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Arguing for a conscious emergence of language

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Abstract

In the present article it is argued that the first instances of linguistic communication between early humans were characterised by the use of consciously invented signs. This position is in contrast with what is probably the mainstream view on the subject, which holds that language is the result of a biologically acquired communicative ability that spontaneously, instinctively, began to manifest itself in the mouths or hands of the very first language users. By highlighting the inextricable link existing between linguistic production and conscious thought, I claim that the first true linguistic items that appeared on the evolutionary scene could never have been generated had a higher level of consciousness not come to characterise the human mind, enabling it to perform 'thinking about thinking'. Key to this novel mental capacity was the acquisition of a new type of representational system accessible to conscious awareness. The view of language emergence suggested here inevitably clashes against some important theories about language and its evolution. By placing conscious meaning right at its core, it rejects, for example, syntactocentric approaches to language. It also distances itself from accounts of language evolution which predict linguistic forms to have arisen before linguistic meanings.

Keywords: Language evolution; Consciousness; Conceptual thinking

1. Introduction: outlining the main points of the discussion

How exactly did our ancestors begin to speak or sign languages? It is an old, unresolved question. Numerous suggestions have been put forward, but almost every aspect of language evolution is still the object of heated debates and controversies. One of such controversies is whether the first languages were the product of conscious inventions or, by contrast, they emerged and developed naturally through a process over which people had little or no control. The present work is going to defend the first of these two contrasting positions, claiming that linguistic inventions became possible when hominins acquired the ability to think about their own thoughts. Here below is a brief description of how the article is structured:

Section 2 introduces the concept of 'thinking about thinking', which is of central importance to the argument developed in the present article. It also presents two conflicting views about the possible involvement of conscious will in the birth of language: the position of those who believe language to be a human cultural artefact is contrasted against that of those who regard it as a product of human biology.

Section 3 evaluates the allegedly spontaneous appearance and development of a sign language among a community of deaf individuals in Nicaragua. This is usually considered to be one of the most convincing pieces of evidence in support

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of the instinctive, unconscious emergence of language. I will argue that what has been found about that phenomenon does not actually undermine the hypothesis that the first human languages were the product of conscious inventions.

Section 4 is where I lay out my arguments in favour of the view that languages were deliberately created and constructed. The section begins by presenting and criticising one of the very few available descriptions of how languages may have come to light spontaneously. The objections I make to that picture lead the discussion straight to the core argument of my thesis, which highlights the intimate relationship existing between language production and conscious thinking.

Section 5 deals with the issue of what kind of mind hominins must first have developed in order to start thinking consciously and invent languages. In this sense, I will look at Jean Mandler's theory of the human mind (perhaps best outlined in her 2004 *The Foundations of Mind*) as a useful conceptual framework within which the idea of language as a conscious invention can be accommodated.

Section 6 seeks to present that idea in relation to a possible evolutionary timeline for language. While suggesting that the appearance of conscious thought (the trigger of linguistic inventions) was the result of a late saltation event, I also stress the equally fundamental role that some other previous physical and mental transformations must have played in paving the way for the later emergence of language.

The final discussion in section 7 contains some conclusive remarks on the significance and implications of the picture proposed in the present article. I will argue that it necessarily denies validity to some influential theories of language and its evolution. In particular, it strongly refutes syntactocentric views of language as well as theories of language evolution that predict linguistic forms to have appeared before linguistic meanings.

2. Two opposing views on language emergence

Humans have metacognitive capacities: they are capable of what some call *thinking about thinking*, the ability to be sometimes aware of, detached from, in control of the thoughts that surface into consciousness. Thinking about thinking (henceforth also referred to as *conscious thinking*) is in essence what Edelman (1989) calls *secondary consciousness* and Bickerton (1995:58) calls *consciousness-2*, whereby the organism becomes aware of being conscious and can think about her own thoughts. It is a level of consciousness that Edelman and other scholars (e.g., Clark, 2006:372) believe to be uniquely human and quite distinct from *primary consciousness* (or *consciousness-1*). The latter is said to characterise the mental life of infants and animals, and involves consciousness about perceptions and sensations. Animals can react to such perceptions appropriately through instinctive behaviours, but cannot reflect upon them. An animal possessing primary consciousness ''has no means of reviewing explicitly its present perceptions in terms of analogues in the past or in terms of anticipated analogues projected to the future...and is not conscious of being conscious'' (Edelman, 1989:186). In secondary consciousness, though, ''we do not only see the rabbit; we know we are seeing the rabbit'' (Bickerton, 1995:129). Conscious thinking is often put in connection with many *executive functions* of working memory (Baars and Franklin, 2003), which are believed to carry out operations such as attention, reasoning, planning, decision making, active inhibition, sequencing, temporal tagging, etc. (Baddeley and Logie, 1999; Miyake and Shah, 1999). Indeed, although in the last several years a series of experimental studies appear to have found the seeds of human metacognition in some non-human animals (e.g., Smith et al., 1995; Shields et al., 1997; Hampton et al., 2004; Kornell et al., 2007; Rosati and Santos, 2016),[1] many of the above executive operations probably remain beyond the reach of most if not all non-human species. In contrast, we routinely use them to carry out a plethora of tasks, often without experiencing any particular mental effort.

In relation to the aims of the present article, even a simple activity such as deliberately inventing a novel linguistic label for some concept probably requires the aid of conscious thinking. For any new thing, event, situation we come across, or for any imaginary, non-existing entity we have constructed in our mind, we can, if we wish, invent a label for it, whereby we are free to come up with any arbitrary gestural or vocal sign we like: we may behold for some time a label that has sprung to mind, perhaps evaluating it against and choosing it from possible alternative labels. Eventually, we can make the voluntary decision to adopt it in the future and even propose its use to some of our friends.

Of course, we never practise this kind of inventive activity: since the very first years of our life we have found ourselves provided with a vast repertoire of shared, conventional signs that cover all of our needs. It is the language used in our community, which we acquire in the first years of our existence, largely without any effort. Nevertheless, when one tries to give an account of how language came about, it is very easy to point out that the very first linguistic creatures did not have any model to learn from (Hurford, 2012:638). It is one of the reasons that have led some to believe that the 'invention hypothesis' should be given serious consideration in order to explain how things got started, irrespective of which

[1] But see Carruthers (2008) on the interpretation of the data gathered in some of those studies. He maintains that the behaviours displayed by the tested animals can be explained in terms of first-order rather than second-order cognitive processes.

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expressive modality was used first (i.e., manual or vocal).[2] This is also because it is a process which would enable individuals to create an indefinite number of labels, and could therefore provide an excellent account for the open-ended nature of language. The idea that language was consciously created has been proposed by social contract theories, which maintain that different communities collectively invented and constructed different languages in explicit agreements. One of the most recent defences of the theory of language as a socially constructed tool has been made by Dor (2015), who regards language as the first communication technology humans have invented (in principle, not very different in kind from inventions such as the telephone, the fax, the Internet, etc.). Another outstanding voice in support of the idea of language as a cultural, collective product is that of Merlin Donald, who argues that language was a *public invention* that involved not only lexicons but also grammars (Donald, 1991:216). Because he thinks that conscious inventions were already involved in the production of *mimesis* (pp. 162–200),[3] he must necessarily believe conscious thought to have been involved in the invention of linguistic signs too. His claim that the inventions were public can only reinforce this conclusion: it would be indeed very difficult to imagine two or more individuals trying to reach agreements over the common use of sign-meaning pairings in a fully instinctive way, that is, without them being wholly aware of what they are doing.

If the invention hypothesis therefore does have some advocates, one cannot fail to notice, however, that it is regarded as rather naïve and untenable by the majority of scholars: ''language was not invented by some groups and spread to others like agriculture or the alphabet'' (Pinker and Bloom, 1990:707); ''. . .language isn't something we invented but something we became, not something we constructed but something in which we created, and recreated, ourselves'' (Leiber, 1991:8). Perhaps, one of the most convincing objections thrown at it is that inventions are irregularly distributed across the world (e.g., even the wheel was unknown in some part of the globe until the last century), whereas language is and was always to be found in every human culture (Burling, 2005:89). It is an interesting point, but, in my opinion, it fails to recognise that once humans had reached a particularly strong predisposition to social life and cooperative behaviour, any efficient communication system that could further enhance such a behaviour would have become of primary importance (Dunbar, 1996). In this respect, when the capacity for conscious thinking became available, the ongoing collaborative and communicative efforts in which early humans were already engaged on a daily basis may well have provided the perfect conditions for the idea of creating labels attached to meanings to occur in *all* communities. In other words, the new ability to think consciously combined with the constant, very high motivation to communicate more efficiently was what may have made the voluntary invention of language *inevitable everywhere*.[4]

What probably makes it difficult for many to envisage a stage of language evolution in which people began to invent signs together in explicit agreements is the spontaneous way in which language grows in today's children. It seems so natural now for our children to acquire language without thinking about it, that the idea of individuals deliberately trying to create and then share novel communicative signs sounds rather artificial and counterintuitive. However, when we talk about language acquisition in today's children we talk about something that is radically different from the birth of language in early non-linguistic humans. When today's children are born, not only do they have a linguistic input to learn from, but they are also already equipped with a *linguistic mind*, that is, they can already benefit from an inborn specialised predisposition to acquire and process language quickly and with no significant effort.[5] But when our ancestors began

[2] There are two contrasting schools of thought regarding the origins of linguistic items. Some authors argue for vocal origins (e.g., see Fitch, 2000; Deacon, 1997; Zuberbühler, 2005), while others prefer the *gesture-first* hypothesis (e.g., see Hewes, 1973; Corballis, 2002; Arbib et al., 2008). One argument that is usually adduced in favour of the second stance, which is the one I also take, is that although apes are unable to produce any modifications to their inborn, rigid set of vocal signals (Goodall, 1986), some of them do show a significant flexibility in the learning of gestures (Arbib et al., 2008; Gardner and Gardner, 1969; Hauser, 1996; Smith, 1977). If, as is reasonable to assume, before the onset of language hominins had further developed an already existing, ape-like communication system based on learnable gestures, then that system may well have served as a natural springboard for the first linguistic expressions. Moreover, one should not underestimate that gestural communication was able to provide our ancestors with a useful initial iconic tool (not obtainable from the spoken mode) for referring to concrete entities and events, which, almost everyone would agree, is where language most probably started from.

