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THE LANGUAGE MYTH

Why language is not an instinct

Vyvyan Evans

The Language Myth

Why Language Is Not an Instinct

VYVYAN EVANS

CAMBRIDGE
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University Printing House, Cambridge CB2 8BS, United Kingdom

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107619753

First published 2014

Printed in the United Kingdom by Clays, St Ives plc

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data
Evans, Vyvyan.
The language myth : why language is not an instinct / Vyvyan Evans.
pages cm
ISBN 978-1-107-04396-1 (Hardback) – ISBN 978-1-107-61975-3 (Paperback)
1. Linguistic universals. 2. Cognitive grammar. 3. Innateness hypothesis (Linguistics) 4. Language and languages–Philosophy. 5. Psycholinguistics. I. Title.
P204.E88 2014
401–dc23 2014014932

ISBN 978-1-107-04396-1 Hardback
ISBN 978-1-107-61975-3 Paperback

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Acknowledgements

I have wanted to write this book since I was a graduate student. But some things are better for the time it takes to grow, experience and learn. The specific impetus for this book was a challenge made to me by Stéphanie Pourcel, on Brighton pier, of all places. Her challenge, a number of years ago now, was to explain why the language-as-instinct thesis, the thesis associated with Noam Chomsky and his followers, is wrong. This book is my response to that challenge. I hope it does that job. More than that, I hope it fulfils the greater task of explaining how I think language works, how language relates to the mind, and what this reveals about what it means to be human.

A large number of colleagues have supported the research and the writing that has gone into this book. For logistical support, specific advice or simply responding to queries, I gratefully acknowledge Ben Bergen, Andy Clark, Ewa Dąbrowska, Adele Goldberg, George Lakoff, Ineke Mennen, Thora Tenbrink, Mike Tomasello, Mark Turner and Mike Wheeler. For detailed feedback on chapters, I am extremely indebted to Ben Ambridge, Mihailo Antović, Bastien Boutonnet, Vivien Mast, Svetoslava Antonova-Baumann and Alan Wallington. I am particularly indebted to Paul Ibbotson: Paul went *way* beyond the call of duty, and fearlessly read quite literally an entire draft of the book. His very extensive comments have shaped my presentation of various aspects of the book's content. I hope he approves of how I have responded to, and incorporated, his advice. I am also grateful for the immensely detailed and helpful advice provided by a number of anonymous reviewers for Cambridge University Press.

Finally, I gratefully acknowledge the support and care I have received from my editor at Cambridge University Press, Andrew Winnard. Andrew is a paragon of sound judgement and

efficiency, and has provided extremely helpful advice on many aspects of the book. I hope to have done justice to the support he has afforded me.

This book is dedicated to my former Ph.D. supervisor, colleague, co-author and dear friend, Andrea Tyler. For a number of years, Ande and I have been intellectual co-conspirators in the language-as-use thesis – the thesis I present in the pages that follow. I hope she approves of what I have done in my part of the conspiracy.

This book, and the range of ideas I cover, are presented from the perspective of linguistics – the scientific study of language – my home discipline. While linguistics covers many more areas and sub-disciplines than are represented here, I've chosen the range of topics on show, in the chapters to follow, for a very specific reason. The majority of the evidence, viewed with objective eyes, now appears to show that language is not innate in the way just outlined.

In a nutshell, I aim to convince you of the following: language *doesn't* arise from innately programmed knowledge of human grammar, a so-called 'Universal Grammar'. I will argue that language reflects and builds upon general properties and abilities of the human mind – specifically our species-specific cultural intelligence; it reflects human pro-social inclinations for inter-subjective communication. I will seek to persuade you that when we acquire language in infancy, we do so by acquiring the language of our parents and caregivers, painstakingly, and by making many mistakes in the process. Language is not something that emerges automatically, and effortlessly. It arises primarily from the language input we are exposed to, from which we construct our mother tongue. Moreover, human infants, I will show, are not empty vessels that come empty-handed to the language learning process. We come ready-equipped with a battery of various general learning mechanisms that make us adept at acquiring our mother tongue(s).

But why should this discussion matter at all? Why should we care? The study of language, for perhaps obvious reasons, is central to a great many other disciplines; after all, if language is the hallmark of what it means to be human, if it is the measure of our lives, then this stands to reason. And because of the centrality of language to all else, it is crucial our understanding of it is accurate. It is also critical that we understand how language relates to other aspects of mental function and social life. And perhaps more than this: language is an index of our very humanity. What would Shakespeare be without his ability to invent, and re-invent the human psyche through language? Language is more

than the paradigm example of cultural behaviour, one that sets us apart from any other species on the planet. We all have a vested interest in it: it makes us who we are, and allows us to explore ourselves: our emotional highs and lows. We should all care about language, even when we take it for granted, for without it we are barely human.

And here is the *really* important part. While I, and a great many other professional linguists, now think the old view is wrong, nevertheless, the old view – Universal Grammar: the eponymous 'language myth' – still lingers; despite being *completely* wrong, it is alive and kicking. I have written this book to demonstrate exactly why the old view is a myth; and to show what the reality is. This book is thus a users' manual for all language users, and for all thinking people. And, it is also, I hope, a reasonably accessible overview of the way language really works.

This book surveys discoveries from a broad array of disciplines; these include linguistics, psychology, philosophy, neurobiology, primatology, ethology and cognitive anthropology. And these discoveries – which have emerged since the mid-1980s – have thrown into relief long-held assumptions about the nature and structure of language, as well as the mind, and the way we acquire our native tongue(s). In this book, I present the emerging reality.

≈

Linguistics is a relatively new discipline compared to others, especially compared to long-established subjects such as philosophy and rhetoric, or even more recent sciences such as astronomy and medicine. Its founding father is often taken to be the eminent Swiss linguist, Ferdinand de Saussure, whose *Course in General Linguistics* (2013) was published posthumously in 1916. The Zeitgeist for much of the second half of the twentieth century, however, was an extreme form of rationalism, which assumed that language is an instinct, something wholly unrelated to any other form of non-human communication. This language myth assumed that all human languages are governed by a single set of

universals buried in the recesses of the human mind, with which we are born.

