

## The Role of Semiotics in the Study of Language, Linguistics and Communication: An Overview

*All knowledge, from the most tentative guess to the most demonstrative certainty, is grounded on evidence; it is supported by data, credentials, warrants, and premises. The data are not themselves evidence for that to which they attest; they must be interpreted to be evidence, to give some credibility to what they support.*

David Savan on C.S. Peirce (1980: 255)

*The whole of culture **should** be studied as a communicative phenomenon based on signification systems.*

U.Eco (1976: 22)

*It is the organization of memory that defines what concepts are. ...the property of being a concept is a property of connectivity, a quality that comes from being embedded in a certain kind of complicated network, and from nowhere else....concepts derive all their power from their connectivity to one another.*

D.Hofstadter (1985: 528)

### Peircean Sign Theory

Following C.S. Peirce (cf. also Sebeok 1991: 152), we may define semiotics only in terms of the system of dynamic signs in interaction, thus bringing us to semiosis itself. (Sebeok [1991: 97] says semiotics “is an exclusively human style of inquiry, consisting of the contemplation...of semiosis.” Semiotics as “doctrine” (*doctrina signorum*) follows from Locke (1690, *An Essay concerning Human Understanding*) [Sebeok 1991: 151].) Semiosis is an irreducibly triadic process of sign action, where there is a relationship between the *sign*, *object* and *interpretant*

(5.473). [Note that all references to Peirce's Collected Papers in 8 volumes are given with volume number followed by paragraph number. This is the convention used by scholars of Peirce.] The underlying focus is on the production and affiliation of the interpretant with the sign-object, a process that is teleological (goal-oriented) by design. [While the notion of a so-called *goal-oriented process* is understood differently within the semiotic community, in no instance does it refer to progress in an evolutionary sense.] The focus of semiotics is on the obligatory signalling of both signification and

communication, where both are of equal importance. For Peircean semiotic theory, the sign categories are defined in such terms as to encompass not only human language, but any and all meaning-generating sign systems.

Semiotics “never reveals what the world is, but circumscribes what we can know about it; ...what a semiotic model depicts is not ‘reality’ as such, but nature as unveiled by our method of questioning” (Sebeok 1991: 12). In other words, semiotics is by its essence a theory of perception (and I use the word ‘perception’ as opposed to the word ‘cognition’—cf. also Hofstadter (1985: 633), especially Hofstadter’s analogy between the Kurzweil scanner and letter- recognition vs. optical character recognition by humans [1985: 634]). Hofstadter makes an excellent point concerning the significant differences in decoding as recognition and encoding as rendition. Semiotics clearly distinguishes these two processes as well. Clearly, we are obliged to look at memory, “which is certainly at the crux of cognition” [Hofstadter 1985: 638]). Kosslyn's work on perception and imagery makes a significant contribution in furthering our understanding of the relationship between visual perception and imagery, and the salient properties of those representations encoded in the brain (1994: 113-136).

Peircean semiotic theory reinforces the relevance of the principles of asymmetry and continuity as they apply to the definition and interplay between categories of variance and invariance. Furthermore, only Peircean semiotic theory provides a metalanguage that codifies not only the symbolic system (which in our case is human language), but also codifies the users themselves as part of the overall system of signs. It is not trivial to note that there exists some resistance to applications of semiotic principles, primarily due to the new perspective of data and facts required by such an approach. In a sense, the semiotic perspective requires a revolution in technique. Such a revolution brings into question the very object of study, as well as the instrumentation used to evaluate the object. By using Peircean semiotics in linguistic analyses, we are compelled to reassess how we define "human language" as a phenomenon. This becomes a central theme as linguists become active contributors to the cognitive sciences and furthering research in the area of language and brain.

Since the focus of Peircean semiotics is not the sign itself, but semiosis, it is our task to take a closer look at the interface between functioning signs as they are used.

Such an interface requires a principal definition of categories as functions that are relational by definition. In order to initiate such a discussion, we will require some familiarity with those sign types, especially interpretants, that are so essential to semiotic-based analysis.

Peirce distinguishes 3 leading principles of acquiring knowledge in terms of inference types: deduction, induction, and abduction. These triadic inferential types may be defined in the following way:

A. Cause and effect: Deduction is a form of a priori reasoning, inferring from cause to effect; abduction is a form of a posteriori reasoning, inferring from effect to cause; induction involves inference between the multiple effects of one cause (Fann 1970: 15, Murphey 1961: 60).

B. A more direct way of defining inference is modified from Peirce and Fann:

“Deduction explicates and proves that something must be; induction evaluates and shows that something actually is operative. But abduction merely suggests that something may be (1970: 51, CSP 5.171, 6.475, 8.238). Peirce states (5.172) that “...every single item of scientific theory which stands established today has been due to abduction.” Only via these three principles can Peirce define the SIGN:

*A sign must first have an inner ground, an internal structure, character, or quality. [This is the sign proper, also called representamen.] Second, it must stand for some correlate external to itself. [This is the object.] Third, it must exemplify some general rule which enables the sign to mediate between its object and some translation (or interpretation) of itself, such that this translation is a sign of the same object represented by the first sign. [This general rule is the interpretant.]* (Savan 1976: 3)[brackets mine]).

These categories are “aspects [not things] of whatever can be known, and they always occur compounded together” (Savan 1976: 9). Further definitions of the sign require 3 fundamental relations at the levels of firstness, secondness and thirdness: sign-sign (qualisign/sinsign/legisign), sign-object (icon/index/symbol), and sign-interpretant (rheme/dicent/argument). [For critical definitions of these terms, see Peirce 1.302-1.532, 2.246-2.252, 8.368, Savan 1976: 4-52, Andrews 1990: 46-59.] In the context of symbolic

and natural language analysis, the second triad (sign-object) has been the most fruitfully applied, beginning with Jakobson (1975, 1977a, 1980). While all forms of language are primarily *symbolic*, all sign types are necessarily hybrids. Thus, there are no pure icons or indices found in human language; rather one finds combinations of the three sign-object types.

### **Iconicity and Diagrammatization**

The Peircean concept of *iconicity* has been extremely popular in modern linguistic thought, encompassing a large spectrum of linguistic philosophies and approaches. Unfortunately, linguistic applications of iconicity are often more simplistic than the concept would dictate, and the researcher ends up with a weakened version of iconicity that does not substantially differ from the principle of analogy. The Peircean or Jakobsonian generic definitions of an icon require similarity between the sign and the object (or the signans [signifier] and the signatum [signified]) (Peirce 8.368; Jakobson 1980: 11). However, this definition does not capture the full range of application and function of iconicity and iconic signs within language. Iconicity is such an important component of modern linguistic thought precisely because of its ability to diagram the structural patterns and rules that unite the different levels of language. Such a diagrammatization implies that any given set of linguistic signs is in a constant state of flux and that the ultimate principle of sign systems is that of inherent asymmetry, where the sign complex is constantly modulating from stages of lesser or greater stability. It is also useful to note that iconic signs occur in three subtypes, images, diagrams and metaphors, where the diagram is considered to be the “chief species of icon” (Shapiro 1991: 13, 56). In the following section, our discussion of iconicity will be expanded to include the semiotic context in which iconicity can be more rigorously defined.

