[Review]

*The Evolution of Human Language: Biolinguistic Perspectives*


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1. Introduction

The paper that provides a general introduction to the principles-and-parameters approach to UG, Chomsky and Lasnik (1993) lists the following five questions as the classical problems in the study of language:

(1) a. What does Jones know when he has a particular language?
   b. How does Jones acquire this knowledge?
   c. How does Jones put this knowledge to use?
   d. How did these properties of the mind/brain evolve in the species?
   e. How are these properties realized in mechanisms of the brain?

With respect to the question of language evolution (1d) (as well as the question about the neural basis of language (1e)), Chomsky and Lasnik suggested that the problem appears to be “beyond serious inquiry for the time being, along with many similar questions about cognition generally.”

The book under review demonstrates that this remark, which was made in the early 1990s, is now outdated, and that linguists of all theoretical persuasion, as well as researchers in anthropology, biology, psychology, and philosophy, are now quite active in seriously examining human language origins. This book is based on a conference held at Stony Brook University

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in 2005, which aimed to survey the updated landscape of research directions sparked by the seminal and provocative essay by Hauser, Chomsky and Fitch (HCF) “The Faculty of Language: What Is It, Who Has It, and How Did It Evolve?,” a paper that originally appeared in *Science* in 2002 and is reprinted as the first chapter of this book. This volume contains 14 papers (in addition to HCF), all of which are written by leading scholars from a number of disciplines working in the evolution of language and who are influenced in one way or another by the HCF paper.

In this brief review, I will summarize some of the hypotheses proposed in these chapters about how the faculty of language evolved in humans, especially focusing on the question of whether the proposed hypothesis postulates gradual evolution or saltational evolution, with the goal of demonstrating how lively and attractive the field of language evolution is. However, this review is quite limited in its scope, not only because the space is limited, but primarily because the evolution of human language is a highly interdisciplinary field (as can be seen below) and hence it is impossible for me (an ordinary linguist) to understand in detail every aspect of the discussion developed in the 15 chapters contained in this book. Those who are not familiar with this field are referred to Ike-uchi (2010), which provides explicit and easy-to-understand explanations for the key notions that play central roles in the current approaches to the evolution of language.


The primary goal of the essay by Hauser, Chomsky and Fitch (Chapter 1 of this book) is to set up the framework for discussion on the evolution of language among linguists, biologists, psychologists, and anthropologists, by identifying core questions and defining the primary object for the study of language evolution. HCF argue that, when we explore the problem of language evolution, there are at least three questions that crosscut the debate. One of these questions is the “shared versus unique” distinction, which is the question of whether our system of communication is uniquely human or shared with other species. A second issue is whether the evolution of language was gradual (step-wise) or saltational (one leap). The third one is the “continuity versus exaptation,” the question of whether our language evolve as a unique adaptation for communication or one for another purpose. In the next section, I will overview some of the proposed hypothesis along the lines of the second issue.

The term “language,” which also appears in these central questions, bears
a number of meanings in different contexts and disciplines. Adopting a biolinguistic perspective, HCF defines “language” as an internal component of the mind/brain (“I-language”; Chomsky (1986)). This notion is still too broad and leaves much open to interpretation, however. HCF thus delineate two more restricted conceptions of the language faculty, in order to identify the target for the study of language evolution. One of these is the faculty of language in a broad sense (FLB), and the other is the faculty of language in a narrow sense (FLN). FLB refers to an internal computational system (FLN), combined with two other organism-internal systems, which are called the “computational-intentional” (CI) and the “sensory-motor” (SM) systems. The CI systems make use of generated linguistic expressions for thought, interpretation, and organizing action, while the SM systems externalize expressions in production and assign them to sensory data in perception. In contrast, the FLN is the abstract linguistic computational system alone, independent of the other systems with which it interacts and interfaces. Admitting that the internal architecture of the FLN is a topic of much current research in linguistics, HCF argue that a core property of the FLN is recursion, which takes a finite set of elements and yields a potentially infinite array of discrete expressions. The paper by Fitch (Chapter 4) examines recursion in more detail, and identifies three distinct interpretations of recursion employed by three different fields (computer science, linguistics, and meta-mathematics), with the goal of clearing up misinterpretations in animal communication literature.

