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A Biosemiotic Modeling of the Body-“Self” Synechism

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Abstract

As a counterargument to the Cartesian split that has impacted both speculative and practical fields of knowledge and culture, we propose Peirce's doctrine of synechism to show the continuity in the semiotic activity that moves from the body as an Interpretant to the emergence of another Interpretant called the “self.” Biosemiotics, a nascent field of interdisciplinary research that tackles inquiries about signs, communication, and information involving living organisms is used as the framework in the discussion. The main question of whether a non-material “self” can emerge from a material body is tackled in many stages. First, the biosemiotic continuum is established in the natural biological processes that takes place in the body. These processes can be taken as an autonomous semiotic system generating the “language” of the body or the Primary Modeling System (PMS). Second, synechism is also observed in the relationship between the mind and the body and this is evident in any physician's clinical practice. The patient creates a Secondary Modeling System (SMS) of how she perceives what the body communicates to her regarding its state or condition. Finally, the question about whether the emergence of “self” is synechistic as well is tackled. There is one organ from which emerges an Interpretant that is capable of generating a dialog between a Subject, that is the “self,” with its Object, and that is the brain. It is the primordial seat of specifically human activities like thought and language. The recent theory on quantum consciousness supports the doctrine synechism between the body as Interpretant to the “self” as Interpretant. This synechism is crucial for the creation of Secondary Models of “reality” that will, in turn, determine the creation of Tertiary Models more familiarly called culture.

Keywords: semiotics, biosemiotics, synechism, Charles Sanders Peirce, Peirce-Sebeok modeling systems

1. Introduction

After Renè Descartes (1596–1650) introduced the doctrine of the duality of substances, namely the mutually exclusive *res extensa* and the *res cogitans*, philosophy has for centuries been battling with how to regard the human body. The Cartesian split resulted in an obvious dilemma. Shall the body be considered as constituting merely a part of what defines a human being? Or does the body define what the human being is in its entirety? Countless studies on the mind–body problem have been trying to resolve the issue, “can a non-material ‘self’ emanate from a purely material body?” This seemingly speculative or theoretical question has spawned divisiveness and fragmentation that we find at the root of contemporary culture.

Societies worldwide are plagued with uncertainty, confusion, and ultimately anxiety that have a major impact on people's mental health [1]. Unknown to many that by the end of the 19th century, Charles Sanders Peirce (1839–1914) had already proposed a counter-argument to the chasm created by the Cartesian duality and that is through his doctrine of synechism ([2], p. 1–2).

“Synechism” is the name, from the Greek synechismos (συνεχισμός), from syneches (συνεχής) meaning continuous. This doctrine is fundamental in Peirce's metaphysics which holds “that all that exists is continuous” (CP 1.172) and as a corollary, “the view that consciousness has a bodily and social dimension, the latter originating outside the individual self” (CP 7.575) ([3], p. 1).

This chapter will usher the reader to the basic notions of Peirce's semiotics and then introduce them to the field of Biosemiotics. A biosemiotics framework will be used to demonstrate how synechism operates in biological processes, particularly in the human body as an independent semiotic system. After which the doctrine of Peircian Categories will be explained to be able to demonstrate the plausibility of synechism between body and consciousness. Establishing this continuity is fundamental to the proposition that the doctrine of synechism is crucial to reversing the cultural effects of the Cartesian split.

2. Charles Peirce and biosemiotics

Biologists generally agree on the fact that the human body consists of codes that carry information. The genetic information the cellular DNA carries is sought to be interpreted, that is to be unraveled and understood. The recourse to collaborative reproduction technology includes embryonic genetic screening as an option. This gives the prospective parent or parents an idea of whether the embryo will turn out to be a healthy or defective child. Hence in this chapter, we assume the human body to be, in Peircian terms, a semiotic system where communication takes place. But, in the spirit of Peirce himself, let us first elucidate the nature of the human body as a semiotic system.

The potential incorporation of philosophy in the dialog among different branches of the sciences has been foretold by Peirce at the beginning of the 20th century. The formulation of his theory of knowledge had its applicability to the sciences foremost in mind. He had even given this field a primordial position of importance because, in his words, “(T)he more a man is educated in other branches, but not trained in philosophy, the more certain it is that two-thirds of his stock of half-conscious philosophical opinions will be utterly wrong, and will completely blind him to the truth, which he will gradually become unable so much as to conceive” (CP1.134) [4]. This quasi-prophetic adage came to fulfillment within the same century when several men from various fields were unknowingly working simultaneously at “various independent lines of inquiry into the problems of information processing, intercellular communications, behavioral psychology, neurobiology, and animal ecology” ([5], p. 35).

