

‘Protolanguage’ and the Evolution of Linguistic Diversity^①

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1. Introduction

The last two decades of speculations on the phylogenetic evolution of language have been especially marked by the debate over whether this proceeded gradually or abruptly from the “protolanguage” proposed by Bickerton (1990ff) to modern language. Bickerton has specifically also argued that pidgins, along with child language up to 30 months of age and the communicative means taught to chimps, are the kinds of fossils that can inform us about the nature of the putative “protolanguage,” a “stage intermediate between no language and full language” (Calvin & Bickerton 2000: 104). He identifies his position as “catastrophic” (Bickerton 1998), a position he still maintains (Bickerton 2006, 2007) against the gradualist approaches submitted by such scholars as Fitch (2002), Jackendoff (2002), Lieberman (1984, 2002), MacWhinney (2002a, 2002b), Wray (1998, 2002), and Wang et al. (2005).

Underlying Bickerton’s hypothesis is the traditional position that creoles emerged abruptly, by the agency of children, who, guided by the “language bioprogram,” would have used no materials other than the lexicon from their parents’ pidgins and would have innovated their grammars *ex-nihilo* (Bickerton 1984a, 1999). We could thus conclude, like McWhorter (2001), that creole grammars are the simplest, or perhaps the most

① I am grateful to Elly van Gelderen, William Wang, and Maggie Tallerman for useful feedback on an earlier version of this essay. I am solely responsible for the remaining shortcomings, especially regarding my (mis?) interpretation of Bickerton’s “protolanguage” and its implications.



“primitive” (Bickerton 1984b), of all modern languages. They too should presumably shed some light on the “leap” from “protolanguage” to “true language” in Bickerton’s terminology.^①

I argue in Part 2 that while creoles and pidgins can give us some “hints” (Mufwene 1999) about how modern language has evolved in mankind, they do not at all suggest “catastrophic evolution.” Siding with gradualists, I submit in Part 3 that the static “protolanguage” hypothesized by Bickerton, spanning perhaps 2 – 1.5 million years until the emergence of early *Homo sapiens*, may never have existed in the phylogenetic evolution of language. I show how the alternative notion of “proto-language” proposed by Ruhlen (1994), in reference to the common ancestor of modern languages by the time *Homo sapiens* migrated out of Africa about 60,000 years ago, may be more justified empirically.

In Part 4, I argue that a gradual and adaptive account of the evolution of language, in response to ecological pressures, seems to be more convincing. I devote Part 5 to two questions: 1) Assuming a “proto-language” à la Ruhlen, how can we account for the extensive typological diversity that obtains among modern languages today? 2) Assuming that prelinguistic means of communication in the phylogeny of hominids consisted of both vocal symbols and gestures and that, as suggested by McNeill (2005), signed language must have evolved from gestures, how can we account for the fact that speech has evolved to be the demographically dominant linguistic modality? Part 6 sums up the paper.

2. Bickerton’s pidgin-based arguments are question-begging

This part is organized into two sections. In the first, I show what is wrong with the

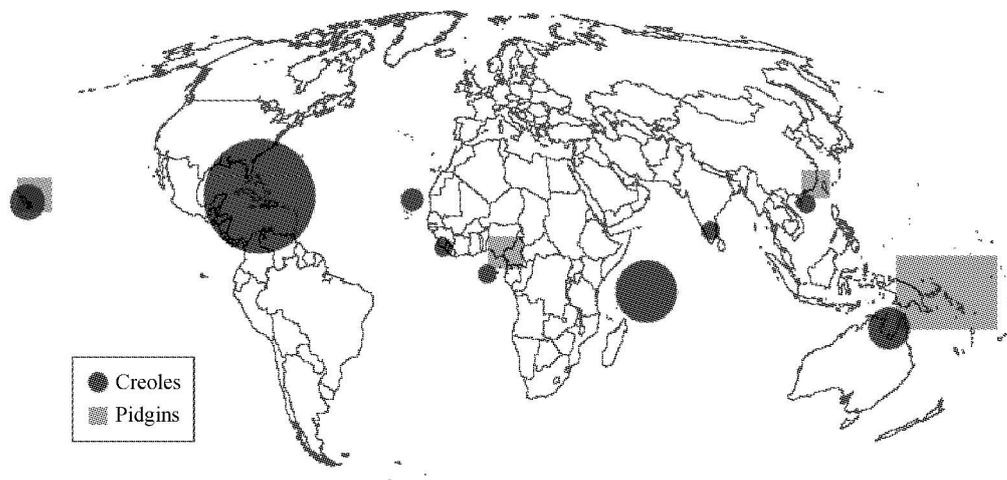
① Bickerton observes that in child language “ontogeny recapitulates phylogeny” (Calvin & Bickerton 2000: 206) and syntax emerges by “a sudden spurt that takes one pretty close to adult competence in a few weeks or months, followed by a gradual filling-in of the picture that takes years” (*ibid.*, p. 207). The position may indeed be identified as gradualist, but he characterizes the latter phase as a “series of Baldwin effects that any such exaptation would be bound to bring *in its wake*” (*ibid.*, p. 150; my emphasis). Otherwise, the emergence of syntax that concerns him is what turned the “protolanguage (...) into a full language *by a single exaptation*” (my emphasis; *ibid.*, p. 150). Note also that the alleged explosion of syntax in children at the age of 2 is debatable. A diary I kept of my own daughter’s language development at about the same age (Mufwene 1999) reveals gradualism, though the time intervals between the different strategies were sometimes just a couple weeks, consistent with Burling’s (2002) observation on the same topic. As argued in Mufwene (2001), gradualism is not incompatible with rapid evolution.

claim that pidgins can inform us about the nature of the Bickertonian “protolanguage.” In the second, I answer affirmatively Botha’s (2005) question about pidgins as a window into the evolution of language. Although I dispute Bickerton’s arguments, I argue that creoles and pidgins can still inform research on the evolution of language not because they are evolutionarily unique but because of the peculiar way genetic linguistics has been practiced, as they prompt us to pay attention to ecological pressures on language evolution that have unduly been overlooked in other cases. Since most of these arguments have been articulated in Mufwene (2001, 2005, 2008), I will just summarize them below.

