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REVIEWS

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Cedric Boeckx, *Reflections on language evolution: From minimalism to pluralism* (Conceptual Foundations of Language Science **6**). Berlin: Language Science Press, 2021. Pp. 76.

Reviewed by Elliot Murphy, University of Texas Health Science Center at Houston

In *Reflections on Language Evolution* (ROLE), Cedric Boeckx targets 'Darwin's problem', or the problem of how language evolved. He claims natural language syntax evolved gradually, not suddenly. ROLE continues Boeckx's transition away from generative grammar and toward what he considers 'pluralism', implying that the minimalist program is incompatible with inter-disciplinary perspectives. To address Darwin's problem, Boeckx argues that we need to boil down the bare essentials of linguistics into a format interpretable and usable by other fields. Otherwise, concepts from linguistics 'won't get past customs' (3).

The program that ROLE seems most sympathetic to appears to be the work of Simon Kirby and collaborators. The *iterated learning paradigm* examines artificial grammar processing to unearth generic biases that drive the learning process. Boeckx notes that 'critics are quick to point out that this line of work implements the cognitive biases by brute force, and does not show how these evolve organically' (28). He deems this line of criticism 'unfair' – yet not inaccurate. Boeckx's preference is to think of language as 'a collection of (generic) cognitive biases' (29). He does not provide much discussion of what these biases are, however: 'I suspect there are likely to be very many, associated with general notions like memory, attention, salience, etc.' (29).

Boeckx argues that components of language 'that don't manipulate (parts of) sentences' and are fundamentally lower-level computations seem 'ideally suited for fruitful comparisons' with other species (3). Boeckx's previous book was entitled *Elementary Syntactic Structures* (Boeckx 2014), a reference to Chomsky (1957). His new book is a reference to Chomsky (1975), *Reflections on Language*. We might expect that his next book will explore '*Paleoanthropological Aspects of the Theory of Syntax*', although Boeckx never explicitly renounces his earlier minimalist work – but it seems implicit. ROLE provides no motivations for why any specific minimalist analysis of linguistic phenomena should be rejected, which until recently he appears to have endorsed (Murphy 2015). Boeckx seems to agree with generativists on the uniqueness of the core trait (unbounded hierarchical recursion)

and its possible mechanism (Merge/labeling), but throughout ROLE he engages in discussions that imply that he has some alternative explanation that never quite materializes. The reader of ROLE would benefit if Boeckx clearly spelled out which aspects of his previous work we should consider part of his current thinking.

There are many reasons to doubt ROLE's gradualist perspective, including the observation that Merge seems to have remained unencumbered and stable (i.e. there aren't different kinds of recursion across languages), which suggests that it is a recent trait and not subject to many evolutionary pressures. Merge is clearly not different in signed languages, and so issues pertaining to the gradual linking of sensorimotor apparatus to Merge do not appear to be relevant, at least with respect to the initial emergence of narrow syntax.

Another major direction concerns Boeckx's effort to show that the language change/evolution dichotomy should be dispelled. He presents the following example: Domesticated finches produce songs of greater complexity than wild white-rumped munias. Boeckx asks: 'If we were to refer to these song repertoires as "languages", would we treat the change in song structure from the munia to the finch as a case of language evolution or language change? That there are genetic differences between the wild munia and the domesticated Bengalese finch would maybe lead one to talk about language evolution, although the core song circuit of the Bengalese finch does not differ in fundamental ways from that of the munia' (30). This seems in line with the claim that human (self-)domestication likely ran alongside an increasing computational complexity of language, but just as 'the core circuit' of the finch does not differ substantially from that of the munia, presumably this also applies between early and modern *Homo sapiens*. All we can conclude is that domestication triggered certain latent computational capacities, but this does not alter the valid description of Modern English as exhibiting 'language change' relative to Old English. Be it wild or domesticated, birdsong still adheres to linear order – something that natural language syntax is independent of. Boeckx later claims that 'it is now possible to move beyond claims that language is exclusive to us' (33). This again seems to conflict with his assessment at the beginning of ROLE that 'core' parts of language may indeed be unique to humans.