The reasons for taking this sort of perspective were based on a number of assumptions about the nature of language, in most cases before actual detailed research had been carried out. But today, we now know a vast amount about the diversity exhibited by the languages of the world – although acknowledging that we still only know something about a fraction of the world's 7,000 or so languages. We also know a vast amount about how children acquire language, much more than we did when the *language-as-instinct thesis*, as I shall call the language myth, was formulated, originally in the 1950s and 1960s. Indeed, the preponderance of evidence now leads a great many linguists, myself included, to the incontrovertible conclusion that language reflects, in important ways, more general, and generalizable, properties of mind. And, importantly, we learn language from our parents and caregivers, through painstaking practice and use. This, for ease, I refer to as the *language-as-use thesis*. In contrast, the language-as-instinct thesis, I will seek to persuade you, is a myth; and, it is made up of a number of component sub-myths.

Taking stock of language

Before moving on, let's get a preliminary sense of what language is for, and how it is organised. Language is integral to our lives. We use it to buy groceries in the supermarket, to get a job, to hire or fire an employee, to buy train tickets, and to compose an email. We use it to make a telephone call, to flirt, to invite someone out on a date, to propose marriage, to get married, to quarrel, and to make up afterwards. Language allows us to make friends, and enemies, to pass the time of day, and so on. In our everyday lives, we produce and comprehend language with such apparent ease that we take it for granted. Yet the ease with which we use language belies a level of complexity of immense proportions. You might not know a preposition from an adverb, or the

difference between the passive voice and the indicative, nor what the double object construction is. You might also be at a loss if I asked you how to conjugate the copula in English, or what perfective aspect is. Yet like around 400 million other native speakers of English around the world, you and I deploy the copula and successfully conjugate it countless times every day. In other words, our knowledge of language is implicit rather than explicit. While you might not be able to explain to a foreigner, should they ask, how to conjugate the copula without the aid of a book of English grammar, you can do it with your hands tied behind your back. Each of us carries around in our heads a 'mental grammar' far more impressive than any written grammar. In short, you or I don't have to know that the verb *be* is the copula to know how to use it.

Another sobering fact about spoken – and indeed signed – language is this: unlike other forms of cultural behaviour, it is blind to demographics, socioeconomics and ethnic difference.[3] I, you and every other cognitively normal human being in the world uses (or comes to use) language with the apparent ease that we take for granted. Put another way, it doesn't matter whether you are rich or poor, black or white or what the colour of your eyes are. You are destined to acquire at least one language – although the majority of the world's nearly 7 billion people grow up speaking two or more languages. In this, the pattern of monolingualism amongst English-speaking populations is not the norm. And, by around 4 years of age, each normally developing human child is a linguistic genius. Nevertheless, we carry on 'learning' our mother tongue, throughout our lives. This is the case not least because the language we speak changes and evolves, often in quite short periods of time.

In virtually all of the situations in which we find ourselves in our daily lives, language allows quick and effective expression, and provides a well-developed means of encoding and transmitting complex and subtle ideas. Language does this by fulfilling two key functions, functions that underpin linguistic communication.

The first is that language enables us to express our wishes, feelings, likes, dislikes and ideas. This language achieves by encoding

and externalising our thoughts. To do this, language uses symbols. Symbols are meaningful bits of language. These include sub-parts of words, such as *un-* and *-ed* in *uninterested*, whole words like *walk*, *yesterday* and *knickers* or groups of words which form clauses, such as *behind the sofa*, and groups of clauses which form sentences, like *She left her knickers behind the sofa*.

The symbols that make up English, or any language, consist of two parts, a form and a meaning. Forms may be spoken, written or signed – as in British Sign Language, the sign language of the British deaf community – while the meanings are the ideas, or concepts, that are conventionally associated with them. For instance, in spoken English, the word *cat* is made up of the three distinct sound segments, technically known as phonemes /k/, /æ/ and /t/ which combine to give the form /kæt/. The meaning unit conventionally paired with this form constitutes the stable knowledge that you and I have relating to cats: that they have four legs, whiskers, a tail, make sounds of particular sorts, exhibit quirky, cat-like behaviour of particular kinds, and so on.

However, for language to function effectively as a means of communication, it is not enough that it employs symbols in order to associate forms and meanings. In addition, these form-meaning pairings must be recognised by, and accessible to, others in our community. After all, we use language in order to get our ideas across: to communicate. This involves a process of transmission by the speaker, and decoding and interpretation by the hearer. In short, language fulfils a symbolic or communicative function.

But in addition, the messages we choose to encode symbolically in language invariably perform an interactive and hence social role – the second function of language. For instance, we can use language to change the way the world is. When a member of the clergy makes the utterance: *I now pronounce you husband and wife*, in an appropriate setting, and addressed to two consenting adults, the utterance changes an aspect of the world in a rather special way. From the moment the utterance has been made, the legal, social and moral status holding between the two individuals is irrevocably altered. The newly created husband and wife have obligations

sounds a human being can make, different languages draw on different numbers of these in producing the words that make up a language. This is why a French speaker finds it difficult to pronounce the *th* sound in English, and why a Chinese speaker often cannot pronounce the *r* sound: *fried rice* becomes *flied lice*. These sounds simply don't exist in French, or Mandarin. Indeed, English speakers often sound equally absurd when speaking other languages, as I can attest from years of mangling the French language. A number of French sounds simply don't exist in English.

