of a scientific revolution has thrown some scholars of semiotics into great despair. Other semioticians, by contrast, have been greatly satisfied with the advent of cognitive science. They are either convinced that semiotics itself has reached the crossroads of a morphodynamic turn to cognitivism (Petitot, 1990) or that semiotics has always been a cognitive science *avant la lettre*. Among the latter is Sebeok (1991: 2), who sees in "the currently fashionable tag *cognitive science* [...] at best a stylistic and methodological variant for *semiotics*."

2. The Cognitive Turn and the History of the Philosophy of Mind

According to the standard historiography of cognitive science (cf. Gardner, 1985), the cognitive paradigm is by no means opposed to semiotics, but has emerged from the ashes of behaviorism. As far as psychology is concerned, Knapp (1986: 13) even divides the whole history of twentieth-century psychology into the two eras of behaviorism and cognitivism. However, from a broader perspective of the history of the humanities, the cognitive turn has not only been a shift away from one scientific methodology to another, but also a narrowing of the scope of the sciences of the mind. As Hilgard (1980) points out, the history of psychology began with the assumption of a tripartite classification of the study of mind into cognition, affection, and conation (or: knowledge, feeling, and volition). We find this triad as early as in the writings of Christian Wolff (1679-1754) and Alexander Gottlieb Baumgarten (1714-1762) who distinguish between a *facultas cognoscitiva*, a *facultas appetiva* and a *facultas sensitiva*. The triad is also apparent in Immanuel Kant's (1724-1804) three critiques of pure reason (cognition), practical reason (will, action, or conation), and judgement (feeling of pleasure and pain).

Against this background, it is perhaps not surprising that the cognitive paradigm is beginning to be reproached for a neorationalist one-sidedness, especially by scholars in the field of emotion (e.g., Fiehler, 1990: 24). It is true that not all cognitivists have ignored the affective dimension of mind (cf. Ortony, Clore, & Collins, 1985), but the cognitive approach to feeling tends to subsume affection under cognition or to consider feeling as secondary to thinking (cf. Zajonc, 1980) and thus to ignore the modular autonomy of affection and cognition in the human mind for which the structure of the "triune brain" (McLean, 1972) provides evidence in its evolutionary differentiation between the neocortex (coordinating cognition) and the limbic system (coordinating emotion).

3. Cognition in Semiosis

In the philosophy of Charles Sanders Peirce (1839-1914), the traditional triad of mind clearly correlates with his fundamental categories of firstness, secondness, and thirdness (cf. Nöth, 1990a: 41; Merrell, 1991: 26-27): Feeling belongs to firstness, the category of immediacy and undifferentiated quality. Volition represents secondness, the category of the dyadic interaction of self and other (a first and a second).

Cognition belongs to thirdness, the category of communication, representation and semiosis, where a mediation "between a Second and its First" (CP 5.66) takes place (cf. Parmentier, 1985). Although each category is irreducible in itself, the higher categories presuppose the lower ones, and in this sense, feeling is not secondary to cognition, but cognition presupposes and mediates between feeling and volition. As Merrell (1991: 27) points out, feeling, volition, and cognition also correspond to the three constituents of the sign according to Peirce. The sign vehicle or representamen perceived in its immediacy belongs to feeling. "That for which it stands, the *object*, is *other than* the self and subject to volition. And the idea to which the representamen gives rise is its *interpretant*, which entails cognitive activity."

Cognition is thus a constitutive element in the triadic sign process (cf. Gentry, 1946: 640) or *semiosis*, as which Peirce (CP 5.484) defines the process in which the sign has a cognitive effect on its interpreter, but semiosis cannot be reduced to cognition. It presupposes perception, itself a triadic process (cf. Santaella Braga, 1993) which arises in the perceiver's consciousness from a level of an as yet undifferentiated immediate feeling where it "is merely the *material quality* of a mental sign" (CP 5.291).

Besides being embedded in the triad which it forms together with feeling and volition, every cognition, in this semiotic framework, is furthermore part of the endless chain of unlimited semiosis according to which "every cognition is determined by a previous cognition" in the interpreter's mind (Gentry, 1946: 637). Cognitions are hence nodes in the unlimited semiotic network which has its foundations in the principle that "every thought is a sign," which "must address itself to some other, must determine some other, since that is the essence of a sign" (CP 5.253).

