

STUDI

Stories come first. The origins of human communication from a naturalised perspective of language

Francesco Ferretti^(a)

Ricevuto: 9 Dicembre 2023; accettato: 29 Maggio 2024

Abstract Within the framework of cognitive science, a naturalised model of language must pass the test of both cognitive and evolutionary plausibility. Underlying this paper is the idea that the theme of the origins of language is the litmus test through which the cognitive and evolutionary plausibility of a model of language, and thus its possibility of naturalisation, can be assessed. Specifically, in this paper, two models of language are examined. The first, focused on the propositional character of thought, is the basis of a conception of language founded on the primacy of the sentence and on the computational architectures used to process the sentence; the second, centred on the narrative foundation of thought, is the basis of a conception of language that sees in discourse and in the computational systems that process the plot and character of stories the constitutive trait of human communication. From the point of view of the topic of origins, the result of the analysis of the first model is negative, since the reference to sentence syntax does not turn out to be the feature of language from which to describe the starting point of human communication. The narrative model of the origin of language, on the contrary, offers a perspective of origins in line with both cognitive and evolutionary plausibility. The latter model, therefore, appears to be congruent with a naturalised perspective of human language.

KEYWORDS: Language and Thought; Narrative; Origin of Language; Pantomime; Storytelling

Riassunto *Le storie vengono prima. Le origini della comunicazione umana in una prospettiva naturalizzata del linguaggio* - Nell'ambito della scienza cognitiva, un modello naturalizzato di linguaggio deve superare sia il test della plausibilità cognitiva sia il test di quella evolutiva. Alla base di questo articolo è l'idea che il tema delle origini del linguaggio sia la cartina al tornasole attraverso cui valutare la plausibilità cognitiva ed evolutiva di un modello di linguaggio e, quindi, la sua possibilità di naturalizzazione. In questo articolo vengono esaminati due diversi modelli teorici. Il primo, incentrato sul carattere proposizionale del pensiero, è alla base di una concezione del linguaggio fondata sul primato della frase e sulle architetture computazionali utilizzate per elaborare la frase; il secondo, incentrato sul fondamento narrativo del pensiero, è alla base di una concezione del linguaggio che vede nel discorso e nei sistemi computazionali che elaborano la trama e il personaggio delle storie il tratto costitutivo della comunicazione umana. Dal punto di vista del tema delle origini, il risultato dell'analisi del primo modello è negativo, poiché il riferimento alla sintassi della frase non risulta essere la caratteristica del linguaggio da cui partire per descrivere le fasi iniziali della comunicazione umana. Il modello narrativo, al contrario, offre una prospettiva delle origini del linguaggio in linea con la plausibilità sia cognitiva che evolutiva. Solo quest'ultimo modello, dunque, sembra essere congruente con una prospettiva naturalizzata del linguaggio umano.

PAROLE CHIAVE: Linguaggio e pensiero; Narrazione; Origine del linguaggio; Pantomima; Storytelling

^(a)Dipartimento di Filosofia, Comunicazione, Spettacolo, Università degli Studi di Roma Tre, via Ostiense, 234 - 00146 Roma (IT)

E-mail: francesco.ferretti@uniroma3.it



1 Introduction

IT IS NOT POSSIBLE TO wind the tape back to its original state: this is the argument that, declined in various ways, has always underpinned criticism of the study of the origins of language. This criticism was used as the theoretical picklock by the *Société de Linguistique de Paris*, which in 1866 issued an edict forbidding its members from presenting papers on the origin of language, an ostracism that prevailed in language studies until a few years ago. After the years of prohibition, the subject of the origins of language has once again taken the theoretical stage in human communication studies: it has done so by overturning classical criticism based on the idea that the question of origins was a purely speculative issue. Compared to the past, in fact, today the situation appears to be reversed: it is empirical studies that have taken the stage over theoretical ones (WACEWICZ & ŻYWICZYŃSKI 2012). In a review article analysing the different empirical ways of studying the origins of language, for example, Fitch (2017) argues that paleogenetics represents the possibility of winding the tape back to its starting state. The theoretical issues related to the topic of origins thus have a good empirical basis to rely on.

Having said this, the theme underlying this article is empirical and conceptual at the same time. Studying the systems that regulate linguistic processing within the framework of language evolution makes it possible to analyse one of the issues on which theoretical reflection has always focused: the relationship between language and thought. In the classical debate, the prevailing idea is that this relationship should primarily focus on the (unidirectional) analysis of the role of language in thought. The study of the origins of language is a privileged vantage point for investigating a specular approach in comparison to the prevailing thesis. Two ideas underlie this new approach: the idea of the existence (in the initial stages) of a thought independent of language; the idea that language (in the initial stages) is parasitic on thought. Such an approach has a solid and recognised tradition in the standard thesis of cognitive science, and it is from this tradition that our discussion begins.

2 The standard hypothesis

In a theoretical perspective that considers thought the precondition of language, the first move is to account for what is to be understood by thought. In contemporary philosophy of mind and cognitive science, the debate on the nature of thought relies on the thesis of mental states as propositional attitudes, in terms of relation between agents and representations. The traditional idea is that the content of thoughts is represented

in the mind in sentence-like propositions of the *Language of Thought* (LOT) proposed by Fodor (FODOR 1975, 1987). The LOT hypothesis exemplifies well the point of view of the classical thesis regarding the nature of mental representations and the content of thought conveyed by them. This is a well-known hypothesis on which, for the purposes of this article, there is no need to dwell further.

What interests us most here is that in the classical thesis of cognitive science, the definition of what thought is, carries with it a precise way of understanding what language is. The prevailing idea in cognitive science is that the distinctive feature of language has to be sought in the constituent structure of sentences (CHOMSKY 1980; PINKER 1994; JACKENDOFF 1993). The thesis that the essence of language has to be identified with the constituent structure of sentences is strictly connected to the theory of isomorphism between language and thought. According to Fodor, in order to express thought, language must have the same (logical) form as thought: since thought has a constituent structure, language also has to have a constituent structure. Following Fodor (1987), «you cannot have it that language expresses thought, and that language is systematic unless you also have it that thought is as systematic as language is» (p. 151).

In the LOT hypothesis, indeed, language is the way it is because to express thought it must imitate its form. Now, as much as both Fodor and Chomsky are deeply sceptical about the subject of language's origins, their proposal lends itself to outlining a precise hypothesis about the evolutionary reasons that have governed the evolution of language. The adaptive result of the selective pressures that guided the evolution of language is an expressive system built for the purpose of information transmission (PINKER 1994; PINKER & BLOOM 1990). Indeed, as Pinker and Bloom (1990) point out, «language shows signs of design for the communication of propositional structures over a serial channel» (p. 713). It is in the strong link with the propositional structure of thought that the sentence acquires a status of priority over other forms of expression.

The priority given to the sentence, moreover, is substantiated by the idea that sentence processing governs the processing of language as a whole. Such an argument fits in perfectly with what Pickering and colleagues argued in a book on cognitive architectures of language:

In this book, the contributors largely focus on the question of what architectures and mechanisms underlie sentence comprehension, but it is our belief that their contributions illuminate the general nature of human language processing in the context of cognition as a whole. Because of the scope of these contributions,

this introduction primarily focuses on sentence comprehension. However, our perspective is to try to use evidence from sentence comprehension to understand the overall nature of language processing (PICKERING, CLIFTON & CROCKER 2001, p. 1).

Chomsky's idea has been highly pervasive in cognitive sciences. To maintain that the essential trait of language is the constituent structure of sentences is to maintain that the processing of sentences is everything you need to produce-comprehend language. Following the *Standard Hypothesis*, it is possible to provide that the constituent structure of sentences is the feature shared by language and thought, and that such a structure is the necessary and sufficient condition to produce-understand language. Although the *Universal Grammar* (UG) thesis was initially proposed as largely speculative, Moro's studies gave empirical solidity to the Chomskyan model by investigating the cognitive devices and brain areas deputed to the processing of the sentence constituent structure (MORO 2006; MUSSO *et alii* 2003). So far, so good: Chomsky's model elegantly passes the test of cognitive plausibility. The next step to take is to understand how this model behaves when faced with evolutionary plausibility.

2.1 Evolutionary plausibility

For many years, the comparison with the Darwinian tradition was strongly opposed by Chomsky. Underlying this rejection is the Cartesian idea of the qualitative gap between language and other forms of animal communication (for a discussion cf. FERRETTI 2010; FERRETTI & ADORNETTI 2014, 2019). There are two interconnected hypotheses of this theory: the idea that syntactic sentence structure is the characteristic feature of the qualitative difference between language and animal communication; the idea that syntactic sentence structure has no simpler evolutionary antecedents because the structure in sentence constituents refers to the idea of the sentence as a complex entity that is given all together or not at all.

