

COMMENTARY

'Ratcheting' up the *scalae naturae*?

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Michael Tomasello (1999), *The Cultural Origins of Human Cognition*. Harvard University Press, Cambridge, MA. 254 pp. ISBN 0-674-00070-6. \$29.95.

During a time when evolutionary psychologists are somewhat over-inclined to place cognition on the operating table and thenceforth carve up the brain into neat "no consciousness necessary" data-driven bundles, Michael Tomasello has done us all a great service with his book *The Cultural Origins of Human Cognition*, in which he quite effectively gives humans back their minds. We can emancipate ourselves from contemporary modularist views that fetter our understanding of human cultural achievement with instinctivist claims, he argues, by paying homage to a particular, giant cognitive specialization that separates us from all other animals: the ability to understand that others are intentional agents like the self and that behavior is governed by unobservable causal processes. It is this adaptation, according to Tomasello, that transformed the basic mechanisms of primate cognition — perception, categorization, memory, and communication — into a reconfigured complex of what is distinctively human cognition.

It isn't that he denies other species, such as chimpanzees, their fair share of the glory — much of what we are today is the same as what we were yesterday — but at some point in hominid history, a novel neurobiological arrangement emerged that paved the way for the benefits *Homo sapiens* has reaped through rapid cultural change. Indeed, inasmuch as culture implies progressive inter-generational change (a definition limited to human culture), rather than simply differences between groups of conspecifics (as displayed by wild chimpanzee communities), it can even

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be said that this biological scaffolding *allowed* the phenomenon of culture to occur.

In addition to the phylogenetic and ontogenetic patchwork that evolutionists set on putting together theoretical accounts of the origins of the modern human mind must perform, Tomasello also adds into the mix the social-historical dimensions characterizing the individual's cultural immersion. The product of this endeavor is a convincing portrait of the mind of the young child as a complex mosaic of a multiple-layered past — her primate cousins' (phylogeny), her own (ontogeny), and her cultures' (history). These three key time frameworks — phylogeny, ontogeny, and history — are so seamlessly interwoven in Tomasello's model that one wonders why sociogenesis has not come to the fore of the intentionality debates sooner. Yes, he concurs, humans inherit a biological disposition with real developmental constraints, such that at about the first year of life individuals the world over come to see others as intentional agents rather than simply as animate, goal-directed beings (like young infants and other primates presumably do). But this inheritance develops also in context. The brains of each new generation are bathed in the symbolic experience of human culture. The child of the 21st century comes bearing with him into this world not only the tooth and nail of his common mammalian ancestry, but because he also comes equipped with the emergent capacity to find meaning in actions — or inactions — he soon inherits the culture of his forebears, who, in turn, inherited their own accumulated culture from their forebears. Among other things, the linguistic conventions, social customs, religious beliefs, political ideologies, technological and intellectual know-how of the previous generation are for the young child's taking, so long as he possesses the requisite biologic substrate enabling him to represent other minds.

What this amounts to, according to Tomasello, is cumulative cultural evolution. Each generation insinuates cultural innovations into the base it inherits, causing it to grow exponentially, and the base never crumbles underfoot of young children because they are tuned into the actions of adults fresh from the womb, and because adults offer both passive and active pedagogical support to assure transmission of knowledge. This 'ratchet effect', then, where individuals build upon the intellectual and social foundations provided them, is the machine behind human culture.

However, because chimpanzees, argues Tomasello, are blind to intentional states, they have no means to intentionally transmit knowledge to naïve conspecifics or learn from knowledgeable others, and thus must reinvent the wheel, so to speak, with each successive generation. (Of course, they haven't even gotten as far as the wheel!)

It is no small wonder, then, that most people are so often surprised to hear that the genomes of chimpanzees and humans are almost perfectly aligned — at the same time, they are confronted with the very real and very expansive *cultural* gulf separating the two species. Humans of the new millennium are on the verge of unlocking the genetic mysteries of disease, have created aircraft that have lifted them to new worlds, and have devised complex communication systems that send messages across the globe virtually at the speed of light; the technical savvy of chimpanzees, on the other hand, amounts to fishing for termites with peeled sticks, which they have likely been doing for a million years or more. One can almost give sympathy to Aristotle and his wrongheaded *scalae naturae* based on Tomasello's model. Yet it couldn't always have been so for *Homo sapiens*. The very first people who crawled naked out of the Pleistocene without their "cultural clothes" might have been (or at least should have been!) a little less surprised to hear of the amount of DNA they shared with their sister species.

As convincing as Tomasello is, and as lucid as his arguments are, the particular evolutionary pathways to this giant cognitive adaptation of intentionality are left to the reader's imagination. Granted, it wasn't the author's intent to sketch out the whole history of the phyletic unfolding of the trait in question, but I, for one, would have liked to see him take a more critical stab at it. For example, based on the archeological record, how did *Homo erectus* or *Homo ergaster* fare in the domain of reading minds? He alludes that causal cognition made its appearance with modern humans, but if earlier hominids were 'mindblind' like autists, then how did they learn the trades of archaic stone tool industries? Acheulean tool making isn't exactly rocket science, of course, but it does seem sufficiently complex to involve social learning processes more sophisticated than those involved in nonhuman primate behavioral transmission. Then again, if our ancestors could engage in such things as true imitation, then why didn't they show signs of cumulative cultural evolution?