Standard English consists of twelve simple vowel sounds. These include the /ɪ/ in *pit* and the /e/ in *pet*. There are, in addition, a further eight two-vowel sound sequences, known as diphthongs, such as the /eI/ in *day*. English also has twenty-four consonants like the /z/ in zip and the /ŋ/ in *ring*. This makes a total of forty-four distinct sound segments from which all English words are derived – at least in standard British Received Pronunciation (RP). This total may, on the face of it, be somewhat surprising, given that the alphabet consists of only twenty-six letters. Yet the English spelling system is, in fact, the Latin spelling system, and as applied to English is notoriously treacherous, as is made abundantly clear by the following poem by T. S. Watt:

> I take it you already know
> Of tough and bough and cough and dough?
> Others may stumble but not you
> On hiccough, thorough, slough and through.
> Well done! And now you wish perhaps,
> To learn of less familiar traps?
> Beware of heard, a dreadful word
> That looks like beard and sounds like bird.
> And dead, it's said like bed, not bead
> for goodness' sake don't call it 'deed'!
> Watch out for meat and great and threat
> (they rhyme with suite and straight and debt).[6]

A second type of knowledge involves word structure. Each of us intuitively knows how simple words are combined to make complex words – and the meanings associated with the parts of

words involved. We know the difference between *teaching*, *teacher* and *teachable*. A teacher is a person who carries out the activity of teaching, while a subject is teachable (or not). We add the suffixes *-er*, *-ing* and *-able* to the verb stem *teach* at will in order to derive the requisite meaning. We also know that while a *teacher* is someone who teaches, we can't necessarily add *-er* willy nilly to create similar meanings. Much of our knowledge appears to be word-specific. For instance, a *villager* is not someone who 'villages' and a *bestseller* is not someone who 'bestsells'. In fact, a bestseller is not a person at all.

Another type of knowledge relates to the range of meanings associated with words and other linguistic expressions. Knowledge of this kind is not the restricted definitional kind that you might find given as concise definitions in a desk dictionary, for instance. The sort of meanings associated with words that you carry around in your head is better likened to an encyclopaedia. In fact, knowledge of this type is commonly referred to as encyclopaedic knowledge. For instance, consider everything you must know in order to understand what *open* means in the following expressions: *open a book*, *open your briefcase*, *open the curtains*, *open your mouth* and *open her blouse*. The kind of knowledge you must have access to, stuffed somewhere in your head, concerns the range of scenarios in which very different sorts of things can be 'opened'. After all, we apply 'open' to very different sorts of 'containers' such as a briefcase, a mouth and a blouse, with apertures of different kinds, whose opening is achieved in different ways and for different purposes. It is less clear that a book is a container, and it is not at all clear that there is a container that is opened by virtue of opening curtains. We conventionally use *open* in relation to these very different scenarios, and many others, including such things as 'opening' a bank account. The word meanings that are stuffed into our heads appear not to resemble the narrow, precise definitions of a dictionary at all. Rather, they relate to the sorts of things and situations with respect to which *open* can apply, the way the opening occurs, and the purposes for the 'opening' event.

Consider how you would go about opening a blouse versus a briefcase, the different sorts of entities you would be likely to find inside each (!), and the reasons for the 'opening' event.

Another kind of knowledge concerns our ability to combine words using knowledge of regular patterns in order to make a seemingly infinite number of novel sentences; we possess knowledge of the abstract rules that make up everything you and I know about English sentence structure. Part of this involves our knowledge regarding word order. We know, intuitively, that in the expression *The window cleaner nervously kissed the supermodel*, the window cleaner did the kissing. But if we reverse the window cleaner and the supermodel – *The supermodel confidently kissed the window cleaner* – now we have a different 'kisser' and 'kissee'. Part of what you, and I, know about a language, then, involves knowing the order in which words are positioned in a sentence. The order, after all, determines the role we attribute to the window cleaner and the supermodel in the kissing event. Of course, other languages vary in quite remarkable ways. Hungarian, for instance, has no fixed word order. Each language represents a unique system replete with its own conventions.

In addition, we possess a large inventory of idioms which are an essential part of any language, and which often pose problems for the language learner. For instance, try explaining to a foreign student why, in English, we can sleep *tight*, *soundly* and *deeply*, but we don't sleep *wide*! *To bend over backwards* means, somewhat bizarrely, to try very hard, rather than to bend over backwards, and *to jump down someone's throat* means something quite different from what it literally says. And *to kick the bucket*, which means 'to die', changes its meaning entirely even if we replace just one of the words. For instance, *to kick the mop* refers, presumably, to a frustrated janitor rather than death.

The final kind of knowledge that I'll touch on relates to what we might think of as contextualisation cues. These include the gestures which accompany our utterances, our facial expression, and cues relating to features of stress, intonation and pitch. For instance, whether the pitch of an utterance rises or falls can

determine whether we interpret the utterance to be a question or a statement. Moreover, even a well-judged pause or glance can provide an effective means of signalling meaning; for instance, Marina Hyde, the journalist, writing in *The Guardian*, once noted that the appeal of Alistair Campbell – Tony Blair's once fearsome spin doctor – was "based entirely on the look he wore – a look which said: 'I'd like to shag you, if only I had the time.'"[7]

Myths and realities

In this book I present a number of myths, associated with the language-as-instinct thesis. I contrast these with what I suggest are the more plausible realities, given current knowledge. These realities suggest a wholly different thesis: language-as-use. Beginning with Chapter 2, each chapter commences with a succinct statement of the myth, and then presents the reasons for thinking that the reality lies away from the position maintained by it. The focus, then, is on debunking the myths, in part by presenting the evidence which supports the realities. And in so doing, I aim to show what contemporary research reveals about the nature of language, its function and organisation: how language is learned, and the way it reflects fundamental aspects of the human mind.