By definition, an iconic sign is determined by the sign-object relation. Thus, the similarity, or iconicity, must reside in one of three places: (1) in the sign, (2) in the object or (3) as a product of the sign-object relationship itself. According to Peirce, “the quality on which the resemblance is based belongs to the sign [as representamen], whether or not its object actually exists” [brackets mine](8.368). In other terms, one might claim that the resemblance lies in the **ground** of the sign. In this sense, the ground

of the sign is an essential component of the functioning sign, given within the sign complex itself. Thus, the ground is NOT given extralinguistically, or extrasemiotically. For Peirce, the representamen, at least as late as 1893, is necessarily connected to three things: the ground, object and interpretant (2.228). The ground is a correlative quality that defines the inherent connection between the sign and codified object (1.558); therefore, ground is of the level of firstness, an abstraction, a quality, a general attribute (1.551). Implications of such a concept of ground include the assurance of signification that leads to general meanings by eliminating arbitrariness and encoding the potential for invariant relationships based on factual similarity (using Jakobson's term). Thus, ground ensures the potential existence of invariant meaning (or repeatability with recognition). However, ground does not guarantee the existence of the necessary corrective factor needed in those instances where the sign itself is false (Short 1981: 200).

We have already seen that the ground is a correlate quality of the representamen (or sign). In this vein, it is also appropriate to envision the object as a correlate of the sign, since one sign may be correlated to another as its object (2.418) (cf. Eco [1979:181] gives 'man' and 'homme' as an example of such a correlation) and the third correlate of the sign is the ground and the interpretant. In general, it is important to note that the focus of Peirce's discussion in 2.418 involves the three conceptions of reference: reference to a ground, to a correlate and to an interpretant. Following from this, symbols always have a triple reference, being of the order of thirdness. Therefore, the symbol, but not necessarily all signs, secondarily refers to its ground "through its object, or common characters of those objects."

Ultimately, we are obliged to return to Short's statement that 'meaning' in mature Peircean thought can in no manner be confused with 'ground' and is explicitly identifiable with the interpretant (Short 1986a: 109). The reader is reminded that Peirce's definition of the **immediate object**, where meaning is "the complete immediate object" (2.293), requires it to be a sampling of the **dynamic object**, a "semiotic effect within the sign" (Savan 1980: 256). The dynamic object, then, establishes an actual, tangible relationship between the parts of the sign and is "essential to the actual occurrence of any sign in some particular context" (Savan 1980: 256). In the application of the Peircean concepts of immediate and dynamic objects to the analysis of human language, one finds

that the speakers themselves become a part of the semiotic process as dynamic objects, while the forms perceived and heard by the speakers are immediate objects. This aspect of Peircean semiotics is very profound for the study of language in that not only the language code itself, but the **users** of language become semiotic entities and are inextricably tied to each other as ‘linguistic’ (as opposed to extralinguistic) phenomena.

The sign-dynamic object relationship may assume any combination of iconic, indexical and symbolic sign types (Savan 1980: 256). Some semioticians have argued that one of the fundamental sign types to explain linguistic change is the iconic index (Antilla & Embleton 1989: 155–80). It is essential to remember that these sign types occur in language only in combination with each other, never individually, and are embedded in symbols. However, the “semiotic effect within the sign” is distinctive from the “proper significate effect” of the sign (cf. 4.127, 5.475, 5.476).

### **Meaning and Types of Interpretants**

As noted above, any Peircean definition of meaning necessarily involves, in addition to those references to the immediate object, the concept of interpretant, where the interpretant is a sign (or rule) mediating interpretation of the sign. The interpretant “creates in the mind... an equivalent sign, or perhaps a more developed sign” (2.228). The interpretant follows from the sign; the sign cannot follow from the interpretant (Savan 1976: 32; Andrews 1990: 52–63). Any attempt to describe the immediate object requires utilization of interpretants of the sign (Eco 1979: 183). Therefore, meaning may only be achieved, or described, via interpretants.

Why is meaning possible only through interpretants? Peirce clearly states that “...the meaning of a sign is the sign it has to be translated into” (4.132), hence an interpretant. As we know, the interpretant “creates in the mind...an equivalent sign, or perhaps a more developed sign” (Peirce 2.228). Once again, the interpretant necessarily follows from the sign, not vice versa. It is the “proper significate outcome of the sign” (4.127).

What is also of significant importance for Peircean theory are the different types of interpretants that may occur. There are two different triads of interpretants: (1) emotional, energetic and logical (5.475–76); (2) immediate, dynamic and final (8.315).

Although somewhat controversial, we take the first triad of interpretants to be at least a type of dynamic interpretant, while the second triad of interpretants would be more basic.

But is there a difference between **meaning** and the **interpretant** in Peircean semiotic theory? As a basic principle for Peirce, we know that the sign, as representamen, “determines something else (its interpretant) to refer to an object to which itself refers (its object) in the same way, the interpretant becoming in turn a sign, and so on ad infinitum. No doubt, intelligent consciousness must enter into the series. If the series of successive interpretants comes to an end, the sign is thereby rendered imperfect, at least” (2.303). It would be, in Peirce's system of signs, the **ultimate logical interpretant**, as ‘habit-change’ or ‘growing habit’, which is distinct from the final interpretant, that would prevent infinite regress (cf. Peirce 5.476; Short 1981: 218–89; 1986a: 115 ff.; Shapiro 1991: 38–39). While such a category exists in Peirce's system, this particular category is never fully realized in living language systems. There can be no definition of sign without mention of interpretant and object. Therefore, any definition of meaning will also evoke at least these two concepts. However, we may choose to more carefully define types of meaning.

The type of meaning in language that involves grounds and immediate objects is an inherent part of the sign-code that ultimately is capable of incorporating different kinds of context into the semiotic base. Furthermore, the existence of ground guarantees the potential for a more generalized type of meaning while failing to fulfill the embodiment of such a general type of meaning. The type of meaning that involves interpretants is precisely that more general, invariant meaning. Elsewhere, I have argued, following a principle originally articulated by Michael Shapiro, that Jakobsonian-based markedness is a theory of interpretants (Shapiro 1983: 17; Andrews 1990: 45ff). However, I have further specified that the type of conceptual features derived from a Jakobsonian-based markedness theory (as applied by Jakobson and van Schooneveld) are of the nature of **final interpretants** (Andrews 1990: 57). Final interpretants, as such, are “successive dynamic interpretants exhibiting a regularity or law” (Savan 1980: 259). Such features, but not only, are truly exemplary of Peirce's concept of the “living habit,” being simultaneously both a result and a rule (Eco 1979: 195). In Peirce's words, the

final interpretant merits attention “because it is that which would finally be decided to be the true interpretation if consideration of the matter were carried so far that an ultimate opinion were reached” (8.184). The final interpretant is inherently goal-oriented, the ultimate “self control” (Peirce 8.372). Within the context of human language, I define final interpretants not as rules or objects, but rather as a **community-based procedure and result** by which linguistic norms are negotiated to a level of repeatable stability. Peirce gives three categories, meaning, sense and significance, in which words may be interpreted. For Peirce, significance corresponds to Peirce’s final interpretant (8.184).

Based on the Peircean definition of **final** and **ultimate** interpretants, I had characterized in earlier work conceptual features derived within the framework of markedness theory in the Jakobsonian tradition as ‘final’ based on its specific definition, namely that the final interpretant, as ‘living habit’, provides a norm by which one can measure dynamic interpretants (Savan 1976: 48–49; Andrews 1990: 55–58):

...the Final Interpretant is the one Interpretative result to which every interpreter is destined to come if the Sign is sufficiently considered (Peirce/Hardwick 1977: 111).

(Here, I would focus on, once again, the notion that these interpretants are part of the collective process and result of negotiating stability in meaning and can never belong only to the individual.)

And, if markedness features are defined as conceptual, then the ultimate interpretant would not be appropriate in defining such features since ultimate interpretants “cannot be a concept alone” (Savan 1986: 140). In attempting to define semantic features in human language, I have, in earlier work, drawn parallels between semantic features and the set of natural numbers, and demonstrated that these features can be described as a nonabelian group of order 6 (Andrews 1990: 117–24). I would now say that the markedness feature approach is not a powerful enough heuristic to present a satisfactory solution in a developed theory of semantics.

