

The Origin of Languages. A Constrained Set of Hypotheses

José Luis Guijarro[†]
joscluis.guijarro@uca.es

ABSTRACT

As it seems impossible to find reliable evidence to back up hypotheses on the origin of our use of the linguistic tool in our acts of communication, I believe that we may start by pointing as accurately as possible to the processes involved, using a methodology that attempts to reach the levels of adequacy proposed by Chomsky, complemented by those suggested by David Marr. If we conclude that human communication and human language may have had different origins, we might find a new perspective which opens a vast field of research.

Keywords: Language, Communication, Evolution, History, Levels of Adequacy.

1. Introduction

1.1. The lamp and the key

A man was walking home late one night when he saw the Mulla Nasrudin searching under a street light on hands and knees for something on the ground.

“Mulla, what have you lost?” he asked.

“The key to my house,” Nasrudin said.

“I’ll help you look,” the man said.

Soon, both men were down on their knees, looking for the key.

After a few minutes, the man asked, “Where exactly did you drop it?”

Nasrudin waved his arm back toward the darkness. “Over there, near my house.”

[†] University of Cádiz, Spain.

The first man jumped up.

“Then why are you looking for it here?”

Because there is more light here than near my house.”¹

1.2 Unsolved problems that have arisen when musing about the origin of languages

It is widely assumed that we haven't got sufficient and reliable data to build a real scientific theory to account for and explain the origin of human languages². We cannot collect any evidence, so the story goes, as none exists in today's physical world, and our conclusions are impossible to prove. Therefore, the only thing we can do when thinking about these matters is to muse, muse...and muse again.

However, there is musing and *musings*: What I am trying to say is that, since we cannot rely on physical evidence, we may however constrain our musings in such a way that they point to clear notions with which we may be apt to construct a likely model that works. If we were able to do that, our model could be then considered a true scientific theory, whose proof relies on this functioning aptitude. In other words, as we do with other realms of the so-called mind, we can attempt a *simulation* of the processes involved in the making of our linguistic tool.

Before that, however, we need to clear up the muddled field in which most of those musings have landed, and attempt to use constraining methodological tools to arrive at somewhat more precise and accurate concepts.

In this paper, I will try to do just that.

From my point of view, almost every musing about the origin of languages, that I am aware of, concentrates its efforts, like Nasrudin, on an illuminated area which seems clear and self-evident to researchers: human languages arose and subsequently evolved as *the* solution to our species *communicative* need. There had to be, it has been claimed, a simple proto-language which slowly developed into a full language in the sense we know it today.

An important problem that appears with this view is that nobody has ever found any token of this supposed protolanguage, not even in the most, so-called, primitive societies that have been discovered so far. All the languages

¹ See: http://www.getnewvisions.com/teaching_stories/how_to_read_ts.html

² The use of the plural, language*s*, is consciously adopted for reasons which will be made clear below.

spoken by the human species that we know of show similar degrees of complexity in their different level structures, so that none is apt to become a likely model for that alleged proto-language.

There have been two main ways to try and avoid that problem without really solving it: on the one hand, it has been proposed that the developing of pidgins into creoles might shed some light on the evolution of the human language. Pidgins are indeed less complex than the natural languages of humans, and, furthermore, they arose for communicative needs. Finally, when these pidgins became creolized, they acquired a universal sort of complexity which made them natural to our species, like every other language. In other words, it is assumed that our proto-language was a kind of pidgin, which then flourished into a primeval creole.

On the other hand, some researchers, like Chomsky and followers (see, for instance, Hauser et al., 2002), decided that there is too much ignorance at present to start musing about human protolanguages. So, they have proposed that, as far as they were concerned, language arose suddenly within the human species, and this is the only interesting object to be considered in the present state of our linguistic knowledge – proto-languages, according to them, are just-so-stories not worth caring about.

A less obvious problem (thus, hidden from general consideration) is that other species also have coded languages they use in their communicative acts. Languages which may be prewired in the species or that may be learned from their co-specifics. Is this sort of coded communicative behavior less evolved than our linguistic codes? A related difficulty that would need to be considered is that some human coded signals seem to point to altogether different conceptual spaces all the time (cf. Wilson, 2008). The coded word RED, for instance does not point to the same hue, when talking about, say, strawberries, the nose of a drunkard, the shame which shows in a face, the color of a kind of hair, the stop sign of a traffic light, a political preference, or the state of a bank account. How come? If RED is a coded sign it must have a fixed relationship with a given thing. It can't keep changing all the time. If it does, as it seems obvious, it is a problem to which we must find a solution in our musings. However, in canonical theories about the origin of languages, it is seldom, if ever, tackled.

In this paper, I will try to make all these problems disappear, not by ignoring them, as some have done in the past; no, I am sure those problems arise from a basic misrepresentation of the processes involved. So, in the same

way we make our fists disappear by opening our hands, if we adopt a different point of view, and try to be coherent with it, those unanswered questions will no longer exist in our theoretical landscape.

2. Constraining musings

I have found that attempting to seriously reach the three levels of adequacy proposed by Noam Chomsky (1957) is a good tool kit to start cleaning the muddled array of musings that are offered today. In order to make it more accurate, I have decided to complement it with the three requisites David Marr (1982) proposed, in his turn, in order to say something valuable about human cognitive faculties. I am not sure whether or not either Chomsky or Marr would be happy with my decision, but the fact is that, for me, the combination of both seems to be, in practice, a highly efficient means of constraining my own musings on the matter.