In view of this, a reasonable question to ask is: what exactly do I mean by a 'myth'? And, equally, what do I mean by a 'reality'? A myth, for my purposes, is an unproven account of a linguistic phenomenon that appears to be at odds with actual findings relating to language, the mind, and so on. The myth may derive from a best-guess attempt to account for an observed phenomenon. Moreover, what makes something a myth is that it relates to a speculative approach to understanding language. For instance, the basis for the language-as-instinct thesis derives from the proposals made by the famous (or perhaps infamous) American researcher Noam Chomsky, beginning in the 1950s and 1960s. Chomsky made a number of observations about the nature of language, and speculated that as language emerges apparently effortlessly, and

all humans appear to be capable of acquiring language, then there must be an innately specified Universal Grammar that allows language to grow in the minds of humans, but no other species: language is an instinct.

But some readers may be surprised to learn that the language-as-instinct thesis is not based on actual findings. Nor is it based on detailed observations about how children appear to acquire language. Even today, over fifty years after it was first proposed, there is a paucity of cross-linguistic studies that have been conducted by Chomsky and his colleagues aiming to substantiate the claims of the language-as-instinct thesis. Chomsky's arguments were largely logical in nature, and to him (and his followers) self-evident: evidence was not required. And myths do have a tendency of becoming immune to evidence – that's what a myth is: plausible, institutionalised through ritual retelling, and the worst possible nightmare for 'truth'. But putting Chomsky's cult-status aside, progress in any field of science requires hard evidence, rather than the word of a 'great man'. Good theories, ultimately, ensure that reality bites, in the form of evidence for or against. And a good theory should, at least in principle, have a way of being proved wrong.[8] As the scientific findings have accrued, these increasingly make it very hard indeed to maintain the language-as-instinct thesis, as I hope to show you.

A reality, in contrast, consists of an account following detailed observations, data collection and analysis relating to the linguistic phenomenon. In other words, the realities I describe in this book follow from findings of fact, and analyses based on them, rather than being due to speculative arm-chair theorising.

My presentation of myths and realities focuses on some of the burning questions in the study of language and mind. These include the following.

Is human language unrelated to animal communication systems?

The myth maintains that language is the preserve of humans, and humans alone; it cannot be compared to anything found amongst

Is language a distinct module in the mind?

In western thought there has been a venerable tradition in which the mind has been conceived in terms of distinct faculties. With the advent of cognitive science in the 1950s, the digital computer became the analogy of choice for the human mind. While the idea that the mind is a computer has been a central and highly influential heuristic in cognitive science, the radical proposal that the mind, like the computer, is also modular was made by philosopher of mind Jerry Fodor. In a now classic book, *Modularity of Mind*, published in 1983, whose reverberations are felt to this day, Fodor proposed that language is the paradigm example of a mental module. And this view, from the language-as-instinct perspective, makes perfect sense. According to Fodor, a mental module is realised in dedicated neural architecture. It copes with a specific and restricted type of information, and is impervious to the workings of other modules. As a consequence, a module can be selectively impaired, resulting in the breakdown in the behaviour associated with the module. And as a module deals with a specific type of information, the module will emerge at the particular point during the life cycle when it is needed. Hence, a mental module, in developmental terms, follows a characteristic schedule. The notion that the mind is modular might, on the face of it, make intuitive sense. In our everyday lives we associate component parts of artefacts with specific functions. The principle of modularity of design is both a practical and sensible approach to the manufacture not just of computers but of many, many aspects of everyday commodities, from cars to children's toys. However, the evidence, as will become clear, provides very little grounds for thinking that language is a module of mind, or indeed that the mind is modular.

Is there a universal Mentalese?

The language myth contends that meaning in natural languages, such as English or Japanese, derives, ultimately, from a universal

language of thought: Mentalese. Mentalese is the mind's internal or private language, and makes thought possible. It is universal in the sense that all humans are born with it. It is language-like, consisting of symbols, which can be combined by rules of mental syntax. Without Mentalese we could not learn the meanings of words in any given language – spoken or signed. But as I shall show, Mentalese assumes a view of mind that is wrong-headed: it assumes that human minds are computer-like. It also suffers from a number of other difficulties, which make this supposition deeply problematic.

Is thought independent of language?

While everyone accepts that language affects thought in the sense that we use language to argue, persuade, convince and so on, according to the language myth, thought is, in principle, independent. The idea that systematic patterns in grammatical and semantic representations across languages (a.k.a. linguistic relativity) give rise to corresponding differences in patterns of thought across communities is utterly wrong. As we shall see, the language-as-instinct theorists mischaracterise the thesis of linguistic relativity. Moreover, there is also now a significant amount of scientific evidence suggesting that, in point of fact, the linguistic patterning of our native tongue(s) does indeed have indelible and habitual consequences for how we perceive the world.

From this brief overview of the issues, one salient theme that emerges is, surely, the following. Language and rational thought – so the language-as-instinct myth contends – are too complex and arguably too mysterious to be accounted for without appeal to special knowledge. Such knowledge is 'special' in the sense that we simply don't know where it comes from. Experience, and general learning mechanisms, can't account for these unique features of

the human mind. Thus, language must be hard-wired, part of our genetic endowment: enter Universal Grammar.

Richard Dawkins describes this type of explanation as an argument from incredulity,[10] while Daniel Everett notes that it boils down, essentially, to a lack of imagination.[11] It proceeds as follows: we (= the extremely clever, tenured professors) can't see how children could possibly learn something as complex as grammar – which underpins language. Therefore, they can't learn it. Thus, grammar must be innate.

The cognitive scientist Anthony Chemero[12] has described such a move as a Hegelian argument after the widely ridiculed 'proof' of Hegel. In 1801, Hegel claimed that the number of planets in the solar system was seven, based on premises which he provided, and had no evidence for. Indeed, we now know that there are eight major planets, and five dwarf planets, including Pluto. The language-as-instinct thesis is precisely this: a Hegelian argument.

But, speculation aside, we know, today, a vast amount about how language is learned, how languages differ, how concepts are formed, and how language interfaces with conceptual knowledge. While we certainly don't know everything there is to know, or even a fraction of everything, at this juncture we are in a position to do far better than the language-as-instinct thesis. In the pages that follow, I will present the case for a nearer approximation to the reality: the language-as-use thesis.

