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James R. Hurford. 2007. *The origins of meaning: Language in the light of evolution.* Oxford: Oxford University Press. xiii + 388 pp. (ISBN 978-0-19-920785-5)

Reviewed by Alison Wray (Cardiff University)

1. Introduction

Anyone who has not followed the debates of the past 15 or so years might imagine that accounting for the evolutionary origins of language is a relatively simple endeavour. Thousands of years ago, human language in its present form did not exist... and now it does. Surely all that happened was that our ancestors first developed phonological forms to represent a few common objects and actions, and then gradually built up the volume and sophistication of the linguistic code, adding forms of different types (adjectives and adverbs, tense markers, prepositions, complementisers, etc.) until they could express quite complicated relationships between ideas.

However, there is barely a step in such a scenario that cannot be challenged, or replaced by plausible alternatives that entail different causes and create quite different forward trajectories. Many interesting issues arise when trying to figure out which components of language — vocal physiology, cognitive capacity, sounds, meaning, words, grammar, pragmatics — needed to be in place, and to what extent, before another could emerge.

Language was a significant innovation. By what quirks of fate was the road paved for it to evolve and yet (we think) evolve only once? If we could go back to some point in prehistory, and rerun things, would human language evolve again **at all**, and if it did, would it be the same? The answers to these questions depend on what we think happened when, why we think it happened, and what we think resulted. For this and other reasons, explaining the evolutionary origins of human language turns out to be very difficult, and many of our very finest linguists worldwide have found language evolution a worthy focus of their extended attention. For many, it is the challenges of this question that shed new light on our understanding of what language actually is.

The more complex a phenomenon, the more we need clear and comprehensive overviews of the current knowledge and claims about it. Yet surprisingly few such resources exist for this topic. So far, readers have been largely reliant on individual articles and chapters that furnish partial (in both senses) insights into subsets of themes; a handful of monographs that peddle a particular view or cover only one

aspect of the story; and brief accounts, inevitably lacking in detail, in publications like *Scientific American*. Drawing it all together — and making sense of as much of the evidence as possible in a coherent account that spans the lengthy period of human evolution — has proved a daunting task.

Although it does not cover everything, Hurford's 2007 book, to be complemented by a second volume in 2010, goes a considerable way to providing the account we have been waiting for. Yet is it not a textbook. On the contrary, Hurford is presenting his own explanation for the emergence of human language. However, in the process of fleshing out and justifying his own account, he describes and interprets, in an admirably even-handed way, a broad range of other views, along with evidence from not only linguistics but also psychology, primatology, philosophy and anthropology.

There must be a good few prominent researchers into the evolution of language who have wistfully contemplated writing a book somewhat like Hurford's, but who have not done so — probably because it would just be too hard. To do the job well — and Hurford has done it well — requires not only an extraordinary breadth of knowledge but a capacity to explore and weigh up contradictory ideas without getting lost in one's own prejudices. One must be able to hold many different aspects of language in one's head at once, view them from the perspectives of multiple disciplines, and draw out a coherent and plausible explication of their relationships. And one must be able still to deliver an account that a reader from any relevant discipline has a good chance of understanding. It is no mean feat. It has required someone of Hurford's stature and scholarship to meet the challenge.

2. Aims of the book

The two books between them tell the story of how human language came into being, with this first volume bringing us as far as the hypothesised capabilities of our australopithecine ancestors around 4 or 5 million years ago. Linguists might find this a rather early point to split the account, since, from the point of view of **language**, very little had happened yet — as Hurford points out (p.xii), phonetics, phonology and syntax enter the story much later than semantics and pragmatics. However, Hurford's focus on this early period of pre-human development is based on the question 'what did language evolve **out of** or, perhaps, 'what, of language, actually predates language?' A torrent of empirical work in recent years into the 'linguistic' capabilities of wild and captive animals has forced us to reassess our assumptions about what is unique to human language. Hauser, Chomsky & Fitch (2002) withdraw to the last bastion, identifying grammatical recursion as the only substantial unique feature. If so much of 'language' is also found in other species,

then we will need to trace back a long way before we fail to find aspects of language in our pre-modern ancestors.

