On language not being at root a communication system: Some morphosyntactic considerations

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1. Introduction

This paper is a follow up to Anne Reboul's article 'Why language really is not a communication system: A cognitive view of language evolution' (Reboul 2015). Reboul develops several convincing arguments in support of the idea that enhanced communicative abilities could not have been the driving force in the origin and biological evolution of language. As she notes, the core features of language — semanticity, discrete infinity, and decoupling — are not found in other known systems of communication, rendering implausible the idea that language evolved for purposes of communication. Reboul goes on to demonstrate that two prominent models of communication systems — the code model (Millikan 2005) and the ostensive model (Scott-Phillips 2015) — cannot account for language evolution. However, Reboul's article has little to say about the evolution of the grammatical properties of language, in particular morphology and syntax. My goal here is to argue that these properties did not arise evolutionarily to support communication. While, to be sure, morphosyntax is in a certain sense 'designed' for communication, this design was effectuated over historical time, rather than evolutionary time.

Reboul's hypothesis that language arose as a cognitive, as opposed to a communicative, tool was at one time the standard view of formal linguists. By 'formal linguists' I mean those working in the tradition initiated by Noam Chomsky, which accords center stage to the structural properties of grammatical phenomena, and characterizes these properties by means of an algebraic system called a 'generative grammar'. Here are some quotes from representative work, with key passages emphasized:

> We should search for the ancestry of language not in prior systems of animal communication but *in prior representational systems* (Bickerton 1990, p. 23)
>
> A far better case could be made that grammar exploited mechanisms *originally used* for the conceptualization of topology and antagonistic forces [than for motor control] (Jackendoff 1983; Pinker 1989; Talmy 1983; Talmy 1988), but that is another story. (Pinker & Bloom 1990, p. 726)
>
> The syntactic category system and the conceptual category system match up fairly well. In a way, the relation between the two systems serves as a partial explication of the categorial and functional properties of syntax: *syntax presumably evolved as a means to express conceptual structure*, so it is natural to expect that some of the structural properties of concepts would be mirrored in the organization of syntax. (Jackendoff 1990, p. 27)
>
> The conditions for the *subsequent development* of language as a medium of communication were set by the evolution of … the level of conceptual structure …A *first step* toward the evolution of this system for communication was undoubtedly the linking up of individual bits of conceptual structure to individual vocalizations … (Newmeyer 1991, p. 10)
>
> [T]he emergent ability, driven by the evolutionary appearance of C[onceptual] S[tructure], was the capacity to acquire meaningful, symbolic, abstract units … *it would be appropriate to expect adaptation-based explanations to come into play at a later stage, once language came to be used preferentially as the human communication system*. (Wilkins & Wakefield 1995, p. 179)
>
> As functions are usually informally defined, then, it doesn't make much sense to say that the function of language is communication. … So some small genetic change led to the rewiring of the brain that made this human [linguistic] capacity

> available. … *And most of it is thinking and planning and interpreting, and so on; it's internal*. (Chomsky 2012, p. 12-14)

As Reboul notes, the bulk of the body of work on language evolution does not share this perspective it all. Rather, it looks at language as a cultural tool for communication and tries to localize its origins in some (predominantly) cultural change, whose result is increased communicative success. Among the hypothesized triggering factors are shared intentionality (Tomasello, Carpenter, Call, Behne, & Moll 2005); a bonding mechanism in order to use social time more efficiently (Aiello & Dunbar 1993); social grooming (Dunbar 1996); female coalitionary strategies (Power 1998); female choice of mate (Miller 2001); territorial scavenging (Bickerton 2009); communicative strategies involved in hunting (Washburn & Lancaster 1968; Hewes 1973); need for mother-child communication (Falk 2004); and foraging efficiency among hunter-gatherers (MacDonald & Roebroeks 2013).

There is certainly nothing amiss about looking at cultural prerequisites for communication. But a cultural focus is not likely to lead to an understanding of why grammatical systems have the architectural properties that they have, that is, what determines the set of grammatical categories and relations across languages, why rules, principles, and constraints are remarkably similar from language to language, why long-distance dependencies exist and how they are constrained, why some word orders are more common than others, and how syntax, morphology, semantics, and phonology interact.