2.1 Language or Languages?

Let me start by wondering about the poorness of the English vocabulary on the fundamental way to point to our subject matter. English has only one word, *language*, while my native language, Spanish, has three, *lenguaje*, *lengua* and *idioma*, and French has two, *langue* and *langue*. There are perhaps other languages with more terminological pointers, but the three Spanish ones suffice for the time being. Although our three terminological pointers are used in a rather loose way, especially by Spanish linguists or philologists (who are strongly influenced by the French tradition and, nowadays, by the Anglo-Saxon research), the fact is that they seem to be not totally synonymous for “normal” people. Thus, some uses of one, but not the other two words are typically exclusive or, at least, preferred in some constructions (Guijarro, 1998).

Be that as it may, when the origin of language is discussed, Spanish minds are at a loss, for we don’t really know whether the origin of *lenguaje*, the origin of *lengua*, or the origin of *idioma* is going to be tackled. Moreover, are they the result of the same process? Do they have a different origin? What?

It is a blessing for my clarifying efforts that English is so lexically poor in this field, for it forces me to try and point sharply to given conceptual spaces, trying to reach the first Chomskyan level of adequacy, the observational one.

What are we observing, what conceptual place are we signaling with our three terminological pointers that English does not have?

Let me translate our word *lenguaje* as language 1 (or L1, for short) and state explicitly that when I use this pointer I am referring to the cognitive device that allows us to abstract away and formalize (*i.e.*, to give a mental form to) elements of our environment, so that we may store them in our minds, manipulate and use them, as needs be. This meaning is in accordance with the meaning of the “language” of computers, which is primarily a way to store and retrieve information in a machine.

How about *lengua*, or language 2 (L2, for short)? When I speak of L2, I’m pointing to a mental module in Fodor’s terms. That is to say, a dedicated automatic device through which certain incoming information is processed according to strict constraints, and is, then, responsible for producing a set of mental structures that universally underlie our *idiomas*.

Idioma, or language 3 (L3, for short) is, thus, the term with which I point to the final state of L2, once it has been formatted by experience in a given linguistic environment. It corresponds to what are known as “natural languages” like English, Spanish, Italian, Swahili, or Lingala.

We have now tried to reach the observational level of adequacy. When I use the English pointer “language”, then, I am signaling three different conceptual spaces. How may I describe them, *i.e.*, how can I reach the second level of adequacy?

It is here that I have found Marr’s three requisites a convenient practical tool. It has helped me to refine the descriptive adequacy effort along three main lines:

- 1) *The computational line.* What are the basic operations that describe the functioning of the observed element? In the case of L1, the basic operations would be those that concentrate on salient aspects of different elements in our environment, abstracting them away and using them as props to mentally reconstruct their relevant identities. In other words, we should research the possibilities and workings of the processes involved in concept formation. When talking about L2, the universal principles and parameters proposed by Chomsky (1981) would offer an accurate description along the computational line. Finally, the computations needed to describe L3 would be those that form the core grammar of any given natural language.

- 2) *The representational line.* One needs to describe the social and/or personal representations that are currently available and those we are going to favor. L1 seems to be widely represented as the other side of the communicative coin, *i.e.*, language/communication. However, once we have made the three term distinction, this is hardly a good representation of L1. My own representation of this element is as one side of the cognitive coin, *i.e.*, language 1/ cognition. Without language 1 there is no cognition; without cognition, L1 is not possible. The representational description of L2 is as a kind of pre-wired blue print which acts as a sieve to allow basic operations described in the computational mode to adapt to social needs and uses. L3, finally, is widely represented as the other side (*i.e.*, the coded side) of the communicative coin, yet again. I will try to refine this representation by imagining it as convenient linguistic tool that helps creating accurate assumptions (by coding them) which may be used in communicative acts as premises to derive relevant conclusions. That is to say: even here, as far as my representation is concerned, L3 is not visualized as *the* other side of the communicative coin. It is only *a part* (a very important part, but a part, however) of this other side of the communicative coin.
- 3) *The implementational line.* Here we should be able to describe how humans at large or given human societies have tried to implement the elements concerned in order to expand and fix them in one way or another. This sort of description is seldom attempted by researchers and, when it is, it is treated as a lateral consideration. That is why, my proposals will be far from explicit in some cases, as I have no background considerations which I might use or criticize. How, for instance, has humanity implemented L1? As it has practically never been pointed to explicitly, there is hardly any implementation available. There are no conscious or mechanical ways to make concept formation easier to achieve. These processes follow a natural path, and the possible efforts to allow for better (or truer) results which some philosophers have tried to design, seem to be overrun by the relevance seeking mechanisms which are pre-wired in our minds (cf. Sperber, Cara & Girotto, 1995). The same difficulty applies to the L2 concept. As it is an inherited trait, it is difficult to impinge on it by implementing it in one way or another. Only L3 has been widely

implemented in human societies: writing, in the first place, allows it to be fixed and more easily observed. The results of these observations, called natural grammars, help people to consciously learn and use it in an effective way. And the expansion it has achieved through the media is enormous. So, the implementational scarcity we have found in L1 and L2 is compensated by the vast array of implementations L3 has developed –a clear consequence of the almost exclusive identification of language with communication.

