

REVIEWS

Language unlimited: The science behind our most creative power. By DAVID ADGER. Oxford: Oxford University Press, 2019. Pp. vii, 272. ISBN: 9780198828099. \$25.95.

Reviewed by ANDREAS TROTZKE, *University of Konstanz*

David Adger is the author of one of the most influential linguistics textbooks ever written. His introduction to generative linguistics, *Core syntax: A minimalist approach* (Adger 2003), has impacted a whole generation of young linguists, including the author of this review—who is therefore excited about having been invited to review A's most recent book, *Language unlimited: The science behind our most creative power*.

This book is not an updated version of his previous linguistics textbook; it is rather an introduction to the philosophy behind generative linguistics. A states this clearly somewhere in the middle of his book: 'This book isn't about how to do linguistics, it's about what the nature of language is, so I'm only going to scratch the surface of why the [linguistic] structures look as they do' (173).

Fair enough. As a reviewer, I would thus like to look in more detail at A's general points about 'the nature of language', rather than delving into the linguistic details that A uses in some of the chapters to illustrate basic characteristics of human language. Those details range from his creation of the language of the Warigs (known from the British TV series *Beowulf*; Ch. 5), over uncontroversial facts about BINDING THEORY (Ch. 7), to fine-grained dialectal data (Ch. 10). A refers to the technical literature in his footnotes, and as a reviewer I think that meticulously discussing and evaluating these aspects of the book would not do justice to the book's overall messages and mission, which is to convey to a broad audience—whose training is not necessarily in linguistics—what the core of our amazing capacity called human language is.

In this review, I would therefore like to focus on three fundamental points that A makes in his book: (i) HUMAN UNIQUENESS (language qualitatively distinguishes us from other species), (ii) MERGE IS THE SOURCE OF HUMAN CREATIVITY (the syntactic operation Merge allows us to use language in a limitless fashion and is the source of building new worlds of ideas), and (iii) THE LIMITS OF GRAMMAR (many social and emotional aspects of language are never co-opted into our grammar). In what follows, I spend most of the limited space that I have in this review on discussing and evaluating those three points because they are the main messages of the book. In line with this, I do not provide the reader with detailed chapter-by-chapter summaries because I often think that those consume too many paragraphs in book reviews. Accordingly, the following single paragraph should suffice to indicate to the reader how the book's ten chapters are organized. After this outline, I turn to the evaluation of A's three fundamental points about the nature of language.

In Ch. 1, A argues that language imposes structure on our experience and thus cannot be learned from mere experience and pattern learning, and that it is different from the mere use of symbols and signals (Ch. 2). Rather, language requires what A calls 'a sense of structure' (Ch. 3), which is more or less Chomsky's famous concept of UNIVERSAL GRAMMAR. Ch. 4 elaborates on the idea of universal grammar (read: an innate biological endowment for language) by discussing the phenomenon of homesign languages where deaf children create a language without receiving the relevant input from their hearing parents. Chs. 5, 6, and 7 sketch some universal features of language (the observation that one can come up with impossible patterns that are nowhere found in the world's languages; the fact that language structure involves only discrete and no gradual categories; and the idea that hierarchy and not order is crucial for language structure). Ch. 8 builds on those three universal features and demonstrates that AIs like Amazon's *Alexa* don't really learn languages based on human principles of language structure. Ch. 9 introduces the basic formal apparatus for generating human language structure by referring to the operation 'Merge' and its limitless, loop-like, and recursive nature. Ch. 10 concludes the book by sketching how the biological basis for language (our 'sense of structure', a.k.a. 'universal grammar') might relate to

the social and emotional dimensions of language. Having sketched the book's outline, let me now turn to the book's three fundamental points listed above, and how they are supported by the individual chapters.