Before continuing our discussion of the final interpretant, it would be useful to remind the reader of the definitions of the immediate and dynamic interpretants. The **immediate interpretant** is a “first of thirds”, where all interpretants, in Peircean terms, are representative of thirdness, while immediacy is of the category of firstness. The



comprehension of the immediate object is made possible via the immediate interpretant. Savan aptly points out that the immediate interpretant is “an incipient habit, a propensity to *replicate* the same interpretation in further circumstances of a like kind” while being **uncritical** and **nonarticulated** (Savan 1980: 257 [emphasis mine—EA]). The actual events of realization, which are by definition finite and bounded, are manifestations of the **dynamic interpretant**. The dynamic interpretant is “whatever interpretation any mind actually makes of a sign” (Peirce 8.315). Thus, speech itself becomes a dynamic interpretant (Savan 1980: 258). Furthermore, it is important to restate Shapiro’s insight that dynamic interpretants taken over a period of time will tend toward final interpretants (Shapiro 1988: 125). Such a statement becomes exceedingly significant in the context of language change.

The final interpretant is explicitly tied to meaning which has a purpose, i.e. goal-oriented meaning as a result of the Peircean habit. The final interpretant may not be consciously perceived although it will be of the nature of a law or general rule, governing the working and perception of the **dynamic object**, and the dynamic object is available “only as a set of interpretants” (cf. Eco 1979: 192–93; Savan 1980: 259–60). What is, perhaps, more pertinent to our discussion is the force of the final interpretant in forming a new set of immediate interpretants and reconciling this new set with a specific set of dynamic interpretants.

This definition of the final interpretant (in terms of the immediate and dynamic interpretants) has profound implications for semiotically-based linguistic theory. First, language systems in both synchrony and diachrony are goal-driven in their dynamics. Such a claim makes provisions for phenomena such as mutability and deixis to be inherent to the asymmetrically-given linguistic sign, which is necessarily dominated by the **symbol**. Second, the habit (as final interpretant) resulting from the sign complex is not only a rule of the action produced, but is also “a behavioral attitude to act in some regular way” (Eco 1979: 194).

It is semiotically impossible for meaning to be expressed without the interpretant vehicle— thus, the interpretant (including the many different types of interpretants) is essential for the communication and signification of any type of meaning. By explicitly stating linguistic relations in terms of final interpretants, we have a more exact method of

calculating the interaction of meanings at various levels of language. The ground provides the potential for signification in general, and hence guarantees the potential for the communication of general meanings via interpretants. Therefore, both ground and interpretant are related to meaning, but my understanding of Peircean thought obliges me to state that the **meaning** is necessarily more than “a sum of grounds” (Eco 1979: 183). The qualitative difference between ground and interpretant is a vivid example of the axiom that “the whole is greater than the sum of its parts.” Although ground is an integral part of the interpretant, no possible sum of grounds will ever yield an interpretant because they are distinct categories, as different as apples and oranges.

Peirce himself acknowledges the fuzzy line between interpretants and objects. He attempts to clarify the situation by making two statements: (1) the interpretant is “all that is explicit in the sign itself apart from its context and circumstances of utterance” (5.473) and (2) “The interpretant of a proposition is its predicate; its object is the things denoted by its subject or subjects....” (ibid.). The interpretant is an essential conceptual tool for establishing the central meaning of any symbol.

The structure of language, which necessarily includes all of its functional levels from phonology to semantics, is governed by rules (or procedures) that can and do change over time. The nature of these rules (or cues) as a psychological and sociological reality are like the Peircean habit—they are final interpretants. The fundamental principle that guarantees the dynamic principle in linguistic structure is asymmetry of the sign. Since the interpretant is determined by and follows from the sign, the speaker, by using these interpretants, abductively, deductively, and inductively recreates structure in the process of language usage. The constant interplay between interpretant and sign provides the opportunity for a multiplicity of interpretations by the speaker(s). These interpretations, subsequently, determine and define the coded reevaluation of linguistic structure. In order to further the use of Peircean semiotics in linguistic analysis, it is clear that it is no longer viable to restrict reference to the sign-object triad; rather, one must include the full range of Peircean relations and sign types in order to achieve more satisfying, robust conclusions.

It is generally true that the occurrence of a particular linguistic phenomenon may have multiple motivations and explanations. What Peircean semiotics lends to linguistic

analysis is a more developed and dynamic metalanguage that may facilitate explanation of complex, unresolved language usage. One such case is the relationship between morphophonemic and morphological alternations in Contemporary Standard Colloquial Russian (CSCR). In particular, we may consider the usage of word forms in –x-, where we may be dealing with the suffixal morpheme –x- or a morphophoneme alternating with /š/ (cf. CSCR *kartoxa* - potato, *Paxa*- proper name [*Pasha/Pavel*], *Toxa*- proper name [*Ton'a/Antonina*]).<sup>1</sup> This process is possible due to the combined iconic and indexical aspects of the morphophonemic alternation /x/ > /š/ and its formal similitude with the -x- suffix (cf. Andrews 1993, 1994). Because of the broad semiotic base provided by Peircean categories, which integrates all levels of linguistic structure with the speakers who activate these structures, we can precisely define the parameters of dynamic linguistic change, logically explain why such a process is occurring, and postulate a range of potential consequences. Yet, within the framework of diagrammatization, it is ultimately the final interpretant that provides the potential for reanalysis of linguistic structure by stimulating “the formation of a new and innovative immediate interpretant” and bringing “an abductive immediate interpretant into harmony with an inductive dynamic interpretant” (Savan 1980: 261).

### **Catastrophe Theory—René Thom**

Thomian Catastrophe Theory (hence CT) was articulated with the intention to provide a means of characterization of “discontinuous phenomena by explicit equations” in dynamic systems (Thom 1983: 121). In so doing, Thom attempts to bridge the gap between traditional quantitative vs. qualitative models, continuity and discontinuity. As Thom states (1983: 111):

*What is important in a model is not its accord with experiment but, on the contrary, its ‘ontological range’, in which it states the manner in which the phenomena take place and in which it describes their underlying mechanisms. Although the gap between quantitative and qualitative modeling remains as a factor, Thomian CT does, however, make relevant statements about systems, domains, fields and their dynamic interaction.*

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<sup>1</sup> For a brilliant example of the use of Peircean semiotic principles, see Andersen's analysis of the Tetak Czech dialect (1973: 765-93).

In order to talk about CT and discuss the parallels between it and Peircean semiotic theory, it is necessary to refer to some fundamental Thomian categories, which include: (From *Structural Stability & Morphogenesis* [1975]; *Mathematical Models of Morphogenesis* [1983])

1. **morphogenesis**—any process that creates or destroys forms, i.e. discontinuity in which change in the previous form is perceived; morphogenesis is one of the central foci of CT because it defines discontinuous phenomena (Thom 1975: 7–8, 1983: 14);
2. **chreods**—areas in a natural process that are structurally stable—“islets of determinism separated by zones where the process is indeterminate or structurally unstable” (Thom 1983: 16). The chreod can be broken down into “elementary catastrophes” through the introduction of dynamic models. The most stable chreods are those “most charged with ‘meaning’” (Thom 1983: 17);
3. **structural stability**—a form is said to exhibit SS if a homeomorphic relationship can be determined between A and any A' sufficiently close to A (1983: 50); it is the dynamic that conflicts with the need for SS (Thom 1975: 19); examples of SS include interactive concepts like memory, and the referents of substantives in language (1975: 14; 1983: 50ff.); Structurally stable forms (as functions) may be altered but will retain the same topological form as the initial function/form.
4. **semantic density**—a measure of conceptual complexity implied by SS (1975: 327; Andrews 1990: 144–45); there is at least one open set where structurally stable fields are everywhere dense (Thom 1975: 26)—the manifold M where  $M > 2$  are not dense everywhere by definition.
5. **catastrophe points**—closed set in which each point is related to at least 1 function that gives a point of discontinuity (1975: 18). There exists ordinary CP and essential CP (1975: 42–43).