We have yet to attain the last level of adequacy, the explanatory one. What are the reasons why those three elements have arisen? To answer this question is the goal of this paper. We will try to do that after first making further observations on some of the other concepts involved.

2.2. Evolution and/or history?

Let me organize the following text schematically for greater clarity.

- A) **OBSERVATIONAL** level of adequacy: when I talk about “evolution” I am pointing to a biological process of change, based on genetic material and resulting in new biological elements. When I talk about “history” I am pointing to social processes, in which the features of a given element are apt to be “infected” (cf. Sperber, 2000) by some of the characteristics of the social environment and made to change in order to cope with them. The biological changes that transformed a kind of ape into a proto-human, and this proto-human into a human being indeed form part of an evolutionary process. The processes which turned, say, Iberians into Hispano-Romans and these into Hispano-Arabs, before finally arriving at the Spaniards who live today in the peninsula are, then, historical processes.

- B) **DESCRIPTIVE** level of adequacy:
 - 1) Computational description:

According to Darwin, evolution happens by natural selection, a process guided by successful genetic mutations which adapt themselves to solve specific problems encountered in the environment. As this idea destroyed the previously accepted notion of a purposeful divine plan, it had to struggle for acceptance so vehemently that, nowadays, when it is finally widely accepted as *the* true story, any other account suggesting different operations may have led to evolution is immediately treated with suspicion and normally rejected. However, natural selection is not a dogma, but a scientific account which may be refined or complemented with other scientific accounts. The one I have in mind has been proposed by Lynn Alexander (1967) who signed it under the name of her then famous husband, Carl Sagan, in which she proposed,

[...] a theory of the origin of eukaryotic cells (“higher” cells which divide by classical mitosis) is presented. By hypothesis, three fundamental organelles: the mitochondria, the photosynthetic plastids and the (9+2) basal bodies of flagella were themselves once free-living (prokaryotic) cells (Sagan, 1967, p 255).

It may not be apparent to everybody, but what the author is suggesting is that sometimes evolution uses a different mechanism to the one proposed by Darwin. Evolution in this case happens when existing entities find it useful to join others to improve their living possibilities, creating a new more efficient entity which may, then, enter the natural selection process. This theory is known as *Serial Endosymbiosis Theory (SET)*, for short). I am proposing it here as a complement to natural selection operations, for it may help us understand some of the conundrums that scientific research has faced in our topic.

We will now describe history computationally: its functioning is really very different to both the natural selection processes and the endosymbiotic operations. History, as I said earlier, describes the development and change of social events according to adjustment operations which take into account the representational character of these events and the surrounding features of the social environment. Those operations are metaphorically closer to epidemiology computations than to evolutionary operations. In epidemiology, in effect,

the success of a contagion depends on, say, the strength of some agents (*i.e.*, bacilli or viruses) and the weak defenses a set of environmental features has at any given moment. If social elements are viewed as representations, the changes that history may produce in some of them will be due to the weakness they show in the face of new and strong representations. So, in our computational description of history we must find an explicit relationship between those two forces at work and establish their respective import in ensuing changes.

2) Representational description:

Despite its many critics, Darwin's theory has proven to be very accurate and helpful to explain the diversity of species in the world. Its success has been so evident, that many metaphorical extensions have been proposed in order to explain facts which don't belong to the changing genetic world. One of the first metaphorical expansions of this biological concept was *social Darwinism*. Its main assumption is that the biological process of natural selection, *i.e.*, the survival of the fittest, could (and should!) also be used when talking about social and political entities. It thus became a so-called *scientific* alibi to defend racist (and sexist) political stances, responsible for pogroms and holocausts. A closer examination of the metaphor, however, shows that it really was an ideological tergiversation of Darwin's idea, based on Herbert Spencer's notions. Social Darwinism is now widely considered an abomination and has, thus, disappeared from the serious scientific landscape.

More successful has been Edward O. Wilson's metaphor known as *sociobiology*. He claimed that Darwin's idea of biological natural selection could be applied to the evolution of social behavior, which, in his view, could thus become, genetically prewired. Aspects, such as aggressiveness, group bonding, religious feelings and human speech capacity are natively determined although they may show different cultural features. This approach has also been strongly criticized, for similar reasons to those above.

Eventually, when the cognitive paradigm overturned behaviorism, what seemed a new modern metaphorical extension of the evolutionary idea, known as *evolutionary psychology*, offered a new representation of the

evolutionary notion. Instead of concentrating on the evolution of behavior, it has tried to describe how certain human psychological faculties are indeed the effect of adapting the mind to vital problems. Let me quote the creators of this trend directly:

[...] human psychological architecture contains many evolved mechanisms that are specialized for solving evolutionary long-enduring adaptive problems and [...] these mechanisms have content-specialized representational formats, procedures, cues and so on (Tooby & Cosmides, 1992, p. 64)

Although I am not an expert in biological evolution³, it seems reasonable to believe that the real goal that moves the evolutionary process is the attainment of an adaptive function; once a vital problem has been solved by a given adaptive function, it may be housed in a biological organ and not vice-versa –*i.e.*, an organic mutation with no given function would not have any reason to become permanent. Therefore, I think this apparent metaphorical expansion of the evolution concept really represents a basic complement to the Darwinian notion of evolution, provided we agree on the fact that the term, “mind” does not refer to a different organ to the term “brain”, but only to a different descriptive perspective, one physical, the other cognitive.

