1. Introduction

This monumental collection of papers grew out of the two important conferences on biolinguistics held in 2007 (*Biolinguistic Investigations* in Santo Domingo and *Biolinguistics: Language Evolution and Variation* in Venice), and is the first volume of the new series *Oxford Studies in Biolinguistics*. The reader can check the details of these conferences on their respective websites, which can be accessed via [http://www.biolinguistics.uqam.ca/conferences.html](http://www.biolinguistics.uqam.ca/conferences.html) (International Network in Biolinguistics).

The book starts with a brief introductory chapter by the editors, which provides the reader with a glimpse of the recent history of biolinguistics and a compact summary of the nineteen chapters that follow. These contributions, each made by the world’s leading scholars in relevant fields, are classified into three Parts (Evolution, Variation, Computation), but this does not mean that each chapter focuses on only one of the three topics by ignoring the other two. It would be sheer absurdity to think, for example, that one can study language evolution without a full understanding of linguistic variation and computation, just as no biologist would even dream of studying the evolution of the human eye without first knowing its internal mechanism. The interplay of multifarious

* Acknowledgements to be added.
research agendas is a vital component of modern biolinguistics, as evidenced practically on every page of the book.

A complete list of the contributions and the contributors can be easily found on the internet so I will not reproduce it here to save my space. For the same reason, I will skip my own summary of the chapters (which I know would do no better than the one given by the editors). In what follows, I will discuss some central issues of today’s biolinguistics by occasionally referring to the pertaining chapters/pages of the book and linking them to my own thinking.

2. Minimalism and the Biolinguistic (Re)turn

Today hardly any linguist, whether of generative persuasion or not, can go without noticing the remarkable enthusiasm about the biology of language shared by cognitive scientists of a large variety of subfields. It is true that ever since its formative years, generative grammar too has seen itself as a branch of human biology, but it is only within the last decade or so that substantive biological research began to be taken seriously, or even conducted, by its practitioners. Biological considerations of human language date back at least to Aristotle, and after a very long period of dark ages they are finally back in their “natural place,” so to speak.

This modern restoration of biolinguistics has been brought about under the influence of a constellation of some great thinkers, N. Chomsky and E. Lenneberg among many others. More concretely, we can identify several important factors which have conspired to bring about the biolinguistics (re)turn in generative grammar. The editors (see also Boeckx et al. 2012) point to: (1) the interdisciplinary perspective adopted by some researchers, (2) progress in the
studies of the genetic basis of language (as reviewed by contributors like M. Piattelli-Palmarini & J. Uriagereka as well as T. Fitch), and (3) the advent and development of the minimalist program, which abandons the long cherished idea of UG as a highly complex modular system in favor of a maximally underspecified UG.

One can easily add to this list other factors such as current neurolinguistic research with advanced brain imaging technology as a strong booster and comparative biological approaches to language that bring into focus not only primates, songbirds and cetaceans but virtually every living organism, as stressed in the chapter by Fitch. Today there is a growing number of generative linguists who realize that they have to look beyond the human lineage for a correct understanding of human language, in sharp contrast to the general atmosphere in the GB era when people blindly believed that language was both species-specific and domain-specific on the basis of their own theories of grammar which defied any comparative considerations.

In this respect, the rise of (bio)linguistic minimalism is particularly effective as an antidote to what the editors dub the “linguistic isolationism” (p.4) that long governed the whole humanities (not limited to linguistics) in the past, often in association with the arrogant view that man ranks highest in the ladder of evolution. Language is uniquely human, and there is no doubt about it. Anyone wanting to argue otherwise would be just playing tricks with their own distorted definition of language (language as a communication system, etc.). But this claim for the humanique nature of language makes sense only insofar as one realizes that many biological capacities of other species are equally unique.

The understanding that human language is nothing more than one example of
such biological traits, to be studied with the same methodology and academic commitment as in other biological sciences, constitutes the conceptual and moral foundation for today’s biolinguistic program. The real issue to be addressed is not the humaniqueness of language as an end result but how this property grew out of a set of non-humanique capacities, i.e., how we can resolve the apparent discontinuity between human language and animal cognition. Minimization of UG by “approaching it from below” offers a powerful tool (if not an ultimate solution) when we square up to this task.