2.1 Pidgins and “protolanguage”

Regarding the light that creoles and pidgins can shed on the evolution of language, Bickerton (1990ff) bases his hypothesis on two traditional assumptions, viz., creoles emerged from antecedent pidgins and, in their early stages, these had no syntax and were therefore protolinguistic. However, research grounded in the socioeconomic history of the territories where creoles emerged, especially Chaudenson (2001, 2003) and Mufwene (2001, 2005, 2008), has shown that the plantations settlement colonies, where creoles emerged, evolved gradually from farm-size homestead communities into large plantation societies. The living conditions of the initial, homestead phase were intimate. The African captives, who typically were demographic minorities then, interacted regularly with the European colonists. Such ethnographic conditions were not conducive to the emergence of pidgins as reduced means of communication associated with sporadic contacts, such as seasonal trade. Indeed, pidgins based on European languages developed typically in the trade colonies of Africa and the Pacific, later than creoles in the latter region (generally in the 19th century), leading to the complementary geographical distribution of contact languages illustrated in the map below. ①

① The main reason why pidgins developed later, while trade between Europeans and the indigenous populations of Africa had started much earlier, is explained in Mufwene (2005, 2008). Portuguese had generally functioned as the lingua franca of trade and diplomacy, all the way to Japan, up to the 19th century (Huber 1999, Ostler 2005). Interpreters played an important role during the relevant contacts, as also highlighted by Fayer (2003). It’s only later that English, for instance, was widely used for trade, without interpreters, and would evolve into pidgins, by basilectalization, just like creoles.



Map 1: Geographical distribution of creoles and pidgins based on European languages

To be sure, both a creole and a pidgin developed on Hawaii. However, as pointed out by Roberts (1998, 2005), they evolved concurrently, with Creole in the city and Pidgin on the plantations. European languages evolved differently in the Atlantic and Indian Ocean areas, where no pidgin developed among the slaves, Creole evolved on the plantations, and closer approximations of the varieties spoken by the European colonists developed in the city and on farms (Mufwene 2005, 2008). Although some pidgins, identified as *baragouins* by French colonists, did indeed evolve in the New World (Prudent 1980; Chaudenson 2001; Wylie 1995), they did only out of trade interactions the European colonists had with Native Americans, with whom they interacted less regularly. As a matter of fact, the vast majority of these pidgins (e. g. , *Lingua Geral*, *Mobilian*, *Chinook*, and *Delaware Jargons*) were based on indigenous languages and some may have started before the European colonization.

Undoubtedly, the adult captives of the homestead phase of the plantation settlement colonies went through an interlanguage phase, like all naturalistic L2 - learners, but the ecologies of their existence favored improvements toward closer approximations of the varieties spoken by the European colonists, and their xenolectal features had little influence on the speech of their Creole children, who targeted the linguistic features of the economically dominant European population.

It is during the plantation phase that the language varieties spoken by (descendants of) the slaves started diverging from those spoken by (descendants of) the European colonists. The primary reason for this divergence is not so much the segregated

population structure that had then been introduced as the new pattern of population growth triggered by the booming plantation industry. Because Black Creoles of the homestead phase spoke like White Creoles, there would have been no reason for the colonial vernaculars to diverge if the slave plantation population had not started to grow more by importation than by birth and if population replacement, caused by harsher living conditions and the increasing death rate, did not rapidly bias the population proportions in favor of African-born, Bozal slaves (Baker 1993).

Thus, fewer and fewer learners, including children, were exposed to the native vernaculars of homestead phase. Instead, more and more “seasoned slaves,” L2 – speakers who had arrived some years earlier, served as model speakers and more and more of their xenolectal features were selected into the emergent colonial vernaculars that would soon be identified as “creoles.” As communal varieties, creoles emerged thus by gradual basilectalization (i. e. , divergence away from the metropolitan and homestead varieties), with substrate influence being filtered through children (DeGraff 1999, Mufwene 2008), just like other, non-creole colonial varieties of the same European languages. One must also remember that the *termini a quo* were generally nonstandard koinés which were themselves in emergence then. As pointed out by Alleyne (1971) there has always been variation, since the beginnings of the plantation settlement colonies, in the ways that (descendants of) the African captives spoke the European languages. These have to do with differences in individual linguistic learning skills and variation in the linguistic histories of individual slaves, the usual kinds of factors that account for inter-idiolectal variation in non-creole communities (Mufwene 2005, 2008). The association of “creole speech continua” with “decreolization” (since Schuchardt 1914) is thus hyperopic.

If Creole children had any special role to play in the emergence of creole vernaculars, this had to do with how they selected features from their respective feature pools into their idiolects and what they made available as primary linguistic data to those who would learn the colonial vernaculars from them when they became “language transmitters” (Mufwene 2005, 2008). Otherwise, creoles are far from constituting a genetic or typological class in their own right. They differ among themselves in important ways. Just to give a couple of basic examples (out of many), French and English creoles resemble their “lexifiers” and differ from each other regarding the position of the determiners and adjectives, as well as in the patterns of their relative clauses. Thus, only English creoles strand the preposition in relative clauses and

questions. English creoles are also different in selecting a form that evolved from *what* and/or *where* as a relativizer, whereas French creoles use *ki < qui/que* when they follow the French pattern. It is also noteworthy that most English creoles of the Atlantic use *se < say* as a complementizer, whereas French creoles, especially those of the Atlantic, use no form based on *dire* ‘say’ for the same function.^① As argued by Chaudenson (2001, 2003), the structural similarities of these vernaculars are attributable as much to the typological kinship of their nonstandard “lexifiers” and to that of their substrate languages, not necessarily to the Bickertonian “bioprogram.”

The evolution of pidgins “lexified” by European languages proceeded in a way very similar to that of creoles (Mufwene 2005, 2008). They started with closer approximations of their nonstandard “lexifiers.” Those that survived the changes in the evolution of the colonies diverged gradually into basilects identified today as “expanded pidgins.” The earlier approximations were spoken by interpreters, who facilitated the initial contacts between Europeans and the indigenous populations. According to Fayer (2003), the original trade colonization relied on the assistance of free and enslaved interpreters, who of course had some privileges in exchange.

