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The subtitle of this book is: The evolution of speech, thought and selfless behavior. Its thesis is that "...the 'key' to the evolution of the modern human brain is rapid vocal communication" (p.9), afforded by "encoded" speech and syntax; "moral progress...follows from our cognitive ability which, in turn, derives from our linguistic ability" (p.10). The book consists of an introduction and six chapters, reviewing a wide range of data and theories concerning human brain structure, speech and syntax, aphasia and other language deficits, language acquisition, and the emergence of human culture.

The longest chapter treats topics that Philip Lieberman (hereinafter, L) knows best and for which he is best known, namely, speech physiology and the evolution of the human vocal tract. L's studies in this area are not without their critics, but anyone who does not know them would profit from reading the relevant sections of Chapter 2 (pp. 53-77). Unfortunately, I cannot say as much for the rest of the book, which has many defects of both substance and scholarship.

Substantively, L asserts rather than demonstrates the supposed evolutionary line from speech to thought to "selfless behavior", leaning on several tenuous assumptions; these include a misleading parallel between structure-dependent syntactic rules and context-dependent phonetic variation (e.g., p.83). More generally, despite its subtitle, the book is less concerned with evolution than with its presumed products: the human brain, vocal tract, and certain cognitive capacities. L has nothing to say about the properties of linguistic behavior, the "pacemaker" that must have driven the evolution of human morphology (Mayr, 1982, p.612), nothing to say therefore about the emergence of the discrete elements of sound and meaning, and their combinatorial structures, that afford language its unlimited semantic scope. These topics are no longer completely intractable (see, for example, Bellugi & Studdert-Kennedy, 1980; Lindblom, 1986; Pinker & Bloom, 1990), and should surely be considered in a book purporting to address the evolution of speech.

As for scholarship, L repeatedly fails to acknowledge the sources of ideas he wishes to promote, and to represent fairly those he does not. Consider, first, a notion at the center of L's argument, the so-called "encoding" and "decoding" of speech and syntax. L notes that we commonly produce and perceive speech at rates as high as 15-25 phonetic segments per second. "This fact leads to a seeming mystery...[because Miller (1956)]...showed that humans cannot identify non-speech sounds at rates that exceed seven to nine items per second.... How, then, can we possibly understand speech...?" (pp. 37, 38; cf. p.59). The answer, L tells us, is that we have specialized neural mechanisms for "encoding" and "decoding" speech and syntax. He draws a parallel between "encoded" speech which evades limits on the temporal resolving power of the ear, and "encoded" syntax which evades limits on short-term memory (p.82). Finally, he proposes that brain mechanisms underlying the "...complex muscular maneuvers of speech may have provided the preadaptive basis for rule-governed syntax" (p.83).

Several things are wrong here. First, Miller's (1956) paper deals with limits on the channel capacities of human perceptual systems and has nothing whatever to say about rate of processing. In fact, the speech rate puzzle was first remarked by Liberman et al. (1967), who also introduced the concept of "encoded" speech, contrasting a cipher, such as the alphabet, which substitutes a single symbol for each unit of the message, with a code in which message units are "restructured". Speech was said to be a code because its segments are merged into larger syllabic units by coarticulation, thus evading limits on the temporal resolving power of the ear. Later, Liberman (1970) drew a parallel between the interleaved patterns of speech and syntax, arguing for analogous specialized decoding devices for phonology and
syntax. Finally, Lenneberg (1967, Chapter 3) elaborated at length the possible homologies between syntax and motor control. L's failure to credit these ideas to their sources indicates, at the least, extraordinarily careless scholarship (not to mention incompetent reviewing by his publisher, Harvard University Press).

Consider, next, L's treatment of Chomsky's universal grammar (UG), which he has quite evidently not taken the trouble to understand (see particularly pp. 127-134). L charges that UG is "biologically implausible", because it admits of no genetic variation. Yet in a work that L cites, Chomsky (1986) states: "...UG is a species characteristic, common to all humans. We...abstract from possible variations among humans in the language faculty.... Apart from pathology (potentially an important area of inquiry) such variation as there may be is marginal..." (p.18). Here and elsewhere (e.g., Chomsky, 1982, pp. 24,25), Chomsky acknowledges variation but, following standard biological practice, proposes a general, species-specific characteristic.

In another misguided passage, L assures us that specialized brain modules (currently favored by many neuropsychologists: e.g., Gazzaniga, 1989) are incompatible with the "mosaic' principle of evolution (p.6). L mistakenly identifies the principle with the determination of the several parts of an organ (the knee socket is his example) by independent genes. If he were correct, we would have no complex, polygenically determined organs at all. In fact, mosaic evolution refers to the "...highly unequal rates of evolution of different structures and organ systems..." (Mayr, 1982, p.613), and is fully compatible with brain modules.

I have had space to illustrate only a few of L's numerous errors. Uniquely Human is a curious compendium of fact and fiction, representation and misrepresentation, understanding and misunderstanding—in short, uniquely Lieberman.

REFERENCES

FOOTNOTE