In Search of Human Uniqueness

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Aside from sharing more than 95% of our genes, humans and great apes show striking similarities in many brain structures and functions. These biological parallels, however, bear out quite differently on a macro level. After all, humans and chimpanzees both have brain systems for evaluating quantity, but only one species understands complex mathematics; both species have the capacity to use tools, but only one uses them to build automobiles and particle accelerators.

In an invited address at the 2015 APS Annual Convention, Michael Tomasello, codirector of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, shared his insights gleaned from more than 20 years of research comparing great apes with human children in a quest to discover what truly elevates our cognitive and social abilities above those of our closest evolutionary relatives.

Tomasello believes that much of this difference boils down to the ability to determine the intentionality of others, and in the case of humans, the unique ability to *share* intentionality. Shared intentionality is a set of collaborative interactions through which people actually share psychological states; not only are both parties aware of each other's specific intentions — they also are aware that they share the *same* intention.

This singular ability to understand the motivational and cognitive state of another enables a whole host of higher order social functions, including collaboration; cooperative participation toward a shared goal; and, ultimately, the creation of social norms, Tomasello believes.

To get there, though, individuals must first be able to share attention. In a 2007 study, Tomasello set up an experiment in which a dominant and a submissive chimpanzee were paired and presented with food that was either visible to both animals or only to the submissive chimp (Bräuer et al., 2007). (Normally, when food is made available to such a pair, the dominant one will almost always end up with it; that's what makes him the dominant.) The submissive subject went after the food that was hidden from the dominant chimp significantly more than it pursued the food that was visible to both, indicating that the submissive understood that the dominant could not see the food from his vantage point.

However, humans can go a step further beyond this awareness of visual perspective — even at the young age of 1 — and comprehend that they and another person are looking at the same thing, according to Tomasello. This creates a foundation — a shared psychological workspace of sorts — from which cooperative activity and collaboration can emerge.

This difference can be seen in the two species' contrasting communicative behavior. Chimps aren't very big on small talk; they communicate primarily to get what they want from others. In contrast, humans often interact simply to share an experience. Tomasello aims to clarify the effects of this communication gap with experiments examining the collaborative abilities of chimpanzees and human children as young as 18 months.

In one experiment, a confederate working with the subject on a collaborative task was instructed to quit helping in the middle of the task, and subjects were monitored for attempts to re-engage their collaborator (Warneken et al., 2006). As shown in video clips Tomasello played during his talk, children at both 18- and 24-months old typically attempted to get the experimenter back on task, while adult chimpanzees tended to eschew these attempts, trying instead to complete the task themselves.

Additionally, in studies where two children worked on a collaborative task that was rigged so that one participant would receive a reward before the full task was complete, that lucky child almost always continued working at the task until his or her partner was duly rewarded as well (Hamann et al., 2012). Children showed these adult-level collaborative abilities at age 3, but not age 2, indicating that growth during the intervening year involves developing an understanding of the mutual commitment involved in joint activities. Tomasello attributes this growth to a newfound ability to take an objective, "bird's-eye" view of a task, in contrast to apes, who operate only from their own perspectives.

Tomasello's work is intriguing not only for its potential to explain the cognitive chasm that separates humans from all other species, including great apes, but also for how it suggests that a relatively small psychological advancement — the movement of cognitive activity from the individual to the collective level — can have an enormous effect on the development of a species. He continues to explore this idea in studies comparing adult great apes with children up to age 4 in order to further refine and test his theory that shared intentionality is the primary distinguishing factor between humans and apes.

References

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