What has been identified as incipient pidgins may represent no more than the initial interlanguages of those other than the interpreters who attempted to speak the European languages without much exposure to them, especially when trade intensified. It is not evident that their productions were typically depleted of inflections and syntax. A lot depended on the typological kinship of the languages in contact. Inflections are attested in some of the examples cited by Bickerton (1981, 1984a) from Hawaiian Pidgin English utterances produced by Japanese speakers:

(1) *mista karsan-no tokoro to tu eika sel shite*

Mr. Carson-POSS place LOC two acres sell do

I sold two acres at Mr. Carson’s place. (Bickerton 1981: 9)

The nouns in this utterance contain the Japanese POSSESSIVE postposition — *no* and the LOCATIVE postposition — *to*; and the verb combination occurs sentence-finally, as in Japanese, the vernacular of the producer of this sentence. The use of the light verb *shite*, whose primary function in this case is to carry tense, also reflects influence from Japanese syntax. Moreover, it is not unusual in Bickertonian “true languages”

^① Although substrate influence has been the usual account, one must also consider differences in the ways English and French use *say* and *dire* quotatively in colloquial and nonstandard discourse (Mufwene 2001, 2005, 2008).

(including colloquial English and isolating languages such as Mandarin) to use null subjects. This utterance should prompt us to rethink Bickerton's equation of pidgins with his "protolanguage."

Bickerton's characterization of the syntactic variation in pidgins as "chaotic" because different speakers do not apply exactly the same word order nor use the same syntactic strategies deserves no less scrutiny. The examples he cites may illustrate no more than the state of Hawaiian Pidgin English before the emergence of a communal norm. This must have not been abrupt in Hawaiian plantations, as the contract laborers lived in ethnically segregated "houses," continued to speak their ethnic languages (viz., Chinese varieties, Japanese, Korean, Tagalog, and Portuguese), received work instructions in their respective languages from their foremen/interpreters, and attempted to speak English with other nationals sporadically.

If the Bickertonian "protolanguage" is associated with the mental structure of hominids before *Homo sapiens*, there is nothing in the particular way creoles and pidgins evolved, from extant languages, which suggests regression of their producers' mental infrastructures or language faculty to the level of *Homo erectus*. Nor is there anything in these linguistic adaptations that is different in kind from the evolution of European and other languages over the past 6,000 years. They certainly provide no evidence of a "great leap" from a prelinguistic to linguistic stage, although they have drawn our attention to various socio-ecological factors, overlooked in the traditional practice of genetic linguistics, that bear on language speciation.

2.2 Botha's question

If from the point of view of language evolution creoles and pidgins are not peculiar or different from other languages, what makes them so relevant to understanding the evolution of language? As Botha (2006) articulates the question:

How big is the heuristic potential of the putative pidgin window on language evolution? (2)

He answers his question as follows:

It is unlikely that much can be learned in a non-accidental way about (...)

language evolution (...) by drawing inferences about it from data about properties of (...) pidgins[, a phenomenon] that is itself poorly demarcated (11).

There is indeed a sense in which what can be learned about the evolution of language from the emergence of creoles and pidgins is only an accident of the traditional practice of genetic linguistics. It has unduly capitalized on the comparative method to establish how languages that have evolved from presumably the same ancestor, “proto-language” (to which I return below), are related to one another. The practice has assumed “uniparentalism” in describing language speciation and has typically discounted language contact, associating it with exceptions. Alternative, uniformitarian perspectives such as in Bailey & Maroldt (1977), Schlieben-Lange (1977), and more recently Mufwene (2005, 2008) have brought attention to the causation of the speciation process and have reminded us of the significance of population contact as an ecological factor. This is precisely part of the explanation Cavalli-Sforza (2000, 2006) presents to account for the diversification of modern languages (see below).

Besides, Bickerton’s invocation of pidgins to shed light on his “protolanguage” would not make much sense if these new language varieties had evolved in an exceptional way. It would be pointless to try to shed light on the otherwise typical evolution of language with information on untypical developments. As explained in Mufwene (2008), since they dispense with many structural features attested in the languages that their makers had spoken as vernaculars, they give a sense of those features that are phylogenetically the most deeply entrenched in the architecture of language (such as the Noun/Verb or Subject/Predicate distinction, spatial and temporal deixis, reference, predication, negation, and basic quantifiers) which can survive even the most dramatic restructuring of a linguistic “system,” consistent with Wimsatt’s (1999) notion of “generative entrenchment.”

Incipient pidgins can also help us understand evolution because they remind us of the chaotic ways in which new language varieties start, with every speaker trying to establish communication through their own individual strategies. (See also Wang et al. 2004, 2005 for similar considerations.) They show how long it takes for a communal norm to emerge, without necessarily eliminating variation and heterogeneity within the population of speakers or within the speaking individuals themselves. Speakers often maintain alternative strategies or forms to express the same meanings, which is in fact an asset in a heterogeneous population. The particular transition of pidgins to expanded

pidgins, which then function as vernaculars (like creoles), can also inform us about the particular conditions under which structures expand and norms emerge, basically when speakers interact regularly with each other in the new variety, attempt to meet new communicative needs, and are trying each to communicate like the others.

The evolution of pidgins, from incipient to expanded ones, shows us how (modern) humans “tinker” with the architecture of the languages they are learning to face their communicative challenges. They often avoid rebuilding new systems from scratch, dispensing with little of the target structures’ peculiarities that can easily be learned (as in cases of structural congruence) and transferring quite a few patterns from their current vernaculars. Through processes such as grammaticization they co-opt some current structures and forms for new grammatical functions. We can thus infer two noteworthy processes that apply to the phylogenetic evolution of language: 1) older means of communication were not necessarily dispensed with, as they were exapted to function in the communication “systems” that emerged later; 2) the reason for such ad-hoc exaptations is apparently that it is more expedient to work with what one knows already than to generate a new “system” from scratch.

The emergence of creoles leads to similar conclusions. Below, I will refer sometimes indiscriminately to both, even more to creoles, about which significantly more research has been conducted, when I invoke them again to explain how linguistic diversity may have emerged in mankind.