The concept of the generalized catastrophe for Thom is connected to the “breaking of symmetry” (1975: 11), making it hard to model. Yet, the catastrophe as *survival manoeuvre* does not destroy one system and replace it with another, but rather requires a given system to “leave its normal characteristic state” (1983: 90). Thus, the system continues to exist when it would generally be unable to do so by exhibiting a “jump”. The type of jumps/discontinuities that are the subject of CT are the same type of jumps that occur in linguistic change. However, even local models developed to describe a particular formal system in CT do not have extensive predictive powers. It is the **chreod**, as a structurally stable set, that gives definition to *replicable* properties, as shown in Peirce’s **final interpretant**. Structural stability, thus, is paralleled to the Peircean **habit**. The domains of both theories are *relatively autonomous* (not autonomous) and both reject the notion that forms are arbitrary. I would note here that Saussure’s notion of arbitrariness of the sign has, in my opinion, been one of the central causes for some of the more significant setbacks in linguistic theory throughout the course of the 20<sup>th</sup> century.

One of the contributions of CT to the semiotic perspective is the efficient symbolic language in which CT is coded (i.e. a more mathematically-determined symbolic system [more logographic than alphabetic, where semantic intuitions are replaced by geometric intuition, spatializing the object of inquiry]). Any theory of language with any explanatory depth requires geometric continuity. Also, the dynamic origin in animate and inanimate nature demands the same treatment (cf. growth of crystals vs. human memory) such that any system is the content of a domain (D) of space-time, requiring a notion of relative autonomy for all systems. Such a code is essential to synthesizing and crunching information that serves as a sufficient and necessary condition for making discrete leaps in knowledge and discovery. Furthermore, it is the chreod, as an area of SS in morphogenesis, and its interaction with structurally unstable zones within the catastrophe, that parallels the fields of final interpretants and their interaction with immediate and dynamic interpretants in determining semiosis.

The more salient common principles of CT and Peircean semiotic theory make important claims about perceptual categories and system analysis. The replacement of semantic intuitions by geometric/spatial ones in CT is very similar to Peirce’s conception

of diagrammatization. From this follows an obligatory sensitization to the constant struggle between continuity and discrete factors in dynamic models. Both CT and Peircean theory (along with Jakobsonian theory) reject the notion that forms are arbitrary. The principle that the dynamic origin of both animate and inanimate phenomena takes precedence over the animate/inanimate distinction in demanding similar methods of analysis is equally valid in both paradigms. Finally, the domains of systems in Thom's, Peirce's and Jakobson's theories are not autonomous, but relatively autonomous—their interactive nature is essential and constant.

### **Communication**

Sebeok characterizes communication as “that critical attribute of life which retards the disorganizing effects of the Second Law of Thermodynamics; that is, communication tends to decrease entropy locally. In the broadest way, communication can be regarded as the transmission of any influence from one part of a living system to another part, thus producing change. It is messages [i.e. information] that are being transmitted” (1991: 22 [brackets mine]).<sup>2</sup>

In Communication Theory, entropy is defined as the “unpredictability in the content or form of a message...Entropy in the content is the equivalent of high information, and frequently requires redundancy to be introduced into the form for effective... communication. Entropy in this form is usually a result of breaking existing conventions... Entropy correlates with information on the level of content, and is opposed to redundancy on both levels. [High information => entropic; low info => redundant.]” (O'Sullivan et. al. 1994: 106). In other descriptions of entropy, particularly social models that are open systems by definition, we find that we may need to distinguish between “internal” and “imported” entropy since in some systems, entropy actually decreases (Bailey 1990: 71):

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<sup>2</sup> It is important to note that entropy may be defined in very different ways depending on the context of usage. In thermodynamics, where the notion of system balance is significant, entropy characterizes a physical measurement, or probability, of heat production of bodies and its effect on the system state. The two laws of thermodynamics are (1) the law of conservation of energy and (2) entropy increases in all closed systems.

*The Prigogine entropy equation...shows that, although internal entropy production increases or remains constant within the system, imported entropy can be decreased by importation of energy from the environment, thus resulting in an overall decrease of system entropy or the increase of order.*

[Prigogine entropy equation for open systems:  $dS = deS + diS$  (Bailey 1990: 81)]

Thus, "the maximum state of entropy in any system is defined as maximum disorder (randomness) OR the most probable state of the system" (Bailey 1990: 86).

**For semioticians, the process of the exchange of information is the essence of semiosis.**

And this exchange necessarily includes a dual process of *signification* and *communication*. Such an approach, as Sebeok confirms, demonstrates that information production and consumption permeate the entire universe and are not restricted to human verbal systems. Examples of other systems include bacteria, plants, animals, fungi, and the component parts of living organisms (cf. cells, organelles, organs, DNA, proteins, etc.) (Sebeok 1001: 22).

In analyzing communication and information flow, we ultimately focus on input and output, encoding and decoding. For examples of models that facilitate the understanding of this principle, see Sebeok (1991: 26–29, 54) and Thom (1983: 278). Thom, for example, notes that it is impossible to reduce information to the content signified; rather, information is the meaning plus intentionality that allows it to continue and grow (1983: 282).

**Jakob von Uexküll's *Umwelt-Forschung***

The work of Jakob von Uexküll, a semiotician who worked in behavioral biology in the 1920's, is fully compatible with Peircean semiotic theory. Uexküll's definition of the life process is "a coherent system in which subject and object define themselves as interrelated elements of a superior whole" (Thure von Uexküll 1986: 130). Uexküll's 'object' is an open, dynamic cyclic system that interacts with its environment. In this context, he presents the concept of "species-specific Umwelt" defined by the species-specific receptor and effector capacities called perception and operation (T. von Uexküll 1986: 131). {See Andrews 2003: 61 for an adapted version of Uexküll's **functional**

**circle.**} Sebeok articulates a strong version of Uexküll's concept to argue that there is no existence for the organism beyond its Umwelt and categorizes Uexküll's theory as endosemiotics (Sebeok 1991: 86).

Uexküll's model of semiosis includes an important time structure where perception is defined as a "meaning-specifier" but "meaning-utilization" is only realizable at some future point (T. von Uexküll 1986: 133). Since the relationship between subject and object (also read sign/object) is contextually determined, the resulting relationship is only realized via an interpreter. And it is the interpreter (similar, but not identical, to Peirce's interpretant) that can determine if the relationship is valid or invalid. In such a model, so-called objects only exist in the human mind "as a coherent whole distinctly definable in space and time ... an abstraction (T. von Uexküll 1986: 138). Thus, these objects are knowable only as a series of signs, and these signs are "private" messages understood only by the recipient via its receptors. Probabilities and possibilities are in a reciprocal relationship (T. von Uexküll 1986: 138–40).

Because of the hermetic nature of individual messages, we must necessarily have access to a code that as a more general competence (cf. immune cells). In this way, "biological signs and biological texts write themselves" in a way that an author writes a text. And it is in the integration of elements that new qualities and relationships appear that were previously unknown at the individual level (1986: 141–43).<sup>3</sup> Therefore, in the Uexküll model, the crux of the semiotic problem is "sign-theoretical explanation of our mechanistic interpretations" (1986: 148). There von Uexküll provides three basic types of semiosis in order to differentiate functions: semiosis of **information** (or signification), **symptommatization**, and **communication**. The first two are indispensable in biosemiosis in allowing the observer to "reconstruct the sign processes of the living beings observed by him/her...[but] this reconstruction...only provides...the exterior and not the interior structure of biosemiosis" (1986: 150). Only those signs that are a part of the code of an organism's particular *Umwelt* can be perceived. The semiosis of communication is

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<sup>3</sup> Maturana and Varela (1972), also biologists, have made an invaluable contribution to the study of living organisms with their theory of *autopoiesis*, which is fundamentally semiotic in its design and fully compatible with Uexküll's theory of *Umwelt*. I would note here that as early as 1979, C.H. van Schooneveld insisted in his writings and teaching that *autopoiesis* was a central contribution to the study of human language and linguistic meaning. It is no coincidence that Maturana was interested in Uexküll's theory (cf. Maturana & Mpodozis 1992: 14). [Special thanks to Julie Tetel for the Maturana/Mpodozis reference on Uexküll.]



group- based where both speaker/receiver (or transmitter/recipient) have access to the same set of interpretants. It is at this point that we find a strong connection between Uexküll's theories and Lotman's work in the semiotics of culture, in which human language plays the central role, as will become apparent in the discussion to follow.

