Evolutionary Linguistics

How did the biological, brain and behavioural structures underlying human language evolve? When, why and where did our ancestors become linguistic animals, and what has happened since? This book provides a clear, comprehensive but lively introduction to these interdisciplinary debates. Written in an approachable style, it cuts through the complex, sometimes contradictory and often obscure technical languages used in the different scientific disciplines involved in the study of linguistic evolution. Assuming no background knowledge in these disciplines, the book outlines the physical and neurological structures underlying language systems, and the limits of our knowledge concerning their evolution. Discussion questions and further reading lists encourage students to explore the primary literature further, and the final chapter demonstrates that, while many questions still remain unanswered, there is a growing consensus as to how modern human languages have arisen as systems by the interplay of evolved structures and cultural transmission.

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Preface

Some necessary background: language and evolution

This book is for anyone who has ever wondered why humans are linguistic animals. There can be no doubt at all that this is exactly what we are: we use language constantly, creatively and almost compulsively. We talk to each other, our pets, and ourselves. We talk to our babies, and are quite unreasonably delighted when they talk back to us (at least for a while). We use language to get to know people; to parade our skills for prospective employers; to share our views; to express our emotions; to negotiate and establish our identities; to argue, lie and mislead; and even, sometimes, to exchange information. We invent new words, which become normal currency within families and social groups; we struggle with which of our various accents to get out of the wardrobe for particular occasions, or which of our languages to use in certain circumstances if we are bilingual; and we get white-hot furious when we feel others are taking liberties with 'our' language. One person's clever neologism is another person's linguistic mangling.

Language, then, is natural. It is part of our lives from the very start: Mehler *et al.* (1988), for example, have demonstrated that newborns are capable of differentiating their mother's language from other languages, even on the basis of a signal filtered so only suprasegmental information remains. Children learn language, as we shall see in Chapter 2, remarkably quickly and efficiently. Language forms part of our identity as individuals, as social groups – and as a species, because one of the remarkable things about language is that no other species seems to do it quite like us. To be sure, other species make noises (some of them quite persistently); and some use vocal or gestural signs, or a combination of both, to communicate. What marks out human language as special is the extraordinary structural complexity all languages display, and the inventiveness with which humans use these systems, applying them regularly to new situations and using new utterances we have neither said nor heard before. Many species use their systems of communication to establish group membership, to issue warnings about dangers in the environment, to keep track of other group members, and to share information; but in general they are restricted in the amount of information they can convey (Hauser 1996). Humans also use language as an art form, and as a tool; and we talk freely about people, objects and situations which are not right here in the physical context for the conversation, and which might indeed be imaginary, hypothetical or impossible.

Given this view of the absolute centrality of language in human life and interactions, it is scarcely surprising that humans also use language, as we are doing now in this introduction, to talk about language. We might in particular expect that linguists and non-linguists alike would be intrigued by the question of where human language came from. If we are linguistic animals, and if this makes us at least quantitatively but probably also qualitatively different from other species (including the other primates who are our reasonably close relatives), how has this situation come about? How did the unique system that is human language arise, and why in particular are we its beneficiaries?

Until relatively recently, the origin and evolution of language have arguably not received the attention they deserve in linguistics or its precursors. There is a long and distinguished history of linguistic analysis of synchronic structure, which has given rise to the many and varied linguistic theories we find today for the description and possible explanation of aspects of phonology, morphology, syntax and semantics. Similarly, there is a long-standing commitment to diachronic, or historical linguistics, with emphasis on the tracking and, again, explanation of changes in these same structural domains, and on the establishment of language families. But in contrast, the origin of language is one of the very few disciplines to have been outlawed by its own practitioners, when the Société Linguistique de Paris announced in 1866 that 'The Society does not accept papers on either the origin of language or the invention of a universal language'.

This prohibition was a response to a nineteenth-century proliferation of theories, many based on the flimsiest of evidence, and some frankly fanciful, which had brought the topic of the origin of language into disrepute among linguists. We shall review some of these ideas briefly in Chapter 1; but though we might concede that the ban on discussion of our topic was amply justified in 1866, it is important to note that the same conditions no longer obtain now. The intellectual climate has changed, so that unsubstantiated theorising is no longer generally accepted; and perhaps even more importantly, we now have vastly more information than the average Victorian gentleman-scientist could have dreamed of. As we shall see in later chapters, the development of medicine, computer technology, archaeology, palaeontology, linguistic theory and typological description, neuroimaging and primatology together mean that we are able to take at least some tottering steps towards answering questions which our predecessors in 1866 could not even have formulated. We do not know everything we need to know to account for the development of language in our species; but we are beginning to understand where we need to look, and to construct reasoned and well-supported hypotheses about what we might find there. These hypotheses are for the most part still plural, and there is still healthy debate over many aspects of the field. This is to be welcomed: it is only by engaging in such interdisciplinary debates that we can expect to move forward.