3. Characterizing the “protolanguage”

The concept of PROTOLANGUAGE has been conceived of in more ways than originally proposed by Bickerton (1990) for the means of communication consisting of vocal and gestural symbols used especially by *Homo erectus* between 1.5 million to 200,000 years ago.^① The vocal symbols putatively consisted of precursors of modern

^① Contrary to Maggie Tallerman (in an evaluation of the ancestor of this paper), I see only three basic kinds of interpretations, on which I focus below: 1) the “synthetic,” still held by Bickerton (2006, 2007) as non-gradualist but interpreted as gradualist by others such as Jackendoff (2002), Botha (2003) and Tallerman (2005) among others; 2) the “holistic,” proposed by Wray (1998, 2002), which is also gradualist; and 3) the consistently hyphenated “protolanguage notion,” also dubbed “proto-world,” developed independently by Ruhlen (1994), on the genetic linguistics model of “Proto-Indo-European” or “Proto-Bantu,” in reference to an initial modern language which has speciated into present-day languages.

phonetic systems and were strung together by the simple syntax of concatenation, plus some other characteristics. In his own words:

It seems likely, then, that protolanguage did develop a set of protogrammatical items, that is, meaningful if somewhat abstract units that may have included some or all of the following: negators, question words, pronouns, relative time markers, quantifiers, modal auxiliaries, and particles indicating location. But this may not have been the only contribution that protolanguage made to true language (1990: 185).

One of these other contributions must have been the identification of thematic roles, although Bickerton finds it unlikely “that these roles would have been systematically expressed” (187). The modern syntactic features that he finds missing from the protolanguage include the following:

Infinitely recursive processes; the binding of anaphors and the traces of moved constituents, ‘proper’ as well as ordinary; case assignment; the processes by which null elements are identified; constraints on movement; adjunction, conjunction, and the embedding of constituents; not to mention a host of technical concepts such as ‘scope’, ‘valence’, ‘c-command’, ‘bijection’, ‘subjacency’, (...) ‘quantifier-float’, ‘extraposition’ ‘exceptional case marking’, ‘preposition stranding’, ‘chains’, ‘parasitic gaps’, and many more that, doubtless to the reader’s relief, will not be discussed here (188).

Typologists will undoubtedly notice that many modern languages do not have some of these syntactic features, such as case assignment, extraposition, preposition stranding, and parasitic gap. The list of items reflects a strong theoretical bias, as also noted by Li (2002), and too much English bias. The identification of null arguments not governed by syntactic constraints as protolinguistic (Calvin & Bickerton (2000: 137) would make Mandarin and similar languages less evolved. Nonetheless, Bickerton intended to highlight how primitive the protolinguistic syntax must have been and what kind of “great leap” the shift from “protolanguage” to “true language” must have been some 200,000 years ago. Despite these lacks, the “protolanguage” was putatively as symbolic as modern languages, thus it must have had the property identified by Hockett

(1960) as “displacement,” which enables its users to communicate not only about their immediate environment and present mental and emotional conditions but also about the past and the future. After all, Bickerton (1990) says it must have had “relative time markers.”

As observed in Part 1, Bickerton does not claim that all syntactic features of modern languages emerged wholesale during the alleged “great leap” from “protolanguage” to “true/real language.” In his own words:

(...) what I formerly conceived of as a single step from protolanguage to true language can be broken down into two stages, one of exaptation (the core phrase-and-clause producing argument-structure machine) and one of Baldwinian evolution (adding mechanisms useful for marking the new structures with grammatical morphemes and making them more readily processable). These Baldwinian universals simply formed part of the cascade of change that was triggered the moment that the syntax engine started running; a cascade that included more rapid processing, clearer and faster articulation, as well as other ambiguity-reducing devices (Calvin & Bickerton 2000: 148).

This has misled some linguists such as Maggie Tallerman (2005) and Botha (2003) to interpret Bickerton's position as gradualist. However, Bickerton insists that he has shown how “a protolanguage could have been turned into a full language by a single exaptation” (*ibid*, 150). Bickerton (2006, 2007) argues explicitly against the gradualist interpretation, treating what he associates with the Baldwinian effect as normal evolution that must have followed after syntax had emerged. To quote his punch line in Bickerton (2007): “If syntax confers enhanced cognition, and no enhanced cognition emerged prior to the appearance of our species, then syntax could not have developed gradually, period.”

The gradualist interpretation is probably what would have made Bickerton's hypothesis more consistent with current hypotheses on the evolution of the hominid species. However, it would also raise the question of what particular stage in the evolution of language most deserves being identified as “protolanguage.” I return to this below.

Contrary to Bickerton, Wray (1998, 2002) argues that “protolanguage” need not have been symbolic or phonetic. It could have consisted of an inventory of holistic

expressions similar to the vocalizations of other primates. The complexity of the inventory would be limited not only by the amount of information its users could express at one time in a message but also by the total or largest number of different holistic messages one was able to distinguish and store in their memory. At the population level this limitation in complexity would also be a function of the total number of different messages the different members of a community could share, which in itself would be a consequence of the complexity of the users' minds.

Bickerton (2002) argues against this alternative, chiefly because it calls for another revolution to account for the transition to symbolic and phonetic communication. Bickerton also reiterates that his "protolanguage" need not have consisted of speech only, it could have been, and probably was, a combination of speech and gestures, used here as the ancestor of signed language. According to him, ecological pressures can be invoked to account for the prevalence of spoken over signed language in modern human populations. Such ecological pressures would be associated with bipedalism and the advantages of freeing the hands to do something else while speaking, as well as the ability to communicate in the dark or in settings where the interactants cannot see each other (see also Givón 1998, 2002).

On the other hand, Wray's hypothesis seems consistent with gradualism. Contrary to Tallerman (2005, 2007),^① one can interpret Carstairs-McCarthy (1999) as an articulation of how the communicative means of hominids would have evolved from inarticulate vocalizations to phonetic utterances, starting with the identification of recurrent syllable-size chunks in the vocalizations. These would have evolved to the ability to distinguish syllables from each other by the segments they consist of. Both evolutions, concurrent or successive, would have resulted in the explosion of the vocabulary and the need to develop some syntax of words, as gradually as proposed by Jackendoff (2002) and Lieberman (2002).