Up until very recently, it had been implicitly assumed that the use of such terms as “message”, “signal”, “code” and “sign” in the context of biology was ultimately metaphoric. More often than not, biological processes have been reduced to understanding and subsequently explaining either the chemical or the physical phenomena taking place within an organism. However, such reductions have become increasingly untenable even in theoretical terms. Besides, there were other exigent issues in biology of whether signification is circumscribed in the unfolding of events, or whether they answer to some fundamental laws, or even meant to accomplish some grand design. Is biology just a description of things as they

happen in living systems or should it postulate that everything is determined by a deep plan ([6], p. 228–247)? These are concerns tackled by fields of investigation such as Philosophy of Biology and Biosemiotics. The latter is a fairly recent research area that began an attempt to revive the dialog across the life sciences – as well as between the life sciences and the humanities – regarding what precisely such terms as “meaning” and “significance” might be in the context of living, complex adaptive systems [7].

As an upcoming field, biosemiotics defines its domain as the study of signs, communication, and information in living organisms [8]. Biosemiotics is an interdisciplinary research agenda investigating the myriad forms of communication and signification found in and between living systems. It is the study of representation, meaning, sense, and the biological significance of codes and sign processes. The scope of inquiry in biosemiotics spans from genetic code sequences, to intercellular signaling processes, to animal display behavior, up to human semiotic artifacts such as language and abstract symbolic thought [7]. Biosemiotics aims to extend the notions and principles of general semiotics to apply to all life processes in the biosphere. Although this chapter would not enter into specialized biosemiotic themes, it would make use of some of its findings, especially as regards the semiotic analysis of the human body as a biological system.

To date, there are four different models of biological semiosis and at least four different schools of biosemiotics. The first was introduced in 1974 by Marcel Florkin (1900–1979). He proposed a biosemiotic model explaining biological “genotype and phenotype” according to the dualistic model of Saussure’s “signifier and signified.” The second is the model developed in the 1960s and 70s by Thomas A. Sebeok (1920–2001). He adopted the triadic scheme of Peirce first in zoosemiotics (semiotics applied to animal behavior) in 1963 and then in the more general field of biosemiotics. Sebeok insists on interpretation as an indispensable component of any semiotic process. The Peirce-Sebeok model of semiosis has a wide following and has been adopted by most biosemioticians, in particular by the Copenhagen-Tartu school (Claus Emmeche, Jesper Hoffmeyer and Kalevi Kull) and (in a hermeneutic version) by the Prague school (Anton Markoš). There exists a third model suggested by Marcello Barbieri (1940–) in the 1980s that considers the cell as a triad of genotype, phenotype, and ribotype, where the latter represents the cell’s “code-maker”, i.e. the seat of the genetic code. In this framework, the simplest semiotic system is the triad “sign, meaning and code” and the origin of semiosis (the semiotic threshold) does not coincide with the origin of interpretation (the hermeneutic threshold). The fourth proposed by Howard Pattee (1926–) includes epistemic matter, something that stands in relation to something else, as an emergent process that leads necessarily to a triadic Peircean relationship of “matter, interpreter and referent” ([9], p. ix-x).

Even among those who identify themselves as biosemioticians, no single well-defined paradigm of this field of study serves as the theoretical framework for ongoing investigations. However, there are shared theoretical assumptions that can serve as the conceptual basis and the basic principles of a semiotic study of life ([10], p. 167–173).

2.1 Life involves communication

The subject matter of semiotics is the exchange of any messages whatsoever – in a word, communication [11]. It considers how messages are successively generated, encoded, transmitted, decoded, and interpreted and how this entire semiotic process is worked upon the context ([12], p. 106). A message is a sign or a formalized string of signs also called a text that is transmitted from an initium sign producer

or semiotic source to a terminus sign receiver or destination. In biosemiotics, any source and any destination is a living entity or the product of a living entity.

Far from envisioning this process as a mechanical or computational exchange of information, biosemiotics assumes that this exchange takes place within the dynamics of natural systems. There are vast networks of sign processes in these systems involving a complex process of interpretation ([13], p. 588). Living systems are predictable when they “systematically recognize and exploit (interpret) important regularities (causal relations) in their surroundings.” But at the same time, they can also create previously uninitiated paths implying the presence of a kind of “semiotic freedom” in living systems ([13], p. 600–602). In any case, semiosis can only be identified as taking place or not depending on whether an end state is achieved or a function is satisfied ([10], p. 167).