Based on these considerations, Chomsky's conflict with Darwinism depends in large part on the fact that the gradualism and continuism underpinning the New Synthesis challenge the idea of the qualitative leap of language over simpler forms of communication. Also linked to these considerations is what has been a staple of the Chomskyan hypothesis for many years: the idea of language as a complex entity. The theme of complexity, as is well known, has always been waved as a bogeyman against gradualism and continuism. Although for different reasons, for a long time Chomsky used the same arguments that Mivart had raised against Darwin and that continue to fuel perspectives

based on *Intelligent Design* (see, e.g., BEHE 2006). Now, granted that the bogeyman of complexity can work in support of creationism, the idea of justifying language (which for Chomsky is a biological organ) by appealing to the same arguments used in defence of creationism seems to me to be a dead-end street – and Corballis (2017) has done well to point out that in such a perspective language looks like a miracle.

Critical of Chomsky's attitude towards the theory of evolution, Pinker and Bloom (1990), in support of a compatibilist thesis, have shown that the reference to the complexity of language is actually an argument in favour of a gradualist (and adaptationist) perspective: since the only way (other than creationism) to account for complexity in nature is by reference to natural selection, then if language is complex it *must* be the product of natural selection. From such a perspective, the complexity of language is perfectly in line with the adaptationist thesis because the only way to account for complexity in nature is to account for it by reference to an evolutionary process that proceeds gradually in the direction "from the simple to the complex".

The compatibilist argument used by Pinker and Bloom did not have the desired effect on Chomsky. The idea that there are no simpler forms of communication from which language could have evolved continues to be the Cartesian legacy of the model that Chomsky does not intend to give up. That said, Chomsky's minimalist turn seems to have opened up a new way of thinking about the relationship between language and evolutionary theory. Unlike in the past, Chomsky now argues that it is possible to look at the relationship between language and evolutionary theory in a new light. This possibility, in his view, depends on both a change in linguistic theory and evolutionary theory. Since, in the minimalist hypothesis (CHOMSKY 1995), language is simple and not complex, the main reason that had stood in the way of Chomsky's adherence to evolutionary theories is missing. Berwick and Chomsky in a book dedicated to these issues write:

For starters, linguistic theory has matured. Complex linguistic rule systems are now a thing of the past; they have been replaced by much simpler, hence more evolutionarily plausible, approaches [...] In particular, we now have good reasons to believe that a key component of human language – the basic engine that drives language syntax – is far simpler than most would have thought just a few decades ago (BERWICK & CHOMSKY 2015, p. 2).

In addition to changes in the model of language, Chomsky's recovery of the evolutionary tradition depends in large part on the possibility

offered by new models of evolutionary theory capable of explaining the evolution of language without having to question the qualitative leap between language and animal communication.

Although with very different outcomes from those of Pinker and Bloom, it is evident that Chomsky's adherence to evolutionism responds to the same compatibilist demands as the two authors. What does not convince me about the compatibilist option is the methodological principle that moves it: by pivoting on the proposed language model, Chomsky's strategy is to identify patterns of evolution that fit the model. I do not enter here into the discussion concerning the new models of evolution, nor the massive reference to stochastic processes made by Chomsky in the writings in which he tends to show the compatibility of minimalism with the new models of evolution (CHOMSKY 2017). What I criticise is the unidirectional path "from language to the evolutionary model" that governs such a perspective. This unidirectionality emerges most clearly in the way Chomsky accounts for the origin of language. Since, as already mentioned, the issue of origins is the litmus test for assessing the cognitive and evolutionary plausibility of a model, what Chomsky has to say in this regard is of particular interest for the purposes of this article.

The refusal to recognise specific adaptive functions in language and the continued recourse to stochastic processes results in an unconvincing idea of the origins of language. In the minimalist model, the issue of the origins revolves around the question of accounting for the two key components of language: the "atoms of computation" (the lexical elements and the concepts corresponding to them); the computational devices underlying language (Merge, specifically). These two elements are all that is needed for the origin of language, since, as the two authors point out, if the minimalist theory turns out to be correct, the evolution of language will reduce to the emergence of Merge, the evolution of conceptual atoms of the lexicon, the linkage to conceptual systems, and the mode of externalization (BERWICK & CHOMSKY 2015, pp. 72-72).

A first point to be made here is that the modes of externalisation (the expressive systems used in actual communicative exchanges) are entirely secondary in the proposal. Let us assume, for now, that externalisation processes are indeed secondary and that all that is needed to initiate language are the conceptual atoms and the computational mechanism driven by Merge. How (and when) did these constituent elements of language emerge? Let us begin with the atomic elements of thought. Here the two authors' answer is emblematic:

The atomic elements pose deep mysteries. The minimal meaning-bearing elements of human

languages – wordlike, but not words – are radically different from anything known in animal communication systems. Their origin is entirely obscure, posing a very serious problem for the evolution of human cognitive capacities, language in particular (BERWICK & CHOMSKY 2015, p. 90).

The obscurity surrounding the origin of thought atoms does not spare the question of Merge's origin either. According to the two authors, in fact:

In some completely unknown way, our ancestors developed human concepts. At some time in the very recent past, apparently some time before 80,000 years ago if we can judge from associated symbolic proxies, individuals in a small group of hominids in East Africa underwent a minor biological change that provided the operation Merge – an operation that takes human concepts as computational atoms and yields structured expressions that, systematically interpreted by the conceptual system, provide a rich language of thought (p. 87).

Complicating the picture is the fact that, once again, Merge is the trait on which the qualitative difference between us and other animals is based, since «we, but no other animals, have Merge, and as a consequence we, but no other animals, can construct unbounded arrays of hierarchically structured expressions» (p. 132).

In the light of these considerations, it is evident that the compatibilism between language and the theory of evolution is not sufficient to bring Chomsky's proposal in line with a plausible perspective on the origin of language. The reference to the subject of origins makes it clear that the compatibilist strategy remains only an abstract hypothesis that gives no indication of *how*, *why* and *when* language took the form and structure it has. One starts with language as it is now and says that *at some point in evolutionary history* the characteristics that make language what it is now must have emerged. Apart from its compatibility with modern models of evolutionary theory, such a reconstruction is of no explanatory value. Taking into account these considerations, it is possible to argue that reference to compatibilism is not sufficient to assess the cognitive and evolutionary plausibility of a model of language. An evolutionarily well-founded model of language is one that, in addition to theoretical considerations, tries to decide on what it is plausible to claim actually happened.

A possible way forward in this direction follows the path traced by Pinker and Bloom (1990) in their attempt to account for the origins of the UG in gradualist and adaptive terms. Several

scholars have taken this programme seriously by attempting to outline an evolutionary path in which the constituent structure of the sentence is analysed following an evolutionary path with intermediate stages.

Martins and Boeckx, for example, have criticized the idea of considering qualitative differences in human language based on the argument that Merge is given all together or not at all. The authors argue that there are several difficulties with such an argument. In particular, their criticism focuses on the idea that Merge, due to its atomic nature, was the result of a single mutation. Against this idea, the two authors point out that Merge's simplicity is only apparent. In fact, in their view:

for Merge to adequately capture the core structural traits of linguistic competence, it must be formulated in such a way as to capture the distinction known to linguists as “external merge” (forming nested dependencies) and “internal Merge” (forming cross-serial/crossing dependencies). Both kinds of dependencies occur in natural language, but the latter type, in which dependencies between items cross one another, requires more memory resources to keep track of all open dependencies across intervening elements. [...] Thus, it is perfectly reasonable to entertain a multistep scenario for Merge, with at least two steps: one step (effectively, external Merge in the terminology mentioned earlier) taking us beyond the range of resources attested in other species' communication systems (limited to dependencies that can be captured by finite-state automata). [...] A second step, corresponding to internal Merge, would make it possible for crossing dependencies to be part of the species' communication system (technically corresponding to characteristics of a linear-bounded automaton (MARTINS & BOECKX 2019, p. 4).

Martins and Boeckx do not commit themselves to the hypothesis that the origin of language actually involved a transition between the two forms of Merge, but what they do claim is that the idea of a single mutation to explain Merge as an atomic component does not stand the test of fact. According to Rizzi (2016), Merge is also not a unitary atomic component.

Considerations of this kind fit in with Bickerton's thesis of the existence of protolanguage. According to Bickerton (1990), however, protolanguage is not language. In contrast to this idea, Progovac (2015, 2016) argues that proto-syntax (small compounds underlying paratactic two-slot grammar) is real language. In her view, forms of “half-syntax” are in fact the necessary scaffolding to initiate the evolutionary process of a full-fledged syntax.

Such a hypothesis leads Progovac to significantly backdate the origin of language compared to Chomsky and Berwick's thesis. Following the line drawn by Dediu and Levinson (2013) that the origin of language must be backdated to around 400,000-500,000 years ago, Progovac argues (2016) that flat syntax can also be legitimately attributed to *Homo heidelbergensis* (the common ancestor of Sapiens, Neanderthals and Denisovans).

Progovac's proposal is an important step that paves the way for a gradual evolutionary process involving hominin species older than *Homo sapiens*. Having said that, the reference to syntax as the proper characteristic of human language, however gradualistically interpreted, leaves the way open to think of language as a uniquely human characteristic. In order to establish some kind of continuity between language and animal communication, in this article we try to follow a different path. A first way of doing this is to show that language is even more ancient than syntacticist hypotheses (closely related to verbalization) are prepared to admit. By shifting attention to the gestural rather than the verbal basis, I believe it is possible to trace typically human forms of communication even in species more archaic than *Homo heidelbergensis*. Such a shift, as we shall see, involves a very different conception of what language is and what its basic constituents should be.