4. Cognition, Conceptualization, and Iconicity

The cognitive paradigm is by no means homogeneous in its basic assumptions, of which only very few can be discussed in this paper. Furthermore, there are also incompatibilities between diverse cognitive approaches to the study of mind, as for example, between Lakoff's (1987: xii-xv) "experientalist" view of cognition and what he rejects as "objectivist" approaches to the study of mind. Semiotics, on the other hand, is no less diversified in its approaches to the study of sign systems, and in this

context, it is important to point out that not all paradigms of the semiotic tradition are equally compatible with the views held by the cognitivists.

Semiotics in the Saussurean tradition of the dyadic model of the sign (cf. Nöth, 1990a), e.g., is a paradigm which is essentially incompatible with basic assumptions of cognitive science. One of them is the cognitivist assumption of the motivation of thought and language by the bodily experience, the biological make-up, and evolutionary roots (cf. Nöth, Ed. 1994) of humans. As Lakoff (1987: xiv) formulates his view of the cognitive motivation of language, "the core of our conceptual systems is directly grounded in perception, body movement, and experience of a physical and social character." Such a view would not have been endorsed by semioticians in the tradition of the dyadic sign leading from Saussure via Hjelmslev to Greimas. According to Saussure's dogma of arbitrariness, the structure of linguistic concepts is essentially unmotivated by nonlinguistic phenomena. Thought, considered before language, "is only a shapeless and indistinct mass. [...] Without language, thought is a vague uncharted nebula. There are no preexisting ideas, and nothing is distinct before the appearance of language" (Saussure, 1916: 111-112).

Semiotics in the tradition of Peirce's triadic view of the sign, by contrast, is not only compatible with the assumption of language being cognitively motivated, but is also able to provide an appropriate theoretical framework for this cognitivist tenet, namely by its category of the iconic sign, the sign whose "qualities resemble those of its object" (CP 2.299). Insofar as a linguistic sign or syntactic pattern is cognitively motivated by the structure of bodily experience, it is an iconic sign (cf. Nöth, 1990b; 1993). Notice that the semiotic theory of iconicity does not subscribe to the naive realism which Lakoff (1987: xiii) imputes to the objectivist view of cognition, the view that "since the human mind makes use of internal representations of external reality, the mind is a *mirror of nature*, and correct reason mirrors the logic of the external world." In the framework of Peircean semiotics, the object of the iconic language sign is by no means any given piece of reality. Particularly, a sign motivated by previous bodily experience is iconic of forms of human cognition, and its object, the motivating cognition, is thus itself of a semiotic nature (cf. Santaella Braga, 1988; 1993: 42). Iconic reference does thus not relate the sign to an external referent, but takes place *within* the process of semiosis. As Peirce put it in 1902, "the object of the sign, that to which it virtually at least professes to be applicable, can't itself only be a sign" (MS 599, quoted in Johansen, 1993: 77).

The account of cognitive motivation in language as iconic semiosis is also compatible with Lakoff's (1987: xiv) cognitive postulate that "thought is *imaginative*, in that those concepts which are not directly grounded in experience employ metaphor, metonymy, and mental imagery - all of which go beyond the literal mirroring, or *representation*, of external reality." The imaginative nature of cognition which Lakoff refers to in this postulate clearly refers to the varieties of iconic semiosis which Peirce differentiates as imaginal, diagrammatic, and metaphorical and which have meanwhile become a foundation of semiotic linguistics (cf. Nöth, 1990b).

5. Models of Cognition as Models of Semiosis

Holenstein (1990: 106) has pointed out that the shift from the behaviorist to the cognitive paradigm was accompanied by a shift from a physicalist to a semiotic metalanguage. Instead of physical categories such as *energy, tension, discharge, impulse, attraction, repulsion, or reinforcement*, the new paradigm is using categories referring to signs or sign processing. *Representation, image, information or code, program, and computation* are the terms of the new paradigm. This shift from the physicalist to the semiotic metalanguage goes parallel with a shift from a logic of dyadic relations, which are basic in classical physics (such as cause-effect, stimulus-response), to triadic relations, which underlie processes of semiosis (cf. Deely, 1982: 95; Neshet, 1990: 4). Let us examine in the following some key terms of cognitive science and investigate more in detail their semiotic nature.

5.1 Cognition as Interpretant and Equivalent Sign

We have already briefly commented above on the semiotic nature of cognition, the term from which cognitive science derives its name. The semiotic triad of sign vehicle (representamen), object, and interpretant (see 3.) constitutes the sign as "a representamen of which some interpretant is a cognition of a mind" (CP 2.242). Cognition thus functions in the first place as the interpretant of a sign, which Peirce also defines as the thought or idea "created in the Mind of the Interpreter" of a sign (CP 8.179). However, since thinking, and hence cognition, according to Peirce (CP 5.283), is only possible by means of signs, the interpretant of a sign also functions itself as a sign. In the endless chain of semiosis, cognition is thus a "thought-sign [...] translated or interpreted in a subsequent one" (CP 5.284).