2.2 Predictive power rooted semiotics

Many biologists, Jakob von Uexküll, Danish biologists Jesper Hoffmeyer and Claus Emmeche among others, consider semiosis to be of prime importance in their field, and even profusely co-extensive with life processes ([11], p. 5). Every living system functions to achieve self-organization, self-regulation for the end of self-preservation. This characteristic feature of living beings known as autopoiesis is defined as “the imperative set of continuing energetic biological processes... by which all living beings maintain themselves” ([11], p. 14). Self-preservation inevitably results in a phenomenon unique among them which is that living systems perpetuate themselves.

In applying semiotic analysis to biology, we are not only interested in iconic signs which allow us to distinguish life from non-life forms. We also seek to identify indexical signs that would be indicative of the state of life living beings possess. We look for the presence of concrete Interpretants or habits in living systems that will in turn serve as objective indicators for homeostasis or well-being within individual organisms and balance within entire ecosystems. The “ideal state” of a living organism serves as the general Icon of the Object or the universal idea of that particular organism. For instance, the mention of the words “human being,” evokes the Icon of one who is “normal and healthy.” This image emerges in the mind in an instantaneous manner. This phenomenon is characteristic of the Peircian Category of Firstness which will be explained in detail in a later section. Each individual strives in its own way to approach or attain this ideal state which serves as the purpose or the telos of their “living.” To what extent they approximate this ideal state becomes the Index, the “reference to a standard,” that indicates how “normal” their actual state is.

2.3 Iconic-indexical nature of life processes

Indexical signs are always best understood within their respective contexts because their function is to point out or indicate something. Hence, they carry out a crucial role or function in securing the continuum of a semiotic process. There are a variety of functions that indexical signs take on from being information-carriers, or regulating, to signaling the process flow. Thus, it becomes apparent that they are necessarily implicated in a wider semiotic system. No indexical sign stands for itself and is meaningful for its own sake. Situating the functional or ordinal role of indexical signs in a wider semiotic network clarifies their significance and enables the system to be, to a great extent, predictable. For instance, we know that an organism produces antibodies when a foreign body enters in its system. This is an indexical relation. Therefore, if antibodies are introduced in the system of

an organism in the form of vaccines, we can predict that the foreign body will be attacked by these antibodies. Granted this indexical behavior is iconic or replicated in all organisms of the same kind, possible outcomes are predictable. Yet it is known that actual outcomes are contingent upon the presence of some conditions or constraints that ensure a system to function as expected ([10], p. 169).

Hence, the human body can be taken as both an iconic and indexical sign. It serves as an Icon of the “human being” while its actual state is an Index of its proximity to the “ideal” or normal state. This state taken as the norm is ultimately achieved, not so much as a consequence of genetic fitness as it is of semiotic fitness. To maintain a state of normalcy, it is indispensable that an individual possesses two functionalities: first, the innate and acquired capacity of the human organism to interpret signs effectively and second, the capability of developing corresponding habits or Interpretants ([14], p. 355 onwards).

3. Thomas Sebeok’s modeling system theory

Adopting the triadic scheme of Charles Sanders Peirce’s semiotics, Thomas Sebeok formulated a theory on modeling systems that has been use in biosemiotics. He distinguishes three distinct modeling systems [15] that are generated as a consequence of a system’s capacity to organize semiotic relationships and formalize models to aid in recognizing patterns in things as well as transmitting messages. These can be broadly taken as communication models. Modeling in a broad sense is a product of semiosis. He designates the three as a Primary Modeling System (PMS), a Secondary Modeling System (SMS), and a Tertiary Modeling System (TMS).

The Primary Modeling System (PMS) allows communication through the modeling of iconic and indexical signs by a quasi-mind. This may be considered as an originary or primitive language. The Secondary Modeling System (SMS) is generated by the human mind that has the capacity for symbolic semiosis. The human modeling capacity takes shape in various forms of language systems. Tertiary Modeling Systems (TMS) are generated from the capacity of humans to create entire texts which hold significance not only for individuals but can define a collective mind, a worldview, and a culturescape.

Using the Peircian semiotic framework, the three modeling systems are related as PMS (Object) – SMS (Sign) – TMS (Interpretant). The sign-object-interpretant relationship involves complex semiotic systems. For the Tertiary Model to reflect the truth about its object which is the Primary model, the system has to reflect its primordial source iconically. This is the norm that the doctrine of the language of the body wishes to acknowledge and abide by. In whatever way the sign is used to signify, the ultimate indicator of a successful transmission of messages in any system would be the conformity to a norm or an ideal, in fine, its iconicity. Using Peircian terms, the test of truth ultimately lies in iconicity: truth is iconic.