### **Metaphor and Metonymy**

There has been a significant interest in the principles of metaphor and metonymy in 20th century linguistic thought. One of the stronger versions of these concepts can be found in the works of Roman Osipovich Jakobson, and later in the work of his former students. Unlike the literary-based definitions of these terms, where metaphor and metonymy are mere 'figures of speech', the Jakobsonian model reveals a structural system in which the paradigmatic and syntagmatic axes, as the axes of substitution/selection and succession/combination respectively, are the fundamental operating principle for human language. Through the utilization of paradigmatic (also *in absentia*) and syntagmatic (also *in praesentia*) relations, the encoding and decoding of speech events in human language becomes possible. Jakobson sees a clear correlation between paradigmatic phenomena and signs (or sets of signs) that are conjoined by the principle of *similarity* and syntagmatic phenomena and signs that are conjoined by the principle of *contiguity*. Once the organizing feature of the paradigmatic and syntagmatic signs is identified, Jakobson argues that this correlation is not coincidental, but corresponds to actual sign categories (as structural relations) that can be characterized as metaphor and metonymy. What is potentially a weakness in this type of approach is the fundamentally binary nature of the opposition itself. It is often the case that dynamic, complex processes require a more intricate network of defining categories.

Jakobson's most profound realization of the essence of the metaphoric and metonymic poles of language can be found in his 1956 article, "Aspects of Language and Types of Aphasic Disturbances." In that work, Jakobson demonstrates how metaphor and metonymy as structural relations can explain language breakdown in the case of different types of aphasia. Although it would be an oversimplification to claim that Jakobson fully characterizes all types of aphasia, this article remains an important contribution to the study of aphasia and, perhaps more importantly, to the study of

symbolic processes as they occur in any manifestation of human language. In particular, Jakobson captures the fundamental nature of the ever-present tension between the metaphoric and metonymic poles of language in all of its functions.

The notion of metaphoric sign types has an even deeper realization in the works of C.S. Peirce in the various types of iconic signs. The power of iconicity in language change and maintenance has been the focus of numerous semiotic and non-semiotic studies in linguistic theory in the latter part of the 20th century. Some of the more prominent figures working with concepts of iconicity include Anna Wierzbicka, John Haiman, and Michael Shapiro. The concept of metaphor plays a major role in the research of a group of cognitive and anthropological linguists associated with Mark Johnson and George Lakoff.

Thomas Sebeok has been the most prominent leader of the semiotic movement in the United States and has been central to the published realization of the important works of many East and West European scholars. Sebeok served as editor of several monograph series, including *Advances in Semiotics* and *Approaches to Semiotics*, as well as editor of the journal *Semiotica*. For an excellent list of American contributions to the field of semiotics, see Sebeok's 1991 *Semiotics in the United States* (Indiana University Press).

### **Lotman's Communication Act and Semiosis**

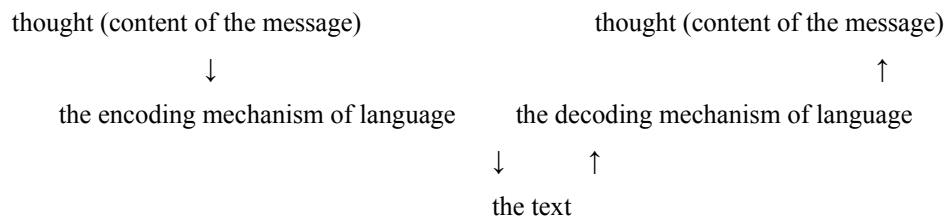
Yury Lotman has made a significant contribution to a semiotic theory of textual analysis, not only in his early work with the Tartu School where he distinguished primary and secondary modeling systems, but perhaps more strikingly in his more mature work on the semiosphere and discontinuities in cultural systems (cf. Lotman 1990, 1992a & b). The breadth and insightfulness of Lotman's published works continue to provide fruitful ground for further development and discussion not only in the area of semiotics, but also in the study of Russian literature and culture. In the present section, I would like to focus on Lotman's communication model as given in his work concerning the text as a "meaning-generating mechanism" (1990: 11–19) and explore its compatibility with other speech act models, particularly those given in Jakobson (1960/1987) and Sebeok (1985, 1991). The goal of this section is to demonstrate the

unavoidable and essential presence of an infinite series of potential embedded speech acts in any given instantiation (as a dynamic interpretant in Peircean terms). In fact, it may be argued that the ultimate power of any such semiotic model of communication lies in its ability to adequately define the structural principles of encoding and decoding as they occur at multiple discrete and continuous levels.

### **Lotman's Three Functions of the Text**

In order to define the fundamental functions of a text, Lotman is obliged to begin with a model of how information is communicated via language from the perspective of the addressee/receiver. In his definition, Lotman sets up the following sequence and demonstrates why it may be problematic (1990: 11):

Figure 1

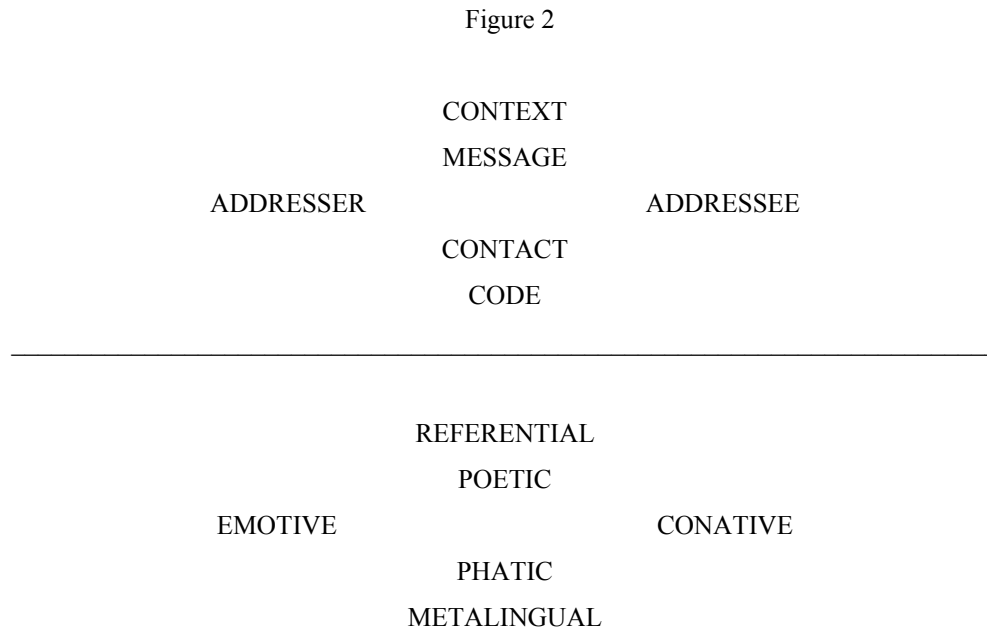


At first blush, this model appears to describe a linear sequence of the pathway of any verbal message. However, when we consider that any process of communication always occurs imperfectly, we cannot find the diagrammatic model given above to be sufficient to the task of explaining the required semiotic mechanism. Lotman himself is critical of this model since it requires, by definition, complete identity of addresser and addressee in order for a full semiotic transfer of information from source to goal to occur successfully. As a result of this model, Lotman will pose a different alternative, using as a baseline the Jakobsonian speech act model.