[...] cognitive descriptions and physicalist ones are not equivalent, but complementary. They cannot be reduced to each other. For this reason, the information-processing descriptions of cognitive science are not merely metaphors in which brains are compared to computers. Their status as an independent level of psychological explanation can be established by considering the fact that the same information-processing relationships can be embodied in many different physical arrangements (Tooby & Cosmides, pp. 65-66)

As has been already mentioned, the representational description of historical changes can be viewed as the infectious power of some representations that impinge on existing socially shared representations, thereby forcing them to become different. Thus, in this paper, I will try

³ However, «[...] anyone of average intelligence should, given goodwill and a little effort, be able to master enough of the literature in all relevant disciplines to avoid making gross errors» (Bickerton, 2003, p. 79).

not to represent these changes as driven by evolutionary mechanisms⁴ for the reasons given above, although there are moments when both points of view seem to coincide.

3) Implementational description

I am not really conversant with the possible implementations that the process of evolution may have had in our world. I suppose, however, that there are computer programs that may simulate it accurately⁵. Perhaps the same is true for historical changes, and it would be interesting to compare them and see how differently they are structurally organized. However, at the present state of our musing, this is really a secondary goal which, therefore, will be left untouched for the time being.

2.3 Human communication

This is the last term that we are going to analyze along the levels of adequacy before trying to explain how I propose to relate them in my origin of language hypothesis. Let us also do it in a schematic way:

A) OBSERVATIONAL level of adequacy:

When I use this term, I try to point to the process by which people make their private representations public (so that others may share them) by some sort of intentional behavior. If there is no intention, I will not talk about communication, although some information may be available. For instance, the nasal hue of Jane's discourse can inform Peter that she has a heavy cold, but in fact she is not communicating it –unless she simulates this in order to mystify him. Similarly, smoke does not communicate that there is fire somewhere; it just informs us that this is so.

B) DESCRIPTIVE level of adequacy

1) Computational description

⁴ As it is widely done by some researchers, like Dawkins (1976), who uses the metaphorical notion of “memes” to do the same work in the changes of our representational world that genes do in the physical one, overlooking the huge differences that distinguish biological mutations, almost unnoticeable in particular cases, from representational mutations which happen in every instance of their transmission.

⁵ In this respect, the work of S. Kirby and colleagues at the University of Edinburgh has been pointed out to me, especially, Scott-Phillips, Thomas C. & Simon Kirby (2010).

The essential operations that are, thus, needed for communication to work are, in a sense, a chain of embedded representations of the following sort: an observable behavior shows an intention to inform about something, or, more schematically:

{communicative intention [informative intention (that X is the case)]}(Sperber & Wilson, 1985/96)

The first representation (*i.e.*, the communicative intention) is processed as a *fact*, or, in other words, a representation that is processed and kept directly in the mental box of representations, as it were. All the other representations are, as we may see, embedded inside the factual one, and thus, they are considered assumptions (Sperber, 1994). Thus, if Peter starts talking, this verbal behavior is a fact directly processed by Tony. We could render it like this: “it is a fact that Peter is talking”, or, shortly: “Peter says”. If Peter wants Tony to know that he is leaving, the computations involved would look like this:

{Peter says [and by saying he wants to inform Tony that (he is leaving)]}(Curço, 1995)

2) Representational description

As noted before, a very wide social representation of human communication is closely linked to the linguistic processes. Human communication is thus represented as consisting chiefly in the ability to code and decode messages in the form established by our L3. Although it would be foolish to deny that L3 plays an extraordinary (and probably species-specific) part in making human messages quite accurate, my representation of its importance is somewhat different to the one which is almost universally held. Therefore, it needs some previous descriptive effort on my part.

Living beings can be described as devices that must cope and adapt themselves to their environment. The processes which allow for this goal to achieve some kind of success may be very roughly described in the following way.

(1) Those processes may be triggered automatically by given stimuli. In the human case, they work in a non-conscious way, even in cases where we have conscious knowledge about its uselessness. For instance, we close our eyes automatically when somebody waves a finger near them, although, at some given occasions, we may positively know that this movement does not represent any danger whatsoever.

(2) A very close (if not the same) process consists in reacting to coded signals which we decode also in an unconscious manner. Such codes may be due to (a) genetic pre-wiring, to (b) imprinting (*i.e.*, formatting it along the lines of a prewired sieve), and to (c) learning it in a conscious manner. Examples of these may be found in animal species such as the dancing of the bees (a), the almost immediate knowledge that ducklings acquire as to who their mother is (b), the song of some birds (c); in humans, we have inherited codes which allow us to interpret our co-specific's faces (a), we acquire L3 by (b), and we learn how to transform it into writing (c). The structurally coded stores of data are known in cognitive science as "modules", for they are encapsulated independently of each other and work only according to their own rules: our identification of human faces, say, does not impinge in any way on our ability to speak our L3 or vice versa.

