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Ljiljana Progovac, *A critical introduction to language evolution: Current controversies and future prospects* (Springer Briefs in Linguistics: Expert Briefs). Cham: Springer, 2019. Pp. xiv + 86.

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Three questions must be confronted in the study of language evolution: what ancient language looked like; whether language evolved incrementally or emerged suddenly; and whether genetic changes were involved. Two representative approaches in response to these questions are discussed by Progovac in this four-chapter monograph, namely the Saltationist approach and the Gradualist approach. It can be seen that the author is an active advocate of the latter.

Chapter 1 firstly justifies the necessity of the study of language evolution. Progovac asserts that an effort in this field is worthwhile since a full understanding of language cannot be obtained without reference to evolution. However, the Saltationists discourage this effort. They consider that it is too hard to make a convincing case targeting a certain linguistic feature if a natural selection approach is adopted. Two divergent views are then introduced. In brief, Gradualists argue that language emerged through a sequence of mutation with small effects, and through intermediate stages triggering natural selection; Saltationists contend that syntax in its entirety emerged suddenly as a result of single event with no possibility of an intermediate stage, irrespective of natural selection.

Progovac proposes that the evaluation of the two approaches can be conducted by examining how successfully they handle the following five more concrete problems: (i) The decomposition problem, which is concerned with whether the start of language can be split into stages. (ii) The selection problem, concerned with the genetic basis of language and the role of culture. Progovac points out that most researchers from Gradualist and Saltationist camps agree that human language is genetically based. Thus, the real challenge for both approaches is to discover how this genetic basis came to be and the role of nature and nurture in the evolution of language. (iii) The loop problem, which deals with how human brains evolved or what the language–brain–genes relationship is. (iv) The variation problem, which concerns how to account for typological variations.

901

(v) The theoretical grounding problem, concerned with the theoretical bases in the study of language evolution. To my mind, most of these problems are designed to be potentially resolved by a Gradualist approach rather than by a Saltationist approach. It seems to me that it is unfair or at least incomplete to compare the two approaches based entirely on their possible answers to these questions. Nevertheless, it effectively allows the author to support her main argument upheld in this book.

Chapter 2 addresses two Saltationist approaches to language evolution in detail, those of Berwick & Chomsky (2016) and Miyagawa (2017). The key of Berwick & Chomsky's hypothesis is that in the very recent past, or about 75,000 years ago, a minor mutation gave birth to the operation Merge and syntax in its full complexity. Taking Problems (i)–(v) as diagnostics, Berwick & Chomsky have addressed the theoretical grounding problem in that they rely on their Minimalist framework, particularly on the Strong Minimalist Thesis (SMT), which postulates that 'language is an optimal solution to legibility conditions' (17). However, Progovac argues that their proposal is 'circular' (17) and SMT is unfalsifiable since they gave no definition of what is optimal. Progovac then contends that Berwick & Chomsky have nothing to say about the decomposition problem because they think syntax emerged as an 'undecomposable block' (18) and there is no way to offer evolutionary explanations for abstract grammatical mechanisms such as Subjacency. Progovac counters that Subjacency effects can be captured under a gradualist approach. As a consequence of the sudden emergent hypothesis, Berwick & Chomsky's approach can say very little about the selection, variation, and loop problems.

Miyagawa's Integration Hypothesis is a little bit different. Miyagawa posits that human language emerged about 100,000 years ago, after the integration of the Lexical system and the Expressive system, which existed separately in distinct species. The Lexical system is found in calls of primates, such as vervet monkeys, which can be understood as referring to something akin to the referential use of certain human words, whereas the Expressive system is found in birdsong, which corresponds to the functional component of language. The two systems are combined together, 'in a biological act of Integration' (22), giving rise to human language. Progovac points out that the advantage of this proposal is that it accommodates the role of communication in the evolution of language, which opens the door slightly to a gradualist approach. The real challenge for this proposal is to fill the huge gap between several animal calls plus several bird songs and tens of thousands of words and complex grammatical rules. With respect to the five problems, since Miyagawa shares Berwick & Chomsky's view that a single event gave rise to complex human language without stages, his approach provides no possible solutions to the decomposition, selection, and variation problems. As to the loop problem, even though he discusses the common brain features shared by singing birds and speaking primates, he does not touch on the issue of the brain–language–genes relationship. Progovac admits that Miyagawa's approach has addressed the theoretical grounding problem in that it emphasizes

the lexical and grammatical distinction, which is also relied on by gradualist approaches.

Chapter 3 discusses two major gradualist approaches. First introduced is Heine & Kuteva's (2007) vocabulary reconstruction approach. Based on attested cross-linguistic grammatical patterns, Heine & Kuteva reconstruct an earliest stage at which there were only two lexical categories, nouns and verbs. They argue that other categories such as tense markers or adjectives were developed from verbs or nouns through grammaticalization. In terms of the five problems, Progovac notes that Heine & Kuteva have addressed the decomposition, variation, and theoretical grounding problems directly. However, since their focus is on the reconstruction of earliest vocabularies, they offer no insights into the selection and loop problems.

