

Josep Call and Michael Tomasello, eds. (2007). *The gestural communication of apes and monkeys*. Mahwah, New Jersey, & London: Lawrence Erlbaum, pp. viii+256. Accompanied by a DVD.

Reviewed by Adam Kendon

If we are to understand human gesture within an evolutionary perspective and, especially, if we are interested in exploring its possible relevance to the issue of human language origins, it will be of great importance to have a good understanding of the communication practices, especially the gestural communication practices, found in species closely related to humans. Already, quite a lot is now known about the use of gestures among chimpanzees, but a comparative study of gestures in all of the species of ape now living would be of great value, and it will obviously be important to extend this to species of monkeys, as well. The book reviewed here, which includes studies of all the African apes and two Asian apes, as well as of one Old World monkey species, will be useful for anyone wishing to add a comparative perspective to the study of human gesture and language.

The book presents, in a compact and well organized manner, the results of several years of work by Michael Tomasello and Josep Call and their colleagues. This work has focused on the use by apes of intentional communicative bodily action, or 'gesture'. At first focused on chimpanzees, and begun at the Yerkes Primate Center Field Station in the United States, the work was then continued in Germany at the Max Planck Institute for Evolutionary Anthropology and the Wolfgang Köhler Primate Research Center, both in Leipzig. By now, after more than twenty years, systematic observations on gesture, following a common method, have been made on all of the African apes (chimpanzees, bonobos and gorillas), and two species of Asian apes (orangutang and the siamang, a member of the gibbon family). Chapters on each of these species are included in this book. Call and Tomasello discuss chimpanzees, Simone Pika in two chapters, discusses bonobos and gorillas, respectively. Katja Leibal writes a chapter on orangutangs and another on the siamang. This work has also begun to be extended to include an Old World monkey species and a chapter by Nana Hesler and Julia Fischer is included in which their observations on the Barbary macaque are presented.

Notwithstanding this chapter, the title of the book is a little misleading. It is mostly about apes and it is notable that, in the general discussions by Call and Tommasello, very little reference is made to monkey communication in general or to the chapter by Hesler and Fischer, in particular.

The book begins with a general introduction by Tomasello and Call which describes the methods employed and the theoretical issues explored. Tomasello and Call also collaborate on two final chapters the first of which, Chapter 8, is a comparative survey and summary of the work presented in the six chapters on individual species. The last chapter, Chapter 9 is a discussion of the implications of the work for theories of human language origins. Each chapter has a separate and highly useful bibliography.

Each of the six chapters presenting studies of gesture in these six species follows a very similar format. Each begins with a brief description of the species in question and with an assessment of its taxonomic status. This is followed by an account of its geographical distribution and ecology with a summary of the main features of its social organization. There is then a section summarizing what is known of the physical and social cognition of the species, and a survey of previous work on communication behaviour, both vocal and kinesic (fixed patterns of bodily expression as well as gesture). Then a specific study of gesture is presented. These studies were all done on colonies of animals in zoos or parks and each was done according to the same method. A repertoire of gestures was established as a result of a combination of free observation and focal animal sampling (individual animals are observed for a set period within each observation period, no matter what they are doing). Observations were also supplemented by more or less extensive video taping. Systematic focal animal sampling, coding gestures in terms of the repertoire established made possible various quantitative analyses.

In their introductory chapter, Tomasello and Call define the criteria that have been followed by the contributors to this volume by which the units of observation termed 'gestures' have been identified. The actions in question must be used by the animal in a flexible and strategic manner to pursue a goal; they must be communicative, in the sense that the animal directs them at other individuals, showing an expectation of response by the other; they are ritualized, in the sense that they are not acts of direct physical manipulation of the other; and they are gestural because they involve bodily motions or postures and not vocalizations. Stereotyped or 'fixed action patterns' such as facial expressions and piloerection are not deemed 'gestures' by these criteria and are not included in the observations.