Based on the FLB-FLN distinction, HCF propose the tentative, testable hypothesis that only the FLN is unique to humans: While most of the FLB is based on mechanisms shared with nonhuman animals, FLN is recently evolved and unique to our species. In other words, the two interface systems (the CI and SM systems) have an ancient evolutionary history, long predating the emergence of language, and the innovation that yielded the faculty of language lies in the evolution of the computational system that links these two systems. HCF further suggest that recursion may have evolved to solve other computational problems such as navigation, number quantification, or social relationships, and hence that other animals may have such abilities. This perspective leads to the central claim of their essay that understanding the evolution of the language faculty requires substantial interdisciplinary cooperation, especially between biology and linguistics.
3. Some Hypotheses about the Evolution of Language Faculty

3.1. Language Evolution as Saltational Transition

Chomsky (Chapter 2 of this book) adopts the thesis in (2) proposed in HCF, and explores the nature of the recursive operations in the FLN.

(2) Interfaces + Recursion = Language

Chomsky argues that the relevant operation is *Merge*, an operation that takes structure X and Y already formed and combines them into a set \{X, Y\}. Assuming further that Merge is the sole recursive operation in the FLN, Chomsky advances the very strong thesis in (3), which he calls “the strong minimalist thesis.”

(3) Interfaces + Merge = Language

Under this view, evolution of language is regarded as the innovation to provide instructions for Merge to operate, forming structured expressions accessible to the two interface systems. Chomsky speculates that this innovation happened as described in (4) (p. 59).

(4) Within some small group from which we are all descended, a rewiring of the brain took place in some individual, call him *Prometheus*, yielding the operation of unbounded Merge, applying to concepts with intricate (and little understood) properties. Guided very likely by third factor principles [principles not specific to the language faculty], Prometheus’s language provides him with an infinite array of structured interpretations of the kind illustrated: duality of semantics, operator-variable constructions, unpronounced elements with substantial consequences for interpretation and thought, etc. Prometheus had many advantages: capacities for complex thought, planning, interpretation, and so on. The capacity would then be transmitted to offspring, coming to predominate (no trivial matter, it appears, but let us put that aside). At that stage, there would be an advantage to externalization, so the capacity might come to be linked as a secondary process to the system for externalization and interaction, including communication—a special case, at least if we invest the term “communication” with some substantive meaning.

In a recent lecture at MIT (July 2005), Chomsky refines this view and argues that the evolution of language should be regarded as the evolution of an apparatus capable of dealing with “edge features,” features which are born by lexical items and drive them to undergo Merge (see also the paper by Piattelli-Palmarini in Chapter 10).
Piattelli-Palmarini’s paper (Chapter 10) also suggests, in line with Chomsky (Chapter 2), that the evolution of language may not be the result of a culmination of a host of smaller steps, and counters the view that language had been shaped gradually by communicative needs. To support his position, Piattelli-Palmarini presents evidence from truncated expressions (see Merchant (2004)).

(5) English: Who was Peter talking with?
   a. Mary.
   b. With Mary.

(6) Spanish: Con quién hablaba Pedro?
   a. *María.
   b. Con María.

As shown by the example in (6), in languages like Spanish which do not allow preposition stranding, one cannot answer with a bare noun, but must repeat the preposition, which suggests that these fragment answers must obey very precise syntactic constraints. Piattelli-Palmarini interprets this observation as indicating that “[t]here is no escape from syntax, not even when it would seem that mere isolated words or mere fragments of sentences could suffice to communicate” (p. 159). These linguistic examples, according to him, constitute a serious challenge to any explanation of the evolution of language in terms of communicative needs.