### **Jakobson's Six Factors and Functions**

In order to appreciate the multifaceted nature of human language, Jakobson designs a model of the six factors and functions of any speech event that are necessarily

present in any instantiation of language. These factors and functions are given below (1960/1987: 66–71):



The Jakobsonian model requires that all six factors and functions be present in any speech act. The variability lies in the inherent hierarchy of the factors and functions in relation to themselves. Thus, in one instance, the dominant function may be metalingual, while the next speech act may have the referential function as its dominant function. Furthermore, within any two speech acts where the dominants are the same, the subsequent hierarchy of factors and functions may be drastically different. Jakobson is careful to note that there can be no equally powerful speech act model that distinguishes less than these six factors and functions (1987: 66).

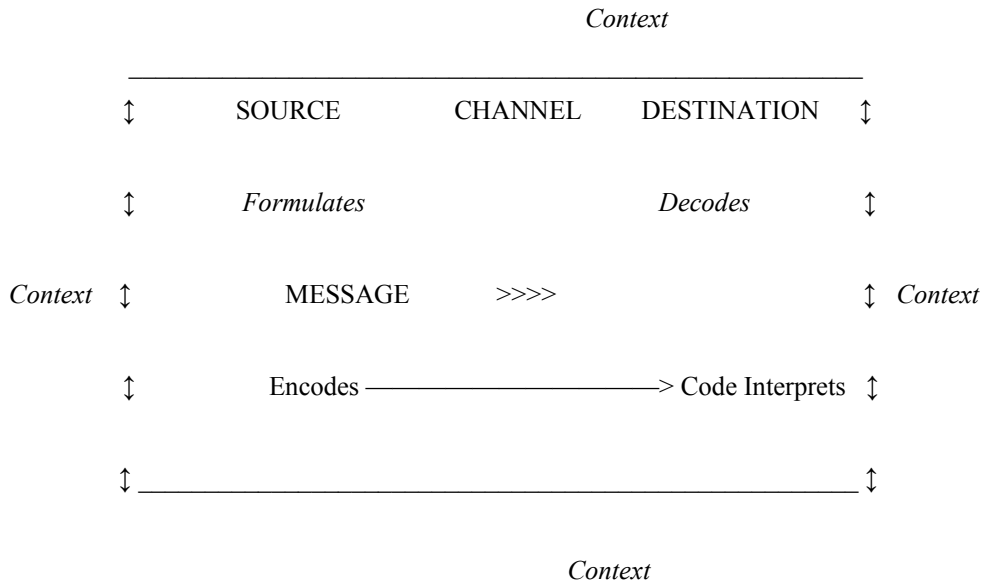
Before returning to Lotman's original construction, it is important to consider one final model of communication as developed by Thomas Sebeok for semiotic systems in general.

### **Sebeok's Communication Act**

The Sebeok model of communication is similar to the Jakobsonian model with at least two major differences: (1) the **context** is the factor within which the entire communication act is embedded and (2) the model includes communication that is not

based in human language (Sebeok 1991: 29–30). Note the following diagram (from Sebeok 1991: 29):

Figure 3



Sebeok makes a special point about the dynamic and adaptive nature of the process diagrammed above:

All communication systems are...not just dynamic but adaptive; that is, they are self-regulated to suit both the external context (conditions of the environment) and the internal context (circumstances inherent within the system itself, such as the array of presuppositions and implicatures that characterize sentences) (Sebeok 1991: 30).

This important observation is stated in the context of the general significance of communication, where it is only via communication that complex, living beings become part of an organizational network with potentially diminished entropic tendencies (Sebeok 1991: 22).

### **Lotman's Autocommunication**

As Lotman continues his analysis of the text as a meaning-generating mechanism, he broaches the subject of *autocommunication*, where the subject is transmitting a

message to him- or herself. Lotman argues that this phenomenon is much more important than has previously been thought, and that, in fact, it can fulfill not merely a mnemonic function (which is the case when the second “I” is “functionally equivalent to a third party” [1990: 21]), but fulfills a cultural function. In the second instance, the information transmitted is qualitatively restructured and necessarily involves a doubling of both the message and the code and is never self-contained (1990: 22).

Some of the more salient features of autocommunication include increase in indexicalization of sign types (e.g. abbreviations that are only decipherable by the text creator, lack of complete sentences, etc.) (Lotman 1990: 26–27). Lotman even claims that rhythmical-metrical systems originate in the autocommunication system and not in the “I-s/he” system (1990: 30). The discussion is concluded with the observation that all of culture is not only “the sum of the messages circulated by various addressers” but “as one message transmitted by the collective ‘I’ of humanity to itself...a vast example of autocommunication” (1990: 33).

What is important about autocommunication for the present discussion is the obligatory doubling of parts of the speech event, especially addresser, message, and code. Lotman (1990: 33) also discusses a doubling of the *channel*. It is important to note that Sebeok uses the term *channel*, while Jakobson uses the term *contact*, which is generally interpreted to include the notion of channel.] Finally, Lotman echoes Sebeok's need for a larger role for "context" in his positing of the **semiosphere** itself, which is the prerequisite space for all cultural signification and communication (2000: 250-276).

Clearly, there is never a singular speech act after the evolutionary inception of the language system; rather, each speech act is obligatorily imbedded in an n-length chain of discrete speech acts. As the speech acts combine and extend into this never-ending chain at multiple, potentially infinite, levels, we see that the strings of discourse become more and more complex and, in time, make demands upon the participants' ability to recall and actively produce previously given utterances and information from the ongoing chain in the present and future. It is at this juncture that we require a sufficient and well-defined semiotic framework that can adequately describe the interaction of language and memory structures. Lotman's extensive work on the semiosphere and the semiotics of

communication provide some invaluable concepts and categories that offer insights into the structural principles of semiosis.<sup>4</sup>

### **The Semiosphere**

Lotman begins his discussion of the semiotic space by noting that research based in the semiotic paradigm has proven that well-defined and functionally unambiguous systems never exist in an isolated form. Rather, they can only become meaningful and functional when perceived as one segment of the continuum of multifaceted, multileveled and variegated semiotic formations, i.e. when they are “‘immersed’ in semiotic space” (1990: 123–24; 1992b: 12–13). Lotman deduces that this situation demonstrates that “semiotic experience precedes the semiotic act” and, therefore, we must define this fundamental ground of semiotic experience as an initial point for our structural framework (1990: 123). Lotman names this structural framework the *semiosphere* (by analogy with Vernadsky’s *biosphere*):

“the semiotic space necessary for the existence and functioning of languages, not the sum total of different languages; in a sense the semiosphere has a prior existence and is in constant interaction with languages” (1990: 123).

The four fundamental concepts associated with the semiosphere are the following: (1) **heterogeneity**—the languages of the semiosphere run along a continuum that includes the extremes of total mutual translatability and complete mutual untranslatability (Lotman 1990: 125; 1992b: 11–24; 1992a: 14–16); (2) **asymmetry**—the structure of the semiosphere is asymmetrical at multiple levels, including asymmetry in terms of internal translations, center vs. periphery, and metalinguistic structures (Lotman 1990: 124–27; 1992a: 25–30; 1992b: 16–19); (3) **boundedness**—one of the primary mechanisms of semiotic individuation is the creation of boundaries, which define the essence of the semiotic process and are abstractions often described as a series of bilingual filters/membranes that are by definition permeable and fluid, on the one hand, and the area of accelerated semiotic processes on the other (Lotman 1990: 131–40;

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<sup>4</sup> In an earlier version of this work, I provided diagrams to demonstrate how these multiple and simultaneously embedded speech acts might look.