Hurford's aim is to "spell out ... the probable animal precursors for various components of the language faculty" (p.ix). As this implies, the book primarily engages with identifying the connections between what we can observe in other species and what we do in human language today, so as to speculate convincingly about how the one might have led, through the minds and behaviour of our ancestors over millions of years — about which we know virtually nothing — to the other. One of the challenges for any such account lies in the implications on later choices of favouring any particular chronology. That is, we may not know if a particular capacity evolved at time x or time y, but it will matter whether or not we think it preceded, and thus constituted part of the context for, the emergence of another capacity.

The take-home message of the book is very simple. When we ask what is unique in language we are not bound to only consider structure as Hauser, Chomsky & Fitch do. Rather, language is a consequence of a unique feature of human **communication**: the intention to share meaning with others. Out of this, Hurford argues, everything else flows. Slightly expanded, his thesis is as follows. On the basis of what apes can do, we can infer that our australopithecine ancestors had basic mental representations equivalent to human propositions, i.e. predicate-argument structure (p.331). But they had not developed the desire or need to share their mental representations with each other. Language came about because of the intention to **share** meaning.

The transition from not sharing to sharing is non-trivial because of the potential disadvantage of others knowing too much about you: "Only humans tell each other in detail about events and scenes in the world. And this is something of an evolutionary puzzle, because giving information away would seem *prima facie* to be against the individual's interests of the information-giver" (p.332). Language was only possible in a context of trust and cooperation — that is, there is a social explanation at the heart of the evolution of language. Once our ancestors "[went] public with their thoughts" (p.x), the rest followed (p. 332f), because the scales tipped for many features of language to develop very quickly, in the service of sharing ideas more efficiently, and making the encodings learnable (the story covered in the second book).

3. Structure and content

The book is divided into ten chapters, in two parts. Part one explores what cognitive capacities our ancestors are likely to have had in place before they started to

share meaning, drawing on evidence from other species — particularly but not only primates. Part two considers the natural barriers to the sharing of information, and what prerequisites of doing so can be seen in other species.

Rather than working backwards from language as some commentators do — so as, for instance, to reason that since we have ended up with nouns and verbs, our ancestors must have had concepts relating to things and actions that they later labelled — Hurford begins with what we can observe in other species. The strength of this approach is that every step of the argument can be justified and exemplified, and there is no need to stray into the fanciful assumptions that can occur when one backfills from what one knows (or thinks one knows) about the nature of our modern language and cognition.

There is a weakness, on the other hand, in looking to other species for evidence of how our ancestors thought and perceived the world — we did not evolve from any of those species and we cannot be certain of finding, amongst them, enough evidence of what our ancestors were like. If we, as modern humans, have the unique capability to share meaning with each other through language, then might not our pre-modern ancestors also have had some unique capability that undermines useful comparisons with other species? Yes, possibly. But good science proceeds cautiously, and caution invites us not to invoke unprecedented processes or properties if there is a viable alternative. Should it turn out that there is some missing link, we have a better chance of finding it if we have constructed the rest of the story using less remarkable factors.

Chapter 1 is devoted to terminology, assisting the broad, multidisciplinary target audience to orientate to Hurford's assumptions. It also covers, importantly, the key issue of how, since other species do not share their thoughts with us, we can reliably assess their cognitive capacities — how can we know what they know, how do we avoid anthropomorphism, and where on the continuum from creatures with simple reflexes to those capable of categorisation and planning should we draw the line in our attribution of 'concepts'?

