DOI: 10.69138/arete-2531-6249-20240903

Evolution of (proto) language between pantomime and narrative

Ines Adornetti[1]

Sommario: 1. Introduction. 2. On the nature of protolanguage. 2.1. Structure. 2.2. Function. 2.3. Modality. 3. Pantomime as a narrative protolanguage. 3.1 Empirical evidence. 4. Conclusion .

Abstract: This article contributes to the ongoing discussion about the nature of protolanguage, which is a hypothetical communication system that is believed to have characterized the communication of ancestor hominins before the emergence of language as we know it today. A number of theoretical models have been put forth in an effort to elucidate the nature of protolanguage's characteristics. This work illustrates that, at a general level, these models can be related to three main aspects: the structure, the adaptive function and the modality of this ancient communication system. By synthesizing the main findings pertaining to these three elements, this paper advances the proposal that this ancient communication system was a pantomimic protolanguage with the primary function of influencing others' behavior through storytelling.

Keywords*: animal communication; language evolution; narrative; pantomime; persuasion; primate communication; protolanguage; storytelling.*

1 Professoressa Associata, CosmicLab, Dipartimento di Filosofia, Comunicazione e Spettacolo, Università Roma Tre - ines.adornetti@uniroma3.it

1. Introduction

In the literature on the evolution of language, a particularly intriguing debate pertains to the nature of protolanguage[2]. In this context, the term "protolanguage" is used to describe a hypothetical, more primitive form of language, a quasi-linguistic system, which existed prior to the emergence of human language. It is considered to be an intermediate phase between the communication abilities of nonhuman animals, particularly nonhuman primates, and the language abilities of *Homo sapiens*. This quasi-linguistic system is seen as a crucial steppingstone in the evolution of human communication. It is therefore imperative to gain an understanding of what a protolanguage looks like in order to shed light on the evolution of our specific mode of communication. A variety of models for the protolanguage have been put forth in the ongoing literature. This article examines the debate by focusing on three key elements: the structural characteristics, adaptive function, and modality of this ancient communication system (section 2). In light of the synthesis of the main findings pertaining to these three elements, a proposal is advanced for a pantomimic protolanguage with the capacity to narrate (section 3). The proposal is then discussed in the context of experimental data that supports it (section 3.1).

2. On the nature of protolanguage

An interest in the nature of protolanguage is consistent with the current consensus among researchers in this field of studies, namely that language is a complex adaptive feature of our species that emerged through a *gradual evolutionary process*[3]. Indeed, as Żywiczyński points out, exactly «[t]he logic

2 P. Żywiczyński, N. Gontier, S. Wacewicz, *The evolution of (proto-) language: Focus on mechanisms,* «Language Sciences», 63, 2017, pp. 1-11; N. Gontier, M.B. Żywiczyńska, S. Johansson, L. McCune, *Introduction to Evolving (Proto) Language/s*, «Lingua», 305, 2024, article number 103740.

3 See for example: I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics:*

of gradualism dictates that the appearance of fully fledged language must have been preceded by a more primitive, quasi-linguistic system that has some but not all characteristics of modern language»[4]. It is generally assumed that such a primitive system characterized the communication of the extinct hominins that preceded *Homo sapiens* during human evolution, particularly those belonging to the genus *Homo*, among which *ergaster/erectus* is a notable example. Given the logic of gradualism inherent in the notion of protolanguage, it is usually believed that the protolanguage of extinct hominins inherited some essential features from the communication of nonhuman primates, especially from the communication of our closest relatives: the great apes. In other words, the concept of protolanguage implies the possibility of tracing the precursors of modern language in the communication and cognition of apes[5]. Accordingly, one potential methodology for elucidating the characteristics of protolanguage is the analysis of the communicative systems of our nonhuman primate relatives. The underlying assumption is that such systems were also present in the last common ancestor of humans and nonhuman apes[6] and thus constituted the initial endowment with which our hominin ancestors initiated the journey to language as we know it today. In fact, many theoretical models of the nature of

How Language Emerges from Use, Routledge, London, 2024; M. Arbib, *How the brain got language: The mirror system hypothesis*, Oxford University Press, New York, 2012; M. C. Corballis, *The truth about language: what it is and where it came from*, University of Chicago Press, Chicago, 2017; F. Ferretti, *Narrative persuasion. A cognitive perspective on language evolution*, Springer Nature, Cham, 2022; S. Mithen, *The Language Puzzle: Piecing Together the Six-Million-Year Story of How Words Evolved*, Hachette UK, 2024; S. Pinker, P. Bloom, *Natural language and natural selection*, «Behavioral and brain sciences», 13(4), 1990, pp. 707-727; T. Scott-Phillips, *Speaking our minds: Why human communication is different, and how language evolved to make it special*, Bloomsbury Publishing, 2014.

4 P. Żywiczyński, P., *How research on language evolution contributes to linguistics*, «Yearbook of the Poznań Linguistic Meeting», 5(1), 2019, p. 76.

5 See for a discussion F. Ferretti, I. Adornetti, *Dalla comunicazione al linguaggio. Scimmie, ominidi e umani in una prospettiva darwiniana*, Mondadori, Milano, 2012; I. Adornetti, *Il linguaggio. Origine ed evoluzione*, Carocci, Roma, 2016.

6 The last common ancestor of the Pan genus, which includes both the common chimpanzee and the bonobo, and the hominin lineage. It is estimated that this species lived approximately 7-6 million years ago: R. Lewin, R. A. Foley, *Principles of human evolution (2nd edition*), Blackwell, Oxford, 2004.

protolanguage refer precisely to non-human primate communication systems to derive some of the possible features of extinct hominin communication. At a general level, three main lines of research into the protolanguage can be identified, focusing on the structure, function, and modality of this ancient communication system.

2.1. Structure

The first line of research aims to elucidate the structure of the communicative system of our hominin ancestors. Some authors[7] posit that protolanguage was compositional in nature. They argue that it initially consisted of words that were combined with each other without a syntactic structure, which subsequently evolved into language with the addition of syntax. Theories that place emphasis on the compositional nature of protolanguage are referred to as the *lexical protolanguage* hypothesis by Fitch[8] and as *synthetic models* by Tallerman[9]. In the field of contemporary studies of language evolution, the author who has made the most compelling arguments in favor of the lexical protolanguage hypothesis is Dereck Bickerton, as evidenced in his book *Language and Species*[10]. One of the arguments that is used by Bickerton to support the compositional nature of protolanguage is the process that leads to the transformation of *pidgin* into a creole language, which he believes constitutes a *living fossil*[11]

7 D. Bickerton, *Language and species*, University of Chicago Press, Chicago, 1990; R. Jackendoff, *Foundations of Language. Brain, Meaning, Grammar, Evolution,* Oxford University Press, New York, 2002; L. Progovac, N. Rakhlin, W. Angell, R. Liddane, L. Tang, N. Ofen, *Neural correlates of syntax and proto-syntax: evolutionary dimension*, «Frontiers in psychology», 9, 2018, article 2415; M. Tallerman, *Did our ancestors speak a holistic protolanguage?* «Lingua», *117*(3), 2007, pp. 579-604.

8 T. W. Fitch, *The evolution of language*, Cambridge, Cambridge University Press, 2010.

9 M. Tallerman, *Did our ancestors speak a holistic protolanguage?,* cit.

10 D. Bickerton, *Language and species*, cit.

11 Bickerton posits that there may exist contemporary phenomena—living linguistic fossils—that could provide insight into the processes through which language emerged. Bickerton's conceptualization of linguistic fossils has since been adopted by language-evolution researchers: see L. Progovac, *Evolutionary syntax*, Oxford University Press, Oxford, UK, 2015;

of language evolution. This process occurs when two or more communities speaking different languages come into contact with each other and invent ex novo a code of communication characterized by simple expressions, that is, a lexicon borrowed from the different source languages, and above all by the absence of a grammatical structure: the pidgin precisely. If a pidgin is learned as a mother tongue by the children of a community, it will tend to evolve over a few generations into creole, a more syntactically and lexically complicated communicative code than pidgin, which over time takes on the connotations of a language proper.[12]

In contrast to the synthetic hypothesis, other scholars have put forth an alternative view, suggesting that the initial protolanguage was not comprised of individual words but rather complete, holistic messages[13]. In the current research literature, the author who provides a benchmark for the holistic model is Alison Wray[14]. In her analysis of nonhuman primate alarm calls, Wray observes that they lack an internal structure and are never combined with other signals to create a multi-component message.[15] Wray posits that this defining quality

---

P. Żywiczyński, S. Wacewicz, C. Lister, *Pantomimic fossils in modern human communication*, «Philosophical Transactions of the Royal Society B», 376(1824), 2021, article 20200204.