Givón (1989: 21, 71) adopts the Peircean notion of interpretant as a basis of his cognitive grammar, using it as a synonym of the "perceived context" of the language sign. Since "context" usually refers to the syntagmatic dimension of the language sign, this interpretation may be misleading. The relationship between the representamen and its interpretant is rather a paradigmatic one, since both signs are in a relation of semiotic equivalence, referring to the same object. As Peirce puts it, the sign created in the mind of the interpreter is "an equivalent sign, or perhaps a more developed sign" (CP 2.228).

The relation of equivalence is also central to the cognitive paradigm. It characterizes on the one hand the logical relation between the representing and the represented domains of a cognitive representation (see 5.2) and is on the other hand central to the mental process of assimilating new cognitions. In the latter sense, Minsky (1986: 57; cf. Sebeok, 1991: 4) defines understanding as a process of "representing each new thing as though it resembles something we already know. Whenever a new thing's internal workings are too strange or complicated to deal with directly, we represent whatever parts of it we can in terms of more familiar signs. This way, we make each novelty seem similar to some more ordinary thing."

5.2 Mental Representations, Models, and Iconicity

Cognitive science investigates meanings as mental representations and describes comprehension as a process of constructing mental models (Johnson-Laird, 1988b: 99, 110). The semiotic nature of these processes is apparent to both cognitivists and semioticians. Johnson-Laird (1988a: 28) enumerates "perceptions, ideas, images, beliefs, hypotheses, thoughts and memories" as examples of mental representations and specifies that "all of these entities [...] are *symbols* of one sort or another." In terms of Peircean semiotics, the argument is that "every thought, or cognitive representation is of the nature of sign. 'Representation' and 'sign' are synonyms" (CP 8.191).

In the framework of cognitive science, Palmer (1978: 262) defines the concept of representation as follows:

A representation is, first and foremost, something that stands for something else. In other words, it is some sort of model of the thing (or things) it represents. This description implies the existence of two related but functionally

separate worlds: the *represented world* and the *representing world*. The job of the representing world is to reflect some aspects of the represented world in some fashion. Not all aspects of the represented world need to be modeled; not all aspects of the representing world need to model an aspect of the represented world. However, there must be some corresponding aspects if one world is to represent the other.

The semiotic basis of this cognitive account of representation is on the one hand a naive dyadic model, not of the Saussurean kind, but one based on the realist assumption of a simple sign/object or mind/world opposition. On the other hand, Palmer defends the view of iconicity in mental representation. Similarly, Jorna (1990: 31, 33) defines representation as the mapping of structures of a represented domain onto the ones of a representing domain, where the relation between the two domains is one of equivalence or resemblance (hence iconicity). As Jorna (1990: 37) points out, central concepts of cognitive science, such as model, analogy, metaphor, simulation, and representation "are based on a notion of depicting, that is to say on portraying (aspects of) domain A into/upon domain B."

Cognitive science distinguishes several subtypes of mental representation related to different activities of mind. Among them are perceptual, pictorial, propositional, episodic, and semantic representations (cf. Jorna, 1990: 20). Can all of these be subsumed under the category of iconicity, or do they not rather testify to the presence of both iconic and symbolic signs in mental representation? The answer to this question can be given if we take into consideration Peirce's three types of imaginal, diagrammatic, and metaphorical iconicity. In pictorial representation, there is certainly a predominance of imaginal iconicity. Semantic and propositional representations involve the processing of symbolic (arbitrary) signs, but insofar as their syntagmatic patterns are concerned, such representations also evince diagrammatic iconicity (cf. Nöth, 1990b).

