Book Review

> **Thomas G. Bever, John M. Carroll, and Lance A. Miller (Eds.),** *Talking Minds: The Study of Language in the Cognitive Sciences.* **Cambridge, MA: MIT Press, 1984.** 283 pages.
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Talking Minds is a collection of papers on language by leading figures in linguistics, psychology, and artificial intelligence. Since many people believe that the key questions in cognitive science are those about the use of language, the book is certain to be of interest in the cognitive science community. However, one factor may diminish its impact—although published in November 1984, the contributions are based on lectures presented at IBM's Thomas J. Watson Research Center in 1979/80. To be fair, the text has been revised considerably since that time, but most of the ideas discussed are already in the literature.

The book is, nevertheless, likely to prove useful, because several of the chapters provide summaries of books that the cognitive scientist may not have time to read in their entirety. Under this heading is Katz's chapter (summarizing *Language and Other Abstract Objects,* Totowa: Rowman and Littlefield, 1981), Jackendoff's (*Semantics and Cognition,* Cambridge, MA: MIT Press, 1983), and Osgood's (*Lectures on Language Performance,* New York: Springer Verlag, 1980). Premack's chapter is in a similar vein. It provides an overview of his recent research papers.

Readers of *Talking Minds* will be guided by their interests and by lacunae in their education to certain parts of the book. Inevitably, I too found some contributions more stimulating than others, as will be apparent from the ensuing discussion.

Katz's Platonist Theory of Grammar has its roots in an observation made against Chomsky in the 1960s. Chomsky argued that the rules of English grammar are "in the mind" of native speakers of English, and are used to understand and produce English sentences. However, just as mental arithmetic almost certainly does not depend on the psychological reality of number theory, language use may not require the mental embodiment of grammatical rules *as formulated by linguists.* Chomsky has argued that grammars are psychologically constrained to a greater extent than number theory because they have to explain facts about language acquisition. Katz's riposte is that there is no reason why they should.

Although Katz's arguments are sound up to this point, I cannot endorse the further conclusions he draws. In particular he fails to justify a Platonist theory, as opposed to a nominalist or conceptualist theory. The parallel that Katz draws between Chomsky's views on language and the conceptualist (or psychologist) philosophy of mathematics is a false one. Although intuition-

ists, for example, believe that mathematical objects are constructions of the human mind, they are *not* committed to the view that intuitionist number theory is psychologically real in the sense that it underlies our ability to do mental arithmetic.

Jackendoff provides a richer framework for semantic theories than has been customary in linguists. And he makes some interesting observations, particularly on tool use and the boundaries of the ego. However, in this extract at least, he fails to extricate himself from the Kantian predicament in which his distinction between the real world and the projected world places him. If all our experience is of the projected world, can talk of the real world even be coherent, let alone true?

Premack's chapter is refreshingly free of the dogma that often characterizes the chimp language debate. In it he outlines the differences and similarities between language-trained and non-language trained chimps, and he compares the performance of both groups of animals with that of young children. However, he confines himself to chimps trained using the "plastic token" language first taught to Sarah. Indeed, he discusses only his own work and that of his associates. Premack's tentative conclusion is that language training induces the ability to match one *relation* to another. The ability to match *objects* is well known from studies of animal learning, and requires no comment.

The two chapters in the section on Artificial Intelligence form point and counterpoint. Schank and Birnbaum provide an overview of the Schankian approach to language processing, which they now describe as one in which syntax and semantics work together, rather than one in which semantics guides syntactic analysis or eliminates the need for it altogether. The Schankian framework is important, if only because of the amount of work it has generated. However, it has not been without its critics, particularly among linguists, whose work Schank has explicitly rejected as a foundation for theories of language processing.

Marcus—a computer scientist who has embraced recent transformational theory in his work on parsing—makes a cogent and even-tempered contribution to this criticism. He points out that language understanding systems based on inadequate principles may handle many sentences satisfactorily, though they will inevitably fail on others. The ability to cope with a large number of inputs is not, in itself, sufficient to guarantee useful insights into language processing. Marcus goes on to show that Schankian analyzers, which rely on verb semantics together with some rudimentary syntactic information, will inevitably misanalyze some sentences which, although syntactically complex, are readily understood by people.

Because of the delay in its publication, *Talking Minds* does not describe the latest work on language and language processing. Nevertheless, it provides a useful and readable introduction to many topics of interest to cognitive scientists. It will be a welcome addition to many libraries, both public and private.