ROLE reviews some recent comparative research, 'from birds to bats to baboons', aiming to show that many features of the broad faculty of language can be found in non-humans. Counter-claims (i.e. that birds cannot compute long-distance and hierarchically organized filler-gap dependencies, or that baboons are not sensitive to subjacency) are termed 'tedious' by Boeckx (7). He notes: 'I do not find this dichotomy particularly useful, and believe that a continuum of cognitive biases … is a more adequate stance'. This talk of 'continuums' and 'spectrums' is, of course, vogue and intuitive, but ROLE does not meaningfully relate this to actual linguistic phenomena.

The above is reflective of a more general move that Boeckx executes throughout ROLE. When he is faced with a direct conceptual obstacle or possible rebuttal, he appears to deny that the opposing camp even exists. He uses this to dismiss numerous forms of criticism: Narrow versus Broad faculty of language? An

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illusion. Language change versus language evolution? A tedious, mainstream false dichotomy.

The minimalist goal of positing as few language-specific architectural and computational foundations as possible seems to be something that Boeckx endorses, and yet he distances himself from the minimalist account of evolution, which 'must be wrong', he states, providing us only 'very briefly' with his reason: '[I]t is wrong because it disregards the comparative evidence ("only us"), it fails to appreciate the multi-level approach required to link genotype and phenotype (claiming that a single mutation yields the simple, atomic operation "merge"), it keeps the discussion at the logical level, without attempting to even sketch a plausible path to testing it, and does not engage with the many lessons coming from the great discoveries in paleo-sciences over the past decade' (9).

Since this is the core of ROLE's critique, these arguments will be assessed one by one. Consider first the claim that the most prominent minimalist model of evolution (not the only one) 'is wrong because it disregards the comparative evidence'. There is no comparative evidence to consult with respect to the major components of narrow syntax; the argument is a straw man. Boeckx disapproves of the rather Old Testament-style and perhaps even, in the current climate, somewhat reactionary belief that non-human animals 'are non-linguistic creatures' (10), yet nowhere does he provide any reasons to assume otherwise.

What about the claim that minimalism 'fails to appreciate the multi-level approach required to link genotype and phenotype'? The 'single mutation' model is not incompatible with a 'multi-level' approach; that is, if linguists acknowledge that genes do not code for 'the labeling algorithm' or 'head movement'. But a 'single mutation' account would still require a series of linking hypotheses. Binary set-formation is a discrete computation – there are no 'multi-level' stages to it. You either have Merge or you don't (Berwick & Chomsky 2019). As biologists such as John Maynard Smith and Eörs Szathmáry have shown, major evolutionary transitions are assuredly possible, with the idea that a small neural rewiring yielded a consequent computational expansion not being unreasonable, as Richard Dawkins (2015: 382) has noted.

What Boeckx finds most compelling about generative linguistics is the earliest results pertaining to the Chomsky hierarchy, the necessity to posit forms of nested and crossing dependencies, and the consensus that 'natural languages are both strongly and weakly mildly context-sensitive' (14). Is Boeckx therefore against the idea that human beings have some species-unique properties? Apparently not quite. Though he dismisses language as a candidate, he instead argues that 'brain changes giving rise to our globular skull, use of complex symbiotic tools like the bow and arrow, and some aspects of figurative art are fairly good bets in my current opinion' (10) for constituting species-unique attributes. It seems we are to believe that what distinguished Robin Hood from the animals of Sherwood Forest was not his knowledge of language, but rather his archery skills. More worryingly, the Chomsky hierarchy makes reference to linearity and concatenation, yet as Berwick & Chomsky (2019) note: 'Merge-based systems do not even appear in the

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hierarchy, and anything concluded from the study of the Chomsky hierarchy is totally irrelevant to the evolution of Merge-based systems'.

