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Comment on “Towards a computational comparative neuroprimatology: framing the language-ready brain” by Michael A. Arbib

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Arbib makes the interesting proposal [3, §1.6] that the first *Homo sapiens* could have been “language-ready”, without possessing the kind of rich lexicon, grammar and compositional semantics that we see in the world’s languages today. This early language readiness would have consisted of a set of “protolanguage” abilities, which he enumerates (1-7 in §1.6), supported by brain mechanisms unique to humans. The transition to full “language” (properties 8-11 in §1.6 and §3) would have required no changes in the genome, he argues, but could have resulted from cultural evolution plus some measure of Baldwinian evolution favoring of offspring with greater linguistic skill. The full picture is set out in [1].

Do the language sciences provide any relevant evidence for or against this view of language evolution? Arbib critiques one prominent proposal in [2] associated with Chomsky’s “Universal Grammar” (see [6,7]) and exemplified in [25], whereby the first *Homo sapiens* would have had “language” in its essentially modern form, complete with all the hypothesized innate linguistic properties that have been claimed [6,7] to form the bedrock of languages today and to make their learning possible by successive generations.

Chomsky’s Universal Grammar has been considerably scaled back over the years [4,8,9,13], with “recursion” almost the only proposed universal left. This greatly reduces its relevance for defining the language abilities of the first humans. The arguments from language learning for supposedly innate properties of grammars have also been undermined by numerous studies [5,11,16,19,27]. These have shown that the absence of negative evidence given to children (i.e. information about what sentences are ungrammatical as opposed to grammatical) is no argument for a rich innate Universal Grammar guiding learning, since children regularly solve parallel learning problems involving properties quite idiosyncratic to individual languages that cannot possibly be innate. This whole approach to understanding the language faculty of the first *Homo sapiens* has now become quite unhelpful, therefore, and it was in any case too speculative and insufficiently grounded empirically to begin with.

Arbib’s proposal for language-readiness, derived from neuroscience, comparative primatology and computer science, offers an alternative that linguists and psycholinguists need to consider seriously. We now have considerable evidence about, and databases on, the world’s grammars [12]. We know a lot about grammatical change, and about how grammatical function words and rules emerge out of lexical items at earlier historical stages, not just in the familiar Indo-European languages but across the globe [21]. We also have a lot of empirical support for the role of psycholinguistic mechanisms of production and comprehension, i.e. language processing, in shaping the data both of language performance and of grammars [16,19]. Examining these phenomena in the light of Arbib’s proposals for brain evolution can lead to a fruitful, and mutually beneficial, research program.

Notice first Comrie’s point in [10] that many grammatical properties that we find in the world’s languages today could not have been present in the language of the first *Homo sapiens*.
sapiens because they are known to have evolved from less complex earlier stages. We see different complexity levels in typological samples [12] of the numbers of vowels and consonants across languages, in the internal structure of words, in the syntactic structures permitted [15,17,18]. Comrie [10, p.210] writes that “certain complexities of all or many presently attested languages, such as morphophonemic alternations, phonemic tone, phonemic vowel nasalization, and affixal and fusional morphology were not present in early human language, but have arisen on the basis of historical processes of types that can be observed as we examine the attested historical development of languages”.

Second, there is now a rich database of “grammaticalization” phenomena across languages linking grammatical words and affixes to the lexical items from which they evolved [20,22,24]. E.g. future will in English (I will go to work now) derives from a lexical verb meaning ‘to want’ (which is still visible in the cognate verb wollen in German), the Finnish postposition kanssa meaning ‘with’ has been reduced to a “comitative case suffix” -ka attached to nouns in languages closely related to Finnish, and so on. The obvious relevance of this for work on language evolution and for inferences about the earliest human language is discussed in [21].

Third, Arbib refers (in §3.4) to my own work [15] as being relevant for the evolution of grammars and grammatical rules in response to considerations of language processing and efficiency. These efficiencies can be seen empirically in languages that give speakers choices between alternatives, such as look the number up and look up the number in English [26]. When grammars do conventionalize a fixed rule of ordering, the same efficiencies can be seen in the formal properties of the rules as are seen in speakers’ preferences in performance, leading to a “Performance-Grammar Correspondence Hypothesis”. Matching sets of data from performance and grammars [14-19] show that even subtle aspects of syntax, of the kind earlier attributed to an innate Universal Grammar [6,7], can emerge from earlier pre-grammatical stages. This evolution from performance preferences to grammars has been modelled in a computer simulation by Kirby [23], leading to the predicted typological distribution of grammars defined in [14] which closely matches their frequencies across the globe.

These research strands from linguistics and psycholinguistics appear very compatible with Arbib’s language-readiness proposal, and they provide mechanisms for the transition to grammars as we know them today from earlier stages, even from the pre-grammatical stage of a proto-language as he envisions it. The devil lies in the details, but a research program integrating these empirical and theoretical strands from the language sciences with his interdisciplinary neuroscience proposal is now urgently needed. Notice that I have chosen to focus my remarks on these three strands, rather than on pidgins and creole languages and on child language acquisition. These latter can provide some relevant data for language evolution but they also introduce confounds into the discussion of a language-ready mature human brain, namely transfers from a pidgin-speaker’s native language, and an immature brain and cultural experience, respectively.

References