Although the Paris Linguistic Society's ban makes a good story, it is unfortunate that mentioning it was, until fairly recently, virtually the only element of coverage of the origin and evolution of language to be found in many introductory

books on linguistics. In the early 1990s, however, there began to appear unmistakeable signs that the evolution of language was ready to come in from the intellectual cold. Interest in this domain came from two very different directions. First, researchers in a range of scientific disciplines outside linguistics began to focus on issues like the organisation and function of the brain, and on similarities and differences between spoken human language and the signed systems which are either used natively or can be taught artificially to other primates. The Human Genome Project, with its target of sequencing the whole human genetic system, attracted a great deal of initial publicity on the grounds that it was hopelessly over-ambitious, and even more as it began to achieve its goals; and as it did so, philosophical as well as genetic attention was focused on which aspects of human behaviour might be 'in our genes', and which not. These developments began to converge on the extent to which human language is species specific, and how it might be genetically and neurologically encoded. At the same time, the development of a range of powerful linguistic theories, ranging from Chomsky's various syntactic models to Optimality Theory in phonology, refocused linguistic attention on the question of innateness, so that both those seeking to defend an innate component underlying language and those keen to attack it found they had to engage with aspects of evolutionary theory. The key issue here is that if we are going to claim that any aspect of language or of any other human physical, mental or behavioural system is innate, and therefore genetically prespecified, we also have a responsibility to explain how it got there. Inevitably, then, questions of origin began to be asked again, both inside and beyond linguistics.

Aims

The origin and evolution of language is inherently interdisciplinary, both because it appeals to such a wide range of intellectual interests, and because it requires contributions from so many fields. This makes the area fascinating: even established researchers are always learning something new. But it also brings its own challenges, not least in terms of providing accessible materials for students. Contributions to the field come from genetics and neurology, psychology and anthropology, archaeology and primatology, sociolinguistics and the sociology of language, computational linguistics (especially simulation), and historical linguistics – and this list is not exhaustive. Sometimes these findings are complementary, and we find emerging syntheses; but in other cases they seem flatly contradictory, and it can be hard to know whether this is an impression created by our relative ignorance of some of the contributory fields, or whether the contradictions are real. True, the Evolang conference series which began in 1996 has provided a welcome and hugely valuable forum for interaction among practitioners of these varied disciplines, and the volumes arising from these (Hurford, Studdert-Kennedy and Knight 1998, Knight, Studdert-Kennedy and Hurford 2000, Wray 2002b, and several more to which we shall refer as we progress

through the book) have disseminated and encouraged scholarship from a wide range of fields. But with the exception of a few introductory textbooks (notably Aitchison 1996, Fitch 2010), and some books on specialist topics (like de Boer 2001), such edited volumes of individual essays by specialists seem to have become the norm in the field (see also Christiansen and Kirby 2003, Tallerman 2005). These are undoubtedly high-quality collections, and are invaluable for colleagues and students seeking to develop a specialism in the area; but they may not meet the needs of students beginning work on the origin and evolution of language, or taking a single course in the area while specialising elsewhere. This is increasingly the case, since this area interacts with historical linguistics; the history of linguistics; language and mind; language acquisition; biological linguistics and neurolinguistics; and the philosophy of language. Indeed, as we have seen, students working in either formal or functional approaches to syntax or phonology may also find they need to confront the issue of innateness, and why it is so controversial; and this clearly involves dealing with evolutionary questions.

In all these cases, students and colleagues investigating the origin and evolution of language would benefit from an accessible treatment of the issues in a single volume, and this is what we seek to provide here. As a historical linguist and a human geneticist, both with research interests in evolution, we approach the topic from different but related perspectives which allow us to interpret and summarise the primary literature, and outline and evaluate the arguments, in order to encourage and equip those new to the field to participate in the many ongoing debates.

These aims mean that we will inevitably be starting from a relatively introductory level in many of the topics we discuss. There will, where necessary, be introductions to human genetics; to the anatomy and functioning of the brain and the vocal tract; to the history and prehistory of our species; to historical as opposed to evolutionary linguistics; and to relevant aspects of language acquisition. Some of these topics will only be dealt with at this introductory level, since they are important as part of the context, to allow us to progress to a consideration of evolutionary linguistics in its own right; our readers do not need to be completely au fait with all the individual complexities of each area at the highest level of expertise. Given the mixed readership we anticipate for this book, this means everyone should realistically expect to find some sections introductory, and others more challenging; some readers will also feel frustrated that we have not dealt with certain issues in greater depth. We will, however, indicate throughout in the text and at the ends of chapters where further information is to be found. Furthermore, although part of our job is to introduce and to summarise what researchers have already established in a range of background areas, we assume that this does not mean we must remain studiedly neutral throughout the book. When we think something is a poor argument, or a strong one, we will tell you. And we will warn you when we are pulling arguments together to make our own evolutionary story, which makes good sense to us; the point of proceeding

in the way outlined below is that, by that stage, you should be able to decide for yourself whether you agree.