(3) However, we are able to relate the output results of these modules in one way or another. One canonical theory has it that there is a sort of mental general mixer which does just that (it is thus known as the *central* processor). Another point of view establishes that at a certain point, the modularized processes become prone to partake in other final modular processes (Fodor, 1983; Sperber, 1994; Carruthers, 2003a, 2003b, 2003c). Be it as it may, the fact seems to be that there is a third way for humans to cope and adapt themselves to their environment: by *interpreting* it, using a kind of logical operations, known as *inferences* – *i.e.*, deriving conclusions from mentally represented premises. It would then seem to be a steady development of adaptive behavior, from the automatic physical responses, through the (de)coded ones, to end up with interpretative processes that may be used in totally new circumstances with quite a reasonable ratio of adaptive success. Human communication is best representationally described as this sort of interpretation which

must be strongly constrained by the principle of optimal relevance (a realization of the principle of minimum effort) (Sperber & Wilson, 1986/1995).

However, it is true that a continued interpretation of a given behavior might finally be coded to ease its functioning. Let me give you a personal example. When I bought my last car, I went into an underground parking place to leave it there. When I went out, the car started to whistle “Oh Susanna”. I needed almost a minute to realize that I had left my lights on. Thereafter, however, as soon as the car started whistling the first bars, I immediately knew what the matter was, and acted quickly. The whistling that had started as a prompt to be interpreted, had become codified in my mind. I am sure that in our primeval communications, some of our groans, shouts, etc., became so coded. No doubt about that. What I am arguing is that this faculty, as soon as symbiosis was achieved, began to point to internal psychological states available by our L1 cognitive nature. And as psychological states may never be proven to be the same in every mind, humans went further and, on top of decoding, managed to retain the interpretative faculty to be able to interchange human messages⁶.

3) Implementational description

Our world seems to be massively dedicated to implement the possibilities of communication. It started by inventing external representations (pictures or other signals which some early societies used for this purpose, cf. Lewis-Williams, 2002), adapting it to messages couched in L3 written format. This last move was so successful that it is one of the main reasons for the wide representation of L3 as the other side of the human communication coin. One tends to view linguistic discourses and, even more, linguistic texts⁷, as the *only* perceivable reality of communicative acts. But as I hope it is clear, now, there is a lot more to decoding oral speech or to reading linguistic texts in order to successfully achieve some sort of communicative act. We will insist on this in the following section. Nowadays, the extension of communication through space is so huge that it surely surpasses the limits of this paper.

⁶ A somewhat similar, but more detailed account, without the language triadic distinction, is made by Origgi & Sperber (2000)

⁷ Texts are here considered to be recorded instances of communicative discourses.

3. Explaining the constrained concepts we have presented so far

The last level of scientific adequacy is precisely the purpose of our present musings. Why and how did some of the above “elements” appear among humans and develop into their present condition. How are, language (or, rather, L1, L2 and L3) and communication related when considered within the evolutionary process? Did one depend on the other, or were they different evolutionary adaptations? What were the reasons for their origin in our species? How did it come about?

I am aware that my musings represent an interpretation of the “objects” I have tried to observe and describe in a most explicit way. As I have no real hard evidence to back my musings, the only way to give a scientific character to them is to constrain them sharply and consider how they offer a likely biological / psychological advantage to our species and thus have become a permanent feature of our species-specific endowment. Although much will remain vaguely explained or even unexplained, I do think that further research along the present lines may bring a novel outlook which may become a source for further productive hypotheses.

If we rely on the natural selection mechanism to describe evolution, the sudden rise of a given element must be considered a side effect with no adaptive function which was subsequently acquired (Gould, 1993). I believe that this suddenness must be due, rather, to our lack of evidence –it is a “hole” in our thinking, rather than in biology. Therefore, as long as I try to explain the origin of a given human trait through the natural selection mechanism, I will presume it to be a gradual development from other species. Damasio (1994) is clear in that respect:

Many simple organisms, even those with only a single cell and no brain, perform actions spontaneously or in response to stimuli in the environment; that is, they produce behaviour. Some of these actions are contained in the organisms themselves, and can be either hidden to observers (for instance, a contraction in an interior organ), or externally observable (a twitch, or the extension of a limb). Other actions (crawling, walking, holding an object) are directed at the environment. *But in some simple organisms and in all complex organisms, actions, whether spontaneous or reactive, are caused by commands from a brain.* (Organisms with a body and no brain, but capable of movement, it should be noted, preceded and then coexisted with organisms that

have both body and brain.)

Not all actions commanded by a brain are caused by deliberation.

On the contrary, it is a fair assumption that most so-called brain caused actions being taken at this very moment in the world are not deliberated at all. They are simple responses of which a reflex is an example: a stimulus conveyed by one neuron leading another neuron to act.

As organisms acquired greater complexity, “brain-caused” actions required more intermediate processing. Other neurons were interpolated between the stimulus neuron and the response neuron, and varied parallel circuits were thus set up, but it did not follow that the organism with that more complicated brain necessarily had a mind. *Brains can have many intervening steps in the circuits mediating between stimulus and response, and still have no mind, if they do not meet an essential condition: the ability to display images internally and to order those images in a process called thought.* (The images are not solely visual; there are also “sound images,” “olfactory images,” and so on.) My statement about *behaving organisms* can now be completed by saying that *not all have minds, that is, not all have mental phenomena (which is the same as saying that not all have cognition or cognitive processes). Some organisms have both behavior and cognition. Some have intelligent actions but no mind. No organism seems to have mind but no action.* (Damasio, 1994, pp. 89-90, the emphases are mine).