12 There are numerous examples of pidgin languages. One of the most studied is the case of Nicaraguan Sign Language: A. Senghas, M. Coppola, *Children creating language: How Nicaraguan Sign Language acquired a spatial grammar,* «Psychological science», 12(4), 2001, pp. 323-328; A. Senghas, A. Ozyurek, S. Kita, *Response to Comment on" Children creating core properties of language: Evidence from an emerging sign language in Nicaragua"*, «Science», 309(5731), 2005, pp. 56-56.

13 M. Arbib, *How the brain got language: The mirror system hypothesis,* cit; A. Wray, *Protolanguage as a holistic system for social interaction*, «Language and Communication», 18(1), 1998, pp. 47–67; S. Mithen, *The singing Neanderthals: The origins of music, language, mind, and body*, Cambridge, Harvard University Press, 2005.

14 A. Wray, *Protolanguage as a holistic system for social interaction*, cit.; for a discussion see S. Nicchiarelli, *Formulaic Language: A Living Linguistic Fossil for a Holistic Protolanguage*, «Academic Journal of Modern Philology», (3), 2014, pp. 67-73.

15 Nevertheless, the findings of recent research appear to contradict this assertion. A number of documented examples of call combinations in nonhuman primates exist. See for example: C. Crockford, C. Boesch, *Call combinations in wild chimpanzees*, «Behaviour», 2005, 397-421; M. Leroux, A.M. Schel, C. Wilke, B. Chandia, K. Zuberbühler, K. Slocombe, S. W. Townsend, *Call combinations and compositional processing in wild chimpanzees*, «Nature

distinguishes them from the words of human language, which have, instead, a compositional, i.e. analytic, character that allows them to be combined by means of a grammar that provides an additional layer of meaning. Similarly, Arbib suggests that «the prelanguage of early *Homo sapiens* was composed of "unitary utterances" naming events as well as a few salient actors, objects and actions, and that this preceded the discovery of words in the modern sense of units for compositional formation of utterances»[16].

2.2. Function

The second area of research on the nature of protolanguages is focused on elucidating their primary adaptive function. This is a crucial consideration, as the question of adaptive function raises the issue of the selective pressures that guided linguistic evolution. What, then, is the purpose of protolanguage? The initial, most intuitive response to this inquiry is one that emphasizes the *communicative function*. According to this perspective, protolanguage (and by derivation, language as we know it today) evolved to inform others about something.[17] A classic example in this regard is the case of the alarm calls of vervet monkeys, where each call seems to refer (or at least be related) to a specific predator, e.g., eagles, snakes, and leopards[18]. Proponents of the information model argue that specimens receiving calls employ a predictive

Communications», 14(1), 2023; M. Leroux, B. Chandia, A.B. Bosshard, K. Zuberbühler, S. W. Townsend, *Call combinations in chimpanzees: a social tool*?, «Behavioral Ecology», 33(5), 2022, pp. 1036-1043.

16 M. A. Arbib, *The evolving mirror system: A neural basis for language readiness*, in M. Christiansen and S. Kirby (a cura di), *Language evolution*, Oxford University Press, Oxford 2003, p. 183.

17 In general, models that refer to the information function assume that communication evolves under the influence of cooperation. On this point, see for example S. Wacewicz, P. Żywiczyński, *Language origins: Fitness consequences, platform of trust, cooperation, and turn-taking*, «Interaction Studies», 19(1-2), 2018, pp. 167-182.

18 R. M. Seyfarth, D. L. Cheney, P. Marler, *Vervet monkey alarm calls: semantic communication in a free-ranging primate,* «Animal Behaviour», 28(4), 1980, pp. 1070-1094.

process to use the information conveyed through vocalizations to infer the presence and nature (e.g., whether it is an animal coming from above, such as an eagle) of the predator. According to Seyfarth and colleagues, «individuals in many species consistently use specific signals in particular social or ecological contexts and... receivers have learned or otherwise acquired these contingent relations, gaining information as a result»[19]. The thesis of some authors is that phenomena of this kind may constitute the precursors of human language words[20]. According to this interpretation, in fact, monkey calls share with words a fundamental element, the referential character, that is, the property to refer to objects and events in the external world.[21] Specifically, researchers have defined "functionally referential communication" (or functional reference) as the ability of nonhuman animals to produce signals capable of communicating to other individuals "messages" related to objects or events in external reality[22]. Following these researchers, signals produced in response to certain contextual stimuli (production criterion) that are capable of causing adaptive behaviors in receivers, who have not had direct experience of the stimulus in question (perception criterion), can be considered functionally referential.

An alternative hypothesis to the model of the communicative function of protolanguage is put forth by Wray[23]. As previously stated, the scholar's perspective is that the monkeys' alarm signals, rather than being analogous to the discrete words of human language, should be regarded as complete messages, i.e. they possess a "holistic" quality. From this perspective, the call emitted by the monkey upon encountering a snake should not be interpreted

19 R. M. Seyfarth, D. L. Cheney, T. Bergman, J. Fischer, K. Zuberbühler, K. Hammerschmidt, *The central importance of information in studies of animal communication*, «Animal Behaviour», 80(1), 2010, p. 4.

20 For a discussion, see J. R. Hurford, *The Origins of Meaning*. Oxford University Press, 2007, Oxford.

21 A critique of this position can be found in T. Deacon, *The symbolic species*, Norton, New York, 1997. For a more recent discussion of the issue, see G. Palazzolo, *A case for animal reference: beyond functional reference and meaning attribution*. «Synthese» 203, 59, 2024.

22 A. Scarantino, Z. Clay, *Contextually variable signals can be functionally referential*, «Animal Behaviour», 100(100), 2015, pp. e1-e8.

23 A. Wray, *Protolanguage as a holistic system for social interaction,* cit.

as a lexical item denoting the snake, but rather as a communicative act akin to the human warning "beware of the snake." The same applies to the eagle call, which would be equivalent to a message such as "beware of the eagle," or even "look to the sky and run for cover," rather than a word indicating the eagle itself. Indeed, according to Wray, animal vocalizations should be considered "manipulative" rather than referential: monkeys do not engage in the transmission of information about external entities to their conspecifics; instead, they merely endeavor to shape and influence others' behavior. From this point of view, the primary function of protolanguage would be to *manipulate* or, exert *influence* on other individuals in order to make them act in a certain way, rather than simply inform them about something [24]. This view is also supported by Mithen [25] who, referring to Alison Wray's research, argues in effect that early hominin protolanguage inherited the holistic character and manipulative nature from ape communication. In this perspective, then, the communicative function of protolanguage would thus be a side effect of a more basic *"persuasive" function* [26].

24 In animal communication studies, a leading theoretical model in this regard is that advanced by Dawkins and Krebs (1978) in an influential article titled *Animal signals: information or manipulation?* According to the two authors, «Communication is said to occur when an animal, the actor, does something which appears to be the result of selection to influence the sense organs of another animal, the reactor, so that the reactor's behavior changes to the advantage of the actor»: R. Dawkins, J. R. Krebs, *Animal signals: Information or manipulation?,* in J. R. Krebs, N. B. Davies (a cura di), *Behavioural ecology: An evolutionary approach,* Blackwell, Oxford, 1978, p. 283. While informational models posit that cooperation was a key factor in the evolution of communication, manipulative models also highlight the significance of competition. For a discussion, see *Animal signalling between informing and influencing: setting the stage for a pragmatic-rhetorical model of communication*, cit.; F. Ferretti, *Agonistic Conversation. A cognitive-interactive perspective on the origin of grammar,* in I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics: How Language Emerges from Use,* Routledge, London, 2024, pp. 124-149.

25 S. Mithen, *The singing Neanderthals: The origins of music, language, mind, and body*, cit.

26 I. Adornetti, *Animal signalling between informing and influencing: setting the stage for a pragmatic-rhetorical model of communication*, in I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics: How Language Emerges from Use*, cit., pp. 23-38; . Ferretti, *Narrative persuasion. A cognitive perspective on language evolution,* cit.; F. Ferretti, I. Adornetti, *Persuasive conversation as a new form of communication in Homo sapiens,* «Philosophical Transactions

Finally, a third perspective, characterized by a robust critique of the communicative model, must be mentioned. This perspective establishes a connection between the evolution of protolanguage and the representation of ideas, thereby offering a different view on the adaptive functions of protolanguage. Bickerton proposes that «if we are to seek for the ultimate origins of language, we cannot hope to find those origins by looking at the means by which other creatures communicate with one another. To find out how language, with all its complexities, evolved, it is necessary to look at how systems of representation evolved»[27]. And again, « we should search for the ancestry of language not in prior systems of animal communication but in prior representational systems» [28]. A similar position is expressed more recently by Reboul: «language did not evolve for communication, it evolved *for* thought (as advocated by Chomsky (...). It allows us to construct what medieval philosophers (...) called *complex concepts*, propositions, judgments, etc. This is essentially Fodor's *Language of Thought Hypothesis* (...). Language was then externalized for communication, and its externalized version inherited its core combination of properties»[29].