HUMAN UNIQUENESS. A's main point in this context is that human language is a faculty that **QUALITATIVELY** distinguishes us from other species. In A's words: 'This book was written to make the argument that it's not a matter of more oomph, it's a matter of different oomph!' (6). In Ch. 1 (and interspersed throughout the book), A contrasts this argument with an account that, according to A, goes back to Charles Darwin and his 1871 book *The descent of man*. According to the Darwinian tradition, humans and no other animals have language because our brains are **QUANTITATIVELY** more powerful, and so our general intellectual abilities are far more flexible than those of other species. The alternative view that A puts forward in his book is that it is not about sheer brain power, but about a qualitative distinction between humans and other species (A's 'different oomph'). Like the Darwinian line of thought, this alternative view has a certain tradition, and it was Noam Chomsky's book *Cartesian linguistics: A chapter in the history of rationalist thought* (Chomsky 1966) that for the first time articulated and traced back this view about 'a different oomph' in the context of linguistics.

I was surprised that A does not mention this work on a single page. Given that the book is intended as a general and accessible introduction, I would never criticize the author for not having provided an exhaustive reference list. Nevertheless, the reason why I think that not mentioning the conceptual background of the 'different oomph' view is a problem is that this view has serious philosophical (including ethical) implications that are not addressed by A. Note also that already in its title, A's book centers on language as 'our most creative power', by which he means 'our creative use of language' (15). The first time the notion of 'creativity' entered the field of modern linguistics was precisely Chomsky's book mentioned above, where he coined the phrase 'creative aspect of ordinary language use' (Chomsky 1966:4–5). The relevance for A's view about the nature of language is thus obvious, and I would briefly like to point out the philosophical implications of the 'different oomph' view that A fails to point out to the reader, although those implications directly concern how we think about the nature of human language and human nature as a whole.

When tracing back the 'different oomph' view, Chomsky (1966) refers to the French philosopher René Descartes (thus Chomsky's title, *Cartesian linguistics*), who denied that the soul of animals is of the same kind as ours. According to Descartes, this crucial difference between humans and animals manifests itself most clearly in the fact that an animal 'never ... arranges its speech in various ways ... in order to reply appropriately to everything that may be said in its presence, as even the lowest type of man can do' (Descartes 2003 [1637]:38). That is Descartes's version of Chomsky's 'creative aspect of ordinary language use' and A's 'creative use of language'. Compare A's paraphrase of that capacity: 'we use our language in an incredibly rich, flexible, and creative way ... We create language throughout our lives, and respond creatively to the language of others' (2).

Crucially now, Descartes, being a philosopher of his times, was convinced that the world consists of two distinct substances: matter and mind. Animals, according to Descartes, are mere machines and belong to the realm of matter because they lack all thought and sensibility. Humans, by contrast, have a soul and thus, in addition to having a body, also participate in the realm of the mind. Neither A nor Chomsky would probably subscribe to such a harsh distinction between humans and other species, but the generative story about a 'different oomph'—contradicting most of the mainstream Darwinian views in evolutionary biology—is actually a modern version of Descartes's approach. Here is how Descartes's view of a qualitative distinction between humans and other species translates into the jargon of modern science:

The simplest account of the 'Great Leap Forward' in the evolution of humans would be that the brain was rewired, perhaps by some slight mutation, to provide the operation Merge, at once laying a core part of the basis for what is found at that dramatic 'moment' of human evolution. ... the Great Leap was effectively instantaneous, in a single individual, who was instantly endowed with intellectual capacities far superior to those of others ... (Chomsky 2005:11–13)

To be sure, there are indeed scientific reasons for assuming nongradual evolutionary steps that contradict Darwin's famous principle *natura non facit saltum* 'nature makes no leap' (those reasons have been articulated especially within the field of evolutionary developmental biology). But in the context of A's book, I think any nonexpert reader should be given a fair warning that this is not the mainstream view at all, even in collections that grant the generative view a lot of space (e.g. Tallerman & Gibson 2012). Quite the contrary: it is an exotic position, even if fascinating to many linguists. But what exactly is so fascinating? I think it is the following.

The most fascinating feature of the generative story about human uniqueness is that both A and Chomsky reduce the 'great leap forward' and the 'different oomph' to a single feature of language (Merge; see below), from which every aspect of our uniqueness (including our human creativity) follows. A is right in pointing out that other hot candidates for human uniqueness seem to be part of other species' capacities too. In particular, he summarizes experimental studies showing that '[t]he ability to impose discrete units on continuous streams of sound is not ... uniquely human' (140) and that, in the context of reading someone's intention, 'other animals have been found to understand that pointing can be used to direct someone's attention to something' (152).