This viewpoint, of minimalism as the firm theoretical background of biolinguistics, is shared by most contributors to this volume (see, among others, the chapters by C. Boeckx and R. Berwick as well as the overarching chapter by R. Berwick and N. Chomsky). It is only natural that the book as a whole serves as a dramatic illustration of the successful collaboration by minimalist theorizing and biological studies of language. With the editors, I urge not only linguists but biologists, neurologists, geneticists, anthropologists and everyone else interested in the biology of language to take the elaborate linguistic analyses presented in this book very seriously. Of course, devotees to minimalism need to heed what others have to say no less seriously. Respecting and informing each other is the only way of promoting research in a highly interdisciplinary field such as biolinguistics.

3. All You Need Is Merge, but How Did You Get It?

If there is one major research topic which characterizes modern biolinguistics better than anything else, then it is the biological origins and evolution of human language (more precisely, of the new human species with language).
Evolutionary linguistics or “Evolingo” therefore becomes an essential subfield of biolinguistics, though it also discusses topics like cultural evolution (perhaps a serious misnomer for cultural change) which are carefully set aside by many generative biolinguists. This book may be considered exceptional in this respect, because it has a number of contributions which tackle the problem of language variation with a cognitive/biological view towards comparative syntax and morphology.

The contribution by A.M. Di Sciullo deserves a special attention, as it attempts to link biological variation and language variation by using asymmetry as a key concept, a standpoint also shared by Jenkins, who discusses symmetry breaking in connecting language evolution and variation with biophysical dynamic systems. Interestingly, Di Sciullo argues that whereas biological phylogeny proceeds in the three successive stages of symmetry > anti-symmetry > asymmetry, linguistic phylogeny lacks the initial stage of symmetry and only shifts from anti-symmetry to asymmetry. This discrepancy reflects the fact that she largely focuses on patterns of linearization based on her previous assumption that “asymmetry emerged with language” (p.319).

But suppose, following Chomsky, Berwick and others, that Merge is what made language possible and that this elementary combinatorial operation is literally symmetric, before its output is transferred to the S-M interface for externalization. It might become easy to strengthen Di Sciullo’s parallelism argument by postulating symmetry at the initial stage of language evolution, particularly if language first evolved for internalization and externalization was a later innovation, as often claimed by Chomsky (but see below).

As Berwick puts it, “Merge is all you need” (p.491) and “Once Merge arose,
the stage for natural language was set” (p.99). This “Merge-only” hypothesis is very probably the most elegant (and controversial) idea that modern biolinguistic minimalism can offer. It sharpens Hauser, Chomsky & Fitch’s (2002) more than vague suggestion that FLN includes only recursion to a testable claim (i.e., the Strong Minimalist Thesis in the form of Interfaces + Merge = Language; Chomsky 2010).

So how plausible is this Merge-only hypothesis? Its viability has to be evaluated in terms of the overwhelming linguistic data, not only of evolution and syntactic computation, but of acquisition, genetics, neurology, disorders and many more. Take, for example, current minimalist theorizing which is still replete with arbitrary analytical tools that are apparently irreducible to Merge (or, let’s not forget, to the third factor considerations of physical/mathematical law). The Merge-only hypothesis poses a big challenge for minimalist syntacticians not only because it requires them to show that core syntactic phenomena all result from the way this basic operation works, but especially because by doing so they can make a significant contribution to the future progress of biolinguistics. I emphasize this point because a large number of good generative linguists (at least here in Japan) still have no idea how their outstanding syntactic analyses can be brought to bear on “biological” issues.

Needless to say, to give support to the Merge-only hypothesis, one needs to guarantee, in the first place, that it is the correct model of phrase structure building. Jackendoff (2011), for example, argues on several interesting grounds that it is not Merge but “Unification” that well captures the true nature of human syntax. Elsewhere he righteously points out that our theory of language evolution depends on our theory of language (Jackendoff 2010). This should in fact be
stated as a bidirectional relation; our theory of language also depends on our theory of language evolution. Furthermore, they both depend on our theory of biological evolution, too (obviously because language evolution is one fairly recent example of biological evolution). In such a complex situation, how can one still be assured that Merge is right?