4. The body as a language system

After this brief introduction to biosemiotics, we can now proceed to applying the fundamental concepts explained earlier to our understanding of the human body and its processes. The practice of medicine relies heavily on the belief that in the case of every patient, there is communication that takes place between the body and the person. What happens in the body is considered an autonomous unilateral semiotic process. This means that it is independent of the patient’s control. The fact that the patient comes to seek the help of the doctor implies that she or he is

engaging the body in a bilateral semiotic process as she or he feels there's something not quite right happening in her or his body. This simple communication between body and person is one concrete instance of synechism.

Physicians generally assume that the body is a self-contained semiotic system with physiological and biochemical processes taking place in it. These make up the elements of the "language" the body uses in its internal communications. The body as a "subjective space" [15] generates a semiotic or modeling system, which we shall designate as a Primary Model System (PMS) ([15], p. 10). The reality of PMS is the principle underlying the medical practice of clinical investigation, concretely when clinicians try to find out the source of a patient's malady ([12], p. 25). Doctors first ask their patients to relate the nature of their complaint. So, the patients begin by giving a verbal account of the state of their bodies, particularly its health or disease, as perceived by them. As the patients do this, they are actually codifying a non-verbal sign by using a verbal model ([12], p. 10). They associate whatever signal coming from a semiotic system that reaches their awareness, whether the source or origin of the signs, we can call the signifier, is the body in general or an affected organ system in particular. We usually call this kind of sign a symptom. Any symptom is an index of how much the body has deviated from a homeostatic state. When patients formulate and later put into words the malady they feel, they resort to using a Secondary Model System (SMS) ([15], p. 10).

What is characteristic of a symptom as a sign is that of being compulsive, automatic, and non-arbitrary. Moreover, a symptom connects the signifier and the signified through a natural link ([12], p. 24). The immediacy and force by which symptoms become manifest in a body are qualities belonging to the Peircian Category of firstness. The underlying disease becomes recognizable through a symptom because the signifier, which is the source of malady, is bound to its signified, which is the symptom, endosemiotically. Both symptom and disease are found within the body's morphology. Being a visible manifestation of the altered state of a physical or biochemical process, the symptom sends a warning signal that intends to trigger a behavior or habit as a response. The patient, as the receiver of the sign, is expected discern the meaning of the symptom and to react ([16], p. 21, 22).

Since symptoms are recognized as some event, situation, or condition that appear as independent of the human will ([12], p. 26), the patient stands as a passive receiver of the sign. This means that persons suffering from symptom are not privy to the semiotic process that has given rise to it and thus do not intend the message the symptom relays. They should acknowledge the symptom as the primary interpretant of the object being signified. They are dependent on this symptom as an interpretant, also an interpreted object, to subsequently formulate a secondary interpretant. Here we can appreciate two distinct, but not necessarily disjunct, semiotic processes simultaneously taking place. On one hand, there is the semiotic system of the body which generates a PMS. The body as a quasi-mind ([17], p. 12), or the principle generating an interpretant within a semiotic process, creates its own PMS as the primary language or the language of the body. On the other hand, there is the semiotic modeling system the patient will create from his perception of his symptoms or the SMS through some representations culled from his subjective experience. Later, a more technical language will be developed by physicians and scientists that belongs to the class of Tertiary Modeling Systems (TMS) ([15], p. 10). TMS are generally created from these experts' interpretation of the phenomenon derived from many SMS that are consistent and coherent with the collateral observations within a specific cultural scope ([18], p. 23).

As with symptoms, we have seen that the body as a living entity uses its capacity to create a "language" as a PMS to communicate unilaterally its condition to the human subject in a synechistic process. This time, let us describe here a kind

of signaling process that takes place in the body that leads to the consciousness of pain. When the body detects an internal affliction that jeopardizes its integrity, the affected cells give out a sign in the form of a hormone. In the case of pain, prostaglandin is released in the body. The nearby cells receive the signal and respond to it by either increasing local blood flow or restricting it with the objective of "saving" the damaged area. The entire body system responds to this "danger" by constantly supplying the needed requirements for the moment and simultaneously maintain homeostasis in the entire organism. At this moment, a chain of signaling processes is unleashed throughout the entire system so that other cells too would know how to respond to this anomaly ([19], p. 41). Among these, the increased pressure in the area impinges on the nearby nerves and transmits the signal to the brain that allows the person to be conscious of the damage the body has suffered. This translates through a PMS to the sensation of pain. This semiotic process taking place within the body is meant to elicit a behavioral response from the person. This time, the body engages the person suffering injury in a bilateral form of communication resulting in a subsequent generation of an SMS. In acknowledging the message of pain created semiotically through the language of the body, the patient assumes the disturbed state of her or his subjective world. The whole process consequently results to the creation of the phenomenon of a person in pain. Illustrated here again is the synechism between the body and consciousness, the continuity between the PMS, and the creation of the SMS resulting in the Icon of a person-in-pain.

