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Approaching linguistic semiosis biologically: implications for human evolution

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Abstract As a functional feature of our species, language, it is argued, cannot be understood outside the domain of biological organization. The established view of language as a tool used for communication has little to offer towards a better understanding of the nature and function of language, making it external to human biology and accounting for the language–mind dichotomy entrenched in philosophy of language and mainstream cognitive science. By contrast, biosemiotics, an interdisciplinary paradigm for the study of life as semiosis, attempts to overcome this epistemological inconsistency by positing the biological nature of signs. At the same time, the theoretical framework of biosemiotics is marked by a conceptual tension between the physicalist accounts of symbol often used in biosemiotics and the Peircean notion of symbol as a kind of sign in the semiotic hierarchy of iconic, indexical, and symbolic reference; this hierarchy is essential in understanding linguistic semiosis as a major evolutionary transition rather than a cultural invention. The firmly established belief that, evolutionarily, sapience precedes language impedes our understanding of language as human life in semiosis; such an understanding becomes possible with a systems approach to the study of our species.
As situationally driven embodied interactional behavior, languaging is constitutive of the human organism-environment system as a unity. Linguistic semiosis – the development of the ability to orient others and self in their consensual domain to what is not perceptually present – is a biological adaptation that allows humans to be able to better live in their habitat and sets them apart from the rest of the living world as linguistic organisms capable of operating on first-order abstractions in co-ordinations of interactional behavior. It is hypothesized that the emergence of language was the pivoting point in the evolution of the human brain, laying the basis for abstract thought as neuronal processes that lead to the establishment of second-order consensuality and languaging as behavior in a second-order consensual domain: cognition as a biological function met language as a biological adaptation, and the ontogenesis of *Homo sapiens* began.

Keywords: Language, Languaging, Biosemiotics, Sign, Symbol, Mind, Evolution

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1. The shortcomings of the orthodox[1] view of linguistic semiosis

Due to the rapid spread in the 20th century of Saussure's (1916) ideas about language as a structured system of signs used for communication, and their deep entrenchment in the new paradigm of linguistic research known as structuralism, the firmly established view of language – not the least because of the indoctrination through the system of education – has been that it is a system of special kinds of objects (signs) as ahistorical, conventional arbitrary parings of form ("acoustic image") and content ("meaning"), or a *signifier* and a *signified*, used for the purpose of communication as exchange of meanings. Accordingly, the functions of language (Jakobson 1960) are typically defined in the context of its use by intelligent living organisms (*Homo sapiens*) as a communication/interaction tool (Wąsik 2003), and the synchronic study of the various properties of signs, such as the relationship between the signifier and the signified and their respective structures, which can be simple or complex, is the subject matter of linguistic semiotics. Following Saussure's call to study language in itself and for itself, orthodox linguistic semiotics ignores the natural-historic development of language and its dynamics in diachrony. However, as is well known, we cannot understand the present without considering the past. Not surprisingly, semiotics as the study of linguistic signs thus conceived has little to offer by way of providing an insightful perspective on the nature and function of language in the evolution of humans, despite the fact that "language evolution is part of human evolution" (Bickerton 2009: 6).

There are several important methodological and epistemological consequences of viewing the relationship between the signifier and the signified as ahistorical and arbitrary. First, it leads to an unavoidable conclusion that linguistic signs are abstract symbols. This creates the so-called 'symbol-grounding' problem (Harnad 1990): how can an arbitrary pairing of a signifier and a signified have meaning, that is, refer to a particular aspect of the world grounded in perceptually based concrete lived experience? Second, indexical phenomena (various types of pronouns, adverbs, grammatical tense, etc.) that constitute the 'deictic field' of language (Bühler 1934), along with iconic signs (onomatopoeic words, syntactic structures, etc.) become peripheral inasmuch as they do not conform with the structuralist maxim of arbitrariness of linguistic signs. However, this maxim is refuted by an unbiased study of the functional properties of indexicals (Kravchenko 1992), specifically, pronouns as *proto-nouns* rather than substitutes of their noun antecedents. From this perspective, new light is shed on important features of natural language as the object of study in linguistic semiotics (Kravchenko 1996) and in "sensory linguistics" (Winter 2019) – such as the general principle of perceptual groundedness of meaning in natural dialogical interactions (Miller & Johnson-Laird 1976; Linell 2009; Kravchenko 2018). As has been argued by Deacon (2011), the simplified view of symbolic reference as arbitrary ignores the dependence of symbolic reference on indexical reference, making symbols elements of a code with an implicit assumption that language is a code. The idea that linguistic signs are arbitrary abstract symbols used in communication to exchange meanings (typically understood and described as information about the 'objective' world) informs the code model as the epistemological foundation on which the orthodox view of language as a means of communication rests (on the inadequacy of such a view, see Harris 1981; Heine 1997; Love 1998; Kravchenko 2007; 2020 inter alia).

