Christina Behme **Vyvyan Evans**

christinabehme@gmail.com **v.evans@bangor.ac.uk**

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Leaving the myth behind: A reply to Adger (2015)

Two recent publications by Vyvyan Evans (*The Language Myth* and *There is no language instinct*[1]) have attracted severe criticism from the minimalist community. While some of this criticism was presented informally in the blogosphere, David Adger (2015)published his remarks in an academic journal, making them deserving of a reply. Adger alleges that Evans seriously misunderstands the commitments of Noam Chomsky and other defenders of the Minimalist Program (MP) and concludes "that the book and the article are useless for anyone coming from outside the field who wants to understand the issues" (Adger, 2015: 76). Given the long tradition of misunderstandings of Chomskyan commitments, any thoroughgoing clarification ought to be welcomed[2]. Unfortunately. Adger's remarks contribute little to such clarification because he (i) fails to evaluate Evans' work appropriately, (ii) only focuses on some of the criticism of the Chomskyan framework and neglects to address the limited scope and internal inconsistencies of minimalist publications, (iii) reveals inadequate understanding of issues he claims expertise in, (iv) ignores work completed outside of the Chomskyan framework that casts legitimate doubt on the appropriateness of this framework, and, relatedly, (v) fails to address specific challenges to the Chomskyan framework discussed in *The Language Myth*. Instead of overcoming those doubts, he focuses on alleged misunderstandings and terminological issues that are largely

[1] *The Language Myth* (Evans 2014a) is a general audience book, and *Real Talk: There is no language instinct* (Evans 2014b) is a précis essay loosely based on the book.

[2] For some discussion of those misunderstandings see Behme (2014 a, b)

irrelevant to his conclusion that currently "the best theories we have [to provide a scientific understanding of language, CB] are all generative" (Adger, 2015: 80). Therefore, Adger's attempted rebuttal misses not only the intended target but also leaves unimpeded the inference that he has not attempted a refutation of more severe challenges to minimalism because he cannot.

1. Building cannons to kill a fly

Since its publication *The Language Myth* has generated a surprising amount of hostile attention. One leading minimalist issued a call to (intellectual) arms: "criticize this in all venues, especially where non-linguists gather. Consider it part of your linguistic public service" (Hornstein 2014). A "panel of experts" led a public "debunking", accusing Evans of making serious errors and ignoring decades of research (Dunbar et al., 2014). Legions of minimalists invaded Evans' Facebook page and imposed a fruitless debate about the exact wording of Chomskyan texts on him. In addition, the publisher of Evans' book has been publicly reprimanded: "The scandal of [Evans'] published work goes beyond the work itself. The bigger scandal is that Cambridge University Press (Yes, CUP, the CUP!!) published this junk. … CUP has embarrassed itself with this book and it owes Generative Grammar an apology." (Hornstein, 2015). Adger's article condemns Evans for misunderstanding and misrepresenting virtually every detail of the minimalist commitment while saluting revolution which, he asserts, has provided the requisite tools to investigate the "function [that] powers our ability to connect meaning with sound and sign, generating the linguistic structures we use in everyday life." (Adger 2015: 76).

One would expect this minimalist fury to have been generated by a monumental work introducing groundbreaking research which suddenly threatens a well-established and universally accepted framework. Yet, *The Language Myth* is a slender volume aimed squarely at a non-academic audience; the tone is conversational throughout and jargon kept to a bare

minimum. In addition to informal summaries of scientific work, the author provides a good deal of anecdotal evidence and catchy rhetoric, making a somewhat "dry" subject matter appealing to a wide audience. True to its provocative title, the book argues that Chomskyan Universal Grammar is a myth and both points to and criticizes problems arising the "rationalist language science" inspired by Chomsky and popularized by Steven Pinker's influential book *The Language Instinct.* Evans suggests that if one truly wants to understand human language, one ought to get rid of the narrow focus on syntax and misleading computer analogies and modularity concepts. In support of these arguments, *The Language Myth* presents research results from a wide variety of sources (e.g. archeology, comparative physiology, computational modelling, evolutionary theory, experimental psychology, field linguistics, genetics, neurobiology, primatology, social cognition, etc.), showing the benefits of considering language as a complex trait embedded in general cognition and human culture.