---

of the Royal Society B», 376(1824), 2021, article 20200196; F. Ferretti, I. Adornetti, *Origin of Language,* «Reference Module in Social Sciences», https://doi.org/10.1016/B978-0-323-95504-1.00053-3.

27 D. Bickerton, *Language and species*, cit. p. 75.

28 *Ivi,* p. 23; For a more nuanced discussion and partial critique of Bickerton's position, see J. R. Hurford, *The roles of expression and representation in language evolution*, in A. Wray (a cura di) *The transition to language*, Oxford University Press, Oxford, 2002, pp. 311-334.

29 A.C. Reboul, *Why language really is not a communication system: a cognitive view of language evolution*, «Frontiers in Psychology«, 6, 2015, article 1434. While Reboul makes reference to Chomsky, it is important to note that the American linguist's perspective is not well-suited to the endeavor of reconstructing the nature of protolanguage. Indeed, the Chomskyan model of language persists in its current form as an all-or-nothing model, which precludes the possibility of precursors and is therefore incompatible with the logic of gradualism inherent in the notion of protolanguage. See for a discussion F. Ferretti, *Quali precursori per il linguaggio? La comunicazione umana tra adattamento, exaptation ed evoluzione culturale*, «Sistemi intelligenti», 31(1), 2019, pp. 139-156.

2.3. Modality

The third line of research on protolanguage seeks to clarify its modality: through what means of expression did our ancestors communicate with each other? Essentially, there are three positions in the field: theories of vocal protolanguage[30]; theories of gestural protolanguage[31]; theories of multimodal protolanguage, that is, characterized by a combination of gestures and sounds[32].

Authors who support the vocal protolanguage hypothesis adhere to the idea that human language has in nonhuman primates' vocalizations the starting point[33] and then underwent a process of complexification in the course of human evolution. The process was influenced by a number of factors, including significant neural and anatomical changes in archaic hominins[34]. For example, changes to the teeth and jaws are of particular importance in this scenario, as they may have resulted in increased mobility of the tongue and lips. Indeed, the capacity to produce sounds from the mouth is contingent upon the formation of "articulatory gestures" by the specific positioning of the muscles of the tongue, lips, jaws, and soft palate [35] : The production of sound is contingent upon a specific configuration of the vocal tract and the regulation

30 For example, R. Dunbar, *Grooming, gossip and the evolution of language*, Faber & Faber, London, 1996; P. MacNeilage, *The origin of speech,* Oxford University Press, Oxford, 2008; T. W. Fitch, *The evolution of language,* cit.

31 M. C. Corballis, *From Hand to Mouth: the origins of language*, Princeton University Press, Princeton, 2002; D. Armstrong, S. Wilcox, *The gestural origin of language*, Oxford University Press, Oxford, 2007; M. Tomasello, *Origins of Human Communication*, MIT Press, Cambridge, 2008.

32 M. A. Arbib, *How the brain got language: The mirror system hypothesis,* cit.; A. Kendon, *Some modern considerations for thinking about language evolution: A discussion of the Evolution of language by Tecumseh Fitch*, «The Public Journal of Semiotics», 3(1), 2011, pp. 79–108; D. McNeill, *How language began: Gesture and speech in human evolution*, Cambridge University Press, Cambridge, 2012; S. Mithen, *The singing Neanderthals: The origins of music, language, mind, and body*, cit..

33 T. J. Bergman, J. C. Beehner, M. C. Painter, M. L. Gustison, *The speech-like properties of nonhuman primate vocalizations*, «Animal Behaviour», 151, 2019, pp. 229-237.

34 For a discussion, see I. Adornetti, *Il linguaggio. Origine ed evoluzione*, cit.

35 C. Browman, L. Goldstein, *Towards an articulatory phonology*, «Phonology», 3(01), 1986, pp. 219-252.

of airflow, which gives rise to a distinctive sound pattern. Consequently, each word is distinguished by a particular articulatory gesture, reflecting the specific configuration of the phonatory apparatus. As posited by psychologist Michael Studdert-Kennedy[36], articulatory gestures represent the fundamental units of both modern articulatory language and the vocalizations of apes and hominins. From this perspective, articulatory gestures, which are not specifically linguistic in nature (in fact, they are motor actions), represent a continuity between the linguistic production of modern humans and the vocal production of apes and extinct hominins. Indeed, articulatory movements, as motor actions, are derived from fundamental mammalian orofacial gestures such as sucking, licking, swallowing, and chewing[37]. As humans evolved, the tongue underwent a process of neuroanatomical differentiation, enabling its tip, body, and base to be utilized independently to generate specific movements, which subsequently gave rise to a range of distinctive vocalizations. As posited by Studdert-Kennedy[38], such differentiation would emerge from the necessity for hominins, particularly for species such as *Homo ergaster* and *Homo erectus*, to adapt to increasingly demanding and intricate communicative requirements stemming from an expansion in group size and the concomitant increase in the intricacy of social relationships between individuals. As Mithen[39] notes, it is therefore possible to hypothesize that the decrease in teeth and jaws in the earliest species of the genus *Homo* made possible a different and more diverse range of articulatory gestures than those available to their *Australopithecus* ancestors. According to the scholar, the holistic vocalizations of *Homo* must have consisted of a series of "syllables" derived from peculiar mouth movements. Over time, such syllables, singly or in combination with each other, could have been recognized as discrete units potentially usable in a compositional language.

Against the idea of vocal protolanguage, proponents of so-called *gesture-*

36 M. Studdert-Kennedy, *How did language go discrete*?, in M. Tallerman (a cura di), *Language Origins,* Oxford University Press, Oxford, 2005, pp. 48-67.
37 See also P. MacNeilage, *The origin of speech,* cit.
38 M. Studdert-Kennedy, *How did language go discrete*?, cit.
39 S. Mithen, *The singing Neanderthals: The origins of music, language, mind, and body,* cit.

first theories[40] point out that the vocalizations of apes are, for the most part, genetically determined, that is, fixed at birth and not subjected to any form of learning, unlike the words of human language. This implies that the breadth of the vocal repertoire of nonhuman primates is extremely limited[41]. Furthermore, neuroscientific evidence indicates that the neural substrates of vocalizations differ between nonhuman primates and *Homo sapiens*[42]. For example, only in humans has the neocortical system developed for voluntary control of the muscles of the vocal cords, tongue, lips, jaw, and larynx[43]. In addition, there are significant anatomical discrepancies (e.g., distinct vocal tracts) between nonhuman primates and *Homo sapiens* that reinforce the notion of a divergence between nonhuman primate vocalization and human speech[44]. These considerations appear to indicate that the last common ancestor of hominins and great apes did not possess preadaptations that would have

40 M. C. Corballis, *From Hand to Mouth: the origins of language,* cit.; M. Gentilucci, M.C. Corballis, *From manual gesture to speech: A gradual transition*, «Neuroscience & Biobehavioral Reviews», 30(7), 2006, pp. 949-960.

41 An exception to the rule of limited vocal plasticity may be orangutans, which have more control over their vocal apparatus: A. R., Lameira, M. E. Hardus, A. M. Bartlett, R. W. Shumaker, S. A. Wich, S.B. Menken, *Speech-like rhythm in a voiced and voiceless orangutan call*, «PloS one», 10(1), 2015, article, e116136; S. A. Wich, K. B. Swartz, M. E. Hardus, A. R. Lameira, E. Stromberg, R. W. Shumaker, *A case of spontaneous acquisition of a human sound by an orangutan*, «Primates», 50, 2009, pp. 56-64.

42 J. Fischer, S.R. Hage, *Primate vocalization as a model for human speech: scopes and limits*, in P. Hagoort (a cura di) *Human language: from genes and brains to behavior*, MIT Press, Cambridge, MA, 2019, pp. 639–656.

43 A. Kirzinger U. Jürgens, *Cortical lesion effects and vocalization in the squirrel monkey*, «Brain Researches», 233, 1982, pp. 299–315; K. Hammerschmidt, J. Fischer, *Constraints in primate vocal production*, in Griebel, Oller (a cura di), *The evolution of communicative creativity: From fixed signals to contextual flexibility,* MIT Press, Cambridge, 2008, pp. 93-119; D. Ploog, *Is the neural basis of vocalization different in nonhuman primates and Homo sapiens?*, in T. Crow (a cura di) *The Speciation of Modern Homo Sapiens*, Oxford University Press, Oxford, 2002, pp. 121–135.

