

and interesting in their own right and not just as precursors of the more fascinating eusocial insects. This is a fair point. Many social insect workers tend to consider these insects only in so far as they provide a substrate from which the more central phenomena of altruism and conflict arose. Costa goes a long way to redress this balance, although it is unfortunate, in my view, that the presocial wasps and bees, which have been quite well studied, are excluded.

Another general theme is that searching for a single explanation for the evolution of social insects is doomed: there is not going to be one theory that explains the diversity of insect social systems. The villain of the piece is kin selection, which is sniped at throughout. Such sniping has become a popular pastime in the field, ever since the great silverbacks of eusociality pronounced that kin selection, as an explanation of reproductive altruism, has outlived its usefulness [1,2]. It seems to me that these attacks are premature. Costa repeatedly asserts that there is some tension between 'intrinsic (genetic) factors such as kin selection' and the 'possible role of extrinsic (ecological) factors'. But there is, and never has been, any such conflict. Kin selection is about both ecology and genetics, as clearly stated in Hamilton's original papers and in textbook accounts of it [3]. True, there have been times when the 'mania for relatedness estimation', to quote Costa, tempted people to sideline ecological factors, but they have always been there in the benefit and cost terms of Hamilton's Rule. Most people, for example, would now accept that, regardless of the impact of haplodiploidy, the major reason that eusociality is common in the Hymenoptera is because they evolved from nest-making subsocial bees and wasps.

Even the most ardent kin selectionist does not consider that Hamilton's Rule explains all social phenomena: relatedness is only insisted on if altruism is actually occurring. Costa cites, as though this is a killer blow to

the Hamiltonian paradigm, that females of a tent caterpillar place their egg masses near those of other unrelated families. Well, Hamilton also invented the selfish herd, which does not hinge on relatedness and is presumably at least part of the explanation for this observation. I welcome this extension of sociality to include herds of caterpillar and grasshoppers, but their existence is not some kind of violation of Hamilton's Rule. Despite the best efforts of theoreticians, kin selection remains the most satisfactory current explanation for non-reciprocated reproductive altruism.

*The Other Insect Societies* includes the most baffling explanation of Hamilton's Rule that I have ever encountered. Costa ends up with the equation in the form  $r > b/c$ : I think that this is because he originally defined his benefit to be what is normally defined as a cost, but this will certainly confuse the naïve reader.

However *The Other Insect Societies* is not really about concepts: it is about insects. I think that everyone who teaches entomology should buy a copy and use it. Costa has a most engaging, unforced enthusiasm for these animals, and we are greatly in his debt that he has unlocked this secret world for us. He is constantly pointing out where there are knowledge gaps and questions remaining. I am sure that, in a few years, we will look back and appreciate this as the book that launched a thousand student projects.

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## Talking and human evolution

**Why We Talk: The Evolutionary Origins of Language** by Jean-Louis Dessalles, translated by James Grieve. Oxford University Press, 2007. £35.00, hbk (320 pages) ISBN 978 019927623 3

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The question of where human language comes from is something that people have wondered about since the human mind became capable of forming such questions. Plato in Classical Greece, Xunzi in Ancient China, and Rousseau and Herder of 18th-century Europe are among the numerous philosophers who have tackled it. But progress on answering the question, centered around speculative

theorizing, had been so unremarkable that, in 1866, the Société de Linguistique de Paris banned all further communication on the subject. The first notable discussion did not appear until a century later, in a 1960 paper by the Cornell linguist C.F. Hockett in *Scientific American*. In 1976, a conference on the subject was hosted by the New York Academy of Sciences (published later as *Annals* No. 280), and research has been picking up momentum ever since. The first steps in this new field were somewhat uncertain, with residual echoes from earlier centuries that language is a dedicated organ owing to a massive mutation in the genes, almost a scenario of special creation. Currently, evolutionary thinking, with its focus

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on empirical research, has won a solid place in discussions of language origins, and *Why We Talk: The Evolutionary Origins of Language*, by Jean-Louis Dessalles, clearly falls within a darwinian framework; that is, that language arose as a result of evolutionary ‘tinkering’ [1] and is built on many abilities that we share with other species, particularly with other primates.

*Why We Talk* is divided into three parts. Part 1 sets the stage by discussing ‘the place of language in human evolutionary history.’ In speaking of language universals [2]\*, Dessalles says, curiously, ‘what is undeniable is that languages are extremely diverse and that such superficial resemblances as there are must be explained as mere incidental features of their historical derivation’. This sentiment seems counter to other parts of the book, which make a case for languages being joint products of the biological prerequisites that we all share, and of the external world that all languages strive to represent. For this reason, the resemblances among languages are deep and interesting, and it is the diversity that is the product of cultural histories. Resemblances and differences are two sides of the same coin, and must be studied together.

In recounting Greenberg’s classification of languages and Cavalli-Sforza’s grouping of peoples, Dessalles says ‘this very close correlation between linguistics and genetics is of course fortuitous’. However, he then goes on to explain why the correlation is not fortuitous, given that both types of variation ‘have a common historical cause: population migration.’ Incidentally, on the same page, the superfamily of languages reconstructed by Joseph Greenberg is ‘Eurasian’, not ‘Nostratic’. (The latter is a similar hypothesis advanced earlier by a group of linguists originally based in Moscow.)

There are many places where one could take issue in Part 1, as well with Part 2, which discusses ‘the functional anatomy of speech.’ Another example is ‘every sentence we speak is an original work’, a belief that has been repeated until it has almost become a mantra, although it is surely a gross exaggeration that was contested since its beginning. Dwight Bolinger, for example, stressed the fact that every language has a large number of prefabricated phrases that are ready for instant use [3]. Now that databases of real languages are ubiquitous, it is easy to see that most working sentences are cut-and-pastes of various prefabricated parts. Indeed, the recent rise of the theory of construction grammar signals a clear recognition of this fact [4]. However, these are minor complaints. The first two parts of the

\* Language universals is an empirical concept [1] and is not to be confused with the currently fashionable “Universal Grammar”, which is a reincarnation of the dedicated language organ.

volume pull together a wide spectrum of considerations in language evolution and present them in a coherent and useful fashion.

Part 3, ‘the ethology of language’, is where the author argues for an approach to the study of language evolution that is ‘radically new’. As a direct rejoinder to the book title *Why We Talk*, he writes ‘we speak because a fortuitous change profoundly altered the social organization of our ancestors, who found themselves faced with the necessity ... of forming sizeable coalitions’. Building largely on the theoretical framework advanced by the Zahavis [5], the author develops a series of arguments on why the giving of salient information brings the speaker prestige and how language has an essential role in the evaluation of the proffered information. Here, as well as elsewhere, Dessalles illustrates his arguments with some graphs derived from multi-agent modeling†.

The plural suffix used in the subtitle of this volume is crucial, for the natural history of language must have had many evolutionary origins as well as important major landmarks. The trajectory began with our unique bipedal posture and the restructuring of our upper body, the making of tools with increasing refinement and complexity, the explosive growth and new organization of our brain, and so on, to the emergence of art and music some thirty thousand years ago, when languages in their modern form must have been largely in place to make them all possible. Of the many strands that enter the complex tapestry of emergence and evolution, the sociopolitical must have had a crucial role, along with those just mentioned, and the present volume makes a useful contribution in highlighting and exploring them. Much exciting research lies ahead in learning how these diverse strands weave together, both with one another and with the environment, leading to what Galileo has called ‘the greatest of all human inventions.’

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† These graphs are based on computer simulations in which agents interact with each other pseudo-randomly. The author provides references to his earlier papers, which are necessary for a clear understanding of the graphs in the book.

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