The question, then, is how to account for the origins of these broad design features of morphosyntax. The prevailing opinion among generative grammarians since the 1960s has been that the grammatical system is not only situated in the human mind, but also that its fundamental principles, its inventory of combinatorial elements, and so on are innate (see, Chomsky 1965; Chomsky 1981). An innate property is, by definition, encoded in the genome, which immediately raises the

question of what sort of evolutionary event(s) could have engendered a rich innate component to morphosyntax. Until the last decade or so, generative grammarians have had no answer to this question, except to reaffirm that the enhancement of communicative skills had nothing to do with it. But recently, some prominent generativists have reconsidered the issue and have come to conclude that important features of morphosyntax were selected for evolutionarily on the basis of their enhancement of communicative abilities. The following §2 sketches two of these approaches and discusses briefly how Chomsky's most recent work is not as 'anti-communication' as one might conclude from a casual reading of some of his publications. Section 3 presents a critique of the idea that the design properties of morphosyntax arose over evolutionary time by virtue of their leading to enhanced communicative abilities. Section 4 is a brief conclusion.

2. Some communication-oriented generative models of the evolution of morphosyntax

The following subsections discuss three grammatically-informed models of language evolution: Ray Jackendoff 's (§2.1), Ljiljana Progovac's (§2.2), and Noam Chomsky's (§2.3).

2.1. Ray Jackendoff 's communicatively-oriented model

Ray Jackendoff has been a central figure of formal linguistics for a half century. The defence and refinement of the theory of UG has always been one of his major concerns, as is indicated by the following representative quote:

> Lines of evidence from the structure of numerous languages, from historical changes in languages, from the character of child language acquisition, and from linguistic deficits due to brain damage all converge on the view that there is a highly specified innate bias ('Universal Grammar') from which children develop an adult language capacity during the first ten or twelve years of life. This innate

> bias … seems to be a specific brain adaptation, specialized to deal with this particular eccentric form of information we call language. (Jackendoff 1992, p. 71)

Furthermore, Jackendoff has always assumed the correctness of the autonomy of syntax (for a lucid defence of autonomy, see Jackendoff 1990, p. 285-286). His current theory of grammar, 'Simpler Syntax' (Culicover & Jackendoff 2005) differs markedly in many respects from Chomsky's approach, though these differences and, indeed, the details of the model, need not concern us in this paper.

What distinguishes Jackendoff's approach to language evolution from all other approaches is its extreme incrementalism. In this model, language evolution has proceeded in stages, each stage improving communicative efficiency. Fig. 1 illustrates.

