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## **Introduction**

### *Primatological Perspectives on Language*

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At the close of one long, productive day, those of us participating in the School of American Research advanced seminar on primatology and language origins, held in October 1996, accomplished what we hadn't done, or even aimed to do, all day. We reached a consensus. It has become impossible, we agreed, for anyone interested in the origins and evolution of language to keep up with the recent explosion of books and articles on the topic. New theories and reviews of evidence appear monthly in fields as diverse as linguistics, anthropology, philosophy, psychology, cognitive science, and neuroscience. If there is a drawback to working interdisciplinarily—indeed, in an area Gómez (1997) characterizes as having second-order interdisciplinarity because so many of its constituent fields are themselves interdisciplinary—it is the risk of information overload.

Yet the variety of approaches evident in this burst of publishing is not so great as one might expect. One or two perspectives dominate, whereas others are found only in an occasional article or book. Indeed, a driving force behind my proposal in 1994 to organize the seminar was

the recognition that a strong corpus of work is needed from within primatology and paleoanthropology—a perspective that is absolutely crucial to understanding language origins and evolution.

Currently in vogue is a view that emphasizes the uniqueness of human language in comparison with all other systems of communication in the animal world. Essential, qualitative differences are believed to set human language apart from other animal communication, and it is held that few or no meaningful precursors to human language inhere in animal communication. Although some theories allow a significant role for the social shaping of language skills during childhood, the most fashionable view is the innatist or nativist one, in which language is seen as an instinct—as an innate biological system with features that are unique to our species.

This idea can be traced back centuries, but in modern times the strong nativist perspective gained prominence with the work of Chomsky. As most readers of this book will know, Chomsky's (1965) view is that language is an innate, rule-based system existing in the brain of the developing child. Language unfolds according to a set of inborn rules, or a "universal grammar," derived from a genetic specialization in the human brain. The essential task is to study these rules. Chomskian theory is concerned primarily with syntax; it is not concerned with conceptual or pragmatic aspects of language comprehension and use (Tomasello 1995). Furthermore, in the Chomskian view, nothing meaningful can be gained by studying language from an evolutionary perspective.

Since the publication of Chomsky's initial theories, most linguists have been responding to him, whether positively or negatively, explicitly or implicitly: "Every modern linguist carries, involuntarily and sometimes unfairly, a vest-pocket vita summarizing his life's work as pro-Chomskian or anti-Chomskian" (Rymer 1993:28). And the Chomskian influence extends far beyond linguistics to other fields that study language acquisition and the evolution of language. When strict innatist views are challenged by those who see human linguistic uniqueness as stemming primarily from social interaction, the research issues still derive, very often, from a Chomskian framework (see Reed 1995). Even one of the most cited and discussed versions of how language evolved

in our ancestors—Pinker and Bloom’s theory of gradual evolution through natural selection in the hominid lineage (Pinker and Bloom 1990; Pinker 1994)—is a modification of Chomskian theory. Indeed, by arguing that language is a “specialized biological system” that evolved through natural selection, Pinker and Bloom (1990:726) have broadened the audience for innatists’ views by drawing in some of those who were uncomfortable with Chomsky’s complete dismissal of an evolutionary perspective (see King, chapter 2, this volume).

The popularity of assertions about the innateness of language is an intriguing phenomenon in its own right. Alternative frameworks suggest interpretations of how language develops that are quite different from Pinker and Bloom’s. Yet even the most compelling alternative approaches seem to garner less attention. These alternatives include cognitive and functional approaches that derive language universals from cognitive and social universals rather than from inborn grammatical rules (see Tomasello 1995; Wilcox, this volume), as well as developmental approaches that show modifiability of communication or language based on social parameters (see Snowdon, this volume).