44 P. Lieberman, *The evolution of human speech: Its anatomical and neural bases*, «Current anthropology», 48(1), 2007, pp. 39-66; T. Nishimura, *Primate vocal anatomy and physiology: Similarities and differences between humans and nonhuman primates*, in N. Masataka (a cura di), *The origins of language revisited: Differentiation from music and the emergence of neurodiversity and autism*, Springer Nature, Cham, 2020, pp. 25-53.

justified the evolution of a communicative system based exclusively on sound.

The question thus arises as to the optimal starting point for the construction of an alternative scenario to the vocal protolanguage hypothesis. It would be erroneous to assume that nonhuman primate communication is solely characterized by vocalizations and alarm calls. Additionally, apes utilize facial expressions, hand gestures, and body postures as forms of communication[45]. Unlike vocalizations, which are mostly involuntary expressions of emotion, in nonhuman primates hand gestures - visible hand movements made without using or touching objects - can be produced deliberately by the animal (because they are under the control of cortical regions of the brain). For example, one of the key features of gestural communication in apes, which marks a crucial difference with vocalizations, is intentionality. In this framework of studies, "intentionality" refers to the fact that apes' gestures are *signals created voluntarily to influence the behavior* of a specific recipient[46]. Thus, although the vocal communication of nonhuman primates shares the vocal-auditory channel with human language, as Tomasello points out, we have «good reason to think that great ape gestures are the more likely candidate, in comparison with great ape vocalizations, for the evolutionary precursor of human-style communication»[47]. Accordingly, numerous scholars in recent years have hypothesized that extinct hominins, long before the emergence of speech, used gestural communication systems[48]. According to Corballis[49], for example, human language developed predominantly through hand and facial

45 M. A. Arbib, K. Liebal, S. Pika, *Primate vocalization, gesture, and the evolution of human language*, «Current anthropology», 49(6), 2008, pp. 1053-1076; J. Call, M. Tomasello, *The Gestural Communication of Apes and Monkeys*, Lawrence Erlbaum, London, 2007.

46 A. Roberts, S. Vick, H. Buchanan-Smith, *Communicative intentions in wild chimpanzees: persistence and elaboration in gestural signaling*, «Animal cognition», 16(2), 2013, pp. 187-196.

47 M. Tomasello, *Origins of Human Communication*, cit. p. 34.

48 M.A. Arbib, *How the brain got language: The mirror system hypothesis*, cit.; D. Armstrong, S. Wilcox, *The gestural origin of language*, cit.; M. C. Corballis, *From Hand to Mouth: the origins of language,* cit.; M. Tomasello, *Origins of Human Communication*, cit.; G. Rizzolatti, M. A. Arbib, *Language within our grasp*, «Trends in neurosciences», 21(5), 1998, pp. 188-194.

49 M. C. Corballis, *From Hand to Mouth: the origins of language,* cit.; M. C. Corballis, *The recursive mind*, Princeton University Press, Princeton, 2011.

gestures starting about 2 million years ago, that is, with the appearance of the first specimens of the genus *Homo*. The author's hypothesis is that intentional communication arose by exploiting the systems of action understanding (of manual ones in particular) present in our primate ancestors and refined during human evolution[50].

The third position concerning of the modality of expression of protolanguage is the multimodal account, which posits that communication of extinct hominins was characterized by a combination of gestures and sounds[51]. One of the landmarks in this regard is McNeill's book *How Language Began: Gesture and Speech in Human Evolution.* The author moves from a critique of gesture-first theories that, in his view, rest on an inadequate analysis of the processes of language evolution. In fact, according to McNeill, gesture-first models and, more generally, all interpretive models that assume that there is a unimodal system (exclusively gestural or exclusively vocal) at the origin of language run into the difficulty of explaining the multimodal character (i.e., characterized by gesture and speech) of the modern human communication system: language is a single integrated gesture-speech system; gesture and speech represent two sides of the same communicative process[52]. In other words, McNeill's idea is that, if language had a gestural origin, the protolanguage of our ancestors should have resulted in a communication system similar to modern sign languages, and not a sound-like language. For this reason, the author hypothesizes that gesture and speech were equiprimordially in human phylogeny.

50 A major boost to the gestural theory of the origin of language was also given by the discovery in the macaque brain of mirror neurons: G. Rizzolatti, M. A. Arbib, *Language within our grasp*, cit.; M. C. Corballis, *Mirror neurons and the evolution of language*, «Brain and language», 112(1), 2010; pp. 25-35. For a discussion, see I. Adornetti, A. Chiera, F. Ferretti, *Embodied cognition e origine del linguaggio: il ruolo cruciale del gesto*, «Lebenswelt. Aesthetics and philosophy of experience» (13), 2018, pp. 43-56.

51 M. A. Arbib, *How the brain got language: The mirror system hypothesis,* cit.; A. Kendon, *Some modern considerations for thinking about language evolution: A discussion of the Evolution of language by Tecumseh Fitch*, «cit.; D. McNeill, *How language began: Gesture and speech in human evolution*, cit.

52 A. Kendon, *Gesture: Visible action as utterance*, Cambridge University Press, Cambridge, 2004; D. McNeill, *Hand and mind: What gestures reveal about thought,* University of Chicago Press, Chicago,1992.

McNeill's hypothesis on the equiprimordiality of gesture and speech finds support in a number of primatological studies[53] from which it emerges that: a) the vocal production of apes, although limited, is not as automatic and involuntary as has long been claimed[54]; (b) great apes, and chimpanzees in particular, use a multimodal communication system in which gestures are often accompanied by vocalizations[55]; and (c) in chimpanzees, the combination of communicative gestures and communicative sounds activates brain areas homologous to Broca's area in humans[56], an area traditionally associated with linguistic functions[57]. Overall, then, this research challenges both the hypothesis of an exclusively vocal protolanguage and the hypothesis of a predominantly gestural protolanguage: rather, they seem to suggest a multimodal scenario for the origin of human communication.

In the light of these considerations, the following sections will delineate a new model of protolanguage, synthesizing some core tenets of the aforementioned elements. It will be argued that the transition from nonhuman animal communication to human language occurred through a protolanguage that exhibited the following characteristics: it was holistic; it evolved to modify the behaviors of others (it had a persuasive function); it was multimodal in nature. As will be demonstrated, the conjunction of these three characteristics is functional in the construction of a model of pantomimic protolanguage with narrative as a central element.

53 See for a review see K. Liebal, B. Waller, K. Slocombe, A. Burrows, *Primate Communication: a multimodal approach*, Cambridge University Press, Cambridge, 2013.

54 C. Crockford, R. Wittig, R. Mundry, K. Zuberbühler, *Wild chimpanzees inform ignorant group members of danger*, «Current Biology», 22(2), 2012, pp. 142-146; A. Schel, S. Townsend, Z. Machanda, K. Zuberbühler, K. Slocombe, *Chimpanzee alarm call production meets key criteria for intentionality*, «PLoS One», 8(10), 2013, article e76674.

55 J. P. Taglialatela, J. L. Russell, S. M. Pope, T. Morton, S. Bogart, L.A. Reamer, ... & W. D. Hopkins, *Multimodal communication in chimpanzees*, «American journal of primatology», 77(11), 2015, pp. 1143-1148.

56 J.P. Taglialatela, J. L. Russell, J. Schaeffer, W.D. Hopkins, *Communicative signaling activates 'Broca's' homolog in chimpanzees*, «Current Biology», 18(5), 2008, pp. 343-348.

57 I. Adornetti, *Le afasie di Broca e di Wernicke alla luce delle moderne neuroscienze cognitive,* «Rivista Internazionale di Filosofia e Psicologia»,10(3), 2019, pp. 295-312.

3. Pantomime as a narrative protolanguage

In outlining a new model of protolanguage, this paper takes the view that language evolved as a tool to modify the mental states (e.g., beliefs, opinions, attitudes) of other people in order to elicit a specific behavioral response, rather than simply inform them of something[58]. From this perspective, the functional role of both protolanguage and language as we know it today is related to its capacity to influence the behaviors of others. As we saw in Section 2.2, animal signals can also have a function of manipulation and influence. This means that human language shares the same functional role with animal communication. However, over the course of evolution, humans have undoubtedly developed a specific way of influencing others, which explains the uniqueness of human language: unlike other animals, humans tell stories to change other people's behavior. From this perspective, investigating the nature of protolanguage means investigating the evolution of narrative[59] that is, investigating the possibility that our ancient ancestors were able to communicate through narrative before the emergence of a fully fledged language. To argue for a narrative protolanguage with the function of influencing the behavior of others, two main argumentative steps are required: 1) to demonstrate the persuasive function of stories; 2) to demonstrate the possibility of a form of narrative that does not rely on verbal language.