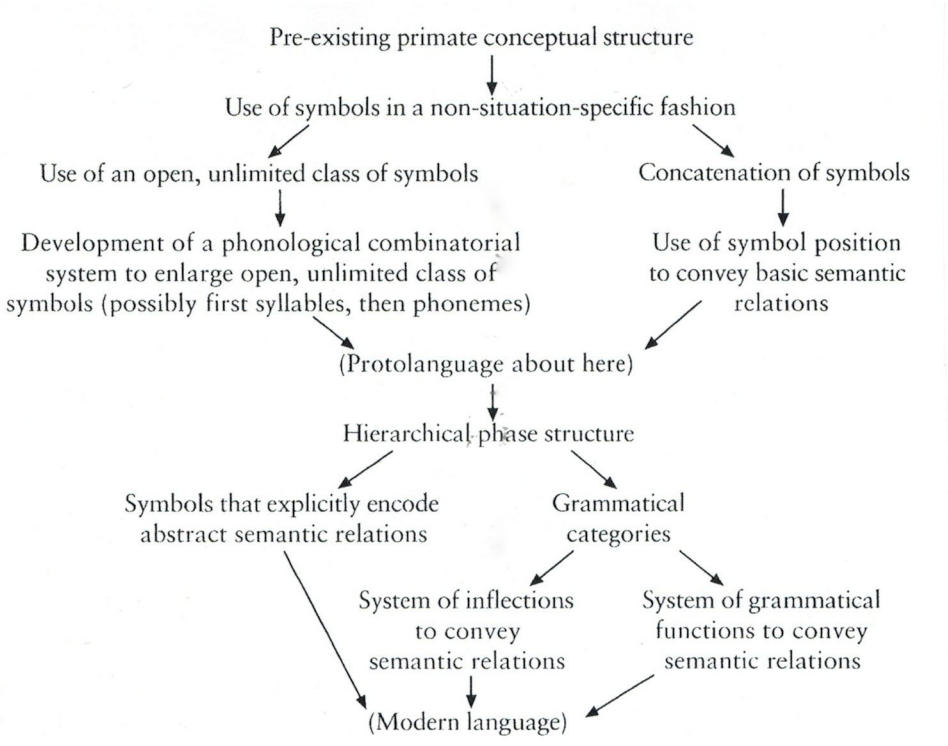


Fig. 1: The incremental evolutionary steps posited in Jackendoff (2002)

Each stage in the progression represents a change to the human genome, shaped either by a mutation or by the Baldwin effect: 'Language has evolved incrementally in response to natural selection' (Jackendoff 2002, p. 235). To give a specific example, he has noted that 'one can see the selective advantage in adding grammatical devices that make overt the intended relationships among words — things like word order and case marking'. (Jackendoff 1997, p. 17). The same can be said about the system of grammatical functions to convey semantic relations (the GF-tier):

> Thus we are pressed into the position of claiming that there is something innate about [the GF-tier] — it is one of those things that has to be carried on the genome. … Our conjecture is that it is a late evolutionary add-on to the syntax-semantics interface, hardly inevitable but affording adaptive advantages in efficiency and reliability of communication … (Culicover & Jackendoff 2005, p. 539)

In Jackendoff's theory, the earlier stages of evolution are still visible as 'living fossils' in certain speech varieties. So Protolanguage manifests itself today in the agrammatic speech of Broca's aphasics, in pidgins, and in the 'Basic Variety' spoken by second language learners. By means of 'reverse engineering' we can use these forms of speech to help reconstruct ancestral versions of human language:

> [H]ow are we to study the evolution of language? To me, the most productive methodology seems to be to engage in reverse engineering. We attempt to infer the nature of universal grammar and the language acquisition device from the structure of the modern language capacity, using not only evidence from normal language, but also evidence from language deficits, language acquisition, pidgins/creoles (Bickerton 1981; DeGraff 1999), and language creation à la [Nicaraguan Sign Language] (Kegl, Senghas, & Coppola 1999) and Israeli Bedouin Sign Language (Sandler, Meir, Padden, & Aronoff 2005). This is what linguists and psycholinguists normally do. (Jackendoff 2010, p. 65)

Finally, in this approach, UG is a 'toolkit', in the sense that not all languages need choose all of its elements:

> Universal Grammar is not supposed to be what is universal among languages: it is supposed to be the 'toolkit' that a human child brings to learning any of the

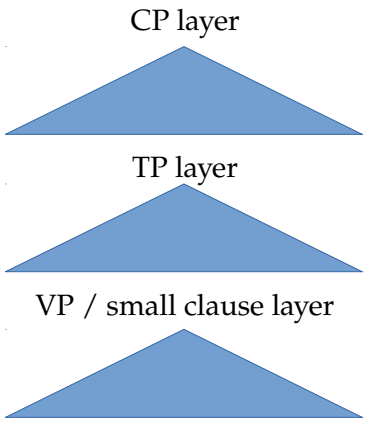
> languages of the world. … When you have a toolkit, you are not obligated to use every tool for every job. Thus we might expect that not every grammatical mechanism provided by Universal Grammar appears in every language. (Jackendoff 2002, p. 75)

Given the toolkit approach, one would therefore not be disconcerted to discover a language lacking phrase structure or recursion or the GF-tier or some other UG-provided feature.