One can, of course, question whether the evidence presented supports the conclusions drawn and one could also object to the informal style of presentation. Works directed at the general public should be especially carefully presented. The intended audience is unfamiliar with the issues discussed and cannot easily evaluate how the work discussed compares to other work in the field. If *The Language Myth* has misrepresented one side in an ongoing scientific dispute and/or misled its intended audience about the current state of (psycho)linguistics in general, and about minimalism in particular, the public should be made aware of these failings. Given the intensity of the negative reaction to *The Language Myth* among some minimalists, the general public—the intended audience of *The Language Myth*—may, accordingly, wonder whether this volume presents an entirely novel challenge to the Chomskyan paradigm.

This is clearly not the case; none of the arguments presented in *The Language Myth* are unfamiliar to the working linguist. The Chomskyan paradigm (especially his Minimalist Program) has faced serious and sustained opposition for decades. Developmental psychologists (e.g. Tomasello, 2003; MacWhinney, 2005) and linguists (e.g. Pullum & Scholz 2002; Sampson, 2002, 2005) have questioned the cogency of poverty of the stimulus arguments, field linguists

have demonstrated that not all human languages share language universals (e.g. Evans & Levinson, 2009), syntacticians have shown inadequacies in data interpretation (e.g. Postal, 2004, 2014; Jackendoff 2011), experts on social cognition have shown how language structure is shaped by language use (e.g. Enfield & Levinson, 2006; Everett, 2012; Tomasello, 2008), computational modellers have simulated aspects of language acquisition previously claimed 'unlearnable' without the help of UG (e.g. Christiansen & Chater 1999, Clark & Lappin 2011, MacWhinney 2010), cognitive linguists have developed successful alternatives to the Chomskyan paradigm, (e.g. Croft & Cruse 2004; Evans & Green 2006; Geeraerts & Cuyckens 2007), and evolutionary theorists have provided persuasive arguments against the minimalist version of Chomskyan UG (e.g. Arbib 2008, Jackendoff & Pinker 2005, Tomasello 2008, Hurford 2011, Lieberman 2013).

Furthermore, it has been argued that the Chomskyan paradigm is internally incoherent (e.g. Behme 2014a, Katz 1996, Katz & Postal 1991, Postal 2009, 2012) and Chomsky himself confessed that his linguistics rests on a ontological foundation that forces us to "accept things that we know don't make any sense" (Chomsky 2012: 91), that his work has not produced any independently confirmed results (Chomsky 2012: 76), that we do not know how Universal Grammar develops into a specific language because "[i]t's hopelessly complicated" (Chomsky 2012: 54), and that, essentially, we cannot know how language evolved because even the evolution of bee communication is "too hard to study" (Chomsky 2012: 105). Given the wealth of work questioning the minimalist paradigm and Chomsky's own admissions, one has to wonder why the defenders of minimalism focus so much effort on select passages of a volume that, according to their evaluation, is riddled with mistakes and based on hopelessly outdated sources[3]. Even if Evans were guilty as charged on all counts, virtually none of the problems raised by other critics would be addressed. One has to wonder whether Adger is focussing on such a 'soft target' —publications intended for the lay reader—because he is unable to address the challenges

[3] Allegedly Evans relies on "work presented in a 20 year old popular science book" (Adger, 2015: 79). Apparently Adger feels justified making such a negative judgment based on one example while ignoring virtually all of the far more recent work cited throughout *The Language Myth*.

to minimalism presented in the technical literature. And, as will be shown next, even several of the charges against Evans do not withstand scrutiny.

2. Who misunderstands what?

Adger provides a long list of misunderstandings, misrepresentations, and mistakes allegedly contained in Evans' work. However, it quickly becomes clear that Adger's narrow focus on the Chomskyan paradigm prevents him from accurately evaluating the work he criticizes. He is seemingly unaware of much recent work in cognitive linguistics (e.g. cognitive grammar, some types of construction grammar), computational linguistics, and developmental psychology, and misrepresents some of the work he cites. Most surprisingly, he also seems unaware of several Chomsky texts (e.g. Chomsky 1975, 1980, 1999, 2002) which justify Evans' interpretation and challenge some of Adger's claims. Space considerations prevent an exhaustive discussion of all these shortcomings, so only two representative examples will be discussed.