My proposal in this paper, in fact, is that the study of the origins of language must free itself from the primacy accorded to sentence structure. For two reasons: the first has to do with the way we define language; the second with the way we define thought. With reference to the first reason, my idea is that, although it represents one of the fundamental nodes in the evolution of language, the structure in constituents of sentences is not the issue on which to focus the analysis of its origins. Indeed, the sentence is the late result of a long evolutionary process that, as such, does not lend itself to function as a trigger for the process that gave rise to language. Proof of this is the second reason related to the way in which thought is considered. As we saw in the first part of this article, the structure in constituents of sentences depends largely on the constraint imposed on communication by the propositional structure of thought. The first and more general reason that leads us to hypothesise a different approach to the theme of the origins of language is closely linked to a different way of understanding what thought is.

3 From sentences to stories

In this paper, my thesis is that the constitutive trait of language is not to be found in what happens at the level of *microanalysis* (the analysis of internal sentence structure) but in what happens in *macroanalysis* (the relationship between sen-

tences on the discourse level). My proposal is that, in the early stages of human communication, our ancient predecessors were more concerned with constructing discourses than with constructing sentences because the hallmark of human communication from the earliest stages is the ability to tell stories (FERRETTI 2024a, 2022). The narrative structure of discourse is what distinguishes human from animal communication; from this view, it is to the narrative origin of language that one must look in order to assess its evolutionary and cognitive plausibility.

The first move in this direction is to defend my reasons for abandoning the sentence and focusing on the narrative discourse. This is a non-obvious and non-intuitive step that needs to be carefully justified. Indeed, when dealing with the topic of origins, the ability to tell stories seems to be the final outcome of a fully developed language. What are the reasons for leaving the solid ground of the sentence and embracing the turbulent waters of discourse to investigate the origins of language?

The first answer to this question comes from empirical considerations. As mentioned above, in models that rely on sentence priority, sentence-processing devices are all that are needed to process language in its entirety. Moreover, since a discourse is composed of sentences, it could be argued that sentence processing also governs discourse processing. Despite the intuitive nature of these considerations, following the thread of discourse (following the plot of a story, for example) is something different from understanding the sentences that make up that story. It is possible to understand every single sentence of a discourse and not grasp the meaning (the gist) of the discourse in its entirety. The idea that understanding discourse requires different skills and processing systems from those required for sentence processing is a source of debate. This debate focuses on the question of whether global coherence (the property underlying the causal and temporal relationship that governs the sequence of events in discourse) is reducible to cohesion (COSENTINO, ADORNETTI & FERRETTI 2013; ADORNETTI 2014). According to Giora (1985), cohesion is neither a necessary nor sufficient condition for the construction of global coherence. Data supporting this idea come from language pathology: some language deficits show that it is not enough to understand sentences in order to understand language. An enlightening example is offered by the language of schizophrenics (CARLO, ADORNETTI & FERRETTI 2021) in whom derailment seems to touch a level of language that cannot be analysed in terms of what takes place within sentences: the inability to “stay on course” in the flow of speech escapes analysis of the structure in sentence constituents (on the distinction between sentence comprehension deficit and discourse deficit cf. ADORNETTI 2018).

That said, my proposal is a stronger hypothesis than the idea that discursive processing involves a processing component distinct from sentence processing. My proposal is that discursive processing is the evolutionary precondition of sentence processing. Underlying this paper is the hypothesis that humans constructed coherent discourses before they constructed well-formed sentences because humans began telling stories before describing facts. In light of these considerations, the problem to be addressed is to justify the idea of the narrative foundation of language. The first step in this direction is to look at the selective pressures that led our ancient predecessors to invent a type of communication that had the narrative form as its characteristic feature.

■ 4 The adaptive role of narrative communication

The classical thesis regards communication as an instrument of information transmission (SHANNON & WEAVER 1949). We will not enter here into the discussion concerning the criticism of the informational model, which, beyond its strong intuitiveness, leaves several problems open (for a critical analysis, cf. SPERBER & WILSON 1986; SCOTT-PHILLIPS 2014; FERRETTI 2022). For the purposes of this article, it suffices for us to point out that, in order to overcome many of the difficulties of the informational model, several authors have proposed a model based on the idea of the eminently persuasive, rather than informative, character of communication. The debate on this issue has its origins in studies on animal communication (DAWKINS & KREBS 1978; KREBS & DAWKINS 1984). In line with these studies, Owren, Rendall and Ryan (2010) define animal communication «as the use of specialized, species-typical morphology or behavior to influence the current or future behavior of another individual» (p. 771). Underlying the persuasion model is the idea that persuasion strategies enact adaptive behaviour that has the primary purpose of avoiding physical conflict. Parrish, for example, argues that the evolutionary reasons for persuasion-driven communication lie predominantly in the fact «that the act of persuading others is an adaptive behaviour that avoids the cost of conflict» (PARRISH 2014, p. 3). Trying to persuade others instead of triggering conflict, in line with the Self Domestication Hypothesis of the origin of language (BENÍTEZ-BURRACO, FERRETTI & PROGOVAC 2021), can thus be considered a highly adaptive strategy.

In addition to re-evaluating their adaptive character, studies on animal rhetoric have another reason of great importance for the issues addressed in this article. Breaking a widely prevailing interpretative bias, studies on animal communication make it possible to support the existence of

persuasive forms of communication independent of language. This is a point of particular relevance to the study of the origins of language because it places the issue of human communication within the framework of an enhancement of persuasive strategies already present in animal communication. Inspired by the Darwinian tradition, Kennedy paves the way for an interpretation that is perfectly in line with the theoretical assumptions of this article: in his view, in fact, it is language that is more parasitic on rhetoric than the contrary, given that «speech would not have evolved among humans if rhetoric had not already existed» (KENNEDY, 2012, p. 4).

In light of these considerations, it is possible to argue that communication at every level (animal as much as human) has a persuasive rather than informative basis. If all animals tend, in communicating, to persuade, the remaining question is to establish what characterises human communication in its own right.

■ 4.1 *Persuasive stories*

My proposal is that storytelling is the communicative tool used by our ancient predecessors to give rise to the first typically human forms of communication. My proposal, more precisely, is that humans invented stories in order to communicate more effectively, since stories are an extraordinary instrument of persuasion and communication is characterised by persuasive, rather than informative, intentions (FERRETTI 2022).

That stories have enormous persuasive power is an undoubted and well-known fact: from advertising agencies to marketing strategies; from conspiracies to religions there are many cases that demonstrate that the epidemic character of beliefs that characterise cultures very often have the structure of stories or use the persuasive mechanisms of stories (SALMON 2007; ADORNETTI 2023; GLASER & REISINGER 2022; FERRETTI & ADORNETTI 2022). By exploiting the mechanism of narrative transport, for example, stories make it possible to “fly under the radar” (DAL CIN, ZANNA & FONG 2004): through the telling of a story, it is possible to conceal the speaker’s persuasive intent from the interlocutor, thereby preventing him/her from activating the epistemic vigilance mechanisms through which the listener prepares to defend his/her point of view (SPERBER *et alii* 2010). According to the *Transport and Imagination Model* (a model integrating imagination, attention and sensation, cf. GREEN & BROCK 2000) the primary effect of transport in a story is the loss of access to certain aspects of the real world (BILANDZIC & BUSSELLE 2013). As Green and Brock point out, in fact,

the reader loses access to some real-world facts in favor of accepting the narrative world that the

author has created. [...] While the person is immersed in the story, he or she may be less aware of real-world facts that contradict assertions made in the narrative. [...] Beyond loss of access to real-world facts, transported readers may experience strong emotions and motivations, even when they know the events in the story are not real (GREEN & BROCK 2000, p. 702).

An important part of the role of narrative involvement in persuasion concerns the processes of experiential simulation that interlocutors enact when listening to or reading a story: one of the canonical forms of such simulation concerns the reader/listener’s ability to put themselves in the shoes of the characters and thereby vicariously experience their experience in the story (GREEN & BROCK 2000; BUSSELLE & BILANDZIC 2008). According to Gottshall (2012), the theme of simulation of experience is the most obvious feature of the adaptive character of stories. Through the storytelling of others (for example, the story of a particularly dangerous hunting trip and the strategies the group used to deal with it), it is possible to experience the hunting trip without having to pay the price of facing the dangers of the real situation.

From these considerations, the adaptive role of stories as an instrument of persuasion becomes clear. That said, the fact that stories are a response to selective drives in favour of communication enhancement is only one of the factors involved in the origin of language. The selective pressures in favour of enhancing a certain structure or function must, in fact, come to terms with the structures and functions already available to organisms. Which means that, in order to invent stories and cope with the demand for an enhancement of persuasive abilities, our ancient predecessors had to be equipped with the appropriate cognitive architectures. Now, how is it possible to have the appropriate structures for the elaboration of the narrative plan before starting to tell stories in order to communicate?