Boeckx then claims that '[e]volutionary considerations invalidate certain theoretical frameworks that fail to come to grips with the "complex dynamical system" nature of language'. Why is a Merge-based computational system that is optimized for efficient structure-building incompatible with being embedded inside a framework capable of modeling a 'complex dynamical system'? There is no clear reason given.

Boeckx seems right to note that 'phenotypic novelty is largely reorganizational', and that 'novelty arises from the combination of generic mechanisms, whose collective effects give rise to what appears to be *de novo* characters'. Crucially, however, the narrow faculty of language can still be a coherent concept even if it is ultimately assembled via wholly generic sub-systems of neural computation (Murphy 2020).

There is also something of a tension in ROLE between Boeckx's insistence that we should boil down language sufficiently so as to render it potentially commensurable with neurobiology, and his parallel insistence that we should doubt 'narratives focused on "component parts", like Berwick and Chomsky's about a syntactic operation like "Merge" being *the* basic property that adds content to FLN' (20, emphasis in original). It is quite difficult to imagine a language faculty without Merge. There are many potential, and exciting ways to ground Merge in neurobiology, which Boeckx does not cite or discuss.

Boeckx then discusses the 'phonological continuity' hypothesis, or the claim that 'phonological processes can be captured by finite-state machinery' (20) and are deeply grounded evolutionarily. The flip side of this argument is that syntax exhibits *discontinuity*, with humans exhibiting either a categorically distinct computational machinery, or a considerably higher propensity to construct hierarchical tree structures. In contrast, Boeckx claims that syntax and phonology 'exhibit a higher degree of continuity' than typically assumed (21). Boeckx cites Thomas Graf's work showing that when we consider syntax as involving computations over sets of trees, and not strings, then a finite-state automaton can suffice. Yet Boeckx omits a crucial detail: While the computational machinery may be similar (a positive step toward the minimalist approach, we might add), the level of featural complexity between the atoms of phonology and those of syntax-semantics differ in major ways. So there remains much discontinuity. What's more, Boeckx sidesteps a presupposition of his thesis, that syntax exploits sets, not strings. Boeckx briefly conjectures about hierarchical tree structures: 'I think [these] predated the emergence of *sapiens*' (23). No elaboration is provided.

ROLE emphasizes that linguistics should return to an original goal of generative grammar of using language not simply to explore technical issues of the English tense system, but to use it as a window into the human condition. Yet, throughout the text we are provided with critical comments about generative grammar that are often inaccurate. Boeckx says: 'Over the years, talk of optimization, efficiency, etc., which occupied center stage in the early days of the program, has been replaced by a

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focus on evolutionary considerations. If such considerations lead to an impasse, the program as a whole may indeed have been (at best) premature' (9). Yet 'talk of optimization' is very much still at the heart of minimalist thinking. ROLE provides no reason why minimalist discussions of optimized computational machinery are incompatible with biology. Conversely, nor are we told why Boeckx's gradualist account of the evolution of syntax can have no place for such concerns of computational efficiency. We are also given no concrete rebuttal of earlier ideas espoused by Boeckx. There is a clear discontinuity between Boeckx's earlier writings and his current position in ROLE, but little clarity with respect to which pieces we are supposed to pick up, and which pieces we are supposed to leave behind.

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David R. Olson, *Making sense: What it means to understand*. Cambridge: Cambridge University Press, 2022. Pp. xii +196.

Reviewed by Norbert Francis, Northern Arizona University

Among the different assessments of the author's study of meaning, for readers of a journal of linguistics, this review will attend to only one of its central applications: to the research on language learning and language ability. One aspect of language development in particular stands out. Within this broad category of ability, David R. Olson's research program prompts us to focus on the use of language for the second-order proficiencies (often termed 'higher-order'), beyond the first-order abilities characterized by spontaneous acquisition, uniform development, and