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A Hypothesis on the Catastrophic Emergence of Syntax and Phonetics

Abstract

There are two major theories about the origin of human syntax: evolutionary and catastrophic, the latter appears more probable on theoretical and empirical grounds, the most serious reason being the problem with imagining the intermediate stages between protosyntax and full-blown syntax (Bickerton 1998). The “missing link” is recently often associated with recursion, a sole element of human syntax considered specifically human and specifically linguistic. Some accounts associate this trigger with a subpart of recursion, either operation *Merge* or a subpart of *Merge*, operation *Label* (Hornstein 2009) which by breaking the initial symmetry provides a *sine qua non* condition for asymmetric syntax in terms of endocentricity, phrase structure and, consequently, recursive embedding. My hypothesis is that assuming the catastrophic scenario, more than one catastrophic event must have happened in a very short time. Given that human vocal tract and human phonetics and phonology have several unique features compared with Great Apes (hierarchical but non-recursive structure, speech imitation skills, abundant use of formants, lack of laryngeal air sacks in the vocal tract) and given that the phonological form constitutes the interface of the human syntax, the mere addition of *Label* to the already existing operations of the protolanguage is insufficient, since (1) it does not account for the emergence of the phonologically interfaced syntax, (2) it fails to explain the indisociability of non-syntactic elements of language in terms of phonology, semantics and syntax as evidenced in Jackendoff (2011). Consequently, I assume that human language emerged as a result of at least two catastrophic processes: catastrophic emergence of phonetics and catastrophic emergence of syntax accompanied by the rapid expansion of the lexicon, the latter possibly as a result of a quantitative rather than qualitative development. The emergence of human phonology might have occurred gradually, but as a result of the catastrophic emergence of phonetics.

Keywords: language faculty, catastrophic scenario, gradual scenario, recursion, Merge, Label.

1. Introduction

The question of the origin of language, a scientific question so fundamental to humankind and our civilization, was once a subject of scientific censorship. Remarkably for some, this scientific censorship did not happen in the Middle Ages, but in 1866 in post-revolutionary and post-Enlightenment France when the Linguistic Society of Paris imposed a ban on discussing the issue, considering the problem unsuitable for scientific investigation. Later on the topic again attracted scientists' attention, despite the fact that exploring the topic is highly speculative given the oft-repeated dictum that "language does not fossilize." Today there are two major trends with respect to the origin of language: evolutionary (gradual) and catastrophic (saltational). The former treats the origin of language as a linear evolutionary process of developing human language out of the communication systems of non-human animals. The latter assumes that at some point in history human language suddenly emerged, without intermediate stages between animal communication and full-blown human language as we know today.¹ Below I argue in favor of the catastrophic scenario. I will briefly summarize the selected syntactico-centric hypotheses that relate the problem of the instantaneous emergence of language with a catastrophic emergence of syntax and show that these are insufficient, since human syntax is inherently interfaced with phonology, which is based on human phonetics. The latter, as I argue, must also have arisen catastrophically, since human phonetics does have some unique human-specific features that are absent in primates. As a result of the evidence provided by Fitch (2000), such features are not human-specific in the absolute sense, as they have equivalents in the phonetic repertoires of sea mammals and some birds, yet these are not considered possible candidates for any possible evolutionary ancestors of humans. Therefore, I find it justifiable to conclude that the emergence of human syntax and human phonetics were two related catastrophic processes, or even a single manifestation of a single catastrophic process of the emergence of human language as a whole.

2. Catastrophic emergence of language – evidence

Catastrophic emergence of language vs. gradual language evolution

The catastrophic emergence of language, improbable though it appears for those who believe that the most natural explanation is a step by step process, appears on the contrary to be the simplest and best empirically accounted for hypothesis for Bickerton who concludes that "(...) the burden of proof lies squarely upon the shoulders of those who would claim the emergence of syntax as a gradual process or a series of several events, rather than a single catastrophic process" (Bickerton 1998: 351). His arguments are based on attested processes of the emergence of syntax-ful languages from syntax-less protolanguage, *i.e.* formation of creoles from pidgins and first language acquisition, or the reverse processes of the return from syntax-ful language to protosyntactic protolanguage in language-related disorders (aphasias and disphasias).² Besides, Bickerton (1998) mentions that had language evolution been a gradual process, it

1 A separate problem is the origin of language variation after the emergence of full-blown human language. I acknowledge this problem, but its discussion is beyond the scope of this article.