2.1. Do linguists speak of instinct?

Adger objects to the use of the term 'language instinct' because "linguists don't use the word 'instinct' as a scientific term. … Linguists talk rather of an innate capacity triggered by, and partly shaped by, experience." (Adger, 2015: 76). But Evans did not claim that the 'language instinct' is used as a scientific term. He explained that psychologist Steven Pinker popularized this term and emphasized that it is one *he* chose in order to identify the position he argues against: "… the language-as-instinct thesis, as I shall call the language myth" (Evans 2014: 5). No one should reasonably expect popular books to be peppered with scientific jargon that requires detailed explanation when, instead, familiar terms can be used as close approximation[4].

[4] The second part of Adger's claim is equally misleading. While (most) generativists may talk of 'innate capacities', there are many linguists who do not talk about such issues at all.

One might suspect, then, that Adger is concerned, rather, that even informal use of the term ‘language instinct’ may mislead the lay-reader because this term misrepresents the minimalist commitment. If so one would expect that his claim (linguists do not use the word ‘instinct’) applies universally and that especially minimalists, in particular, refrain from using such a misleading term in work directed at lay audiences. Yet, in such publications minimalists regularly use the term instinct and/or attribute it to Chomsky. Philosopher James McGilvray writes: “Chomsky’s work advances the rationalist cause considerably by … treating language - its growth and development and its internal operations - as an ‘animal instinct’ introduced by mutation into the human species” (McGilvray, 2012: 178). Linguist Cedric Boeckx states: “Darwin establishes connections between our ‘‘language instinct’’ (that is where the term comes from) and the abilities that for example birds display when they sing”. (Boeckx, 2009: 45) and, last but not least, Chomsky writes: “A natural hypothesis is that children are born with a ‘language faculty’ (Saussure), an ‘instinctive tendency’ for language (Darwin)” (Chomsky 2002: 7). Furthermore, one finds comparison between human language and biologically determined abilities in other species: “humans are to language what birds are to flight and fish are to water” (Boeckx & Hornstein 2009: 79), “random mutations have endowed humans with the specific capacity to learn human language” (Chomsky 1980: 36), “In Gallistel’s words, in all animals learning is based on specialized ‘learning mechanisms,’ ‘instincts to learn’ in specific ways, … human language acquisition is instinctive in this sense, based on a specialized ‘language organ’” (Chomsky 1999), and ”[a rational scientist] would now consider the properties of the mind that underlie the acquisition of language and common sense as biological properties, on par in this respect with those that enable a bird to build a nest or produce a characteristic song ... Humans are not adapted, in the same way, to the learning of physics” (Chomsky 1975: 155).

Furthermore, one finds explicit reference to the language instinct by linguists in their scientific work. *The Cambridge Handbook for Biolinguistics* has a chapter with the title *(Evidence for) the language instinct* (Tsimpli, 2013). In an article published in *Lingua* arguing for a ‘second

language instinct', one reads: "Most language acquisition researchers would agree that there is something akin to a language instinct for native language (L1)" (Schwartz, 1998: 133), and in an article in *Nature* (aimed at a wide range of academics outside linguistics) one learns that "Darwin argued that language is an instinct, like upright posture … [and] Chomsky proposed … an innate set of mental computations" (Musso et al., 2003: 774).

These examples indicate that (i) a number of minimalists do not share Adger's concern that the lay reader may be unduly misled by the informal use of the term 'language instinct' or by analogies between human language and animal instincts, and (ii) that the term is also used in scientific publications. On a charitable interpretation, one might grant that Adger used 'linguists' as a generic term that admits of exceptions to general rules rather than as an unrestricted universal quantifier. This charitable interpretation comes at a price though: if the occasional linguist is using these terms in formal and informal discourse, then why does Adger object so vehemently to their use by Evans[5]? Of course, there might be subtle differences in the intended application of the term 'instinct' when it is used by defenders or challengers of the minimalist framework. But Adger can't expect the lay reader to be aware of them, given that the term is used without qualification in formal and informal discourse alike. Adger claims that "Evans misunderstands what the basic proposal in generative linguistics is" (Adger 2015: 77). But, instead of explaining which of the many proposals of generative linguists he considers to be 'basic', or which of the many definitions of 'innate' he has in mind when vaguely referring to 'innate capacities', he wastes time and printing space with the pointless terminological quibbles.