But there is a difference between testing those capacities and the claim that Merge is the feature *sui generis* that distinguishes us from other species. A flurry of research in the 2000s has shown that testing Merge in other species faces—at the very least—some serious methodological challenges (e.g. Sauerland & Trotzke 2011). A does not refer to those more recent studies on other species' syntactic capacities, but rather grounds his main argument in studies like the ones carried out in the 1980s with the bonobo Kanzi, whose performance was tested when learning human-like language structures based on lexigrams (Ch. 7).

Unsurprisingly, Kanzi does not speak like humans, and both his production and comprehension capacities could not master human-like phrase structures. But does that mean that other species like bonobos lack a 'creative use of language' altogether? Other species do not speak a human language, but maybe their communication mode is nevertheless complex and creative (e.g. Schlenker et al. 2016). The main problem I have with all of this is that combining the 'different oomph' view with the idea of a single distinct feature (which is hard to test in other species) is an ideal support for anthropocentric views like Descartes's account (or occult theories of a divine spark)—and after the Darwinian revolution, this is certainly not the way most of us look at the difference between us and other animals nowadays (Korsgaard 2018).

All in all, A's presentation of why human language might be unique is a brilliant introduction to Chomsky's ideas about human uniqueness. However, for a general introduction to 'the science behind our most creative power', A's discussion is simply too narrow and does not reflect the different views in linguistics on why human language is so special. There are other language features that have been argued to be special and unique, which are briefly discussed when A is pointing to Willard Van Orman Quine's *gavagai* and Elizabeth Spelke's CORE KNOWLEDGE (148–52). In this context, A does not mention the psychologist Michael Tomasello, who has developed a full-fledged theory about human uniqueness based on the features indicated in A's discussion (Tomasello 2008). Tomasello is also famous for harsh statements like 'Universal grammar is dead' (Tomasello 2009), so I can see why A might have been reluctant to cite his work. However, as soon as one talks about intention reading and how human versions of theory of mind might distinguish us from other species, Tomasello is the big elephant in the room. I do not see how a general introduction to the nature of language can ignore his (even if antagonistic) views.

MERGE IS THE SOURCE OF HUMAN CREATIVITY. Let us now turn to the second fundamental idea of A's book. At the end of his book, A concludes that 'Merge gives us the ability to build the new worlds of ideas that have been so central to the successes and disappointments of our species. It makes language unlimited' (251). According to A, the syntactic operation Merge, illustrated in Ch. 9, is thus at the center of human creativity. The crucial feature of Merge, according to A, is that it is a loop-like device, which reuses its own output as input to create hierarchical structures. This recursive nature of Merge is the source of human creativity. However, A points out that this kind of '[s]elf-similarity is everywhere in nature' (209), so the reader might wonder why it is then that Merge is at the core of human uniqueness (see above) if similar output structures can be

found everywhere in nature. Perhaps the unique part is not the generation of self-similar structures per se, but rather THE DOMAIN of Merge (i.e. applying the generation of self-similar structures to linguistic domains like lexical items)? The reader is left in the dark about this question, but, as any linguist knows, the interesting questions (and controversies) begin here.

For example, A illustrates Merge (211–30) using examples that do not contain anything like complex subjects (like [*the man*] in [[*the man*] *left*]). The crucial point is that in order for the syntactic derivation to work in those cases, elements like complex subjects have to be merged in a separate derivation layer (and enter the whole derivation as an atom, just like single words; see Trotzke & Zwart 2014, Trotzke 2020). But how is this derivation layering motivated on general grounds? This question is about the domain(s) of Merge, and not about Merge itself. It is the common assumption in the minimalist literature (which A cites in his book) that the domain of Merge is the so-called ‘numeration’, a set of lexical items the operation Merge draws from. Crucially, this numeration, as it is conceptualized in minimalism, is exhaustively determined BEFORE the derivation; that is, it contains not only all the lexical items, but also ‘subnumerations’, determining opaque domains and ‘phases’. Again, what might be unique about Merge is not its combinatorial modus operandi, but rather its interaction with the interfaces when merging complex objects that have already been composed and interpreted at the interfaces in previous derivations. But that would also mean that what makes Merge so unique and distinguishes us from other species perhaps cannot be captured in terms of a single feature (see ‘Human uniqueness’ above). Rather, one would have to take into account a diverse set of interface rules, which are more common to the constructionist approaches that A criticizes throughout the book.