2 Of course, the problem is actually much more complex. However, the comparative studies of various kinds of pidgins or various types of language related disorders is beyond the scope of this paper. The argument concerning first language development is indirectly referred to in the subsequent part of the paper while discussing Jackendoff and Wittenberg's (2011)

would have left some traces in terms of archeological evidence: some form of a gradual development of civilization correlated with the gradual language evolution, something that is not attested by archeological evidence. On the contrary, as Bickerton (1998) emphasizes, the archeological evidence indicates that civilization and syntax-ful language are correlated, as there is no indication of civilization at the time before human language is assumed to have originated and there is abundant evidence for civilization in the post-linguistic era. All things considered, Bickerton (1998) concludes that intermediate stages between protosyntax and syntax are not only empirically disproven but even theoretically hard to imagine, there is either syntax or no syntax at all, but not some form of semi-syntax.³

A different perspective is entertained by Jackendoff and Wittenberg (2011). In their hierarchy of natural grammars they propose the following intermediate stages between syntax-less protolanguage and syntax-ful language:

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|-----|----|---------------------------------|--|---|
| (1) | a. | One-word grammar | [_{Utterance} Word] | [<i>Traditional notation</i> : Utterance → Word] |
| | b. | Two-word grammar | [_{Utterance} Word (Word)] | [Utterance → Word (Word)] |
| | c. | Concatenation grammar | [_{Utterance} Word*] | [Utterance → Word*] |
| (2) | | Simple phrase grammar | [_{Utterance} Word/Phrase*]
[_{Phrase} Word Word] (2-word phrase) <i>or</i> [_{Phrase} Word*] (unlimited phrase) | |
| (3) | | Recursive phrase grammar | [_{Utterance} Word/Phrase*]
[_{Phrase} Word/Phrase*] | |
| (4) | | Compounding: | [_{Word} Word Word] | |
| | | Affixal morphology: | [_{Word} {Word/Stem, Affix}] (either order) | |

(Jackendoff & Wittenberg 2011: 2, their examples 1–4)

However, I do not consider their hierarchy of grammars neither theoretical nor empirical evidence against the catastrophic scenario. Actually, the catastrophic scenario does not necessarily entail the lack of any stages at all. Clearly, numerous diachronic processes of language change, both quantitative and qualitative, occur gradually. This might also have been the case with the beginning of language variation after the period of a single human language. Yet I perceive such gradual changes as either changes within the syntax-less protolanguage or as changes within syntax-ful language, not as intermediate stages between language and protolanguage. For example, assuming that Everett (2005, 2009) is indeed right with respect to his point that Pirahã language does not make use of linguistic recursion and that it replaces recursive embedding with parataxis (see also Nevins *et al.* 2009 for a contrary view), one may argue that Pirahã might in the future develop recursive embedding by undergoing a gradual change of the type (2) → (3). But this would be a diachronic change within a single syntax-ful language, since in line with both Everett (2005, 2009) and his critics (most notably Nevins *et al.* 2009) Pirahã is a syntax-ful language. It is a language of a monolingual speech community that makes use of some very complex structures in

hierarchy of grammars, which the authors consider to reflect the process of first language acquisition. Below I argue that even if their hierarchy of grammars is correct, it is not a convincing argument for the gradual scenario.

3 I discussed Bickerton's arguments in more detail in Napierała (2009).

terms of morphology and tonal system, hence it is not a syntax-less pidgin or a contact language that one might classify as protolanguage. By the same token, it is possible to imagine a change like (1a) → (1b) → (1c), but this would most probably be a diachronic change within a syntax-less protolanguage, for example in a given pidgin or in the process of first language acquisition. Therefore, I conclude that the numerous stages provided by Jackendoff and Wittenberg (2011) are not to be interpreted as evidence for the gradual scenario. Even if we assume that all these stages are legitimate given that syntax-less protolanguage and syntax-ful language differ qualitatively rather quantitatively, which is even observable at a pretheoretic level, the follow change in (5) would still be saltational, no matter where the change in (5) should be located with respect to the continuum of stages (1)–(4), *e.g.* at the stage (1c) → (2).