In each study, a repertoire or list of gestures observed is provided. These are divided into *visible gestures*, *tactile gestures* and *auditory gestures*. Visible gestures might include — taking examples from the chimpanzee list in Chapter 2 — actions such as 'head bob' (move head rhythmically up and down), 'hand beg' (place hand under recipient's mouth) or 'wrist offer' (present the back of the hand, flexed at wrist, so that wrist is directed toward recipient). All of these gestures require the recipient to be looking in the direction of its producer if it is to be effective communicatively. Tactile gestures, such as 'arm on' (approach recipient with arm

extended and place arm on recipient's back), 'pull' (pull quickly and rapidly on a body part of the other), or 'direct hand' (place the recipient's hand on the subject's body) involve body contact and do not require the visual attention of the recipient. In fact they may sometimes be used as a way of attracting the recipient's visual attention. Auditory gestures ('audible gestures' would have been a better name) include 'belly slap' (hit the belly with one or two open hands), 'ground slap' (hit the ground or an object with open hands or sometimes feet), or 'hand clap' (strike open hand against another). These do not necessarily require the other's visual attention and sometimes they are used as a way of obtaining it.

An important general observation is that, in all species observed, visible gestures are not made unless the gesturer has the visual attention of the recipient and various strategies are described that are sometimes followed to ensure this attention. This can include the use of an auditory gesture or a tactile gesture, but the visual attention of the other can also be gained by the gesturer first moving into a new position in relation to the recipient, so that the gesturer is in front of the recipient where he can be seen. Setting up conditions so that the other is visually attentive and only performing visual gestures when the other is looking is referred to as 'audience effect' — it shows that the gesturer is attentive to whether or not he has an audience for his action. In all of the studies reported here careful attention was paid to 'audience effect' in this sense, and how an audience for an action was achieved. This 'audience effect' feature is a good indication that these animals intend their actions as being done for another, as a communicative action.

Each of the six chapters that reports a study of a particular species includes a list of the gestural repertoire observed for that species in the study in question, but a table describing the gestures (similarly organized) reported by other observers is also given, including, where available, reports from observations made in the wild. This is a valuable feature, and makes it possible to get a broader view of a species' repertoire than can be gained from a single study, even if prolonged, as these were.

In terms of the numbers of different gestures described, the totals ranged from over 30 for the gorilla to 20 in the siamang. If visible, tactile and auditory gestures are compared, it seems that the smallest repertoire is for auditory gestures (and these were not observed at all in the two highly arboreal asian apes — the orang and the siamang). Visible and tactile gestures are much more numerous, and tactile gestures comprise the larger part of the gestural repertoire observed for the orang and the siamang. These differences may be related to differences in environment and adaptation to arboreality. Gorillas and chimpanzees, for example, spend much time on the ground, as well as in trees, and this might account for their tendency to use visible gestures as well ground slapping and other kinds of auditory gestures, in comparison to the highly arboreal asian apes, who live in

dense forests, for whom visible gestures might be less useful. However the bonobo, which is much more arboreal than either the gorilla or the chimpanzee, also uses many visible gestures, so differences in habitat alone do not relate in any simple way to differences in kinds of gestures employed.

The contexts in which the gestures were observed to be used were classified in a very broad manner into categories that include 'play', 'walk', 'nurse', 'eat', 'groom', 'agonistic', and 'sexual'. The authors differ slightly among themselves in what context categories they use, however it is clear from their analyses that most gestures in all species were observed to be used in 'play' contexts, although there are some differences which seem to separate the Asian apes from the African apes. Among the Asian apes higher frequencies of gestures were observed in contexts labelled 'sex/grooming/affiliation' than was reported for the African apes. This no doubt reflects the fact that in the Asian apes a great deal of interaction involves close bodily contact.