By the same token, one must, like Lieberman (2002) and Fitch (2002), match this protracted evolution with the various changes that marked the evolution of the hominid anatomy and mind from about 2.5 million years ago to about 150,000 – 100,000 years

① Due to space limitations, I will refrain from articulating here a host of reasons why I disagree with Tallerman's wholesale rejection of both Wray's and Carstairs-McCarthy's alternative proposals to the Bickertonian "protolanguage." They are not implausible if one interprets linguistic "systems" as emergent patterns rather than as integrated design(ed) sets of features. My demonstration to support this position would be too digressive for now. This demonstration, outlined in some chapters of Mufwene (2008), will have to wait for another occasion. I focus below on my position that any notion of "protolanguage" other than Ruhlen's appears to be unjustified.

ago. In particular, these involved the descent of the larynx, a reconfiguration of the skull and especially the basocranial structure, changes in the shape of the tongue, the growth of the brain size, and the emergence of the modern cortex. Wray's "protolanguage" need not be assumed to have lasted as long as Bickerton's. It may perhaps be identified with the incipient stage of Bickerton's "protolanguage." An articulate system would have gradually replaced the initial holistic one, after overlapping with it for a while. Indeed, Jackendoff (2002), who clarifies that the "protolanguage" was not replaced but was incorporated in later stages of the human language, claims that holistic expressions such as *shh*, *pst*, *hey*, and *ouch* are "fossils" of that particular phase of the evolution of language. Thus, the emergence of speech as the dominant modality of linguistic communication would have emerged before the extinction of *Homo erectus*, and along with it some basic (perhaps only concatenate) syntax, as well acknowledged by Bickerton himself. Thus, Corballis (2002a: 172) concludes that "at least a rudimentary form of speech may therefore have evolved in the common ancestor of ourselves and the Neanderthals by some 500,000 years ago."

The above modification of the Bickertonian "protolanguage" has the merit of suggesting an incremental evolution of language, which can be correlated with various stages in the anatomical and mental evolution of *Homo*. It suggests the co-option, by scaffolding (Wimsatt and Griesemer 2007), of some mechanisms that had already evolved independently for more adequate or efficient and complex communication, as also observed by Johansson (2003), among others. Bickerton (1990ff) disputes this gradualist account by successive stages of exaptations and adaptations, through selection, to various ecological pressures. He invokes primarily the present lack of linguistic "systems" intermediate between the communicative means of other primates and modern human languages as evidence against this account. However, as I show in Part 4, all the evidence stacks against his catastrophic hypothesis.

One can surmise that by the time *Homo erectus* vanished about 200,000 – 150,000 years ago, he would already have been close to speaking like modern humans. As noted by Buckley & Steele (2002: 37), there is no conclusive evidence that the Neanderthal did not use some form of speech at all, although he did not elaborate it like *Homo sapiens*. Lieberman seems correct in concluding that:

(...) *Homo erectus* most likely talked, had large vocabularies, and commanded fairly complex syntax. Full human speech capability, enhancing the

robustness of vocal communication, most likely is characteristic of anatomically modern humans (58).

The above considerations raise the question of whether we should not consider more seriously Lieberman's (2002: 52) conclusion that "'protolanguage' probably never existed in any hominid." It seems quite arbitrary to associate any particular stage in the apparently protracted evolution of language with the Bickertonian "protolanguage," especially if the different features he attributes to it did not evolve concurrently, as we will see in the next section. However, I should first present Ruhlen's (1994) alternative.

As noted above, what Ruhlen (1994) calls "proto-language" and others such as Jackendoff (2000) and Johansson (2003) identify as "proto-world" refers to a common ancestor from which all modern languages have evolved. It putatively evolved some 100,000 years ago. Conceived of on the model "Proto-Indo-European" or "Proto-Bantu," it is a hypothetical language reconstructed backward from the distribution of lexical items in modern languages and expected to have structures similar to those of present-day languages. Perhaps, more accurately, modern languages are hypothesized to have speciated from it in the same way Indo-European or Bantu languages are assumed to have evolved from their respective common ancestors. The cladogram proposed by Ruhlen (1994: 192) would correspond to the dispersal patterns of *Homo sapiens* from East Africa since about 60,000 years ago. Cavalli-Sforza (2000) argues that the distribution of genetic materials around the world corroborates this hypothesis, noting also that things are complicated by post-dispersal contacts between the migrating populations.

Thus, population and language contacts account jointly for the lack of isomorphism between the number of languages and that of ethnic groups (due partly to language shift under contact conditions), although language is often used to identify ethnic groups. They also account for the fact that the branching of language diversification illustrated by the Stammbaums of genetic linguistics does not always reflect the trajectories of the migrating populations. They were not always rectilinear or unilinear, and there were often intermediate dispersal points geographically, as also explained in Mufwene (2005, 2008). Sometimes populations in contact mix genetically but not linguistically, and some other times it is the other way around, although the contiguous parts of populations neighboring each other geographically and/or socially bear influence from each other

genetically and linguistically (Cavalli-Sforza (2000)).

As in the case of all such reconstructed proto-languages, it is legitimate to ask Trubetzkoy's (1939) question, as I do in Part 5, viz. , whether groups of *Homo sapiens* dispersing from East Africa would have spoken the same language. If they did, was this language necessarily homogeneous, regardless of how these questions are answered, Ruhlen's hypothesis prompts us to address another, related question typically overlooked in the literature on the evolution of language, viz. , what are the origins and causes of linguistic diversity in the world today? This is for me an important reason for concluding that Ruhlen's conception of "proto-language" is empirically more useful to understanding the phylogenetic evolution of language than any of the other alternatives, although Bickerton's hypothesis has the undeniable merit of stimulating research on how the evolution of language can be correlated to other aspects of the hominid phylogeny. I now turn to the latter question.

4. The gradual, protracted, and seamless evolution of language

There seems to be some relative consensus on the following phylogenetic facts. When the *Australopithecus africanus* emerged about 2.5 million years ago, he was already capable of communication by vocalizations and gestures, like other primates. McNeill (2005: 255) estimates that this capacity may have evolved much earlier, at least 5 million years ago, with *Australopithecus anamensis*, consisting of "something an apelike brain would have been capable of." There is no particular reason to doubt this, since any kind of communication means shared by modern humans and the great apes may have emerged before the speciation that occurred 7-5 million years ago.