(5) syntax-less protolanguage → syntax-ful language

What might be this theoretical link with respect to the hierarchy of grammars proposed by Jackendoff and Wittenberg (2011)? I think that the satisfactory answer to the question about the missing link is very difficult to be found regarding the hierarchy of grammars for theoretical and empirical reasons. Given the fact that recursion in linguistics does not have a precise definition, such as, for example, in computer science (*cf.* Parker 2006), the distinction between (2) and (3) may not be as conspicuous as assumed by Jackendoff and Wittenberg (2011). But given the popular view that it is linguistic recursion that makes syntax-ful language different from pre-syntactic protolanguage (Hauser *et al.* 2002 and much of the subsequent literature), the difference between the two is equivalent to (2) → (3). Yet if recursion is equated with the combinatorial operation Merge, as it is often the case in the minimalist literature, I find no reason to claim that recursion is present in (3) and absent in (2) or even in (1c) since simple phrase grammar in (2) (or even 1c?) does make use of some form of Merge. The other possible problem for the hierarchy of grammars is the fact that some words appear to be problematic in regards to their position in this hierarchy. Bartosz Wiland (2012, personal communication) pays attention to “contractions, differences between morphological, syntactic, phrasal and phonological features, or even worse, partial overlap of these features, *e.g.* forms like isn’t, aren’t, [Polish] *byśmy*, *etc.*”. For me, this is still another argument in favor of the saltational scenario, as it is unclear how to posit these on the above hierarchy of grammars, an issue that is worth exploring in future research.

As for empirical evidence, it is worth bearing in mind that Pirahã is reported to have a rich morphology, even by Everett (2005) who argues for the syntactic simplicity of this language. This means that Pirahã is a language at stage (2) combined with (4), but without (3). This makes the overall picture quite complex, which I treat as an argument against the gradual process of (5). All things considered, even if the hierarchy of grammars from Jackendoff and Wittenberg (2011) is the correct way to capture various stages of linguistic organization, and if recursion was a vital step in the origin of language (both claims I doubt), it would still not be an argument for the gradual scenario, since then one set of stages would be intermediate stages within the system of a protolanguage, the other set of changes would be intermediate stages within the system of language (*e.g.* some diachronic processes), and some other stage, *e.g.* (1b) → (1c) or (1c) → (2) or (2) → (3) would still be a saltational change in order to account for the qualitative difference between syntax and no syntax.

3. Faculty of language in the narrow sense – what is it?

3.1. Syntactocentric approaches: recursion, Merge and Label

In regards to the discussion concerning a possible scenario of language origin, it is necessary to mention the notion of the language faculty (FL), subdivided into language faculty in the broad sense (FLB) and in the narrow sense (FLN). The nomenclature comes from Hauser's *et al.* (2002) seminal paper concerning the nature of the human language faculty. According to the definition from Hauser *et al.* (2002), FLB includes all elements of FL that are neither specifically human nor specifically linguistic, which means that they are shared between human and non-human animals or between human language and non-linguistic domains, such as for example music or mathematics. FLN, in line with their definition, includes only the elements that are both specifically human and specifically linguistic, *i.e.* not occurring in any other domain apart from human language. Hauser *et al.* (2002) hypothesise that almost all elements of FL are part of FLB, and FLN is delimited to a single element, *i.e.* "(...) the core computational mechanisms of recursion as they appear in narrow syntax and the mappings to the interfaces" (Hauser *et al.* 2002: 1573). Thus, the capacity for recursion, whatever it actually means in linguistics, would be a missing link between syntax-less protolanguage and syntax-ful language.