Comparative studies of the contexts of use of gestures were undertaken in an attempt to examine how flexible these animals are in their use of them. As is clear from the analyses in all of the studies reported, a gesture regarded as the same was observed in use in many different contexts and, at the same time, within each context, a considerable variety of gestures were observed to be used. This does not seem very surprising, given the nature of the actions distinguished as gestures. Most appear to be abbreviated or truncated forms of manipulatory action of various kinds — such as 'reach', 'pull', various kinds of gentle poking or touching, and the like. They function at the level of moment to moment attempts by the gesturer to modify or adjust the ongoing flow of action of the recipient, rather than as set forms with standard uses. There are some gestures that do appear to function in this way — such as using a certain kind of arm action as an invitation to play or to sexual interaction — but most of them do not seem to operate in this manner. As Call and Tomasello put it (p. 209) "the use of gestures is in many ways analogous to the use of tools as a way to solve certain problems". In other words, the gestures described in these studies are not like signals with fixed meanings. They are, rather, largely understandable as statements of a plausible intention which can be, and often are, re-shaped in the course of the interaction as it develops over time through a process of 'co-regulation' between the participants (I draw here on a discussion by Tanner, 2004, p. 18).

In each of the studies reported in the book, analyses are undertaken to throw light on how the various gestures are acquired. They do not seem to be forms of action that are inherited (as facial displays appear to be). However, they might be acquired as a result of animals imitating each other's actions, or through a process of what Tomasello refers to as "ontogenetic ritualization" (see pp. 5–6). Ontogenetic ritualization is said to occur when an animal comes to perceive that an action he

performs originally for a non-communicative reason, but which draws a certain response from a conspecific, can be used again as a way of drawing that response. And, further, when a partner in an interaction provides a form of the response in anticipation of the other performing a certain action (this seems quite reminiscent of George Herbert Mead's (1934) account of the development of a "conversation of gestures" among dogs, for example)

No detailed account of this process is given in the present book. As an illustration, however, I will cite Plooij (1978), who provides a very good example of this process (she does not use the term, however) in her account of the derivation of the 'arm raise' gesture in the chimpanzees she observed. Among juveniles and adults it may be used as an invitation to play or to otherwise engage in friendly interaction. Plooij observed that, when a mother chimp is grooming her infant, she may pull the infant's arm up and back, so that she can groom beneath the infant's arm. Infants soon come to anticipate this and they raise their arm as the mother begins grooming, thus facilitating the mother's access to the infant's body. Later, the infant comes to use this lifting of the arm as it approaches the mother, and it now serves as an invitation or as a request to be groomed. Subsequently, the use of this action appears to become generalized as an invitation to grooming and, as an extension, as an invitation to friendly interaction, including play.

As Call and Tomasello say, if most of the gestures observed are acquired through a process of imitation, then we might expect that differences in gesture between groups of the same species would be greater than differences within groups. On the other hand, if gestures develop through a process of ontogenetic ritualization, we might expect that there would be as much variability within groups as between them. Analyses that have been reported (presented here only for apes), where this has been possible, show that within group variability in gesture repertoires is no different from variability between groups, suggesting that individual variability in gesture use is high and that group traditions in which gestures come to be shared in common do not develop. This would suggest that apes do not imitate one another's gestures and that such common uses as there are, develop through processes such as ontogenetic ritualization.

Data is also presented on age differences in gesture use in the ape species considered in the present set of studies. It was found that there are a number of gestures used only by the very young (in interacting with their mothers, for example) and by juveniles (in play) which disappear among older animals (who in any case tend to use gestures less) but are replaced by other gestures which are more adapted to adult interactions, such as agonistic and sexual encounters. As Call and Tomasello point out, the gestures observed in the very young could not have been acquired by imitation, since these gestures are not directed to the young by their mothers, but are used by infants in interacting with their mothers (rather

as we saw in the example from Plooij, quoted above). In addition, all the authors in this set of studies report many gestures that appear to be idiosyncratic inventions by particular animals. Presumably the ‘meaning’ of these invented gestures comes to be established through consistency of use by a given individual so that its partners in interaction come to recognize what it intends when it uses one of these gestures.