At a general level, narrative can be defined as «a primary resource for configuring circumstances and events into more or less coherent scenarios involving the experience of persons»[60]. Its persuasive power depends mainly on the 'emotional effects' that stories elicit in audience members in reference to both the *characters* (e.g., through forms of empathic simulation) and the *plot* (e.g., through expectations about the ending)[61]. In particular, stories facilitate

58 F. Ferretti, I. Adornetti, *Persuasive conversation as a new form of communication in Homo sapiens,* cit.; F. Ferretti, *Narrative persuasion. A cognitive perspective on language evolution,* cit.
59 F. Ferretti, *Narrative persuasion. A cognitive perspective on language evolution,* cit.
60 D. Herman, *Storytelling and the sciences of mind*, MIT Press, Cambridge, 2013, p. 74.
61 H. Bilandzic, S. Kinnebrock, M. Klingler, *The emotional effects of science narratives: a theoretical framework*, «Media and Communication», 8 (1), 2020, pp. 151–163.

transportation processes in the narrative world, which can lead individuals to adopt the beliefs and opinions implicated in the sequence of events narrated in the story. This is achieved by enabling mental simulation of the narrated events[62]. Indeed, while engaged in a narrative, individuals demonstrate a reduced awareness of factual information that is incongruent with the assertions presented within the narrative and, therefore, «may be less likely to disbelieve or counterargue story claims, and thus their beliefs may be influenced»[63].

The second argumentative step to be taken in order to support the thesis of a narrative protolanguage is to demonstrate the possibility of a form of narrative that does not rely on language. Or, as Sibierska proposes, it is to demonstrate the feasibility of a form of "storytelling without telling"[64]. In this regard, it is worth quoting Boyd, who suggests that «narrative need not involve language. It can operate through modes like mime, still pictures, shadow-puppets, or silent movies»[65]. The reference to mime is particularly pertinent to the view addressed in this article. Indeed, numerous scholars [66] who adhere to the view of gestural or multimodal protolanguage posit that a mimetic or pantomimic phase marked the evolution of hominin communication, which enabled the representation of the external world in an iconic manner. Different, however,

62 H. Bilandzic, R. Busselle, *Narrative persuasion*, in J.P. Dillard, L. Shen (a cura di.), *The Sage handbook of persuasion. Developments in theory and practice. 2nd ed. Sage*, Thousand Oaks, 2013, pp. 200–219.

63 M.C. Green, T.C. Brock, *The role of transportation in the persuasiveness of public narratives*, «Journal of Personality and Social Psychology», 79 (5), 2000, p. 703.

64 M. Sibierska, *Storytelling without telling: The non-linguistic nature of narratives from evolutionary and narratological perspectives*, *«Language & Communication», 54,* 2017, pp. 47-55.

65 B. Boyd, *On the Origin of Stories*, Harvard University Press, Cambridge, 2009, p. 159

66 M. C. Arbib, *How the brain got language: The mirror system hypothesis,* cit.; M. C. Corballis, *The truth about language: what it is and where it came from*, cit.; M. Donald, *The Origins of Modern Mind*, Harvard University Press, Harvard, 1991; F. Ferretti, I. Adornetti, A. Chiera, S. Nicchiarelli, R. Magni, G. Valeri, A. Marini, *Mental Time Travel and language evolution: a narrative account of the origins of human communication*, «Language Sciences», 63, 2017, pp. 105-118; P. Gärdenfors, *Demonstration and pantomime in the evolution of teaching,* «Frontiers in psychology», 8, 2017, article 415; G. McBride, *Storytelling, behavior planning, and language evolution in context, «Frontiers in psychology», 5,* 2014, article 1131; M. Tomasello, 2008, *The origins of human communication*, cit.

are the definitions of pantomime that, although within a similar theoretical scenario (gestural or multimodal protolanguage), these authors provide[67]. As emphasized by Żywiczyński and colleagues[68], a crucial distinction that can be drawn among the various definitions is whether pantomime is limited to manual communication or instead encompasses the entire body. In their respective works, Arbib[69] and Corballis[70] put forth a model of pantomimic protolanguage that places a significant emphasis on the role of manual communication (they acknowledge the potential involvement of other forms of movement beyond manual gestures, yet assert that manual gestures play a predominant role). Corballis, for example, hypothesizes that a pantomimic protolanguage evolved starting 2 million years ago with *Homo ergaster/erectus*. The author writes:

> Unlike their great-ape cousins, the hominins were bipedal, which would have freed the hands for the further development of expressive manual communication. The body and hands are free to move in four dimensions (three of space and one of time), and so mimic activity in the external world. The hands can also assume, at least approximately, the shapes of objects or animals, and the fingers can mimic the movement of legs and arms. The movements of the hands can also mimic the movement of objects through space, and facial expressions can convey something of the emotions of events being described[71].

For Arbib, pantomime is the ability to express «a situation, object, action,

67 There are also different definitions of pantomime in other disciplines, such as neuroscience, gesture studies, Theatre Studies, and Semiotics. For a discussion, see P. Żywiczyński, S. Wacewicz, M. Sibierska, *Defining pantomime for language evolution research*, «Topoi», 37, 2018, pp. 307-318; P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska, *Introduction. Perspectives on pantomime: Evolution, development, interaction*. In P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, pp. 1-15.

68 P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska, *Introduction. Perspectives on pantomime: Evolution, development, interaction,* cit.

69 M. A. Arbib, *How the brain got language: The mirror system hypothesis*, cit.

70 M. C. Corballis, *The recursive mind*, cit.

71 *Ivi*, p. 63.

character, or emotion without words, and using only gestures, especially imitative gestures, and other movements»[72]. In opposition to the idea that pantomime is primarily manual, models that refer to mimesis theory instead assume whole-body involvement[73]. Indeed, as Żywiczyński and colleagues point out, «since many everyday actions (e.g. walking, pushing, jumping) involve coordinated muscular activity across the entire body, to represent these as iconically as possible would require a similar use of the whole body»[74].

A second relevant distinction is whether pantomime is conveyed exclusively through the visual channel (i.e., whether it is produced without the aid of vocalizations), or whether it is instead a combination of gestures and vocalizations. From Corballis and Arbib's quotations above, the idea of a pantomimic protolanguage limited exclusively to the visual channel emerges. Also of the same opinion is McNeill, according to whom pantomime (which, however, in his view is not a phylogenetic precursor of language[75]) is «dumb show, a gesture or a sequence of gestures conveying a narrative line, with a story to tell, produced without speech»[76]. Other authors adhere instead to a multimodal scenario. Tomasello[77], for example, characterizes "pantomiming"

72 M. A. Arbib, *How the brain got language: The mirror system hypothesis*, p. 217.

73 I. Adornetti, A. Chiera, V. Deriu, D. Altavilla, F. Ferretti, *Comprehending stories in pantomime. A pilot study with typically developing children and its implications for the narrative origin of language*, «Language & Communication», 93, 2023, pp. 155-171; M. Donald, *The Origins of Modern Mind*, cit.; F. Ferretti, *Narrative and pantomime at the origin of language*, in P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, pp. 78-99; F. Ferretti, I. Adornetti, A. Chiera, *Narrative pantomime: a protolanguage for persuasive communication*, «Lingua», 271, 2022, article 103247. P. Gärdenfors, *Demonstration and pantomime in the evolution of teaching and communication*, «Language & Communication», 80, 2021, pp. 71-79; J. Zlatev, P. Żywiczyński, S. Wacewicz, *Pantomime as the original human-specific communicative system*, «Journal of Language Evolution», 5 (2), 2020, pp. 156–174.

74 P. Żywiczyński, S. Wacewicz, C. Lister, *Pantomimic fossils in modern human communication*, cit. p. 4.

75 See D. McNeill, *How language began: Gesture and speech in human evolution*, cit.

76 D. McNeill, *Introduction*, in D. McNeill (a cura di), *Language and gesture*. Cambridge University Press, 2000, p. 5.

77 M. Tomasello, *The origins of human communication*, cit.

as a gesture that is accompanied by speech. Zlatev and colleagues[78] also hold a similar view, according to which the original human-specific communication was polysemiotic, i.e. consisting of a number of semiotic systems working together, including the semiotic systems of gesture, vocalization and facial expression.