Third, the strategy of isolating language from real time is doomed to failure, because the so-called linguistic units "are events in time, and the processes which employ these units

[1] "Orthodox" here refers to the structuralist view of language as a means of communication (a tool), institutionalized in education systems and passed on from generation to generation by indoctrination, regardless of the current advances in contemporary linguistic research.

are also events in time" (Port 2006: 104). Adopting Saussure's maxim of synchronicity and describing language as an autonomous conventional system of signs devoid of any previous history, orthodox linguistics, on the one hand, loses its explanatory power (Mengden & Kuhle 2020), while, on the other hand, it overlooks the fact that, biologically, humans are linguistic organisms (Deacon 1997; Bickerton 2009; Jennings & Thompson 2012). The maxim of synchronicity amounts to viewing the system of linguistic signs as something pregiven, as a tool "out there" with a fixed form and a predetermined (conventional) function according to which it must be used after it has been "acquired". The inadequacy of this premise has become clear long ago, when linguists began to realize the explanatory weakness of the synchronic approach to meaning and were forced to include in their analysis of meaning the role of context and so-called extra-linguistic phenomena generally subsumed by the concept of (linguistic) pragmatics as the study of how sign use affects the meaning of signs. Thus, the idea that meanings were contained in words as static forms (the bilateral concept of linguistic sign) was undermined, setting off the continued controversy about the primacy of either semantics or pragmatics in the study of linguistic signs (Kravchenko 2011; Börjesson 2014; Grindrod & Borg 2019).

Fourth, the focus in linguistic semiotics is, traditionally, on the lexicon as a potentially open inventory of easily identifiable 'symbols' (words as 'lexemes'), while the role of grammar – a closed class of signifiers of a special kind and their functional relationships with "lexemes" – is not given the attention it deserves for the obvious reason that the functional properties of 'grammemes' as a specific kind of linguistic signs, or metasigns (Stepanov 1981), considerably differ from 'lexemes'. The traditional concept of grammar as the setting of arbitrary rules for organizing words and morphemes into larger units needs rethinking in terms of semiosis as a perceptually grounded cognitive process (Kravchenko 2012).

Finally, and crucially for the entire concept of linguistic semiotics, an instrumental view of language as a code used to exchange meanings makes language external to human biology – particularly, in its evolutionary developmental aspect – and accounts for the language–mind dichotomy firmly entrenched in philosophy of language and mainstream cognitive science as the study of the mind. This kind of externalism is largely explained by the written language bias in linguistics (Linell 2005), that is, identification of natural spoken language (acoustic-auditory phenomena) as contextually driven perceptually grounded interactional behavior, or *languaging* (Cowley 2019), with writing as a conventional system of artifacts allegedly used to represent speech. Far from being two different manifestations of the same phenomenon, speech and writing are experientially different cognitive domains (Kravchenko 2009), and the orthodox (representational) view of writing as part of the practiced educational ideologies in literate cultures transforms language itself such that the map – the model of language built by linguists – becomes the territory (Davidson 2019). However, as observed by Bickerton (2009: 36), "blind faith is far commoner in science than we like to admit", and, regardless of the aforesaid inadequacies of the structuralist approach to the study of linguistic signs, the task of linguistic semiotics continues to be seen as a "search for meaning bearers in the domain of spoken and written texts, their social and cultural contexts and extra-textual reality" (Wąsik 2003: 7).

Evolutionarily, language as a functional behavioral feature of humans has an *emergent architecture* (Deacon 2005) which cannot be understood outside the domain of biological organization. No wonder that the study of linguistic signs as "meaning bearers" within the conceptual framework of structuralist linguistic semiotics has been unable to yield illuminating insights on the nature and function of linguistic semiosis as a *defining feature in the dynamics of humans as living systems* (cf. Maturana 1978). This justifies strong criticisms

of orthodox linguistics as a science. As observed by Finch (2003: 1), "in spite of all the technical terminology, linguistics is not a science: It's a pity that the subject doesn't have a different name"; and, according to Harris (2005: 84) "it takes more than thousands of linguists chanting in unison "Linguistics is a science" to make it so".