2.2. Recursive turtles and libraries

[5] One has to wonder even more, why Adger did not object to the use of the term 'innate language instinct' in reference to his own work. Under the headline *Born to chat: Humans may have innate language instinct* one finds a report on work by Jennifer Culbertson and Adger which allegedly establishes that humans learning an artificial language "were consulting an internal hierarchy" (Holmes, 2014).

Adger accuses Evans of conflating two notions of 'recursion' but fails to mention that Chomskyans do not use terminology consistently when discussing recursion. It has been remarked that "uncertainties concerning the role of recursion in linguistic theory have prevailed until the present day [and] that debates about such topics are frequently undermined by fundamental misunderstandings concerning core terminology" (Tomalin 2011: 1). The topic has received a great deal of attention over the last decade or so. For instance, psychologist Marc Hauser, linguist Noam Chomsky and biologist Tecumseh Fitch in 2002 published an influential article claiming that the human language faculty can be conceptualized as having two components (FLB and FLN) and that "The core property of FLN is recursion... it takes a finite set of elements and yields a potentially infinite array of discrete expressions" (Hauser, Chomsky, & Fitch, 2002, 1571). A few years later anthropological linguist Daniel Everett published an article in which he claimed that one human language (Pirahã) lacks this putative core property. Ever since, an acrimonious debate has raged about who misunderstands what recursion is (e.g. Nevins, Pesetsky & Rodrigues 2009 a, b; Everett, 2009, 2010; Evans & Levinson, 2009; Levinson, 2013; Legate, Pesetsky & Yang, 2014; Watumull, Hauser, Roberts & Hornstein, 2014). Unfortunately, the by now voluminous literature about (linguistic) recursion has contributed little to a better understanding of the core issues. And, given that minimalists have recently even indicated that, on their view, recursion can be equated with a single computational operation: "Optimally, recursion can be reduced to Merge" (Berwick & Chomsky 2011: 29), addressing the issue seriously is especially desirable.

In general, when talking about 'recursion' one ought to specify whether what is at issue is (i) the class of computable functions, (ii) recursively defined functions, (iii) recursively defined grammars, or (iv) recursive structures. There are many formalizations of the intuitive notion of a computable function, e.g. Turing machines, μ-recursive functions, Post systems, lambda calculus, combinatorial logic, and cellular automata, all of which have been proven to define the same class of functions. The class of functions characterized by these models of computation is very broad, and according to the widely accepted Church-Turing thesis, includes every computational procedure (for details see Cooper, 2003). A recursively defined function refers to a

function that is, in part, defined in terms of itself, e.g. the function for nonnegative integers can be defined by recursion: (a) 0! = 1 if n =0; (b) n! = n (n-1)! if n >0. It can also be defined without recursion: n! = n (n-1) …. 1, where 0! is defined to be 1. This illustrates the point that in general, functions have various definitions. Definition by recursion is simply one type of definition. In fact, in principle, definition by recursion is optional, and so does not describe an intrinsic property of a function. Note, for instance, that the Turing machine model of computation is an iterative one. In the more practical world of computers, at the machine code level there are no recursively defined functions. Rather one finds loops and memory structures (stacks, etc.) that keep track of where the machine is in processing.

The notion of a recursively defined grammar is ambiguous. On one reading, it refers to a grammar of rewriting rules in which the set of rules contains some rule(s) that can be reapplied in the course of a derivation. For example, in the grammar {S -> A B, A -> a A, A -> a, B -> S B, B-> b}, the rule S -> A B can be applied more than once thanks to the rule B -> S B, which reintroduces S, and A -> a A can be successively applied to its own output. On another reading, 'recursively defined grammar' refers to a grammar that has some operation(s) that can be applied initially to some stock of basic elements (e.g. lexical items) but then iteratively to structures previously built by the operations. Minimalist Merge is an example of this combinatorial approach. Merge is not recursive in either the sense of "defined by recursion" or the sense of a recursive rewriting grammar. When Chomsky refers to recursion in the context of minimalism, he is tacitly referring to iteration of the merge operation. Two other examples of combinatorial systems are categorical grammar and tree-adjoining grammar. For example, in tree adjoining grammar the initial elements are trees representing basic linguistic patterns, and larger structures are built using the operations of substitution and tree adjunction. The class of grammars that enumerate sentences either by rewriting rules or combinatorial operations has been aptly termed "generative-enumerative" by Pullum and Scholz (2001)[6]. The language (set of sentences) generated by any generative-enumerative grammar are effectively computable: there is a