5. Secondary modeling system

As the patient gives the doctor an account of his symptom which as a sign is an externalized natural form deriving from the body as PMS, he creates a model using other signs we can call externalized artificial forms ([15], p. 3–4), like verbal or non-verbal sounds or gestures to represent the symptom as he perceives it in his body. Unlike the symptom, the signs he uses ([20], p. 18) are not "naturally" linked with the signified which is the disturbed state of the body. Such sign, therefore, would bear a meaning distinct from that derived from the PMS since the meaning, in this case, is linked more to the sign that is used by the signifier, who in this case is the patient, than it is to the signified [21]. With this, the patient uses the body's modeling system as the Object and he creates a system of signs representing sensory inputs. These representational signs are iconic in that they are related to their referents by way of likeness or analogy in a natural way ([12], p. 81).

The semiotic movement, from the source of pain to the body signals spontaneously generated within its subjective space (PMS) that lead to the consciousness of pain and the eventual externalization of the experience of pain (SMS), takes place in a continuum exemplifying synechism. At the heart of synechism is continuity, "the very idea the mathematicians and physicists had been chiefly engaged in following out for three centuries," (CP 1.41) and "the leading conception of science." (CP 1.62) Peirce uses descriptives like "unbrokenness" (CP 1.163), "fluidity, the merging of part into part," (CP 1.164), where "all is fluid and every point directly partakes the being of every other" (CP 5.402n2) ([1], p. 3).

The conversion of the body's PMS, which consists of the biosemiotic processes that naturally occur in the body, into concrete descriptions is made possible through the instrumentality of a language. The body can now dialog with a Subject who is the person who owns that body – the reverse order is appropriate to the dialog as well – leading to the generation of a secondary semiotic system. To understand how this system is created, we first have to elucidate how a subject is capable of formulating a Modeling System that is iconic of the Object of its experience.

5.1 World-mind synechism

The semiotic theory Peirce formulated in his later years seeks to uphold and defend the existence of an Object which stands for itself and is independent of the knowing or perceiving subject. This Object is found in the realm of reality. Now “the real” for Peirce, upholding the doctrine of Aristotle and the Latin scholastics, is characterized as being independent of any finite mind ([22], p. 20). He consistently points to the Object as the principle which determines the Sign. The capacity of one to determine another presupposes the ontological priority of the former over the latter. Hence the Object is ontologically prior to the Sign. And this is justified by the fact that the Object gives form to the Sign. He likewise consistently claims that the Interpretant is an effect of the Object on the subject. This is so because it is the Object, through the Sign, which elicits in the subject the Interpretant. It is the Interpretant that makes the Object present and meaningful to the subject. Once again, this description of the relationship between Object-Sign-Interpretant emphasizes the ontological priority of the Object ([23], p. 479).

Peirce describes human experience or “phaneron” as encompassing everything which “life has forced upon us.” With these words, he makes reference to the semiotic Object, as well as the multifarious modes by which the content of consciousness takes its form corresponding to the semiotic Interpretant [24]. The notion of phaneron does not highlight the distinction between the subject and object because this phenomenon is suprasubjective while both subject and object are merely elements situated within a universe of relations. He calls this universe of relations Categories which he invariably classified into three. As he was developing the doctrine, these three Categories took on several names. Peirce eventually settled with simple terms and named his Categories as Firstness, Secondness, and Thirdness [25].

The Category of Firstness refers to a quality of feeling that necessitates the presence of a mind-independent reality and a subject that is “struck” by its brute presence by way of abduction ([26], p. 205). Firstness is described as a single undifferentiated experience and it rightfully belongs to both what is being felt and the one who is feeling. This takes place in a continuum between both elements. Our experience of the things that are present around us and the affirmation that there are things around us, no questions asked, belong to the Category of Firstness.

The experience of the Category of Secondness is immediately created as one wrestles with the presence of the object of Firstness. A relation is generated between the two elements involved in the experience. The relation may be one of a hierarchical or an ordinal nature, as in the case of cause and effect for instance. From the awareness of the “separateness” of oneself and another by way of resistance or opposition, the concept of the “non-self” emerges. Hence, the acknowledgment of the Object in its proper sense, which is derived from the Latin *obiectum* (ob- meaning “against” and *iactum* meaning “thrown”), is formulated. In the experience of Secondness, we can say that a unity of opposition occurs. Two entities mutually opposed to one another end up united in that thing over which they are opposed [1]. Such opposition is congruent to the tenets of synechism.