A straw man?

One of the objections, I anticipate, to this book is that I am attacking a straw man. Surely the 'myths' described above are not taken seriously? Indeed, one colleague has firmly censured me with the following reprimand: "These 'myths' are extreme views that barely anyone subscribes to."

Alas, this is not the case. The views that I classify as myths are presented as established fact in many of the linguistics textbooks

currently in use in many of the stellar universities throughout the English-speaking world. I was trained using these textbooks, and they are still compulsory reading for today's undergraduate and graduate students – tomorrow's researchers, educators and language professionals – even at the university where I teach and work. University students are regularly told that there *is* a Universal Grammar, that language *is* innate, that language *is* incommensurable with non-human communication systems, and that all languages *are* essentially English-like.

For instance, the world's best-selling university textbook on language is *An Introduction to Language*, written by Professor Victoria Fromkin and colleagues. This book, now in its tenth revised edition, proclaims the following in its very first chapter:

> This business is just what the linguist attempts – to find out the laws of a language, and the laws of all languages. Those laws that pertain to all human languages, representing the universal properties of language, constitute a **Universal Grammar** . . . To discover the nature of this Universal Grammar whose principles characterize all human languages is a major aim of linguistic theory. . .the more we investigate this question, the more evidence accumulates to support Chomsky's view that there is a universal grammar that is part of the human biologically endowed language faculty.[13]

A recently published textbook introduction to the English language, *The Structure of Modern English*, by Professor Laurel Brinton, makes the following claims in its introductory chapter:

> Language is rule-governed, creative, universal, innate and learned, all at the same time . . . A more general set of constraints on language is known as **language universals**. These are features of language that are not language specific . . . Inherent in the notion of universals is the belief that language is innate, that we are born with an inborn capacity for language acquisition.[14]

As we shall see, the claims made in both these representative textbooks are wrong – they fly in the face of, now, several decades of evidence-based research.

More worrying, the educated general public has been treated to a series of best-selling popular books on language by Professor Steven Pinker of Harvard University, no less. Pinker is talented, eloquent and erudite. He presents various views of language and mind adopting the language-as-instinct thesis that he has helped to develop. The educated general public who have read such pop-sci. bestsellers, including *The Language Instinct* (1994), *Words and Rules* (2001), *How the Mind Works* (1997), *The Blank Slate* (2002) and *The Stuff of Thought* (2007), might be forgiven, given Pinker's eloquence, for thinking that Pinker is right, and everything is settled. Far from it: don't be fooled! As we shall see, the language-as-instinct crowd don't always fight fair: ideas can be massaged to fit the claims, and often, too often, the facts are misrepresented, ridiculed or simply not presented at all. Moreover, since Pinker's first popular book appeared, back in 1994, science has moved on. And to end it all, Pinker is largely wrong, about language and about a number of other things too – as we shall see.

So here it is: I will be arguing that there is no Universal Grammar, and language is not innate: at least, not in the way supposed. More than that, the current generation of university students is still being systematically presented, at the very least, with controversial claims for which there is scant empirical evidence. And the general public deserve a proper exposure to the full facts, and the state of the art. This all matters because language is central to such a vast array of disciplines throughout the humanities as well as the cognitive and behavioural sciences. More than that, language is central to virtually everything we do: it *is* the measure of our lives. And, if for no other reason than that, it deserves to be correctly understood and appreciated.

I've written this book precisely because the myths I shall be refuting do not add up to a straw man. The language myth described and debunked in this book is very much alive. The component myths that make it up – that I tackle in each of the chapters to follow – relate to versions of the brand of speculative linguistics argued for by the linguist Noam Chomsky, and

(decidedly odd) dress sense of Superman, who wears his underpants on the outside.

But the danger with emphasising the uniqueness of language is that it can seem to overstate the gap between human language and other forms of communication, such as animal systems of communication – an issue I shall address in the next chapter. After all, if language is unlike anything else, it is then but a small step – and a slippery slope – to claiming that language really must have emerged out of thin air. The language-as-instinct thesis proposes something very much like this. Its progenitor and most extreme proponent, Noam Chomsky, has claimed that language was most likely the result of a genetic mutation. On this account, language emerged all at once in a perfect or near-perfect state, in one lucky individual, who won the greatest linguistic jackpot of all time.[17]

But this account has been criticised by a wide range of scholars on evolutionary grounds. For instance, one prominent expert, the biological anthropologist Terrence Deacon, has described it as a hopeful monster story, after evolutionarily implausible and widely ridiculed claims made by the German geneticist Richard Goldenschmidt in the 1940s. A hopeful monster account of evolution proposes that evolution may involve a sudden very large change from one generation to the next, facilitating the emergence of a new feature.[18] According to Deacon, Chomsky explains away the origin-of-language problem by sleight of hand: like a white rabbit, it is pulled from out of evolution's magic hat. And consequently, this hopeful monster explanation – the language-as-instinct thesis – is completely at odds with the facts of evolution. Language, as we know it today, must have required many changes to the cognitive (re-)organisation, as well as the anatomy, of pre-linguistic hominins, in order to achieve its current level of sophistication. These would have both affected the primate brain plan inherited by ancestral humans, and changed the anatomy of the genus *Homo*. Moreover, the result would have facilitated an anatomy enabling the production of speech in *Homo neanderthalensis* (Neanderthal man) – now extinct, but who probably

had some form of speech capability – as well as *Homo heidelbergensis*, the common ancestor of both humans and Neanderthals.[19]

Such changes, at the very, very least, would have necessitated quantitative variations in the pre-human brain such as an expansion of the frontal part of the cortex – the outer layer of the human brain – relative to other regions. Greater direct control by the cortex over the mouth would also have been required, not least to produce the articulatory gestures to facilitate speech: speech is one of the most complex neuromuscular activities we accomplish, involving around an incredible seventy-eight distinct muscles.[20] A further change has been the lowering of the larynx (or voice box), compared even to our forebears, which has taken evolutionary time to accomplish. As I explain in the next chapter, this was required in order to facilitate speech production, but at the risk of death by choking – an unfortunate side effect of being able to talk. In the United Kingdom around 16,000 people are treated in hospitals each year for choking. And status is no barrier: US President George W. Bush hit the headlines in 2002 when he fainted for a few seconds and fell off a couch after choking on a pretzel. Other changes would have been required, such as an expansion of working-memory, required for composing and producing utterances. Increased memory would have been required for developing temporal sequencing skills, essential for human syntax – the ability to produce grammatically well-formed sentences.