Another interesting question arises when reading A’s discussion of Merge: Why should we view Merge as the source of creativity in the first place? A answers this question by demonstrating that Merge can generate infinite structures like *Arnie’s sister’s neighbor’s friend’s cat’s tail’s tip’s color’s brightness* (184), and he uses such examples to argue that only Merge (and not a general cognitive strategy like chunking) can explain the existence of those structures:

English-speaking children don’t hear examples like this—at least as far as we know from the millions of words of recordings we have from parents speaking to children. Chunking makes it mysterious why such phrases are perfectly grammatical in English. Why do children go beyond their linguistic experiences, developing a mental grammar that places no limits on possessive examples like this? (216)

Looking at the quite incomprehensible example above, the nonlinguist reader of A’s book might wonder how exactly those examples exemplify human creativity. Yes, multiple embeddings are LOGICALLY POSSIBLE. However, psycholinguistic research over the last forty years or so has shown that they are not ACCEPTABLE (see the famous missing-VP effect in the context of multiple self-embedding structures; Frazier 1985, Trotzke et al. 2013). In the quote above, A is suggesting to the reader that those examples ‘are perfectly grammatical in English’, but I doubt that every nonlinguist reader will be convinced. Human language is a major source of creativity, but I think that putting examples like the multiple embeddings above at the center of illustrating human creativity is at least misleading to any reader who is not familiar with the classical debates in generative linguistics. And for all linguists not working within the generative framework, A’s illustration of human creativity only reinforces the negative stereotype that generative linguistics often deals with empirically unsubstantiated data points.

THE LIMITS OF GRAMMAR. The last fundamental point of A’s book is that grammar has its limits, a point that is mainly expressed in the last chapter, ‘Grammar and culture’ (Ch. 10). The chapter contains, among other things, an extensive discussion about the crosslinguistic and dialectal expression of Topics (245–50). At the end, A concludes that ‘[t]his last chapter has taken us in a different direction from the previous nine. It has been about those aspects of language that Merge does not touch’ (250). I was slightly puzzled by this statement, because discourse notions like Topic, according to many generative linguists, indeed do belong to the sort of categories that Merge touches (for many, Topic is even a recursive syntactic projection). I think my puzzlement points to a more fundamental issue that goes beyond A’s book and concerns a conceptual divide in generative linguistics that is often only implicitly articulated.

One branch of generative linguistics aims at representing every conceivable interpretive aspect in terms of functional syntactic projections, or, to put it more metaphorically, it attempts 'to draw maps as precise and detailed as possible of syntactic configurations' (Cinque & Rizzi 2010:51)—thus the name the 'cartographic approach'. Scholars who are not interwoven in theory-internal debates have repeatedly pointed out

that oceans of functional projections ... represent a singularly *unminimalist* framework for capturing ... variation. Given that few languages manifest the proposed cartography in its fullness, there is no benefit to proposing that [universal grammar] provides the set of projections and their ordering. (Newmeyer 2009:131, emphasis in the original)