2. Language and biosemiotics: the conceptual tension

An understanding that signs have a biological nature (Sharov 1992) and semiosis is fundamental to life, i.e., that all living creatures are semiotic systems (Sebeok 2001) informs biosemiotics as a theoretical framework for the study of biology. In this framework, all processes going on in animate nature at whatever organismic level are analyzed and conceptualized in terms of their character of being sign-processes (Emmeche 1991; Bouissac 1998) – including language viewed by biosemioticians as "a very particular case of semiosis that requires its own models and approaches, given its origin and deep commonality with other non-human semiotic systems" (Favareau & Kull 2015: 17). Among the questions asked by biosemioticians are: What can biosemiotics bring to linguistics (and vice versa)? What are the biosemiotic implications for language sciences? What are the biosemiotic groundings of language and how to study them? etc. (Kull & Velmezova 2015: 2). Questions of this kind indicate the necessity of a biological approach to language as a functional feature of our species. Such an approach, however, seems to be at odds with the key concepts of sign and symbol as they are generally understood in biosemiotics; thus, a certain conceptual tension arises.

Epistemologically, the notion of sign may not be derived from the notion of language; while language is routinely described as the activity of using signs, not every activity of using signs may count as language. Language *is* a semiotic phenomenon, but various semiotic phenomena are not necessarily linguistic phenomena inasmuch as their dynamics differ from the dynamics of languaging as human coordinated interactional behavior distributed across space-time: "Language is *activity in which wordings play a part"* (Cowley 2011: 4). Therefore, orthodox linguistic semiotics with its dualistic conception of sign cannot serve as a model for formulating epistemological foundations of biosemiotics (Kravchenko 2020), which is striving to find an acceptable balance between Peirce's tripartite conception of the sign and Uexküll's (1921) Umwelt viewed as non-human semiosis. Peirce's hierarchical triad of icon, index, and symbol could provide a good starting point in elaborating a comprehensive semiotic framework for the study of life phenomena at different levels of organization of the living systems without overgeneralizing when it comes to the concept of symbol.

While all symbols are signs, not all signs are symbols. Failure to see the difference between the general concept of sign and the concept of symbol as a kind of sign, when signs are taken to be symbols with no room for icons and indices (see e.g., Swan & Goldberg 2010), may prevent biosemiotics from finding common ground with general semiotics as the study of signs. A good illustration is the stance taken by Howard Pattee, who finds Peirce's semiotic terminology "ambiguous and unnecessary at the cellular level" (Pattee 2008: 158), while, to him, "what is of greatest interest for the field of biosemiotics is that biologists, physicists, philosophers, and linguists see similarities between the cell's symbol systems and the human brain's symbol systems even though they are separated by 4 billion years of evolution" (*Ibidem* 149).

That biologists, physicists, philosophers, and linguists see "similarities between the cell's symbol systems and the human brain's symbol systems" is, of course, an overstatement. While physicists – and, perhaps, biologists – appear to agree on the general projects of their respective sciences (that is, on what and why they study, including a shared

understanding of some basic concepts such as life, matter, physical dynamics, physiology, etc.), there is no such coherence among philosophers and linguists. Beside the fact that it is sometimes difficult to uncompromisingly distinguish one from the other because of the shared "language connection", their respective grand projects are indeterminate and elude clear-cut definitions. Within the rationalist paradigm, there is no consensus among linguists – nor among philosophers – about *what* language is, as the defining feature of our species, nor *what* its main function is, considered from the point of view of biology. The same applies to biologists and biosemioticians.

In this context, looking for similarities between genetic sequences and natural language (both viewed as a kind of code) as "the only general-purpose languages that are known" (Pattee 2009: 299), is hardly gratifying. Far from being a symbolic system "in the brain" – much less a code – natural spoken language (languaging) is a bio-socio-culturally constructed dimension of the human cognitive dynamics, and it depends on socio-cultural contingencies (Sinha 2009). Languaging is *not* verbal patterns (Kravchenko 2010) which exist autonomously as "symbols" – either in the head (internalist accounts of language) or in the world as "objective reality" (linguistic externalism); it is a *consensual domain of interactions* (interlocked and interlocking conducts) between organisms (Maturana 1970). It is in these interactions that meaning emerges as the outcome of interpretative activity.

Surely, "biosemiotics must state clearly the epistemic principles on which symbols and matter are empirically distinguished" (Pattee 2008: 148). So, what's the catch? For someone with a strong background in physics, their cognitive domain of linguistic interactions will be strongly influenced by this fact. To them, to admit the reality of symbols would be to find their place in the world as drawn by physics, which is concerned with matter and energy. Thus, symbols become "energy-degenerate structures not determined by laws that act locally as constraints on law-based energy-dependent matter in living systems" (*Ivi*: 147). In other words, as Rączaszek-Leonardi (2011: 163) observes, Pattee reconstructs the notion of "symbol" and defines symbols by the function they have with respect to the dynamics within which they evolved. Such a novel approach to the notion of "symbol" implies, whether Pattee means it or not, that "symbols" are a biological species, which does not make sense, because evolution is the change in the characteristics of a species over several generations. Moreover, while symbols thus understood may be viewed as constraints, *not all constraints (that elude local functions) may be viewed as symbols*. The use of the term *symbol* as synonymous with (non-local) *constraint* is of the same order of epistemic inconsistency as when the term *code* is used as synonymous with *language*: the 'epistemic cut' is made between the measuring device (language as a "symbolic" system) and what it measures (symbols in one case, code in the other) as if one existed independently of the other. However, this is not the case: what language 'measures' is always bound up with language.

