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Shared intentionality

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Abstract

We argue for the importance of processes of shared intentionality in children's early cognitive development. We look briefly at four important social-cognitive skills and how they are transformed by shared intentionality. In each case, we look first at a kind of individualistic version of the skill – as exemplified most clearly in the behavior of chimpanzees – and then at a version based on shared intentionality – as exemplified most clearly in the behavior of human 1- and 2-year-olds. We thus see the following transformations: gaze following into joint attention, social manipulation into cooperative communication, group activity into collaboration, and social learning into instructed learning. We conclude by highlighting the role that shared intentionality may play in integrating more biologically based and more culturally based theories of human development.

Introduction

Human cognition seems very different. Unlike other animal species, human beings use language, make mathematical calculations, create social institutions, build skyscrapers, use maps, marry one another, form governments, play symphonies, use money, and on and on.

For some years now we have been trying to figure out what enables humans, but not our nearest primate relatives, to do these things. After a few false starts, we have zeroed in on a suite of social-cognitive and social-motivational skills that may be collectively termed shared intentionality. Shared intentionality, sometimes called 'we' intentionality, refers to collaborative interactions in which participants share psychological states with one another (Gilbert, 1989; Searle, 1995; Tuomela, 1995). For example, in problem-solving activities participants may have a shared goal and shared action plans for pursuing that goal, and in communication they may simply share experience with one another linguistically. The big Vygotskian idea is that what makes human cognition different is not more individual brainpower, but rather the ability of humans to learn through other persons and their artifacts, and to collaborate with others in collective activities (Tomasello, 1999; Tomasello, Carpenter, Call, Behne & Moll, 2005a; Tomasello, Kruger & Ratner, 1993).

In what follows we look briefly at four important sets of social-cognitive skills and how they are transformed by shared intentionality. In each case, we look first at a kind of individualistic version of the skill – as exemplified most clearly in the behavior of chimpanzees – and then at a version based on shared intentionality – as exemplified most readily in the behavior of human 1- and 2-year-olds. We conclude by highlighting the role that shared intentionality may play in integrating more biologically based and more culturally based theories of human development.

Gaze following and joint attention

Chimpanzees know what others see. They follow the gaze of others to external locations, they check back with the other if they do not see anything interesting, they quit looking if they see nothing interesting repeatedly, they pursue contested food only if a dominant cannot see it, and they visually conceal their approach to contested food if there is a dominant competitor nearby (see Tomasello & Call, 2006, for a review).

Human infants and young children know what others see as well, but they also go beyond this. From before the first birthday, human infants do not just follow the gaze of others to external targets, and do not just want to know what the other sees, they also attempt to share attention with others (Bakeman & Adamson, 1984). Importantly, joint attention is not just two people experiencing the same thing at the same time, but rather it is two people experiencing the same thing at the same time *and knowing together that they are doing this* (Tomasello, 1995). This is truly intersubjective sharing, and it is critical because it creates a shared space of common psychological ground that enables everything from

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collaborative activities with shared goals to human-style cooperative communication, as we will detail below.

In a recent longitudinal study, we assessed three human-raised juvenile chimpanzees on a whole suite of social-cognitive skills (Tomasello & Carpenter, 2005; see also Tomonaga, Myowa-Yamakoshi, Mizuno, Yamaguchi, Kosugi, Bard, Tanaka & Matsuzawa, 2004). We found that chimpanzees were very similar to human infants on the more individually based social-cognitive skills such as gaze following, intention reading, and so forth. But when it came to sharing attention, we saw virtually no relevant behavior in the chimpanzees. Thus, the chimpanzees sometimes looked at an interacting human to check what she was doing, but they did not look to her as a way of sharing interest and attention to some external thing. They also did not attempt to initiate joint attention by communicating gesturally (see below). Further, they did not use shared common ground to infer the exact referent of a looker's gaze, as do 1-year-old human infants (Moll, Koring, Carpenter & Tomasello, 2006). Based on these results and much previous research with human children (see Tomasello *et al.*, 2005a, for a review), it is clear that from a very early age human infants are motivated to simply share interest and attention with others in a way that our nearest primate relatives are not.

Social manipulation and cooperative communication

In their natural communication, great apes produce and comprehend many different communicative gestures and vocalizations. Particularly in the gestural modality, they do this in intentional, flexible ways, sensitive to the attentional state of the recipient (see Call & Tomasello, 2007, for a review). Apes are also very good at manipulating the behavior of humans to get what they want. Thus, apes raised in contact with humans learn to indicate objects they want (even those in hidden locations), tools they need, and places they want to go (Leavens, Hopkins & Bard, 2005). But great ape communication is still very different from human communication in terms of its most basic underlying structures and motivations.