Their paper triggered off numerous debates, the most famous being Pinker and Jackendoff (2004) where the two authors claim that FLN includes much more, suggesting that the recursion-only hypothesis of Hauser *et al.* (2002) is based on an implicit reliance on the minimalist program (MP) that is based on the idea of a very simple syntax, delimited solely to the recursive operation Merge, the simplicity of syntax being achieved at the cost of relegating unwanted syntactic complexities to semantics in order to have an elegant minimalist theory, but at the cost of ignoring much of the empirical evidence. Also, Pinker and Jackendoff (2004) show that Hauser *et al.* (2002) ignore numerous elements of FL that are specific to the human linguistic domain, such as speech production, speech perception, phonology and some elements of morphosyntax like case or agreement. Even if some of them, like speech production and human phonology, are indeed shared by some nonhuman animals, these animals are in no way linked to any possible evolutionary ancestors of humans, as the animals capable of imitating human speech are sea mammals and some birds, not primates. Thus, the feature sharing is not a matter of homology but analogy. Therefore, Pinker and Jackendoff (2004) include such features in FLN, which, I think, is the right solution.

The debate inspired numerous papers concerning the problem of whether recursion is indeed the missing link between protosyntax and full-blown syntax and whether it is indeed the sole element of FLN. I already summarized some of these debates in Napierała (2009) and below I only mention one minimalist hypothesis I have not discussed therein. In the minimalist framework, recursion is often equated with operation Merge, therefore, one might suggest that Merge is this missing link. However, some claim that is just a subpart of Merge that constitutes FLN. The solution recently proposed by Hornstein (2009) is that Merge is a composite operation, comprising Concatenate, which is part of FLB, as it is also present in animal communication, and Label, which is specifically human and specifically linguistic, hence it constitutes FLN.⁴ The operation Label captures the phenomenon of syntactic asymmetry, constituency and endocentric phrase structure whereby two elements concatenate, but only

4 Interestingly, however, Hornstein (2009) does not discuss the nature of the specifically-human character of Label and its absence in animal communication or animal cognition of any animal species.

one of them gets more prominence and assigns its label (projection) to the product of concatenation, as expressed *in abstracto* in (6).

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$$(6) \quad \alpha + \beta \quad \rightarrow \quad \{\alpha, \beta\}$$

A more concrete representation of (6) is provided in (7) under the standard X-bar theoretic notation or in (8) in a way more compatible with the allegedly more natural Bare Phrase Structure convention.

$$(7) \quad \begin{array}{ll} \text{a. } \text{D}[\text{the}] + \text{N}[\text{park}] & \rightarrow \quad \text{DP}[\text{D}[\text{the}] \text{N}[\text{park}]] \\ \text{b. } \text{P}[\text{in}] + \text{DP}'_{\text{D}}[\text{the}]_{\text{N}}[\text{park}] & \rightarrow \quad \text{PP}[\text{in}[_{\text{DP}}'_{\text{D}}[\text{the}]_{\text{N}}[\text{park}]]] \end{array}$$

$$(8) \quad \begin{array}{ll} \text{a. } \text{Merge } \{\text{the, park}\} & \rightarrow \quad \{\text{the } \{\text{the, park}\}\} \\ \text{b. } \text{Merge } \{\text{in, } \{\text{the } \{\text{the, park}\}\}\} & \rightarrow \quad \{\text{in } \{\text{in, } \{\text{the } \{\text{the, park}\}\}\}\} \end{array}$$

In his work Hornstein (2009) suggests that it must have been the origin of Label that broke the original symmetry of the protosyntax and allowed for the hierarchical endocentric phrase structure that make use of recursive embedding. Interesting though it may appear, I do not find this hypothesis convincing. Leaving aside the technical syntactic discussion on whether Label is indeed needed for human syntax or not (Collins 2002), or whether Label is a syntactic or a semantic issue, I think that the Merge addition of Label to the Concatenate-based protosyntax is not enough to explain the catastrophic emergence of language.

This is because FLN appears to contain more elements than just recursion, no matter whether recursion is defined in terms of the embedding of elements/phrases within the elements/phrases of the same type, or in terms of a hierarchical phrase structure grammar, or in any other way. Actually, recursion itself is not implausibly even unnecessary for human language as such (*cf.* Parker 2006), the problem I discussed more extensively in Napierała (2009) and briefly acknowledge below. The problem is not easy to solve at present, since solving the problem would necessitate examining all animal species in terms of their potential for recursion, which is an impossible task, as the problem whether a given animal species makes use of recursion or of some alternative algorithm is by no means an easy task, as shown for example in the debate on whether Gentner's *et al.* (2006) starlings did master some rules for phrase structure grammar or whether they learnt the artificial songs in an alternative way. Interestingly, this is not only a methodological and empirical problem for animal communication research but even for linguistic research on humans, as evidenced by Fitch and Hauser's (2004) experiment that allegedly showed that humans were capable of parsing both recursive phrase structure grammar and non-recursive finite state grammar, while cotton-top tamarins were only capable of the latter. As Kochanski (2004) concludes, the effect attributed to the parsing phrase structure grammar constructions, not only by tamarins but even by humans, "could also be made by any other algorithms" (Kochanski 2004).