The answer to this question lies in the recognition of the primacy of thought over language: humans were able to represent reality in the form of stories even before they started telling stories to communicate with others. If it is possible to hypothesise the existence of narrative thought before language, then the dependence of language on thought offers interesting food for the topic of origins. As we shall see in the final part of this article, such a thesis ties in well with the idea of the constraint that thought imposes on the ways of expressing thought: if the expressive system chosen by our ancient predecessors to communicate must have the traits capable of making it an effective system for expressing thoughts, then that expressive system must have assumed (from the very beginning) an eminently narrative character. Narra-

tive, in fact, can be considered «the basic mode of communication that best fits the way individuals think and remember» (BILANDZIC & BUSSELLE 2013, p. 205).

5 Narrative thought

In continuity with a tradition that has in Bruner (1991) a progenitor, my idea is that the characteristic form of human thought is discursive (narrative, specifically), rather than propositional. According to Bruner, in fact, «we organize our experience and our memories of human happenings mainly in the form of narratives – stories, excuses, myths, reasons for doing and not doing, and so on». (BRUNER, 1991, p. 4) Narrative is the hallmark of the representation of human experience, because the representational capacities of which individuals are capable through narrative do not appear reducible to any other form of representation.

In light of these considerations, the key point to be discussed is how to account for the narrative character of thought. The prevailing thesis points to the dependence of narrative on language (SCALISE SUGIYAMA 2005). Living in a community where stories are told, individuals internalise (through forms of social apprenticeship) the stories shared by the group and make them an instrument of (internal) representation of reality. Closely following Vygotsky's socio-constructivist perspective (VYGOTSKY 1978), such a thesis is at the basis of the *Narrative Practice Hypothesis* (NPH), an interpretative hypothesis that has in the constitution path from the outside (from social practices) towards the inside (the states and mental processes that characterise the psychic life of individuals) its centre of reflection (HUTTO 2007, 2008; GALLAGHER & HUTTO 2008). Without going into the details of this hypothesis, suffice it to say here that the weakness of the NPH is that it only works by *presupposing* language: it does not lend itself to explaining how language originated for the simple fact that it only works by having a fully developed language at its disposal (FERRETTI 2023a). This article takes a mirror-image viewpoint to that proposed by the proponents of NPH: my idea is in fact that humans represent reality in the form of stories because humans think through stories before and independently of language. Before social practices, in fact, narrative thinking depends on the use of cognitive systems underlying the narrative brain (FERRETTI 2023a, 2022; FERRETTI & ADORNETTI 2020).

Considering cognitive constraints as the basis of narrative thought, my hypothesis mirrors that proposed by NPH proponents: in the early stages, it is the constraints imposed by cognitive systems on narrative thought that constrain narrative practices in society. The ability to represent reality narratively, therefore, in addition to being auton-

omous from language, can be considered one of the basic constraining factors of its origin. In this direction, two questions need to be addressed: the first concerns the processing systems capable of producing narrative forms of representation; the second the justification of the idea that the representations produced by these systems can be considered the evolutionary precondition of language.

5.1 The narrative brain

The analysis of the first question passes through the identification of the distinctive properties of stories and the identification of the cognitive systems appropriate for the processing of these properties. Although the debate as to what distinguishes a story from other forms of representation is still open, a certain uniformity of opinion is found in recognising that *plot*, *time* and *character* are among the salient features of every story.

Compared to sentences, stories are characterised by a holistic character: a narrative, in fact, is governed by global coherence, a property that makes it possible to consider narrative as «a primary resource for configuring circumstances and events into more or less coherent scenarios involving the experience of persons» (HERMAN 2013, p. 74). Global coherence is the internal framework of the discourse through which the constituent elements of the narrative (time, intrigue and character) merge with each other. It is with reference to this property that the plot takes shape. In fact, as emphasised by Herman, «from a structural standpoint, one of the hallmarks of narrative is this linking of phenomenon into causal-chronological wholes; stories provide a resource for connecting otherwise isolated occurrences onto elements of episodes or “scenes”, whose components can then be represented as systematically interrelated via causal networks» (p. 237). Along with the holistic dimension determined by the causal relations between events, the extended character of narrative is strictly connected with the time factor.

One of the authors who has most forcefully outlined the relationship between time and narrative is Ricoeur. In his view, in fact,

what is ultimately at stake in the case of the structural identity of the narrative function as well as in that of the truth claim of every narrative work, is the temporal character of human experience. The world unfolded by every narrative work is always a temporal world. Or, as will often be repeated in the course of this study: time becomes human time to the extent that it is organized after the manner of a narrative; narrative, in turn, is meaningful to the extent that it portrays the features of temporal experience (RICOEUR 1980, p. 3).

Projection in time gives the narrative an extended character, one of the constitutive features of the plot and the holistic foundation of narrative representation. Following Ricoeur, also according to Brooks «the meaning that narrative seeks to communicate, and perhaps the very *raison d'être* of narrative, are identified with time and located in time» (BROOKS 1984, p. 11).

Another characteristic feature of stories is certainly the character. Fludernik (1996), for instance, has insisted a great deal on this role. In her view, in fact, the role of the character in a story renders reference to the plot of the story completely irrelevant:

In my model there can therefore be narratives without *plot*, but there cannot be narratives without a human experience of some sort at some narrative level. This radical elimination of plot from my definition of narrativity is based on the results of research into oral narrative, where [...] the emotional involvement with the experience and its evaluation provide cognitive anchor points for the constitution of narrativity. Merely plot-oriented narratives are therefore here argued to represent a zero degree of narrativity (pp. 9-10).

The idea that the understanding of stories has to do with character evaluation has been widely witnessed in theoretical reflection (CULPERER 2001; PALMER 2004; SCHNEIDER 2001).

These general considerations provide a basis for the analysis of the processing devices underlying narrative competence. It is plausible to argue that if humans are characterised by the ability to represent reality in the form of stories, they must have the processing systems in place to process the characteristic properties of stories. With regard to the role of the time factor and its close relationship to the theme of plot, Corballis (2011) holds that the same constructive process that allows us to reconstruct the past and to construct possible futures also allows us to invent stories. In line with this intuition, we conducted some studies on the ability of children with *Autism Spectrum Disorder* (ASD) to perform mental projection in time, showing the role of *Mental Time Travel* – the cognitive systems allowing us to project backward and forward in time – in the processing of narrative global coherence (FERRETTI *et alii* 2018; MARINI *et alii* 2019). Consistently with our findings, an investigation by Race and colleagues (RACE, KEANE & VERFAELLIE 2015) on hippocampal amnesic patients has corroborated the link between the processing of global coherence and the brain systems (especially the hippocampus) involved in spatial-temporal representation.

The idea that character represents one of the characteristic features of stories has led to min-

dreading systems being identified as one of the essential components of the narrative brain. (MAR 2011; YUAN, MAJOR-GIRARDIN & BROWN 2018) From such a perspective, understanding a story means understanding the motivations, intentions and desires that drive characters to act in a certain way (MARGOLIN 2007). Empirical studies at both the psychological and neurological levels support this hypothesis. On a psychological level, experimental studies have shown that human mind treats fictional characters in a story as if they were real people (EDER, JANNIDIS & SCHNEIDER 2010; GERRIG 2010; OATLEY 1999). On a neurological level, functional magnetic resonance imaging studies have shown that several brain areas are activated in ToM tasks, including the bilateral temporoparietal junction (bTPJ), posterior superior temporal sulcus (pSTS), medial prefrontal cortex (mPFC), posterior cingulate cortex (pCC), precuneus, and temporal poles (for a review, cf. MAR 2011). The important fact for my purposes is that the brain system underlying *mindreading* ability overlaps in several areas with the network of systems underlying the narrative brain (MAR 2004; FERSTL *et alii* 2008; LIN *et alii* 2018).

In line with the above, it can be argued that the ability to represent reality in the form of stories is largely dependent on the cognitive systems capable of constructing an extended representation of physical and social reality. The fact that these systems are cognitive devices capable of processing the extended dimension of stories contributes to the idea that the cognitive underpinnings of stories should be identified with a functional macrosystem designed to allow for contextually relevant behaviours through detachment from the here-and-now, which I have termed the *Triadic System of Grounding and Projection* (TSGP – Ferretti 2010, 2015, 2022). Humans, unlike other animals, connect to context through continuous projections (disengagements) from the here and now. To do this, humans must be equipped with the appropriate cognitive architectures. The behavioral flexibility that characterizes individuals of our species depends largely on the TSGP: this functional macrosystem actually consists of projection systems in space (*Mental Space Travel* – MST), in time (*Mental Time Travel* – MTT), and in the minds of others (*Mindreading*). Offering credence to this idea is the existence of a brain network – the *Default Mode Network* (DMN) – composed of systems closely bound to one another and responsible for projection in space, time and the minds of others (BUCKNER & CARROLL 2007). Specifically, my idea is that the abilities of projection governed by such systems are the skills we need to produce a narrative representation of reality (FERRETTI 2022; FERRETTI & ADORNETTI 2020).