[6] The term "generative-enumerative" was introduced by Pullum and Scholz (2001) to contrast with so-called model theoretic frameworks, which have not played a role in the debates between minimalists and their opponents. For discussion see also Pullum (2007).

procedure—a computable function— using the grammar that recursively or computably lists the sentences of that language. Such languages are said to be recursively or computable enumerable[7]. In fact, unrestricted rewriting grammars are as powerful as Turing machines (and, of course, vice versa): given an arbitrary language accepted by some Turing machine there is some unrestricted grammar that generates the same language (for details see Partee et al., 1990).

Finally, recursive structures in linguistics are typically linguistic trees (but could be other structures) in which a constituent of type T occurs within a constituent also of type T. Recursive linguistic trees could be right branching, left branching, or center-embedded (or some mixture). These recursive structures have received a lot of attention in the linguistic and psychological literature (e.g. Christiansen & Chater, 1999, de Vries et al. 2011, Elman 1991, Fitch & Friederici, 2012).

Adger never attempts to provide a precise definition of 'recursion'. He claims that "[Chomsky's] idea is that our language abilities arise because of a special property of the human mind and this property can be scientifically understood as a kind of mathematical function. Like an engine, this function powers our ability to connect meaning with sound and sign, generating the linguistic structures we use in everyday life" (Adger, 2015: 76). This formulation either reveals a deep confusion about the ontological status of mathematical functions and cognitive states, or it is so vague that it is virtually meaningless. Mathematical functions are abstract objects, which do not exist in space or time. Hence they cannot power any transitions between cognitive states, which exist in space and time. In short, Adger appears to conflate abstract models of grammars (which can be expressed with the help of mathematical functions) and the biophysiological implementation of grammars (sequences of brain-states).

[7] More formally, a computably/recursively enumerable set is the range of some partial recursive function. A partial function is a function that is not necessarily, but could be, defined on all elements of its domain. A total function is one that is defined on its entire domain. Computability theory in general deals with the larger class of partial functions.

Any useful model should specify a well-defined structure preserving function between the mathematical function and the sequences of brain-states. Adger never attempts to establish such a function but repeatedly refers to human capacities and mathematical functions as if they were objects of the same kind. For example, he writes: "proposals about the structure of the human capacity for language (that is, what the mathematical function is)" (Adger, 2015: 77) and "…the generative view is consistent with evolutionary theory. It says that there was some genetic event, enough to allow human brains to take advantage of a particular computable function, which then created structures that could be used to soup up our thinking" (Adger, 2015: 79). In these cases it is unclear that Adger understands that human brains and human capacities are of a distinct ontological type from computable functions and that, therefore, it is impossible for computable functions to interact with genetic events.

Adger's attempt to 'educate' Evans about the proper use of two distinct notions of 'recursion' is problematic as well. Instead of providing precise explanations, he offers two myth-analogies that are supposed to illustrate the difference between "category recursion" (likened to a pile of turtles stacked on each other) and "recursion as computable function" (compared to instructions for finding books in a given language in Borges' library of Babel). In some cases, simple analogies provide informative illustrations of sophisticated concepts. This is not such a case, because the analogies are too vague to clarify anything.

For example, when writing "language has, at its heart, a computable (recursive) function: the Pirahã could tell which of Borges's books are in their language just as well as you or I can" (Adger, 2015: 78), Adger might be implying that minimalists have provided a function from corpora to language names: for any book in the Borges library as argument, the function would provide as value a name of the language it instantiates. The names could be (Goedel numbers of) generative grammars[8]. Alternatively, Adger could just be talking vaguely about a parser along with a grammar or grammars that can do language identification (i.e. answer yes/no questions: is

[8] One can only speculate if this is what Adger had in mind and it is pointless to elaborate in detail on a speculation that could be incorrect.

this text T in language L by parsing T using G(L)). In either case, it is not clear how the analogy is supposed to illuminate the relationship between recursion as computable function and its implementation in a human brain[9].