[3] According to Donald, mimesis was used as a means for self-expression long before the advent of language. It primarily unfolded through the movement of hands and limbs, but also involved vocal and facial skills.

[4] Perhaps, another case of 'universal invention' can be made for weapons of some sort (either harpoons, or lances, arrows, javelins, etc.), some of which were surely available to *all* early human communities starting at least from the Upper Paleolithic because of the primary need to make hunting as efficient and successful as possible.

[5] For a child to become 'linguistic', she needs some years of exposure to a sufficient amount of language input. Unless this condition is met, language will not start to pour out of the child's mouth by itself. In this sense, language acquisition cannot be a wholly innate disposition as it is tunnel-digging for moles or web-spinning for spiders. Nevertheless, because children can 'pick up' with no apparent effort and with no formal instruction an extremely complex symbolic system such as language, there is broad agreement that some inborn facility to acquire it must exist: ''Virtually all language researchers agree that language acquisition would be impossible without some kind of innate structure'' (Dabrowska, 2004:58). That innate element needs not be a complex system of abstract, universal rules (i.e., Universal Grammar); it might simply involve a greatly enhanced ability for pattern-recognition and replication of sounds/words sequences.

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to generate their very first linguistic signs no language acquisition support system was there yet to help them learn those signs: for such a system to come to light at all some form of language had to be already around, or else the system would have had nothing to work upon. This is also why I am very sceptical that studies of language acquisition conducted on any category of humans living today (whatever their life circumstances, i.e., normal or abnormal), especially on children and adolescents, can be of any help to the understanding of language origins. Their findings obviously provide most important information on how language and its acquisition works at the present time, but as far as clues on language emergence are concerned, they could actually be more misleading than revealing, since they are most certainly heavily biased by the specific inborn mechanisms that are now (but were not before) available to us for the acquisition and development of language.

In the end, one question inevitably arises: if language was not the result of conscious inventions, and at the dawn of language individuals had neither an existing linguistic model to draw from nor a genetically driven predisposition to acquire language naturally, then how could language arise and develop at all? The only option is that our inborn predisposition for language does not only facilitate its acquisition and its processing, but can also make languages appear and grow 'automatically' (in which case, it would necessarily have come into existence before any instance of linguistic exchange). This position can only be associated with *nativist* views of language, whereby language is all about biology and innateness (e.g., Chomsky, 1988; Pinker, 1994). Probably, the most common line of evidence used in support of such views relates to documented cases of 'spontaneously' emergent languages. Perhaps, the case that has generated the most attention is the birth and development of a sign language among a community of deaf children in Nicaragua. It may be appropriate to take a brief look at it.

3. Nicaraguan Sign Language: possible evidence for the unconscious emergence of language?

Nicaraguan Sign Language (NSL) is a sign language developed by deaf children in a number of schools in western Nicaragua starting from the late 1970s. Before then, there was no deaf community in Nicaragua. Deaf people were largely isolated from each other, and mostly used a rudimentary system of communication with their families (*home-sign*). Initially, the language programme emphasised spoken Spanish and lip-reading, but achieved little success. However, children began to communicate with each other by combining gestures of their home-sign systems. Rapidly, they developed a new, gestural system that soon expanded to form an early sign language. It continued to develop (and it is still developing) in successive cohorts of pupils who joined this deaf community in the years that followed. The growth of NSL over the years was studied by comparing the signing patterns of different cohorts of children. The investigations found that while the earliest cohort of children tended to express bundles of information containing more than one semantic element through holistic gestural expressions, later cohorts preferred to segment those expressions into separate signs, each one representing a single, discrete semantic element. A good example of this phenomenon can be found in the study of Senghas et al. (2004). There, most first-cohort children described the idea 'roll-down' by moving their arm downwards (path of motion) while simultaneously wiggling their hand or forming some circles with it (manner of motion). By contrast, most children of later cohorts spontaneously dissected the two semantic elements by performing the two actions sequentially. This change in expressive habits has resulted in the creation of signs for basic units of meaning that can be used as building blocks for linguistic constructions such as phrases and sentences. The findings are important because they seem to demonstrate that our brain is now not only *language-ready* (i.e., predisposed to acquire and process languages very quickly), but also, so to say, *language-biased* (i.e., any possible kind of communicative expression tends to be naturally reshaped into a format that is suitable to language): ''children naturally possess learning abilities capable of giving language its fundamental structure'' (Senghas et al., 2004:1779).[6] However, with respect to how exactly gestures and signs come to light in the first place, how exactly they get invented, I think that what has been found in the above investigation is only partially informative. If, as the study suggests, the fractionation of holistic expressions is a typical feature of our innate capacity for language, then it is reasonable to assume that discrete language-like signs emerging out of those expressions are released instinctively. But what about the initial holistic gestural expressions? What about

[6] This phenomenon is also observable in the formation of home-signs: young deaf children transform the input of their mothers' gestures, which lack any kind of morphology and syntax, into a system of signs that exhibits a language-like structure. However, the fact remains that the development of a home-sign may rest on the initial gestural material provided by the child's mothers, and that home-signs might not be able to come to light at all without that material: ''...mothers' gestures may serve as an initial foundation for their deaf child's homesign system...'' (Carrigan and Coppola, 2012:1398); ''...the children may have borrowed the forms and meanings that were the building blocks of their morphological systems from their mothers' gestures'' (Goldin-Meadow et al., 2007:132).

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discrete signs that may emerge without being part of a holistic gestural expression?[7] Can they all be produced spontaneously? Descriptions of motions in space like the 'roll-down' example are often a very instinctive affair because they are susceptible of easy schematisations (another example can be moving your hand or arm like a pendulum to express the concept of *swinging*). However, how often do we actually come across thoughts that can readily find some intuitive gestural representation? I believe that there is a vast amount of concepts, not necessarily of abstract nature, that are not easy to be expressed on the fly. For example, think of food items that are not characterised by any particular shape. How can you spontaneously invent a sign for the concepts of *meat, honey, sugar, coffee*, etc.? Inventing a sign that refers to any of such things will probably require you to think about best possible options; it will force you to reflect, and will make you aware of what you are trying to do. In other words, your decision to express one of those concepts will not automatically activate your arms/hands in a certain manner. Further, you will also have to make some conscious effort in trying to get your interlocutor understand what your invented sign stands for (obviously, a crucial step for possibly sharing that sign in the future).[8]

In brief, I think that what has been found about NSL does not provide any conclusive evidence that a language can be created from scratch without any involvement of conscious thinking and conscious inventions. In fact, it appears intuitively very strange that people capable of conscious thought never resort to that ability when they struggle to create and communicate a novel sign.

4. Making the case for a conscious invention of language

We have just seen that it is difficult to explain how certain words can be created and shared naturally, that is, without thinking about them. Perhaps that is why it is also difficult to find practical descriptions of how exactly the first linguistic items of human history came into existence with no need for conscious inventions.

Rather strangely, I think that one interesting account of language spontaneous emergence comes from Tomasello (2008:218–225), whose views on language are certainly far from nativist theories. Although we must assume that the author does believe the earliest true linguistic signs to have involved some degree of intentionality (he views some of apes' signs as ''intentional'' (p. 14), and so it would be very odd if he thought that the first humans' linguistic signs were less intentional than some of those exhibited today by great apes), he does not seem to believe that degree of intentionality to have amounted to anything like the idea of conscious thinking as was described here at the beginning of section 2. Nor does he believe such a kind of thinking to have been critically involved in a possible deliberate invention of the first true linguistic signs. As a matter of fact, he repeatedly claims that language emerged ''naturally'', ''spontaneously'', and that it was only ''at some later point'' that ''some kind of general insight'' (p. 223) enabled humans to realise that they could make up as many signs as they wished anytime (therefore, this supplementary event is not seen as a necessary key factor in the emergence of language but simply as a, perhaps handy, but not crucial add-on). Moreover, in his account of language birth he unequivocally denies that the first languages arose as a result of explicit agreements between individuals (as argued before, that is a rather complex process which can hardly be thought of as something occurring outside conscious awareness). According to him, explicit agreements could not be made because agreements can only be formulated through an already existing means of communication that is more powerful than the one to be invented (p. 222). Although he actually does believe that language was preceded by an unconventionalised, uncoded communicative system, which he identifies in natural gestures such as *pointing* and *pantomime* (p. 59), and which he views as the first steps towards language, he evidently denies that such earlier forms of communication could be used as tools for reaching explicit agreements on consciously invented linguistic items (the reason probably being that pointing and pantomime are less powerful than language, and therefore, in his view, not sufficient to perform that task). Neither language nor the preceding pointing and pantomime came into existence thanks to deliberate inventions; they all surfaced into human behaviour in a natural, spontaneous fashion.