A third element becomes imperative in uniting the two previous ones into a singular experience. Occasioned by the resistance and opposition from Firstness to Secondness, the third is needed for one not fall into a reductionist perception of phaneron. This is the Category of Thirdness. Thirdness is the relation that fixes, governs, and regulates how the two other categories are related, concretely through the habitual use of signs. It is thus in the Category of Thirdness that laws, norms, rules, and regulations take on the vigor of imperatives. Since the Category of Thirdness eventually characterizes and regulates the interaction among signs, whose signification can only be elucidated by understanding the meaning of a

particular sign within a designated context, it may be said to be responsible for creating culture. The Category of Thirdness applies to conventions governing the use of language and the ethics of behavior, to name some examples.

Through Peirce's doctrine of the Categories of Firstness, Secondness and Thirdness, he overcame the deep wedge between the subject and object created by the Cartesian split. In effect, he provided this doctrine as a way of demonstrating the plausibility of having a true knowledge of a mind-independent reality. For Peirce, true knowledge is ultimately characterized by iconicity. This is how Peirce justifies the possibility for the mind to know the world, and that the mind and the world are related synechistically.

5.2 Body-mind synechism

We have seen how the Peircian Categories underlie the doctrine of synechism. We have also explained how the Cartesian split is overcome by this doctrine. We now proceed to apply the doctrine of synechism to the experiences derived from one's own body. As mentioned earlier, the body is a quasi-mind capable of interpreting the biological signs or bioforms contained in the genetic information as well as those generated in the course of interpreting these sets of information. And as a mind, it directs the semiotic activity towards auto-conservation when the interpretant generated sustains the organism's integrity as an individual, and auto-replication this time maintaining the integrity of the species. This is made possible through the continuous flux of signs within the body through which the various organ systems communicate. The body truly is a remarkable web of semiosis. However, there is one organ of the body from which emerges an interpretant that is capable of generating a dialog between a subject with its object. This is the brain.

The brain is the organ of the body responsible for the organization, regulation, coordination of all systemic activities of the body. It is also the primordial seat of all specifically human activities, like thought and language. The semiotic scope of the brain encompasses those belonging to the vegetative domain, as well as those belonging to the sentient and rational domains. The rational domain is characterized by the emergence of a higher-order semiotic interpretant called “self”. For this interpretative capacity to be actualized, the interpreter must be organically equipped by some functional power that gives the brain the capability for this emergent phenomenon to take place.

Researchers in the field of neurobiology have identified a class of neurons lodged deep within the brain, specifically proximate to the Broca's area, which have long been associated with both motor control and language use. It is believed to biosemiotically effect the emergence of hypostatically abstracted pre-linguistic representations of “self” and “other”. They have called these the “mirror neurons” ([27], p. 59). These mirror neurons allow individuals to exhibit iconic motor-neural patterns as one executes and the other observes and replicates through execution actions or behavior like in mimicry. This somehow substantiates a common belief that all individuals are equipped with some automatic observation/execution mirroring mechanisms in the brain that gives rise to a mimetic i.e. iconic interpretation done in observation and execution ([27], p. 79) of something belonging to an external realm. What happens in mimicry is the formation of a habit (Thirdness) that assumes the distinction between the “self” and the “other” (Secondness) as the subject replicates iconically something it observes (Firstness). Closer scrutiny of this mimetic capacity discloses a highly significant negative variance in the activation of mirror neurons when presented with indexical or symbolic behavior patterns. From this difference, it can be conjectured that semiotic objects do not set off neuronal sign exchanges in the same manner since they are perceived differently. So, what about the indexical signs that the body sends the brain, as in the case of pain?

5.3 Body- “Self” synechism

For Peirce, what the senses perceive or the “percept,” represents an “unconscious synthesis of sensory or qualitative elements” which the senses may have gathered ([28], p. 103). Percepts are purely psychical thoughts and involve three equally psychical elements: the qualities of feelings, of being undeliberate reactions, of being associated or triggered by something ([29], p. 62). The involvement of the senses makes the percept dependent on some external or physical object which is the immediate object of perception. One can distinguish then the immediate object as that which triggers neural firing in the brain from the dynamical object “which is the Reality which by some means contrives to determine the Sign to its Representation” [30] which in turn causes the emergence of an interpreted object or the actual percept. The formulation of that interpreted object has, not the object per se as its actual source but, the abstracted object as that which it represents. Abstraction, as the retired Professor Emeritus of Law Denis Brion writes, “entails selection. Selection entails choice. Choice requires criteria of selection. Criteria of selection necessarily rest on values. That is, the relationship of the sign to the object is value-determined” ([27], p. 82).