Given that humans are naturally inclined to think reality in the form of stories, my hypothesis

in this paper is that the narrative brain may be the evolutionary precondition for the invention of human language. In the face of selective pressures in favour of enhanced persuasive communication, in fact, arguing that our ancient predecessors possessed the appropriate cognitive architectures for the elaboration of stories is an important first step to take. A further aspect to be emphasised concerns the fact that the cognitive apparatus underlying the narrative brain is independent of language, since the cognitive systems that compose it are adaptations the evolution of which depended on purposes other than communication. This is an important aspect because it allows one to hypothesise the origin of language without having to postulate specialised systems for linguistic processing before the advent of language. That said, how can we justify attributing a narrative brain to our ancient predecessors?

5.2 And other animals?

Since the oldest species of hominins are extinct, comparative studies with non-human animals, particularly those closest to us on the evolutionary scale, provide us with valuable food for thought in this regard. With regard to the cognitive systems underlying the narrative brain, there is experimental literature in favour of the fact that processing systems such as the ability to *Mental Time Travel* (MTT) and mindreading are cognitive systems also possessed (though in a different form) by some non-human animals (for a detailed discussion, cf. FERRETTI 2022; FERRETTI & ADORNETTI 2020).

The possibility that non-human animals can project themselves in time has raised wide debate (for a discussion cf. ZENTAL 2013). Comparative studies have shown that non-human animals can, to a greater or lesser extent, remember past episodes and anticipate future needs. As well as in great apes, evidence of MTT can also be found in birds (CLAYTON & DICKINSON 1998) and rats (LU *et alii* 2012). A study by Kano and Hirata (2015) conducted with six chimpanzees and six bonobos suggests that «apes encoded particular information (location and content) into long-term memory [...] and later retrieved that information in anticipation of the impending events» (p. 2515). Research on MTT in great apes also focused on the assessment of future projection abilities (GOODALL 1964; BOESCH & BOESCH 1984). The fact that our closest relatives have the ability to mentally travel in time is particularly relevant to the aim of this article: the presence of forms of MTT in animals that cannot talk corroborates the view that such an ability is independent from language and preceded it phylogenetically.

A similar argument can be made with regard to mindreading systems. Premack and Woodruff's

article (1978) is considered by many to be a milestone in studies on the subject. Although, there is some controversy (for a discussion, cf. ANDREWS 2017), most scholars are now largely willing to consider the mindreading system (*Theory of Mind*, specifically) also present in non-human animals. The question that continues to fuel the debate is what kind of mental states are at play in such cases. Although non-human animals are recognised as being able to attribute volitional or perceptual states to others, the question that remains is whether they are capable of attributing epistemic states (beliefs). In this regard, summarising thirty years of research, Call and Tomasello (2008) write:

there is solid evidence from several different experimental paradigms that chimpanzees understand the goals and intentions of others, as well as the perception and knowledge of others. Nevertheless, despite several seemingly valid attempts, there is currently no evidence that chimpanzees understand false beliefs. Our conclusion for the moment is, thus, that chimpanzees understand others in terms of a perception-goal psychology, as opposed to a full-fledged, human-like belief-desire psychology (p. 187).

For a long time, the attribution of epistemic states seemed to be the insurmountable limit for non-human minds. Over the last ten years, however, the situation has profoundly changed. In particular, there has been a crucial study promoting a new experimental paradigm based on the anticipatory looking test. The new study, conducted by Krupenye and colleagues (2016), used the implicit false belief task developed by Onishi and Baillargeon (2005) based on non-linguistic behavioural measures. The anticipatory looking paradigm relies on eye trackers that measure the individual's tendency to look towards a location in anticipation of an imminent event. In this way, it allows one to evaluate a participant's predictions about what an agent is about to do, even when that agent holds a false belief about the situation. Krupenye and colleagues (2016) tested for false belief understanding in chimpanzees, bonobos and orangutans. Their results revealed that primates were able to predict the actor's behaviour. In other words, the results «suggest that apes solved the task by ascribing a false belief to the actor, challenging the view that the ability to attribute reality-incongruent mental states is specific to humans» (p. 113). Subsequent investigations obtained similar results (BUTTELMANN *et alii* 2017; KANO *et alii* 2019). The fact that apes have, at least in an implicit form, the ability to attribute false beliefs to others opens the way to the possibility that also our hominin ancestors possessed the cognitive equipment necessary to understand how and what others thought.

This ability, which originally evolved to interpret others' behaviours, was later exploited for communicative purposes allowing our ancestors to develop increasingly sophisticated narrative forms of communication (FERRETTI 2023a; FERRETTI & ADORNETTI 2020).

The fact that humans have the cognitive systems that underlie their ability to represent themselves in the form of stories, in addition to testifying to the independence of these capacities from language, can legitimately be considered to underpin the cognitive architectures that humans must have had in order to initiate the origins of human communication. That said, there is still one last step to be taken: given that our ancient ancestors already had at their disposal the cognitive paraphernalia necessary for the production of narrative representations of reality, what remains to be explained is what made the transition from narrative thinking to communication through stories possible.

As already mentioned, the answer to this question passes through a rethinking of the relationship between thought and language. In contrast to the classical thesis of the influence of language on thought, my idea is that (in the early stages of language) the dependency relationship must be reversed. The constraint that narrative thought imposes on forms of externalisation, in fact, leads us to hypothesise that, in the initial stages that gave rise to language, it was thought that constrained language more than the reverse (FERRETTI 2023a). In contrast to the classical arbitrarist thesis (which sees linguistic expressions as abstract and arbitrary), it is legitimate to assume that at the initial stage, in the absence of stipulated conventions, communicative understanding could only function by appealing to expressive systems capable of conveying content in a transparent manner (through sound iconicity or bodily mimesis, for example). From this point of view, the answer to the question of the type of expressive system used by humans in their earliest communicative exchanges is strongly linked to the type of thought to be expressed: to be effective in conveying content in the form of stories, the expressive system had to take the form of storytelling from the very beginning. Pantomime seems to be the ideal expressive system for this purpose.

6 Telling stories without language

Contrary to Chomsky's claims, the choice of an effective externalisation system is an integral part of the theme of the origins of language. Underlying this writing is the idea that pantomime is the archaic form of communication through which, long before verbalisation, our ancient predecessors began to tell stories, giving rise to a typically human type of communication (FERRETTI 2022,

2023a; ADORNETTI *et alii* 2023). To say that pantomime is an expressive means of storytelling in the absence of language is to consider pantomimic storytelling as the evolutionary bridge capable of ensuring the transition from archaic forms of language to the development of modern language. More precisely, the idea is that pantomime represents the protolanguage, referable to *Homo ergaster* (a species that lived in the period between 2 and 1 million years ago), that functioned as an evolutionary scaffold to the development of modern language typical of *Homo sapiens* (who appeared as a species around 200,000 years ago) characterised by verbalisation and a complex grammar.

Several authors have argued that such a shift is mainly due to the expressive shortcomings of pantomime (ARBIB 2012; CORBALLIS 2017). Arguing that «it is hard to pantomime “blue”», Arbib states that the advent of language is governed by the shift from the iconic character of pantomimic expressions to the arbitrary and abstract character of linguistic signs (ARBIB 2012, p. 219). Similarly, according to Corballis (2015): «in the early stages, perhaps, stories were told as pantomimes [...]. But pantomime is inefficient and often ambiguous and needed to be developed into a system of symbols whose meanings were clear and understood by members of the community» (p. 91).

As much as the iconic character of pantomimic expressions is of great use in initiating a communicative system in a context where there is not yet a shared code, the reference to this character also represents a major difficulty on an expressive level. The selective drive that promoted the shift from pantomime to symbolic language responds to the need to minimise the communicative ambiguities of the iconic-gestural code. Along these lines, Corballis (2017) pointed out that the expressive difficulties of pantomime represent the selective pressure in favour of the advent of an abstract code of communication. Underlying considerations of this kind is the thesis that pantomime is an important evolutionary juncture in the origin of language, above all by virtue of its shortcomings: the difficulties of the iconic character that characterise its function as selective thrusts in favour of the advent of the abstract and arbitrary codes characteristic of the symbolic plane. With respect to this way of seeing things, my idea is that insisting too much on the shortcomings of pantomime entails a serious risk (FERRETTI 2022). The danger of a hypothesis that only pushes on the negative characteristics of pantomime is to open the way to the idea that the proper trait of language is only gained by the advent of the arbitrary and abstract character of linguistic signs. Without denying that pantomime has played a role in the process of constructing symbolic language, my contention is that its contribution to the origin of language relates predominantly to an aspect

strongly connected to its positive characteristics (to what pantomime has, rather than what it lacks): the ability to tell stories in the absence of verbal language.

My thesis is that in order to understand the role of pantomime in the origin of language, it is to its positive characteristics that we must look, rather than to its shortcomings. My thesis, specifically, is that pantomimic narrative represents the constitutive scaffolding of language that verbalisation inherits, incorporates and reconstructs, but never completely supplants. Pantomime represents the narrative structure that symbolic language modifies and reinforces, because pantomime is the scaffolding on which verbalisation pivots in order to reconstruct, at a different level of abstraction, a new expressive form (FERRETTI 2022).