A different point of argumentation is the problem whether full-blown syntax-ful languages can make use of alternative strategies to recursion, such as parataxis.⁵ The ongoing discussion of the Pirahã language described by Everett (2005, 2007, 2009) may still shed more light on the issue. For the time being

5 Etymologically, however, one might contrast syntax and parataxis. The difference might be deeper than just etymological, as the two terms might be located at two opposite extremities of a symmetry/antisymmetry dimension, the issue I discuss in Napierała, forthcoming.

the phenomenon of Pirahã is either interpreted as a counterargument to Hauser *et al.* (2002) recursion-only hypothesis (e.g. Parker 2006) or as evidence based on methodological errors, as maintained in Nevins *et al.* (2009). It is beyond my capabilities to try to evaluate the pertinent conclusion of the debate, so I leave it to those more competent than me. However, no matter whether recursion finally turns out to be a *sine qua non* condition for human syntax, or whether languages can either make use of recursion or an alternative means, such as parataxis (not only in the case of Pirahã but also in the case of other possibly recursion-less languages, the most famous being perhaps Riau Indonesian described by Gil (2009)), I still assume that FLN must contain more elements.

3.2. Semantics and lexicon

There are many of them. One might be what Hurford (2004) calls semantically compositional syntax.⁶ It means that syntactic alterations are correlated with particular semantic alterations. Except for the presence of this feature in honeybee dance, this feature will be classified as FLN given the above criterion that it is biological homology that relegates FL elements to FLB, not biological analogy, especially such a highly specific analogy as honeybees' semantically compositional syntax. To illustrate how specific this analogy is, it is worth quoting Hurford (2004) in full:

Perplexingly, the best example of semantically compositional communication outside humans has been found in a species only very distantly related to us, honeybees. Honeybees communicate the location of food by a two-part signal; one part conveys the distance of the food from the hive, and the other conveys the direction. Composing distance and direction yields location. This system differs in many ways from human languages. Most obviously, it is extremely limited; it is also innate, and iconic, rather than symbolic, as the individual parts of the signal are iconically related to their meanings (faster waggle means nearer food, angle of dance to the vertical means angle of flight to the sun). (Hurford 2004: 556)

Of course, the issue of semantically compositional syntax being part of FLN cannot be definitely established, as it is by far easier to prove that something exists rather than to prove that something does not exist. Although one might follow Hurford's further argumentation that the semanticity of complex birdsongs or of some primates' songs are expressed holistically and there is no evidence for the overlap between the syntactic (or, perhaps more precisely, protosyntactic) organization and semantic organization, yet it appears to be a hardly possible task to examine all species of birds, primates, dolphins, *etc.* with respect to semantic compositionality. As it is often the case, some future research might prove some correlation between protosyntax and semantics therein. But even if this is finally proven, it is quite likely that semantic compositionality in humans and some animals might appear to be not only quantitatively but even qualitatively different, just the way it is with still another property of FLN in line with Hurford (2004), *i.e.* learned symbolic lexicon.

As for arbitrary lexicon, Hurford (2004) classifies it as a uniquely human feature, even though he admits that the differences between humans and animals are quantitative, not qualitative. Even though Hurford (2004) stresses the fact that animal symbolic communication is often inborn (as is the case with the previously discussed honeybee dance), yet he acknowledges that some human symbols are also inborn, while some animal symbols are also clearly arbitrary. The well-known examples of Great Apes

⁶ This section is basically based on Hurford (2004) and my reflections concerning his arguments.

trained in American Sign Language clearly demonstrate that these primates are capable of using arbitrary learned symbols. Many other animals, *e.g.* dogs, cats and horses, can also properly react to the verbal instructions used by humans. Therefore, I only acknowledge the problem concerning the lexicon without discussing the issue in more detail, since the differences between humans and other animals (including primates) are not qualitative, which makes the gradual scenario more likely here. Yet the gradual scenario of the development of human lexicon is perfectly compatible with the saltational emergence of human language as such, since by the gradual process only the protolanguage originates in a process equivalent to pidgin formation or first language acquisition.

