Introduction

Gestural communication in nonhuman and human primates

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Hitherto researchers of gestural communication in human and nonhuman primates have not engaged in an intense discourse. A comparative approach to this topic and an interdisciplinary exchange were the goals of a workshop on “Gestural communication in nonhuman and human primates” held at the Max Planck Institute for Evolutionary Anthropology in Leipzig, March 2004. The special issue of GESTURE carries this enterprise a step ahead by inviting the interdisciplinary audience of GESTURE to join in this stimulating exchange between researchers interested in different fields of gesture research, but also investigating different species. This multidisciplinary perspective offers promising insights into such fundamental questions as the evolution of language and will enhance our understanding of the phenomenon of gesture as such: by throwing light on the multiple facets of cognitive, affective, and social functions of gestures, on their forms of uses, on the varying structural properties of different kinds of gestures, and on cognitive processes such as intention and abstraction involved in the creation and use of gestural signs. Studying gestures in nonhuman and human primates appears therefore a highly interesting enterprise; not only because of their shared phylogenetic history but because of their close relation to language. We know in humans that gesture is the modality which may take over the burden of vocal language if needed for physiological or ritual reasons (as in sign languages of the deaf and in alternate sign languages cf. Kendon, 1988, 2004); put another way, gestures may develop into a full fledged language under certain conditions — taking this potential seriously may help to throw new light on the hypothesis that gesture might have been the modality where vocal language has evolved from.
It appears that a comparative approach would profit significantly from the clarification of some fundamental issues — and the following list offers a survey of the most urgent questions:

1. What are the major goals of studies concerning gestural communication in nonhuman and human primates, respectively?
2. To what extent are the gestural communication systems of nonhuman and human primates comparable?
3. Do studies of gestural communication in nonhuman and human primates help to clarify the scenario for the evolution of language?
4. What are the methodological steps with regard to data collection, analysis, and coding?
5. How can a gesture be defined and where does intentionality come into play?
6. What are the semiotic structures of gestures and how do they relate to cognitive processes?
7. What are the structural properties of gestures?
8. What are critical contexts of use and what are the functions of gestures?
9. What kinds of gestures must be distinguished?

These questions are supposed to fulfill several goals: they may be used as a background for comparative research in human and nonhuman primates in general but may also serve as frame and reference point for this issue of GESTURE. The workshop on “Gestural communication of nonhuman and human primates” covered a broad range of different strands in the study of gestures and this issue presents almost all of the papers in addition to some contributions which were written for this issue.

The issue begins with an article that provides a highly important frame for a comparative stance towards gestures in nonhuman and human primates. The article by Alice Roy and Michael Arbib offers new arguments for a neurobiologically grounded theory of gestural origins of human language. The authors further develop the mirror system hypothesis (Arbib, 2005a, b, c; Arbib & Rizzolatti, 1997; Rizzolatti & Arbib, 1998), i.e. which assumes that the mirror system — supporting production and perception of hand movements in humans and nonhumans — might have played a critical role in the evolution of language. Roy and Arbib’s article offers an introduction to the ‘syntactic motor system’ integrating the ‘motor theory of speech perception’ into the ‘mirror neuron system hypothesis’; they argue on the one hand that “the ‘syntax’ implemented in Broca’s area is a ‘motor syntax’ far more general than the syntax
of linguistics”. They suggest on the other hand that sentence structure owes much to the structure inherent to the achievement of communicative goals. Put another way, this article provides a highly pertinent theoretical frame for an evolutionary scenario including a gestural origins of human language and hence provides a theoretical background against which the articles assembled in this issue may be viewed.

The second part of the issue concerns gestural communication of nonhuman primates. It starts with an article by Simone Pika, Katja Liebal, Josep Call, and Michael Tomasello. In this article the authors provide an introduction to a project aiming at systematically investigating the gestural repertoire and use of gestures in apes (including gibbons); they focus especially on how the different ecological, social, and cognitive conditions in these species might influence the respective characteristics of the different gestural repertoires. Juan Carlos Gomez contribution gives an overview of the state of the art in research of begging behavior in captive monkeys and apes and discusses whether request gestures are simply conditioned responses or whether they serve as primitive referential signals based upon a causal understanding of the attentional contact and direction. The next two papers present empirical studies on monkeys and great apes. First, Dario Maestripieri describes the impact of the social organization on the frequency and contextual use of gestures in three macaque species each of them realizing a different social system. Second, Leavens and Hopkins report how food size and distance influence the communicative behavior of chimpanzees during interactions with humans including manual gestures, but also gazing and vocalizations. The last paper in this part is written by Valerie Chalcraft and Allen Gardner and concerns the use of sign language by chimpanzees. It shows that chimpanzees — as human signers — directionally modulate signs to indicate actor and instrument but also quantitatively modulate signs to indicate intensity.

The third part of the issue presents studies on gestural communication in humans. Several papers are concerned with gestures used by preverbal children. Ulf Liszkowski provides an overview of communicative and social-cognitive abilities of infants and relates these studies to recent findings on pointing in twelve-months old children. Different aspects of the relationship between gesture and language in early language acquisition are the topics of the following papers. Olga Capirici and colleagues (Annarita Contaldo, Cristina Caselli, and Virginia Volterra) investigated Italian children between 10 and 23 months of age; the obtained results suggest that meaningful actions turning into intentional gestures pave the way for spoken language. Elena Pizzuto and Micaela
Capobianco describe the use and interaction of both deictic and representational elements in Italian children's early gestural-vocal system. Finally Joanna Blake and colleagues (Grace Vitale, Patricia Osborne, and Esther Olshansky) report on a cross-cultural comparison of gestures in human infants during the transition to language (9–15 months); they found that pointing in object exchanges and agency gestures increased with age and language skill (receptive vocabulary) while at the same time reach-request and emotive gestures decreased.

The last section presents two papers which focus on gesture in relation to speech and language — including the relation of gesture to a signed language. Asli Özyürek and colleagues (Sotaro Kita, Shanley Allen, Reyhan Furman, and Amanda Brown) show that the linguistic framing of events influences co-speech gestures of adult Turkish and English speakers; they find that differences in linguistic structures (syntactic frames of motion events) were paralleled by differences in gestural representations. On the other hand, similarities in linguistic structures (omission of certain elements within the event) were related to similarities in the gestural forms that represented these events.

Finally, Susan Goldin-Meadow describes that gestures may take different forms depending on whether they are produced with speech (gestures as parts of language) or without speech (gestures as language) referring to speech-accompanying gestures on the one hand as opposed to the “home signs” of deaf children. Put another way Goldin-Meadow’s article documents the ‘linguistic potential’ of gestures which ‘sleeps’ when gesture is part of vocal language and which is activated when vocal language is not available.

The assembled articles document vividly the variety of aspects of gestural communication that have attracted the interest of researchers and more than that: they indicate that there is quite some ground to cover for further comparative studies of nonhuman and human forms of gestural communication. Cornelia Müller’s articles seeks to spell out this potential in a more systematic way; by taking up the framing questions of the workshop she describes why a comparative view might offer interesting insights both for researchers of nonhuman and human primates, how comparative studies may further contribute to the dispute over the evolution of language, and what are conceptual and methodological prerequisites for future comparative research. The article thus offers a condensed presentation of the purpose of this special issue: to indicate the current state of the art in the study of gestural communication in nonhuman and human primates and to stimulate further interdisciplinary and comparative studies of a wide variety of primate species including humans.
References


Arbib, Michael A. (2005c, in press). A sentence is to speech as what is to action? Cortex.


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