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Cognitive Development



Understanding communicative intentions and semiotic vehicles by children and chimpanzees



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ABSTRACT

Developmental and comparative studies of the ability to understand communicative intentions using object-choice tasks raise questions concerning the semiotic properties of the communicative signals, and the roles of rearing histories, language and familiarity. We adapted a study by Tomasello, Call, and Gluckman (1997), in which a “helper” indicated the location of a hidden reward to children of three ages (18, 24, and 30 months) and to four chimpanzees, by means of one of four cues: Pointing, Marker, Picture and Replica. For the chimpanzees, we controlled for familiarity by using two helpers, one unfamiliar and one highly familiar. Even 18-months performed well on Pointing and Marker, while only the oldest group clearly succeeded with Picture and Replica. Performance did not correlate with scores for the *Swedish Early Communicative Development Inventory* (SECDI). While there were no positive results for the chimpanzees on the group level, and no effect of familiarity, two chimpanzees succeeded on Pointing and Marker. Results support proposals of a species difference in understanding communicative intentions, but also highlight the need to distinguish these from the complexity of semiotic vehicles and to consider both factors.

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1. Introduction

When do children begin to understand communicative intentions? To what extent are other species capable of doing so? How do different means of communicating such as gaze, pointing gestures, replicas, or pictures, affect understanding? Tomasello, Call, and Gluckman (1997) used an object-choice task to address these questions. Subsequent studies have applied this method to address both developmental (Aureli, Perucchini, & Genco, 2009; Behne, Carpenter, & Tomasello, 2005; Behne, Liszkowski, Carpenter, & Tomasello, 2012) and comparative questions (Call & Tomasello, 2005; Hare & Tomasello, 2004; Hermann, Melis, & Tomasello, 2006; Leekam, Solomon, & Teoh, 2010), without reaching definitive conclusions. This may be because the two questions have not been differentiated from a third, that of semiotic vehicles.

We address all three questions theoretically and empirically by adapting Tomasello et al.'s (1997) study in which a reward was hidden in one of three boxes differing in shape and color. A second researcher communicated the reward location by (a) *pointing* to the correct box, (b) placing a wooden block *marker* on top of it, or (c) holding up a *replica* of the box. Thirty-month-old children found the reward in all cases. In contrast, apes (six chimpanzees and three orangutans) performed above chance only in the marker condition previously trained on. Tomasello (1999a) interpreted this as showing that “the apes were not able to understand that the human beings had intentions toward their own attentional states” (p. 102). Initially, this interpretation was thought to support the claim that apes do not understand intentions in general: “. . . the understanding of conspecifics as intentional beings like the self is a uniquely human cognitive competency” (p. 56). This conclusion, however, was shown to be problematic since a number of studies demonstrated that (at least) chimpanzees do understand others' intentions. Specifically, chimpanzees pursue contested food only if a (dominant) conspecific competitor cannot see it (Hare, Call, Agnetta, & Tomasello, 2000; Hare, Call, & Tomasello, 2001); they conceal their approach when competing against a human experimenter (Hare, Call, & Tomasello, 2006; Melis, Call, & Tomasello, 2006); they discriminate unwillingness from inability to deliver food (Call, Hare, Carpenter, & Tomasello, 2004); and they distinguish states of knowledge from states of ignorance (though not false beliefs) in a competitive game (Kaminski, Call, & Tomasello, 2008).

These capabilities were observed in competitive contexts, i.e. when the chimpanzees were motivated to consider the perspectives, goals and knowledge states of another (conspecific or human) individual, so as to maximize their own profits. Furthermore, even the brief description above makes it clear that it is specifically communicative intentions that are required for task success, a possibility Tomasello (1999b) admitted: “. . . in the current context I will simply maintain that non-human primates, whatever they may or may not understand about the simple intentions of others, clearly do not understand the communicative intentions of others” (p. 72). But what exactly are communicative intentions? The notion stems from Grice (1957), according to whom, to mean something by uttering/performing *x* is approximately equivalent to (a) intending to produce some effect on another individual and (b) intending this individual to recognize (a). Theorists who have employed the notion (Csibra, 2010; Moore, submitted for publication; Sperber & Wilson, 1995; Strawson, 1964; Zlatev, 2008a) differ in their interpretations, but there is general agreement that communicative intentions imply at least a second-order intention (b) to recognize the primary intention (a).

Tomasello, Carpenter, Call, Behne, and Moll (2005) and Tomasello (2008) offered this explanation of what distinguishes human from ape (social) cognition: (a) a motivation to share (information) and (b) the cognitive capacity for shared intentionality, i.e., engaging in and understanding joint intentions, both simple and communicative. Zlatev, Persson, and Gärdenfors (2005) and Zlatev (2008a) complemented this explanation by noting first that apes have restricted imitation capacity, in particular of bodily actions (Call, 2001; Custance, Whiten, & Bard, 1995; Hribar, Sonesson, & Call, in press; Myowa-Yamakoshi & Matsuzawa, 2000; although see Carrasco, Posada, & Colell, 2009). Second, imitation has been closely linked to empathy, both theoretically and empirically (Hurely & Chater, 2005; Tomasello & Carpenter, 2005), ever since the classical proposal of Lipps (1903). Third, imitation and empathy have been argued to serve as springboards for intentional communication in both child development (Piaget, 1962), and hominid evolution (Donald, 1991). Thus, an adaptation for bodily mimesis, implying improved volitional control of the body, could possibly explain why human beings are particularly skillful (compared to non-human primates) in all three domains – imitation, empathy

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