In Chapter 2, Hurford considers the extent to which other species can be assumed, by virtue of living in the same physical world as us, to share our basic concepts. To this end, he first considers the evidence for induction, generalisation and abstraction in other species. For instance, swallows dive at hawks and cats, but do not dive at ducks and pigeons: does this mean they have a category 'predator', or do they just respond to specific predator types without generalising (p.22)? Hurford explores in some detail what kinds of conceptual feats monkeys, apes and other animals (including sea lions and parrots) can be trained to achieve in the laboratory, which raises, as elsewhere, the question of what sorts of cognitive capacities animals may have but not use in the wild — and what the existence of such potential means for the story of language.

Provocatively headed 'freewill', the next section in this chapter considers animals' metacognition, as exemplified by the "ability to 'stand outside' [their] immediate behaviour, possibly to choose [their] next move" (p. 29) and by awareness of their own uncertainty about something (p. 30) — which entails a conceptual distinction between self and the world. Next is considered animals' awareness of what happens to objects when they are no longer visible. The concept of object permanence is not present in human infants, but develops during the first two years of life. The associated ability to refer to things that are not present (displaced reference) is central to the usefulness of language, since — in the case of the physical world at least — there is rather little value in using language to refer to things that one could point to, as compared with using it to refer to things that are in another location or exist only in the past or future. Animals' capacity to distinguish between animate and inanimate objects and their motion is next addressed. It is relevant because of particularly strong linguistic biases to encode animacy both in vocabulary and structure (p. 45). Then Hurford turns to transitive inference, i.e. the ability to figure out the relationship between all items in a hierarchy on the basis of only a few examples. As with object permanence, there is evidence from several species of this capacity, though care is required in interpreting it (pp. 48–49).

Of key importance to Hurford's overall thesis is the existence of semantic memory, independent of language (p. 49ff), for without it, when the impulse to share meaning with others emerged, there would have been nothing substantial to share. So he is interested in evidence that animals can retain "permanent cognitive representations" (p. 49) that act as a reference point for decision-making (e.g. about where to seek food), and that they can draw the different aspects of knowledge about an object into a unified concept. Finally, Hurford explores how sensory and motor information are related, pointing to mirror neurons to explain the integration of what used to be viewed as rather independent aspects of knowledge. Mirror neurons, because they fire when others perform an action, have been identified as crucial to explaining how meaning could come to be shared: "when public signals get conventionally associated with concepts ... it becomes possible for one animal to stimulate the imperative content of a concept in the mind of another animal" (p. 63).

Chapter 3, *A new kind of memory evolves*, draws us away from those elements of cognition that many animals appear to share with us, towards those that, rather rarer amongst other species, even more particularly constitute aspects of the capacity our ancestors must have developed in the latter stages of the transition to becoming language-users. The new kind of memory in the title is episodic memory, and Hurford surveys evidence that, despite its apparently recent evolutionary origin, other species do show signs of an awareness not only of past events but also possible future ones, such as would result in hoarding tools for forthcoming foraging tasks (p. 76f).

In Chapter 4, Hurford discusses animals' capability for proto-thought and proposition-like cognition. Humans are no better than many animals at judging quantities ('subitising') — we can accurately count only four or five items just by looking (p. 91). He notes that in language, sentences usually express relationships between no more than four participants, which he attributes to this constraint and its application to tracking objects in a visual scene (p. 95). He next discusses whether animals have a version of logical predicate-argument structure, arguing that they do, since separate neural pathways in animals track the location of an object in space (the 'where stream' or dorsal pathway) and the nature of the object (the 'what stream', or ventral pathway) (p. 99f). The dorsal stream tracks up to four objects and the ventral stream categorises them, one at a time (p. 103f.). Understanding the relationships between objects involves the juxtaposition of these two streams of information (p. 104ff). Here, Hurford draws on clinical evidence to demonstrate what happens when one part of this system is disabled (e.g. p. 107). The information is constituted as a set of one-place predicates, some global, some local, that create an interpretation of the scene rather than just a description of it (p. 113). Finally in this chapter, Hurford argues that even the limited mental propositions of animals adhere to the principles of truth and reference.