In contrast, chimpanzees, for instance, only have a working-memory capability equivalent to that of a two-year-old human infant.[21] But a sophisticated working-memory is essential for human-like grammar, which requires recalling and sequencing strings of words in the correct order. In short, even if an ancestral human being had, by some chance mutation, developed a language gene, without a language-ready brain and body, the gene would have been useless.

Just as language had to be presaged by many other changes to the ancestral human genome, occurring gradually and incrementally, it is likely that language itself emerged gradually. Just as evolution teaches us that changes build upon one another

incrementally, another lesson relates to the principle of evolutionary natural drift.[22]

Evolution as natural drift nuances the classic Darwinian formulation that evolution involves, more or less, progressive fitness. Evolution as natural drift presumes a co-determining relationship between organism and environment. An organism evolves in order to best obtain advantage from regularities in its environment. From this perspective, evolution involves co-evolution. For instance, honeybees see in the ultraviolet range of the colour spectrum. Flowers have co-evolved with honeybees so that those most likely to be pollinated are the species which provide greatest ultraviolet reflectance.

As ancestral humans were anatomically incapable of speech, it is highly plausible that proto-language emerged via other means. And this involved co-evolution of neuroanatomical changes ultimately resulting in spoken language.[23] A likely suspect is gesture, and as we shall see in the next chapter, chimpanzees and other primates make ready use of gestures for purposes of communication.[24] We thus gain insight into human language by looking for similarities with (and differences from) other forms of animal communication. To paraphrase the metaphysical poet John Donne, no species is an island. And language did not emerge out of thin air. It is grounded in the communicative tendencies apparent in our ancestral forebears.[25] And various forms of proto-language abound, to varying degrees, in many other extant species.

All that said, human language does, nevertheless, achieve the level of sophistication absent elsewhere. And this is because humans have evolved a special kind of intelligence – cultural intelligence – that harnesses the communicative abilities that are apparent elsewhere, about which I shall have more to say later, especially in the final chapter when I fully review the new synthesis: the language-as-use thesis. Nevertheless, this sceptred kind of intelligence facilitates a range of cooperative behaviours of which language is an example *par excellence*. This is the issue to which we now turn.

2 Is human language unrelated to animal communication systems?

> Myth: *Language is the preserve of humans, and humans alone; it cannot be compared to anything found amongst non-humans, and is unrelated to any non-human communicative capability.*

Until relatively recently, it had been widely assumed that human language was unique: while some animals may have rudimentary forms of communication, these are limited, and relatively uninteresting. Moreover, so the myth goes, human language is unrelated to animal forms of communication. Even if it did derive from an evolutionarily earlier form of human proto-language, this bore no relation to the communication systems found, today, amongst other primates, mammals and countless other types of species in the animal kingdom. But the accumulation of research on the way other species communicate, from apes to whales, from vervets to starlings, increasingly suggests this may overstate the divide between human language and non-human communicative systems. Many of the characteristics exhibited by language are found, to varying degrees, across a broad spectrum of animal communication systems.

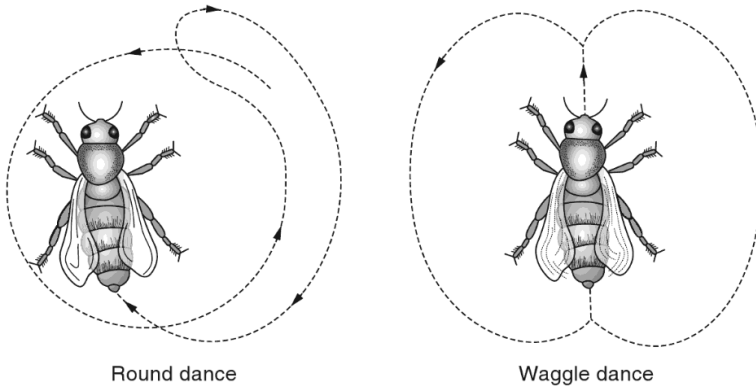
In key respects, many of our nearest primate cousins are so like us, from our DNA to our bad habits. In Disney's film *The Jungle Book*, King Louie – an orang-utan – famously desired the secret of man's red fire. And it has recently been reported that Tori the orang-utan has developed a smoking habit. Tori, a resident at a zoo in Indonesia, first acquired the habit by picking up cigarette butts that were tossed near her enclosure, and imitating humans by drawing on them.[1] Later she would beg for cigarettes from visitors, holding two fingers together to her mouth. Sadly, visitors too often obliged and Tori became a

cigarette junkie. Her keepers were forced to move her to a more spacious and better-protected location. And which zoo visitor can fail to be struck by just how human-like young monkeys' faces are, how fragile, how like our new-borns' their tiny limbs, hands and fingers?

To be sure, human language stands out from the decidedly restricted vocalisations of monkeys and apes. Moreover, it exhibits a degree of sophistication that far exceeds any other form of animal communication. Even our closest primate cousins seem incapable of acquiring anything more than a rudimentary communicative system, even after intensive training over several years. The complexity that is language is surely a species-specific trait. That said, many species, while falling far short of human language, do nevertheless exhibit impressively complex communication systems in natural settings. And they can be taught far more complex systems in artificial contexts, as when raised alongside humans.