Understood in this way, my thesis is in line with the definition of pantomime proposed by McNeill (2012). Indeed, in his view, pantomime should be considered as a «dumb show, a gesture or a sequence of gestures conveying a narrative line, with a story to tell, produced without speech» (MCNEILL 2005, p. 5). Although such a definition fits perfectly with what has been argued in this paper, according to McNeill, pantomime suffers from the defect of being a form of expression that lacks one of the fundamental characteristics of linguistic expressions, the absence of the verbal sound. Intervening in the debate on the priority of gesture over speech, McNeill argues for equiprimordiality. Since, in his view, gesture and speech are inexorably linked from their initial states, pantomime (gesture without speech) cannot be considered an evolutionary precondition of language. In contrast to McNeill, the reason that leads me to consider pantomime as an evolutionary precursor of language is the fact that pantomime seems to be the ideal expressive system for expressing human thoughts. If individuals of our species represent reality in the form of stories, then pantomime is the most appropriate means of expression for communication between humans (FERRETTI 2024b, 2023a; ADORNETTI *et alii* 2023).

Finally, the idea that pantomime can be considered the expressive tool that gave rise to the earliest forms of human communication seems to receive further confirmation from research on non-human animals. A very important study in this regard is the one on the Koko gorilla conducted by Perlman and Gibbs (2013). Analyses of the pantomimic activity of great apes received further impetus from studies on orangutans. According to Russon and Andrew (2011a) these animals, but also other great apes (2011b), are capable of producing spontaneous pantomimic gestures referable to past events (not referable to the here-and-now of the contextual present). Despite the importance of these studies, the results achieved do not seem encouraging.

The first reason has to do with the fact that in Russon and Andrews' research, pantomime is linked to the possibility of communicating «content with propositional structure and have the kind of cognitive capacities with constituent structure typically associated with linguistic capacities» (RUSSON & ANDREWS 2011a, p. 629). In claiming that the gestural expressions used by orangutans are pantomimic, in fact, the two researchers state that «complex pantomime may enable in gesture some of the communicative complexities that sentences enable in language» (p. 630). In such a thesis, pantomime is associated with the idea of the propositional content of thoughts and the sentence as the underlying structure of human language, a thesis perfectly in line with the thesis of the proposition as the phase constituent of thought and with the idea of the primacy of the sentence as the basis of the models of language we discussed in the first part of this article. Now, if this is the result of the research on the pantomime of orangutans, then not only is the use of pantomime by these animals very different from that of humans, but above all pantomime cannot be considered the type of material scaffolding that can guarantee the origin of language since, in my hypothesis, constructing sentences is not a sufficient condition for constructing the articulate discourses that underpin stories (FERRETTI 2022).

From this it follows that the point at issue in assessing whether monkeys are capable of using pantomimic gestures is to understand whether certain traits characteristic of storytelling are present in the communication of these animals. In a new paper, Russon and Andrews (2011b) take an important step in this direction by explicitly addressing the question of the relationship between pantomime and storytelling in apes. Defining storytelling as «the representation of an event or series of events», according to the two authors the gestures used by the orangutan Kikan to narrate a past event can be considered a form of pantomimic storytelling. How should the data from this research be interpreted?

The case of Kikan shows that some monkeys are able to describe past events but not a succession of connected events. More precisely, Kikan appears capable of producing a succession of complex movements to represent a complex action: what Russon and Andrews correctly refer to as the ability to represent the structure in constituents of utterances. Such an ability is a sophisticated way of representing events, but it is certainly not an effective way of describing successions of events causally connected in time. From which it follows that it is not possible to attribute a form of pantomimic storytelling to these monkeys. The positive interpretation of the results proposed by Russon and Andrews depends on a weakening of both the notion of pantomime and the notion of

storytelling (FERRETTI 2022). While, on the one hand, it is entirely legitimate to look for simpler, more primitive forms of pantomime in non-human animals, on the other hand, weakening the understanding of pantomime does not serve the cause of continuism: the risk of stripping pantomime of the traits that distinguish it is to strip it of precisely those properties that make this expressive system the connecting point between animal communication and language.

It follows from these considerations that, in line with our proposal and the role we have attributed to pantomime (and for the data available to us today), non-human animals are not capable of using properly pantomimic gestures. At the current state of research, pantomimic communication appears to be a specific trait of human communication (ARBIB 2012; PERLMAN, CLARK & TANNER 2014; ZUBERBÜHLER 2013; ŻYWICZYŃSKI, WACEWICZ & SIBIERSKA 2018). From this follows why language appears to be the unique exclusive trait of our species.

7 Conclusions

In this article, I have argued that the topic of the origins of language is the litmus test for assessing the cognitive and evolutionary plausibility of a model of language. In the light of this hypothesis, two models have been examined that represent two different ways of considering language within the framework of cognitive science: the model based on the propositional character of thought and the structure in constituents of sentence, and the model based on the narrative character of thought and storytelling as the characteristic feature of human communication. Although the standard version model of language continues to be very strong in the current debate, what is convincing of the explanatory power of the narrative model is its ability to pass the test of cognitive and evolutionary plausibility in light of the problem of the origins of language. The model of the narrative origin of language, in fact, is in line with a hypothesis in which the specific traits of human language fit into a framework of continuity with animal communication; with an adaptive perspective in which human communication is the outcome of selective pressures in favour of a strengthening of persuasive communication; and with the hypothesis of the existence of cognitive architectures appropriate to the elaboration of the narrative plan.

Finally, by recognising the proper importance (totally denied in Cartesian models of language) of the plan of “externalisation”, the model of the narrative origin of language can count on an expressive system adequate for the purpose: pantomime is an effective means of storytelling in the absence of language and thus to be considered the proto-

language from which the evolution of modern language began. In the light of the theoretical arguments and experimental results presented in this article, it is possible to argue that the narrative model is a naturalistically founded model of language.

Literature

- ADORNETTI, I. (2014). *A neuro-cognitive perspective on the production and comprehension of discourse coherence*. In: P. CHRUSZCZEWSKI, J. RICKFORD, K. BUCZEK, A. KNAPIK, J. MIANOWSKI, S. WACEWICZ, P. ŻYWICZYŃSKI (eds.), *Ways to Protolanguage 3*, Wydawnictwo WSF, Włocławek, pp. 9-24.
- ADORNETTI, I. (2018). *Patologie del linguaggio e della comunicazione*, Carocci, Roma.
- ADORNETTI, I. (2023). *Investigating conspiracy theories in the light of narrative persuasion*. In: «Frontiers in Psychology», vol. XIV, Art. Nr. 1288125 – doi: 10.3389/fpsyg.2023.1288125.
- ADORNETTI, I., CHIERA, A., DERIU, V., ALTAVILLA, D., FERRETTI, F. (2023). *Comprehending stories in pantomime. A pilot study with typically developing children and its implications for the narrative origin of language*. In: «Language & Communication», vol. XCIII, pp. 155-171.
- ANDREWS, K. (2017). *Chimpanzee mind reading: Don't stop believing*. In: «Philosophy Compass», vol. XII, n. 1, Art. Nr. e12394 – doi: 10.1111/phc3.12394.
- ARBIB, M. (2012). *How the brain got language: The mirror system hypothesis*, Oxford University Press, Oxford.
- BEHE, M.J. (2006). *Darwin's black box: The biochemical challenge to evolution*, Touchstone, New York, 2nd edition.
- BENÍTEZ-BURRACO, A., FERRETTI, F., PROGOVAC, L. (2021). *Human self-domestication and the evolution of pragmatics*. In: «Cognitive Science», vol. XLV, n. 6, Art. Nr. 12987 – doi: 10.1111/cogs.12987.
- BERWICK, R.C., CHOMSKY, N. (2015). *Why only us: Language and evolution*, MIT press, Cambridge (MA).
- BICKERTON, D. (1990). *Language and species*, University of Chicago Press, Chicago.
- BILANDZIC, H., BUSSELLE, R. (2013). *Narrative persuasion*. In: J.P. DILLARD, L. SHEN (eds.), *The Sage handbook of persuasion: Developments in theory and practice*, Sage, Thousand Oaks, pp. 200-219 – 2nd edition.
- BOESCH, C., BOESCH, H. (1984). *Mental map in wild chimpanzees: An analysis of hammer transports for nut cracking*. In: «Primates», vol. XXV, n. 2, pp. 160-170.
- BROOKS, P. (1984). *Reading for the plot: Design and intention in narrative*, Harvard University Press, Cambridge (MA).
- BRUNER, J. (1991). *The narrative construction of reality*. In: «Critical Inquiry», vol. XVIII, n. 1, pp. 1-21.
- BUCKNER, R.L., CARROLL, D.C. (2007). *Self-projection and the brain*. In: «Trends in Cognitive Sciences», vol. XI, n. 2, pp. 49-57.
- BUSSELLE, R., BILANDZIC, H. (2008). *Fictionality and perceived realism in experiencing stories: A model of narrative comprehension and engagement*. In: «Communication Theory», vol. XVIII, n. 2, pp. 255-280.