A parallel example of the attraction of innatist thinking comes from the “grammar gene” controversy. This debate centers on the idea that human grammatical capacity is determined by a specific gene. When a report in a scientific publication described a genetic cause of aggrammatism in one family, academics, science writers, and even the public responded with extreme interest. When rebuttals were published, scant attention was paid (Elman et al. 1996:377–78). Why should this be the case? “There seems to be a deep-rooted desire to believe that humans are not only unique (every species is, after all) but that our uniqueness arises from a quantum leap in evolution” (Elman et al. 1996:378). Yet the data ably counter other nativist claims—for example, that grammar function is localized within the human brain or that critical periods for language acquisition are compatible only with a view of language as innate (see Elman et al. 1996 for accounts that challenge these claims).

A major flaw in many accounts of human uniqueness, whatever their emphasis, is their failure to incorporate information about non-human primates. If such data are used at all, the tendency is to focus on

a few examples—perhaps a few captive nonhuman primates or a few “famous” populations of free-ranging monkeys or apes (often the Gombe chimpanzees or the Amboseli vervets)—without any understanding of the breadth and complexity of nonhuman primate behavior (Wiener 1984:255–56; King, chapter 2, this volume). Anthropology, given its dependence on cross-cultural variation and the role of learning through social interaction, tends to be skeptical of strongly innatist scenarios but is itself far from immune to the neglect of data from nonhuman primates. Even where the four-field approach is practiced—integrating cultural anthropology, biological anthropology, archaeology, and linguistic anthropology—as it is in many colleges and universities in the United States, many anthropologists are reluctant to embrace a view that is cross-species as well as cross-cultural. And some anthropologists reject outright the worth of a focus on our evolutionary past. Consider what a former editor of *Current Anthropology*, the major international journal in anthropology, had to say:

Human beings today live very differently from even their ancestors of a thousand years ago. We should not then expect to learn very much about our present nature from a study of remote ancestors scratching a living some forty thousand years ago, let alone from the primates who were contemporary with *Australopithecus* some four to five million years ago. If ultimate origins are supposed to explain the essence of what we are, we might just as well go back to the first insects that spread over the world, or forward to the origins of capitalism. (Kuper 1994:100–101)

The assumptions expressed in this quotation are fascinating, starting with the idea that hominids whom we know to have been capable of complex social behavior can be described as scratching a living. Also significant is the thought that evolutionary analysis cannot explain our essence. Primatologists would reply—at least this one would—that we cannot understand our essence without looking at other species, particularly humans’ closest living relatives, the monkeys and apes (see Shephard 1996).

Many other anthropologists do accept the worth of the perspective that Kuper rejects, but they focus on nonbehavioral research issues or else study (or reconstruct) behavior but exclude monkeys and apes from their analyses. Biological anthropologists have tended to emphasize either fossil or artifactual analysis. Methods of choice involve reconstructing skulls and vocal tracts (e.g., Lieberman 1991), relating degree of encephalization to language (e.g., Tobias 1987), and evaluating whether behavioral products such as stone tools reflect linguistic skills (e.g., Gibson and Ingold 1993). When the emergence of language is considered, questions often focus on controversies concerning hominids alone, such as whether Neandertals had language.

Although these approaches from biological anthropology can yield valuable insights into the origins and evolution of language, they cannot address questions of central importance to the topic. What aspects of language or language use in hominids or humans evolved before the split between African apes and hominids? What does language have in common with the communication systems of nonhuman primates and even with their nonlinguistic behavior? How is language different? Surely only by approaching these questions with data from behavioral primatology can we even know the full range of questions to ask about language evolution. As Taylor (1996) has said, if it can be shown convincingly that the behavior of nonhuman primates indicates no “language gap” between monkeys and apes, on the one hand, and hominids and/or modern humans, on the other, then there is no need to create theories capable of explaining how “the language gap” was bridged.

To be sure, some language theorists do integrate the nonhuman primate behavioral data into their analyses. Some conclude that nonhuman primate behavior is significantly languagelike or shows language precursors, either in the wild (Boehm 1992; Savage-Rumbaugh et al. 1996; see King 1994a) or in captivity (Savage-Rumbaugh et al. 1993). Precursors can include simpler versions of so-called language properties such as syntax or displacement or wholly different behaviors that nonetheless contain some essential features of the property in question (and could thus have evolved over time into that property). Other language theorists maintain that despite some basic evolutionary commonalities, there is a fundamental discontinuity between non-

human primate communication and human language (Noble and Davidson 1996). Some theorists broaden the search for selection pressures to include those operating on nonhuman primates (Dunbar 1993, 1996). What is missing, however, is a comprehensive attempt to pull together the nonhuman primate data and discuss their implications for language origins and evolution. Such an endeavor is less likely to come from a single scholar or research team than from a tightly focused, cross-disciplinary group. The SAR advanced seminar provided a chance for just such a group to write about and discuss the relevant issues at length.