The last chapter of part one, Chapter 5, is an attempt to bridge the gap between psychological approaches to the representation of meaning, which are the most obvious approach to describing animal cognition, and the philosophical approach to representation that, using logic, has been central to the characterisation of meaning in human language. Proposing that "there are only two basic kinds of entities: (1) objects/events/scenes ... and (2) properties ..." (p. 157), he recommends a simplification of logical notations, so the representations do not outnumber the likely brain mechanisms associated with them (p. 125). Beginning with the claim, already substantiated earlier in the book, that there is a neural basis for one-place predicates, Hurford seeks to capture in as simple a way as possible the types of proposition likely to have been possible just prior to the transition to language. Here again, then, his aim is to build from the bottom in simple stages, so as to see how parsimonious — and thus psychologically plausible — a model of representation can be.

To this end, he introduces a notation of representation, simplified from Discourse Representation Theory, to capture all and only the meaning entailed in a visual scene with up to four participants — this being the upper limit on cognitive representation that he identified earlier. A clear explanation of the system is given on p. 126f, where the features of the representation are justified in terms of the story so far, particularly in relation to global and local attention, and the limitations on subitising (up to four items) of global attention. This choice of representation is both helpful and practical, in remaining simple in structure and in using lexical

labels that can be easily understood. For the same reason, it is also vulnerable to wilful misinterpretation by anyone who does not want to play the game of using his notation as a shorthand for shared assumptions about the nature of conceptualisation. That is — and Hurford clearly anticipates it because he offers more than one caveat regarding what his notation does **not** entail or capture — a semanticist could nitpick at the labels or the relationships and find them wanting precisely because they do not attempt to represent any ‘deep’ detail. To my mind, Hurford has got it right. Readers who buy into his mind set and travel with him, will easily see what he is doing and common sense will do the rest — it is not an exhaustive approach to semantic representation, but it is not intended to be.

Hurford enters into an extended discussion of why he does not allow, in his representation, for individual constants — i.e. terms for specific entities (proper names). He argues that there is no compelling evidence that animals have a concept of uniqueness: their discrimination of individuals is, rather, contingent on bundles of properties. He goes on to propose that proper names are an add-on in human language, a subset of more general predicates, rather than a class in their own right (p. 136ff). The issue is nice, but important, because there are major theoretical consequences for the ongoing story of language emergence, depending on when one thinks unique reference arises (Wray 2002).

Next, Hurford shows how the ordering of multiple arguments is obviated if participant roles (agent, patient, etc) are also treated as arguments. It means that a predicate can be associated with an (unordered) list of different arguments (p. 140ff). This might seem simply to shift the detail from one place to another, while causing an unseemly build-up of simple representations of information, but the visual scene is limited to four items in global attention. Thus, the one-place predicate, inspired by empirical evidence of our limited capacity to subitise, naturally captures the actual ‘size’ of the propositions we normally handle, avoiding the logical expansion *ad infinitum* arising from multiple-place predicates and thus holding structural potential (competence) and actuality (performance) together.

The final part of the chapter engages with objects, events and states, which are treated identically in his notation. Hurford defends this choice by proposing that the differences we perceive between them are a matter of our focus on the scene and how we, as humans, then encode that focus using language. For prelinguistic creatures, the same choices of focus exist, and they naturally define the interpretation of the scene, so there is no need to distinguish objects, events and states at any other level.

One of the things I most like about this account of predicate-argument structure is that there is, built in from the start, cognitive **perspective** on a scene (p. 331). The juxtaposition of global and local information — the ability to see both the wood and the trees — means that when our ancestors finally reached the

point of wanting to share their thoughts, what they would have wanted to share was not the **facts** of a scene but what they construed as their relative importance. Thus, encoded from the start, is interpretation. The speaker wishes to present a particular interpretation of a scene to the hearer, and this motivates the application by the hearer of pragmatics. In this way, we escape from a bland conception of information sharing, towards communication as, fundamentally, the construction of walls and pathways that draw others' attention to particular parts of the scene and encourage specific interpretations of them. By this means, one can be both cooperative and Machiavellian — perhaps, with social alliances, the difference is in the eye of the beholder.