For Pattee (2008), influenced by von Neumann's (1966) work, the essential semiotic requirement is that "*symbols and codes must be part of a language to allow open-ended evolution*". A symbol is "always an element of a coherent symbol system functioning as a language that allows adaptive behavior" (p. 158). Correspondingly, he speaks of "genetic symbols" and "genetic language" as constitutive of "general-purpose language" (Pattee 2008: 161).

The stance taken by Pattee is provoked by the epistemological trap of language (Kravchenko 2016a): language is interpretatively terminal as "there is nothing that stands to language in the relation that language stands in to everything else" (Love 2007: 705). We are used to seeing and interpreting the world, including language as part of this world, through the prism of language, and as observers we exist in language as the

domain of distinctions we make, which we take for the picture of the "objective" world as "a domain specified by the operations of the observer" (Maturana 1978: 54).
Another point of criticism is Pattee's indiscrimination between sign and symbol. For a child learning a language, linguistic structures function, first and foremost, as icons and indices, thus ensuring perceptual groundedness of language as orientational activity in a consensual domain of interlocked conducts, or *adaptive behavior* in the child's cognitive niche. The infamous symbol grounding problem stems from viewing all linguistic signs as bilateral static (ahistorical) parings of form and meaning and ignoring the developmental dynamics of languaging – how the emergence of "symbols" rests on a rich infrastructure of indexical and iconic relations in which linguistic signs participate:

> The main problem is not how children ground abstract formal symbols (somehow delivered to them as such) but how their embodied, embedded, and situated communicative behaviors can ever become symbolic. This is what makes it an ungrounding process rather than a grounding process" (Rączaszek-Leonardi *et al.* 2018: 43).

For that matter, all nervous systems support iconic and indexical reference as a meaning-making process of interaction with the environment. However, organisms with only a nervous system cannot go beyond their limited realm of first-order consensual domain; to do so requires language as coordinations of coordinations of behavior in a second-order consensual domain not limited by the here-and-now of the physical context of communicative interactions. This freedom from the here-and-now of the cognitive niche, or their referential generality (Favareau 2015), is the distinctive property of linguistic symbols as a scaffolding for abstract thought. However, this property does not make linguistic symbolic signs unquestionably arbitrary, because the symbolic function of linguistic signs is an *emergent property*, arising with the establishment of language as recursive behavior in a second-order consensual domain in which elements of the first-order consensual domain (linguistic signs perceptually grounded in the physical context – icons and indices) are used *without* the consensual domain. Hypothetically, this function must have co-evolved with the evolution of the human brain, making humans a "symbolic species" (Deacon 1997) – as contrasted to all other non-symbolic species capable of semiosis. Language is the semiotic Rubicon that effectively separates human linguistic semiosis from non-human (non-linguistic) semiosis (Kozintsev 2018).
For a physicalist trying to explain semiotic phenomena, physics is, understandably, *the* paradigm science. For example, Boeckx and Piattelli-Palmarini (2005) argue that since language can be profitably studied as a natural object, "the study of language should share the developmental paths, the assumptions and the explanatory style of the most successful natural sciences, epitomized by theoretical physics" (p. 462). However, if theoretical physics is best represented by quantum physics, then the explanatory style of the latter adopted by the language sciences (including semiotics) should inevitably lead to the conclusion that nothing is determinate, and everything is at the same time something else. While this sits well with the sciences experiencing a relational turn (Fernández 2010), it is precisely what orthodox nominalist linguistics, with its belief in arbitrary symbols, crusades against!
Language is prior to science. As observed by Lavoisier (1789, 3d paragraph),

> It is impossible to disassociate language from science or science from language, because every natural science always involves three things: the sequence of phenomena on which the science is based; the abstract concepts which call these

> phenomena to mind; and the words in which the concepts are expressed. To call forth a concept a word is needed; to portray a phenomenon a concept is needed. All three mirror one and the same reality.

Linguistics simply cannot follow the developmental paths of natural sciences because these themselves developed with the development of language, particularly its written form, which was brought to life, among other things, for the specific purpose of serving science in its quest for knowledge. So, when one reads that the "semiotic concepts of symbols, codes, messages, and languages […] function in the survival of a replicating population of cells in an ecosystem" (Pattee 2008: 159), one cannot help feeling confused, because this is undoubtedly putting the cart before the horse. As I have already argued, it is gratuitous to extend the notion of concept to whatever characterizes the behavior of a mindless organism (that is, one without the central nervous system). A population of cells does not use language to exchange symbolically coded messages except in a metaphorical sense prompted by the common-sense (naïve, folk-theoretic) view of language.