### **SOME QUESTIONS AND SOME ANSWERS**

During our advanced seminar we explored a host of issues, including these: Are there (or were there) linguistic and/or behavioral precursors to language in nonhuman primates, including the hominids? How can they best be sought? To what degree does primate vocal and gestural communication unfold in a flexible manner, according to experience and interaction, instead of unfolding according to prespecified, biologically determined structures or processes? How do events during ontogeny contribute to the development of language? What specific processes contributed to the emergence of language both ontogenetically and phylogenetically and to the subsequent evolution of language over time? How can the future study of nonhuman primate communication and cognition advance our understanding of language origins?

The chapters in this book reflect the significant headway we made during the seminar in answering these questions. In the next chapter, I lay groundwork for what is to come later in the book by analyzing some recent language-origins theories. I ask not only how language-origins theorists interpret the data from primatology but also why they need to arrive at such interpretations. Although the oft-used terms “continuity theory” and “discontinuity theory” are too simplistic, a continuum of theories can be identified by analyzing each theory in terms of the questions it asks (and does not ask), the definitions it uses (and rejects), the assumptions it makes (and does not make), and the evidence it reviews (and ignores). Sorting out such differences across theories should clear the ground for more productive dialogue across the

disciplines involved in the study of language origins and evolution.

Next come three chapters by primatologists who provide data on primate communication and insights into how these data can aid in understanding the origins of language. In chapter 3, Dario Maestriperi compares the gestural repertoires of three species of macaque monkeys in order to evaluate the hypothesis that sophisticated communication is most likely to develop in societies that are more egalitarian and individualistic than dominance-oriented. His data support the suggestion that when flexible individual strategies and coordination of behavior are at a premium, the size of the gestural repertoire will be greater. Maestriperi's research provides a window into the dynamic interaction between primate social life and the evolution of communication and into the broader question of evolutionary trends in primate communication.

In chapter 4, Charles Snowdon discusses his research with marmosets and tamarins, monkeys from the New World, and reviews evidence from a number of other primate species to demonstrate that vocal communication and language are socially constructed. Hard data point to continuity between nonhuman communication and human language and to the importance of social experience in the development and expression of primate vocalizations. Claims that critical periods tightly constrain development in primates and that vocal learning is absent in nonhuman primates—which, if correct, would render suspect the notion of an evolutionary continuum in language—are greatly weakened by Snowdon's data.

Through allegory and imagined dialogue between an animal-language researcher and a skeptic of claims from animal language work, Sue Savage-Rumbaugh shows in chapter 5 how primatologists must adopt a new starting point if they hope to fully understand nonhuman primate communication. Merely counting types of vocalizations produced and assigning function to calls depending on the events immediately following them will not give us insights into the rich communication of monkeys and apes. Currently, it is unacceptable in the scientific community to assume even that nonhuman primates actually mean to communicate, much less that they purposefully coordinate their complex behavior. Yet, Savage-Rumbaugh says, these are exactly the things we must assume before we can start to understand

primate communication. She elaborates on this point by discussing her research with enculturated apes.

The next trio of papers broadens the scope of the book to consider hominids. In chapter 6, Kathleen Gibson and Stephen Jessee review the comparative anatomy, brain structure, and behavior of humans and great apes in order to suggest that quantitative changes in the brain during evolution—not the appearance of unique organs in the brain—enabled humans to construct more hierarchically complex schema, both in language and in other behavioral arenas, than other animals can construct. They discuss evidence in support of their suggestions that by the time of *Homo erectus*, hominids were using language to coordinate action and that Neandertals and anatomically modern humans were cognitively indistinguishable.