In synthesizing the main definitions discussed thus far, Ferretti[79] proposes a characterization of pantomime as a suitable system for storytelling in the absence of language. This characterization is therefore useful for supporting the main proposal of this article. According to this definition, pantomime can be described as «[a] nonverbal, mimetic, and non-conventionalized polysemiotic communicative system, which holistically refers to events and/or to sequences of events causally connected in time and displaced from the here and now by means of coordinated movements of the whole body»[80]. In the context of a narrative account of language origin, the holistic nature of pantomime appears to be a particularly relevant concept, i.e. the fact that pantomime can refer to «whole events or sequences of events in a holistic -continuous strand-, with no self-apparent onsets and terminations in the stream of movement, which does not naturally decompose into easily isolable component parts»[81]. Also crucial is the fact that it is a form of enactment involving the whole body. To argue that pantomime is a process involving the whole body that can refer to whole events in a holistic way is to adopt a 'broad' definition of pantomime, which distinguishes it from iconic gestures that are generally considered to be exclusively manual. While hand gestures can be very effective at pantomiming single actions and objects[82] (using fingers to represent cutting scissors), they may be less successful at representing broader events (representing a tennis player serving the ball). Since narrative consists of sequences of events of the

78 J. Zlatev, P. Żywiczyński, S. Wacewicz, *Pantomime as the original human-specific communicative system*, cit.

79 F. Ferretti, *Narrative and pantomime at the origin of language*, cit.

80 Ivi, p. 93.

81 P. Żywiczyński, S. Wacewicz, M. Sibierska, *Defining pantomime for language evolution research*, cit. p. 314

82 See S. Brown, E. Mittermaier, T. Kher, P. Arnold, *How pantomime works: implications for theories of language origin*, «Frontiers in communication», 4, 2019, article 9.

latter type (e.g., a tennis player serving the ball and celebrating the point) a broad notion of pantomime, implying body-to-body mapping, is required[83].

3.1 Empirical evidence

A number of empirical studies have demonstrated the efficacy of pantomime as a storytelling device. In a recent study conducted in our laboratory[84], we investigated the comprehension of stories conveyed through pantomime by a group of typically developing children aged between 8 and 10 years. In particular, our objective was to ascertain whether pantomimes encompassing the entire body and illustrating causally and temporally contiguous sequences of events to convey a narrative would be perceived as intelligible by participants. The children were asked to observe five short stories presented in pantomime and then to respond to a comprehension question and to retell the stories they had observed. The stories were structured in a consistent manner, comprising the following elements: an initial incident, a series of events linked to the actions of a character, the emergence of a challenging situation, and a conclusion that left the actress/actor to resolve the conflict. Subsequently, the narratives produced by the children were transcribed and subjected to qualitative analysis. This entailed the assessment of the accounts through the quantification of specific attributes, such as the children's comprehension of the motivational

83 The potential for pantomime to convey narrative content is also contingent upon the assumption that our ancestors possessed the requisite cognitive abilities to comprehend such content. This topic is not addressed in detail in this paper; instead, I refer the reader to: F. Ferretti, I. Adornetti, A. Chiera, S. Nicchiarelli, R. Magni, G. Valeri, A. Marini, *Mental Time Travel and language evolution: a narrative account of the origins of human communication*, cit; F. Ferretti, I. Adornetti, A. Chiera, *Narrative pantomime: a protolanguage for persuasive communication*, cit.; F. Ferretti, *On the influence of thought on language: a naturalistic framework for the pantomimic origins of human communication*, in «Frontiers in Psychology», 14, 2023, 1197968.

84 I. Adornetti, A. Chiera, V. Deriu, D. Altavilla, F. Ferretti, *Comprehending stories in pantomime. A pilot study with typically developing children and its implications for the narrative origin of language*, cit.

factors influencing the protagonist's actions. The results were particularly encouraging, as they demonstrated that children exhibited comprehension of pantomime stories, with this comprehension increasing with age (ontogenetic development of the ability was observed). In other words, these results constitute empirical evidence in favor of the idea «that pantomime represents a suitable means for conveying narrative contents (...). The fact that pantomime turns out to be a suitable system for storytelling (...) opens the way to the possibility of considering it a precursor to human language»[85].

It is important to note, however, that pantomime does not encompass the full range of characteristics associated with contemporary storytelling. This expressive medium imposes constraints on both the narrative form and content, as evidenced by the findings of Sibierska and colleagues[86]. The authors initiated their investigation from a pertinent theoretical issue, namely, the observation that one of the defining characteristics of storytelling is to alter the natural order of events on the temporal plane. In his 2002 work, Genette[87] posited that the most pervasive narrative structure is to commence the account in the middle and then introduce elucidatory analepses, or explanatory flashbacks. The issue that must be addressed is that, as Sibierska and colleagues underline, «[s]ince pantomime is strongly based on iconicity, the order in which a sequence of events is shown can be expected to match the so-called *ordo naturalis,* so that if a person mimes a woman eating a sandwich, then a monkey stealing the sandwich, then the woman screaming at the monkey in anger, we would not assume that screaming happened before eating»[88]. It can be reasonably inferred that pantomime is an effective narrative technique for stories that adhere to a natural chronological order of events. However, it is less suited to stories that present a non-chronological order of narrated events.

85 *Ivi,* p. 165.

86 M. Sibierska, P. Żywiczyński, J. Zlatev, J. van de Weijer, M. Boruta-Żywiczyńska, *Constraints on communicating the order of events in stories through pantomime*, «Journal of Language Evolution», 8(1), 2023, pp. 18-32.

87 G. Genette, *Order, Duration, and Frequency*, in Richardson, B. (ed.), *Narrative Dynamics: Essays on Time, Plot, Closure, and Frames*, Ohio State University, Columbus, 2002, pp. 25–34.

88 M. Sibierska, P. Żywiczyński, J. Zlatev, J. van de Weijer, M. Boruta-Żywiczyńska, *Constraints on communicating the order of events in stories through pantomime,* cit. p. 2.

In their research, Sibierska and colleagues sought to empirically test this hypothesis by subjecting adult participants to "semiotic games." In this context, participants are required to engage in communication with one another through a designated medium, eschewing the use of spoken or written language. The participants were invited to engage in a pantomime-based game of Charades, in which they were required to convey short stories to one another under two conditions: chronological and non-chronological. The primary hypothesis was that the degree of communicative success would be greater in the chronological condition than in the non-chronological condition. The results substantiated the hypothesis, demonstrating that the communicative efficacy of pantomimes ordered in a chronological sequence was significantly higher than those ordered non-chronologically. This indicates that pantomime is an efficacious method for conveying simple narratives but may be less effective for more complex ones.

Thinking about the evolutionary implications of the results of these experimental studies, one can therefore imagine, as pointed out by Ferretti and colleagues, that «although pantomimic storytelling allows the representation of two crucial elements of a story, i.e., the plot and the character ... such a representation takes place at a basic level. Considering these limitations, it appears appropriate to refer to the kind of storytelling made possible by pantomime in terms of "protostories" »[89]. Of similar opinion is also Arbib, in a recent work in which he adheres to the narrative pantomime hypothesis:

> purely pantomimic narratives would have been severely limited. Protonarratives would then increase in subtlety as protolanguage developed (i) a vocabulary of protosigns large enough to allow the recognition of the As, Xs and Bs of "A does X to B" without strong reliance on a limited context and, crucially, (ii) new protosigns became available that could support achronological narratives of increasing complexity. One such set of protosigns would provide the equivalent of pronouns to remind us that the agent or object now described has already been introduced *earlier in the narrative*[90].

89 F. Ferretti, I. Adornetti, A. Chiera, *Narrative pantomime: a protolanguage for persuasive communication,* cit. p. 11.

90 M. A. Arbib, *Pantomime within and beyond the evolution of language*, in P. Żywiczyński,

In the light of these considerations, it seems reasonable to posit that the increasing necessity to convey stories in a more streamlined and effective manner (as a consequence of the adaptive value of narratives, as previously discussed) exerted a selective pressure on the evolution of more refined linguistic elements like grammar (and the advent of an expressive system based on the sound medium), ultimately giving rise to the language as we know it today.

4. Conclusion

In alignment with the hypothesis that human language originated through narrative, in this paper it has been suggested that our ancestors began recounting stories long before the advent of verbal language through pantomimic protolanguage. Such a protolanguage was *holistic*, capable of representing events or sequences of events in a continuous flow of movements, in which meaning is derived from the whole and not from the combination of individual parts. It was *persuasive*, aimed at modifying the mental states of interlocutors through narrative content. It was *multimodal* (or polysemiotic), made up of a number of semiotic systems that work together, including the semiotic systems of gesture, vocalization, and facial expression. This pantomimic-narrative protolanguage thus represents a pivotal transitional phase between nonhuman animal communication and the emergence of modern language.

J. Blomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, p.43.

References

I. Adornetti, *Animal signalling between informing and influencing: setting the stage for a pragmatic-rhetorical model of communication*, in I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics: How Language Emerges from Use*, Routledge, London, 2025, pp. 23-38.

I. Adornetti, *Le afasie di Broca e di Wernicke alla luce delle moderne neuroscienze cognitive,* «Rivista Internazionale di Filosofia e Psicologia»,10(3), 2019, pp. 295-312.

I. Adornetti, *Il linguaggio. Origine ed evoluzione*, Carocci, Roma, 2016.

I. Adornetti, A. Chiera, V. Deriu, D. Altavilla, F. Ferretti, *Comprehending stories in pantomime. A pilot study with typically developing children and its implications for the narrative origin of language*, «Language & Communication», 93, 2023, pp. 155-171.

I. Adornetti, A. Chiera, F. Ferretti, *Embodied cognition e origine del linguaggio: il ruolo cruciale del gesto*, «Lebenswelt. Aesthetics and philosophy of experience» (13), 2018, pp. 43-56.

I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics: How Language Emerges from Use*, Routledge, London, 2024.

M. A. Arbib, *Pantomime within and beyond the evolution of language*, in P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, pp. 16-57.

M. A. Arbib, *How the brain got language: The mirror system hypothesis*, Oxford University Press, New York, 2012.

M. A. Arbib, *The evolving mirror system: A neural basis for language readiness*, in M. Christiansen and S. Kirby (a cura di), *Language evolution*, Oxford University Press, Oxford 2003, pp. 182-200.

M. A. Arbib, K. Liebal, S. Pika, *Primate vocalization, gesture, and the evolution of human language*, «Current anthropology», 49(6), 2008, pp. 1053-1076.
D. Armstrong, S. Wilcox, *The gestural origin of language*, Oxford University Press, Oxford, 2007.

T. J. Bergman, J. C. Beehner, M. C. Painter, M. L. Gustison, *The speech-like properties of nonhuman primate vocalizations*, «Animal Behaviour», 151, 2019, pp. 229-237.

D. Bickerton, *Language and species*, University of Chicago Press, Chicago, 1990.

H. Bilandzic, R. Busselle, *Narrative persuasion*, in J.P. Dillard, L. Shen (a cura di.), *The Sage handbook of persuasion. Developments in theory and practice. 2nd ed*. Sage, Thousand Oaks, 2013, pp. 200–219.

H. Bilandzic, S. Kinnebrock, M. Klingler, *The emotional effects of science narratives: a theoretical framework*, «Media and Communication», 8 (1), 2020, pp. 151–163.

B. Boyd, *On the Origin of Stories*, Harvard University Press, Cambridge, 2009

C. Browman, L. Goldstein, *Towards an articulatory phonology*, «Phonology», 3(01), 1986, pp. 219-252.

S. Brown, E. Mittermaier, T. Kher, P. Arnold, *How pantomime works: implications for theories of language origin*, «Frontiers in communication», 4, 2019, article 9.

J. Call, M. Tomasello, *The Gestural Communication of Apes and Monkeys*, Lawrence Erlbaum, London, 2007.

M. C. Corballis, *The truth about language: what it is and where it came from*, University of Chicago Press, Chicago, 2017.

M. C. Corballis, *The recursive mind*, Princeton University Press, Princeton, 2011.

M. C. Corballis, *Mirror neurons and the evolution of language*, «Brain and language», 112(1), 2010.

M. C. Corballis, *From Hand to Mouth: the origins of language*, Princeton University Press, Princeton, 2002.

C. Crockford, C. Boesch, *Call combinations in wild chimpanzees*, «Behaviour», 2005, 397-421.

C. Crockford, R. Wittig, R. Mundry, K. Zuberbühler, *Wild chimpanzees inform ignorant group members of danger*, «Current Biology», 22(2), 2012, pp. 142-146.

R. Dawkins, J. R. Krebs, *Animal signals: Information or manipulation?,* in J. R. Krebs, N. B. Davies (a cura di), *Behavioural ecology: An evolutionary approach,* Blackwell, Oxford, 1978, pp. 282–309.

T. Deacon, *The symbolic species*, Norton, New York, 1997.

M. Donald, *The Origins of Modern Mind*, Harvard University Press, Harvard, 1991.

R. Dunbar, *Grooming, gossip and the evolution of language*, Faber & Faber, London, 1996.

F. Ferretti, *Agonistic Conversation. A cognitive-interactive perspective on the origin of grammar,* in I. Adornetti, F. Ferretti (a cura di), *Introducing Evolutionary Pragmatics: How Language Emerges from Use,* Routledge, London, 2025, pp. 124-149.

F. Ferretti, *Narrative and pantomime at the origin of language*, in P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, pp. 78-99.

F. Ferretti, *On the influence of thought on language: a naturalistic framework for the pantomimic origins of human communication*, in «Frontiers in Psychology», 14, 2023, 1197968.

F. Ferretti, *Narrative persuasion. A cognitive perspective on language evolution*, Springer Nature, Cham, 2022.

F. Ferretti, *Quali precursori per il linguaggio? La comunicazione umana tra adattamento, exaptation ed evoluzione culturale,* «Sistemi intelligenti», 31(1), 2019, pp. 139-156.

F. Ferretti, I. Adornetti, *Origin of Language,* «Reference Module in Social Sciences», 2024 - https://doi.org/10.1016/B978-0-323-95504-1.00053-3

F. Ferretti, I. Adornetti, *Persuasive conversation as a new form of communication in Homo sapiens,* «Philosophical Transactions of the Royal Society B», 376(1824), 2021, article 20200196.

F. Ferretti, I. Adornetti, *Dalla comunicazione al linguaggio. Scimmie, ominidi e umani in una prospettiva darwiniana*, Mondadori, Milano, 2012.

F. Ferretti, I. Adornetti, A. Chiera, *Narrative pantomime: a protolanguage for persuasive communication*, «Lingua», 271, 2022, article 103247

F. Ferretti, I. Adornetti, A. Chiera, S. Nicchiarelli, R. Magni, G. Valeri, A. Marini, *Mental Time Travel and language evolution: a narrative account of the origins of human communication*, «Language Sciences», 63, 2017, pp. 105-118.

J. Fischer, S.R. Hage, *Primate vocalization as a model for human speech: scopes and limits*, in P. Hagoort (a cura di) *Human language: from genes and brains to behavior*, MIT Press, Cambridge, MA, 2019, pp. 639–656.

T. W. Fitch, *The evolution of language*, Cambridge, Cambridge University Press, 2010.

P. Gärdenfors, *Demonstration and pantomime in the evolution of teaching and communication*, «Language & Communication», 80, 2021, pp. 71-79.

P. Gärdenfors, *Demonstration and pantomime in the evolution of teaching,* «Frontiers in psychology», 8, 2017, article 415.

G. Genette, *Order, Duration, and Frequency,* in Richardson, B. (ed.), *Narrative*

Dynamics: Essays on Time, Plot, Closure, and Frames, Ohio State University, Columbus, 2002, pp. 25–34.

M. Gentilucci, M.C. Corballis, *From manual gesture to speech: A gradual transition*, «Neuroscience & Biobehavioral Reviews», 30(7), 2006, pp. 949-960.

M.C. Green, T.C. Brock, *The role of transportation in the persuasiveness of public narratives*, «Journal of Personality and Social Psychology», 79 (5), 2000.

N. Gontier, M.B. Żywiczyńska, S. Johansson, L. McCune, *Introduction to Evolving (Proto) Language/s*, «Lingua», 2024, 305, article number 103740.

K. Hammerschmidt, J. Fischer, *Constraints in primate vocal production*, in Griebel, Oller (a cura di), *The evolution of communicative creativity: From fixed signals to contextual flexibility,* MIT Press, Cambridge, 2008, pp. 93-119.

D. Herman, *Storytelling and the sciences of mind*, MIT Press, Cambridge, 2013.
J. R. Hurford, *Language in the Light of Evolution: Volume 1, The Origins of Meaning*. Oxford University Press, 2007, Oxford.

J. R. Hurford, *The roles of expression and representation in language evolution*, in A. Wray (a cura di) *The transition to language*, Oxford University Press, Oxford, 2002, pp. 311-334.

R. Jackendoff, *Foundations of Language. Brain, Meaning, Grammar, Evolution,* Oxford University Press, New York, 2002.

A. Kendon, *Some modern considerations for thinking about language evolution: A discussion of the Evolution of language by Tecumseh Fitch*, «The Public Journal of Semiotics», 3(1), 2011, pp. 79–108.