2.2. Ljiljana Progovac's communicatively-oriented model

Progovac (2015) assumes the basic picture of minimalist clause structure, as illustrated in (1), where a VP (or small clause) layer is embedded in a TP layer, which is itself embedded in a CP layer:

(1)



It is postulated that each higher level was added gradually over evolutionary time. In Progovac's view, the addition of each new level of structure was functionally motivated, in that the human communicative capacity was thereby increased:

> For example, each step in the progression from one-word stage (no syntax), to small clause stage (paratactic two-slot syntax), to hierarchical TP stage accrues clear incremental communicative benefits. Small clauses (or half-clauses), with only one layer of structure, would have been immensely useful to our ancestors when they first started using syntax. A half-clause is still useful, even in expressing propositional content — much more useful than having no syntax at

> all (one-word stage), and much less useful than having more articulated hierarchical syntax of the specific functional category stage. This is exactly the scenario upon which evolution/selection can operate. (Progovac 2015, p. 15)

2.3. Chomsky and the evolution of morphosyntax

The most visible UG-based approach to grammar (and the evolutionary origins of grammar) is the Minimalist Program (MP), first elaborated in Chomsky, 1995. For Chomsky, the evolutionary 'great leap forward' (Chomsky, 2012: 14) was the mutation enabling the Merge operation, that is, the mutation that allowed unbounded recursivity in language. Chomsky is clear that this event was of great *cognitive* functionality: 'As soon as you have [Merge], you have an infinite variety of hierarchically structured expressions [and thoughts] available to you' (p. 14). One assumes that Chomsky's position is that it was only later in the course of human history that recursivity was exploited for its communicative benefits. For to posit a second mutation enabling the externalization of Merge for use in discourse would amount to a concession that language did arise — in part — to serve the needs of communication. Frankly, I am skeptical that the intricate coordination of mental Merge with the input and output channels used for communication could have been achieved over historical, as opposed to evolutionary, time.

What is more, nobody — and least of all Chomsky — questions that there is more to grammar *as a whole* than recursion. A sampling of the minimalist literature in recent years reveals principles governing morphology, phonology, and formal semantics; agreement, labeling, transfer, probes, goals, deletion; economy principles such as Last Resort, Relativized Minimality (or Minimize Chain Links), and Anti-Locality (which don't fall out from recursion per se, but rather represent conditions that need to be imposed on it); the entire set of mechanisms pertaining to phases, including what nodes count for phasehood and the various conditions that need to be imposed on their functioning, like the Phase Impenetrability Condition; the

categorial inventory (lexical and functional), as well as the formal features they manifest; the set of parameters (hundreds have been proposed), their possible settings, and the implicational relations among them. To the extent that these principles are built into UG (and we have no reason to think that minimalists believe otherwise), then they demand an evolutionary explanation. Could any of them have arisen to facilitate communication? The answer is 'Possibly'.

One needs also to refer to Chomsky's discussion of what he calls 'the three factors in language design', namely, genetic endowment, experience, and principles not specific to the faculty of language (Chomsky, 2005). Having stressed the centrality of recursion and minimizing (as always) the role of experience, Chomsky appeals heavily to third factor principles:

> The MP seeks to approach the problem 'from the bottom up': How little can be attributed to UG while still accounting for the variety of I-languages attained, relying on third factor principles. (Chomsky 2007, p. 4)

As far as third factor principles are concerned:

> [they fall] into several subtypes: (a) principles of data analysis that might be used in language acquisition and other domains; (b) principles of structural architecture and developmental constraints that enter into canalization, organic form, and action over a wide range, including principles of efficient computation, which would be expected to be of particular significance for computational systems such as language. It is the second of these subcategories that should be of particular significance in determining the nature of attainable languages. (Chomsky 2005, p. 6)

'Principles of data analysis' and wide ranging 'developmental constraints' are subject to a wide variety of interpretations. As has been frequently noted (see the comprehensive discussion in Mobbs, 2014), parsing principles — that is principles that aid communication by facilitating speech production and comprehension — fit comfortably into the domain of third-factor explanations.