In counterpoint to Gibson and Jessee, Iain Davidson argues in chapter 7 that Neandertals and modern humans were fundamentally distinct in their use of language. For Davidson, the essence of language is symbol production, which he sees as uniquely human. But there is a twist to Davidson's discussion of the discontinuity he sees between modern humans and all other creatures, for he emphasizes that language itself fosters this discontinuity. Humans can name events, objects, and people, and in doing so can change their perception of their world. Davidson, like Gibson and Jessee, analyzes changes in brains during human evolution, but he understands and discusses this evolutionary change in the context of human development. He emphasizes the uniquely human process of joint attention between caretaker and child in children's acquisition of language and also in language origins.

Data on children's behavior and possible patterns in primate ontogeny are discussed by Lorraine McCune in her developmental, comparativist account in chapter 8. McCune's previous research had demonstrated that one type of children's grunt vocalization—the final grunt to develop in a sequence of three—reliably predicted the child's first use of language referentially. The child's own experience of her grunt apparently facilitates recognition of the correspondence between sound and meaning in adult communication. McCune suggests that grunts may function similarly in other primates: monkey and ape grunts may help their producers establish a correspondence



between sound and meaning and may act as a bridge to use of the species-specific communicative repertoire.

Two concluding chapters ask about processes involved in language emergence. In chapter 9, Robbins Burling suggests a special role in the evolution of language for motivated signs. Motivated signs are those that are not arbitrary but instead depend on an individual's ability to recognize similarities between a sign and the thing it stands for. Burling points out some continuities between human and ape use of motivated signs, noting that apes alone among animals have demonstrated productive iconicity. Building on this fact, Burling constructs a stagelike model by which a species without language might evolve into a species with language.

In the final chapter, Sherman Wilcox sees even broader continuities across species and asks whether general cognitive abilities account for the emergence of language. He contrasts Cartesian approaches to language evolution, which emphasize grammar as structure, with cognitive-functional views, which see grammar as emerging from cognitive abilities. Building on the cognitive-functional view, which requires no special human abilities in order for language to emerge, Wilcox argues for a catalytic role for visible gesture as a raw material in the evolution of language through ritualization. Ritualization involves repetition, and so gestures can become, over time, indexical of the act they perform. Eventually they can become signs for, and then symbols of, the act itself.

This volume begins, then, with a general overview of language-origins theories and moves on to reports of empirical research on monkeys, apes, hominids, and humans. It concludes by considering how we can use these data to fashion more reliable and rigorous theories of language origins and evolution. The brief chapter summaries just concluded are meant to invite readers to delve into each author's rich treatment of language-origins issues. The authors themselves frequently cite each other's chapters, drawing the reader into a closely interconnected network of ideas. In the remainder of this chapter, I hope to provide a framework for those connections by discussing different views of what language is and how the primatological perspective can inform them.

## WHAT IS LANGUAGE, ANYWAY?

Rule-based grammatical systems, as I mentioned earlier, have assumed a monumental presence in modern linguistic theory, such that most theorists—including but not limited to the innatists—define language through syntax. It thus becomes significant to ask whether syntax has any precursors in nonhuman primates. Testing hypotheses along these lines is difficult at present, because we have so little knowledge about units of perception and communication in other species (Hauser 1996). Building up such knowledge, however, is a better alternative than equating syntax with word order, which is far too simplistic a reduction of a system that involves complexities such as phrases embedded within other phrases.

In aiming for a comparative investigation of syntactic capabilities, we might ask, Do other animals have precursors to syntax in their behavior, either vocal or nonvocal? Can a plausible account be offered for the incremental development of syntax? Several recent papers address the first question. Snowdon (this volume) and Wiener (1984) review attempts to identify precursors to syntax in the way units are structured in utterances of monkeys and apes, finding some plausible examples. Ujhelyi (1996), in asking whether there is any intermediate stage between animal communication and language, considers what she calls “naturally occurring syntax.” Based on a literature review, she concludes that certain types of nonhuman primate calls, such as the songs of gibbons, titi monkeys, tamarins, and indris, fit the criteria of a “minimal language.” She justifies this conclusion by noting that “it can be shown that a given call is built up from a limited number of elements, which form complex, acoustically different sound lines. . . . The call variants resulting from combination of available elements not only express the actual emotional states of an animal but [also] contain some representational meaning by signaling individual identity” (Ujhelyi 1996:73–74).