According to the language-as-instinct thesis, human language is a singularity, unrelated to any other form of animal communication. Chomsky is quite clear: sometime in the recent past language emerged all at once, in a near-perfect form, in one individual, as a sudden jump in evolution. Writing as recently as 2010, Chomsky explains that "roughly 100,000+ years ago ... there were no languages ... [but] ... a rewiring of the brain took place in some individual, call him Prometheus".[2] And this led to language.

In this chapter, I will show that it is erroneous to think that human language is a singularity, and, in this sense, unrelated to the communication systems of other species.[3] In fact, we can learn more about human language, and what makes it special, by better understanding how it relates to, and is derived from, the communication systems of other species. For human language evolved from earlier systems of proto-language which abound today in nature. The sophistication exhibited by human language lies on a continuum, which takes in less sophisticated forms of animal communication.



Von Frisch (1976: 70).

Finer distinctions are indicated by the frequency with which the dance is repeated. A slower repetition indicates a greater distance. This means of communication is much like some of the traits central to human language: it is symbolic – conveying a message using an arbitrary symbolic code to do so, e.g., a dance; it is inter-subjective – involving a signal between two or more individuals; and it is referential – involving reference to a third party, in this case a source of nectar. And, arguably, bee dances exhibit cultural differences: different species of bee have slightly different dances to convey much the same meaning.

While bees deploy dance to communicate, other species make use of vocalisations. A striking example is the alarm calls made by vervet monkeys. Vervets live in southern and eastern Africa. They make specific and distinct calls upon sight of different predators: a chutter when they see snakes, and different calls when they spot eagles or leopards. And, tellingly, other vervets take an appropriate form of evasive action, even if they haven't seen the predator.[7] For instance, upon hearing a leopard-call, other vervets run towards trees and begin climbing. Upon hearing an eagle alarm call, they look up into the air. And upon hearing a snake-call, they look down at the ground, often by standing on their two rear legs. While the vervet alarm calls appear to be innate – the

calls emerge at a relatively fixed point in a vervet's development, and do not rely on having previously heard other vervet alarm calls – vervet parents nevertheless appear to positively reinforce the production of the correct alarm call in infants, by repeating the call. Moreover, there are reports of infant vervets being punished when providing an incorrect alarm call.

Clearly, while communicative systems such as these are interesting, they are highly restricted in terms of their communicative value. In the case of both busy bees and vocal vervets the symbolic systems used are limited to specific contexts of use. This is not, of course, to trivialise the importance of those contexts, and the value of the communicative systems for the well-being and survival of the species. But human language is much more flexible in the range of contexts that it can refer to – from declaring undying love to commenting on the weather – especially in the rain-sodden UK!

And, it is flexible in another way too – different communities of humans adopt different linguistic varieties: Swahili, Japanese and English are all quite distinct, in a range of ways. This is because the system itself is inherently flexible. Its flexibility arises from a process that allows us to combine otherwise meaningless symbols. Sounds and words can be combined in a range of ways, following the 'rules' of an abstract grammar, individually learned, that each human seems to carry around with them in their heads.

It has been claimed that *the* stand-out property that provides this degree of flexibility is recursion. This is the mechanism that allows us to 'embed' phrases within larger sentence structures. For instance, take the expression *Death is only the beginning*, uttered by Imhotep in the 1999 movie *The Mummy*. This phrase can be embedded in the grammatical frame *X said Y*, providing a more complex sentence: *Imhotep said that death is only the beginning*. This sentence can then be further embedded in the same frame recursively: *Evelyn said that Imhotep said that death is only the beginning*.

Relative clauses – clauses introduced by expressions like *who* or *which* – enable us to add information to a sentence. And again,

this is an example of recursion: we are capable of building up highly complex sentences, recursively. An expression such as *Phoebe runs a lingerie shop* can be embellished with a relative clause *which sells frilly knickers*: *Phoebe runs a lingerie shop which sells frilly knickers*. And this process of recursion can occur, in principle, ad infinitum: *Phoebe runs a lingerie shop, which sells frilly knickers, which have purple sequins sewn down one side.* Chomsky and colleagues have suggested that not only is recursion unique to human language, it may be the definitional feature of language.[8]

However, recent research on European starlings provides evidence that these birds can also learn to recognise recursion.[9] Starlings sing long and relatively complicated songs, consisting of acoustic motifs. The motifs are made up of sequences of rattles and warbles. A team of researchers at the University of Chicago[10] designed motifs, featuring recordings of rattles (which I'll represent as A) and warbles (which I'll represent as B). These motifs were of two sorts. One sort included a basic AB pattern that could be extended: ABABAB, etc. A second pattern involved embedding elements recursively in the basic AB frame, like this: AnBn. In this frame, the 'n' represents an embedding of the preceding element, as in AABB, AAABBB, AAAABBBB, and so on. Now here's the crucial part: an AnBn pattern is a recursive pattern; the insertion of additional rattles (A) and warbles (B) in such a sequence, in principle ad infinitum, is a manifestation of recursive embedding, albeit a non-linguistic one. And if starlings are able to recognise, or can be trained to recognise, the difference between the two patterns, they could, in principle, be capable of recursion.

To test this, two groups of starlings were trained on each of the patterns. One group of birds was rewarded for recognising the non-recursive AB pattern. Another group was rewarded each time they recognised the recursive AnBn pattern. The researchers found that, following this training, the startling starlings did indeed learn to identify the recursive patterns.

But wait. The language-as-instinct crowd would no doubt chide that this is surely taking things too far. After all, recursive

embedding in human language syntax, producing meaningful sentences, is one thing. It's quite another to suggest that starlings have anything like the same ability. 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.