[7] Probably, not every novel gestural expression necessarily generates an assemblage of multiple semantic primitives. Sometimes, it may only express a single irreducible basic element, thus simultaneously counting as a linguistic sign available for future linguistic constructions. It all depends on what you want to express. Imagine that instead of 'rolling down', first-cohort signers had been asked to describe something 'going down' (i.e., an event that contains path information only, and that is not further reducible into smaller elements); presumably, they would have had no problem to simply move their arm downwards in a straight line. Likewise, if they had been asked to describe something that is rotating (i.e., an event that contains manner information only, and that is not further reducible into smaller elements) they would have had no problem to simply form a circle with an arm or a finger.

[8] One of the tests of a study carried out by Goldin-Meadow et al. (2015) compared the within-group stability of the handshape forms used by ASL signers, by NSL signers, and by home signers for the objects *pen, book, airplane*, and *lollipop* (p. 391). We are informed that NSL signers displayed a good stability rate (their convergence rate on the use of a common handshape form for each of those objects was slightly lower than that of ASL signers, but much greater than that of home signers). However, what we are not informed about is how that convergence had been achieved, that is, how those handshape forms had been agreed upon. Unfortunately, that is exactly what is at issue in the present work.

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The claim that pointing and pantomime were the most immediate precursors of language actually sounds very reasonable, given that great apes, which are our closest relatives and yet do not have language, are very poor at both.

Pointing is a deictic gesture aimed at getting the interlocutor to tune in to the speaker's attention and interest on outside entities. Although it can emerge in captive chimpanzees (Leavens et al., 2005), it has hardly been recorded in chimpanzees living in the wild (Povinelli et al., 2003:41). Most important, however, the use of pointing made by captive chimpanzees seems to be restricted to *imperatives* (Tomasello, 1999; Moll and Tomasello, 2007); this is in accordance with the instrumental nature of chimpanzees' manual gestures in general, through which a member of the group always tries to get another individual to help in attaining a goal (Pika et al., 2005). By contrast, the pointing displayed by human infants can also perform *declarative* functions, whereby ''the child does not just want some result to happen, but [. . .] she really desires to share attention with an adult as an end in itself'' (Tomasello, 2003:96). This second use of pointing is certainly much more suggestive of the idea of the gesturer knowing that other people have interests, desires, thoughts, needs, etc., just like herself. It can therefore be indicative of a very early predisposition of human infants to later acquire a full theory of mind.[9]

As far as pantomime is concerned, this consists in the communicative use of iconic gestures. Evidence of this kind of communicative ability in nonhuman animals appears to be fragile.[10] The iconic gestures characterising pantomime differ from linguistic iconic gestures (such as many of those to be found in sign-languages) in that they are *not* conventional. Also, they differ from linguistic signs in general in that they can only be iconic, not symbolic. Pantomime can be just as declarative as declarative pointing because it directs another's attention to an item of interest in order to share that interest with the recipient of the sign or to inform about it. However, it shows further special features that make it look much more similar to language than to apes' communicative systems, which is why it may be worth spending a few words about it. In addition to the point made about the declarative functions that pantomime can perform, there are two more observations usually made about it that, in the present view, are particularly revealing of its special relationship with language.

The first one is that pantomime necessarily implies the ability of what Suddendorf and Corballis (1997, 2007) call *mental time travel*. That is, its gestures usually refer to something that has been experienced in the past but is not present in the immediate environment of the communicators (in order to refer to something that is in the 'here-and-now' it would in fact be sufficient for the producer of the sign to simply point at the intended object/action of interest); this is not the case for chimpanzees' manual gestures, for example, because the producer of that kind of sign always wants something now and in the place where she and the recipient of her message are. The fact that pantomimers refer to things beyond the here-and-now means that they at least suspect that their addressees can sometimes think of and have their actions driven by a world of mental representations and beliefs dissociated from current realities, which strongly suggests that pantomimers must be already in possession of an advanced theory of mind.

The second observation is that pantomime provides an *open-ended semantics* for communicating about an unlimited range of objects, actions, and events (Arbib, 2012:219; Stokoe, 2001). In fact, the capacity to refer to absent entities, events or situations entails that the pantomimer can produce at least as many gestures as the things she has experienced in her past existence. Since the number of things that can be stored in long-term memory is incredibly vast, or even theoretically infinite (Schoeke and Bittlin, 2008:94)), so is the potential number of iconic gestures. This is clearly in contrast with the closed nature of all non-human communicative systems.[11]

However, what perhaps can be seen as the most interesting character of pantomime, one which has hardly been pointed out in previous works and which might actually lie at the heart of all of the features mentioned above, is that it appears to be inextricably linked with and be *the product of conscious thought*. Communication through iconic gestures

[9] With regard to great apes, so far the capacity for a fully-fledged theory of mind that includes the subject's ability to ascribe false beliefs to others has been denied by most relevant experiments. Evidence in favour of that ability is confined to an implicit kind of understanding of such beliefs, and it is rather inconsistent: when apes were tested on false-belief tasks based on looking preferences they were successful in the task reported in Krupenye et al. (2016), and in experiment A, but not in experiment B of Krachun et al.'s (2009) study. It is probably significant that apes have always failed tasks that measure false-belief understanding based on explicit behavioural choices (e.g., Krachun et al., 2010; Krachun et al., 2009; Kaminski et al., 2008; Call and Tomasello, 1999); in the experiment of O'Connell and Dunbar (2003) four chimpanzees did pass some false belief test trials, but they crucially failed the true belief test trials, thus casting serious doubts on the false belief results.

[10] Some observational studies have reported instances of iconic gesture use in great apes (e.g. Russon and Andrews, 2011; Genty and Zuberbühler, 2014; Tanner and Byrne, 1996), though it is sometimes suggested that the iconicity of some of those gestures could be an interpretation of the human observer (Call and Tomasello, 2007; Tomasello, 2008). The only two studies that have investigated the matter experimentally strongly suggested that great apes are unable to produce (Grosse et al., 2015) or comprehend (Bohn et al., 2016) iconic gestures.

[11] Even chimpanzees exhibit no more than a few dozen signs. Hobaiter and Byrne (2014) reported 66 apes' *gestural signals* (a flexible set of gestures that chimpanzees develop in interactional activities such as play, grooming, nursing, etc.). Pollick and de Waal (2007), found 31 of such gestures; they also found 18 *gesture-calls* (an inborn system of genetically fixed, reflex-like signs, associated to specific emotional states). Arbib (2012:213–214) explicitly admits that the system of chimpanzees' gestural signals is ''not very open'' after all, informing us that ''a group might have 10 or so gestures in its novel repertoire''. It is also important to note that their gestures are only dyadic, that is, non-referential (i.e., just influencing the behaviour of others without referring to any third object or event) (Pika et al., 2005).

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requires the subject to retrieve visual images from memory and to keep them in the focus of attention long enough to come up with a correlated iconic gesture. There is no denying that on some occasions finding a suitable gesture for the expression of a certain concept can be easy, so much so that its production can unfold wholly instinctively. As pointed out in the previous section, that can often be the case with concepts that lend themselves well to an easy schematisation. I made this observation in relation to descriptions of motion, but the same can also apply to objects (e.g., most people would rapidly form a circle with their thumbs and index fingers to evoke a circular or spherical object such as a *ball*). Gestural expressions can occur spontaneously also when they refer to concrete actions that the gesturer can simply reproduce (e.g., to express the concept of *eat*, you simply move your mandibles the way you do when you eat). Nevertheless, my conviction is that in the majority of cases we must show persistence in wanting to keep in mind the absent object or event because it is not easy to find a suitable gesture capable of evoking the thing one wants to refer to (remember the previous examples related to food items, but also think of other very much concrete entities such as *fire*, *wood*, *sand*, *paper*. . ., etc.). Indeed, many will probably have experienced first-hand how hard pantomiming can be even when we definitely know that we are consciously trying to find ways to make ourselves understood. It seems to me that whenever we happen to be in one of those situations in which we do not know any of the languages used by our interlocutor and she does not know any of those we use, we seldom find ourselves fluently pouring out strings of instinctively created signs. On the contrary, at least some of the signs we are trying to invent on the fly definitely require a conscious, sustained voluntary effort on our part, whereby we often spend some time actively trying to work out what iconic representations may best get our message across.[12]

The point to be made here is that, if, as I argue, conscious thought is regularly involved in the creation and communicative use of most iconic gestures, this could be quite a problem for those who believe in the spontaneous emergence of language. For how can one dismiss any conscious invention of language if conscious thinking was already characterising a communication system that appeared on the scene before (or, at a minimum, alongside) language?

I want, however, to leave aside for a moment this initial problem that a theory of an unconscious birth of language would have to face, and still take a look at how Tomasello (2008) accounts for the later advent of more arbitrary gestures, which can therefore be viewed as symbolic. It seems that, like iconic gestures, these too emerged instinctively, although not quite in the same way iconic signs did. Arbitrary signs were not created from scratch, but, over time, they began to grow out of already existing iconic gestures spontaneously.[13] The process is illustrated through an example (pp. 222–223) which is summarised here below.