Organisation, and how to use this book

Much of the introductory contextualisation above has inevitably involved sweeping statements and unsubstantiated claims. The following chapters will develop the arguments underlying these, and help readers to understand why we approach the issues from the perspectives we do, and to decide whether they agree with us or not. The book is structured to start within linguistics, work outwards to concerns mainly within adjoining disciplines (though with clear implications for language), and finish squarely within linguistics again. Chapters are organised according to topics, but are not wholly self-contained, though Chapters 4, 5 and 6 are more so than the others. There is considerable interaction between the topics of Chapters 1–3, and 7–9, in particular.

In the first chapter, we introduce the background issues; review some of the problematic early ideas about language origins; and deal with questions of terminology as we contrast evolution with history, noting a number of recent cases where linguists say 'evolution' without meaning it. Chapter 2 goes on to consider why we might find it necessary to invoke evolution to account for language in the first place, outlining aspects of the relevant evidence from such varied areas as language acquisition, genetic disorders, creolisation and ape language experiments which suggest the development of some genetically specified underpinnings for language in our species. In Chapter 3, we ask the obvious question of whether linguists can access information about the earliest human language by taking the linguistic systems we have today and simply extrapolating backwards, and show why this cannot in practice be achieved. At the end of this first section of the book, we will have established that it is not language systems or linguistic behaviour that have evolved; rather, it must be the genetic instructions and biological structures underlying these.

To investigate the genetic and biological characteristics of a species, we must ask where that species has come from, and how it has evolved compared to its ancestors and relatives; and this is the topic of Chapter 4. We shall consider fossil evidence, and evaluate different theories on where and when *Homo sapiens sapiens* evolved. In Chapter 5, we consider the physical system which seems most clearly specialised for language in modern humans, namely the vocal tract; while in Chapters 6 and 7, we turn to an outline of the interacting roles of the brain and genes in the acquisition, use and evolution of language. Chapter 8 is central to the book, addressing the question of whether the genetics underlying language evolved slowly and gradually, via incremental pathways of mutation and natural selection, or whether a more abrupt and drastic mechanism might have been involved; it is here that we become most closely involved with questions of evolutionary theory. Chapter 9 begins by discussing how we might model what

happens in populations after something linguistic has originated, but during its development to a more complex and structured set of systems, and continues to consider possible social explanations for these innovations, stressing the possibility of selective advantages provided by improved communication. Here, we face a lack of concrete evidence, since social alliances do not fossilise, and we cannot rerun human evolutionary history to assess the dynamics involved; but we are in no worse a position than many synchronic or historical linguists, who must often assess the most likely hypothesis in the light of limited facts, and by considering the best fit of a number of disparate pieces of the puzzle.

Each chapter will end with a list of primary reading, and because exercises tend not to be appropriate to this kind of field (imagine: 'Exercise 2: Rerun the last 7 million years of primate evolution and assess what conditions are needed for primates other than humans to speak'), we have provided points for discussion. These can be used in conjunction with the primary reading for reflection on the issues; as essay topics; or as pivots for discussion in tutorials or workshops. In a field like evolutionary linguistics, there are many things we do not yet know, and debate and discussion can only be of benefit in tackling these problems; likewise, the existence of many unanswered questions should not discourage beginners in the field, but should encourage them to see that they are just as able to make a contribution as any of the rest of us. With this in mind, we encourage readers to use their evolved linguistic systems well and reflexively in considering their development in our species.

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This book has been a long time in the making; one of the problems with rapidly moving interdisciplinary fields is that nobody (even if there are two of you) can keep up with all that is going on, so we have been very reliant on talking things over. Our thinking has been shaped by discussions with colleagues in Cambridge, Sheffield and Edinburgh, and through the AHRC Centre for the Evolution of Cultural Diversity based at University College London, and while mentioning individuals by name always seems invidious when so many influences are indirect and cumulative, we would like to acknowledge Simon Kirby, Rob Foley, Marta Lahr, Jim Hurford, David Chivers, Colin Renfrew, Peter Matthews, Francis Nolan, James Steele, Fiona Jordan, Ruth Mace, Jamie Tehrani, Guy Deutscher, Roger Lass, David Barton, Hannah Cornish, Thom Scott-Phillips, Gareth Roberts, Paul Heggarty, Maggie Tallerman, Dan Dediu, Bob Ladd, Alison Wray, Andrew Smith and Kenny Smith, among many others. We would like to pay particular tribute to colleagues and students in the Language Evolution and Computation Unit in Linguistics and English Language at the University of Edinburgh, who have done so much to put the study of evolutionary linguistics on the map, and indeed to establish it as a discipline.

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