



Commentary: The use of referential gestures in ravens (*Corvus corax*) in the wild

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A commentary on

The use of referential gestures in ravens (*Corvus corax*) in the wild

By Pika, S., and Bugnyar, T. (2011) *Nat. Commun.* 2, 560. doi:10.1038/ncomms1567

This comment fits within the fundamental ethological framework that says that, in an evolutionary context, we have to look for the most parsimonious (according to Morgan's Cannon and Ockham's Razor) materialistic explanations for behavior (see Van Rooijen, 1983a,b, 1987; Kennedy, 1992). Pika and Bugnyar (2011) stated that virtually nothing is known about gestures used to attract attention toward a social partner and an object of mutual interest in non-primate species. Van Rooijen (2009) has mentioned that such behaviors are already described in several species, e.g., wolves (Mech, 1970), dogs (Hare and Tomasello, 1999; Morris, 2002), poultry (Kruijt, 1964), sticklebacks (Tinbergen, 1951) and bees (Von Frisch, 1954). Such gestures (in an anthropomorphical interpretation) are investigated in chimpanzees (Leavens et al., 2004; Pika and Mitani, 2006) and, later, in several fish species (Vail et al., 2013).

Pika and Bugnyar (2011) reported in ravens (*Corvus corax*) examples of showing and/or offering of non-edible items (moss, small stones, twigs) to recipients, leading to frequent orientation of receivers to the object and the signallers and subsequent affiliative interactions. They call this "referential" gestures. This description on itself is not anthropomorphical. These authors claim that there exists only one other study suggesting referential gestures abilities in birds (Kaplan, 2004, cited by Pika and Bugnyar, 2011). However, showing and/or offering of non-edible items to recipients, leading to frequent orientation of receivers to the object and the signallers and subsequent affiliative interactions is, on basis of systematic observations at hundreds of birds, described by Kruijt (1964, p. 8, 117, 118) in the Burmese red jungle fowl (*Gallus gallus spadicus*). It is a very variable courtship behavior called tidbitting.

This behavior consists of ground pecking directed to edible or inedible objects and/or ground scratching, accompanied with high rhythmically repeated calls. The male may peck at an object without actually taking it in the bill, he may take an object in the bill and swallow it or perform bill beating, or he may raise his head and drop the object or he may hold the object and bow up and down. The male may also make head shaking movements. When food is available the male mainly points at food items, however, in their absence other objects (straws, small stones) are used. Tidbitting attracts females strongly (Kruijt, 1964, p. 159). It is especially elicited in a resident male when an unknown hen is introduced in his pen. Tidbitting may be performed near the partner or at a distance of several meters while the tidbitting bird often faces the partner (Kruijt, 1964, p. 119). Bouts of tidbitting are often interspersed with locomotion toward, away from, or around the partner. Probably the direction is partly dictated by the position of the partner and partly by that of the objects. The tidbitting male frequently looks at the partner (Kruijt, 1964, p. 132). The tidbit

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calls probably function to establish and maintain the sexual bond between a male and his female(s) (Kruijt, 1964, p. 129). This tidbitting is a “referential” behavior following the limited description given by Pika and Bugnyar (2011).

Pika and Bugnyar (2011) stated that the corvid family is renowned for exceeding the majority of other avian species, with the exception of some parrots, rivaling even primates in many physical and social cognitive domains. Like humans, corvids rely heavily on cooperation between pairs. The motives to form and maintain affiliate relationships could have been crucial in boosting not only their cognitive but also their vocal and non-vocal communicative abilities. However, the Burmese red jungle fowl uses “referential” gestures and has a harem structure. This may suggest that such gestures are also present in other avian species.

Apparently the presence of real food is not necessary during tidbitting in order to have a positive effect on the male/female bond. It is concluded that the behavior is than ritualized food sharing. The behavior of ravens described by Pika and Bugnyar (2011) is probably also ritualized food sharing. In one interaction a raven, after offering a piece of moss to a recipient, even tried subsequently to put it in the beak of the recipient. This could be seen as an indication of the original motivation. Nevertheless, these authors rejected this possibility. One reason was that the behavior was clearly communicative. However, food sharing may also have a communicative function. Another reason was that this showing and offering in ravens did not always end in attempts to allofeed nor did they observe other characteristic behaviors

such as twitching of the wings and feeding vocalizations, which have been described to accompany allofeeding. However, because the (main) function of this showing and offering is to form or strengthen a bond and not to share food this behavior has become ritualized and the elements that belong to allofeeding have become absent. An example of the disappearance of elements can be found in the courtship display of some duck species (as the Mandarin duck, *Aix galericulata*). These displays are ritualized wing preening. In these displays the movement itself has changed: the wing is no longer touched. Such species often developed conspicuous feathers at which the males only point in this display (Tinbergen, 1951). Referential behaviors in ravens seem not fundamentally different from other ritualized courtship behaviors as tidbitting in jungle fowl or pointing at the wing feather in Mandarin ducks.

Pika and Bugnyar (2011) compare the referential gestures of ravens with those of human infants. This comparison may suggest anthropomorphic assumptions about the ravens mind (e.g., intentionally produced, understood by the receiver). Although one may defend that it is more parsimonious to assume an evolutionary continuity in the presence of feelings between man and the other animals, as we do with the body, than to assume an unexplainable gap between man and other animals in feelings but not in the body (Van Rooijen, 1991) an explanation only based on phylogeny and natural selection seems more according to Morgan’s Cannon than an explanation based on an intentional production and an understanding by the receiver.

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