And we all know that having a theory of mind is adaptive for an intelligent, social species — but what apish trait of mind *in particular* did it build on? The reader is told that, in fact, it builds upon relational categories in the social realm, but this merely whets our appetites for more details, or at least more theory. This is a frequent and frustrating omission of primate researchers like Tomasello and Povinelli, who often write as if the ability to reason about mental states appeared *de novo*, almost magically, in extant humans, without kith or kin in earlier species. Getting from relational categories — which still has only to do with observable phenomena — to intentionality is a much larger leap than Tomasello seems to argue when he claims that this line of reasoning provides some measure of continuity between great ape and human cognition. Why couldn't the gradualism of ontogeny in the domain of intentionality also characterize phylogeny? Although I don't necessarily agree that it, in fact, must do so, I do think that the question must be probed deeper than Tomasello does in the book.

Tomasello's phylogenetic analysis is instead reserved to comparative studies (mostly his own) with laboratory apes, the overwhelming majority of which lead to the rather unavoidable conclusion that other species are oblivious to intentional states. Other researchers have been partial to the criticism that these experiments can tell us little about chimpanzees in their natural state, and for a true education on chimpanzee minds we must observe them in the wild. This is a moot point, however, when one considers the fact that even fieldworkers have chronicled no definitive accounts of active teaching, joint attention, pointing, or imitation — precisely the sorts of behaviors that are diagnostic of a theory of mind — in feral populations.

Still, if modern minds are essentially chimpanzee minds revamped, mightn't we find some vestige of metacognitive abilities in *Pan*? Indeed, since Tomasello's book was published in 1999, a series of convincing studies conducted by Brian Hare and coauthored by Tomasello have indicated that chimpanzees may, under certain conditions of conspecific competition, be able to represent the visual perspective and knowledge of others. In light of this, Tomasello might have tread more carefully over the sacred ground of the animal romanticists when writing his book, but I doubt it — and readers should be glad that he didn't. If indeed chimpanzees do have some appreciation of intentional states, be it implicit or otherwise, there seems to

be sufficient empirical grounds to reason that it is markedly impoverished in comparison to humans' expertise in this area.

Yet some questions still remain unanswered even in regard to our species. Among the most piquant, why did a 200,000-year-old species whose earliest descendents were genetically identical to the Joe and Mary Smiths of today, take upwards of 190,000 of those years to get civilization off the ground? Was there some critical cultural threshold that had to be reached before the rapid changes Tomasello emphasizes could occur? And although he denounces the massive modularity hypothesis (rightly so in my opinion) he does briefly acknowledge the plausibility of some of the more 'classical' mental modules, such as mate retention systems; unfortunately, he does not speculate on how his view of the conscious mind might interact with these more 'hardwired' structures, which is a question altogether unanswered by evolutionary psychologists. These are comparatively small points, however, when one considers the radical ideas of cultural evolution Tomasello is proposing.

Although it's not as novel as he claims, Tomasello's emphasis of the young child as active facilitator in the development of her own theory of mind is nevertheless a refreshing change from a large contingent of theorists who seem to believe that the child's theory of mind ripens according to some deterministic timetable carved into stone, such that the child merely needs to passively be. Not so, says Tomasello — the active participation of the child, especially in the context of language acquisition, is a critical link in the process. The continual dynamic interchange between dialogic partners, for instance, helps the young child to appreciate that she, and her actions, thoughts, beliefs, etc. can be the center of another person's attention, and also that others can represent the same event differently than the self. The ability to hold multiple representations of the same event, then, is posited to arise through the elaboration of symbolic thought that is made possible by the bi-directional relationship between language and an intuitive psychology. Language is thus portrayed as both a symptom of symbolic thought and a contributor to its maturation.

Tomasello adds surprising power to Paul Harris's simulation-based model of mind by marshalling findings from a series of studies designed to assess whether self-knowledge fosters knowledge of others. In short, it does. But it is not so straightforward, as self-knowledge is to a large

extent a product of social interaction. Again, there is the assumption of bidirectionality, wherein adults' attention directed toward the developing child's intentional states serves to objectify these states for purposes of causal analyses. The young child is compelled to identify with the people surrounding him, says Tomasello, and is able to use his own experiences as a default background with which to simulate others' mental states. This allows him to understand *why* people, for example, cover their heads when it rains, not simply *that* they do so.

The main point here is that this is a book with only a few shortcomings, and even these are easily overlooked when considering the message Tomasello hammers in. It is okay, and even reasonable, he assures us, to once again view humans as 'special'. This time, however, it is modern science on our side, not clumsy metaphysics. The book is as solid in its theorizing as it is its empirical construction, it is written by a master of his craft, and it is clearly and expertly composed. A slim volume that hides within its pages big ideas, it is a must-read for students of evolutionary cognition, primatology, psycholinguistics, cultural anthropology, and anyone else who takes human origins, and the psychological foundations underlying them, seriously. But it is an even more important read, perhaps, for those who don't.

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