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## REVIEWS

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PHILIP LIEBERMAN, *Human language and our reptilian brain: The subcortical bases of speech, syntax, and thought*. Cambridge, MA: Harvard University Press, 2000. Pp. 221. Hb \$39.95.

CHRIS KNIGHT, MICHAEL STUDDERT-KENNEDY, AND JAMES R. HURFORD, *The evolutionary emergence of language: Social function and the origins of linguistic form*. Cambridge: Cambridge University Press, 2000. xi, 426. Hb \$74.95.

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The two volumes reviewed here thumb their noses at the 1866 ban by the Linguistic Society of Paris on publications concerning language origins – a ban imposed by those august guardians of public faith in linguistic science because of the disreputable, speculative, nonempirical character of language origins scholarship. Yet nose-thumbing has been on the rise in the past two decades, even alarmingly so. Why? Have we witnessed epochal new empirical or conceptual breakthroughs that would warrant the overturning of that sober 19th-century decision?

The answer is yes, but also no. One major research development from the 1970s onward has been the efforts to teach language to nonhuman primates. The results of that research, however, are not central in these two volumes. So what has motivated them?

Philip Lieberman's book is his fifth, since 1975, on the subject of language origins. His earlier writings were concerned especially with vocal tract evolution and speech production, and this has been an area of significant increase in empirical understanding. Everyone must surely agree that it has proven impossible to teach nonhuman primates actually to speak a human language, regardless of one's assessment of the capacity of those nonhumans to understand spoken language or to produce language through gestural signs or other semiotic devices. Consequently, speech physiology and vocal tract evolution loom large in understanding the course of language evolution in humans.

The present book, however – though an organic outgrowth of Lieberman's earlier work – taps into a different, albeit equally rich, vein of empirical investigation: the study of brain structure and functioning. In this volume, we enter into the world of functional magnetic resonance imaging, tracer studies of neural circuitry, clinical investigation of brain lesioning, and the relationship of all of these to the production and perception of spoken language. Indeed, *Human lan-*

*guage and our reptilian brain* might serve as an accessible introduction to brain research for those interested only or primarily in language.

Language for some time has been thought to be localized in the neocortex, the evolutionarily most recent outer layer of the brain. Lieberman by no means denies the importance of the neocortex, but he is at pains – as indicated by the phrase “our reptilian brain” in the book’s title – to look to evolutionarily ancient portions of the brain to fathom the origins of language. Of special importance for him are the basal ganglia (the putamen, caudate nucleus, and palladium), which “are located deep in the cerebrum” and connect us to our reptilian past.

Why the basal ganglia? The short answer is that they are involved in the coordination of motor activity, cognition, and emotion, and the coordination of speech perception and production is one key to the development of spoken language. Significantly, the basal ganglia are also important for sequencing and syntax.

Yet, as in the case of some of Lieberman’s other works, it is difficult to state what he is arguing for without simultaneously stating what he is arguing against. The enemy here, as in other of his writings, is the linguist Noam Chomsky and his followers. In particular, the book is an argument against the idea, attributed to Chomsky, that there is a genetically transmitted brain module or organ that is responsible for syntax. Simultaneously, it is an argument against the so-called “big bang theory” that syntactic ability, and hence language, arose all at once in an evolutionary leap.

Lieberman’s argument is that there is no single language module or organ, but rather what he calls a “functional language system” made up of many different brain structures, including the basal ganglia, that are involved in activities other than language as well as with language proper. For Lieberman, language evolved gradually as part of the overall evolution of the brain through its role in facilitating the adaptation of human organisms to their world. As language evolved, it proved useful for that adaptation.

From the perspective of social and cultural approaches to language, it is significant that Lieberman conceptualizes language as “a learned skill” and “not an instinct.” Brain evolution – that is, evolution of the “functional language system” – facilitated the learning of language, but Lieberman’s approach views language as part of the social environment to be internalized through processes of learning.

Like Lieberman’s book, Knight et al. is another installment in a series of publications; this one is the second set of papers resulting from an “International Conference on the Evolution of Language.” Its predecessor was *Approaches to the Evolution of Language: Social and Cognitive Bases* (Cambridge University Press, 1998), edited by the same three, but with Hurford in the lead. Both volumes are organized into three parts: one dealing with the social functions of

language in relationship to language origins, another dealing with the emergence of phonology, and a third concerned with syntax.