- BUTTELMANN, D., BUTTELMANN, F., CARPENTER, M., CALL, J., TOMASELLO, M. (2017). *Great apes distinguish true from false beliefs in an interactive helping task*. In: «PLOS One», vol. XII, n. 4, Art. Nr. e0173793 – doi: 10.1371/journal.pone.0173793.
- CALL, J., TOMASELLO, M. (2008). *Does the chimpanzee have a theory of mind? 30 years later*. In: «Trends in Cognitive Sciences», vol. XII, n. 5, pp. 187-192.
- CARLO, E., ADORNETTI, I., FERRETTI, F. (2021). *Il ruolo della costruzione di scenari nella spiegazione dei disturbi macrolinguistici della schizofrenia*. In: «Rivista internazionale di Filosofia e Psicologia», vol. XII, n. 1, pp. 88-105.
- CHOMSKY, N. (1995). *The minimalist program*, MIT press, Cambridge (MA).
- CHOMSKY, N. (2017). *The language capacity: Architecture and evolution*. In: «Psychonomic Bulletin & Review», vol. XXIV, n. 1, pp. 200-203.
- CLAYTON, N.S., DICKINSON A. (1998). *Episodic-like memory during cache recovery by scrub jays*. In: «Nature», vol. CCCXCV, n. 6699, pp. 272-274.
- CORBALLIS, M.C. (2017). *The truth about language. what it is and where it came from*, University of Chicago Press, Chicago.
- CORBALLIS, M.C. (2011). *The recursive mind*, Chicago University Press, Chicago.
- CORBALLIS, M.C. (2015). *The wandering mind: What the brain does when you're not looking*, University of Chicago Press, Chicago.
- COSENTINO, E., ADORNETTI, I., FERRETTI, F. (2013). *Processing narrative coherence: Towards a top-down model of discourse*. In: «Open Access Series in Informatics (OASICS)», vol. XXXII, Special Issue: 2013 Workshop on Computational models of narrative, pp. 61-75.
- CULPEPER, J. (2001). *Language and characterisation: People in plays and other texts*, Pearson Education, Harlow.
- DAL CIN, S., ZANNA, M.P., FONG, G.T. (2004). *Narrative persuasion and overcoming resistance*. In: E.S. KNOWLES, J.A. LINN (eds.), *Resistance and persuasion*, Erlbaum, Mahwah, pp. 175-191.
- DAWKINS, R., KREBS, J.R. (1978). *Animal signals: Information or manipulation*. In: J.R. KREBS, N.B. DAVIES (eds.), *Behavioural ecology: An evolutionary approach*, Blackwell Scientific, Oxford, pp. 282-309.
- DEDIU, D., LEVINSON, S. (2013). *On the antiquity of language: The reinterpretation of Neandertal linguistic capacities and its consequences*. In: «Frontiers in Psychology», vol. IV, Art. Nr. 397 – doi: 10.3389/fpsyg.2013.00397.
- EDER, J., JANNIDIS, F., SCHNEIDER, R. (eds.), *Characters in fictional worlds: Understanding imaginary beings in literature, film, and other media*, De Gruyter, Berlin.
- FERRETTI, F. (2010). *Alle origini del linguaggio umano: il punto di vista evoluzionistico*, Laterza, Roma-Bari.
- FERRETTI, F. (2015). *La facoltà di linguaggio: determinanti biologiche e variabilità culturale*, Roma, Carocci.
- FERRETTI, F. (2022). *Narrative persuasion. A cognitive perspective on language evolution*, Springer Nature, Cham.
- FERRETTI, F. (2023). *On the influence of thought on language: A naturalistic framework for the pantomimic origins of human communication*. In: «Frontiers in Psychology», vol. XIV, Art. Nr. 1197968 – doi: 10.3389/fpsyg.2023.1187968.
- FERRETTI, F. (2024a). *The narrative origins of language*. In: N. GONTIER, A. LOCK, C. SINHA (eds.), *The Oxford handbook of human symbolic evolution*, Oxford University Press, Oxford – doi: 10.1093/oxfordhb/9780198813781.013.33.
- FERRETTI, F. (2024b). *Pantomime and narrative at the origin of language*. In: P. ZYWICZYNSKI, J. BLOMBERG, MONIKA BORUTA-ZYWICZYNSKA (eds.), *Perspectives on pantomime: Evolution, development, interaction*, John Benjamins, Amsterdam, pp. 78-99.
- FERRETTI, F., ADORNETTI, I. (2014). *Against linguistic Cartesianism: Toward a naturalistic model of human language origins and functioning*. In: «Language & Communication», vol. XXXVII, pp. 29-39.
- FERRETTI, F., ADORNETTI, I. (2019). *Piaget's comeback. Reflections on language in a post-Chomskyan era*. In: «Paradigmi», vol. XXXVII, n. 1, pp. 101-120.
- FERRETTI, F., ADORNETTI, I. (2020). *Why we need a narrative brain to account for the origin of language*. In: «Paradigmi», vol. XXXVIII, n. 2, pp. 269-292.
- FERRETTI, F., ADORNETTI, I. (2022). *Dual inheritance theory. Religion, narrative, and selection*. In: Y. LIOR, J. LANE (eds.), *The Routledge handbook of evolutionary approaches to religion*, Routledge, London, pp. 243-260.
- FERRETTI, F., ADORNETTI, I., CHIERA, A., NICCHIARELLI, S., VALERI, G., MAGNI, R., VICARI, S., MARINI, A. (2018). *Time and narrative: An investigation of storytelling abilities in children with Autism Spectrum Disorder*. In: «Frontiers in Psychology», vol. IX, Art. Nr. 944 – doi: 10.3389/fpsyg.2018.00944.
- FERSTL, E.C., NEUMANN, J., BOGLER, C., VON CRAMON, D.Y. (2008). *The extended language network: A meta-analysis of neuroimaging studies on text comprehension*. In: «Human Brain Mapping», vol. XXIX, n. 5, pp. 581-593.
- FITCH, W.T. (2017). *Empirical approaches to the study of language evolution*. In: «Psychonomic Bulletin & Review», vol. XXIV, n. 1, pp. 3-33.
- FLUDERNIK, M. (1996). *Towards a natural narratology*, Routledge, London.
- FODOR, J.A. (1975). *The language of thought*, Harvard University Press, Cambridge (MA).
- FODOR, J.A. (1987). *Psychosemantics: The problem of meaning in the philosophy of mind*, MIT Press, Cambridge (MA).
- CHOMSKY, N. (1980). *Rules and representations*, Blackwell, Oxford.
- GALLAGHER, S., HUTTO D. (2008). *Understanding others through primary interaction and narrative practice*. In: J. ZLATEV, T. P. RACINE, C. SINHA, E. ITKONEN (eds.), *The shared mind: Perspectives on intersubjectivity*, John Benjamins, Amsterdam, pp. 17-38.
- GERRIG, R.J. (2010). *Readers' experiences of narrative gaps*. In: «Storyworlds: A Journal of Narrative Studies», vol. II, n. 1, pp. 19-37.
- GIORA, R. (1985). *Notes towards a theory of text coherence*. In: «Poetics Today», vol. VI, n. 4, pp. 699-715.
- GLASER, M., REISINGER, H. (2022). *Don't lose your product in story translation: HOW product-story link in narrative advertisements increases persuasion*. In: «Journal of Advertising», vol. LI, n. 2, pp. 188-205.
- GOODALL, J. (1964). *Tool-using and aimed throwing in a community of free-living chimpanzees*. In: «Nature», vol. CCI, pp. 1264-1266.
- GOTTSHALL, J. (2012). *The storytelling animal. How stories make us human*, Houghton Mifflin Harcourt,