Call and Tomasello say that while imitative learning may play some role in the acquisition of gestures — there are some examples of gestures that are shared within a group and not found in other groups — they conclude that “the overwhelming weight of the evidence demonstrates fairly conclusively that the main way apes acquire their intentional gestures is through some form of social learning — presumably ontogenetic ritualization” (p. 208).

It will be clear, I hope, from the summary of the main findings reported in this book attempted here, that there is much of interest and value to be gained. Nevertheless there are one or two critical points that seem to me to be worth making.

Although, as we have seen, we learn quite a lot about certain aspects of gestural communication in the species studied, one comes away from this book with a curiously dry feeling. We are given no sense at all of what ape (or Barbary macaque) interactions are really like. The authors have all followed a method which has sought to distinguish in a categorical way actions referred to as ‘gestures’ but we are given no idea as to how these units function within the exchanges of action of which they must be a part. We have no idea, from the quantitative analyses provided, as to exactly how these gestures are incorporated within the ongoing flux of the of movements *between* the animals in question. *Interactions* between animals are not described at all. As a consequence, we gain no real insight into how the units distinguished as gestures work in the interaction process. The book is accompanied by a DVD on which a number of Quick Time video-clips are provided which are meant to illustrate the various units of action identified. Unfortunately (at least in my case) many of these clips could not be opened due to some error in the process by which they had been transferred to the DVD. However, of those that I was able to look at, it seemed clear that, for the most part, these video clips have been presented as specimens to show what the gestures look like, but, it seems (with a few exceptions), as far as possible they are presented as units of behaviour in isolation. There is little attempt to show how they occur in the ongoing interactions where they are observed.

Yet one can see at once, even from the clips I was able to open, that the units isolated as gestures are often fluid, somewhat ill defined forms of action that occur against a background of a continual flow of shifting postural, spatial and orientational changes. Within a given bout of interaction between two animals (and it is usually between two animals) there is a continual change in posture, spacing and

orientation. This is an inseparable part of the interaction process and it provides continual alterations in the contexts within which the actions isolated by the observer as a gesture occur. Without the kind of detailed micro-analysis of interaction that has (hitherto) been mainly applied in the analysis of human interactions, it will not be possible to go much further in understanding how the gestures and other aspects of behaviour in the interaction function in the communication process.

Joanne Tanner (2004) provides one recent example of an attempt to go in this direction in her study of gestural exchanges in a pair of zoo-living gorillas. She describes in some detail five short interactions (the video-tapes of these interactions are available with the electronic version of this publication). From these it is possible to see how the interactions evolve through a continual negotiation between the two animals. Their behaviour is 'co-regulated', as Tanner suggests (adopting a term from Alan Fogel). As she says "a particular kind of gesture will not always have the same outcome because of all the variables of context, prior activities and influences, and changes in group dynamics" (p. 18). Repertoire studies of the kind reported in this book are important, but to have a more complete understanding of the way in which these actions are constructed and how they operate within the developing interaction situation, descriptive studies of interactional sequences will be necessary.

A second limitation to the present set of studies, it seems to me, is that they deal *only* with gesture. Except in the chapter on the Barbary macaque, no observations are made on facial expressions or how they may be orchestrated with the actions of gesture. Further, there is no inclusion of observations on vocalizations. Limiting one's study to gesture is certainly a very practical thing to do, since it would indeed be very difficult to develop methods of observation that would take into consideration these other aspects as well. High quality video records would be necessary and, given the circumstances of observation, to make such recordings with synchronized sound recordings of sufficient quality to be able to examine any interrelations there might be between the uses of voice and face and visible bodily action would be a considerable technical challenge. Nevertheless, I hope that one day it will be possible to study ape (and monkey) interaction in a more 'multi modal' fashion than has been done here. Although apes seem to be remarkably silent much of the time, they do use their voices, and in close interactions they may make quiet grunts or other sounds which surely will have a place in the interaction — although we have little understanding of what this place may be, as yet. It might be very illuminating to have a more complete picture of how and when voice and gesture are used in conjunction with one another, if indeed they are.

