

REVIEWS

Rudolf Botha & Martin Everaert (eds.), *The Evolutionary Emergence of Language: Evidence and Inference* (Studies in the Evolution of Language 17). Oxford: Oxford University Press, 2013. Pp. xviii +334.
doi:[10.1017/S0332586514000298](https://doi.org/10.1017/S0332586514000298)

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According to the preface, this edited volume grew out of the EVOLANG8 conference held in Utrecht, the Netherlands, in 2010. However, it is a much more ambitious work than an ordinary volume of conference papers. It comprises an introduction and a selection of 13 chapters, based on the conference presentations; as is promised in the preface, they are ‘state-of-the-art discussions of a wide range of facets of the evolution of language’ (p. vii). The authors have clearly spent time on making their contributions comprehensible for a fairly wide audience and on providing well-documented and up-to-date overviews of their research areas. The list of references occupies almost 65 pages, including around 80 titles published in 2011 or 2012, after the conference.

Thus, the book can serve as an overview of ongoing research for people who approach this multidisciplinary area from various disciplines. It is not an introduction, of course, but there is no urgent need for another one; McMahan & McMahan (2013) is a regular textbook, and Fitch (2010) is a broad overview. It is also not an encyclopaedic presentation covering all aspects of the field; Tallerman & Gibson (2012) provides just that. But the present volume shows how a number of leading scholars assess the present situation and indicate where they and their colleagues seem to be heading in years to come.

I first make some general comments about the state of research in the area, as reflected by this volume. Then come presentations of the individual chapters.

One general trend in the development over the last decade or so is hinted by the formulation of the book’s title: it is not about the evolution of language, but about its evolutionary emergence. The capacity for linguistic communication is now not so often seen as a more or less independent process, triggered by one specific need and/or made possible by one specific genetic change. Rather, many researchers envisage the development of that capacity as something that has been part of the long evolution of the species in general and has been intimately related with other

genetic and cultural changes. The era of simple, all-inclusive explanations based on the formula 'We have language because . . . ' seems to be approaching its end.

To some extent, this trend seems to be related to a perceptible shift in the style of discussions between researchers, away from antagonizing statements and towards efforts to consider and understand views proposed by representatives of other disciplines. In particular, primatologists and linguists, two of the major groups involved, have often been at odds, as is pointed out by a primatologist, Kathleen Gibson, in her contribution. 'Indeed, linguists' attempts to articulate essential components of language were sometimes interpreted by primatologists as continual redefinitions of language . . . with no apparent purpose other than setting a continually higher barrier for animal entry into the "language club"' (p. 205). Linguists have certainly been prone to highlight the uniqueness of human language, but to judge from this volume, the developments in the field point in another direction. And the specific claims by generative linguists about an innate language faculty, connected with some genetic change, do not fare well. They are rejected by a few contributors and ignored by most others; the only defender, Stephen Anderson, seems to be approaching an agnostic position.

I now move on to comments on the contributions, following the vaguely thematic order of the volume. First comes 'Introduction: Evidence and inference in the study of language evolution', by the editors (pp. 1–17).

As there is absolutely no direct evidence for what actually happened during the evolution of the species, all assumptions and conclusions have to depend on long chains of inferences from a large number of areas. Botha & Everaert are acutely aware of the many problems associated with this procedure. They survey the contents of all contributions in the volume, consistently commenting on the way in which inferences are drawn from the evidence that is presented. 'From an evidentiary point of view' (p. 4) runs the start of one comment; the phrase well describes their attitude. At the end the authors stress the need for future work on what they call 'bridge theories', theories that clarify how and to what extent evidence from one area of research, say the development of modern children, can be used for inferences about another area, say language evolution.