The author imagines a woman in a cave spontaneously making a cooperative iconic gesture, which consists in moving her hands as if she were digging. She does that in front of other members of her group with the intention to ''tell them'' *let's go outside and dig for tubers*. Every time she and other individuals make that sign, some young children inside the cave watch that and begin to use that sign themselves but with a different meaning, namely *let's go out*. This is because every time they have seen some adult make that sign they subsequently have only seen some people go out of the cave (and the children still know nothing about tubers). In this way, the children have created a novel arbitrary symbol (there is no resemblance between the act of going out of some place and the gesture of digging) without any conscious, deliberate decision to do that.

In the above story, we can see that the appearance of symbols is brought about by a process that turns iconic gestures in into arbitrary ones. Essentially, it is possible to view that process already as an instance of language change in children language acquisition, a phenomenon that has often been highlighted by generative linguists (Lightfoot, 1999, 2006). We are therefore presented with a scenario in which symbols began to characterise the interactions between our ancestors even though they were not the product of conscious inventions. It is also to be assumed that Tomasello believes that their numbers could have progressively increased in this manner unlimitedly. This is because it is widely known that the system

[12] However, although communication through pantomime can often be very hard to accomplish, on several occasions we certainly manage to get at least some of our gestures understandable to our interlocutors, so that those gestures could potentially be reused in successive conversations with the same interlocutors and gradually acquire a conventional element. Instances of successful understanding and communication through pantomime are clearly made possible by our ability to put things into context and to be excellent mind readers. This suggests that an organism capable of both pantomiming and mind reading (according to what I have previously argued when listing the main features of pantomime, the two things actually go together, since the capacity for pantomime seems to entail the presence of mind reading abilities) may be sufficient for reaching agreements on the meaning of novel gestures that later have the potential to become conventional and therefore linguistic. As a consequence, I hold some reservations about Tomasello's conviction that public language inventions realised through explicit agreements could have occurred only if a communication system more powerful than language was already around.

[13] It would be quite difficult to argue that even symbolic signs arose *from nothing* without their first producers being aware of those geneses: while it is still possible to imagine the unconscious creation of some novel iconic sign on the grounds that its exhibited shape is spontaneously triggered by the shape of the thing it is meant to refer to, with symbolic signs the lack of perceptual similarity between signifier and signified would make it extremely unlikely that the creation of a novel symbol from nothing could occur instinctively, without the intervention of any conscious thinking. The same would also be true in relation to comprehension: while the resemblance between signifier and signified might still enable the interlocutor to automatically grasp the meaning of the sign without further reflection, the lack of that resemblance would probably make the intuitive understanding of novel, naturally emerged symbols impossible.

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of iconic signs displayed in pantomime has an open-ended nature, and so it would be very odd to claim that the symbolic system that later grew out of it no longer exhibited that same nature.

Nevertheless, positing that the number of spontaneously generated symbols began to increase indefinitely without their producers ever to think, to reflect on the meanings and on the forms of the signs they were unknowingly making up, is, in the present view, a seriously unconvincing possibility. The reason for this comes from the observation that it is impossible to separate language production from the conscious experience of the thoughts it couches (an exception can be made for the absent-minded processing of learned-by-heart strings of language stored in long-term-memory, that is, songs, poems, prayers, etc.). Language, of course, has been studied much more extensively than pantomime, and its profound connection with consciousness has not gone unnoticed: ''Language is the only modality of consciousness in which the abstract and relational elements of thought are available as separable units. By becoming conscious, these elements of thought become available for attention'' (Jackendoff, 1996:24); ''In conversation, we may be impervious to all but the topic under discussion, and oblivious to other events in the environment'' (Corballis, 2011a:157). In particular, it has been remarked that one of the most typical traits of language is that the thoughts expressed during its production are invariably conscious: ''. . .since we are conscious, at least to some degree, of saying something, we are conscious of what we say, and hence of the thought our speech act expresses'' (Rosenthal, 1990:6); ''We do readily express in words all the thoughts we are conscious of having, but not thoughts that are not conscious'' (Rosenthal, 2000:278). This means that when language came about conscious thinking must have been there too, right from the start. In fact, some form of conscious thinking must have come onto the scene slightly before linguistic items began to appear. It is reasonable to suppose that before labels began to spread across communities, some non-linguistic concepts capable of emerging into consciousness were already around, or else humans would have had nothing to attach those labels to.[14] It was only when people started to become aware of non-linguistic concepts forming in their mind that they became able to perform some early form of reasoning, some thinking about thinking. And, frankly, it is very difficult to believe that this new mental ability was left unused during the formation of the first human languages, and that individuals capable of some conscious thought began to sign without ever reflecting on the signs they were producing and on the meanings these expressed.[15] On the contrary, we should seriously consider a scenario in which ever since our ancestors began to make their very first attempts to create communicative gestures for the expression of conscious concepts, they also became aware of the possibility to deliberately invent an unlimited number of iconic and symbolic signs.

According to the present view, then, conscious thinking was indeed the key factor that led to the appearance and to the unrestricted growth of linguistic signs, the earliest of which probably arose during cooperative activities involving communicative efforts. The rise of language was ultimately unleashed by a radical transformation of human cognition, per se *non-linguistic*, that made it possible for early humans not only to invent languages, but, more generally, to think qualitatively differently from all other animals.[16] A brief discussion on that transformation will follow in the next section,

[14] That the emergence of conscious thinking could not occur after that of language can perhaps be maintained by arguing that the existence of the former is indispensable for that of the latter, but that the reverse does not seem to hold true. While the argument of the present study is that it is not possible to produce language without experiencing conscious awareness of the thoughts being expressed, we do not appear to be precluded from entertaining at least some conscious thinking in the absence of linguistic production. *Imagery*, for example, can unfold independent of language in a non-propositional mode (see Keller and Keller, 1996), and at least in some cases we appear to have full knowledge of the voluntary use of images we are making in order to achieve some goal: ''. . .mental imagery typically results from *deliberate* attempts to construct *conscious representations* in working memory. . .'' (Barsalou, 2008:619, my italics). A good example can be the chess player thinking about her next moves. She voluntarily produces visual images of possible next configurations of pieces on the chessboard; she reflects on them, compares them to each other, decides which one is best without any apparent need of language.

[15] I disagree with those who argue that we cannot actually gain any conscious access to linguistic meanings. Jackendoff (2012), for example, claims that all meaning remains unconscious (hence his *Unconscious Meaning Hypothesis* (p. 86)), and that all we can perceive is a *feeling of meaningfulness*, which comes attached to the phonological representation of words and sentences. I find this position a little obscure. A term like *feeling* surely carries an implication of consciousness (e.g. a felt pain is a conscious pain), and so he does seem to recognise the existence of some consciousness in relation to meanings. But if this consciousness is not about the contents of those meanings, what is it exactly about? If I utter or listen to a certain word or sentence, the feeling of meaningfulness I perceive cannot certainly be about *any* possible meaning, or else it would be completely useless: somehow, it has to refer to the particular meaning of that word or sentence. This is not to deny that there are aspects of meaning that are impervious to conscious introspection; this is why dictionary definitions are inadequate to convey an exact, complete description of many meanings. But it is also true that most language learners find those definitions very helpful; the sales of dictionaries clearly demonstrates that (Johnson Laird, 1983:217). This suggests that access to linguistic meaning is possible, at least up to a certain depth.

[16] By arguing that conscious thought was prior to language, I deny any identity between language and thought. That is instead what Chomsky (2010) seems to imply when he identifies language as a system of recursive thought (created by a mechanism which he describes as ''Unbounded Merge''). Recursive thought is thinking that takes itself into consideration. Essentially, it is thinking about thinking. Although I welcome Chomsky's conviction that thinking about thinking and language are intimately related, I also want to highlight how profoundly different his position is from the one advocated in the present work. While his claim is that recursive thought *is* language, my claim is that it was a prerequisite *to invent and construct* languages. The fact that language in turn surely has a reinforcing influence on recursive thought still does not make the two things equivalent.

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where an attempt will be made to accommodate what has been argued so far within the framework of some already established mind theory.

5. The new mind behind language: from perceptual to conceptual thinking

At the beginning of section 2, I mentioned the position of some authors who hold that only humans are capable of thinking about thinking, and who also associate the mental life of animals with the world of *perceptions* (p. 3). In the literature on mental representations it is actually not too uncommon to find this kind of association, as it is also not too uncommon, as a consequence, to find the term *concept* used exclusively in relation to adult human thinking. This was done here too when, towards the end of the previous section, it was used to refer to a kind of mental representation that at some point along humans' evolutionary path began to emerge into consciousness, changing our cognition completely, and making it unique in the animal kingdom.[17] To see what this new type of mind consisted of, I will now briefly revisit some of the traditional differences that characterise the concepts/percepts dichotomy, trying to identify what particular features may have made the former qualitatively rather than quantitatively different from the latter. In doing so, I will heavily draw on Mandler's (2004) theory of concepts formation in children, and adopt some of its main tenets to provide the views previously expressed here on language emergence with a congruent picture of the modern human mind.