Studies of vocalization in apes and monkeys are referred to and summarized in this book, but the main burden of this discussion is to emphasize that the use of

the voice is quite stereotyped, each species having its own range of vocalizations which, although in performance these may be modulated to some extent in tone and loudness, are nevertheless used only as expressions of alarm at the presence of danger, the finding of food, distress at being separated from the group, and the like. Call and Tomasello quote a statement by Jane Goodall (1986, p. 125) as a summary of the place of vocalization in chimpanzees. She writes “the production of a sound in the *absence* of the appropriate emotional state seems to be an almost impossible task for a chimpanzee”. From what they report of other studies from many different species they seem to be quite clear in their view that “vocalizations are used for evolutionarily urgent functions, such as signalling danger...” and because of this, they suggest, “vocalizations are typically hard-wired and used with very little flexibility, broadcast loudly to much of the social group at once — who are then infected with the emotion” (p. 222).

This relatively inflexible character of vocalizations stands in marked contrast to gestures. As all the studies in this book show, these are highly variable in form, sometimes even being idiosyncratic, and used with great flexibility in a variety of communication circumstances. In the final chapter in the book, in which Tomasello and Call discuss the implications of these studies for theories of human language origins, much emphasis is placed upon this contrast. They suggest (p. 222), rather quaintly, that because gestures are used mostly “for less urgent and emotionally charged functions” than vocalizations “Mother nature can relax her grip” and gestures can be “learned in social interaction with others and used very flexibly in different communicative circumstances — more in the manner of human linguistic symbols.” This is one of the reasons why they think that language first developed in the gestural modality and not vocally.

Another reason they give in support of a “gesture first” theory of language origins is that gestural communication requires mutual visual attention, whereas vocal communication does not. As already mentioned above, all of the studies reported in this book show that apes, especially, are highly sensitive to each other’s visual attention and, in using visible gestures, make sure that these are used when their interactional partner can see them. This means that in communicative exchanges involving the use of visible gestures the participants will establish reciprocal visual attention to one another. This, they suggest, could provide the foundations for one of the important features of communication in spoken interaction which takes place within the framework of a shared understanding of the situation.

This is an interesting suggestion. In human conversations participants typically enter into shared spatial orientational ‘formations’ with one another, often organizing themselves so that they hold an attentional space in common (Kendon, 1990a, 1990b, 1992). By cooperating to maintain, over extended periods of time, such a common attentional space they can, through postural positioning and co-

ordinated visual orientations, create a shared attentional 'frame' within which acts of utterance, spoken and gestural, come to have a commonly understood relevance to a shared approach to whatever aim in common may be at hand (Goffman, 1961, 1963, 1974). If gestural communication requires shared visual attention, as it is clear that it does, and if apes cooperate together to establish such shared visual attention when communicating gesturally, as it seems that they do, then, as Tomasello and Call suggest, it may well have been as a consequence of using gestures that the shared attentional frameworks fundamental to the establishment of linguistic symbols first began to be developed.

Tomasello and Call nowhere suggest, however, that apes use gestures symbolically, in the sense that we might say this to be true of human gestures (or words). In fact they do not discuss anywhere the semiotic status of the ape gestures that are described. As I suggested above, as far as one can tell from the descriptions given (and drawing, also, from the kind of interactional analyses undertaken by Tanner) ape gestures begin as instrumental acts of some kind — a reach, a pull, a postural adjustment in the service of some practical action in respect to another individual — which then, through a process such as ontogenetic ritualization, come to be abbreviated into 'intention movements' and serve, thus, as signals to the other of a next intention to which, then, the other can adapt, the other himself also using abbreviated 'intention movements.' In this way a 'conversation of gestures' can be established. Whether we can see the origins of symbolic action in this is not discussed, however. Yet it seems that, in Tanner's study, she found examples in which, for instance, one gorilla, by extending his arm and pounding on a rock nearby, appeared to be taken by the other gorilla to be *indicating* a location to which he wanted his partner to move. This is suggested by the fact that the partner moved to that location, immediately after which the interaction continued in a way that seemed predicated by the new position that the first partner had indicated. Tanner also describes movements, partly tactile, which seem to be abbreviated attempts by the gesturer to manoeuvre his partner into a new orientation. They work communicatively, however, because the partner responds by an appropriate change in orientation, not as a consequence of being physically manoeuvred but by apparently interpreting the gesture of the other as an indication of a change he wants. To the extent that gestures work in this way, we begin to see a kind of distancing between the form of the action and how it is responded to, which would be a first step toward a symbolic use.