On what value shall the choice of abstraction and consequently interpretation rest? Biosemiotically, these “values” are derived from the telic orientation of the semiotic process towards the achievement of the ultimate interpretant of the respective system’s domain, namely the vegetative, sentient, and rational domains. But for all living systems in general the ultimate interpretant would be survival and perpetuation. Living organisms capable of a higher-order semiotic process on the other hand could derive semiotic objects that are more and more distant and distinct from their immediate object. For all these to take place, we must assume that the biosemiotic quasi-mind, which is the body, must be the source of the immediate object, but the human mind generates a dynamic object which in turn serves as a secondary semiotic source providing “that specific item within its context to which all interpretants (or significate effects) of that sign are collaterally related” ([27], p. 83). Behind the dynamism that characterizes the human mind is the involvement of the agency of a subject. Thus, we understand the subject to be one possessing a human mind that allows the generation of the “self.” This subject is what we call a person.

Are these semiotic descriptions that draw for us the picture of the “self” and consciousness backed up by science? Earlier descriptions of the brain’s neural networks liken it to computer activity, hence characterized as highly functional, physical, reductionist, materialist, and computational. This led to concepts of the mind as mechanical and deterministic [31]. This signals a mind that is ruled by the Category of Firstness and maybe to some degree by Secondness but not of Thirdness. In the mid-1990s, the eminent mathematical physicist Sir Roger Penrose, a Nobel Laureate in Physics, and prominent anesthesiologist Stuart Hameroff suggested the presence of quantum vibrational computations in the structural skeleton of brain cells called microtubules that are detected by EEG rhythms. This proposition includes the possibility that “consciousness derives from quantum vibrations in microtubules, protein polymers inside brain neurons, which both govern neuronal and synaptic function, and connect brain processes to self-organizing processes in the fine-scale, ‘proto-conscious’ quantum structure of reality” [32].

The quantum theory in physics can be basically illustrated in the cloud atomic model where electrons are hypothesized to occupy a volume to space, hence exhibiting a behavior characterized by degrees of probability. From such behavior, discrete energy or quanta emanate in wavelike movement or in packets. This stands in contrast to an older model that proposed that electrons follow a discrete path that

orbits around a dense nucleus which makes their behavior, and the energy they produce, continuous, certain and predictable. Applied to brain functions, quantum vibrational computations “implies a non-algorithmic process which is neither deterministic nor random, a property which Penrose also attributes to conscious thought and understanding. This clue suggests that quantum computation with objective reduction may be somehow involved in consciousness” [31]. Furthermore, in the Penrose-Hameroff theory of quantum consciousness, it is the way the microtubules are structured, that is following a fractal pattern, that enables quantum processes to occur. In mathematics, fractals emerge as beautiful recurring patterns that extend infinitely, creating a structure with a finite area and an infinite perimeter. There is fitting parallelism between the complexity of human consciousness the patterns created by fractals. Both are infinitely intricate and support the emergence of complexities from the recurrence of simple patterns. Indeed, fractals “could be the structures that support the mysterious depths of our minds” [33]. Although this theory of quantum consciousness has yet to account for the actual relation between the brain and consciousness across the three domains namely vegetative, sentient and rational, after some two decades one can safely assert that “the approach has fruitfully inspired important innovative research on quantum effects on consciousness, both theoretical and empirical” [34]. In fact, this model of the mind supports the experience of Thirdness and approximates Peirce’s description of the emergence of the “self” as Interpretant.

All these data from neuroscience suggest that the mirror neuron activity on one hand and the quantum consciousness on the other, support the pre-reflexive biosemiotically emergent process of the “self” as a naturally synechistic phenomenon. Semiotically, the “self” is an interpretant, as it is the case of iconic mimicry. The “self” is characterized as being non-deterministic, complex, and dynamic, as painted by the theory of quantum consciousness. As an interpretant, it reflects the object and at the same time is distinct and separate from it. But the “self” is also an interpreter as it generates the percept. As “self” it is capable of establishing its identity ([35], p. 44), that is its indexical relation to objects affecting it and generate a pool of symbols in response to an intrinsic movement to communicate. The relation of identity is an example of degenerate secondness, one that is derived from indexicality.