As L1 is the other side of the cognition coin, it is clear that some sort of L1 exists in other species which do display images internally and retrieve them when needed. Some may even be able to embed representations into other representations. These species are those that may be trained by humans for, at least, they are able to represent and store in their memory something like this:

[Award (for doing X)]

[Punishment (for doing Y)]

Human beings have developed this embedding faculty to attain almost infinite levels of recursion which today seem to account for our sense of humor (Curço, 1995) and other exclusive human thought processes (Guijarro, 2009). This, I submit, is the main characteristic of our L1 (Corballis, 2011). Through it, we are able to organize spatially and temporarily given mental representations in such a way that we consider them items of more abstract

general representations, or inversely, we may find similar elements in them which are the basis to represent time and space relationships among them. This mental capacity of our species developed into organizing abilities which helped our species to order our surroundings in convenient ways. My (very tentative) hunch is that this was mainly achieved by the female individuals of our species, who had the biological instinct to make homes in which to care for their offspring.

Men, on the other hand, went out to forage for food. They were more successful when hunting in groups, needing to communicate their joint actions to the other participants. They did it in the same way some other species do, by making visual signals to those that were near, and by oral noises when the others were out of sight. In this respect, human communication at that time was not different to animal communication.

Both processes, the creation of a mental organizing tool, and the use of visual and oral behavior to communicate joint action, thus, started to solve different adaptive problems, and it is even possible that some of their elements became codified in altogether different modules.

However, at some point, both modules got entangled in one way or another. This would amount to what Daniel Dennett (1995) calls a “good trick”; one that helped to actualize the mental tool perceptually and, at the same time, made the communicative power of the species increase exponentially. It was, metaphorically speaking, a sort of mental “endosymbiotic” process in which a totally new entity was created at one go; a new entity which worked with elements of both modules, but mixing them in a novel and productive way: human linguistic communication.

There should be then no problem to admit that this new symbiotic product appeared suddenly when its two components met and went on functioning thereafter⁸. If we adopt this hypothesis, however, our efforts should be now directed to imagine what advantages were gained through this permanent bonding.

⁸ The metaphorical expansion of the theory was suggested by Margulis herself in her lecture at the University of Valencia in 2002 (my emphasis): “... la historia natural, ecología, genética y metabolismo de organismos macroscópicos debe de ser suplementada con un conocimiento preciso del metabolismo y del comportamiento de los microorganismos. La fisiología y la ecología microbianas son esenciales para la comprensión del proceso evolutivo. El comportamiento de los microorganismos dentro de sus propias poblaciones y en sus interacciones con otros determinó el curso de la evolución de la vida. El mundo vivo subdivisible en último término es el *fundamento del comportamiento, desarrollo, ecología y evolución del mundo visible del cual formamos parte y con el cual evolucionamos*”.

First of all, the already mentioned “ordering” origin of L1, became modularized (and, thus, prewired in our species) in L2, with important consequences.

In effect, Chomskyans propose that the basic principles prewired in L2 are MERGE and EMBED (Chomsky, 1995). They are, thus, universal characteristics of all the human natural languages (or L3). This seems to be a unique feature of our species and it helps us to relate, in two complementary ways, a lot of seemingly independent material, establishing all sorts of meaningful links. The merging feature is the cause of the existing multiple levels in human linguistic structure. Thus, any given element, X , at level n , may rise to a higher level, m , by itself, or by merging it to another element, Y (*i.e.*, $X_n (+Y) = X_m$). However, the embedding faculty allows any given element X to remain at its level although it may have been merged to another element (*i.e.*, $X_n \rightarrow X_n+Y$)⁹. What is rather amazing is that this last faculty seems to be the linguistic realization of the way we store and process mental representations inside other such mental representations, as I mentioned before. It is, thus, an evident human trait which may be responsible of much of the seemingly “spiritual” character that has been traditionally attributed to our species (Guijarro, 2009) and, as such, it seems to be a crucial feature to account for “humanity” (Sperber, 1997).

But let’s leave that idea open for the time being. What interests us at this moment is to analyze the effects that resulted from the symbiotic union between L1 and L2 and the communicative faculty of humans.

I don’t see any reason to doubt that human communication, before the symbiotic event, was in any way different to that of other species. Intentionally ostensive acts would be the gist of that sort of behavior, in which, either by gestures or by making some kind of sounds, individuals could point to certain objects and events which would then become manifest to other individuals. It may even be possible that some gestures and/or sounds became codified and used in similar way by members of a given social group.

However, when symbiosis did occur, the human communicative process began to differentiate itself from that of other species. The direct (codified or not) signaling to external objects and events shifted somehow, making it possible to point to mental states which represented external objects and events. These mental states had been already structured by L1, probably in an

⁹ This is the gist of the so-called X-bar model in syntax (cf. Radford, 1988)

image-like (Rivière Gómez, 1982) format. Maybe, then, the symbiotic gain was to allow those primitive direct codings to push the abstracting processes a bit further, changing the image-like format into a propositional one (Levelt, 1989) couched in the coding actualizations that each group had assimilated – *i.e.*, in the L3. However, if it all had stopped there, the human way to communicate would not be so radically different to the one other (even close) species have. It would basically be a question of coding messages and decoding them, which is the general mechanism of animal communication in our world. We also code and decode, of course; but we do not convey our messages by this process. Our coding mechanism allows us to create very specific indices of our internal mental states which are thus presented as premises, along with many others that are evident in our surroundings. We, then, perform complicated but almost mandatory logical operations (Sperber & Wilson, 1986/1995), *inferences*, whose results are astonishingly accurate, for it looks as if we have read the minds of other individuals (Grice, 1969).

