the evolutionary model we have offered (see Povinelli et al. 2000). The *reinterpretation hypothesis* posits that the ancestor of the ape/human group possessed a suite of systems dedicated to representing and reasoning about behavior (detailed in Povinelli & Vonk 2004), but not intentions or other mental states. Further the model posits that, at some point in the evolution of the human lineage (probably coincident with evolution of natural language), a new system for encoding the behavior of self and other in terms of mental states was grafted into these ancestral systems for representing and reasoning about behavior. In modern humans, then, these two systems are now complexly interleaved into each other. Thus, the model stipulates that many of the same invariants in the behavior of others that humans explain in terms of underlying mental states, were discovered and exploited long before we evolved to re-code them in a mentalistic fashion. Furthermore, the model suggests that humans still do both: every time we attribute a mental state, we have already isolated a behavioral abstraction. The reinterpretation hypothesis thus suggests that it is not only *possible* to consider that chimpanzees and other species represent behavior without representing mental states, it suggests that, this is the typical case. Humans are the exception.

In this theoretical light, it is easier to see why the empirical data cited by Tomasello et al. do not demonstrate that apes represent intentions as mental states. Reconsider the unwilling/unable study. Although humans can attribute different intentions in cases where someone intentionally withholds something versus cases where it is accidentally dropped, and although this attribution can be causally implicated in generating aggressive reactions in the first case, but not the second, there is no reason why these reactions need to be mediated by an intention attribution. Even in humans, much of the time they probably are not. Although different intentions do indeed underlie the two actions, the chimpanzee (or human) need not know this to keep track of the behavioral invariances. And because these invariances must be represented anyhow (that is the basis upon which the different intention attributions are purported to be based), then what additional explanatory work does the intention representation perform in explaining the experimental results? As far as we can tell, none. The reinterpretation model suggests why: the ability to represent mental states co-opted the systems for behavioral representation that were already in place.

This issue plagues all experiments cited by Tomasello et al. (see Povinelli & Vonk 2004). For example, the authors describe a series of food-competition experiments to support the claim that chimpanzees "understand that what others see affects what they do." We have already shown in detail why this attribution is unwarranted by using the reasoning just described (Povinelli & Vonk 2003, 2004). Furthermore, empirical findings show that the robust effects of these studies are easily accounted for by nonmentalistic construals of the situation (some as simple as "on the basis of previous experience, don't approach food if it is in the unobstructed path of a dominant individual" [see Karin-D'Arcy & Povinelli 2002, experiments 3 to 6; Povinelli & Vonk 2003, 2004]).

Importantly, the authors overlook other data that have experimentally analyzed how chimpanzees interpret social cues related to "seeing" in simple social situations in which they can request food from one of two caretakers. *Without training*, chimpanzees base their choices on full body orientation (who is facing them) and, *with training*, they rapidly learn to base their choices on the direction of the head or even whether their recipient's eyes are open or closed (Povinelli & Eddy 1996; Reaux et al. 1999). Using slightly different methods these findings have been largely replicated by Tomasello and colleagues (Kaminski et al. 2004). These results suggest that the learned social cues remain subordinate to cues that tend to covary with someone "seeing" them, but have no bearing on "seeing." For example, even after they learn to gesture to the person whose eyes are open (as opposed to the person whose eyes are closed), chimpanzees will nonetheless prefer to gesture to someone whose eyes are closed if that person is facing them, as opposed to someone facing away, but looking (eyes open) over their shoulder toward them! One interpretation of these data is that the behavioral abstractions formed by chimpanzees are essentially postural heuristics that have nothing to do with "seeing" at all.

So, are Tomasello et al. correct that chimpanzees and humans both *understand* certain mental states, but only humans share them? The reinterpretation hypothesis argues that only humans represent mental states at all – and that, in turn, is why we are the only species who shares them. Further, it offers more explanatory power: it explains all the differences that Tomasello et al. catalog between human and great-ape cultures in one evolutionary step. Tomasello et al. require two distinct evolutionary steps: the evolution of the ability to conceive of intentions, followed by the disposition to share them. In the reinterpretation model, sharing such states comes for free, because the original code in which mental states were represented was inextricably embedded in a predominantly social capacity: natural language. And that may be the big difference that made a big difference.

Illusions of intentionality, shared and unshared

Robert R. Provine

Department of Psychology, University of Maryland–Baltimore County, Baltimore, MD 21250. **provine@umbc.edu**

Abstract: Intention, shared or unshared, is based on the presumption of unknowable and unnecessary motives and mental states in ourselves and others.

Until proven otherwise, why not assume that intention does not play a role in human and animal behavior? Although it may seem radical on first hearing, this is actually the conservative position that makes the fewest assumptions. The null position is an antidote to our tendency to presume rational, conscious control over processes that may be unconscious and not require a ghost in the neurological machinery. The argument here is not that we lack consciousness, but that we overestimate the conscious control of behavior and cannot trust its narrative as an explanation of our actions. Proving this proposition is a challenge because it's difficult to think about consciousness and the causes of our behavior, intentional or otherwise. We are misled by an inner voice that generates a reasonable but often fallacious narrative and explanation of our actions, and we use this account to interpret the actions of others. Is the presumption that human cognition "sticks out like an elephant's trunk, a giraffe's neck, a peacock's tail" an illusion in the eye of the beholder? Is the critical level of neurological processing one step removed from the user-friendly but unreliable interface accessible through introspection? That the beam of conscious awareness that illuminates our actions is on only part of the time further complicates the task. Since we are not conscious of our state of unconsciousness, we vastly overestimate the amount of time that we are aware of our own actions, whatever their cause.