The earliest forms of hominid communication must thus have been predominantly reflexive and affective (as among the great apes today), responding holistically to stimuli in the producer's immediate environment. Once *Homo*'s larynx had sunk already (see below), he must have been capable of producing a larger inventory of vocalizations than modern great apes. However, he may not yet have been able to produce articulate speech, with phonetic sounds, because he did not yet have the same cranial structure as *Homo sapiens*; nor did he have the kind of neural infrastructure that would have enabled him to manipulate his speech organs at will to produce speech. His brain was also too

small to control the kinds of complex mechanisms involved in speech and in the production and processing of language. If size does not really matter, his brain had not evolved yet to the kind of complexity required for linguistic communication. As explained by McNeill (2005: 247ff) and others, both gestures and vocalizations must have been used in combination in the earlier hominid populations all the way to *Homo erectus*, as both modalities are controlled by the same, Broca's area in the brain.

Communication by gestures may actually have prevailed by the time *Homo habilis* emerged about 2 million years ago, with the inventory of gestures increasing thanks to the co-option of some of the same manual skills involved in the production of tools (Hewes 1999), as members of different social groups must have endeavored to share their knowledge and to learn new techniques about tool-making. Thus, communication must also have become more and more intentional, referential, and symbolic, though there is no evidence that an (elaborate) form of speech would have evolved yet, for the same reasons stated above.

Pace Bickerton (2000ff), these observations highlight the relevance of social organization as an ecological factor in the evolution of language. As a matter of fact, Tomasello et al. (2005) and Wang et al. (2005) observe that social collaboration and cooperation are among the features that distinguish humans from other primates. This lends support to McNeill *et al.*'s (2007) hypothesis that the emergence among **hominids** of the ability to read each other's minds and to learn from each other must have led to the emergence of more complex language, which would express nuances of meanings, empathy, and different perspectives in the way situations are described and opinions and feelings are reported.

On the other hand, bipedalism, which has often been invoked as the critical factor in the emergence of speech as the dominant linguistic modality, did apparently not act alone in producing this change, although it must have facilitated tool-making and transportation of goods especially during the transition to life in the savanna. The complexity of pre-modern language must not have increased to the level of the Bickertonian "protolanguage" before *Homo*'s brain size increased. This evolution must have followed some changes in his basocranial structure (especially in *Homo erectus*) which enabled the complexification of his mind and social life. He was becoming more of a forager, was omnivorous, had domesticated fire, and lived in larger groups, which called for more complex social organization and more explicit and nuanced communication, especially when information must be reported.

I am aware of no paleontological evidence which suggests that the brain size increased abruptly, though there is apparently evidence of fluctuations, correlated with particular kinds of Homo involved (Hilton-Barber and Berger 2002). Bickerton (1995: 39) seems correct in observing that it should be more a matter of the reorganization of the brain structure than of the ⁱⁿincrease of its size.

Taking into account all the preceding, Corballis (2002a: 172) estimates that “at least a rudimentary form of speech may (...) have evolved in the common ancestor of ourselves and the Neanderthals by some 500,000 years ago.” This does not really corroborate Bickerton’s (1990ff) position that “protolanguage” must have been stable throughout the Homo erectus phase, especially if one accepts his concession (see above) that it already had some simple syntax. If Corballis is correct, the question arises of how the Bickertonian “protolanguage” consisting admittedly of speech and gestures could have remained stable, with simple, basic syntax, for at least 1 million years before speech emerged in the hominid phylogeny? There wouldn’t have been phonetic strings to which syntax could apply before 500,000 years ago. Bickerton’s position would not be problematic if it assumed gradualism and claimed, instead, that “protosyntax” would have emerged toward the end of the Homo erectus phase.

To be sure, Fitch (2000) argues that the descent of the larynx does not mark modern humans from other mammals as decisively as traditionally assumed. It does not account alone for the emergence of speech as made of sequences of phonetic sounds. Several mammals modify the position of their larynx, which enables them to produce louder vocalizations. Moreover, some mammals apparently have a permanently descended larynx, but they produce no speech. ^① According to Fitch, what distinguishes modern humans from other mammal is the possession of neural control mechanisms, situated in the cortex, which enable them to produce speech at will, i. e. , a wide range of phonetic sounds produced through the mouth and sometimes also through the nose. Fitch’s argument suggests that the evolution of speech itself must have been gradual, which may lend support to Wray’s and Carstairs-McCarthy’s conceptions of “protolanguage.” Regardless of whether it started with the identification of syllables or with that of individual sounds, speech was apparently enabled by the evolution of a complex mind among the most recent of our ancestors, who co-opted the descent of the

^① I also wonder how African parrots can imitate speech while their bucco-pharyngeal structure is so different from human speech organs.

larynx to advantage.

More and more scholars agree with Bickerton that the closest ancestor of modern language did not emerge until the last 150,000 – 100,000 years. He differs from them not only in positing a “protolanguage” in the way he does but also in claiming, especially in Bickerton (1995), that syntax enhanced modern humans’ capacity for complex thought. ① I think just the opposite, viz., that it is the emergence of a superior mental capacity in hominids, compared to other primates, which exapted current vocalizations and gestures to develop speech and signed language, in the way explained above. It is precisely because great apes lack a comparable mental capacity that they cannot advance past the Bickertonian “protolanguage” once taught human language.

We must also bear in mind that none of the indirect pieces of evidence that have been invoked in the literature to support or dispute the Bickertonian “protolanguage” involves the invention of a new language *ex nihilo*. ② They all have to do with learning a language already in place, even where members of a different species are involved. Even if one subscribed to the ontogeny-recapitulates-phylogeny assumption, none of the cases replicates the mind of *Homo erectus* or early *Homo sapiens*, nor the particular conditions under which the “protolanguage” would have emerged.