1992b: 13–16);<sup>5</sup> (4) **binarity**—the beginning point for any culture based on the binary distinction of internal vs. external space; Lotman insists that binary oppositions in the semiosphere only exists as pluralities, i.e. as a mechanism that is obligatorily included for multiplication of languages (Lotman 1990: 124, Lotman 1992b: 13–17). Lotman's take on binarity is a good beginning for developing a corrective to the dyadic approach and opening the door to a more robust characterization of language function and usage, where all *linguaging* is conducted within the boundaries of the semiosphere. Donald talks about "cultural mindsharing", a formulation that is compatible with Lotman's theory (2001: 10-12).

Beyond the boundaries of the semiosphere, one finds externally-given, unorganized, “non- structural” surroundings. Even if one were to imagine that there was no space beyond the semiosphere, in Lotman’s conception, the semiosphere will nonetheless construct such a chaotic external field (1992b: 15–16).

One of the remaining defining characteristics of the semiosphere and the “highest form and final act of a semiotic system’s structural organization” is self-description, or the development of a metalanguage (Lotman 1990: 128; 1992b: 16–17). Once such a metalanguage is in place, the system achieves a higher level of organization, but the presence of the metalanguage slows down dynamic development and the processing of new information. However, the semiosphere’s metalanguage may be necessary to prevent disintegration of the semiosphere itself. This would be the case if diversity within the semiosphere were to become overly prevalent. Once again, the role of self-description in the semiosphere is played out between the bounded areas of center and periphery. The center would be defined by the metalanguage, while the periphery would still be free of self-description and more likely to be defined by accelerated dynamic

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<sup>5</sup> One of the primary defining characteristics of the boundary involves translatability across and within said boundaries. The importance of translatability parallels the Peircean notion of translatability as the defining property of the interpretant and its role in the sign complex. Lotman (1990: 11-19; 1992: 8-17) tackles the question of translatability in the context of tension in discourse in terms of (1) a desire to achieve understanding and (2) attempting to increase the value of the message.



development (ibid.). In the end, it is the semiosphere's heterogeneity that underlies its *integrity* [in Russian целостность/*celostnost'*] (Lotman 1992b: 17).<sup>6</sup>

If we now return to our modified view of the communication act, then we may wish to imagine how this model might effectively demonstrate the importance of a system-based metalanguage. I believe that we can diagrammatically show this important feature of the semiosphere through a reordering of factors, where code would become dominant at each of the levels given as soon as it enters the system.

In order to define the dynamic mechanism of the semiosphere and its contents, we must go beyond the four properties of the system and unveil the underlying structural invariant—the principle of continuity and discontinuity.

### **Continuity and Discontinuity**

The question of continuity and its relationship to discontinuity (or discreteness) is a subject of enormous philosophical import. It would be impossible for Lotman to construct the principles of organization of semiotic spaces without recourse to this important distinction. Clearly, Lotman is not the only semiotician to be concerned with this distinction, and thus, I will include relevant discussions of the notion from C.S. Peirce and René Thom. It is only after addressing this important distinction that we may move forward to discuss the functioning semiosphere in time and space from the perspective of both the individual and collective levels.

For Peirce, cognition and perception, as central issues in semiotic epistemology, are, by definition, obligatorily continuous. That is why Peirce claims that continuity is “the leading conception of science. The complexity of the conception of continuity is so great as to render it important wherever it occurs” (1957: 204). Continuity occurs within the science universe as a direct and necessary result of the sign's triadic nature. Peirce goes on to admit that “the idea of continuity is so indispensable... that it is perpetually introduced even where there is no continuity in fact...” (1957: 59). However, continuity is not the entire picture. As Thom points out, we must have a theory that has descriptive power in the context of forms and structures that are spatially and temporally bounded.

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<sup>6</sup> Lotman is one of the major figures in Russian/Soviet semiotics of the past forty years. For more on Lotman, Soviet/Russian semiotics, and the Tartu-Moscow school of semiotics, see Andrews 2003, Ivanov 1998, and the revitalized Tartu-based semiotic series *Sign Systems Studies* (led by P. Torop).

Such boundaries are necessarily discontinuities in the system. Thus, in a Thomian world, discontinuity is defined as a “change in the previous form” and this concept plays a key role in his theory of *morphogenesis* (Thom 1975: 7). For Thom, as for Lotman, the dynamics of the system can come into conflict with the need for *structural stability*. Since continuous models always become unique and reintroduce a discontinuous factor, leading back to a formal system, it is unavoidable that continuous models/systems necessarily have a discontinuity at some point. Therefore, it is unavoidable that any semiotic space will be made up of both continuities and discontinuities that are asymmetrically defined.

Lotman represents the relationship between continuity and discontinuity in a fashion that is quite complementary to a Thomian model in that he begins with discontinuity and only then moves on to continuity. In his discussion of culture, where culture is obligatorily a complex unit (1992a: 25), Lotman points to discreteness, the mechanism for producing information segmentally, as “the law of all dialogic systems” (1990: 144). Therefore, if culture consists of different levels moving at different speeds and at different points in development, then it follows that any “cut” (Russian *рез*) will produce the immediate, simultaneous presence of variegated and qualitatively different stages (1992a: 25). In this scheme, the gradual (continuous) processes will guarantee the existence of innovation, while the explosive (discrete) processes will guarantee “succession” (Russian *преемственность*) and these two phenomena are endlessly (and inseparably) intertwined so that a constant dynamic is in place (Lotman 1992a: 26–27). So we find that Lotman makes a clear statement that all continuous phenomena guarantee discontinuities and all discontinuous phenomena guarantee future continuities within the cultural-semiotic system.<sup>7</sup> One final piece of Lotman’s argumentation is found in his distinction between actual discontinuity and perception of discontinuity. The perception of discontinuity is perhaps best described in the context of a culture’s power of self-

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<sup>7</sup> Perhaps the sense of Lotman’s characterization of continuity and discontinuity becomes clearer in the context of his discussion of the “moment of explosion”, which is a point of higher charged information of the entire system where any element from within the system or from another system may become the dominant element following the explosion (Lotman 1992a: 28). The inception of the explosion (or discontinuity) is first and foremost the beginning of a new stage in the semiotic system’s development (Lotman 1992a: 32). But this new stage must be viewed not as a linear development, but more in terms of a cyclical alternation similar to a sine curve. For more discussion of the cyclical nature of culture, see Lotman 1990: 144–45).

description. Even though a culture's development is cyclical in nature, the periods of self-awareness are "usually recorded as intermissions" (cf. describing the history of the Russian novel as an example) (Lotman 1990: 144). The result is viewing the cultural text as a "freeze frame, an artificially frozen moment between the past and the future" which is asymmetrical by definition (Lotman 1992a: 27 [translation mine]). The asymmetry of the relationship between past and future is defined by Lotman in the following way:

*The past is given in two manifestations: internal—the direct memory of the text as embodied by its internal structure, its unavoidable contradictions, its immanent battle with its own internal synchronism, and external—as it correlates with extratextual memory. Placing oneself into the present, which is realized in the text (for example, in a given painting at the moment when I am looking at it), the viewer actually fixes his gaze into the past, which converges like a cone with its end-point in the present. Looking to the future, the participant becomes inundated by a spectrum of possibilities that have not yet made their potential choice. The unknown nature of the future allows anything to be potentially meaningful* (Lotman 1992a: 27 [translation mine—EA]).

It is at this juncture that we find an important distinction between internal and external memory and in exploring its realization, we return to the core of any semiotic space—human language.