Ujhelyi sees language as composed of subsystems, some of which emerged earlier evolutionarily than others. She stresses that structural reorganization at the subsystem level can lead to the emergence of an entirely new system (see also Elman et al. 1996 for a discussion of this kind of nonlinear change), a perspective that allows human language to be

unique while also having evolutionary precursors (see also King 1994a).

Looking for syntax or its precursors outside of vocal behavior is also possible. When monkeys or apes show that they understand relationships across complex patterns of social behavior, we might infer, if arguably, that they are displaying cognitive precursors to some syntactic capability (King 1996). An example in which monkeys likely are understanding such relationships among patterns—not just relationships among objects—is when vervets, in forming alliances with unrelated conspecifics, choose as allies those monkeys who have groomed them at the highest rates in the past (Cheney and Seyfarth 1990). De Winter (1988:257; see also Peters 1972:37; Fischer 1988) goes even further, suggesting that syntactic rules of language “are derived from the syntactic rules which govern all flexible behavior.” This suggestion is made because flexible behavior can be broken down into parts and recombined to form “new functionally complete sequences, following strict rules of recombination,” thus producing a “striking” analogy to language (de Winter 1988:256).

Yet each of these analyses of syntax remains vulnerable to charges of reductionism—to being judged to significantly underestimate the complexity and generative nature of syntax. More robust analyses await more data. Meanwhile, a strong response to claims for the innateness of syntax comes from an evolutionary scenario put forth by Armstrong, Stokoe, and Wilcox (1995) in which syntax is derived incrementally in the hominid lineage. Edelman’s (1987) idea of neuronal group selection provides the mechanism for the process being described, in which gesture is seen as containing the seeds of syntax, and sorting words into categories is enhanced by the experience of gesturing (Wilcox, this volume). Growing attention to the topic of communicative gestures by apes, broadly defined to include movements of the body, limbs, and hands as well as facial expressions, shows that ape gesture may be an important raw material for natural selection in a way that nicely supports the “seeds of syntax” view as developed by Armstrong, Stokoe, and Wilcox (see Savage-Rumbaugh, Wilkerson, and Bakeman 1977; Goodall 1986; Tomasello, Gust, and Frost 1989; Tomasello et al. 1994; Tanner and Byrne 1996; King n.d.). The most detailed studies of ape gesture have been carried out on animals in captivity, although field

studies show that communicative gestures occur in wild populations as well (for a review see Tomasello and Camaioni 1997; King n.d.).

Many language theorists, of course, see language not just as a system of universal grammar but as a collection of various unique features or properties. Influenced by Hockett's (1960) analysis of 16 of the design features of language, primatologists have asked which of these language features are uniquely human and which are more widely distributed in animals. Only a few features appear to be unique to humans (Weiner 1984; Boehm 1992; McCune, this volume; Snowdon, this volume; but see Noble and Davidson 1996 for a different view). Even what looks like displacement, or at least a precursor to it, has been tentatively identified in the nonvocal behavior of wild bonobos, who flatten vegetation to indicate the direction of group travel across time and space (Savage-Rumbaugh et al. 1996).

Another common view is that language is representational—that is, words “stand for” or represent real things in the world. Language thus encodes or reflects something real and can transfer information or ideas from mind to mind. The units of language and the information they contain encode meaning. Alternatives do exist to these mentalistic ways of thinking about language, as when language is seen as interaction, with the meaning residing in the interaction. In this view, meaning is negotiated dynamically by participants in ongoing interactions. The linguist Halliday, for example, thought about language in ways quite opposed to Chomsky's:

Halliday's theory of language is part of an overall theory of social interaction, and from such a perspective it is obvious that a language must be seen as more than a set of sentences, as it is for Chomsky. Rather, language will be seen as a text, or discourse—the exchange of meanings in interpersonal contexts. The creativity of language is situated in this exchange. A Hallidayan grammar is therefore a grammar of meaningful choices rather than of formal rules. (Malmkjaer 1991:160)