Stephen R. Anderson, in 'What is special about the human language faculty and how did it get that way?' (pp. 18–41), starts from the assumptions that the study of I-language is what linguistics is about and that the language faculty exists. He concludes, after a discussion, that the language faculty may have been the result of natural selection. From there he moves to 'the evolution of UG and the content of I-language', that is, the question of what must be hereditary and how one can prove it is. He makes it clear that for him, the language faculty (in the 'narrow sense', the FLN) consists of much more than just recursion, as was proposed in Hauser, Chomsky & Fitch (2002). But what? He revisits the well-known 'poverty of stimulus' argument, finding that it is difficult to use in practice. As for universals of language, he believes

that it may not be possible to distinguish between what is actually inherited and what is culturally learned because what is learned may be favoured by what is inherited. (He calls that ‘duplication’, for some reason.) The conclusion is that it may not be possible to answer the question ‘What is the structure of the human language faculty?’.

This is a remarkably pessimistic position. Anderson believes in the existence of a substantial inherited language faculty but does not think it is possible to specify what it is. It seems to be hard to defend such a stand except by appealing to faith rather than to reason.

Morten H. Christensen, the author of ‘Language has evolved to depend on multiple-cue integration’ (pp. 42–61), explicitly rejects the usefulness of the distinction between E-language and I-language. In that, he seems to speak for a silent majority, in this volume at least; those terms are not utilized by anyone else apart from Anderson. Christensen sees language as a culturally evolved linguistic system, and further, he maintains that ‘language evolution is not conceptually different from language change’ (p. 45). In his view, a main reason for the evolution of complex structures in language was that users rely on multiple cues that facilitate acquisition and use. To prove that, he reports results of simulations of learning by simple recurring networks (SRN) that use phonological and distributional cues to identify word classes (nouns and verbs) and to find grammars from sentences.

To me, these simulations seem to be of dubious value. The hypothesis of reliance on multiple cues is hardly sensational for people dealing with language acquisition and learning. It could have been studied more directly and more reliably, for example by observing learners of a second language.

Ann Senghas, Asli Özyürek & Susan Goldin-Meadow, ‘Homesign as a way-station between co-speech gesture and sign language: The evolution of segmentation and sequencing’ (pp. 62–76), have studied users of the emergent Nicaraguan Sign Language (NSL) and have seen a tendency to move from synthetic, unitary signs towards analytic and sequencing expressions. One example only is discussed. Hearing co-signers make a ‘conflated sign’ for ‘roll down’, while the later cohorts of NSL signers tend to make an analysis: first ‘roll’, then ‘down’. This was seen to be a trend also among Turkish homesigners. The conclusion is that ‘child learners have a natural inclination to analyse a linguistic signal as discrete and combinatorial, even if it is originally presented as continuous and holistic’ (p. 74). The field of study seems very promising, but in this paper there is a strong claim based on what seems to be minimal evidence.

Maggie Tallerman’s ‘Kin selection, pedagogy, and linguistic complexity: whence protolanguage?’ (pp. 77–96) is a critical review of recent suggestions that kin selection and the need for instruction have been driving forces in the evolution of complex language. Kin selection here is the evolutionary concept of an individual helping conspecifics other than offspring. Although it does not improve her/his own

direct fitness, it helps individuals sharing the same genes. Tallerman does not think it is proven that such behaviour has been important. Further, she points out that language is by no means always necessary or much used in instruction, discussing traditional societies, modern societies, and also learning among apes. Rather, according to her, the crucial thing about transfer of knowledge is the docility of the learner, which must have developed first, before any language. Words are needed for learning, and she thinks that the driving force behind the emergence of phonology was the need for more words, i.e. semantics, referring to the 'rigorous modelling work' by Björn Lindblom, e.g. Lindblom (1998).