As an example of how purely formal principles have been replaced by communication-based ones within the general envelope of the MP, consider the following. Kayne, 1994 provided an elaborate UG-based parametric explanation of why rightward movement is so restricted in language after language. Ackema & Neeleman, 2002, on the other hand, argue that the lack of acceptability of structures in 'right-displaced' position should not be accounted for by syntax proper (that is, by the theory of competence), but rather by the theory of language processing. In other words, they provide a communication-based third-factor explanation.

It is also worth pointing out that the evolutionary appearance of grammar, given minimalist assumptions, was not necessarily abrupt, despite the claims in the following quote:

> There is no possibility of an 'intermediate' syntax between a non-combinatorial syntax and full natural-language syntax — one either has Merge in all its generative glory, or one has effectively no combinatorial syntax at all, but rather whatever one sees in the case of agrammatic aphasics: alternative cognitive strategies for assigning thematic roles to word strings. (Berwick 1997, p. 248)

But Brady Clark has pointed out the MP does allow for gradualism in language evolution:

> In conclusion, syntactocentric architectures like the one presupposed by most work within the Minimalist Program are compatible with an incremental view of the evolution of syntax. The evolution of syntax on minimalist assumptions must have involved several distinct stages, including the evolution of Merge, the evolution of words, and externalization. One or more of these stages (for example, the emergence of Merge) might have involved further stages, once FLB and FLN are distinguished. (Clark 2013, p. 191)

Once again, any of the steps of the gradual progression might have been incorporated into the genome on the basis of its facilitation of communication. In sum, despite what one might conclude from some passages in the literature,

Chomsky's Minimalist Program does indeed allow for language evolution to have been shaped in part by the needs of communication.

3. Communicative needs did not shape the biological evolution of morphosyntax

This section closely examines the incrementalist approach to the evolution of grammar and concludes that it lacks convincing empirical evidence. In short, there is very little evidence that all of the stages represented in Fig. 1 arose in the course of biological (as opposed to historical) evolution. The section addresses the following three questions, each of which is discussed in a separate subsection: Do the incremental steps aid communication to the point that they would be incorporated into the genome? (§3.1); Is 'decremental' development attested? If so, how can that be reconciled with an incremental model? (§3.2); Are there alternative explanations for the development of morphosyntactic complexity that do not involve biological evolution? (§3.3).

3.1. Do the incremental steps aid communication to the point that they would be incorporated into the genome?

It is clear that the earlier (pre-Protolanguage) steps of the Jackendoff progression are selectionally advantageous. The ability to use an unlimited class of symbols and to concatenate them was obviously a great leap forward evolutionarily. There is selective advantage in being able to convey an unlimited range of meanings in a communicative setting, and in particular to be able to exchange information about events distant in time and space. But what about the later steps in the progression: the steps that added grammatical categories, grammatical relations, and so on? That is not clear. Jackendoff asserts that they were indeed incorporated into the genome, in that he 'agree[s] with practically everyone that the "Baldwin effect" had something to

do with [how increased expressive power came to spread through a population]' (Jackendoff 2002, p. 237).

Was the gain in expressive power (if it was indeed accomplished) sufficient for the Baldwin effect to do its work? It is true that a more elaborated grammar can overtly express more semantic nuances, but at the same time elaboration can slow down production (if a lot needs to be made overt).[1] Grammaticalization-related changes can offset this slowdown to a certain extent, by shortening the time needed to express certain frequently-called upon concepts (affixes are faster to produce than words). Viewed from another angle, a less elaborated grammar seems to place more interpretive demands on the hearer, but requires less syntactic processing. We are still at the early stages of being able to measure whether overall communication is enhanced by more elaboration (for recent relevant discussion, see Piantadosi, Tily, & Gibson 2012; Kurumada & Jaeger 2015; and Fedzechkina, Jaeger, & Newport 2012).