Peirce considers the drive to communicate as the second most important social instinct next to the instinctive drive to reproduce ([36], p. 85). This is the manner the Secondary Modeling System (SMS) is generated. It is the merging then of three semiotic domains: the vegetative domain covering the vital processes of the body, the sentient domain covering the coordination of the *innenwelt* and *umwelt* semiotic processes towards the defense of the individual’s integrity, and the rational domain covering the generation of and participation in a culture which is the product of strictly anthroposemiotic systems.

The subject’s state of consciousness derives from the emergence of “self” and is the condition and a fundamental property of the sentient mind. The sentient mind is capable of generating ultimate interpretant in response to perceptions formulated of one’s conscious world for auto-defense thus favoring responses that guarantee survival. Thus, the sentient mind’s secondary modeling is focused on subjective values directed towards the ultimate interpretant marked by the capabilities and constraints of subjects within its domain. The rational mind however operates in a higher-order domain and is capable of generating three kinds of interpretants: sensations, identities, meanings. These interpretants are hierarchically oriented such that the most primitive interpretant, sensations, acquire its full significance as it forms part of the symbolic domain where it will ultimately acquire its full meaning.

The body is a web of semiosis and at the same time, it is a sign. Being a singular sign implies a singular ultimate interpreter of the body. Secondary Modeling is done by a cognizant subject initially through iconic and indexical activities. One of the first objects of an infant's sensibility is its own body though he may not be fully aware of his indexical relation to it. In Peirce's thoughts, "A very young child may always be observed to watch its own body with great attention. There is every reason why this should be so, for from the child's point of view this body is the most important thing in the universe." ([6], p. 5.229) The body is not only the object but infants learn to use them as tools to connect them with the world. For the child the body is not merely a tool, it provides him the authoritative picture of what the world is all about. "Only what it touches has any actual and present feeling; only what it faces has any actual color; only what is on its tongue has any actual taste" ([6], p. 5.229).

The initial SMS is iconic-indexical and the child's concept of truth and reality is solely based on what corresponds to his sensory experiences. "No one questions that, when a sound is heard by a child, he thinks, not of himself as hearing, but of the bell or other object as sounding" ([37], p. 5.230). The subject generally pools up a source of interpretants or habits iconically through imitation or repetition. Moreover, the subject discovers another way of pooling up interpretants and that is by associating indexically a kind of behavior that would elicit a desired or at least a favorable response from another. For that response to be elicited, the subject makes use of his body to establish some sort of contact with that other body. He discovers that to communicate he must use his body thus "makes this body still more important and central since it establishes a connection between the fitness of a thing to be changed and a tendency in this body to touch it before it is changed" ([37], p. 5.231).

In both cases, subjective awareness has the external world as the source of objective signs and the self as the terminus of the semiotic process. The dialog the subject engages in would revolve around the categories of firstness and secondness. But it is "through refined capacities for acting and [sic] for communicating" ([36], p. 85) that the stage of self-consciousness in a subject is actualized and gradually develops. This is the moment self-consciousness makes its initial appearance. Since the generation of thought and its endurance in memory depends on one's developing capacity for managing some linguistic tool, we see why consciousness is generally linked to thought, communication, and language. Thought is fixed in the mind through the use of a Tertiary Model, the most common of which is human language. As the subject's semiotic world becomes richer, one's symbolic capacity becomes more pronounced. The Secondary Model a subject created is then used for more meaningful communication, not only within oneself for whatever purpose that would suit one's self. Rather it would serve as a springboard to communicate with other subjects towards the generation, creation, and enrichment of other-selves through the Tertiary world of Culture.

6. Conclusions

Interest in doing studies and research on Peircian semiotics has been spreading in crescendo in the past 50 years or so. This chapter is a minor contribution to this collection. The topic of "self" has more commonly taken the phenomenological or the existential slant. However, here we attempt at a study of the "self" using the semiotic doctrine and principles Charles Sanders Peirce. We have seen how the body formulates its own semiotic modeling system we called PMS that constitutes its own "language." The person who owns the body also formulates its own semiotic modeling system we called SMS. It is called secondary because its generation is dependent

on a primary semiotic system known as the Object and this can be the reality of Objects whether they be situated outside the body or within the body. The generation of SMS is possible because of the synechistic relationship the mind has with both the world and the body. Peirce uses the doctrine of the relationship of universes or Categories of Firstness, Secondness, and Thirdness to justify the ubiquitous metaphysical principle of synechism as underlying the whole of reality. Scientific brain studies uphold the possibility of the continuity of PMS and SMS. The more recent discovery of quantum consciousness support Peirce's theories in relation to the capacity of the brain to create semiotic relationships of Thirdness that is characterized by synechism as well. Far from being a finished project, this chapter hopes to usher studies that can delve into the topic with greater depth.

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