As is always the case when one tries to deal with elusive labels denoting mental faculties and phenomena, the issue concerning the concept/percept distinction is very slippery. Probably, nobody can confidently explain the difference between percepts and concepts, as nobody can tell for sure what exactly either of those are. However, with regard to perceptual categorisation, many would agree that this occurs when a continuous flux of stimuli is not apprehended by an organism as a continuum, but is broken up into discrete categories; these categories allow the organism to identify, recognise something, and distinguish it from something else. To psychologists like Mandler (2004:43) this ability does not amount to much more than 'seeing', and cannot really be regarded as 'thinking'. That said, the notion of perception surely has to refer to more than just the rather static process of registering and categorising the stimuli apprehended by the senses. Unless one is prepared to claim that even the simplest instances of any animal's intelligent behaviour (e.g., a zebra fleeing immediately after having realised that a lion has just launched an attack on her) are evidence of the presence of a conceptual system in that animal, we must grant percepts a more dynamic dimension too, one that allows an organism to respond to certain perceived situations with appropriate actions. In fact, Mandler views perceptual processes as part of the sensorimotor system, which means that they are not only about the formation of perceptual schemas of objects but also to that of motor schemas that control actions (p. 14). In other words, perceptual processes are not only responsible for the recognition of things or events, but also for what Koehler (1921) and Piaget (1936) identified as *practical* or *sensorimotor intelligence*, a system that understands the world in terms of objects, causal connections, and spatial relations. Gibson's (1979) notion of *affordances* also lends itself well to describe such a kind of perceptually-based intelligence: visual perception does not only deliver the apprehension of physical entities, but also allows the animal to perceive the possibilities that the environment affords for action on or reaction to something. All of this implies that, theoretically, even the most strikingly clever behaviours that some smart animals carry out in response to what they are perceiving could still be explained in terms of perceptual operations (e.g., see Koehler, 1917).[18] If so, however, what exactly would the supplementary existence of *concepts* in some organism add to its mental powers? In which ways would they dramatically change the organism's mind and behaviour?

Mandler (2004) believes that concepts arise from the child's analysis of perceptual information falling under her attention (*perceptual meaning analysis*). The analysis, which is the crucial component of conceptualisation, recodes a piece of perceptual information into a non-perceptual form that represents a meaning. The idea is not so much that of a gradual development of percepts into concepts,[19] but rather that of a process in which perceptual source data are used to create something entirely different. In fact, Mandler makes a very clear point that concepts form a completely distinct, independent representational system with a different format (p. 75). Perceptual meaning analysis enables children to gain a deeper understanding of the things they refer to, and to become *interpreters* of the world from a very early age. In this respect, her position is in accordance with the views of the neuroscientist Gazzaniga (2011) who also believes that

[17] With the term *unique*, I do not refer to any alleged 'privileged position' enjoyed by our cognition over that of the rest of animals, as if it lay outside the boundaries of evolutionary laws. The term should simply be interpreted in the same way as when we say that sonar systems are unique to bats and to some marine mammals.

[18] During the 1910s Wolfgang Köhler carried out many tests on chimpanzees to assess their ability to solve problems. For example, a banana was hung from the ceiling of a cage, which a chimpanzee could not reach. The chimpanzee stacked some boxes that were lying on the ground inside the cage, climbed onto the top box and fetched the banana.

[19] That idea of percepts progressively turning into concepts rather evokes Karmiloff-Smith's (1992) theory of *representational redescription*, according to which lower-level representations continue to redescribe themselves onto increasingly abstract levels.

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humans are interpreters of the world around them, and that, contrary to any other animal, they try to find meaning in anything that falls under their attention. He and his team claim to have identified in the left brain hemisphere an *interpreter* (or *interpreter module*) which corresponds to conscious thought. According to Gazzaniga, it generates explanations about our perceptions, memories, actions, and the relationships among them.

One of the most defining characteristics of concepts is that their representation of something is not primarily determined by physical appearance, but by more abstract features that are not delivered by the senses. Unlike percepts, they are not about what something looks like but rather with what something actually is. This may not only apply to entities typically characterised by intangible properties like *function* (e.g., it is likely that what you must first know about a classic wrist-watch is that it shows us what time it is, not that it usually has a round shape, two hands, and a wristband); it may apply to all concepts: ''It is quite possible to know what a dog looks like and not have any idea of what it is, and [. . .] equally possible to have a concept of an animal without a commitment to any particular kind of shape or features'' (Mandler, 2004:5).[20] To a great extent, this view is in line with the notion of *image schemas* proposed by cognitive linguists in relation to fundamental spatial concepts such as *containment, path, up-down, link*, etc., which emerge out of the direct experience our bodies have of the physical environment around us; the point here is that they are not actually rich in imagistic detail because they do not represent specific physical images, but rather abstract, schematic patterns arising from many specific images perceived in our concrete daily experience of the world (Johnson, 1987; Lakoff, 1987). For example, the concept of *enter/into* arises from the experience of countless concrete instances of something going into somewhere, which can involve completely different perceptual scenarios (e.g., a cat walking into a room; a bird flying into a tree hole; a man diving into water, etc.). Once the *enter/into* schematisation is acquired, it can function in highly abstract contexts that are hardly reproducible in perceptual terms (e.g., ''The programme has now entered a new phase''), and that are yet understood immediately without us having to resort to any imagistic representation of them. If conceptual thinking can run completely removed from possible physical representations of its contents, there are good grounds to believe that it is something quite distinct from perceptual thinking. However, it would be controversial to say that humans are the only organisms provided with non-perceptual kinds of mental representation. Experimental work on pigeons, for example, has suggested that they can form abstract concepts of relationship such as *same* and *different* (Cook et al., 1995; Wasserman et al., 1995; Young and Wasserman, 1997)), although there appears to exist general caution in granting these animals or indeed any animal the capacity to gain conscious access to such representations. Commenting on the experimental work cited above, Shettleworth (1998:227) is sceptical that pigeons can ever become aware of and control abstract concepts: ''Implicit knowledge of some abstract relationship may be embedded in a highly specific perceptual module without the animal being able to access it to control explicit, arbitrary, discriminative responses''.

The issue regarding the level of consciousness that a mental representation can attain is actually one of the key points made by Mandler in relation to the difference between percepts and concepts. To Mandler, perceptual knowledge is implicit, procedural, and although the organism has conscious sensations (qualia) of its surroundings (we can therefore parallel this level of consciousness to that of Edelman's *primary consciousness*), it has no access to their contents in the sense that it cannot become aware of being conscious of them (we can parallel this other level of consciousness to that of Edelman's *secondary consciousness*). With concepts, however, we have a different situation, since they *are* potentially available to conscious awareness. Becoming aware of one's own thoughts essentially means that the subject can become detached from those thoughts, stand back from them, look at them 'from the outside'. The possibility that this can be done by some non-human species is severely called into question by the fact that animals appear to be constantly glued to their emotional states, as Deacon (1997:414) argues while commenting on an experiment conducted by Boysen and Bernston (1995) on chimpanzees.[21] This inability of even the smartest non-human animals to unchain their thoughts from the emotional states they are experiencing suggests that no animal species might actually be able to perform conscious

[20] Speaking of dogs and the way we conceptualise them, Jackendoff (2012:52) says that a German shepherd, which we all identify as a dog, actually looks less like a toy poodle than like a wolf. He rightly concludes that the visual image of a dog cannot be the meaning of the word. The crucial point here, I think, is that wolves are not domesticated animals while poodles and German shepherds are. 'Domesticated' is part of the concept of dog. Though it cannot itself be visualised, it is probably what makes all the difference here. German shepherds *look* more similar to wolves, but *are* more similar to poodles conceptually.

[21] Two chimpanzees were made to select among two different amounts of candy. The task was designed so that selection of either array by the active animal (selector) resulted in that array being given to the passive animal (observer), with the remaining (nonselected) array going to the selector. Neither animal was able to select consistently the smaller array, which would reap the larger reward. Rather, both animals preferentially selected the larger array, thereby receiving the smaller number of reinforcers. Evidently, they were not able to repress the strong desire they felt for the larger array, which prevented them from making the correct selection. The negative interference that perceptual motivational features (the arrays of candy) had on task performance was highlighted in a subsequent trial of the experiment, when the food arrays were substituted with Arabic numerals (both animals were first trained to correctly associate between arrays of 1 to 5 candies and their corresponding Arabic numerals). With the use of these abstract symbols, the selector improved his performance, selecting the smaller numeral and thus receiving the larger reward.

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thinking, and that even their most intelligent actions could still be the result of instinctive processes. In other words, it might well be that animals are always 'passengers' rather than 'drivers' of the behaviours they display. Humans too are often passengers of actions triggered by instinctive thoughts (''we find that we often do clever things without thinking at all. We do them 'automatically' or 'unconsciously'" (Dennet, 1996:13)), but not when they enter the conscious thinking mode. This mode allows them to stand back from their current emotional states, and can lead them to behave in a way opposite to that initially suggested by instinctive mental processes, or to behave according to what these have suggested but only after having evaluated the pro and cons. It may be worth mentioning that a series of experiments conducted in the early eighties (e.g., Libet et al., 1982; Libet et al., 1983) seems to have provided some evidence for the existence of such a process. They suggested that the intention to carry out an action is caused by unconscious preparatory brain activity over which we have no control. Conscious awareness of that intention sets in at a later stage in the genesis of the action. Crucially, we have enough time to *veto* its actual occurrence: out of the many initiatives that arise from unconscious brain activity conscious will selects those which may go forward to an action; the rest are aborted, with no act appearing.