A position such as Jackendoff’s gradual account of the evolution of syntax makes rather arbitrary any cutoff point that one may propose between “protolanguage” and “modern language.” There is no compelling reason for assuming that the evolution of language differs in kinds from that of hominids. We can thus agree with Lieberman (1984, 2002), Ruhlen (1994), MacWhinney (2002a, 2002b), Li (2002), and Fitch (2002), among others, and hypothesize a protracted coevolution of language and other aspects of human evolution. According to them, different components of modern language did not evolve concurrently; some emerged later than others, being scaffolded by earlier evolutions in the hominid anatomical and mental structures, social

① Bickerton’s argument is actually quite curious. There is no evidence, even among modern humans, that the language of thought is structurally the same and is constrained by the same syntactic principles as spoken or signed language. It functions at a level where it need not be constrained by the physical modalities of spoken or signed language, such as being linear and having predominantly arbitrary symbols. Neither is there evidence suggesting that people who cannot speak cannot think like others unless they have learned or invented a signed language. The language of thought could be (partly) imagistic for that matter, as humans often have ideas they cannot express linguistically.

② Scholars working on home sign language (to which I return below) have stayed off this debate and only passing references have been made to the Nicaraguan Sign Language in the literature. As evidence, the latter supports gradual evolution and the role of social interactions in the expansion and normalization of the “system” (Mufwene 2008).

organizations, and even extant means of communication.

There are undoubtedly reasons other than those summarized above, but accounts of the evolution of language make more sense when presented from the perspective of ecological conditioning, with ECOLOGY situated partly within the anatomical and mental/neural makeup of the interactants and within the dynamics of social organization and interaction (Mufwene 2001). This ecological approach to the evolution of language by competition and selection complements and enriches the view that languages are complex adaptive systems (Steels 2000, Buckley & Steele 2002, Mufwene 2001, Wang et al. 2005, Gong et al. 2006, and Schumann et al. 2006), as it seeks to make partial sense of how the “invisible hand” works in producing communal languages and transforming them from one state to another. It also makes a contribution to the position assumed by the same scholars that languages are emergent systems, arising from self-organization out of successive ad-hoc adaptations that the interactants make to changing ecologies.

5. The origins of linguistic diversity

5.1 Why the world's languages vary typologically

Insofar as spoken language is concerned, Ruhlen and Cavalli-Sforza seem to agree on the probable timing of the emergence of “proto-language,” viz. , not long before the dispersal of *Homo sapiens* out of East Africa, probably 100,000 years ago. Since East Africa is a large territory and there must have been more than one band of *Homo sapiens* dispersed around, one can ask the following question: Is it justified to assume that this “proto-language” consisted of one single language? If it was, was it not internally variable? If it was not variable, how can we account for present-day typological diversity among the world's languages? If it was internally-variable, can we not assume the same thing of earlier stages in the evolution of language? These questions boil down to whether competition and selection played a role in the gradual evolution of language and in the emergence of typological diversity.

As remarked by Paul Mellars at the end of my presentation at the “Cradle of Language” conference in Stellenbosch (November 2006), there must have been several groups of *Homo sapiens* in East Africa; they must have dispersed at different times and

in different directions, with some of them colonizing others in the process. Indeed, in his account of the distribution of Y chromosomes around the world, Cavalli-Sforza (2000) also states that “there must have been more than one major migration from Africa to Asia” (156) and there must also have been “several centers of expansion at different times” (157).

Regardless of whether or not we posit one common origin for modern languages (an open question at this point), the different populations dispersing from different localities, which probably communicated less regularly with each other than inhabitants of modern villages even in less technologically developed countries, must have spoken different varieties. Under this conjecture, much of the present-day typological diversity among the world’s languages must be a legacy of that variation during the dispersal period. Different emigrants would have taken different varieties of the “proto-language” with them. Post-dispersal contacts between the migrants would have created new feature pools in which selection would have favored some of the competing structural variants for particular communicative needs (e. g. , *OV vs VO* for predication; and word order *vs* case marking and prepositions *vs* postpositions for thematic roles). Contact may account for the reality of mixed typologies in the structures of several languages, such as mixed *VO* and *OV* predicate structures or *Adj+N* and *N +Adj* patterns in the same language.

Creoles have been associated with a lot of internal variation in their structures, a phenomenon identified in the literature as “creole (speech) continuum.” In reality, this variability is observable in other language communities too, especially those whose varieties are stratified into standard and nonstandard ones, as hardly any native speaker produces only standard utterances. It is thus also possible that by the time of the dispersal out of East Africa, no single group had normalized their language variety into a uniform one in which there was no idiolectal variation. Then, as today, every language variety must have had variants competing for dominance; and different communities need not have innovated nor resolved competition among similar variants in identical ways. Present-day typological diversity among the world’s languages may be the ultimate outcome of varying dynamics, in different demographic and interactional ecologies. This conjecture is consistent with Cavalli-Sforza’s (2000: 153) conclusion that today’s linguistic diversity, with the ever-changing number of differing varieties, is the consequence of that long “history of migration and admixture of different people.”

Assuming the kind of geographical dispersal pattern hypothesized by Ruhlen (1994) and Cavalli-Sforza (2000, 2006), one can expect different migrant groups to have taken

different patterns of distribution of variants with them to their new settlements. One can thus also expect their respective varieties of “proto-language” to have evolved differently, with the outcomes contributing to more pronounced or more extensive speciation of what had been spoken and/or signed in East Africa. Subsequent contacts brought about by several layers of population expansion and colonization would have affected the variants of each prevailing language (variety) to have evolved in yet another direction. This is evident, for instance, from the dispersal of Indo-European languages, as their speakers spread in Europe and South Asia. Contacts with the indigenous populations and among themselves after the dispersal from the homeland caused their languages to diversify in ways similar to the latest migrations of Western Europeans to especially the New World and Australia since the 15th century (Mufwene 2005, 2008).

The above considerations are at variance with Bickerton's (1990: 174) stronger claim that only one individual must have experienced the magic mutation that produced modern language; it spread through learning by his/her contemporaries. This makes mutation almost the exclusive, but questionable, explanation for the emergence of language diversity. While this conjecture is consistent with his conception of “protolanguage,” it makes its emergence so unlike that of other cultural phenomena, which are typically the results of the contributions of many individuals to the solution of a common problem, even in science, where individuals tend to be credited with particular discoveries.

To be sure, in all hominid populations, as in modern  today, there must have always been individuals more skilled at communication than others. There must have always been more successful innovators than others, the successful ones being those whose innovations are copied by others and spread within their respective communities and perhaps beyond. From a uniformitarian perspective, it is unlikely that all innovations in any particular generation of any particular group would have been made by the same individuals, with the other group members waiting for them to develop a language variety they could copy. Various individuals must have contributed to the gradual evolution of their language at particular times.