The strongest reason to doubt that biological evolution has shaped grammatical elaboration is the fact that there are languages that do very well without some of the putatively evolved devices. So there are languages that present little or no evidence of hierarchical phrase structure, such as the Australian languages Warlpiri, Jiwarli, and Wambaya (Hale 1983; Nordlinger 1998; Austin 2001). There are languages (see Van Valin & LaPolla 1997; Kibrik 1997) that present no evidence for grammatical relations. Based on the work of Mark Durie 1985, 1987), Van Valin and LaPolla identify Acehnese as one such language and Primus (1999) makes the same point with respect to Guarani and Tlingit. No learner of these languages would be led to posit a distinction between subjects and objects. There are languages lacking sentential recursion, or where, at least, recursion is highly restricted (Pirahã; see Everett 2005). And there are languages lacking major categorial distinctions (Riau Indonesian; see

[1] Hence speakers are more likely to omit case markers when the information carried by those markers is predictable than when it is not (Kurumada & Jaeger 2015)

Gil 2007). The question is whether these languages are less expressive than languages with the 'full set' of features. Gil says such is not the case for Riau (see especially Gil 2009). In any event, how would one test the idea that one language might be more 'expressive' than another?

There is of course the logical possibility that broad grammatical differences among languages might be derived from (or at least related to) differences in culture among the speakers of those languages. If such were the case, then any theory of language evolution would need to address the 'cultural need' for the development of whatever grammatical property is under discussion. The idea of an intimate grammar-culture link is mooted from time to time; indeed Everett has claimed that the lack of recursion in Pirahã is related to facts about Pirahã culture. However, since the pioneering work of Boas (1911/1963) linguists have overwhelmingly rejected the idea of such a link. To give a simple example, Russian and Chinese are both languages used as vehicles for modern science and technology, yet the former is quite complex morphosyntactically and the latter quite simple. On the other had, Bote (a language of Nepal) is of roughly the same complexity as Russian and Phuan (a language of Thailand) is of roughly the same complexity as Chinese, yet both are spoken in pre-technological cultures.

In sum, I have no problem with UG as a 'toolkit', but we need to acknowledge that speakers of languages having only hand tools manage to build the necessary structures as well as speakers that have power tools.

3.2. Is 'decremental' development attested? If so, how can that be reconciled with an incremental model?

Do some languages 'regress', in the sense that they lose features that are putatively evolutionarily 'advanced'? The answer is 'yes'. Starting with grammatical relations, it is apparently the case that some (if not all) languages that lack them now

did have them at an earlier stage in their history. For example, the comparative evidence points to Acehnese being an innovation, as far as grammatical relations are concerned. Closely-related Austronesian languages do indeed have them (Ross 2002).

The same point can be made about the miniscule categorial inventory of Riau Indonesian. Related languages are much more 'developed' in terms of their categorial inventory and Gil (2005) has argued that the common ancestor of the Austronesian languages, spoken perhaps 5000 years ago, was substantially more complex than Riau Indonesian in many grammatical domains.

While we know nothing about the prehistory of Pirahã, the loss of recursive structures has been observed in a number of cases. Matsumoto (1988) calls attention to two ways of expressing in Japanese the proposition 'Although Taro is young, he does a good job'. One is by the simple conjunction of the two main propositions (2a), the other by use of the adversative subordinating suffix *-ga* (2b):

(2) a. Taro-wa wakai(-yo). Ga, yoku yar-u(-yo)
Taro-TOP young. but well do-PRES
'Taro is young. But he does a good job.'

b. Taro-wa wakai-ga, yoku yar-u(-yo)
Taro-TOP young, well do-PRES
'Although Taro is young, he does a good job.'

According to Matsumoto, paratactically-formed sentences such as (2a) have been recorded only since the seventeenth century, while the hypotaxis manifested in (2b) is observed much earlier. In other words, a recursive structure was lost (for more discussion of this and similar cases, see Traugott 1997).

The loss of case markers is so well attested in Indo-European that no examples are necessary. The absence of case markers is often accompanied by rigid word order, but

not always. On the one hand, a number of languages have no case marking, yet allow very flexible word order. Steele (1978) lists Classical Aztec, Karok, Achi, Wiyot, Tuscarora, Garadjari, and Maleceet-Passamoquoddy in this group and goes so far as to claim that 'the presence or absence of case marking has nothing to do with freedom of word order' (Steele 1978, p. 610).[2] Conversely, some languages, like Khamti, combine case marking with rigidity of word order (Mallinson & Blake 1981). That is even partly true for English, which case-marks pronouns, but does not thereby grant them freedom of occurrence (**I saw in the garden her*).