One further distinctive property of concepts is that they enable *conscious recollection* of something that is not perceptually present (Mandler, 2004:222). Unless a thing or event is conceptualised, it cannot be stored in long-term memory in such a way as to become retrieveable at any later time. Conscious recall of things lying outside the here-and-now (the *evocation of absent realities* (Piaget, 1951)) is, again, something that only humans appear to excel at. Nobody wants to deny that, strictly speaking, many animals can and do think of things and places that are not being apprehended by their senses. For example, when my dog gets thirsty, she suddenly rises to her feet and goes to the kitchen 'knowing' that she might find there some water inside the bowl: somehow, she must think about that bowl and that kitchen before heading there. Direct evidence for some displaced thinking in animals comes from hippocampal recordings on rats (e.g., Pfeiffer and Foster, 2013). The recordings have shown that rats replay events of the past and pre-play events of the immediate future right before they start to move from a current location to a known reward location; Moser et al. (2015) claim that the replay phenomenon may support *mental time travel* (p. 6). But despite such achievements, the extension of displaced thinking in non-human animals seems to be subjected to quite stringent limitations. Namely, they can think of something that is not present in their immediate vicinity only if that something is *directly relevant to their current urges or activities*. As a matter of fact, there are only a few reports of alleged *anticipatory planning* behaviour (Gulz, 1991) in non-human organisms, that is, cases in which an organism plans for future needs that are not connected to the situation being experienced (e.g., I am feeling sick and I am certainly not hungry now, but I can still think about food because I know that I will be hungry tomorrow; so I go and buy some food).[22] More generally, animals are prevented from ever ''...follow[ing] a train of thought quite irrelevant to [their] surroundings or what [they] are engaged in doing'' (Dummett, 1993:123), something that humans routinely do.

In sum, it is possible to hypothesise that the major human cognitive transformation that also laid the foundations for the invention of language consisted in the formation of a new format of mental representations. These differed from previous perceptual categories in that they formed more abstract schematisations, but especially because, unlike procedural perceptual operations, they were available to conscious thought. Most important, any of them could be accessed any time, even those that bore no relationship with the current circumstances. This of course had a dramatic effect on the variety of things that an individual could potentially think of at any given moment. If the range of thoughts that can occur at a certain moment for organisms only equipped with perceptual categories is always confined to what is relevant to their current needs and activities, the range of thoughts that can possibly occur at any given moment for an organism equipped with a conceptual system will permanently coincide with the extension of the conceptual network that has formed in her mind during her life. Obviously, the extension of this second mental field is much larger than that of the first one, since it embraces all the things that have been conceptualised in the past through perceptual meaning analyses, the vast majority of which have nothing to do with the present situation.

One further consideration about the size of the conceptual system is that there is of course no limit to the number of concepts that can arise in our mind, since perceptual meaning analysis can in principle operate on anything that falls

[22] Western scrub-jays rely on memory to recover their caches of hidden food even months into the future. Clayton et al. (2003) claim that this behaviour clearly has elements of future-planning, since it does not bring obvious immediate benefits: the hiding of food yields its returns only when the bird comes to recover the caches it made. However, this type of skill could be domain-limited, that is, scrub-jays might not be able to do the same thing with non-food items (Millikan, 2004:26); in which case, their food-related planning behaviour could be the result of some particular, innate predisposition rather than a more general capacity to purposefully recall the past and plan the future. I think that a more convincing case of anticipatory planning in non-humans is the one reported in Osvath and Karvonen (2012), where a chimpanzee was found capable of planning future deception. The chimpanzee cached projectiles for later throwing at zoo visitors; he placed the future-oriented, often self-made concealments close to the visitors' observation area, probably to make his throws more effective. Certainly, that was neither a genetically driven- nor a learned kind of behaviour. It may therefore be regarded as evidence for at least some ability of anticipatory planning in great apes, although more research is probably needed in order to make the findings more robust.

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under our attention. Notice that the open-ended character of the conceptual system can offer a simple, natural explanation to the open-ended character of language, given that the latter must necessarily map onto the former, one way or another. This means, for example, that there is actually no need to invoke syntactic devices such as *recursion* in order to account for the potentially infinite nature of language. This property, which stems directly from the capacity of our mind to generate an unlimited number of concepts, can already be appreciated at the lexical level.

6. A possible evolutionary time course

After having linked the present view of language origins with a compatible mind theory, I will now try to see what kind of evolutionary history of language it is most likely to evoke.

There can be little doubt that the idea of people deliberately trying to invent and share linguistic symbols portrays language as a *cultural* product. Since cultural developments are known to move at a much faster rate than biological processes of natural selection, then, at least in principle, we should not expect language to have evolved at an ice-slow pace over eons of time. This latter option is the one proposed by those *biological* theories of language evolution that conform to the principle of Darwinian gradualism. Such an approach can be found in one early work of Bickerton (1981), for example (who later became well-known for his saltationist views). There, he accepted gradualism as part of the ''biological reality'' (p. 294), saying that ''evolution has advanced not by leaps and bounds but by infinitesimal gradations'' (p. 221). Gradualism, however, is perhaps best advertised in Pinker and Bloom's (1990) influential article ''Natural language and natural selection''. They too look at language evolution as a fundamentally biological affair (''...the ability to use a natural language belongs more to the study of human biology than human culture'' (p. 707)), and argue that grammar evolved in very small steps that took our ancestors from having no language at all to having language as we see it now, with each small step providing some reproductive advantage on its speakers (p. 721). They also argue that the first recognisably distinct mental system that constituted an antecedent to modern human language may have appeared as late as 3.5–5 millions of years ago in australopithecines (p. 726). All these claims almost seem to evoke constant-rate gradualism, that is, a smooth, seamless evolutionary process that proceeds at an unvaried slow pace over unimaginable stretches of time. Such a kind of gradualism would necessarily imply that by the time, say, *Homo sapiens* appeared (ca. 200,000 years ago, that is, when at least 90 percent of the evolutionary history of the genus *Homo* had elapsed), linguistic proficiency had already reached a very advanced level, one that was actually close to that we have now. The problem I find with the above picture is that it is in stark contrast with evidence coming from the archaeological record of hominins' artefacts, in particular from those that are examined in relation to possible symbolic contents. Clear, undisputed evidence for the presence of a symbolic mind in humans, which prefigures language, does not appear before 100,000–135,000 years ago with the shells found at Skhul Cave in Mount Carmel (Israel) that were used symbolically as beads (Vanhaeran et al., 2006); similar shells, several of which show traces of having been strung as an ornamental necklace, were found at Qafzeh Cave, Israel (dated ca. 92,000 years ago) (Bar-Yosef Mayer et al., 2009). It is significant that these earliest productions of symbolic ornaments are roughly concomitant with the first instances of another kind of symbolic behaviour, namely the burial of the dead with ritual grave goods (ca. 100,000 years ago (Vandermeersch, 1981; McCowan and Keith, 1939)).[23] Now, the question is: if according to constant-rate gradualism the kind of language that was used just a few hundreds of thousands of years ago was already similar to its present state, how can it be that the very first rudimentary forms of human symbolism had not appeared yet? Perhaps language had existed for a long time without being accompanied by any other form of symbolic expression? I find this very unlikely. Like Tattersall (2016:159), I believe that because language is a particular instance of symbolic cognition, it is very hard to imagine it or any other type of symbolic thought in isolation. Consequently, I also believe that what the dating of the above artefacts probably suggests is that gradual narratives of language emergence based *solely* on mechanisms of natural selection are unsatisfactory, and that much shorter scenarios deserve attention. The most common 'short stories' are still to be found in biological accounts of language origins. They describe the advent of language, which is said to coincide with the appearance of innate syntactic abilities, as a very sudden and catastrophic event triggered by a macro mutation that rewired our brains (Chomsky,

[23] Claims that human symbolic skills emerged significantly earlier than that are very controversial. They mainly concern the Berekhat Ram figurine (Israel, ca. 230,000 years ago), an anthropomorphic pebble carrying at least three grooves possibly engraved on it by a sharp-edged stone. What is not clear is whether the pebble was actually modified by human action, and, if it was, whether the scratches on it really have any artistic or symbolic intent; some authors argue that that is indeed the case (D'Errico and Nowell, 2000), but others disagree (Mithen, 1999). Another controversial issue regards the possible symbolic value of pigment use, which goes back to the beginnings of the Middle Stone Age (MSA) (ca. 280,000 years ago): chunks of ochre or other materials were found at Kapthurin, in Kenia (McBrearty and Tryon, 2006), at Twin Rivers (Barham, 2002), and Saï Island (Van Peer et al., 2003). The problem with pigment use as evidence of symbolic skills is that pigments must be found in association with art/ornamental objects (colouring). In the absence of that association, the use of ochre and other materials may simply have served utilitarian purposes. In this respect, a particular emphasis has been put on the functional use of such materials as adhesives for hafting (Wadley, 2005; Wadley et al., 2009; Lombard, 2007).