Part two explores the nature and evolution of animal communication and why it does not extend very far into the sharing of information. At the heart of the matter is establishing just what animals **do** communicate to each other and why it is that much and no more. Hurford makes from the start the assumption that communication is undertaken for the benefit of the communicator (it is this assumption that later problematises the sharing of meaning through language), so that “we should look for the precursors of human-to-human communication in behaviours that benefit the signaller” (p. 168). He begins with a definition of ‘communication’ suitable for his purposes, proposing that “communicative acts evolved out of non-communicative acts” (p. 169) by virtue of an observer applying pragmatics to derive information that the producer did not intend to share.

Thus it is to non-communicative acts benefiting the producer that one must look for the first communication events. In other words, Hurford proposes two independent developments in animals: the representation of scenes (as already described), which remains internal and personal, and the use of gestures and noises as signals affecting another. The latter he proposes to have evolved in three stages: dyadic signals simply influencing the receiver's behaviour in some way; triadic signals drawing the receiver's attention to an **object**; and triadic signals drawing the receiver's attention to a **situation**. In this view, descriptive messages are the last to arise. Hurford considers the alternative — that descriptive utterances were an independent line of development, first used for the external expression of private thoughts (p. 174) — but rejects it on the basis that we do not sustain private languages for our thoughts, but rather use the same codes that we use to share information with others. Thus, he prefers to assume that “the first communicative acts between the remote ancestors of modern humans were of the purely illocutionary variety, like ‘Hey!’ and ‘Hello!’” (p. 175).

Chapter 6 concerns dyadic communication in animals, because “the fact that every human expression can be, and most often is, used to **do something**, makes simple dyadic non-descriptive communicative acts a good place to look at the origins of human public language” (p. 176). Central to bridging the gap between

animal communication and language is the social behaviour of animals, which creates a layer of complexity, achieved through signalling, between what the animal wants to achieve in relation to a conspecific and how it goes about achieving it. Examples are drawn from ritualised threat behaviour and from mating behaviour (p. 178ff). Hurford then proceeds to examine the environmental and social conditions conducive to the development of communication, including group size and organisation (p. 187ff.), the transition from polygamous to monogamous bonding, and the role of increasing brain-size in promoting social cooperation and extended dependency in infancy, both seen as crucial for the development and sustaining of language. This leads to a discussion of the role of learned versus innate signalling behaviour. Hurford concludes that animal communication does foreshadow human-like communication, but that at least two ingredients are missing: motivation to imitate and trust (p. 202–4).

Next, Hurford turns to triadic communication (Chapter 7), that is, where reference is made in the message to a third person, object or event. A key distinction is made between manipulative or imperative signals, such as begging for food, and declarative signals, which merely draw attention, with the latter found predominantly in human-reared great apes (p. 213). Hurford proposes that declarative pointing occurs in captive but not wild apes because only in the former context is there a culture of co-operation to make it worthwhile using the gesture (p. 216). Meanwhile sets of alarm calls used to warn about different predators — found not only in monkeys but also some birds — constitute a kind of triadic communication that Hurford proposes had a different evolutionary route (p. 226). He demonstrates, using his notation system, the difference between the **denotational** function of alarm calls and the **referential** function of pointing (p. 227ff.), and then discusses at length the extent to which alarm calls are genetically hardwired. In the final part of the chapter, he reviews the assembled evidence for features of communication that are prerequisites for language (p. 235ff). He concludes that neither the difference in the size of vocabulary between humans and wild primates, nor the partial innateness of primate denotational/referential signals, is a barrier to a continuum model (p. 237). He identifies changes in ecological and social circumstances as crucial to our ancestors coming to use more of their existing potential for displaced reference, and integrating denotation (through symbols) and reference (e.g. through pointing, later through deictic symbols like *this* and *now*) into the powerful mix found in language.