Even scientific metalanguages have benefited from the additions or improvements that other users have contributed to them. My research on the development of creoles and pidgins (Mufwene 2001, 2005, 2008) suggests that all members of the populations in contact participated, not necessarily equally, in the emergence of these new language varieties, although nobody could anticipate whether their particular variants, deviations,

or innovations would be favored by particular socio-ecological factors to prevail over competing alternatives. This process seems to be true of any speaking population, even those not associated, unjustifiably, with contact (Mufwene 2001, 2005, 2008). The actuation of language evolution lies within the interacting individuals, under the pressure of a host of external ecological factors.

The conjecture submitted here regarding the emergence of linguistic diversity is predicated on variation within and across communities consisting of small hunter-gathering bands by the time of the dispersal out of East Africa. It is unlikely that Ruhlen's "proto-language" would have been homogeneous, exhibiting no interdialectal and inter-group variation. We need a competition-and-selection evolutionary approach to account for today's linguistic diversity among the world's languages.

5.2 Why speech is the dominant linguistic modality

Nobody has taken issue with Bickerton's correct hypothesis that "protolanguage" must have consisted of vocal speech and gestures, except for the question of whether speech had already emerged 1.5 million years ago. Otherwise his position finds support in observations such as by McNeill (2005) that gestures are regulated by the same neurological architecture that controls speech. This means that our hominid ancestors resorted to both vocalizations and gestures throughout the different stages of their prelinguistic communication. Modern humans still combine speech and gestures even when they are not interacting face to face. On the other hand, Deacon (1997), Hewes (1999) and Corballis (2002a, 2002b) conjecture that the earliest forms of communication among hominids must have been dominated by gestures, especially up to the time of *Homo habilis*. According to Li (2002a, 2002b) and MacWhinney (2002a), protolanguage evolved from gestural means of communication (about 5 – 6 million years ago) to vocalizations and eventually to phonetic linguistic systems (between 200,000 and 50,000 years ago). The gradual emergence of particular properties can be correlated with the successive evolutions of specific anatomical and mental infrastructures needed to scaffold the complex-thought-processing capacity required to manage and process modern human languages.

Overall, these positions raise the question of why spoken languages have evolved to be the dominant means of communication all over the world (Goldin-Medadow 2003a, 2003b). Has the physiology of the human being as an immediate ecology of language played a role in favoring spoken language over gestures or signed language, or is this

particular evolution the consequence of the coevolution of the hominid species with the physical ecology around it? The brief discussion below suggests that both factors are relevant.

Givón (1998: 89) seems to argue that ecological pressures had a lot to do with the prevalence of speech over signing as a language modality, although signing is not structurally less developed or evolved than speech. They include the following advantages that speech conveys: 1) “freeing the hands and the body (...) so that communication may now proceed simultaneously with manual activities, and can in fact support them”; and 2) “transcending the visual field” so that “auditory-oral communication may proceed in the dark, in thick bush, over physical barriers that prevent eye contact.” These are reasons that Bickerton (1990ff) has generally agreed with. I speculate that speech must also be more energy-efficient than signing, as the speech organs move faster and within a much smaller space than the hands. Moreover, speech can still be clearly supplemented by manual gestures or even signing. Goldin-Meadow (2003a: 240, 2003b: 210) argues as follows:

Because the manual modality allows one to represent an image as a whole without breaking it into parts, gesture offers a better vehicle for encoding imagistic information than does speech. The manual modality is therefore the natural choice to encode mimetic information, leaving the information that is better captured in a discrete and segmented form to the oral modality.

The above considerations need not be mutually exclusive. If some of them are correct, they constitute some of the more convincing evidence for the hypothesis that the evolution of language must have been variational, rather than transformational, just like most of biological evolution, driven by various ecological pressures. These include the different transformations that hominids have experienced in their protracted evolution all the way to when modern “proto-language” as posited by Ruhlen (1994) emerged, for instance bipedalism and the reconfiguration of the basocranial structure, as well as changes in the hominid mental capacity.

6. Conclusions

Phylogenetically, language appears to have evolved gradually, with its different

evolutionary stages scaffolded by the anatomical and mental structures of the particular Homo genera that innovated some new features. The different stages are correlated with the particular social and material cultures that emerged then, suggesting that communication for regulating social organization and sharing knowledge, perspectives, and emotions was apparently a critical factor in this protracted evolution, contrary to Bickerton's (1990ff) claim that language evolved to enhance human capacity for thought or for representing knowledge. The significance of communication as a trigger in the evolution of language is underscored by the invention of home sign language (e. g., Goldin-Meadow 2003a, 2003b) as the deaf children produce their predominantly iconic signs to communicate with their family members. I submit that it is lack of support from the family members, who interact with them verbally, that prevents these embryonic signed languages from expanding into full-fledged ones. The fact that the deaf children have not developed communities of their own, unlike those who developed the Nicaraguan signed language, has also been an obstacle to such an evolution.

Overall, the evidence also seems to stack against Bickerton's (1990ff) assumption of a "protolanguage" from which "true language" would have evolved by some "great leap." The alternative proposed by Wray (1998, 2002) unwittingly lends support to Lieberman's conclusion that no "protolanguage" need be posited on this gradual evolutionary trajectory, marked as it is by successive co-options of extant anatomical and mental structures to innovate for a more complex or adequate means of communication.

I submit that the evolution of language seems to have proceeded on the model of that of computers over the past century or so, with the earliest specimens appearing to be primitive and having limited functions, and with the intervals of improvements becoming smaller and smaller and the scope of their implications wider and wider the later one proceeds in time. Ruhlen's (1994) "proto-language" seems to be heuristically more justified, as it can in principle be reconstructed (albeit with variation) from modern languages and can prompt or stimulate research on the emergence of linguistic diversity. The scenario proposed by Cavalli-Sforza (2000, 2006) to explain this, through layers of population movements and language contacts also accounts both for the ongoing dynamics of the emergence of new language varieties from the dominance of some of the competing languages and for the endangerment and loss of others.

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