Natural/Sexual Selection: What's language (evolution) got to do with it?

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Much of current scientific research on language evolution reveals a distaste, if not disdain, for proposals invoking natural/sexual selection when it comes to language capabilities, and cognitive capabilities more generally. There are claims to the effect that humans have stopped selecting altogether, except perhaps for some minor health benefits. This distaste is evident not only in Noam Chomsky and colleagues' long-held views on language evolution, but also in some recently advanced cultural evolution approaches to language. These two approaches cannot be more different in their methodologies and theoretical orientation, and yet they often converge on the same assumption that natural/sexual selection is not (directly) relevant for language evolution.

Here I discuss arguments and reasons for rejecting this view, and I do so by considering some specific proposals and linguistic data. The two most difficult challenges facing language evolution studies are: (i) identification of the initial (ancestral) stage(s) of language (the Decomposition Problem), and (ii) the determination of how the genetic bases for language came to be (the Selection Problem). Not only are these Problems extremely difficult to tackle, but they are also intertwined, exponentially increasing the difficulty. Especially when it comes to syntax, these Problems are typically either avoided or denied altogether, in the proposals to the effect that language/syntax can neither be decomposed into primitives, nor can it be subject to selection. Can scientific progress be made in the fields of language and human evolution without confronting the Selection and Decomposition Problems?

In order to illustrate the challenges and rewards of attempting to address the Decomposition Problem, I consider a specific reconstruction of ancestral proto-grammar, addressing the syntactic phenomenon of transitivity. In this reconstruction, transitivity is decomposed into primitives of syntactic structure, identifying a common denominator for crosslinguistic variation in transitivity, consistent with both typological and theoretical linguistic findings. I then consider how such primitives can be tinkered with (minimally manipulated) to produce three main transitivity types: (i) ergative-absolutive, (ii) nominative-accusative, and (iii) serial verb types, each type tinkering a different solution to the same problem (as per François Jacob's metaphor). It will be shown that approximations of the reconstructed ancestral grammars can still be found in various constructions across present-day languages.

In order to engage the Selection Problem, I report the results of an fMRI experiment which was designed to test the validity of the above proposal. The stimuli used in the experiment included small clauses (mini sentences) in English, as well as middles (neither transitive nor intransitive sentences) in Slavic. The experiment addressed the question of whether simpler (ancestral) linguistic structures are processed differently by the brain in comparison to their more complex (modern) counterparts. We specifically looked at the differential role played by the Broca's-Basal Ganglia network in processing "ancestral" versus "modern" types of structures. The

significance of this brain network is twofold: first, it is preferentially involved in language processing, including syntax. Second, several recent findings suggest that this network has been bolstered in the line of descent of humans, by increased synaptic plasticity and neuronal connectivity. This evolutionary development appears to be a result of the selection of certain gene alleles, including those of the *FOXP2* gene. As this is consistent with the possibility that certain language abilities drove the selection, this line of research has a potential to engage the language-brain-genes loop in language evolution studies. To this end, I explore a specific sexual selection scenario for the emergence of ancestral grammars.