Katherine Mac Donald & Wil Roebroeks, in 'Neanderthal linguistic abilities: an alternative view' (pp. 97–117), are quite sceptical about previous and current assumptions about the presence or absence of linguistic abilities among Neanderthal men. Specifically, they contend that 'rather than the archaeological record indicating the presence of language, *we archaeologists have been using the concept of "language" to explain (changes in) the archaeological record*' (p. 100; italics in the original). The paper provides a survey of the present state of knowledge, with many references. The question if or to what extent the use of language is useful or necessary for the learning of hunting and gathering skills is discussed at length, and a substantial part of the paper is a survey of the practices of modern hunters and gatherers. It is concluded that this ethnographic evidence suggests that 'the impact of language on foraging skills may have been significant', but that there is no certain evidence for or against its use: 'the Pleistocene archaeological record is strikingly silent in this domain' (p. 117).

Thomas Wynn, Frederick L. Coolidge & Karenleigh A. Overmann's 'The archaeology of number concept and its implications for the evolution of language' (pp. 118–138) is mainly about some European bone plaques with series of marks that seem to have served as some kind of tally boards. The oldest of those is from about 28,000 years ago. As for the evolution of language as such, they do not provide much information; few if any researchers have doubted that linguistic capacities were fully developed by the time of the earliest relevant artefacts.

There exists only extremely meagre evidence for the evolution of semantics. In 'The evolution of semantics: sharing conceptual domains' (pp. 139–159), Peter Gärdenfors relies mainly on the clues given by the development of semantic domains in children, which are assumed to have provided selective advantages in the evolution of the species. The main focus is on how 'expanding semantic domains makes possible new forms of cooperation' (p. 140). Gärdenfors first shows how the different components of intersubjectivity, i.e. the sharing and representing of others' mentality, are developed successively in children. Then, he turns to an analysis of the various semantic domains required for what he calls 'meeting of minds', understanding of and cooperation with others: the emotional domain, the visual and physical domains, the category domain, etc. His general proposal is that 'intersubjectivity and the sharing

of the corresponding semantic domains are ... the evolutionary background for increasing communicative capacities' (p. 158).

The paper by Jacques Vauclair & H el ene Cochet, 'Speech-gesture links in the ontogeny and phylogeny of gestural communication' (pp. 160-180), provides, first, a useful overview of recent work by psychologists and primatologists about communicative gestures among non-human primates and among human infants. The authors see gestural communication as an important precursor to vocal linguistic communication in humans, both in phylogeny and in ontogeny, and they present considerable evidence in support of that general view. Secondly, in the latter part of the paper, focus is directed towards one particular aspect of the relation between gestures and language, namely the problems of handedness in humans and other primates and of the lateralization of brain functions pertaining to linguistic capacity. The authors highlight the differences between handedness in manipulation of objects and handedness for communicative gestures, and suggest that there is a relation between handedness for communicative gestures and brain lateralization for language.

In 'Exploring the gaps between primate calls and human language' (pp. 181-203), Alban Lemasson, Karim Ouattara & Klaus Zuberb uhler deal with parallels between vocal communication among primates and among humans. Here, focus is not so much on apes as on other monkeys, and the overall message is that there are more parallels than has commonly been assumed. Vocal productions of other primates are not always automatic responses to stimuli; they are sometimes clearly chosen to suit the situation and/or the intended audience. They are not necessarily reflex-driven in any simple sense: warning calls used by Campbell's monkeys show clear differences between warnings for tree fall, for eagle acoustically spotted, and for eagle visually spotted. The calls are not always genetically determined but are sometimes socially learned, especially among apes. In some species of monkeys, calls are exchanged by turn taking that resembles the structure of human dialogue. Most spectacularly, Campbell's monkeys produce complex calls, combinations of a simple call with an 'affix' that seems to modify the function of the call in a predictable way. Similarly, putty-nosed monkeys produce combinations of simple calls in rapid succession, with a different function than any of the simple calls. Clearly this is reminiscent of the combinatorial properties of human languages. However, the authors refrain from making specific claims concerning the evolution of language: 'At present, the available evidence is too sparse to make meaningful statements about the nature of the evolutionary mechanisms responsible for the observed parallels' (pp. 200-201).