In other words, cartographic approaches, which indeed include discourse notions like Topic in their syntactic apparatus, are at root incompatible with core assumptions of minimalist syntax (the version of generative linguistics that A presents in his book). There are reasons for this that directly concern the domains Merge can draw from: according to Chomsky's (1995:228) economy conditions, 'any structure formed by the computation ... is constituted of elements already present in the lexical items selected ... ; no new objects are added in the course of computation apart from rearrangements of lexical properties'. This 'inclusiveness condition' implies that Merge can refer only to lexical features, and it is inspired by a core property of cognitive modules: informational encapsulation (see e.g. the 'strong modularity hypothesis for discourse features' by Horvath 2010). The conceptual problem in the context of notions like Topic is that lexical items cannot be viewed as inherently possessing information-structure properties like Topic. Nevertheless, A claims that 'Topic is one of the grammatical meanings that Universal Grammar makes available for syntax All children come equipped by Universal Grammar with the idea of Topic' (246–49). My question then is: Where do the limits of grammar actually lie for A? Is Merge introduced in line with Chomsky's (1995) 'inclusiveness condition'? Or are discourse notions like Topic part of universal grammar and can thus be manipulated by Merge? These aspects of the syntax-pragmatics interface remain ambiguous in A's book.

One aspect of language that A unambiguously excludes from the domain of Merge is the expressive dimension of language, exemplified by lexical means like *bastard* or *fucking*. Based on possible placements of the intensifier *fucking* within a sentence, A states that '[e]xpressive meaning takes advantage of the sequential nature of the speech stream, quite a different dimension from the hierarchies of phrases constructed by Merge' (242). I concur with A that the sequential nature of speech is central to the expression of emotions via language. Already Roman Jakobson (1960:354) noted this point when discussing phonetic strategies like *John is biiiiiitiiiiig!* ('emphatic prolongation', in his terms). In many cases, however, expressive components in fact do have an impact on core syntactic operations (and thus also on the hierarchical dimension of linguistic structures). This has recently been shown, for example, in Gutzmann's (2019) book *The grammar of expressivity*—a book that appeared in a series that A is editing. In fact, there is a whole field of recent syntactic research showing that expressive components of language impact core syntactic operations (e.g. Trotzke & Villalba 2021), and so in this regard A's conclusions are inaccurate and a little outdated.

At the end of this review, I would like to reemphasize that A's book *Language unlimited* is a brilliant and entertaining introduction to Chomskyan ideas about what human language is. However, the book is not aimed at the broader field of linguistics, let alone at a broader nonlinguist audience. *Language unlimited* is yet another book that confirms the beliefs of those who are already working in the generative framework—and I think that is a lost opportunity because A is aware of the questions that concern a broader linguistics community. At the end of the book, he highlights that '[o]ne of the most exciting areas, for me, in current linguistics seeks to understand the relationships between linguistic structure, built by Merge, and language use' (250).

I completely concur, but for those questions to be answered we have to look beyond our framework and acknowledge that the relationship between language use and language structure is not just a one-way street. Compare A's central analogy for his understanding of the interaction between language use and language structure: the alcohol analogy (40–42). A points out that alcohol has a chemical structure and many uses, and that we need to study the structure because it can tell

us why alcohol does what it does in its many uses. In A's words: 'To understand use, we need to understand structure' (42). I think the analogy fails because the chemical structure of alcohol always stays the same and is never affected by its many uses, whereas language use affects language structure over time. I am sure that A is perfectly aware of the fact that there are detailed theories about that—but the most elaborate theories in this domain can be found outside of generative linguistics (e.g. Schmid 2020). It is too bad that A refers to those theories only as a target and not as a source of new insights that can advance our knowledge about the relationship between language use and language structure. If generative linguistics keeps ignoring major insights from the broader field of the language sciences, important aspects of what makes human language so special will remain a mystery.