When the notion of symbol is defined as a 'material constraint not determined by physical laws that controls specific physical dynamics of a self-replicating system', the meaning of "symbol" is reified: since "symbol" refers to something material which exists objectively, independent of languaging human subjects, this objectivity is taken to be *the* meaning of "symbol". In this context, it becomes possible to speak of the "symbol's survival" as "determined by natural selection". Surely, what we call constraints do exist, but as such they exist in *our* world of the *named*. Constraints are relational phenomena, and so are symbols, but there is a difference. Constraints as boundary conditions on law-based energy-dependent matter in living systems are part of the description of the environment observed and described by a languaging human (e.g., a physicist); as such, they belong to *the observer's* cognitive domain of interactions (cognitive niche), including interactions with *the observer's* descriptions of the niche. In other words, constraints in living systems may *become* symbols to the observer as the result of their interpretation by the observer, but their nature does not become symbolic because of that.

Pattee (2008) is in error when, for example, he says that "codes interpret symbols", or that "to read symbols requires some material pattern recognizer or measurement mechanism" (p. 150). Although he makes a disclaimer, saying that he doesn't think of a code in the narrow sense of an arbitrary mapping between two symbol systems, associated with a translation or hiding a message, he uses the original meaning

> in the context of a social code or system of rules used in common by an organization with the function of maintaining the coherence of the organization. In this sense, a code implies a complete set of rules that is associated with a symbol system or language. This is the case with the genetic code that can read any genetic sequence (*Ibidem*).

Reading as a specifically human activity of interacting with cultural artifacts such as written marks (organized into texts) is not just pattern recognizing. Such an ability of itself, resulting in vocalizations prompted by written marks which do code (rather inconsistently) sound types of a given language, does not imply the ability to make inferences which, by return, may exert orientational influence on the reader. Reading is not about "decoding" meanings, it is about *constructing* them on the basis of interpretation (Kravchenko 2021). While a code does imply a complete set of rules for manipulating symbols of which it consists – a necessary condition for code

translatability – natural language, being an open system, does not. That is why computers, using what is often called "symbolic language" or "programming language", can neither "read" nor "interpret" natural language; the "symbolic language" of a computer program is not a language but a code. Likewise, claims about the biological notion of symbol-use constituting an organismic analog to human symbol-use (Swan & Goldberg 2010) are ungrounded as long as the term "symbol" is used in this controversial manner.

3. Is language a "cultural tool"?

A notable contrast to both the physicalist view of symbols (Pattee) and the evo-devo interpretation of symbolic reference as hierarchically dependent on iconic and indexical reference (Peirce, Deacon) is the view that ostensive use of symbols in languaging is not a direct legacy of hominin evolution but a cultural invention (Everett 2012). Counter to the view that language arose as a major evolutionary transition (Szathmáry & Maynard Smith 1995), Cowley and Kuhle (2020), for example, challenge theories of language as symbol systems as they find no grounds for such a transition. Their deflationary approach to linguistic symbols (which they prefer to call "wordings", stressing the dynamic character of the activity of *languaging*), while shedding light on many important issues regarding the role of languaging in the life of humans, appears as another extreme in defining the nature of language.

The body of Cowley and Kuhle's arguments rests on the thesis that, in primordial (non-literate) societies vocalizing produced material extensions to hominin and human use of cultural tools. They trace human vocal activity (languaging) to "how, in ontogeny, infants learn to make use of cultural tools" and how "voices come to serve as cultural assets" (Cowley and Kuhle 2020: 2). Finding analogy between reciprocal vocal activity (expression) of humans and "cultural practices among nonhuman primates", Cowley and Kuhle argue that "[f]ar from being symbolic or arbitrary, such expressions act as learned extensions to bodily powers – they function as, not symbols, but cultural tools" (*Ivi*, p. 3). Thus, they commit the double error of extending the inherently anthropocentric notion of culture to non-human animals on the one hand, and viewing linguistic signs as Saussurean symbols – arbitrary abstracta ungrounded in lived experience – on the other. The key concept in their explanation of the rise of languaging becomes "culture"; other related concepts deemed important in understanding languaging are "cultural tools", "cultural practices", "cultural life" (part of which is languaging), "cultural objects as material wordings", etc. Thus, the semiotic concept of "symbol" as a complex cognitive phenomenon that lies at the core of languaging as interactional/orientational activity is discarded, while "semiosis" or "semiotic" are not even used in the paper on languaging. Such an extremely "deflationary approach" seems to be highly problematic.