5.3 Cognition and Semiotic Mediation

In contrast to the naive dyadic (world/mind) account of cognition, the semiotically more adequate triadic theories of cognition are those which acknowledge the role of mediation in cognition. From the point of view of cognitive science, Molitor, Ballstaedt, and Mandl (1989: 10) describe the mediating function of mental models as follows: "Mental models seem to offer a means of mediation between the different forms of knowledge. A mental model is the representation of a limited area of reality

in a format which permits the internal simulation of external processes, so that conclusions can be drawn and predictions made." Once again, we have a cognitivist description of the role of the interpretant - alias mental model - in the process of interpretation. The mediating function in this process is more specifically apparent in the theory of mental models in language comprehension proposed by Johnson-Laird (1988b: 110): "According to this theory, the initial mental representation of an utterance, which *is* close to its linguistic form, is used to construct a model of the state of affairs that is described [...]. The process is guided by a knowledge of the contribution to truth conditions made by the words in the utterance, by a knowledge of how to combine meanings according to syntax [...], by a knowledge of the context [...], and by general knowledge of the domain and the conventions of discourse." This description of verbal cognition corresponds at its basis to the Peircean triadic account of semiosis. It begins with a specification of the utterance as a representamen, which is already a sign since it evokes an initial mental representation. The "states of affairs" are the object of this sign. Mental models mediate between these two correlates of the sign as their interpretant. They give rise to a "more developed sign" (see 5.1) and are aided in this process by the various modes of available knowledge. Johnson-Laird's account of text understanding can thus serve as an exemplification of Peirce's definition of the interpretant as a "mediating representation" (CP 1.554) and of representation as a "medium between a second and its first" (CP 5.66). Peirce must have anticipated the central role which his idea of mediation would once have within the cognitivist theory of mental models, when he exclaimed in 1906 (MS 339, in Parmentier, 1985: 23): "All my notions are too narrow. Instead of 'Sign,' ought I not to say *Medium*?"

5.4 Schemata, Habits, and the Final Interpretant

Schema theory is a further approach to cognition whose foundations can be elucidated with reference to the theory of semiosis (cf. Daddesio, 1989). In the context of cognition, the term schema was first proposed by Kant and later adopted as a key term in Bartlett's psychology of memory and Piaget's genetic epistemology. In the framework of cognitive science, Rumelhart (1980: 33-34) defines schemata as the "building blocks of cognition" which represent and organize the use of knowledge: "A schema, then, is a data structure for representing the generic concepts stored in memory [...]. A schema contains, as part of its specification, the network of interre-

lations that is believed to normally hold among the constituents of the concept in question."

There are three semiotic implications in this account of the role of schemata in the process of cognition. The first is that the description of schemata as "networks of interrelations" refers to the semiotic principle of unlimited semiosis (see above, 3.), according to which the interpretant of the sign is always embedded in a network of previous (and future) cognitions or elements of knowledge. The second implication has to do with the essentially inferential nature of semiosis which is due to the Peircean principle that every cognition is determined logically by previous cognitions (cf. Gentry, 1946: 636-637). Since schemata are formed as the result of previously memorized cognitions, they serve in the same way as data from which inferences are derived in the interpretation of new cognitions. The third implication is related to the schema being a set of relations which the interpreter "believes to normally hold among the constituents of a concept." The semiotic categories which are most closely associated to this aspect of schemata are the ones of habit (cf. Arbib & Hesse, 1986: 43) and generalization. Both categories are central to semiosis as a cognitive process (cf. Neshet, 1990: 10) since habits and general rules are the outcome of sign use and the prerequisite of the inferences necessary in sign interpretation. In this context, Peirce (CP 8.332) argues: "It appears to me that the essential function of a sign is [...] to establish a habit or a general rule whereby they will act on occasion." More specifically in his theory of meaning, the category of habit is constitutive of what Peirce defines as the "final," "normal," or "ultimate" logical interpretant (cf. Gentry, 1952). This type of interpretant refers to the final phase in the process of semiotic interpretation, in which the cognition formed in the interpreter's mind has become a habit, "a tendency [...] actually to behave in a similar way under similar circumstances in the future" (CP 5.487). At this stage, the sign fulfils the same function as a schema of cognition. It points both to the past (qua memory) and to the future (qua habitual interpretation) in the process of semiosis. As Peirce put it in 1902 (MS 599, quoted in Johansen, 1993: 169), "The type of sign is memory, which takes up the deliverance of past memory and delivers a portion of it to future memory."

6. Conclusion

Semiotics is far from being a paradigm threatened by the advent of cognitive science, but there is a double challenge between the sciences of sign processes and

cognition. While cognitive science is a challenge to semiotics insofar as semioticians are called upon to contribute to the foundations of cognitive studies, semiotics is also a challenge to cognitive science insofar as the new paradigm in the study of mind cannot achieve a satisfactory account of cognition without taking into consideration the insights which semiotics has contributed to the study of cognition since John Locke first postulated a *Sémeiotiké* as a Doctrine of Signs in 1690.

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