REFERENCES

- ADGER, DAVID. 2003. *Core syntax: A minimalist approach*. Oxford: Oxford University Press.
- CHOMSKY, NOAM. 1966. *Cartesian linguistics: A chapter in the history of rationalist thought*. New York: Harper & Row.
- CHOMSKY, NOAM. 1995. *The minimalist program*. Cambridge, MA: MIT Press.
- CHOMSKY, NOAM. 2005. Three factors in language design. *Linguistic Inquiry* 36.1–22. DOI: 10.1162/0024389052993655.
- CINQUE, GUGLIELMO, and LUIGI RIZZI. 2010. The cartography of syntactic structures. *The Oxford handbook of linguistic analysis*, ed. by Bernd Heine and Heiko Narrog, 51–65. Oxford: Oxford University Press.
- DARWIN, CHARLES. 1871. *The descent of man, and selection in relation to sex*. London: John Murray.
- DESCARTES, RENE. 2003 [1637]. Discourse on method. *Discourse on method and meditations*, ed. by Elizabeth S. Haldane and George R. Thomson, 1–52. Mineola, NY: Dover.
- FRAZIER, LYN. 1985. Syntactic complexity. *Natural language processing: Psychological, computational, and theoretical perspectives*, ed. by David Dowty, Lauri Karttunen, and Arnold Zwicky, 129–89. Cambridge: Cambridge University Press.
- GUTZMANN, DANIEL. 2019. *The grammar of expressivity*. Oxford: Oxford University Press.
- HORVATH, JULIA. 2010. 'Discourse features', syntactic displacement and the status of contrast. *Lingua* 120. 1346–69. DOI: 10.1016/j.lingua.2008.07.011.
- JAKOBSON, ROMAN. 1960. Closing statements: Linguistics and poetics. *Style in language*, ed. by Thomas A. Sebeok, 350–77. Cambridge, MA: MIT Press.
- KORSGAARD, CHRISTINE M. 2018. *Fellow creatures: Our obligations to the other animals*. Oxford: Oxford University Press.
- NEWMAYER, FREDERICK J. 2009. On split CPs and the 'perfectness' of language. *Dislocated elements in discourse: Syntactic, semantic, and pragmatic perspectives*, ed. by Benjamin Shaer, Philippa Cook, Werner Frey, and Claudia Maienborn, 114–40. New York: Routledge.
- SAUERLAND, ULI, and ANDREAS TROTZKE. 2011. Biolinguistic perspectives on recursion: Introduction to the special issue. *Biolinguistics* 5.1–9. Online: <https://www.biolinguistics.eu/index.php/biolinguistics/article/view/201>.
- SCHLENKER, PHILIPPE; EMMANUEL CHEMLA; ANNE M. SCHEL; JAMES FULLER; JEAN-PIERRE GAUTIER; JEREMY KUHN; DUNJA VESELINOVIC; KATE ARNOLD; CRISTIANE CĂSAR; SUMIR KEENAN; et al. 2016. Formal monkey linguistics. *Theoretical Linguistics* 42.1–90. DOI: 10.1515/tl-2016-0001.
- SCHMID, HANS-JÖRG. 2020. *The dynamics of the linguistic system: Usage, conventionalization, and entrenchment*. Oxford: Oxford University Press.
- TALLERMAN, MAGGIE, and KATHLEEN R. GIBSON (eds.) 2012. *The Oxford handbook of language evolution*. Oxford: Oxford University Press.
- TOMASELLO, MICHAEL. 2008. *Origins of human communication*. Cambridge, MA: MIT Press.
- TOMASELLO, MICHAEL. 2009. Universal grammar is dead. *Behavioral and Brain Sciences* 32.470–71. DOI: 10.1017/S0140525X09990744.
- TROTZKE, ANDREAS. 2020. Constructions in minimalism: A functional perspective on cyclicity. *Frontiers in Psychology* 11:2152. DOI: 10.3389/fpsyg.2020.02152.
- TROTZKE, ANDREAS; MARKUS BADER; and LYN FRAZIER. 2013. Third factors and the performance interface in language design. *Biolinguistics* 7.1–34. Online: <https://www.biolinguistics.eu/index.php/biolinguistics/article/view/273>.
- TROTZKE, ANDREAS, and XAVIER VILLALBA (eds.) 2021. *Expressive meaning across linguistic levels and frameworks*. Oxford: Oxford University Press.

TROTZKE, ANDREAS, and JAN-WOUTER ZWART. 2014. The complexity of narrow syntax: Minimalism, representational economy, and simplest Merge. *Measuring grammatical complexity*, ed. by Frederick J. Newmeyer and Laurel B. Preston, 128–47. Oxford: Oxford University Press.

Universitätsstraße 10
78464 Konstanz, Germany
[andreas.trotzke@uni-konstanz.de]