Even leaving aside language, to make the comparison fairer, human infants gesture in order to communicate with others in species-unique ways, for example, by pointing. These gestures depend fundamentally on skills and motivations of shared intentionality (Tomasello, 2006). First, human intentional communication depends fundamentally on some kind of shared common ground between communicator and audience, for example, some kind of joint attentional frame. Thus, suppose that an adult points to an opaque bucket for the infant. If he does this out of the blue, the infant cannot know whether he is pointing to direct her attention to the container's color, its material, its contents, or any other of myriad possibilities. However, if they are playing a hiding–finding game together, and in this context the adult points to the bucket, the infant will very likely infer that he is pointing to inform her of the location of the hidden object. Fourteen-month-old infants make just such an inference in this situation (Behne, Carpenter & Tomasello, 2005), but chimpanzees and other apes do not (see Call & Tomasello, 2005, for a review). It is important to recall that apes are very good at following gaze direction in general (including that of humans), and so their struggles in this task do not emanate from an inability to follow the directionality of the pointing cue; rather, they do not seem to understand the meaning of this cue. Because they do not share with the human the joint attentional frame (common ground) of the hiding–finding game, they follow the point to the bucket and say, in effect, 'A bucket. So what? Now where's the food?' They do not understand that the pointing is intended to be 'relevant' to the searching as a shared activity (see Sperber & Wilson, 1986).

Second, humans also communicate for different motives than chimpanzees. Chimpanzees and other apes gesture in order to manipulate others – to get others to do what they want them to do – not, as humans, to inform others of things helpfully or to simply share experience with them. Thus, by 9 months of age, human infants have begun to direct others' attention to objects by showing gestures in order to initiate joint attentional interactions (Carpenter, Nagell & Tomasello, 1998). By 12 months of age, infants point for others simply to share interest and attention with them (Liszkowski, Carpenter, Henning, Striano & Tomasello, 2004). In addition, 12-month-olds also point to inform others of things they do not know – in effect sharing information with them – even when there is no benefit for themselves (Liszkowski, Carpenter, Striano & Tomasello, 2006). Apes do not point for either of these reasons, even though they sometimes point to things they want humans to fetch for them (Call & Tomasello, 1994). Interestingly, even when young children are requesting things from others, their communication is collaborative in the sense that they are not just trying to get the things but instead to influence the other's informational and goal states (Shwe & Markman, 1997). In general, chimpanzee communication involves individualistic means and motives whereas even prelinguistic human infants communicate cooperatively, and often with the sole motivation to share experiences and information with others.

This difference in motivation is highlighted by a recent experiment. Hare and Tomasello (2004) compared apes'

comprehension of the pointing gesture in a hiding–finding game, as above, to their comprehension of a similar but different reaching cue in the same task. Specifically, in one condition the experimenter simply pointed cooperatively to the location of the hidden food, as before, whereas in the other condition the human first established a competitive relationship with the ape, and then subsequently reached unsuccessfully in the direction of the baited bucket (because the hole through which he reached was too small for full arm extension). In this situation, with an extended arm that resembled in many ways a pointing gesture (but with thwarted effort and without gaze alternation), apes suddenly became successful. One interpretation is that in this situation apes understood the human's simple (competitive) intention to get into the bucket, and from this inferred the presence of food there. But when they observed the pointing gesture, they did not understand its underlying cooperative motive – to inform them, helpfully, of the food's location – and so the gesture had no meaning for them.

Group activity and collaboration

Wild chimpanzees participate in complex group activities, including group hunting (Boesch & Boesch, 1989). There is currently controversy over what level of collaboration – in the sense of joint goals and plans – these activities involve (see Boesch, 2005; Tomasello, Carpenter, Call, Behne & Moll, 2005b, for discussion). One possibility is that, instead of working together toward a joint goal, each chimpanzee is pursuing its own individual goal, and reacting individually to what the other participants see and do. This is a cognitively complex group activity – involving all the participants assessing the others' hunting activities and their effectiveness (Melis, Hare & Tomasello, 2006) – but it does not involve collaboration in the narrowly defined sense of individuals forming a shared goal to which they are all committed, and know together that they are committed, and then forming shared plans to reach the goal (Bratman, 1992).

Experimental studies comparing children and chimpanzees support this interpretation. For example, Warneken, Chen and Tomasello (2006) presented 18- and 24-month-old children and three human-reared juvenile chimpanzees with a series of collaborative tasks. The experimenter was programmed to quit acting at some point and subjects' re-engagement attempts were coded. Children at both ages all actively encouraged the adult to rejoin the game by communicating with him in some way, suggesting that they had formed with him a shared goal, and they wanted him to now re-commit to it (and many 14-month-old infants in a similar study by Warneken & Tomasello, in press, also did this). Chimpanzees, in contrast, never tried to re-engage the adult, instead mostly attempting to solve the task individually during this period. In addition, children, but not chimpanzees, often seemed to collaborate just for the sake of collaborating. For example, they collaborated in social games as well as instrumental tasks, and also, after obtaining a toy in the instrumental tasks, they often replaced it in the apparatus to start the activity again – the collaborative activity itself seemed to be more rewarding than the instrumental goal. Thus, again, whereas chimpanzees' participation in group activities is more individualistic, 1-year-old children's participation in group activities relies on shared intentionality in the form of shared goals and plans (perhaps underlain by skills of joint attention and cooperative communication), as well as purely social motives to share experience with others.