4. Conclusions

Once we have presented a tentative explanation, it seems reasonable to end this paper by putting forward the following conclusions:

- 1) The origin of L1 is parallel to (if not the same as) the evolution of our cognitive device¹⁰. It rests mainly in the growing ability to embed representations into other representations, allowing thus to order and classify objects which are considered to form part of a given more general concept.
- 2) The origin of L2 is the result of fixing some L1 abilities into a modular sieve which permits humans to acquire (*i.e.*, to imprint) their mother language (or L3) and use it thereafter to facilitate its ordering original purpose.

¹⁰ This idea is gaining weight silently but seriously: see, Donald (2011), Sperber & Wilson (1986/1995), etc., among others. However, none, so far, have been able to distinguish the three types of language. Thus, there is no real way to ascertain clearly *which* is the one concerned.

- 3) The social changes of L3 which have resulted in many different natural languages need not to be considered metaphorically as evolutionary processes. This only muddles the issue and offers no real help in understanding them. A better metaphor to use in this particular case is the epidemiological one which does not have to force the natural selection device, or the symbiotic one, to account for the changes. It may explain them by considering some changing elements to be very salient and thus contagious, provided the environment offers enough reasons for it.

Moreover, the *historical* changing of the human languages (L3) is due to the fact that they do not communicate solely by the coding-decoding process. The reason is well schematized in Sperber & Origgi (2012, p. 337):

(...) a more advanced language faculty, which leads those who possess it to internalize a richer [*i.e.*, different] code than the one present in the community, may emerge and evolve. In a coded based system, every departure of the common grammar will be disadvantageous, or at best neutral: it will never be advantageous.

This, by the way, and as the authors reasonably claim, is also the reason for the huge expansion of our linguistic codes, while other animal codes must remain restricted in order to be functionally successful.

- 4) The human communicative ability evolved in the same way for very many species: the intentional ostensive (at times codified) behavior of one individual was interpreted by others as pointing directly to objects, events, or desires which were thus made manifest. After the evolutionary process of symbiosis took place, humans added a further source of premises to allow for this sort of interpretation: the mental states. It is not that some mental states of other species are not used in their interpretation of messages. It is, rather, that, after symbiosis, humans have been able to construct very accurate premises of these states by using their linguistic abilities and, thus, use them in almost the same way as those they extract from their environment.¹¹

¹¹ Although, when they enter into conflict, the premises of the environment usually are deemed more important than those couched in linguistic form. You may thus say “how nice he is!” and show a gesture which points to the fact that you are being sarcastic and therefore you mean exactly the contrary than what you say.

After all this clearing effort has been attempted, a lot more needs to be done to refine the hunches I have presented here. My purpose, though, was to start a novel way to look at the evolution of language and communication as two separate processes that, due to a symbiotic union, have become a species-specific human trait with unique characteristics. In other words, I have tried to move to the dark place where Nasrudin's key is to be found. Once I got hold of it, I used it in the lighted place in order to find the keyhole that opened a door to a new perspective.

REFERENCES

- Bickerton, D. (2003). Symbol and structure: a comprehensive framework for language evolution. In M. H. Christiansen & S. Kirby (Eds.), *Language Evolution* Oxford: Oxford University Press, 77-93.
- Bickerton, D. (2009). *Adam's Tongue*. New York: Hill and Wang.
- Burge, T. (2010). A real science of mind. *New York Times* (19-XII-2010): <http://opinionator.blogs.nytimes.com/2010/12/19/a-real-science-of-mind/>
- Carruthers, P. (2003a). Fodor's Problem. *Mind and Language*, 18, 502-523.
- Carruthers, P. (2003b). Is the Mind a System of Modules Shaped by Natural Selection?. In Hitchcock, C. (Ed.), *Contemporary Debates in the Philosophy of Science*. Oxford: B. Blackwell, 293-311.
- Carruthers, P. (2003c). Moderately Massive Modularity. In A. O'Hear (Ed) (2003). *Mind and person*. Cambridge: Cambridge University Press.
- Chomsky, N. (1957). *Syntactic Structures*. Mouton: The Hague.
- Chomsky, N. (1981). Principles and parameters in Syntactic theory. In N. Hornstein & D. Lightfoot (Eds.), *Explanation in Linguistics. The Logical Problem of Language Acquisition*. London & New York: Longman. 32-75.
- Chomsky, N. (1995). *The Minimalist Program*. Cambridge: The MIT Press.
- Christiansen, M.H., & Kirby, S. (Eds.) (2003). *Language Evolution*, Oxford: Oxford University Press.