Next, Progovac elaborates on her syntactic reconstruction approach. Her main innovation is that an earliest proto-grammar stage is reconstructed. In short, Progovac maintains that human language started from a flat, tenseless, headless, two-slot small clause (SC), with hierarchical structures such as transitivity (vP) and finiteness (TP) developed at later stages. There are two types of cross-linguistic living fossils to support Progovac's hypothesis: (i) verb–noun compounds, such as *cry-baby*, *kill-joy* in English, *cepi-dlaka* (lit. 'split-hair'; 'hair-splitter'), *vrti-guz* (lit. 'spin-butt'; 'fidget') in Serbian (43); and (ii) tenseless small clauses, such as *Case closed*, *Point taken* (52).

However, Miyagawa (2017) and Nóbrega & Miyagawa (2015) disagree with Progovac's postulate of syntactic fossils. They argue that on the one hand, certain fossils in one language are simple but their equivalents in other languages are rather complex; on the other, these fossils look simpler but can be analyzed as containing covert layers. Progovac refutes the first attack with an analogy. She argues that it is equivalent to claiming that the Queensland lungfish in Australia cannot be viewed as genuine living fossils because some lungfish found elsewhere looks different. As to the second objection, Progovac demonstrates convincingly that these fossil structures cannot be embedded as shown in (1), which suggests that there are no covert structures, otherwise their embedding should be allowed.

(1)　(a)　*I believe (that) problem solved.

　　(b)　*I believe (that) apology accepted.　　(53)

With regard to the five problems, Progovac confidently states that her approach addresses the decomposition problem in that it identifies an initial stage of grammar corroborated by living fossils. It also addresses the theoretical grounding problem as it is essentially based on Chomsky's (1995) Minimalist framework. The variation problem is addressed too since the proto two-slot mold provides the root structure on which various grammatical layers can be established, which, for instance, elegantly accounts for the emergence of ergative syntax vs. accusative syntax. The selection and loop problems can also be addressed under this approach as discussed in the last chapter, with the latter being further evidenced by fMRI studies.

Chapter 4 firstly addresses the language–genes relationship together with the selection problem. Progovac hypothesizes that in a community of 150 hominins, one jumped from the one-word stage to suddenly having the power to combine two proto-words either for the purpose of increasing the effect of insults or for the competition for mates (sexual selection). Progovac further posits that it was possible for some hominins to alter their genetic structures thanks to this novel 'verbal skill' (72). It was also possible for these hominins to earn more opportunities to have more offspring to inherit and spread their genetic make-up. In this way, the language-genes connection can be evolutionarily established and the sexual/natural selection problem is covered.

As for brain–genes relations, strong evidence given by Progovac is that some recent discoveries in the affected members of the KE family[1] have shown that their inherited language impairment was caused by a mutation in the FOXP2 gene which was closely related to the 'under-activation in the Broca's area' (74). Furthermore, it is proposed that some special mutations in FOXP2 can lead to 'increased synaptic plasticity and denser neuronal connectivity of the human brain' (75). These pieces of evidence demonstrate that gene mutation can affect the brain and language functions.

Lastly, two fMRI experiments done by Progovac and her collaborators are reported. One is on Serbian middles (e.g. *Deja se tuku* 'The children hit/are hitting each other') contrasted with matched transitive structures (*Deja me/ga tuku* 'The children are hitting me/him'; Progovac et al. 2018). It is found that processing flatter structures relies more on ancient and more diffuse neural networks while processing layered syntactic structures relies more on the Broca's-basal ganglia network. Another is on English root small clauses (e.g. *Point taken*, *Problem solved* (78)) in comparison with their tensed sentential counterparts (e.g. *The point is taken*, *The problem is solved* (78)). It is shown that there are increased activations in the left BA 44 and in the right basal ganglia for TPs, indicating that the greater activation is related to the presence of extra layers of syntactic structure. To my knowledge, the findings of these experiments are significant and valuable in illuminating the association between brain processing and language structures. However, they still cannot serve as sufficient evidence to anchor an evolutionary link between human brain and language.

Overall, this monograph is brief in length but rich in content. It provides an in-depth overview of the approaches, debates and findings on language evolution. Returning to the three questions raised at the outset, it can be concluded that Progovac's hypothesis bears much resemblance to Berwick & Chomsky's on the involvement of genetic changes. Both of them consider that a single mutation in genes gave rise to human language. However, they diverge on the appearance of ancient language and on the way of evolution. The fundamental disagreement

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[1] KE family is a medical name for a British family, a large part of whom show speech disorder. It is the first family to be investigated using genetic analyses and the language gene FOXP2 was thus discovered.

904

between them lies in the fact that Progovac employs the Darwinian approach, viewing language as an adaptive complexity in the service of communication, while Berwick & Chomsky distance themselves from such a conception, emphasizing that Merge, the recursive generative capacity of language, is designed not for communication but for the expression of thought. While both of their approaches are thought provoking and shed new light on the study of language evolution, Progovac's approach is empirically more testable and falsifiable and thus more convincing. Particularly, her two supporting fMRI experiments provide impressive support. There is little doubt that it will be a challenge for researchers to do similar experiments on the basis of Saltationist hypotheses.

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Rena Torres Cacoullos & **Catherine E. Travis**, *Bilingualism in the community: Code-switching and grammars in contact*. Cambridge: Cambridge University Press, 2018. Pp. x + 372.

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Understanding the relationship between language contact and language change continues to be a central concern within a wide range of linguistic disciplines. One route into this problem is to examine the role of intergenerational transmission of linguistic systems. Here the biases in input received by a child acquiring language may induce reanalysis of linguistic forms and rules. The result is a system that

905