The case of referential gestural signaling

Where next?

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Referential acts play a crucial part in our everyday communication since human language is, in its essence, a referential system. Reference can be made via icons, indices and signs but also via ostensive/inferential communication, in which the behavior of the actor directs the attention of the recipient to particular aspects of the environment. The earliest uses of ostensive/inferential gestural communication can be observed in human children around the age of nine to 12 months. However, what about comparable gestures in our closest living relatives, the nonhuman primates or other animal taxa? The present paper aims to provide a brief overview of the state of the art to encourage future research into the evolutionary origins and uses of referential gestural signaling.

Human language is, in its essence, a referential system, which involves cooperation of three subjects: a sign, its referent, and its interpretant. Signs vary in the way they relate to their referents involves cooperation of three subjects: a sign, its referent, and its interpretant. Signs vary in the way they relate to their referents in which the behavior of the actor directs the attention of the recipient to particular aspects of the environment. The earliest uses of ostensive/inferential gestural communication can be observed in human children around the age of nine to 12 months. However, what about comparable gestures in our closest living relatives, the nonhuman primates or other animal taxa? The present paper aims to provide a brief overview of the state of the art to encourage future research into the evolutionary origins and uses of referential gestural signaling.

An additional interesting property of ostensive/inferential communication is that it can occur even without the signaler having the intention to communicate (the recipient can discover the raven in the tree by simply following the signaler’s gaze). However, it is frequently identified with “intentional communication” to underscore the fact that it is especially powerful when subject to the intentional control of signalers. Intentional communication or illocutionary behavior are behaviors, “in which the sender is aware a priori of the effect that a signal will have on his listener, and he persists in that behaviour until the effect is obtained or failure is clearly indicated.”

Interestingly, the onset of intentional ostensive/inferential behavior can be observed in pre-linguistic human children around the age of nine to 12 months. Human children start to use gestures such as giving (for example, food objects), offering, pointing and showing, to coordinate attention toward a social partner and an object of mutual interest. These gestures create a referential triangle between signaler, recipient and a third entity and are used either to make requests (imperatives, for example, ‘take this’) or as a means to obtain ‘attention’ in the form of “laughter, comment, smiles and eye contact” (declaratives, for example, ‘look at this’).

Since the use of intentionally produced referential gestures (hereafter referential gestures) has been viewed as the foundation to engage in symbolically mediated conversations, a considerable amount of research attention has been focusing on referential gestural abilities of other animals, especially our closest living relatives, the nonhuman primates. Surprisingly however, observations of referential gestures in nonhuman primates are relatively rare and mainly concern “language trained” great apes and/or occur in interactions between apes and their human caretakers.

The most compelling evidence of referential gestures in natural environments so far stems from adult chimpanzees (Pan troglodytes) males at the Ngogo community, Kibale National Park, Uganda, who use so-called directed scratches, to indicate distinct spots on their bodies to be groomed. Recipients of these gestures understand the conveyed message and respond to it in appropriate ways by grooming the indicated spot after a directed scratch (Fig. 1).

These gesture types are of special importance, because they represent, due to their two-tiered intentional structure (combining social intention to get something done and the ‘referential’ intention to draw the attention of the recipient to some
To investigate these two hypotheses, we therefore instigated a study on natural referential gestural skills of ravens (*Corvus corax*), which (i) live similarly to chimpanzees in a highly complex social system, and (ii) engage in complex behaviors (e.g., preening, see Figure 2) to initiate and/or strengthen social bonds.

Natural communicative interactions of individually marked members of a wild raven community were filmed in Grünau, Northern Alps, Austria during three field seasons outside the courtship and breeding season. We observed that ravens performed two distinct referential signals, showing (see Figure 3) and offering of non-edible items to recipients, which led to

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**Figure 1.** Use of the gesture directed scratch and response to the gesture. ©MPIO/Claßen.
degree of behavioral plasticity. Interestingly, Gwinner also noted that the degree of gestural flexibility might significantly differ between ravens and other corvid species such as rooks (*Corvus frugilegus*) and magpies (*Pica pica*).

However, since the gestural domain and its underlying cognitive complexity and plasticity has so far been widely neglected in communicative studies of birds and other non-primate vertebrates, the absence of referential signaling and gestural flexibility in other species (but see refs. 30–31) might merely reflect a paucity of data, rather than a lack of gestural abilities on behalf of the animals. Future research is needed to understand in much more detail how referential gestural signaling systems have evolved and which key traits shaped their development, variation, distribution and their underlying cognitive complexity.

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