My suggestion here is that we can give credit to the Merge theory by explicitly showing how this computational capacity came into existence during the hominin evolution; in other words, the plausibility of Merge to some extent depends on its evolvability. This consideration has led Fujita (2009) to propose that Merge is an exaptation of the motor capacity for hierarchical, sequential object combination as typically observed in tool use and tool making. The general idea itself is nothing new (see Lashley 1951 and Greenfield 1991, among others) but the upshot of my proposal is that the Merge-based derivation theory makes it possible, for the first time in the history of generative grammar, to embed purely theoretical linguistic research in a much broader perspective of evolutionary/developmental studies on human and animal cognition and to seek the origin of human syntax in the domain of nonlinguistic behaviors.

Such being our situation, the reader of *The Biolinguistic Enterprise* will naturally expect that he/she will see a lot of other proposals on the possible evolutionary roots of Merge, as the editors themselves state that “only merge is to be explained and so far seems to remain discontinuous” (p.9) in summarizing one chapter by Berwick. Quite surprisingly, however, the fact is that such exciting attempts are not to be found anywhere in this volume. This general neglect is perhaps an unwelcome reflection of Chomsky's negative stance towards the gradual adaptationism in relation to the evolution of language and
of Merge in particular. He famously remarked: “… for both evolution and
development, there seems to be little reason to suppose that there were precursors
to unbounded Merge” (Chomsky 2010: 54), and Berwick in this volume follows
suit and writes: “… there is no possibility of an intermediate language 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” (p.99).

While I fully appreciate their sentiment and even agree that Merge may
have been unbounded and recursive right from the start, whether or not Merge
has its evolutionary origin in some distant capacity is a totally different question,
to be seriously asked by everyone committed to biolinguistics. I even suspect that
there may be a lethal confusion among some people between the rather
saltational evolution of the language faculty (made possible by Merge) and that
of Merge itself. To the extent that Merge is a biological trait unique to the human
language, it must have had an evolutionary precursor; to treat it as if it suddenly
came out of nowhere would do every kind of harm to the development of
biolinguistics by reincarnating the kind of linguistic isolationism we are so eager
to dispel.

4. Approaching the C-I System and the Lexicon from Merge
In a similar vein, I would also like to take issue with the widely accepted
minimalist claim that recursive syntactic computation by Merge is the only
uniquely human ingredient of language (roughly, the SMT). Take the C-I system,
for instance. We are told that other animals, typically primates, have their own
C-I systems, and I am almost convinced that they do. The question is, is a
chimpanzee’s C-I system qualitatively or mechanically the same as ours?

There is no clear evidence either for or against it, of course, but it can be pointed out that there is always the danger of anthropomorphism in animal research which purports to prove the higher mental faculty of the animal in question. Similarity in observable behaviors does not necessarily imply similarity in internal mechanisms supporting them, as the recent controversial report on the alleged recursive capacity of European starlings (Gentner et al. 2006) reminds us. In fact, “Morgan’s Canon” warns us: “In no case is an animal activity to be interpreted in terms of higher psychological processes, if it can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development” (quoted in Wystrach & Graham 2012).

So all we can say for now with some confidence is that there is some continuity between the chimpanzee C-I system and the human counterpart (H(C-I)). Unless they are exactly the same, we somehow need to explain how their difference comes about. Just to say that there is less discontinuity between them than once believed, is a poor excuse for failing to discuss the unique nature of H(C-I) and to try to see where the difference, however small, comes from.

The problem is more obvious in the case of the evolution of the C-I interface (how the computational system and H(C-I) came to be linked to each other). Insofar as syntax (Merge) is uniquely human, the C-I interface must be, too (where there is no Merge, there is no interface). In my view, it is only illusionary to suppose that H(C-I) and the C-I interface do not belong to FLN. A careful extension of this consideration will lead one to suspect that not only Merge but most components of language are in fact uniquely human.
By saying this, I may sound like playing the devil with the methodological advantage of the Hauser-Chomsky-Fitch conjecture, which is intended to promote comparative evolutionary studies by narrowing down the truly species-specific aspect of human language. The truth is quite the opposite, and I believe that one can continue to accept the Merge-only hypothesis without self-contradiction. Here is how.

Suppose, as I have already suggested elsewhere (Fujita 2009), that it was Merge that gave rise to H(C-I) and the C-I interface. It is not that H(C-I) was already there, to be connected to syntax later, but rather that syntax transformed the pre-human C-I system to genuine H(C-I), and the way this was done is itself the evolution of the C-I interface. The chapter by W. Hinzen is highly illuminating here, and I regard his ideas as the culmination of current minimalist thinking (though there are many other points which I simply do not agree with). Hinzen in particular casts doubts on the popular view that there is a pre-determined semantic or thought system (H(C-I)), to which syntax had to evolve to get linked, in an appropriate “matching” style. This view entails that semantics demands syntax to do whatever is necessary to establish their interface, and that in an optimal way. This kind of “matching complexity” model of grammar (p.423) is what is usually implied in the minimalist framework when we make casual reference to interface conditions or bare output conditions.