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2010:59; Bickerton, 1995:69). As will soon be evident, the reason why I find this position unconvincing is not a preconceived diffidence against the concept of saltation per se. Rather, it has to do with what this specific kind of saltation would have entailed; namely, that the human genome had to encode an extraordinary, probably excessive amount of information (i.e., a complex system of syntactic rules). This concern is shared by more than one author: ''. . .the genome might not be big enough to represent a system as complex as modern language in its entirety'' (Hurford, 2012:577); '' [genes] don't have anything like the necessary coding power to ensure that Universal Grammar is etched into the microcircuitry of the human brain'' (Evans, 2014:107).[24] Nevertheless, if we dismiss this particular type of macro mutation but still want to give credit to what the archaeological clues on symbolism suggest, postulating a saltation event (say, between 100,000 and 150,000 years ago) that was somehow key to the emergence of language remains unavoidable. This is true even if we decide to abandon the biological path, and argue that languages are the result of cultural creations: saying that people did not start pouring out linguistic expressions instinctively under the guidance of some bioprogram but began to invent them through conscious decisions still needs some explaining as to how, at some point, this inventive ability became possible. One option could be that proposed by Coolidge and Wynn (2009): they argue that a very late neural mutation led to a reorganisation of the brain that enabled *executive functions* of working memory (as said on p. 3 of the present article, such functions essentially coincide with those enabled by secondary consciousness). Another possibility relates to theories that treat consciousness as an emergent property. Under this perspective, secondary consciousness may have arisen as an emergent property of a brain that had reached a certain critical degree of complexity or a particular configuration of mental skills: ''. . .the origin of modern human consciousness must have been an emergent event, whereby an entirely unanticipated level of complexity was achieved by a sheer chance coincidence of acquisitions'' (Tattersall, 2008:111).

An important point that needs to be made about the present account of language origins is that while it does surely embrace the idea of a big saltation event (i.e., the late onset of secondary consciousness), at the same time it is not meant to overlook or underplay at all what went on before that event. On the contrary, it also intends to stress how equally crucial some of the physical and mental traits previously acquired by hominins turned out to be for the later appearance of language.

In relation to physical features and to the present hypothesis of language gestural origins (see footnote 2), the appearance of *bipedalism* in australopithecines, for example, was probably very important. The freeing of the hands may have significantly enhanced gestural communication, making it more frequent and more sophisticated than the one exhibited today by apes. Although for a very long time that communicative system remained something completely distinct from pantomime or language (it remained of finite nature, non-referential, and was not accompanied by conscious thought), it provided those two latecomers with a ready-for-use platform for the production of iconic and symbolic expressions.[25] Of course, the existence of that platform must have been a decisive factor for the possibility of linguistic communication if, at the time when people became *mentally* capable of language, their vocal apparatus was not yet ready to articulate linguistic sounds. This possibility is very real, at least according to the findings reported in Lieberman and McCarthy (2007:19–20). In their reconstruction of some fossil specimen, only modern humans postdating 50,000 years show an anatomy that could have accommodated a fully modern vocal tract; the anatomical traits shown by a 100,000-year-old specimen from Israel, by contrast, would still not have been able to reproduce the full range of today's human speech. Lieberman (2007:52) concludes that the emergence of fully modern speech must have occurred sometime in the period between 90,000 and 50,000 years ago. Although he also argues that some form of speech must have been in place in the archaic hominins ancestral to both humans and Neanderthals (p. 52), a hyoid bone of a *Homo Erectus*, dated 400,000 years ago, recovered at Castel di Guido (Rome, Italy) and analysed by Capasso et al. (2008) seems to deny that

[24] The attentive reader could object that the issue might actually not arise in the case of the recent, 'lightest' version of Chomsky's UG, which is reduced to one single operation (i.e., the recursive operation of unbounded merge — see footnote 16). The problem is that, in linguistic terms, that recursive operation is usually associated with syntactic embedding, but syntactic embedding does not seem to be universal (see Everett (2005) on the lack of subordinations in the Pirahã language). Perhaps, one might argue that linguistic recursion should be interpreted in more general terms and broadly refer to the compositional character shown by all languages, whereby unspecified elements are merged to create structures of any desired level of complexity. In that case, however, I would align with those who cannot see how such a notion of UG could be useful to the study of language: ''Yes, all languages probably involve the merging of elements of various sorts - that's what makes language generative. But rather than dwell on this simple idea, we might be better to study languages in all of their diversity, and understand how they are shaped by culture, and by the pressures of the everyday commerce of cooperation and competition'' (Corballis, 2011b).

[25] Returning for a moment to the emergence of pantomime and language, it is unlikely that the advent of the former long preceded that of the latter. As argued in section 4, the two abilities are closely related in virtue of the fact that they are both manifestations of conscious thought. Though it cannot be excluded that there may have been an initial period in which people tried to understand each other by simply pantomiming, it is actually not impossible to imagine a scenario where the two systems appeared together with no neat dividing line between them. Language may have gradually hosted more and more iconic signs used in pantomime, especially those which proved to be particularly successful in conveying certain meanings, and which therefore began to undergo a process of conventionalisation.

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possibility: the hyoid bone ''is very similar to both chimpanzee hyoid bones and to the only known *Australopithecus afarensis* hyoid bone'' (p.1009).[26]

Switching to mental skills, probably the most important cognitive ability that had to be in place before the onset of secondary consciousness and language was the *theory of mind*, since almost all of our conversations are permeated with constant inferences about the interlocutor's beliefs. Some researchers argue that our ability to represent false beliefs, which apes seem to lack (see footnote 9), is dependant on the human ability for language (e.g., De Villiers and Pyers, 2002). However, some studies have reported false belief understanding in preverbal or barely verbal human infants (Buttelmann et al., 2009; Onishi and Baillargeon, 2005; Surian et al., 2007), thus suggesting that at least some implicit form of theory of mind (perhaps an innate module (Baron-Cohen, 1995; Leslie, 1994; Scholl and Leslie, 1999)), did evolve *before* language and secondary consciousness. It may have been particularly helpful in supporting the very first linguistic exchanges at a time when people still did not have enough language to enhance their conscious reasoning about others' beliefs.

Equally important for the appearance of language was the development of *cooperative attitudes*. In fact, it has long been noticed that language is inherently cooperative in nature (Grice, 1975), ''a form of joint action'' (Clark, 1996:3) that partly involves altruistic motives (as Searle (1999) observes, while requests presuppose a You-to-Me direction of fit because I want you to conform to my desires, informative utterances imply a Me-to-You direction of fit because I want to conform to your desires). It is almost impossible to believe that language could have been created if their inventors had not first acquired the ability to collaborate with others in acts of shared intentionality (Tomasello, 2008; Tomasello et al., 2005).

In sum, I agree with Coolidge and Wynne (2009:214–215) that humans are the product of a long history of different evolutionary processes: these involved natural selection, but also epigenetic events and genetic mutations. The final cognitive leap that enabled humans to be aware of their thoughts and to create languages did result in dramatic behavioural advantages. However, without the pre-existing ancient storehouse of skills that hominins had developed earlier, languages would not have emerged. That store of ancient pre-existing capacities must therefore be regarded just as important.

Before presenting the final considerations in the next section, I would like to add a few thoughts about the process of linguistic inventions that followed the appearance of secondary consciousness. A possible misunderstanding might arise in relation to the idea of people starting to create and to share symbols. Namely, it could lead some readers to believe that languages appeared almost overnight. This is surely not the idea of language emergence that the present work intends to convey. We must consider that when conscious thinking began to surface into the minds of our ancestors, their reflective capacities were probably still quite different from those available to us now, if only because language itself was still not available. In its earliest stages, the process must have actually struggled to get started at all. Communicative attempts between individuals trying to create novel conventional signs must have met more often with failure than with success. A long, painfully slow initial phase was probably characterised by people tentatively trying to add only some small vocabulary to the already existing, volatile corpus handed down by previous generations. Presumably, as the vocabulary of a language became wider and more stable, humans began to agree more easily and more rapidly on the conventionalised use of novel signs-meanings inventions. Despite that, a major impediment to their initial development was that children were able to acquire the linguistic products of earlier generations only through general learning skills. A significant acceleration must have taken place only when the human brain started to adapt to language and form a *linguistic mind* (see section 2, p. 5). At that point, children started to acquire the particular language found in their community naturally, and things really began to take off. Even grammatical words and constructions that little by little began to be added to the existing lexica of a language were now acquired and stored in their linguistic knowledge much more easily. As time went on, the diachronic changes undergone by a language began to be increasingly determined by uncontrollable, unconscious processes involved in children acquisition and by social/historical phenomena, rather than by novel inventions consciously made by individuals. From these considerations it follows that the development of language may initially have gone through a slow phase to then progress more rapidly in a second stage. This is by no means a new idea. The contrast has been described, for example, in terms of *learning* vs. *innateness*: in the first stage, new words and constructions would have been learned and produced with some effort, whereas, in the second, those processes would

[26] The reader will have noticed that, under present view of language emergence, the time-gap between the rise of the first sign languages and the significant modifications that the human vocal tract underwent in order to make speech possible is very narrow. I think that that should not come as a surprise. For evolution to have taken the trouble to make radical changes to our vocal tract (the lowering of the larynx in particular), selective pressure towards the attainment of all the advantages that would result from the adoption of speech must have been remarkably strong (with speech you can communicate in the dark, you can communicate when your hands are busy and when your interlocutors are not looking at you). This is especially highlighted by the fact that they also needed to outstrip the grave reproductive disadvantage of a descended larynx, namely the danger of chocking to death on our food. Thus, if the selective pressures in favour of spoken language were so powerful, they must have made themselves felt soon rather than late, which is why, in my opinion, positing that speech had to wait a very long time before finally replacing sign language would not sound very convincing.