Social learning and instructed learning

As paradoxical as it may sound, some forms of social learning are mainly individual – in the sense that learners just gather information unilaterally (exploitively) from unsuspecting others. When chimpanzees learn from others how objects work, they are most often engaging in this individualistic type of social learning (emulation learning; Tomasello, 1996). Human infants, in contrast, imitate more readily the actions of others, and they sometimes do this with the apparent motivation not just to solve a task, but rather to demonstrate to the adult that they are 'in tune' about the current situation (Carpenter, 2006; Užgiris, 1981). Chimpanzees seemingly do not engage in this type of imitative learning for this purpose.

In addition, human adults quite often teach youngsters things by demonstrating what they should do – which the youngsters then respond to by imitating (and internalizing what is learned: what Tomasello *et al.*, 1993, called 'instructed learning'). Adult chimpanzees do not demonstrate things for youngsters (or at least do this very seldom). Interestingly, when human adults instruct their children in this way (providing communicative cues that they are trying to demonstrate something), 14-month-old infants copy the particular actions the adults used, and they do so much more often than when adults do not explicitly instruct – in which case they just copy the result the adult achieved (Gergely & Csibra, 2006). Furthermore, there is some evidence that 1-year-old infants are beginning to see the collaborative structure of some imitative interactions. Thus, they sometimes observe adult actions directed to them, and then reverse roles and redirect the actions back to the demonstrator, making it clear by looking to the demonstrator's

face that they see this as a joint activity (Carpenter, Tomasello & Striano, 2005). Chimpanzees may on occasion redirect such learned actions back to their partners, but they do not look to their partner's face in this way (Tomasello & Carpenter, 2005). Thus, chimpanzees' social learning is actually fairly individualistic, whereas 1-year-old children often respond to instruction and imitate collaboratively, often with the motivation to communicate shared states with others.

In addition, when 2-year-old children observe an adult engage in some new activity, saying something like 'Now I'm going to dax', they not only imitatively learn to perform that activity, they also seem to see that activity in normative terms as how 'we' do daxing. For example, Rakoczy, Warneken and Tomasello (submitted) demonstrated such a new activity for 2- and 3-year-old children, and then had a puppet enter and do it 'wrong'. Many of the children objected in very explicit terms, telling the puppet what it 'should' be doing, and almost all protested to some degree. They saw the puppet's actions as somehow not conforming to the social norm of how we do daxing, and they enforced the norm. Social norms – even of this relatively trivial type – can only be created by creatures who engage in shared intentionality and collective beliefs, and they play an enormously important role in maintaining the shared values of human cultural groups.

Conclusion

In all four of these domains, apes are mostly concerned with their own individual goals. They use or exploit others – by gathering information from them, manipulating them as social tools, coordinating actions with them for their own benefit – and often compete with them as well. Human children, on the other hand, often are concerned with sharing psychological states with others by providing them with helpful information, forming shared intentions and attention with them, and learning from demonstrations produced for their benefit. The emergence of these skills and motives for shared intentionality during human evolution did not create totally new cognitive skills. Rather, what it did was to take existing skills of, for example, gaze following, manipulative communication, group action, and social learning, and transform them into their collectively based counterparts of joint attention, cooperative communication, collaborative action, and instructed learning – cornerstones of cultural living. Shared intentionality is a small psychological difference that made a huge difference in human evolution in the way that humans conduct their lives.

In terms of ontogeny, Tomasello *et al*. (2005a) hypothesized that the basic skills and motivations for shared intentionality typically emerge at around the first birthday from the interaction of two developmental trajectories, each representing an evolutionary adaptation from some different point in time. The first trajectory is a general primate (or perhaps great ape) line of development for understanding intentional action and perception, which evolved in the context of primates' crucially important competitive interactions with one another over food, mates, and other resources (Machiavellian intelligence; Byrne & Whiten, 1988). The second trajectory is a uniquely human line of development for sharing psychological states with others, which seems to be present in nascent form from very early in human ontogeny as infants share emotional states with others in turn-taking sequences (Trevarthen, 1979). The interaction of these two lines of development creates, at around 1 year of age, skills and motivations for sharing psychological states with others in fairly local social interactions, and then later skills and motivations for reacting to and even internalizing various kinds of social norms, collective beliefs, and cultural institutions.

In our view, there are at least three reasons why shared intentionality is an important phenomenon for developmentalists to study. First, as the current paper has argued, it would seem to be a big part of what makes humans unique in the animal kingdom, serving as a psychological foundation for all things cultural. Second, as a phenomenon it brings together aspects of development that are typically studied separately but which everyone thinks should be studied together. In particular, investigating any phenomenon of shared intentionality ends up involving perforce a study of both cognitive and motivational processes working together, and often issues of social norms as well. Third, as a phenomenon, shared intentionality also brings together in particularly intimate ways the workings of biology and culture. Skills and motivations for shared intentionality are, in the current account, direct expressions of the biological adaptation that enables children to participate in the cultural practices around them.

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