True, while the nature–culture dichotomy continues to be in the focus of attention in various fields of research, there is no general agreement on what culture is as different from nature (Jahoda 2012). On the one hand, the concept of "culture" emerged in the process of setting a distinction between the way of life of humans as languaging sapient organisms and other, non-human social animals, such as primates. On the other hand, as physical bodies, human organisms are part of nature. As was argued by Gibson (1979: 122), "[t]here is only one world, however diverse, and all animals live in it, although we human animals have altered it to suit ourselves". Over the millennia of human history, the impact of human civilizations on primordial nature has been such that it appears simply impossible to provide an example of "pure" nature in today's world; therefore, as argued by Heras-Escribano and De Pinedo-García (2018), the nature–culture dichotomy

should be rejected. But do such considerations justify an overgeneralized definition of culture as a "natural ecosystem" (Cowley & Kuhle 2020: 9)? While in the case of populations of humans it might, perhaps, be accepted with certain reservations, what about the ecosystems of populations of non-human animals, such as termites, cliff swallows, or the Nile crocodiles? Can one really speak of their natural ecosystems as cultures?

Moreover, the notion of "material cultures in non-human primates" (see also Kuhle 2018; Mengden & Kuhle 2020) implies its logically assumed counterpart, "non-material (immaterial?) culture in non-human primates", whatever that might be. However, it is not explicated by the proponents of the "deflationary approach". Instead, they focus on the idea of vocalizations ("wordings") as material extensions to human use of cultural tools, contending that "the development of such skills in using tools is a crucial basis for the whole of cultural life – including languaging" (Cowley & Kuhle 2020: 3). Note, however, that if languaging (a skill in using vocalizations as tools) is part of cultural life, and the natural ecosystem of, say, cliff swallows is, indeed, their culture, then the inescapable inference is that cliff swallows' vocalizations (their songs) are constitutive of languaging. This brings us back to the epistemologically flawed idea of language as a communication tool (discussed in section 1), when, identifying language with communication, researchers speak of animal languages, a most notable example being the so-called honeybee language (Frisch 1967; for a profound critique, see Wenner & Wells 1990).

The belief that the so-called human cognitive-cultural niche construction leads to language, thus allowing Darwinists to speak of the evolution of humans as forming a continuum with hominin evolution, is likely to be rooted in the widely spread belief that language is a cultural tool, a communicative technology invented by intelligent humans. Recently, this belief has received additional strong support with the publication of the acclaimed "Language: The Cultural Tool" (Everett 2012), where it is argued that languages are formed to meet the needs of our culture and social situation. However, there is no denying major qualitative behavioral and mental gaps that separate humans from other animals (Penn, Holyoak & Povinelli 2008), and the question, of course, is to what evolutionary factor(s) such gaps might be attributed.

Mesmerized by our self-invented story of human intelligence as something genetically pregiven, a mysterious biological endowment that makes us the dominant species in the world of the living, we continue to think of language as the product of our intelligence, as an "add-on" to human culture – a fuzzy and elusive concept that defies an uncontroversial definition. According to Everett (2012: 6), "[l]anguage is how we talk. Culture is how we live", and this is where the root of the trouble lies. Counter to what our common sense tells us, language is not *how we talk*, language is *how we live*; it is "the house of being" in which humans dwell (Heidegger 2008).

A more weighted approach to culture as a phenomenon would be from the point of view of biology in general, and evolutionary biology in particular. Viewed biologically, culture is the manner of living of a socially organized *human population*, and, as such, it is constitutive of the population as a living system. The concept of culture is intrinsically anthropocentric, it bears on the unique ability of humans to modify their natural environment in a way totally alien to any other known species. Unlike non-human primates, humans create various artifacts that become an integral part of the environment with which communities of humans are in a relationship of reciprocal causation, constituting organism-environment systems (Järvilehto 1998). Just as humans affect their environment, their modified environment affects humans, defining the path of their cognitive development. The cognitive domain of humans is the domain of language as coordinations of coordinations of behavior, and the evolution of living

systems is the evolution of their cognitive domains (Maturana 1970). Therefore, because language is the way a human living system maintains its identity, a language is neither part of a culture nor a cultural invention. Language *is* culture, and there are as many cultures as there are languages (cf. Whorf 1958).

Of course, one can speak of the "culture" of primates, just as many ethologists speak of the "language" of chimps, dogs, parrots or what have you (Savage-Rumbaugh & Lewin 1994; Pepperberg 2002; Pilley & Hinzmann 2013) – as long as it is understood as what it is, a *metaphor*. If, however, we view culture as what Popper (1978/2011) called the world of the "products of the human mind" that molds social behavior and norms found in human societies as living systems, the questions to ask are: (1) What makes a society a society as different from simply a group of individuals that are also living systems? and (2) What makes the human mind so radically different from the non-human mind (if there *is* such a thing as "non-human mind")? The answer is: Language (languaging) as the typically human *life in semiosis* (Kravchenko 2014; 2016b).