3.3. Phonetics and phonology

Interestingly, I daresay that human phonetics in general should be classified as part of FLN. The idea is not novel, as the uniqueness of phonology in terms of FLN considerations was discussed in Pinker and Jackendoff (2004), relying both on the well-known facts concerning the qualitative differences between humans and Great Apes with respect to phonetics as well as on the literature review, especially on Mark Liberman's hypothesis that "Speech is special." However, when Pinker and Jackendoff (2004) discuss phonetics, they use the name phonology, which is somewhat imprecise in this context. As Bartosz Wiland (2012, personal communication) rightly noticed, many aspects of phonology are possible without phonetics, as it is the case with sign language which has phonology but not phonetics. Therefore, what I treat as FLN is phonetics, not phonology. As for phonology, I classify it as FLB, since many animals properly react to human phonemes. Below I argue for the catastrophic emergence of phonetics, not phonology, even though human phonology interfaced with human syntax is certainly intertwined with human phonetics. This is a relevant point, since all syntax-ful languages of speech communities capable of speaking are vocal languages. Discussing the issue at length is beyond the scope of this paper, however.

Interestingly, the evidence I provide below is mostly based on the interdisciplinary research summarized in Fitch (2000), which is somewhat surprising given the fact that two years later William Tecumseh Fitch argued in favor of the abovementioned recursion-only hypothesis in Hauser *et al.* (2002).⁷ As for his arguments from Fitch (2000: 258), he claims that "(...) most aspects of speech acoustics, physiology and neural control are shared with animals, and thus open to empirical investigation," though except for the construction of the vocal tract and the ability to imitate speech. These two appear to be uniquely human among primates.

As for the uniqueness of the construction of the human vocal tract, Fitch (2000) pays particular attention to the lowered larynx. This makes the phonetics used by human languages possible. Other primates, including Great Apes, are incapable of producing most human sounds from human phonetic inventory. Therefore, the ape language projects are based on sign language. Even though the trained apes certainly have the motivation to learn human language, they cannot master human phonetics due to the difference in vocal tract. Ape vocalizations make use of vowels, whereas human phonetics makes use of consonants and vowels, languages varying from more to less consonantal cross-linguistically. As the results from the researches summarized in Fitch (2000), there is currently no evidence for the gradual evolution of larynx. This feature is not attested at any pre-*Homo sapiens* stage. Although Fitch (2000)

⁷ Fitch (2000: 258) claims that "(...) the evolution of speech can be studied independently of the evolution of language." In the current paper I clearly disagree with Fitch (2000) with regard to this separationist approach. Actually, I do not see any rationale for treating the origin of language and speech as independent on both empirical and occamist considerations.

admits that lowering the larynx is possible, as it is the case in human ontogenesis, the current evidence appears to support some catastrophic process resulting in the emergence of the human vocal tract as such. Apart from the lowered larynx, Fitch (2000) discusses a number of features of the human vocal tract that are unique or almost unique among primates. First, Fitch (2000) mentions the lack of laryngeal air sacks in the human vocal tract, which is dissimilar to all Great Apes and most primates. Although he states that the relevance of laryngeal air sacks has not been conclusively established, the lack thereof is certainly worth mentioning. Second, he mentions the quantitative difference between humans and other mammals in the use of formants, since “(...) humans make unusually heavy use of formants: they are the single most important parameter in human speech” (Fitch 2000: 260). However, as a quantitative change, this is of less importance for FLN considerations. Third, Fitch (2000) discusses the hierarchical (but probably non-recursive) structure of human phonology marked by “(...) hierarchical organization of speech segments (consonants and vowels) into higher-order structures (syllables, words, sentences)” (Fitch 2000: 261). Even though this pertains to phonology which I consider part of FLB, this is also linked with articulatory phonetics: Great Apes are incapable of producing such hierarchical structures, no matter what kind of rewards are offered to the learning apes. This is the result of the foregoing problem of the difference in the vocal tract morphology responsible for the qualitative difference between human speech and ape calls. This is also a good argument for the catastrophic emergence of human phonetics. In regards to the ability to imitate speech, Fitch (2000) provides ample evidence for its qualitative uniqueness among primates, which I find worth quoting in full:

