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Language evolution: an ecological perspective
Language is a complex phenomenon and it can be examined from different complementary perspectives, including but certainly not limited to its modular architecture, its functions as means of communication and as identity marker, and its relation to cognition as catalog of knowledge and experience. In the context of my current research on language evolution, I have chosen to conceive of it both as a complex adaptive system and as a piece of technology that was built incrementally and has been modified several times over by its users and makers (speakers and signers alike) to meet their current communicative needs, under the influence of habits developed previously. The succession of these adaptive modifications, which often entail no improve- ments, is what evolution boils down to. I mean by “language” (without an article) what is identified in French as le langage, an abstraction of convenience for the common characteristics of individual languages, which downplays diversity among them.

Various generations of individuals have successively and collectively contributed to the current states of individual languages as pieces of technology, contributing or modifying a component or a function at a time, subject to various direct and indirect ecological factors, as explained below. At the population level, the process of producing technology involves innovators and copiers. This state of affairs introduces variation and therefore competition and selection, as different innovators often introduce variants (forms or structures) for the same functions. The copiers show preference for one or the other, for various reasons, such as what is more efficient, what is less costly (say, in terms of energy), or what is easier to use. This complex communal process reduces variation to smaller ranges of variants acceptable to the population using the technology. These considerations apply to language too, for instance, regarding words or particular constructions intended to describe particular activities, emotions, or states of minds. In time, self-organization produces communal norms, which typically just reduce variation and define patterns thereof. Thus, in French, one can say le livre dont Marie m’a parlé just as another can say le livre dont Marie parlait. Linguists think of these (variable) patterns as fitting into systems, but we could also identify them as “emergent patterns,” in the language of complexity theory. The convergent processes that produce them are hardly controlled by the speakers or signers of the relevant languages, because languages do not emerge by design.

My research at the Collège de Lyon is an extension of my ecological approach to language evolution as explained in my book The Ecology of Language Evolution1, Critique, ecological social theory, evolution linguistique2, and Language Evolution: Competition, cooperation and change1. Inspired by population genetics and macroecology, I then focused on how external ecological factors (e.g., population movements, the particular dialect mix of the allopatric population, the kinds of languages spoken by the people they coexist with in the colony, and population structure, which determines patterns of social interaction) influenced language change. I attempted especially to explain the ecological factors that trigger or favor the speciation of some dominant languages into new varieties and, in some cases, the concurrent, or perhaps consequent, loss of the socially “weaker” languages. I started with the emergence of creole language varieties; then I extended the approach to all colonial varieties of the imperial European languages (especially English and French), and even to the dispersal and diversification of Indo-European and Bantu languages, the families I understand the best.

Impressed by the explanatory power of the ecological approach, particularly regarding the actuation of change, I now attempt to apply it to the pro- phetic phylogenetic evolution of language or languages. I pro- ject an evolutionary trajectory that extends from what can be identified as Homo erectus (corresponding to any of our early hominid ancestors up to Homo habilis) to Homo sapiens to meet various pressures to commu- nicate, in increasingly more complex ways, at various stages of the hominid evolution all the way to Late homo sapiens. Following Brian Arthur2, I interpret technology as whatev- er an individual or population develops, physical or mental, to serve some purpose. This includes solving communicative problems.

The structure of a particular piece of technology need not be reducible to analogies; it can involve com- ponents of different natures, as with computers, which consist of both hardware (which is physical) and software (which includes various complex abstract algorithms). In the case of language, hominids domesticated their own anatomy, viz., the lungs and the buccal-pharyngeal structure to speak and the hands to sign. The vocal and manual signs produced are phy- sionomically crafted things; the lingual articula- tions packaged into information chunks of different sizes, without which the vocal and manual gestures would have no significance in commu- nication. All this is the essence of the linguistic technology, though I am oversimplifying things in this short exposition of an architecture that is much more complex, as several modules run concurrently when we speak or sign, as well as when we process utterances (spoken or signed).

From a phylogenetic perspec- tive, the concurrently evolving mind and social structures played a critical role in the gra- dual invention of language, but the architecture of this emer- gent technology was subject to the direct ecological constraints on human body size and mobility. This can be conceived of on the model of the production of music, which is constrained by the particular instruments used, including the singer’s vocal organs. Music produced with a fiddle technology was subject to gentler technology was subject to greater technological innovation. Nonetheless, the momentum of change is packaged into words and phrases, which are derived from one language to another? Cognitive linguists and linguistic anthropo- logists should be interested in this kind of question.

Phonology (the particular ways that sounds can be combined into words in a particular lan- guage) and syntax (how words can be structured into sentences of different kinds) are deriva- tive constraints on the script. They illustrate the arbitrariness of cultural conventions, which must be learned. Other kinds of linguistic constraints, such as concepts and constraints on, for instance, how related constituents can be moved in a sentence, such as when we ask questions and move the question word to the beginning of a sentence in European languages, or when we form a relative clause and move the element in focus to the beginning of a clause (as in the man whom you talked to 0). The constraint in this particu- lar case has to do with keeping track of the moved constituent (saxon) and tracing it easily to the relevant position in the sen- tence (marked by “0”) — I have coindicted them in the example with the subscripted “t”.

Among my research questions are the following: 1) When did particular aspects of language emerge in human phylogeny? 2) What particular evolution- ary stages of human anatomy and mind favored these evolu- tions? 3) How did the changes happen? 4) What particular developments may be consid- ered as the late arrival of this or that earlier evolutionary stage? 5) What led to complexity in the emergent languages? 6) What are the consequences of the linking of languages as complex adaptive systems? 7) Does lin- guistic diversity today provide any hint as to when and where the origins of language or languages are monogenic or polygene- tic? These are plenty of research questions to keep me busy for the next few years.

4 The Nature of Technology. Why it is what it is and how it works, Free Press, 2009, 256 p.


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