4. Linguistic semiosis and sapience

The cognitive revolution, started in mid-20th century and, later, ambitiously characterized as the 'mind's new science' (Gardner 1985), not only seems to have gone awry, entrapped in its theoretical underpinnings by the pervasive computer metaphor and a firm belief that the human brain is a computer processing information input, and "thought is a species of computing" (Pylyshyn 1999: 7). It has gone much farther in exerting a drastic influence on how humans think about their cognitive powers, including natural language. Continuing the dualistic tradition set by Descartes, mainstream cognitive science has been quite successful in convincing not only its practitioners, but the general public as well, that mind and language are separate phenomena and "it is important not to confuse thought and language" (Loritz 1999: 16) because language just reflects more general properties of mind (Evans 2014). Advancing an ideology of segregationism against any well-grounded warnings (cf. Harris 1996; 2004), mainstream cognitivists continue to adhere to the code-model of language as a tool used to encode meanings (mental representations) and exchange them in the course of communication:

> Like many other species, we are minded creatures: we store representations of the world around us, and of our own internal bodily states. But unlike other species, we also have language: an unheralded means of packaging these representations - our thoughts - and rendering them public (Evans 2015: 3).

However, to assert that humans are not the only minded creatures in the absence of what might acceptably pass for a scientific definition of mind, and to claim at the same time that *no other species has* language, is, epistemologically, like trying to sit between two chairs – an attempt doomed to failure. We know that we have a mind largely because we can, and do, speak about it as an object thanks to the distinction (the word "mind") we as observers make in language. This distinction is important for our understanding of self and others in our cognitive domain – the interactional domain of humans as second- and third-order living systems, and the name "mind" becomes a convenient "handle" on this distinction we call the "concept" (of mind, in this case). As Dennett (1996: 159) observes, "[c]oncepts *are* things in our world, because we have language". Therefore, all other species that do not have language cannot have what we call "mind" referring to the feature of the species *Homo sapiens*. The following observation is in place here:

> The idea that we decide to say something and then dress it in words is one of those ideas, like the sun going around the earth, that seem obvious and irrefutable to the naive, untrained mind, but bear no relation to what actually happens in the real world (Bickerton 2009: 77).

There is an immense literature on the language–mind problem as a focal point on the cognitive science agenda. However, just as it is a mistake "to assume in advance that Mind and Body are clearly distinct, and that we know enough about each of them that a line can be drawn" (Port 2006: 118; cf. Varela, Thompson, Rosch 1991), it is a mistake to draw a line between Mind and Language for the same reason. The picture of language drawn by orthodox linguistics is far from approaching any likeness with the original, largely because of the epistemological trap of language mentioned in section 1.

Cognitive internalism – the belief that mind has a locus in the brain – makes the whole cognitive enterprise thoroughly devoid of meaning, because mind is *reified* (Kravchenko 2016c). Exploiting the computer metaphor, cognitivists see mind as a kind of software package sitting in the hardware of the brain, and language as an input-output process run by this software. By studying this process, cognitivists hope to find what is in the mind, overlooking the obvious – that cognition, as a functional feature of living organisms, is a fundamental biological phenomenon, and so is language as a functional feature of the human biological setup (Maturana 1970; 1978). This is the main reason why mainstream cognitivism is incapable of offering a comprehensible account of cognition, both as a process and as a function, in general, and of human cognition in particular. Unless the biological nature of cognition and language has been acknowledged, discussions of how they work, and how language relates to mind, are pointless: *gigni de nihilo nihil*.

Counter to first-generation cognitive science view of cognition as computation, in biologically oriented cognitive science (Kravchenko 2006) cognition is the coordination of bodily processes of the organism with salient features of the environment (Menary 2010), which include the domain of linguistic interactions (languaging) as situationally grounded semiotic interactional activity maintained by the organism. Language is a functional biological feature of humans as living systems, and as such it is constitutive of the human organism-environment system as a unity. A systems approach in the study of our species disallows of the language–mind dichotomy.

Cartesian science takes sapience for granted as something that defines us as a species and is biologically (genetically) predetermined (Pinker 1995). Language is viewed either as a product of mind (Popper 2011) or dependent on mind (Searle 1983). This view is the basis of how we understand ourselves as a species:

> Since we usually regard language as no more than the means by which we express our thoughts, it seems natural to think that language should issue from intelligence, rather than vice versa. It seemed equally obvious, to naive observers, that the earth was the center of the universe, and the sun, moon, and planets all went around it. When it comes to mind, intelligence, and language, we're just about where people were with regard to the universe, say a thousand years ago (Bickerton 2009: 58).