- New York.
- GREEN, M.C., BROCK, T. (2000). *The role of transportation in the persuasiveness of public narratives*. In: «Journal of Personality and Social Psychology», vol. LXXIX, n. 5, pp. 701-721.
- HERMAN, D. (2013). *Storytelling and the sciences of mind*, MIT Press, Cambridge (MA).
- HUTTO, D. (2007). *The narrative practice hypothesis: Origins and applications of folk psychology*. In: «Royal Institute of Philosophy Supplement», vol. LX, pp. 43-68.
- HUTTO, D. (2008). *The narrative practice hypothesis: Clarifications and implications*. In: «Philosophical Explorations», vol. XI, n. 3, pp. 175-192.
- JACKENDOFF, R.S. (1993). *Patterns in the mind: Language and human nature*, Basic Books, New York.
- KANO, F., HIRATA S. (2015). *Great apes make anticipatory looks based on long-term memory of single events*. In: «Current Biology», vol. XXV, n. 19, pp. 2513-2517.
- KANO, F., KRUPENYE, C., HIRATA, S., TOMONAGA, M., CALL, J. (2019). *Great apes use self-experience to anticipate an agent's action in a false-belief test*. In: «Proceedings of the National Academy of Sciences», vol. CXVI, n. 42, pp. 20904-20909.
- KENNEDY, G.A. (1992). *A hoot in the dark: The evolution of general rhetoric*. In: «Philosophy & Rhetoric», vol. XXV, n. 1, pp. 1-21.
- KREBS, J.R., DAWKINS, R. (1984) *Animal signals: Mind-reading and manipulation*. In: J.R. KREBS, N.B. DAVIES (eds.) *Behavioural ecology: An evolutionary approach*, 2nd Edition, Sinaur, Sunderland (MA), pp. 380-402.
- KRUPENYE, C., KANO, F., HIRATA, S., CALL, J., TOMASELLO, M. (2016). *Great apes anticipate that other individuals will act according to false beliefs*. In: «Science», vol. CCCLIV, n. 6308, pp. 110-114.
- LIN, N., YANG, X., LI, J., WANG, S., HUA, H., MA, Y., LI, X. (2018). *Neural correlates of three cognitive processes involved in theory of mind and discourse comprehension*. In: «Cognitive, Affective, & Behavioral Neuroscience», vol. XVIII, 273-283.
- LU, H., ZOU, Q., GU, H., RAICHLE, M.E., STEIN, E.A., YANG, Y. (2012). *Rat brains also have a default mode network*. In: «Proceedings of the National Academy of Sciences», vol. CIX, n. 10, pp. 3979-3984.
- MAR, R.A. (2004). *The neuropsychology of narrative: Story comprehension, story production and their interrelation*. In: «Neuropsychologia», vol. XLII, n. 10, pp. 1414-1434.
- MAR, R.A. (2011). *The neural bases of social cognition and story comprehension*. In: «Annual Review of Psychology», vol. LXII, pp. 103-134.
- MARGOLIN, U. (2007). *Character*. In: D. HERMAN (ed.), *The Cambridge companion to narrative*, Cambridge University Press, Cambridge, pp. 66-79.
- MARINI, A., FERRETTI, F., CHIERA, A., MAGNI, R., ADORNETTI, I., NICCHIARELLI, S., VICARI, S., VALERI, G. (2019). *Episodic future thinking and narrative discourse generation in children with Autism Spectrum Disorders*. In: «Journal of Neurolinguistics», vol. XLIX, pp. 178-188.
- MARTINS, P.T., BOECKX, C. (2019). *Language evolution and complexity considerations: The no half-Merge fallacy*. In: «PLoS Biology», vol. XVII, n. 11, Art.Nr. e3000389 – doi: 10.1371/journal.pbio.3000389.
- MCNEILL, D. (2005). *Introduction*. In: D. MCNEILL (ed.), *Language and gesture*, Cambridge University Press, Cambridge, pp. 1-10.
- MCNEILL, D. (2012). *How language began: Gesture and speech in human evolution*, Cambridge University Press, Cambridge.
- MORO, A. (2006). *I confini di Babele*, Longanesi, Milano.
- MUSSO, M., MORO, A., GLAUCHE, V., RIJNTJES, M., REICHENBACH, J., BÜCHEL, C., WEILLER, C. (2003). *Broca's area and the language instinct*. In: «Nature Neuroscience», vol. VI, n. 7, pp. 774-781.
- OATLEY, K. (1999). *Meetings of minds: Dialogue, sympathy, and identification, in reading fiction*. In: «Poetics», vol. XXVI, n. 5-6, pp. 439-454.
- ONISHI, K.H., BAILLARGEON, R. (2005). *Do 15-month-old Infants Understand False Beliefs?*. In: «Science», vol. CCCVIII, n. 5719, pp. 255-258.
- OWREN, M.J., RENDALL, D., RYAN, M.J. (2010). *Redefining animal signaling: Influence versus information in communication*. In: «Biology & Philosophy», vol. XXV, pp. 755-780.
- PALMER, A. (2004). *Fictional minds*, University of Nebraska Press, Lincoln (NE).
- PARRISH, A.C. (2014). *Adaptive rhetoric. Evolution, culture, and the art of persuasion*, Routledge, London/New York.
- PERLMAN, M., CLARK, N., TANNER, J.E. (2014). *Iconicity and ape gesture*. In: *Evolution of language: Proceedings of the 10th international conference (EVO-LANG10)*, pp. 228-235.
- PERLMAN, M., GIBBS, R.W. (2013). *Pantomimic gestures reveal the sensorimotor imagery of a human-fostered gorilla*. In: «Journal of Mental Imagery», vol. XXXVII, n. 3-4, pp. 73-96.
- PICKERING, M., CLIFTON, C., CROCKER, M. (2001). *Architectures and mechanisms in sentence comprehension*. In: M. CROCKER, M. PICKERING, C. CLIFTON (eds.), *Architectures and mechanisms for language processing*, Cambridge University Press, Cambridge, pp. 1-28.
- PINKER, S. (1994). *The language instinct. How the mind creates language*, Morrow, New York.
- PINKER, S., BLOOM, P. (1990). *Natural language and natural selection*. In: «Behavioral and Brain Sciences», vol. XIII, n. 4, pp. 707-784.
- PREMACK, D., WOODRUFF, G. (1978). *Does the chimpanzee have a theory of mind?*. In: «Behavioral and Brain Sciences», vol. I, n. 4, pp. 515-526.
- PROGOVAC, L. (2015). *Evolutionary syntax*, Oxford University Press, Oxford/New York.
- PROGOVAC, L. (2016). *A gradualist scenario for language evolution: precise linguistic reconstruction of early human (and Neandertal) grammars*. In: «Frontiers in Psychology», vol. VII, Art. Nr. 1714 – doi: 10.3389/fpsyg.2016.01714.
- RACE, E., KEANE, M.M., VERFAELLIE, M. (2015). *Sharing mental simulations and stories: Hippocampal contributions to discourse integration*. In: «Cortex», vol. XLIII, pp. 271-281.
- RICOEUR, P. (1980). *Temps et récit, tome 1*, Éditions du Seuil, Paris.
- RIZZI, L. (2016). *Monkey morpho-syntax and merge-based systems*. In: «Theoretical Linguistics», vol. XLII, n. 1-2, pp. 139-145.
- RUSSON, A., ANDREWS, K. (2011a). *Orangutan pantomime: Elaborating the message*. In: «Biology Letters», vol. VII, pp. 627-630.
- RUSSON, A., ANDREWS, K. (2011b). *Pantomime in great*

- apes: *Evidence and implications*. In: «Communicative & Integrative Biology», vol. IV, n. 3, pp. 315-317.
- SALMON, C. (2007). *Storytelling, la machine à fabriquer des histoires et à formater les esprits*, La Découverte, Paris.
- SCALISE SUGIYAMA, M. (2005). *Reverse-engineering narrative: Evidence of special design*. In: J. GOTTSALL, D.S. WILSON (eds.), *The literary animal*, Northwestern University Press, Chicago, pp. 177-196.
- SCHNEIDER, R. (2001). *Toward a cognitive theory of literary character: The dynamics of mental-model construction*. In: «Style», vol. XXXV, n. 4, pp. 607-639.
- SCOTT-PHILLIPS, T.C. (2014). *Speaking our minds. Why human communication is different, and how language evolved to make it special*, Palgrave-Macmillan, Basingstokes/London/New York.
- SHANNON, C.E., WEAVER, W. (1949). *The mathematical theory of communication*, The University of Illinois Press, Urbana (IL).
- SPERBER, D., CLÉMENT, F., HEINTZ, C., MASCARO, O., MERCIER, H., ORIGGI, G., WILSON, D. (2010). *Epistemic vigilance*. In: «Mind & Language», vol. XXV, n. 4, pp. 359-393.
- SPERBER, D., WILSON, D. (1986). *Relevance: Communication and cognition*, Harvard University Press, Cambridge (MA).
- VYGOTSKY, L.S. (1978) *Mind and society: The development of higher psychological processes*, edited by M. COLE, V. JOHN-STEINER, S. SCRIBNER, E. SOUBERMAN, Harvard University Press, Cambridge (MA).
- WACEWICZ, S., ŻYWICZYŃSKI, P. (2012). *Beyond proto-language: Contemporary problems in the evolution of language*. In: «Theoria et Historia Scientiarum», vol. IX, pp. 5-11.
- YUAN, Y., MAJOR-GIRARDIN, J., BROWN, S. (2018). *Storytelling is intrinsically mentalistic: A functional magnetic resonance imaging study of narrative production across modalities*. In: «Journal of Cognitive Neuroscience», vol. XXX, n. 9, pp. 1298-1314.
- ZENTALL, T.R. (2013). *Animals represent the past and the future*. In: «Evolutionary Psychology», vol. XI, n. 3, pp. 573-590.
- ZUBERBÜHLER, K. (2013). *Acquired mirroring and intentional communication in primates*. In: «Language and Cognition», vol. V, n. 2-3, pp. 133-143.
- ŻYWICZYŃSKI, P., WACEWICZ, S., SIBIERSKA, M. (2018). *Defining pantomime for language evolution research*. In: «Topoi», vol. XXXVII, pp. 307-318.