Because Adger's discussion of 'recursion' is so vague, his challenges to Evans' arguments are problematic. Adger writes: "Evans presents arguments against "recursion" being specifically human and against it being necessary in language. But he doesn't seem to know that there are two ideas at play here, and his discussion is not just confused, it's out of date" (Adger, 2015: 78). This criticism is misleading and uncharitable. Evans mentions 'recursion' several times and while not carefully defining what he means by 'recursion', he explicitly states that he does not equate human and non-human abilities:

"Surely equating starling and human recursive abilities is stretching the point too far? But remember, I'm not equating anything. I'm not trying to show that *the facility of starlings to recognise patterns of warbles and rattles* amounts to anything like the complexity involved in human language syntax. My claim is simply this: recursion appears not to be a uniquely human trait; to maintain that human language is a singularity, totally unrelated to the abilities and communication systems of other species, incorrectly skews our view of language. And it impoverishes our study of it" (Evans 2014: 34, emphasis added).

It seems clear that, when using 'recursion' in this context, Evans refers to a pattern recognition ability in starlings and implies that this ability, while qualitatively different from human capacities, is nevertheless, from an evolutionary perspective, continuous with the ability of humans to recognize recursive patterns in speech. Calling 'recursion' a human trait in this context is, in fact, less ambiguous than Adger implies. A justified criticism of Evans' claim would have to show that the recursive patterns recognized by starlings are not merely less

[9] It may be objected that Adger did not claim he was attempting to explain how the computational function is implemented in the brain. However, given that he defends Chomskyan biolinguistcs and claims that "our language abilities arise because of a special property of the human mind and [that] this property can be scientifically understood as a kind of mathematical function" (Adger 2015: 76), he ought to offer an explanation for how a mathematical function can be a property of a human brain.

complex than those occurring in human syntax but of an entirely different kind—and hence, not even continuous with human capacities. Presumably, Adger cites Michael Corballis' criticism of the starling research conducted by Gentner et al. (2006) to establish that just such a difference in kind exists[10]. Corballis uses the term 'recursion' to refer to both: recursively defined functions and recursive structures: "Recursion is a computational procedure that calls itself, or that calls an equivalent kind of procedure. A distinction can be drawn between tail recursion and center-embedded recursion" (Corballis 2007: 698).[11] In the context of the starling research Corballis is only interested in center-embedded recursion and questions whether "the starlings in the study by Gentner et al. (2006) parsed the AnBn sequences in terms of center-embedding. It is much more likely that they used a simple strategy such as counting or subitizing the numbers of As and Bs, and then matching them" (Corballis 2007: 701-2). Like many psychologists, Corballis considers only center-embeddings 'true recursion' and he argues that it has not been demonstrated that starlings are capable of discriminating such structures from others: "There are considerable challenges to be met in order to demonstrate true center-embedding, whether in the context of animal protolanguage or nonlinguistic sequential calls. For the present, at least, *there is no convincing evidence that any nonhuman species is truly capable of recursive syntactic parsing*" (Corballis 2007: 703, emphasis added).

Here the ambiguity in the use of the term 'recursion' might support Adger's claim that Corballis' article had refuted Evan's claims. But it is not clear that Evans and Corballis mean the same

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[10] It is surprising that Adger would rely on Corballis (2007). According to leading supporters of minimalism many psychologists are confused about recursion. For example an article reporting work on tamarin monkeys "was immediately mis-interpreted as concerning 'recursion' … This was an unfortunate mischaracterization, because the Fitch & Hauser paper drew no conclusions about, and indeed made no mention of, recursion" (Fitch & Friederici: 2012: 1941). In the article Adger relies on, Corballis states that he "examine[s] two recent attempts to demonstrate recursive parsing in nonhuman species, one by Hauser and Fitch (2004) in tamarins, and the other by Gentner, Fenn, Margoliash, and Nusbaum (2006) in starlings (*Sturnus vulgaris*)" (Corballis 2007: 698). One has to wonder why Adger thinks that someone seemingly confused about recursion in tamarins would be an expert on recursion in starlings.