However, as more and more evolutionary biologists seem to agree, the exclusive role of genetics in explaining life has been somewhat overexaggerated, and the importance of epigenetic factors in species development, such as niche construction (Laland, Odling-Smee & Feldman 2000) becomes more and more obvious (Magnani & Bardone 2010; Peterson *et al.* 2018). Evolution is not "just selfish genes mindlessly replicating themselves. It's a process in which the things animals do guide their own evolution" (Bickerton 2009: 11). To understand living things requires reference to higher-order

principles of system organization – as a matter of fact, "it is the fact that they are organisms that do things that requires explanation" (Mitchell 2017). And in the case of our species, everything we do that makes us human and what other species cannot do, depends crucially on language. It may well be the only thing that makes us human, and it was language that caused the human brain to evolve, making it bigger and better as compared to all other known species.

It is generally agreed that the distinctive feature of our species is the cognitive ability for abstract thought that emerged with the evolution of the human brain, which is larger in relation to body size than the brains of many other higher animals. In other words, we are much smarter than other animals because our brains are bigger and better. However, as far as research into the origin of human intelligence goes, it is not quite clear to what evolutionary factors humans owe their outstanding intelligence (Willemet 2013). Clearly, the difference between human and non-human mental phenomena is one of quality, not of quantity, just as it is clear that this difference must have arisen due to some epigenetic factors that were uniquely characteristic of populations of humans while absent in the ecologies of non-human animals. As was proposed by Maturana, Mpodozis and Letelier (1995), to understand the biological and neurophysiological processes that give rise to human mental phenomena, it is necessary to consider them as behavioral relational phenomena that take place in the relational manner of living that *human language constitutes*.

Although the genetic differences between humans and chimpanzees, for example, are negligible, the two are distinctly different kinds of animals because their manners of living as languaging and not languaging beings are different (Maturana & Verden-Zöller 2008: 55).

The biological function of languaging is the establishment of a relational domain in which the unity of a population of talking organisms as a living system is sustained through coordinations of coordinations of cooperative behavior, giving rise to communities and, on a larger scale, societies. As I have argued elsewhere (Kravchenko 2014), linguistic interactions between individual humans are an essential part of the medium with which human adaptive behavior must be congruent. On an evolutionary scale, the human-specific relational domain of linguistic interactions becomes an epigenetic mechanism, when extragenomic constraints (the adaptive necessity to orient others and self in a consensual domain of interactions) can induce the same effect as morphogenetic processes – the so-called "Lazy Gene" effect (cf. Deacon 2009).

As coordinations of coordinations of cooperative behavior, languaging becomes possible because of the ability of human organisms to take account of a constantly more remote, perceptually not present environment in controlling their interactions with the world (Morris 1938) – in the process of linguistic semiosis. As such, it is a biological adaptation that sets humans apart from the rest of the living world. The emergence of the ability to orient others and self in their consensual domain to what is not perceptually present – that is, to operate on first-order abstractions in co-ordinations of interactional behavior – was the pivoting point in the evolution of the human brain, laying the basis for abstract thought as neuronal processes that lead to the establishment of second-order consensuality and languaging as behavior in a second-order consensual domain (Kravchenko 2021). This marks the beginning of thought as dynamic internal states, recursive interactions with which become behavioral components in the consensual domain: cognition as a biological function meets language as a biological adaptation, and the ontogenesis of *Homo sapiens* begins.

While the question of how exactly language evolved, according to some estimates, about 100 – 150 thousand years ago, and what was the driving force behind this development, does not, today, have an answer (Tattersall 2007), it is obvious that the origin of

sapience lies in linguistic semiosis. Humans exist in the flux of joint activity with others in a consensual domain of languaging that sustains the uninterrupted continuity in their organization as living systems (communities of talking organisms), or organism-environment systems. This environment, as the material and relational (cognitive) domain of human populations built by the human organisms, becomes the scaffolding for promoting thought and reason (Clark 2006; Schilhab 2015), the experienced environment with which a linguistic organism forms a unity - the world of affordances constructed in linguistic semiosis (Gasparyan 2020). This remarkable ability of humans allowed them to go beyond the perceptually present Umwelt of non-linguistic organisms by creating not only the Welt, but also virtual reality as the infinite universe of possible worlds constructed on a daily basis in the human cognitive domain. In short (to use what I believe to be a more correct translation from Greek), "In the beginning was the Word, and the Word was **before** God (πρὸς τὸν θεόν), and the Word **was** God". We are what we are, we are where we are, and we do what we do because of language. And our continued evolution as a species is the evolution of our cognitive domain - the domain of languaging in which we *happen* as humans.

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