Kathleen R. Gibson's 'Talking about apes, birds, bees, and other living creatures: Language evolution in light of comparative animal behaviour' (pp. 204-222) is an overview of the evidence from studies of animals about the evolution of language, written by a veteran researcher in primate behaviour. Gibson provides an interesting historical introduction, sketching a long period of mistrust between primatologists and linguists (see quote above); the primatologists have mainly worked within a

Darwinian framework, while linguists were for a long time not willing to accept that non-humans had capacities that were even interesting for the study of human language. Gibson herself contends that human behaviours that seem to be different in kind from those of apes are actually often just differences in degree. She first overviews the relevant capacities of great apes, stressing that they are actually able to perform many actions necessary for human language: they can invent novel signals and transmit them culturally within a group; they are able to refer to absent objects; they can cooperate to achieve common goals; and more. Their limitation is seen mainly as a lack of capacity for advanced cognitive processing. The second main section is an overview of various current ideas about the factor triggering the early evolution of human language, in the light of parallels in other species. She discusses tool-assisted extractive foraging, cooperative breeding, power scavenging, predator defence, gossip, singing and sexual selection, and her final conclusion is that all may be correct to some extent. In her view, it is likely that 'language and protolanguage always functioned to communicate a diversity of information.' (p. 221).

Alan Langus, Jana Petri, Marina Nespor & Constance Scharff's 'FoxP2 and deep homology in the evolution of birdsong and human language' (pp. 223–243) is a paper with two main parts. The first one is a comparison between birdsong and human language, stressing parallels in acquisition and to some extent in function. The second part deals with the expression of the gene FoxP2 in human language and in birdsong. For a reader such as the reviewer, lacking any background in modern genetics, this part makes very difficult reading. It is clear, though, that FoxP2 is involved in the regulation of several functions in many species, among others the vocal production of sounds in birds as well as in humans. The authors speculate that this may be a case of what in modern evolutionary theory is called 'deep homology', parallel developments in widely different species that involve similar parts of the genome.

Karl C. Diller and Rebecca L. Cann are geneticists. In the book's final paper, 'Genetics, evolution and the innateness of language' (pp. 244–258), they are strongly polemical against claims by generative linguists about a special status for language in evolution: 'Universal Grammar requires magical thinking about genes and genetics' (p. 244). Among other things, they completely reject a recent proposal in Berwick & Chomsky (2011) that a mutation that allowed for the operation Merge (i.e. recursion) happened in an individual as late as 75,000 years ago. This is absurd on two counts, in their view. First, such a recent mutation can impossibly have reached all mankind. Secondly, a single mutation can impossibly have had a complex effect of this type. Their belief is that language has had a long evolutionary period, perhaps from *Ardipithecus ramidus* 4.4 million years ago, and that it was fully developed around 200,000 years before now. In their view, what evolved was speech, not signed language, as there are so many genetic adaptations for speech: control of breathing, evolution of Broca's area, fine motor control, and much more.

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With the advent of the World Wide Web around 1993, it gradually became apparent that an unprecedented source of linguistic data had come into existence for many languages. By 1998, 26 million unique URLs (uniform resource locators, roughly, web pages) were indexed by Google, itself launched in the same year. In 2000, the figure had risen to one billion (1,000,000,000) pages (Alpert & Hajaj 2008). A couple of years ago, estimates suggested that Google indexed about 40 billion pages (Fletcher 2013). In 2008, Google reported that they had identified the astonishing figure of one trillion (1,000,000,000,000) web pages, and that the number was ‘growing by several billion pages per day’ (Alpert & Hajaj 2008). By 1999, papers based on data obtained from the web were beginning to get published at major computational linguistics conferences (Kilgarriff & Grefenstette 2003). Broad acceptance of the usefulness of such data was manifested by the publication of a special issue on the web as corpus of the journal *Computational Linguistics* in 2003, the launch of the annual Web as Corpus (WaC) Workshop in 2005, and the founding of the ACL SIGWAC, the Special Interest Group of the Association for Computational Linguistics on Web as Corpus, in 2006.