(...) there is one clear and undisputed difference between human vocal control and that of other primates. We are consummate vocal imitators, easily learning to produce whatever speech sounds we grow up with, together with musical sounds like singing and whistling. In sharp contrast, no nonhuman primates can learn to produce numerous sounds outside their ordinary species-specific repertoire. Attempts to change the vocal repertoires of monkeys by cross-fostering them with other species have been disappointing. Although evidence for vocal matching in primates exists, and primates can be trained, with difficulty, to modify their calls, the amount of acoustic variability observed is trivial compared with that necessary for human speech or song. Even chimps raised in human families, with extensive training and abundant rewards, fail to produce more than a few spoken words. By contrast, many studies have demonstrated that apes have the capacity to learn new gestures, pair them dependably with meanings and use them communicatively. Despite these good communicative abilities, and a capacity for perceptual learning of new sound–meaning pairings, the ability of nonhuman primates to produce learned sounds is limited or nonexistent.

This fact is made more curious by the abundant documentation of vocal imitation in nonprimate species. (Fitch 2000: 261)⁸

However, the nonprimate species with the ability to vocal imitation (seals and cetaceans mentioned by Fitch (2000)) and so-called talking birds like parrots, mynas, and to a certain extent also starlings and ravens capable of imitating human speech with human-specific phonetics and phonology are not assumed to be in any evolutionary ancestral relation to humans, hence their interesting imitative behavior does not pose a challenge to my FLN hypothesis and the catastrophic scenario.

⁸ An inquisitive reader is invited to get acquainted with this passage in the original source, as his claims are supported with numerous links to bibliography I omit in this paper.

4. Summary of the results: general picture of FL

64 As illustrated above, human language appears to be a complex phenomenon, contrary to the central idea of the Minimalist Program. It appears to have some uniquely human features (FLN), which have analogy in animals not considered to be possible candidates for human ancestors, but do not have any analogies in Great Apes, the closest candidates for an alternative evolutionary scenario. These features include at least human syntax and human phonetics. Apart from that, there are numerous aspects of language (FLB) that are shared between humans and other primates, but with quantitative rather than qualitative differences, like arbitrary and learnt lexicon. Elements of syntax, semantics, phonetics-based phonology are all parts of FL, with complex interactions among them all. The complex interactions, with partial overlaps among several modules and partial mismatches among them resemble the general model of FL somewhat similar to Jackendoff's (2011) Parallel Architecture Model in my opinion. Given the validity of Bickerton's (1998) argumentation concerning the lack of evolutionary time for the gradual emergence of such a complex phenomenon as human language, archeological and theoretical evidence against the evolutionary scenario, as well as the arguments against the gradual scenario of the emergence of speech, I deem the saltational scenario more probable.

5. Conclusion

The current paper has analyzed the controversial issue of the emergence of human language that was once subject to scientific censorship in modern times with respect to selected arguments for the gradual and catastrophic scenario from the theoretical and empirical point of view. It has shown that Jackendoff and Wittenberg's (2011) idea of the gradual scenario, even if assumed to be the right one despite the theoretical problems their hierarchy of grammar poses, does not contradict the possibility of the catastrophic scenario. On the basis of Bickerton's (1998) arguments that it is even hard to imagine the concept of semi-syntax and the ample evidence against its gradual evolution based on the empirically attested processes of the formation of syntax from protosyntax, I assume that syntax emerged catastrophically. On the basis of the clear evidence that speech imitative skills and the ability to produce human speech are uniquely human among primates and given the lack of any archeological evidence for the gradual evolution of speech, I conclude that the origin of human syntax must have been accompanied by a catastrophic emergence of phonetics. Not implausibly some other aspects of language might also have been connected with the two catastrophic changes, like semantically compositional syntax. However, given the almost impossible task of conducting comparative interdisciplinary research on human language and its possible counterparts in all animal species, a plethora of questions will remain open for future research.

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