Plooi (1978), whose work I referred to above, likewise has described how the arm-raise, which she sees as deriving originally from an infant's anticipation of a mother's intention to groom, becomes a way in which grooming can be requested and then a way in which affiliative or sexual interaction can be requested. She describes a further transformation in the use of this gesture in an incident in which

the arm-raise appeared to be used as a gesture of reassurance by an older male to a juvenile. As he approached he raised his arm as if to show that his approach was friendly, not dangerous. These kinds of transformations of gestural use and function could suggest how steps toward symbolic use could have occurred. It is to be noted, however, that this kind of further understanding of the communicative significance of ape gestures requires the detailed study of specific interactional sequences, something which, as we have remarked, is not included in the present book.

As Tomasello and Call remark, on the last page of their last chapter, if we are to entertain a gestural theory of language origins we “must also tell some story about how and why humans eventually settled on the vocal modality for language” (p. 235). They decline to offer any “story” along these lines, perhaps because, to do so, would have taken them too far away from the main themes treated in their book. Certainly, this review is not the place, either, to offer any such story. However it does seem worthwhile to point out that the actions of the jaws, lips and tongue by which *speech* is articulated are under different systems of neurological control than are the actions involved in the kinds of stereotypic and inflexible vocalizations that Tomasello and Call have contrasted so sharply with gesture (see Ploog, 2003, for example). There is a sense in which *speech* is only incidentally vocal. Long ago Sir Richard Paget (1930), a pioneer in the study of acoustic phonetics and a proponent of the ‘tongue gesture’ theory of the origins of speech, observed, “...in our appreciation of [speech] we appear to be interested in the sounds...as they give evidence of the positions and gestures of the organs of articulation which produced them” (p. 126). Here he anticipates the motor theory of speech perception, developed so much later by Liberman and others (Galantucci et al., 2006 provide a useful critical review). In other words, it is the *movements* of the oral ‘organs of speech’ that it is crucial for us to understand, sound being only a means to provide clues to these movements. If we assume this view, then it will be seen that we can think of the oral actions of speech as a kind of ‘gesture’ (cf. Armstrong, Stokoe, & Wilcox 1995 and Armstrong & Wilcox, 2007). Thinking of them in this way might help us to see how the gulf between the visible manual action of communicative gesture and the audibly evidenced actions of the mouth found in speech, could be bridged.

In this connection it is interesting to note that there is a good deal of evidence that the appreciation and perception of speech is not exclusively a matter of hearing. In face-to-face interaction participants also make a great deal of use of the *visible features* of the activity of speech in understanding what is being said. I have already mentioned the tendency for conversational partners to arrange themselves spatially so that they have easy visual access to one another. This, as Tomasello and Call describe, is crucial for effective gestural communication. But *speakers qua speakers* also look at one another, and the visual information about the actions of speaking that they gain in this manner is often of great use in comprehension. For

what is ultimately at issue in speech comprehension, if Paget and the proponents of the motor theory of speech perception are to be believed, is understanding the actions that the mouth makes as it articulates the different components of speech. We are misled if we think of speech as vocal in the first place. It is, rather, a complex of voluntary actions, performed to produce units within a system of expression, and thus can be compared to gesture as this is understood in this volume. Looked at in this way, perhaps the gestural communication of apes as described in this book is even closer to human linguistic action than Tomasello and Call themselves propose.

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