- Corballis, M. C. (2011). *The Recursive Mind. The origins of Human Language, Thought and Civilization*. Princeton: Princeton University Press.
- Curçó, C. (1995). Some observations on the pragmatics of humorous interpretations: a relevance theoretic approach. *UCL Working Papers on Linguistics* 7, 27-47.
- Damasio, A. (1994). *Descartes' Error. Emotion, Reason and the Human Brain*. New York: Avon Books.
- Dawkins, R. (1976 /1989). *The Selfish Gene*. Oxford: Oxford University Press.
- Dennett, D. (1995). *Darwin's Dangerous Idea*. London: Penguin Press.
- Donald, M. (2011). The first hybrid minds on earth. In A. W. Geertz, & S. J. Jeppe (Eds.), *Religious Narrative, Cognition and Culture. Image and Word in the Mind of Narrative*. Sheffield: Equinox Publishing Ltd. 67-96.
- Fitch, W.T., Hauser, M., & Chomsky, N. (2005). The evolution of the language faculty: clarifications and implications. *Cognition*, 97, 179-210.
- Fodor, J. (1983). *Modularity of Mind*. Cambridge: MIT Press.
- Fodor, J. (1985). Précis of modularity of mind. *Behavioural and Brain Sciences*, 8, 1-12
- Gould, S. J. (1993). Fulfilling the spandrels of world and mind. In J. Selzer (Ed.), *Understanding scientific prose*. Madison: University of Wisconsin Press, 310 - 325
- Guijarro, J. L. (1998). Idioma, lengua y lenguaje y otras cosas del mensaje. In J. Martín, F. Velázquez & J. Bustamante (Eds.). *Estudios de la Universidad de Cádiz ofrecidos a la memoria del Profesor Braulio Justel Calabozo*. Cádiz: S.P.U.Ca.
- Guijarro, J. L. (2009). A possible way to naturalize the human soul. *Pragma lingüística*, 17, 40-51.
- Grice, H. P. (1969). Utterer's meaning and intentions". *Philosophical Review*, 78, 147-177.
- Grice, H. P. (1989). *Studies in the Way of Words*. Cambridge, MA: Harvard University Press.
- Hauser, M., Chomsky, N., & Fitch W. T. (2002). The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?. *Science*, 298, 1569-1579.
- Hirschfeld, L., Gelman, S., (Eds.) (1994). *Mapping the Mind: Domain-Specificity in Cognition and Culture*. Cambridge: Cambridge University Press.

- Levelt, W. J.M. (1989). *Speaking: from Intention to Articulation*. Cambridge: The MIT Press.
- Lewis-Williams, D. (2002). *The Mind in the Cave*. London: Thames & Hudson.
- Margulis, L. (2002). *Una revolución en la evolución*, Valencia: Col·lecció Honoris Causa. Universitat de Valencia.
- Marr, D. (1982). *Vision: A computational investigation into the Human Representation and Processing of Visual Information*. San Francisco: Freeman.
- Mayr, E. (1984). What is Darwinism Today?. *Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 2, 145
- Mora Millán, M. L., (Ed.) (2008). *Cognición y Lenguaje. Estudios en homenaje a José Luis Guijarro Morales*. Cádiz: Servicio de publicaciones de la universidad de Cádiz.
- Origg, G., & Sperber, D. (2000). Evolution, communication and the proper function of language. In Carruthers, P. & Chamberlain, A. (Eds.). *Evolution and the Human Mind: Language, Modularity and Social Cognition*. Cambridge: Cambridge University Press. 140-169.
- Pinker, S. (1994). *The Language Instinct*. London: Penguin Books
- Pinker, S., & Jackendoff, R. (2005). The Faculty of Language: What's Special about it? *Cognition*, 95(2), 201-236.
- Radford, A. (1988). *Transformational Grammar. A first Course*. Cambridge: Cambridge University Press.
- Rivière Gómez, Á. (1982). *Razonamiento y representación*. Madrid: Siglo XXI de España, Editores.
- Sagan, L. (1967). On the origin of mitosing cells. *Journal of Theoretical Biology*, 14 (3), 225-IN6.
- Scott-Phillips, T., & Kirby, S. (2010). Language Evolution in the Laboratory. *Trends in Cognitive Science*, 14(9), 411-417.
- Selzer, J., (Ed.) (1993). *Understanding Scientific Prose*. Madison, Wisc: University of Wisconsin Press.
- Sperber, D. (1994). The modularity of thought and the epidemiology of representations. L. Hirschfeld & S. Gelman (Eds.), *Mapping the Mind: Domain-Specificity in Cognition and Culture*. Cambridge: Cambridge University Press, 39-67.

- Sperber, D. (1997). Intuitive and reflective beliefs. *Mind & Language*, 12 (1), 11-24.
- Sperber, D. (2000). *An objection to the memetic approach to culture*. In R. Auger (Ed.), *Darwinizing Culture: The Status of Memetics as a Science*. Oxford: Oxford University, 163-174.
- Sperber, D., Cara, F., & Girotto, V. (1995). Relevance theory explains the selection task. *Cognition* 57, 31-95.
- Sperber, D., & Origgi, G. (2012). A pragmatic perspective on the origin of language. In D. Wilson & D. Sperber (Eds.), *Meaning and Relevance*. Cambridge: CUP
- Sperber, D., & Wilson, D. (1986/95). *Relevance. Communication and Cognition*. Oxford: Basil Blackwell.
- Tooby, J., & Cosmides, L. (1992). The psychological foundation of culture. In J. Barkow, L. Cosmides & J. Tooby (Eds.), *The Adapted Mind*. Oxford (UK): Oxford University Press, 19-136.
- Wilson, D. (2008). Relevance theory and lexical pragmatics. In Mora Millán, M. L., (Ed.), *Cognición y Lenguaje. Estudios en homenaje a José Luis Guijarro Morales*. Cádiz: Servicio de publicaciones de la universidad de Cádiz, 233-247.
- Wilson, D. & Dan Sperber (2012): *Meaning and Relevance*. Cambridge: CUP