A. Kendon, *Gesture: Visible action as utterance*, Cambridge University Press, Cambridge, 2004

A. Kirzinger U. Jürgens, *Cortical lesion effects and vocalization in the squirrel monkey*, «Brain Researches», 233, 1982, pp. 299–315;

A. R., Lameira, M. E. Hardus, A. M. Bartlett, R. W. Shumaker, S. A. Wich, S.B. Menken, *Speech-like rhythm in a voiced and voiceless orangutan call*, «PloS one», 10 (1), 2015, article, e116136.

M. Leroux, A.M. Schel, C. Wilke, B. Chandia, K. Zuberbühler, K. Slocombe, S. W. Townsend, *Call combinations and compositional processing in wild chimpanzees*, «Nature Communications», 14(1), 2023.

M. Leroux, B. Chandia, A.B. Bosshard, K. Zuberbühler, S. W. Townsend, *Call combinations in chimpanzees: a social tool*?, «Behavioral Ecology», 33(5), 2022, pp. 1036-1043.

R. Lewin, R. A. Foley, *Principles of human evolution (2nd edition),* Blackwell, Oxford, 2004.

K. Liebal, B. Waller, K. Slocombe, A. Burrows, *Primate Communication: a multimodal approach*, Cambridge University Press, Cambridge, 2013.

P. Lieberman, *The evolution of human speech: Its anatomical and neural bases*, «Current anthropology», 48(1), 2007, pp. 39-66

P. MacNeilage, *The origin of speech,* Oxford University Press, Oxford, 2008.
G. McBride, *Storytelling, behavior planning, and language evolution in context, «Frontiers in psychology», 5,* 2014, article 1131

D. McNeill, *How language began: Gesture and speech in human evolution*, Cambridge University Press, Cambridge, 2012.

D. McNeill, *Introduction*, in D. McNeill (a cura di), *Language and gesture*. Cambridge University Press, 2000, pp. 1–10.

D. McNeill, *Hand and mind: What gestures reveal about thought,* University of Chicago Press, Chicago,1992.

S. Mithen, *The Language Puzzle: Piecing Together the Six-Million-Year Story of How Words Evolved*, Hachette UK, 2024.

S. Mithen, *The singing Neanderthals: The origins of music, language, mind, and body*, Cambridge, Harvard University Press, 2005.

S. Nicchiarelli, *Formulaic Language: A Living Linguistic Fossil for a Holistic Protolanguage*, «Academic Journal of Modern Philology», (3), 2014, pp. 67-73.

T. Nishimura, *Primate vocal anatomy and physiology: Similarities and differences between humans and nonhuman primates*, in N. Masataka (a cura di), *The origins of language revisited: Differentiation from music and the emergence of neurodiversity and autism*, Springer Nature, Cham, 2020, pp. 25-53.

G. Palazzolo, *A case for animal reference: beyond functional reference and meaning attribution*. «Synthese» 203, 59, 2024

S. Pinker, P. Bloom, *Natural language and natural selection*, «Behavioral and brain sciences», 13(4), 1990, pp. 707-727.

D. Ploog, *Is the neural basis of vocalization different in nonhuman primates and Homo sapiens?*, in T. Crow (a cura di) *The Speciation of Modern Homo Sapiens*, Oxford University Press, Oxford, 2002, pp. 121–135.

L. Progovac, *Evolutionary syntax*, Oxford University Press, Oxford, UK, 2015

L. Progovac, N. Rakhlin, W. Angell, R. Liddane, L. Tang, N. Ofen, *Neural correlates of syntax and proto-syntax: evolutionary dimension*, «Frontiers in psychology», 9, 2018, article 2415.

A. C. Reboul, *Why language really is not a communication system: a cognitive view of language evolution*, «Frontiers in Psychology«, 6, 2015, article 1434.

G. Rizzolatti, M. A. Arbib, *Language within our grasp*, «Trends in neurosciences», 21(5), 1998, pp. 188-194.

A. Roberts, S. Vick, H. Buchanan-Smith, *Communicative intentions in wild chimpanzees: persistence and elaboration in gestural signaling*, «Animal cognition», 16(2), 2013, pp. 187-196.

A Scarantino, Z. Clay, *Contextually variable signals can be functionally referential*, «Animal Behaviour», 100(100), 2015, pp. e1-e8.

A. Schel, S. Townsend, Z. Machanda, K. Zuberbühler, K. Slocombe, *Chimpanzee alarm call production meets key criteria for intentionality*, «PLoS One», 8(10), 2013, article e76674.

T. Scott-Phillips, *Speaking our minds: Why human communication is different, and how language evolved to make it special*, Bloomsbury Publishing, 2014.

A. Senghas, M. Coppola, *Children creating language: How Nicaraguan Sign Language acquired a spatial grammar,* «Psychological science», 12(4), 2001, pp. 323-328.

A. Senghas, A. Ozyurek, S. Kita, *Response to Comment on" Children creating core properties of language: Evidence from an emerging sign language in Nicaragua"*, «Science», 309(5731), 2005, pp. 56-56.

R. M. Seyfarth, D. L. Cheney, T. Bergman, J. Fischer, K. Zuberbühler, K. Hammerschmidt, *The central importance of information in studies of animal communication*, «Animal Behaviour», 80(1), 2010, pp. 3-8.

R. M. Seyfarth, D. L. Cheney, P. Marler, *Vervet monkey alarm calls: semantic communication in a free-ranging primate,* «Animal Behaviour», 28(4), 1980, pp. 1070-1094.

M. Sibierska, *Storytelling without telling: The non-linguistic nature of narratives from evolutionary and narratological perspectives*, *«Language & Communication», 54,* 2017, pp. 47-55.

M. Sibierska, P. Żywiczyński, J. Zlatev, J. van de Weijer, M. Boruta-Żywiczyńska, *Constraints on communicating the order of events in stories through pantomime*, «Journal of Language Evolution», 8(1), 2023, pp. 18-32.

M. Studdert-Kennedy, *How did language go discrete*?, in M. Tallerman (a cura di), Language Origins, Oxford University Press, Oxford, 2005, pp. 48-67.

J. P. Taglialatela, J. L. Russell, S. M. Pope, T. Morton, S. Bogart, L.A. Reamer, ... & W. D. Hopkins, *Multimodal communication in chimpanzees*, «American journal of primatology», 77(11), 2015, pp. 1143-1148.

J.P. Taglialatela, J. L. Russell, J. Schaeffer, W.D. Hopkins, *Communicative signaling activates 'Broca's' homolog in chimpanzees*, «Current Biology
M. Tallerman, *Did our ancestors speak a holistic protolanguage?*, «Lingua», 117(3), 2007, pp. 579-604.

M. Tomasello, *Origins of Human Communication*, MIT Press, Cambridge, 2008.

S. Wacewicz, P. Żywiczyński, *Language origins: Fitness consequences, platform of trust, cooperation, and turn-taking*, «Interaction Studies», 19(1-2), 2018, pp. 167-182.

S. A. Wich, K. B. Swartz, M. E. Hardus, A. R. Lameira, E. Stromberg, R. W. Shumaker, *A case of spontaneous acquisition of a human sound by an orangutan*, «Primates», 50, 2009, pp. 56-64.

A. Wray, *Protolanguage as a holistic system for social interaction*, «Language and Communication», 18(1), 1998, pp. 47–67.

J. Zlatev, P. Żywiczyński, S. Wacewicz, *Pantomime as the original human-specific communicative system*, «Journal of Language Evolution», 5 (2), 2020, pp. 156–174.

P. Żywiczyński, P., *How research on language evolution contributes to linguistics*, «Yearbook of the Poznań Linguistic Meeting», 5(1), 2019, pp. 1-34

P. Żywiczyński, N. Gontier, S. Wacewicz, *The evolution of (proto-) language: Focus on mechanisms,* «Language Sciences», 2017, 63, pp. 1-11.

P. Żywiczyński, S. Wacewicz, C. Lister, *Pantomimic fossils in modern human communication*, «Philosophical Transactions of the Royal Society B», 376(1824), 2021, article 20200204.

P. Żywiczyński, J. Blomberg, M. Boruta-Żywiczyńska, *Introduction. Perspectives on pantomime: Evolution, development, interaction*. In P. Żywiczyński, J. lomberg, M. Boruta-Żywiczyńska (a cura di), *Perspectives on Pantomime*, John Benjamins, Amsterdam, 2024, pp. pp. 1-15.

P. Żywiczyński, S. Wacewicz, M. Sibierska, *Defining pantomime for language evolution research*, «Topoi», 37, 2018, pp. 307-318.