[11] Psychologists (e.g. Christiansen & Chater, 1999; Fitch & Friederici, 2012; Levinson, 2013) and linguists (e.g. Pinker & Jackendoff, 2005; Karlsson, 2010; Kinsella, 2010: Harder, 2010) consider the distinction between right branching (by Corballis here referred to as tail recursion) and center-embedded structures important and argue that only the ability to generate the latter is a 'species property' of human language. This view has been challenged (Paap & Partridge, 2014). But even though Adger relies on Corballis (2007) for his critique of Evans, he neither comments on the challenge nor does he pay any attention to the distinction.

thing when they use the term 'recursion'. For example, Evans was not claiming that starlings are capable of recursive *syntactic parsing*. Instead, his claim was that there might be no unbridgeable cognitive gulf between the abilities of humans and non-human species and the starling research was just one of the many examples Evans discussed. Therefore, even if Corballis' interpretation of the results of the starling research is correct, it does not follow that all non-human animals are incapable of recognizing recursive patterns. By focusing on the starling research, Adger misses an opportunity to provide evidence against numerous other examples discussed in *The Language Myth* that threaten the Chomskyan paradigm.

Adger's narrow focus on the starling research seems to be misguided even from within the generativist perspective. Philosopher Peter Ludlow discusses the ubiquity of recursion in nature and emphasizes its limitations for generating interesting linguistic structure: "Of course, a simple merge operation and the resulting recursive structures do not, by themselves, put strong constraints on linguistic theory – nature is full of various kinds of simple processes generating recursive patterns after all (for example spiral patterns in shells and galaxies) – and some of the most interesting properties of natural language (subjacency for example or the basic principles of binding theory) don't seem to have anything interesting to do with recursion by itself … If there are no constraints imposed by the interfaces, then nothing forces the interesting properties of language into relief – we just get vanilla recursive structures, and not the quirky structures we find in natural language" (Ludlow, 2013: 1-2). While Ludlow seems comfortable mixing the notions of recursion Adger accuses Evans of conflating, he is stressing that the most important properties of language are not explained by recursion. It would have been desirable for Adger to focus more on those other interesting properties and explain why the Chomskyan framework is desirable when accounting for them.

3. (Un)biological organs

Adger's discussion of biological systems was presumably intended to clarify how the conceptualized language module might be biologically implemented. Without providing any reference, Adger claims that Evans incorrectly attributes to minimalists the view that "language should be anatomically lumped together in a single bit of our brains. But there's no logic to this." (Adger, 2015: 79). First, while the view that language is located in a narrowly defined part of the brain could be incorrect, it is not illogical. Second, Evans does not hold the view Adger attributes to him. Consulting the text one finds "a mental module is realized in dedicated neural architecture …deals with specific type of information …[and] must be already programmed as part of the human genome" (Evans 2014: 134). What makes something a module on this (Fodorian) view is functional unity not spatial localization. Evans accurately describes Fodor's and Chomsky's commitment before providing evidence suggesting that there are "very little grounds for thinking language is a module of mind … [and] that the modular view of mind provides only an overly simplistic view of the nature of human cognition" (Evans 2014: 135). The evidence discussed by Evans suggests that one cannot assume as established the modularity of mind view but rather one needs to provide novel arguments for it. Adger never attempts to meet this challenge.

Further, Adger seems, himself, to be confused about Chomsky's commitment. He writes: "the nervous system is a distinct part of human beings' anatomy in just the same sense that language is thought by linguists to be a distinct part of the human mind, but the nervous system is hardly localized" (Adger, 2015: 79). As is well known, Chomsky's favourite analogy to the language faculty is the visual system. He emphasizes the similarities regularly: "Endowed with these principles, a System provided with adequate experience will develop a grammar of the peculiar and specific sort characteristic of human language, just as a human visual System develops to a relatively steady state given early interactions with the environment" (Chomsky, 1981: 8), "knowledge of a particular language grows and matures along a course that is in part intrinsically determined … rather in the manner of the visual system or other 'bodily organs' (Chomsky 1985: 5), and "… in the mammalian visual system (there you can

experiment), certain kinds of stimulation at particular points of life are necessary for the system to function at all and there is some variation in the way it functions depending on the kind of stimulation. As far as we know, language is sort of like that" (Chomsky 2000: 56). Adger is of course free to use analogies he finds convincing. But, given that he purports to defend Chomsky's view, it is surprising that he implicitly rejects Chomsky's favoured analogy to the visual system which is a fairly localized perceptual and cognitive organ.