When language is viewed as use and interaction, wholly different

methods for studying its origins and evolution emerge. In these methods, there is little value in parsing sentences or searching for the meaning in words and units. What is meaningful in language is not static in structure but constructed in use. If we accept that meaning is constructed socially and does not reside in an innate ruled-based system, then the most valuable places in which to look for linguistic precursors are social behavior, social interaction, and the comprehension and coordination of activities—perhaps in developmental contexts most critically of all. Particularly valuable will be data collected in naturalistic contexts where the responses of the subjects under study are not tightly constrained. In these contexts, the effects of social interaction on the acquisition of linguistic skills can be well understood, as they cannot be in studies where subjects' acquisition skills are examined in isolation.

Richman (1997:21–22) points out a potentially fruitful direction to take in studying the evolutionary roots of language from the perspective of interaction:

I'm going to suggest that human beings and some highly social primates both use in their social lives a wide variety of meaning-producing symbols that we could call presentational gestures. Presentational gestures are multi-media complexes of intentional movements of different parts of the body that develop over a course of time and which produce meanings and demand responses from others. . . .

Because presentational gestures are actions that develop over the course of time, because they enact life and emotions (not represent static substitutions), [and] because they demand participation by others, their meanings are public, out in the open, and interactive. So the story of meaning for them is not just one about how meaning is produced by individual actors, but also how it is reproduced by others in their responses.

Here we are back to an emphasis on gesture, but with the focus broadened to include not just apes but other nonhuman primates as well. Hamadryas baboons “vote” on the direction of group travel by

using specific facial expressions and orienting their bodies in a certain direction, near certain conspecifics (Kummer 1968). By doing so they affect what others will do, just as what others already did has affected their own bodily movement, in a way that likely involves Richman's presentational gestures. Not only behavioral outcomes but also meanings are negotiated as action unfolds.

What one might do in studying such interactional gestures is not to carry out spectrographic analyses of vocalizations or apply a trait-list approach to properties in vocal or gestural behavior or even use an initiator-response linear framework for studying communication. Rather, one might ask, How do subgroups coordinate their fission-fusion patterns on a daily basis (see Maestriperi, this volume)? How do individuals coordinate their movements during a hunt? How do caretakers and very young infants coordinate their behavior and communication right from birth (Parker 1985; Borchert and Zihlman 1990; King n.d.; McCune, this volume; see Trevarthen 1979)?

These questions might be thought about in a systems, or coordinated-action, perspective. Much better established in the human than in the nonhuman primate literature (e.g., Eckerman 1993; Hutchens 1995; Markova, Graumann, and Foppa 1995; but see Strum, Forster, and Hutchens 1997 for an example from primatology), this view considers behavior and cognition to be processes in which two or more participants coordinate their actions on a subtle level. The communication and meaning emerge from the system rather than flowing in a linear fashion from an initiator to a recipient. This can be most easily seen, perhaps, in mother-infant pairs, where the pair is the system, where eye and limb movements are coordinated right from birth, and where signals of mutual understanding are developed gradually from those movements, vocalizations, and facial expressions.

Of course a systems perspective does not preclude wanting to know whether vocalizations have syntax, displaced reference, or other structural properties. Yet the underlying assumptions of the various conceptions of language explored here differ enough that the questions of origins and continuity emphasized by each will differ also. Those who see meaning in interaction and not in the utterances themselves are less likely to do structural or design-feature analysis of the

utterances. Those who want to know whether strings of calls or gestures have design features may not pay close attention to the dynamics of negotiated meaning. Only when researchers begin to make explicit how they think about language will the reasons for the questions asked and not asked become clear in the language-origins literature (Taylor 1996; Savage-Rumbaugh, Shanker, and Taylor 1998; King, chapter 2, this volume).