### **Lotman and Collective Memory**

Any discussion of the interrelation of language and memory necessarily must include both the individual and collective levels. Clearly, the speakers of a given language must assimilate a significant amount of information and behaviors in order to be recognized as a full-fledged member of a particular linguistic community. This aspect of language learning is dependent upon mastery of a norm that is determined a priori to the individual speaker's existence in the framework of a dynamic system that presupposes the participants of the speech event (including addresser and addressee), context, contact, code and message. As discussed above, in order for this communicative system to begin to operate in the Lotmanian semiotic paradigm, it must be initially contextualized and immersed in semiotic space, a space which Lotman designates as the **semiosphere** (Lotman 1990: 124).

In the context of the semiosphere, language becomes a complex set of relations that may be called ‘functions’ that map between distinctly heterogeneous, asymmetrical semiotic spaces (Lotman 1990: 125–26). The asymmetry of the semiosphere may be realized as center/periphery, different velocities of semiotic layers, or different temporal periods. The semiosphere may appear to be a semiotic unity at its highest level, but in fact it is a conglomerate of boundaries defining ever-changing internal and external spaces (Lotman 1990: 127–30). Thus, there can be no ‘language’ or ‘memory’ for Lotman without the guarantee of semiosis in the form of the semiosphere.

One of the manners in which cultures and languages maintain their identity is through the utilization of collective memory, which creates mechanisms for self-preservation and propagation. Lotman identifies writing as one of the most important means of preserving information of discrete, even anomalous events (1990: 246–47). Writing as memory sets up the potential for linear (cause and effect) relationships, an increase in “the quantity of texts” and information in general (1990: 247). The other central means of self-preservation is oral culture, where the focus is not on the generation of new texts, but on the regular, ritualistic, law-based nature of existence (1990: 246–47). Both forms of collective memory rely predominantly on language. It is important to note that writing, as opposed to oral culture, shifts the burden of ‘memory’ from the individual to an externally-given symbolic system, while oral culture is more determined by the accuracy of individual memory. In essence, language becomes the symbolic “condenser” between different levels of semiosis and different segments of the time axis (Lotman 1990: 110).

If language itself necessarily exists within and beyond the individual speaker, requiring both individual and collective memory, then texts, as a codification of a moment between past and future in an asymmetrical fashion, become meaningful in the undeterminability of the future (Lotman 1992a: 27–28). And culture, in Lotman’s definition, necessarily includes not only collective memory, which allows for the preservation and transfer of knowledge and information through time, but collective intellect, which guarantees the potential actualization of coded information in the present and the production of new information in the future (1992b: 200). Thus, it is through the

communication act, defined as a semiotic entity, that continuity and higher-level orders such as language and culture are created from endless strings of discontinuities:

The individual human intellect does not have a monopoly in the work of thinking. Semiotic systems, both separately and together as the integrated unity of the semiosphere, both synchronically and in all the depths of historical memory, carry out intellectual operations, preserve, rework and increase the store of information.

*Thought is within us, but we are within thought just as language is something engendered by our minds and directly dependent on the mechanisms of the brain, and we are with language* (Lotman 1990: 273).

### **Semiotics and Cognitive Science**

The question of the interrelationship between brain, language and culture is one of the most fruitful areas of research in linguistics and cognitive science today. The semiotic approach to these questions provides an important foundation upon which to formulate and test hypotheses about the generation of meaningful systems of knowledge at the individual and collective levels in a way that is relevant to central questions of contemporary cognitive and neuroscience today. Many in the scientific community, including psychologists, neurobiologists, cognitive scientists, grapple with questions of human language in the context of their research. What is missing is more significant input from the linguistic community itself. Obviously, there are voices from the linguistic community that have taken on this role (Searle, for example, has been doing this for the past three decades). Slavic linguistics as a field has its roots in a rich tradition of theoretical studies of language and brain that are not only seeped in semiotic epistemology, but continue to be mainstream texts in neuroscience research, especially the works of Vygotsky and Luria (see also Frawley 1997).

There are multiple venues in which linguists might take on a larger role in working with the cognitive science community today, including redefining basic terms like "speech" and "language" and what they mean in the context of language and brain, designing linguistic experiments and monitoring language function with brain imaging technologies (including ERP, PET, fMRI, CT, MEG), the study of multilingualism, language pathologies, or memory and language (cf. Rosenfield 1988, Fabbro 1999, Luria

1996 are just a few examples of outstanding research in these areas where human language plays a central role).

In my view, the fundamental questions of brain and language found in all of the current linguistic research on the topic falls into one of three categories: (1) the degree of innateness and naturalness of human language; (2) the degree of autonomy of language structures in the brain (including modularity, connectivist, and localization theories); and (3) the relevance of *critical periods* in language learning. Each of these broadly-based questions are answered in a particular way or ignored, depending on the theoretical linguistic approach applied.

I would like to address specifically the third point in the context of first and second language acquisition as an example of how linguists can make an impact within the language/brain debates. There are many non-linguists, as well as some linguists, who believe that mastery (i.e. achievement of native or native-like proficiency) of a second or third language is not possible after a certain age. What that age may be varies from source to source, with success rates sometimes posited as low as 5% (Selinker 1972: 209-231, Danesi 2003: 3-4).<sup>8</sup> The explanation given for this language failure is often based on the notion of *critical period* – the learner initiated study of the second or third language after the "window of opportunity" had closed. The notion of the hopelessness of achieving high level proficiency in a second language is so great that it has reached the level of an urban myth; even people who know nothing about language and brain are quite certain that this state of affairs is inevitable. However, the neuroscience community has been quite clear in its articulation of what critical periods in cortical development actually are, and even in questioning the notion itself. Dowling gives an outstanding summary of the notion of critical period, referring to it as the "period of great susceptibility" where there is often "neither a sharp start nor a sharp end..." (2004: 50). Moreover, he notes that "critical periods can be modified by environment" (2004: 51). Although Dowling is more interested in vision and ocular dominance in these passages, his definition of the notion reveals that the generic use of the term in reference to language acquisition in particular may, in some cases, be inaccurate. Both theoretical and

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<sup>8</sup> Danesi 2003 is an outstanding example of how the semiotic approach can be successful in renegotiating the boundaries between what has traditionally been called applied and theoretical linguistics in order to make a significant contribution to larger questions on language and brain.

applied linguists are very interested and active in studying questions of language acquisition (first and second) and need to continue to develop research projects that borrow from and are relevant to the cognitive and neurosciences. Semiotics provides a common space on which linguists and cognitive scientists can interact and talk about precisely these issues.

The neuroscience community has made enormous advancements in understanding the mechanisms of human memory and cognition. Rose, for example, argues quite convincingly that the fundamental structural principles of memory are not definable if one is restricted to the individual level (1992: 60):

Individual our memories may be, but they are structured, their very brain mechanisms affected, by the collective, social nature of the way we as humans live."

Lotman echoes Rose in his stance that there is neither language nor memory without the prerequisite semiotic space, which he has named the semiosphere (1990: 124). For Lotman, culture not only includes collective memory, but also collective intellect, thus ensuring the chain of semiosis and the generation of meaning (1992b: 200; Andrews 2003: 156-7). And it is the Peircean interpretant that, in creating "an equivalent sign, or perhaps a more developed sign" (2/.228) in the mind of the user, directs the individual's encoding behavior, and continues to underwrite the generation of current, past and future meanings in both individual and collective memory.<sup>9</sup>

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<sup>9</sup> For a more thorough rendering of these points, see Andrews 2003: 158-160. I would note here that Peircean interpretants, especially the three sub-types of the dynamic interpretant (emotional/energetic/logical) have significant explanatory power in explaining certain aspects of first and second language acquisition (Andrews 1990: 64-80). A recent **Newsweek** article ("Your babies brain," Aug. 15, 2005, 33-39), which refers to Kuhl's research on successful and unsuccessful language acquisition in infants, is an example where Peirce's semiotic theory would have predicted such findings and provided a robust explanation for them.

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