Furthermore, Chomsky has recently written extensively about the evolution of the language faculty and claimed this is based on a single mutation: "Some small genetic modification somehow that rewired the brain slightly… So some small genetic change led to the rewiring of the brain that made this human capacity available... The simplest assumption - we have no reason to doubt it - is that what happened is that we got Merge." (Chomsky 2012: 13 -14). Similar claims are made elsewhere: "… it could be that explosion of brain size led to some small rewiring which yields unbounded Merge, and everything else that it has come up with, and that yields the semantic interpretations" (Chomsky 2009: 41). Here Chomsky states that the essence of the language faculty was caused by a small or slight rewiring of the brain. Only a very localized brain-rewiring can be called "slight". Adger claims such a localized view to be "a straightforward misunderstanding of what it means to be a biological system" (Adger, 2015: 79). If this is the case, it is not Evans but Chomsky who commits the straightforward misunderstanding.

4. Beyond Minimalist Myth-busting

Given that Adger's goal is to defend the Chomskyan framework, it is not surprising that he spends most of his efforts on anti-myth busting. As a result, he mostly ignores large parts of the book that are unrelated to the Chomskyan framework, which present Evans' positive 'counter-

story'. Only one short paragraph mentions (and dismisses) Evan's alternative to the Chomskyan Language myth:

"Evans' new proposal is that humans have a different instinct: an instinct for cooperation. But he doesn't tell us, in either the article or the book, how the 'cooperation instinct' explains anything about language, or why it's any kind of improvement. I'm all for people trying out different approaches to understanding human language, which is a gloriously complex phenomenon, and perhaps we can learn things about language by looking at it from the perspective of the cooperation instinct, but it's hardly an actual proposal" (Adger, 2015: 79).

Presumably, Adger has not read much of *The Language Myth* besides the passages he objects to. Only from a very syntacto-centric vantage point would it make sense to ignore Evans' detailed discussion of similarities (and differences) between animal and human communication, of the importance of embodied cognition, of cultural transmission, of linguistic diversity, of diachronic language change, of the life long process of language learning (no one achieves a 'steady state' at the end of puberty), of human neurobiology, of co-evolution driving the interdependence of language and brain, of the intricate interplay between language and visual perception, and much more. While language is unarguably a gloriously complex phenomenon, Adger's own approach is reminiscent of the Indian tale about a group of blind people who stand besides each other and touch an elephant to learn what it is like. Each person feels one part of the elephant, and when they compare notes they discover that they are in complete disagreement. Refusing to take seriously the 'notes' of anyone but himself, Adger misses much of the glorious complexity of language. In contrast, many psycholinguists have been exchanging 'notes' with other researchers and have learned about the parts of the 'language-elephant' not covered by their own research.

5. Conclusions

Minimalists have directed severe criticism at *The Language Myth* and *There is no language instinct,* but little of this criticism seems justified. Alleged misunderstandings or

misinterpretations of the minimalist framework are in large degree due to the imprecise and, at times, inconsistent formulation of the basic assumptions of minimalism. Minimalists refer informally to language as an instinct, do not use key terms (e.g. 'innate', 'innateness hypothesis', 'language organ') consistently, do not provide precise definitions of Universal Grammar, and they regularly conflate the meanings of 'recursion' Adger wishes to keep separate. Given that most of *The Language Myth* has been ignored by Adger, he is no position to judge whether it makes a valuable contribution or should be dismissed[12]. And he has given little reason to think that the minimalist research program can shed light on there being "new exciting challenges to be addressed about how language is implemented in the brain, how what we know about language structure can improve statistical translation techniques, how language interacts with other systems in our minds and how it's put to use in situations of social complexity" (Adger 2015: 80). Generative grammarians used to play a vital role in linguistic research. But this has changed, and it will take more than Adger's assertion to convince the multidisciplinary research community that minimalist theories still contribute to a scientific understanding of the nature of language.

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[12] *The Language Myth* has received very positive reviews from the popular press and seems to appeal exactly to the audience the book was written for.

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