Unlike Lieberman's book, the major advance giving rise to this volume is not the understanding of brain structure, which plays very little role in these 22 chapters. Rather, it is – for six of the core contributions, at least – the use of computers to construct agent-based models and run simulations of language evolution.

Noteworthy from a social perspective on language is that many of the simulations show language emerging through cultural evolution, rather than, or in addition to, biological evolution. Kirby, for example, proposes that, once our ancestors had the ability to acquire new signs through learning, “the dynamics introduced make the emergence of compositionality [and, hence, syntax] inevitable without further biological change” (p. 321). While Hurford's model assumes that our ancestors had some syntactic capability (presumably due to biological evolution), he too is at pains to show that “general linguistic rules are favoured by a completely nonbiological mechanism, namely the social transmission of language from one generation to the next” (348).

At the level of phonology, de Boer's simulations show how a defined system of sounds can emerge within a community of interacting agents. The emphasis is on communication as social interaction. As he puts it: “This effectively decreases the number of linguistic phenomena that have to be explained by biological evolution” (177).

The models, even while focusing on cultural evolution, do not exclude biological evolution as a factor. Livingstone & Fyfe, for example, examine the co-evolution of speech and physiology, with speech leading the genetic evolution of human physiology toward the support of “improved language capacity” (199). From such coevolution, “hominids developed differences from other primates, among them increased brain size and a supralaryngeal vocal tract” (199).

I would be short-changing this rich and complex volume were I to mention only those papers concerned with agent-based computer modeling. Among the papers on the emergence of phonology, we find, if not empirical breakthroughs, at least new developments in the study of prelinguistic sound imitation by children from birth to 18 months of age. Vihman & DePaolis argue that “a capacity for facial and vocal matching is in place as early as the first three months of life” (133). They go on to link a timeline for early childhood communicative development (birth to 18 months) to one for hominid evolution (5 million years BP to present) – though here (as in many of the other papers) our French predecessors must be peering down their ghostly noses in disapproval.

In a related contribution, McNeilage & Davis examine the same period in early childhood development, once again linking imitative sound acquisition to phylogeny. Their specific focus is the transition from babbling (around seven months) to more language-like syllable production. The intriguing point here is that, although chimpanzee infants too babble (albeit much less than humans), the

babbling does not give way to the subsequent stage found in humans. In the babbling stage, as described by McNeilage & Davis, there are rigid constraints on the relationship between vowels and consonants. These constraints give rise to determined sequences of sounds, such as we find in primate vocalizations. In other words, there are mechanical constraints on paradigmatic substitution within syntagmatic slots. The transition involves a freeing up of these constraints, such that true paradigmatic substitution (the hallmark of Saussurean structure) begins to develop.

In addition to phonology and syntax, six of the papers – the first six in the volume – look at the relationship between communication and social interaction. The authors ask: What does language accomplish within social interactions when compared with other communicative forms such as gesture? Jean-Louis DeSalles argues that communication is not about reciprocal altruism, contra some social interactional assumptions. Rather, speaking confers “a selective advantage on the speaker” (62), thereby setting in motion processes of natural selection. Camilla Power proposes that the primal function of language may be as a kind of “vocal grooming,” wherein solidarity emerges out of patterns of concealment and revelation of knowledge. And Chris Knight looks at language in relationship to play as a form of social interaction.

If there is, from my perspective, a major lacuna in both of the volumes reviewed here, it is the absence of a semiotically sophisticated consideration of signs, such as one finds, for example, in Terrence Deacon’s work. What are the characteristics of the semiotic forms we are trying to explain? How does communication take place? And what light does an analysis of how communication takes place shed on the possible origins of language? None of the writings reviewed here actually considers these questions.

I have been asking whether we have witnessed major empirical or conceptual breakthroughs in language origins research that warrant so much nose-thumbing at the 1866 ban. And I have been arguing that these two volumes answer “Yes.” There have been breakthroughs in the area of brain research, in computer modeling of evolutionary processes, and even in child language acquisition research.

The other side to the answer is “No.” We continue to grope for answers without direct evidence of language origins, just as our 19th-century ancestors cautioned. Our plight is that of the hapless fellow who searched for his keys under a street-lamp, not because he had lost them there, but because it was there that he could see best. We can study brains; we can construct computer models; we can investigate child language acquisition; but that is not the same as directly studying language origins. Yet one cannot help but feel, perusing these two energetic and hopeful volumes, that we are getting closer. The game is afoot. There is excitement in the air. These two volumes furnish clues that stir our imagination and fill us with wonder, causing us to throw ancestral caution to the wind.

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