Chapter 8 tackles the major theoretical problem of why our ancestors should have evolved to share their hard-won information with others. There must have been a profound social shift, able to turn the normal rules of natural selection on their head, so that there was a survival advantage to engaging in cooperation and altruism. His appeal to environment and culture rather than to a genetic mutation

is significant, and represents a more general shift in language evolution research in recent years. Hurford prefers to constrain any hypothesised genetic change to something small and discrete, albeit with a large consequence for the phenotype — a case that, having set up his account thus far in the way he has, is easily made, for so many of the prerequisites for language have already been demonstrated as likely to be there.

After an extended consideration of the evolutionary basis of cooperation and altruism, Hurford examines and largely discounts a major role for sexual selection in promoting an expansion of communication for display (p. 285), and doubts also that Zahavi's Handicap Principle, whereby risky displays are undertaken to demonstrate fitness, can be applied (p. 288f). However, in conjunction with social sanctions, and by viewing the content rather than the form of the signal as selective, the Zahavi notion of costly behaviour (as modified by Dessalles) is more convincing (p. 290ff): "Those playing the game [of cooperative information sharing] successfully, and joining strong coalitions, will have more access to mates and get better food" (p. 292). He retains, though, reservations about whether any of the various theories proposed to account for the development of human society and communication is sufficient on its own, suggesting that they are best applied collectively. Doing so gives a better chance of resolving the dilemma of how language could ever arise and yet arise only once (p. 305).

The final substantive chapter, 9, seeks evidence from the animal kingdom consistent with the claim that our ancestors developed language as a result of increased levels of trust and cooperation. Hurford explores the theoretical potential for information exchange to exist without shared intentionality and *vice versa*, before reviewing evidence that primates share with humans a sense of fair play, indicative of "tacit awareness of group norms of cooperative behaviour" (p. 325). Finally, he describes the discovered role of the neuro-peptide oxytocin in enhancing levels of interpersonal trust. He suggests that the strong desire in human babies to conform, which leads to the imitation of language before it is used meaningfully, could be the result of a naturally high oxytocin level (p. 328). This could explain the initial boost in our species towards increased trust, the corollaries of which were then dealt with culturally by punishing those who abused it.

In an admirably brief rerun of the arguments presented in the book, Hurford delivers in his epilogue a three-page summary of how he believes our ancestors became language-ready (p. 331f). As a substitute for reading the whole book the reader will find it too densely packed with allusion to arguments made elsewhere, but as a means of orientating oneself regarding which exit he took from each part of the maze he has been in, it is very helpful. Thus he brings us to what he terms the "watershed" (p. 333), where already highly functional capacities for understanding the world and operating within a social group were the context in which, when

thoughts became publicly shared, a “cascade of consequences” led to the emergence of human language.

4. Conclusion

Hurford’s book is important for two reasons. Firstly, it sifts through and interprets a vast range of research evidence from many disciplines. In this regard alone it is a book that deserves to be read, and read carefully. It will certainly be a very valuable resource for those who need a reliable account of the research and what it is likely to mean. Secondly, the book makes a significant new contribution to knowledge. Hurford makes some very specific claims that can, and should, be the focus of future attention — challenged, explored, extended, justified or rejected. And this is what Hurford invites his reader to do. Most experienced authors do the ritual dance of admitting to potential gaps or flaws, and encouraging others to take a constructive approach to filling them. But Hurford’s desire to know where the weaknesses of his story are, so that we can collectively pursue a fuller and truer understanding of the story of language evolution, is clearly genuine. We can surely anticipate that volume two will be a similar *tour de force*.

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