### THE FUTURE OF LANGUAGE-ORIGINS RESEARCH

No matter what view of language is taken, the primatological perspective suggests that language has a long evolutionary history. Most of us in the seminar agreed with this statement. We found precursors to language properties and features as well as precursors to the construction and negotiation of meaning, and we saw commonalities across species in how ontogenetic patterns affect both comprehension and production. Still, it would be misleading to overestimate our agreement about continuities. Some participants saw vast differences between the productive and symbolic capacities of human language and the capacities of other primates' communication systems (Burling, this volume; Davidson, this volume). All of us, nonetheless, saw both continuities and discontinuities—a duality that forms the heart of Davidson's chapter.

Stemming from this basic split in opinion, perhaps, was another divergence in our viewpoints. We differed over an issue of critical importance to the future of studies relevant to language origins. That is, should we try to set out, as clearly as possible, what is unique about human language? Is it important to be precise about ways in which we see human language as different from all other animal communication, even if only as a first step toward searching for these very features of human language in other species? Or is this attempt misguided, likely to result only in "top down" analyses in which we seek syntax in some human form or referential communication in some human form, to the neglect of finding out what monkeys and apes really do? Would Savage-Rumbaugh and her colleagues (1996) have suggested that wild bonobos flatten vegetation to indicate the direction of group travel—and thus appear to have a form of displacement in their communica-

tion—if they had looked solely for mirror reflections of human linguistic skills? Does it even make sense to ask which species have language? Wouldn't it be better to look not at "language" as a package but instead at each type of linguistic skill—whether verbal, vocal, or nonvocal behavioral—on its own? Should we throw out the trait lists altogether and build understanding of the units of primate communication from the bottom up (see Kuczaj and Kirkpatrick 1993)?

We did agree that specific proposals about the uniqueness of human language will be most useful when they are grounded in reliable data on what primates can do and in a broad conception of language as both comprehensive and productive, both gestural and vocal. We were prodded toward this broad view by, in particular, Burling, Maestriperi, Wilcox, and Savage-Rumbaugh, each of whom urged us, in a different way, not to focus exclusively on vocal capacities. Through Burling's discussion of motivated signs, Maestriperi's of the relationship between gesture and social organization, and Wilcox's of the catalytic role of visible gesture, and through Savage-Rumbaugh's insistence that we recognize the theoretical and practical significance of comprehension in communication, we found a host of ways in which to explore both continuities and discontinuities outside the vocal realm.

Taken together, the chapters in this book make a powerful case against the fashionable position that language is an innate biological system unique to humans. That language is, in significant part, socially constructed emerges as a theme of the book. The importance of social interaction during development for an animal's communicational competence is highlighted again and again. In writing our chapters, we have used data from both children and nonhuman primates to demonstrate the role of social experience and learning in acquiring communication and language skills. In doing so, we do not aim to deny any role for innate processes or to polarize "innate" versus "learned" processes, which surely interact during language acquisition (and evolution) just as they do in the acquisition (and evolution) of other behavioral systems. We do aim to reject a view of language that is, in our opinion, too narrow in its dismissal of the role of social interaction and social construction. Our chapters further suggest that many aspects of language, under all but the most anthropocentric of definitions, likely



have a long evolutionary history. In the opinion of many of us, that history extends back beyond hominids to encompass our closest living relatives in the animal world.

Human language may have emerged gradually via general cognitive capacities (Ragir 1992; Gibson and Jessee, this volume; Wilcox, this volume). It may have emerged in a mosaic fashion, so that certain elements have a longer evolutionary history than others (Ujhelyi 1996). Alternatively, there may have been a system-level reintegration leading to the spontaneous emergence of language as a system from its component parts—a system that is more than the sum of its parts (see Elman et al. 1996). And with this alternative, we return to questions of naming, to concerns with what is language and what is not (see Davidson, this volume), and to a recognition that continuities and discontinuities can both occur in the same evolutionary process (Davidson, this volume; King, chapter 2, this volume).

We may never be able to determine which of these alternatives best characterizes what happened in evolutionary history, but we can give them prominence as frameworks to guide our thinking and analysis—prominence equal to that of the innatist framework that now commands so much attention. From a primatological perspective that begins with new questions in new frameworks, new answers are sure to emerge.