So the question is how decremental development can be reconciled with an incremental model. Now, clearly, evolution is not directional and is certainly not unidirectional. Features that convey a fitness advantage at some point in evolutionary time might at a later point in time get lost: One thinks of flightless birds, believed to be descended from flying ancestors. But their loss of flight was compensated for by other factors, such as large size and speed of locomotion on the ground. Turning to the evolution of grammar, if the development of a certain feature represented an evolutionary advance, then why would a language lose that feature, in most cases without any obvious compensating gain elsewhere? In short, if UG is a toolkit, then why would speakers stop using a useful tool?

[2]Peter Culicover (p. c.) suggests that the case and word order properties of these languages might follow from their polysynthetic morphology. This matter requires further investigation.

3.3. Are there alternative explanations for the development of morphosyntactic complexity that do not involve biological evolution?

The essential question here is whether it is *necessary* to posit biological evolution to account for the development of the grammatical features that Jackendoff considers to have arisen post-Protolanguage. The answer appears to be 'no'. The literature of diachronic linguistics is rich with examples of how these features have developed over time by means of 'natural' processes of language change.

Let us start with grammatical relations (for an overview, see Cristofaro 2014). One common development is the transformation of topic markers into subjects. König, 2008 gives a number examples of this change in various African languages. In the Australian language Bagandji, subjects developed from demonstratives (McGregor 2008) and in the Sahaptian languages from directional markers (Rude 1997). Objects as well have historical sources. For example, object markers can develop from 'take' verbs in constructions of the type 'take X and Verb (X)'. Such a development has been described for Mandarin Chinese (Li & Thompson 1981) and West African languages (Lord 1993).

Kulikov, 2009 gives a detailed account of how case systems can arise over historical time. One common source of case morphemes is adpositions, where the development is attested in Indo-Aryan, Lithuanian, and Iranian. Other sources for case markers are adjectives and adverbials, and indexical elements such as pronouns and articles.

Even some of the features that Jackendoff considers to be evolutionarily ancient can arise through normal language change. The foremost of these is recursion. Deutscher (2000) documents the origins of finite recursive structures in Akkadian over the millennia in adverbial constructions and from the merging of two distinct arguments of a verb into one complement clause. The complementizers themselves

arose from demonstratives. Another example of historically attested rise of recursivity is what happened in Sranan (Heine & Kuteva 2007). In its pidgin stage there were no formally marked relative clause structures at all. In a period of only a couple of hundred years, the demonstrative *disi* 'this' evolved into a relativizer with the concomitant development of full relative clause structures. If the Akkadian and Sranan cases are representative, it may not be necessary to appeal to biological evolution to explain the origins of recursivity, much less to assume that it was the major defining feature of the transition from non-language to language.

For both Jackendoff and Progovac, compounds are 'living fossils', harking back to the earliest stage of language, Jackendoff finding noun-noun compounds to be particularly ancient. But in fact compounds appear naturally over historical time, either as grammaticalizations of phrases (see Downing 1977 for numerous examples) and in languages like Chinese that have developed increasingly reduced syllable structure and lack simplex accomplishment verbs (Huang, to appear).

In sum, it is not easy to find examples of specific grammatical phenomena that *necessarily* arose via biological evolution. In all or almost all cases, well understood processes of diachronic change suffice to explain their appearance.

4. Conclusion

Anne Reboul has argued that enhanced communicative abilities could not have been the driving force in the origin and biological evolution of language. This paper has supported Reboul's hypothesis from the point of view of morphosyntax. It provides arguments to reject the incrementalist approach to language evolution proposed by Ray Jackendoff and others, in which the evolution of morphosyntax has proceeded in biologically-determined stages, each stage improving overall communicative efficiency.

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