Unfortunately, however, the supposition that syntax evolved to match an independently given semantics is based on the kind of teleology which is out of place in modern evolutionary biology and which also comes into direct conflict with the third factor considerations of minimalism which set a high value on “teleomatic” explanations. Evolution is a blind process and nothing evolves for a
particular purpose. So to say the least, the C-I interface must be an accidental end product, and not a preset goal, of the evolution of syntax.

The same can be said of H(C-I); the human conceptual capacity is in such conformity with the human syntax because syntax forms it and not vice versa. Chomsky often stresses that language first evolved for thought (internalization) and not for externalization (communication), and this claim is repeated in several chapters of this book. But this virtual truism also requires a careful interpretation in the present context because, as just stated, evolution has no foresight. This is what actually happened: Language evolved for no specific purpose, but then it first began to be used for the adaptive function of thought, followed by a secondary function of communication.

Note that this way of looking at language evolution will not so much damage Chomsky’s position that syntax is the language of thought as it backs it up further. As Hinzen puts it, “syntax formats human thought rather than expressing it” (p.424). The argument made by R. Larson that phases (roughly) constitute the units of computation corresponding to propositions on the semantic side, may be an exemplary illustration of how the C-I system arose out of syntax. Let us suppose, then, that Merge applies to the pre-human concepts to construct the uniquely human conceptual structure of a higher order, by recursively combining and recombining them. I would like to suggest that the same reasoning may apply to the evolution of the equally unique human lexicon.

Boeckx quite correctly observes that “Word formation … is as specific and unique to the FL as recursion” (p.54). He also conjectures: “The creation of the human lexicon … goes hand in hand with Merge” (p.59), with which I couldn’t agree more. But then was it just an accidental coincidence that these two unique
capacities appeared in the human brain simultaneously to make language possible, or was there some deep connection between the two? I assume there was. Specifically, I argue that Merge provides the cognitive tool for word formation; it combines the fundamental units of lexical items (features) into concrete words by the same syntactic computation that builds phrases and sentences.

That word formation is a (post-)syntactic process is a claim made by some of today’s grammatical theories, most notably by Distributed Morphology. Other approaches like “Nano-syntax” also pay full attention to the syntactic nature of word/morpheme-internal organization. In fact, several contributions to this volume include proposals to a similar effect, although in different tones. R. Kayne, for example, argues that the distinction between nouns and verbs is not “an intrinsic property of anything called the lexicon” but derives from antisymmetry (p.333). This amounts to saying that lexical categories are not stored in the lexicon. Likewise, Di Sciullo presents a morpho-phonological analysis of complex words which crucially utilizes the notion of asymmetry, on the assumption that “the structure of words is binary-branching and is derived by a general operation such as Merge” (p.314).

I strongly believe that it is correct to assume that Merge, as the one and only generative engine of the language faculty, is responsible for word formation; to say the least, it serves as the null hypothesis for studies of the evolution of the human lexical capacity. The lexicon (in the common sense interpretation) is now totally eliminated, to be replaced by something like a universal pool of features, including the mysterious “edge feature.” Along with Merge, this pool of features should constitute our innate biological trait as a
component of UG, and as such it requires an evolutionarily adequate explanation. Semantic features such as [+animate] and [+male] or even \( \phi \) -features like number may easily find their analogues in the animal kingdom, but for the moment it seems hopeless to find anything coming close to the edge feature outside the human league. The origin and evolution of this feature may remain the final frontier of evolutionary biolinguistics.

5. Conclusion

There are many other, equally important topics and discussions in this book that are left untouched in this short review. While hoping to give them a close examination on another occasion, I hasten to conclude that in the quality and wide coverage of the collected papers, *The Biolinguistic Enterprise* stands as one great showcase of the biological and theoretical studies of language currently conducted. A state-of-the-art report from pioneers of the new human science.

References


Fujita, K. 2009. A prospect for evolutionary adequacy: Merge and the evolution