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have occurred with much greater facility (Hurford, 2012:581). The transition from slow to fast can be explained with the concept of *culturally-driven genetic assimilation* (Dor and Jablonka, 2000). The basic assumption is that the evolution of the linguistic system in cultural terms underwent a partial genetic assimilation. This partial assimilation did not write linguistic specificities into the brain structure, and it did not result in genes for linguistic rules; it simply enabled easier and more effective language acquisition and use (p. 52).

7. Discussion

The picture of language emergence that has been outlined in the present study derives from the simple observation that in the production of some communicative signs, these can be regarded as linguistic only if they are simultaneously accompanied by the awareness of the thoughts they are expressing. This must also have applied to the very first truly linguistic sign ever produced. As conscious thinking therefore had to be already around when language appeared, it is hard to believe that there was a time when its users engaged in acts of linguistic communication without ever thinking about the meanings of the signs they produced, about the relationship between meanings and forms, and about the possibility to create an unlimited number of signs for concepts forming in their mind. Chances are that they did not leave this possibility unexplored, and that during communicative interactions they soon began to actively engage in the conscious invention and sharing of both iconic and arbitrary signs, however difficult and mostly frustrating this process must have been. The ability to invent signs and, more generally, to think about our thoughts came about as a result of a radical transformation of human cognition. This involved the acquisition of an additional representational system accessible to a new, higher level of consciousness. Our ancestors could use it to reflect, recall the past, and think about things that were not related to the current situation. Becoming capable of retrieving at will mental representations associated with the past, use them to imagine, compare, evaluate possible futures, often before planning long-term courses of action, surely had a major impact on the lives and behaviour of early humans. The most important product of conscious thinking, i.e., language, not only took cooperation to another level by enabling members of a group to organise and coordinate activities for the accomplishment of common future goals (Gärdenfors, 2004); it also enabled the construction and transmission across generations of moral beliefs, traditions, norms of behaviour, social practices, etc. (in short, of all what can be identified by the term *culture*), to which everyone was expected to conform. Because of that, it certainly played a crucial role in the development of *cultural group selection* (Richerson et al., 2014:42–46).

It must be noted that viewing language as an invention of conscious thought does have some implications on what should be understood under the term *language* itself.

One of the upshots of the picture depicted here is that syntax should not be regarded as the ultimate hallmark of language, that is, as the only significant feature that makes language something completely different from the communication systems of any other non-human species. Although syntax undoubtedly *is* a distinguishing and most important feature of language,[27] my claim is that language was already displaying unique characteristics that set it completely apart from any other communicative system *before* significant syntactic structures were around. I refer here in particular to the linguistic feature of *open-endedness*, reflected in its massive vocabulary of lexica (in the tens of thousands). According to the present position, that feature has been there since our ancestors acquired the capacity to consciously create a potentially infinite number of conventional signs for a potentially infinite number of meanings; it did not have to wait for syntactic recursion to appear. In any case, viewing syntax as the *only* true hallmark of language would carry an unwanted implication for the understanding of language advocated here. Namely, it would strongly suggest that at the very initial phase of language, the one in which human communicative signals were uttered in isolation or ''combined lawlessly'' (i.e., what Bickerton refers to as *protolanguage* (1990, 1995), also described by Jackendoff as ''modern language minus syntax'' (2002: 235)), these were only quantitatively different from signals used by other animals (i.e., the inventory was significantly larger), yet not qualitatively so. On the contrary, it is important to stress that the production of some syntax-free isolated word-like sign, just like the production of any particular behaviour, can be the result of very different mental processes. In the present view, when our ancestors began to invent signals, had control over their use, and were aware of the thoughts these delivered, such signals became something profoundly distinct from any of those exhibited by non-human species; they could already be called *linguistic* even if a most important and distinctive

[27] Some animals do exhibit combinatorial systems of signals (e.g., monkey calls and birdsongs), which usually convey either an alarm, or a sexual, or a territorial message. But there is little if any evidence that these systems are syntactic in the sense that they are semantically compositional; the dominant consensus is that the meaning of a whole string of sounds is not a function of the meanings of the parts (Hurford, 2012:14–18). In any case, some might actually be very reluctant to grant any semantics at all to the innate emotional states underlying those vocal messages (e.g., the feeling of sexual attraction). This is true at least for those who share Mandler's belief that meanings arise from an interpretation of what falls under the organism's attention, and therefore seem to have little in common with a small set of emotions related to inner perception.

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feature of language such as syntax was still missing. If this is correct, the non-syntactic language apes are trained to learn today would still not be comparable to the very first truly linguistic signs that were invented and used by our ancestors. Likewise, it would be wrong, for example, to draw a parallel between the symbols learned by apes and those used by speakers of pidgins (as was done by Bickerton (1990)). Surely, the symbolic skills apes but also other animals exhibit are remarkable; some apes and some dogs can even understand complex linguistic utterances (Savage-Rumbaugh et al., 1998; Pilley and Reid, 2011). But there are at least two main reasons why one should be cautious to view those mental achievements as truly linguistic. The first is that, in human communication, linguistic symbols are interpreted in relation to the contextual situation. The coding-decoding system they form is subservient to inferential processes (Sperber and Wilson, 1986). Suppose you and your wife speak pidgin. You see an incredibly huge man and want to draw your wife's attention to him; you point your finger towards him and just say to her ''an elephant!''. Your wife will not worry about your sight or mental health; she knows you just want to make the point that the man is ridiculously large. The question is: even if we could get a linguistically trained chimpanzee to make declarative pointing and declarative utterances, could the animal use or understand the label *elephant* in the above way? The second concern is that although apes and some other animals can use symbols in some communicative situations (imperative requests), there is no evidence that they can use them for thinking too (humans produce more language in soliloquies inside their heads than in communicative exchanges). Premack (1985:255) is in fact pessimistic about the possibility of chimpanzees thinking of a concept through its symbol: ''language does not enter the ape's mind''. This raises doubts over apes' capability to carry out conscious thinking through the use of their learned symbols. Commenting on the linguistic feats of the bonobo Kanzi, apparently the most proficient non-human linguist, Donald (2001) claims that his acquired remarkable symbolic skills do not seem to have fundamentally altered his awareness: Kanzi never constructs self-referential expressions such as ''I think'' or ''I feel'' or ''I want''.

Placing conscious meaning and thought at the heart of language results in the rejection not only of *syntactocentrism* (Chomsky, 1981, 1995) but also of theories of language evolution that look at form rather than meaning as the starting point of linguistic ability. I refer here in particular to the idea of *prosodic protolanguage* (Fitch, 2010:468) which draws from Darwin's (1871) belief that there was a first stage of *musical* language evolution with no propositional meaning for the transmission of basic emotions related to courtship in sexual selection (Arbib and Iriki (2013:494) describe this musical protolanguage hypothesis as 'phonology first, semantics later'). For one thing, positing the emergence of propositional language within the framework of a pre-existing musical protolanguage would advocate for a vocal origin of language, not for a gestural one as argued in the present work. Most important, however, is that even if we accepted that such a prosodic phase indeed existed, and so also that it evolved a suitable vocal articulatory system to be later exploited by the onset of propositional language, it is impossible for a view of language firmly centred on meaning, as the present one is, to regard as linguistic or even just proto-linguistic streams of musical sounds that express feelings but are void of any real conceptual content. In other words, the simple fact that propositional language would have later plugged into that initial prosodic structure would not automatically have made that earlier structure already protolinguistic. Otherwise, a good number of species that exhibit sophisticated vocal abilities should rightly earn the title of 'protolinguistic creatures' (i.e., at least many bird species would be entitled to that). Of course, one is free to think that that is fine, but I repeat here my conviction that before viewing some communicative skill as linguistic, even if only partially so, that skill should already display at least some of the features that are distinctive of human language. A vocal tract that is good at producing and modulating sounds is not something that can only be found in our peculiarly linguistic species. By contrast, a mind that is able to create and be aware of meanings that are used both for communication and thinking cannot probably be found in any non-human animal. As a consequence, as I have repeatedly claimed throughout my argumentation, that mind can already be regarded as linguistic.

One very last observation goes to the notion of thinking about thinking. Though it may be obvious to many, it is worth pointing out how crucial the concept of *self* must be for that kind of thinking to occur. When you think about thinking, that concept is necessarily included in that activity because you are aware of *yourself* having some thoughts. In contrast, self-awareness is not a requisite for thoughts unfolding in primary consciousness because the self needs not be part of what is being thought about; in that process, the organism 'thinks consciously' simply in the sense that it has a phenomenal experience of something, whereby that something is *not* put in relation to the self. Do great apes have self-awareness? They surely seem to have some: unlike lower apes and indeed most animals, they do pass mirror tests. Nevertheless, all what a chimpanzee might perceive when standing in front of a mirror could be simply a sense of body identity; ''the animal may recognise itself as a physical object without necessarily understanding that that object has desires, beliefs, emotions, and the like'' (Corballis, 2011a:149). Consequently, it cannot be excluded that one of the major obstacles to the acquisition of secondary consciousness (and, therefore, to the invention of languages) in great apes could be the lack of a sufficiently developed sense of self.

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