3.2. Language Evolution as Gradual Transition

The paper by Jackendoff (Chapter 3) contrasts two theories of the architecture of language, to explore how alternative views of the language capacity might generate alternative hypothesis about its evolution. While HCF (Chapter 1) and Chomsky (Chapter 2) adopt a syntactocentric architecture, which localizes the generative capacity in the syntactic component, Jackendoff pursues a parallel architecture, in which phonology, syntax, and semantics are all equipped with independent principles of combinatoriality, and in which the generated structures from these three components are linked with each other by interface rules (e.g. Jackendoff (2002)). In Jackendoff’s parallel architecture, semantic/conceptual structure is the product of a combinatorial capacity that is independent of syntax. Thus, the parallel architecture has the potential of accommodating Bickerton’s (1990, Chapter 14 of this book) “proto-language,” which uses linear order to crudely express semantic relations. This architecture hence is more compatible with the view that the language capacity evolved in stages, each adding an incre-
ment to the system’s communicative efficiency and grammaticality.

Gärdenfors and Osvath (Chapter 6) argue that the evolutionary force behind the emergence of symbolic language has its basis in prospective cognition, that is, the ability to plan for future events and needs. The Oldowan culture, dating 2.6–1.5 million years ago, had a long-ranging character, and stone tools and their raw materials, as well as pieces of carcasses were transported from kilometers away. This aspect of Oldowan culture made the use of prospective cognition beneficial. According to Gärdenfors and Osvath, advanced prospective cognition made communication about future goals advantageous for the hominines. The evolutionary gain of being able to communicate about objects that are not yet present would be that human cooperation, which depends on elaborate long-term planning and negotiation, became possible. Symbolic communication should have emerged as an efficient way of solving problems concerning cooperation about future goals. Gärdenfors and Osvath suggest that their hypothesis is in conformity with the view that there was a gradual shift into symbolic communication, but not with explanations relying on evolutionary discontinuity.

Corballis (Chapter 7) also assumes that language evolution was a gradual switch. Specifically, he postulates a manual phase in the evolution of language, and argues that the most likely form of early language was manual, rather than vocal, and that facial and vocal elements was gradually introduced into this manual system. This view amounts to saying that language evolved before speech, that is, before it became autonomously vocal. One argument in favor of this view comes from the discovery of the “mirror neuron system”: Mirror neurons, which lie in area F5 in the monkey brain, respond both when the animal makes a grasping movement and when it watches another individual making the same movement. In the human brain, this system also seems to mediate speech. The neural links between hand and mouth may be adapted for gestural and finally vocal language. Corballis suggests, however, that even though the switch from manual to vocal language may have been gradual, the final step to autonomous speech may have had a relatively sudden and decisive impact, which may have resulted from a mutation of the FOXP2 gene. Thus, the evolutionary scenario proposed by Corballis appears to be in a medial position between gradual transition approaches and “sudden emergence” approaches.

Bickerton (Chapter 14) also suggests that human language arose gradually, from a proto-language by relatively small, incremental steps. He isolates “displacement”—the capacity to refer to objects not present in the here-and-now—as the central property of human language, and speculates that
“recruitment,” a transfer of information that involves displacement, was the selective pressure that started protolanguage. For human ancestors approximately 2 million years ago, the richest sources of food were in carcasses of megafauna, which would have necessitated some means to indicate where and/or how far away the carcass was located. Such pressure would have created an initially crude and primitive protolanguage. Once established, protolanguage itself became a selective pressure for its own expansion, which gradually created the rich and complex system that characterizes language today.

4. Conclusion

The fifteen papers on the evolution of language included in this book demonstrate a symbolic lifting of the ban on investigations into the origin of language officially imposed by the Linguistic Society of Paris back in 1866, and succinctly show that the evolution of language is now a quite lively field of study. All of these papers are influenced in one way or another by the seminal essay by Hauser, Chomsky and Fitch, which makes the very strong and challenging proposal that the evolution of language should be regarded as the emergence of a recursive operation. Under this perspective, UG should not require any stipulated device beyond this recursive operation, and hence all the linguistic phenomena, including language variation, must be derived from complex interactions between this recursive operation and the principles not specific to the language faculty (especially, the principles of efficient computation). This suggests that tackling the question of language evolution will not only requires substantial interdisciplinary cooperation (as demonstrated in this book), but also should restrict the range of possible linguistic analyses and hence requires harder work than ever in the field of linguistics itself.

REFERENCES


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