But while starlings seem able to learn to recognise recursion, what about the complexity of animal communication systems in the wild? Research using underwater hydrophones, and subsequent digital acoustic analysis, demonstrates that ethereal whale song exhibits a similar level of complexity to human musical traditions. Moreover, whale song appears to have a socio-communicative function.

Take, for instance, the song of humpback whales. Whale song is produced by male humpbacks during the mating season. While it is assumed it has a role in mating, its precise function is still not fully understood. It is still unclear whether the song of male humpbacks is designed to attract a female to mate, or whether it has some other social bonding function. What is clear, however, is that the song has a hierarchical structure, consisting of vocalisations of varying frequencies.[11] The base units of the song, the 'notes', consist of single uninterrupted emissions of sound which last for up to a few seconds at a time. Notes are integrated with between four and six other notes, on average, to form a sub-phrase. This lasts for around 10 seconds. Two sub-phrases are combined to produce a phrase, which is repeated for between 2 and 4 minutes, making a theme. The whale song consists of a series of themes, and can last from anything from 30 minutes to several days.

Communication in the wild

One of the striking features of some animal vocalisations – for instance, vervet alarm calls – is that they are not learned; they emerge in vervet development regardless of whether infant vervets are exposed to alarm calls by their parents or not. In contrast, human language is acquired through learning. And learning takes place in contexts of social interaction: a process of cultural transmission. This is most clearly evident in cases where language doesn't emerge, in the unfortunate cases of so-called 'feral children'. In some cases, children are lost by accident, as in the fictional story of the man-cub Mowgli, as depicted by Rudyard Kipling in his classic stories. Mowgli grew up in the Indian jungle, raised amongst wolves. Yet, eventually, he returned to a human village, becoming fully integrated back into human social life.

True-life cases tend not to be so heart-warming. In one well-documented case, a child dubbed the wild boy of Aveyron, and later named Victor, was found in the South of France in 1797. Victor was estimated to be around 12 years old when found, and, like Mowgli, had also been brought up amongst wolves. A French physician spent the best part of the next five years attempting to teach the boy to speak. But, although Victor learnt to recognise words such as his name, short phrases and commands, he never learned to speak properly.

Perhaps the most famous fictional feral child of all is Tarzan. In the books by Edgar Rice Borroughs, Tarzan is reared by apes from the age of one until he is a young adult. Despite this, he excelled at language. The reality is sadly different. Human language only emerges within a human socio-cultural setting. And, as in the case of Victor, once a child has reached a certain age – the so-called 'critical period' for language learning – then the ability to learn language appears to become significantly diminished. Unlike vervet alarms calls, then, without exposure to human language, a child will never be capable of speech. And from the early teens, the ability is typically dramatically diminished.

significant as it shows the communication system of sperm whales, like that of humans, has a socio-cultural motivation.[14]

Sperm whales are not alone in using vocalisations for identifying and establishing socio-cultural relations. The song of the Baleen humpback whales comes in different 'dialects'. While whale song evolves over time, whales from the same geographical area – which might be as wide as an ocean basin – sing similar songs. However, whales from non-overlapping regions sing markedly different songs.[15]

I now turn, finally, to the communicative strategies of our nearest primate cousin: the common chimpanzee (*Pan troglodyte*). Chimps use gestures to communicate in a qualitatively different way from their vocalisations. Chimp vocalisations, like those of vervet monkeys, are inflexible; in chimps they are used to coordinate foraging, to defend against aggressors, and to warn of danger. However, chimp gestures, in the wild, are used in much more varied situations and contexts, including more social and intimate ones. These include play, grooming, nursing and sexual encounters. Chimps use gestures intentionally, in order to attempt to influence the behaviour of other chimps – much like the interactional function of human language I discussed earlier. The gestures are learned individually – like human language – and can be used flexibly, also like human language.

For instance, just as a word such as *on* can be used to describe different spatial configurations – a fly can be *on* the table (horizontal top surface), *on* my nose (vertical surface) or *on* the ceiling (horizontal lower surface) – so chimps can use particular gestures to signal different meanings. For instance, an infant chimp touches the relevant part of their mother's anatomy to signal that it wants to suckle, or that it wants to ride on her back.

Similarly, different gestures can be used for the same goal: slapping the ground and bodybeating for play.[16] This mirrors the linguistic ability of humans to use different words to convey a similar meaning, such as when we describe a disreputable person as a 'crook', or a 'villain'. The flexibility evident in

human language is, it seems, also apparent in the gestural communication of chimps.

Chimp gestures are of two types. The first involves an action that forms an integral part of an activity. The action is gestured, standing for the entire activity. For instance, an infant chimp will raise its arms – the initial action in play – in order to signal that it wishes to play.

Integral actions such as this, signalling a specific activity, are equivalent to human speech 'acts': where an utterance can have the 'force' of an action.[17] For example, on 3 September 1939, when Neville Chamberlain, the British Prime Minister, stated that "This country is at war with Germany" in a broadcast to the nation, a state of war came into effect. The utterance, by a designated authority, the Prime Minister, was to alter irrevocably the socio-political and legal status holding between the two countries. In this way, the utterance itself served to create a state of war; it was an action achieved through speech.[18] In related fashion, a chimp, by performing the raised arm gesture, brings play into effect. It does so by miming an action that is integral to it.

The second type of communicative gesture is an 'attention-getter', a means of getting other chimps to look. A stand-out example is leaf-clipping. This is performed typically by frisky adult males: the gesture makes a noise, the purpose being to draw the female attention to the male's erect sexual arousal. This type of gesture is similar to human 'attention-getters'. An example is a word like *hey*; in British English this expression draws attention, ensuring that the channel is open prior to proceeding with communication.

Talking animals

In Hugh Lofting's tales of Dr Dolittle, the good doctor from Puddleby-on-the-Marsh gives up on his human patients in Victorian England. He decides, instead, to care for animals; and, serendipitously, he has the special talent of being able to *talk* to