My thinking about unconscious control and associated issues of intentionality was shaped by my field studies of the primitive play vocalization of laughter (Provine 2000). When I asked people to explain why they laughed in a particular situation, they would concoct some reasonable fiction about the cause of their behavior – "someone did something funny," "it was something she said," "I wanted to put her at ease." Observations of social context showed that such explanations were typically unfounded. In clinical settings, such post hoc misattributions would be termed *confabulations*, honest but flawed attempts to explain one's actions. How different is our account of intentions?

Subjects in my laughter study also incorrectly presumed that laughing is a choice (intention) and under conscious control, a reason for their confident, if bogus, explanations of their behavior (Provine 2000). But laughing is not a matter of speaking "ha-ha," as we would choose a word in speech. When challenged to laugh on command, most subjects could not do so. In certain, usually

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playful, social contexts, laughter simply happens. However, this lack of voluntary control does not preclude a lawful pattern of behavior. Laughter appears at those places where punctuation would appear in a transcription of a conversation – laughter seldom interrupts the phrase structure of speech. We may say, "I have to go now – ha-ha," but rarely, "I have to – ha-ha – go now." This *punctuation effect* (Provine 1993) is highly reliable and requires the coordination of laughing with the linguistic structure of speech, yet it is performed without conscious awareness of the speaker. Other airway maneuvers such as breathing and coughing punctuate speech and are performed without speaker awareness.

Another challenge to intentionality comes from the contagion of laughter (Provine 1992) and yawning (Provine 1986). Laughter triggers laughter and yawning triggers yawning in observers. In neither case is the contagious act an intention of the observer – it just happens in the presence of the appropriate stimulus. Before explaining these acts away as special cases, consider their similarity to the replication of facial expressions by neonates (Meltzoff & Moore 1977; Provine 1989a; 1989b), a phenomenon reported in terms of the higher cognitive process of imitation and to acts that may be mediated by so-called "mirror neurons" that have been implicated in imitative behaviors and mental state attribution (Arbib et al 2000; Wohlschläger & Bekkering 2002).

The discovery of lawful but unconsciously controlled laughter and yawning led me to consider the generality of this situation to other kinds of behavior. Do we go through life listening to an inner voice that provides similar confabulations about our motives? Are essential details of the neurological process governing human behavior inaccessible to introspection? Can the question of animal consciousness be stood on its head and treated more parsimoniously? Instead of considering whether other animals are conscious, or have a different or lesser consciousness than our own, should we question whether our behavior is under no more conscious control than theirs?

The complex social order of bees, ants, and termites documents what can be achieved with little, if any, conscious control as we think of it. Is intelligent behavior a sign of conscious control? What kinds of tasks require consciousness? In the spirit of Julian Jaynes (1976), I suggest a scientific agenda that pursues an often counterintuitive path, asking hard questions about the role, evolution, and development of consciousness and the associated role of intention. Higher-order cognitive processes should not be tacitly assumed and, when suggested, must be expected to earn their keep. Tomasello et al. do a good job of operationalizing complex tasks and using them in cross-species comparisons. I do not challenge their methods or behavioral results but urge a conservative stance concerning how we talk about and explain the actions of animal minds, including our own.

Humans evolved to become *Homo negotiatus* . . . the rest followed

Philippe Rochat

Department of Psychology, Emory University, Atlanta, GA 30322.
psypr@emory.edu
http://www.psychology.emory.edu/Faculty/rochat.html

Abstract: Social animals need to share space and resources, whether sexual partners, parents, or food. Humans, however, are unique in the way they share as they evolved to become *Homo negotiatus*; a species that is prone to bargain and to dispute the value of things until some agreement is reached. This evolution had far-reaching consequences on the specific makeup of human psychology – a psychology that has for trademark a compulsive preoccupation with the self in relation to others. I propose that the understanding and sharing of intentions are probably the consequences of such evolution, and not its origins.

We evolved to become *Homo negotiatus*, a species keen to count and compare. It is a species that takes advantage or gets even not only by taking, but also by giving. That does not make *Homo negotiatus* a nicer, kinder species compared with other animal species. Obviously not. It does not mean either that close primate relatives do not show some precursor signs of sharing by negotiation (de Waal 1982, 1996).

However, as pointed by the classic anthropological work of Mauss (1967), human societies seem particularly keen to hold at their core the propensity to offer gifts with the explicit motive of strengthening social ties among its members. Gifts allow for the maintenance of social ties over time, the guarantee of a social debt in a society that holds reciprocation as a core value. Mauss showed that gift giving and reciprocation are indeed an organizing core of many small society cultures all over the world. It appears to be a human universal.

There are many plausible stories as to why humans evolved to become *Homo negotiatus*. One story is that the combination of food surplus, food storage, and greater density of group living triggered profound changes in the way humans shared their resources (Diamond 1997). From coercive dominance (the physically more powerful gets the lion's share principle), humans were channeled to engage in actual trading and complex reciprocation via gifts and other bartering chips. In this new way of sharing, the most prestigious and richer individuals became the rulers, getting the lion's share by giving and trading favors, not only by forceful coercion.

Favorable environmental (e.g., climatic) circumstances, technological progress, or any other causes leading to food surplus could have triggered a host of changes in the life of our ancestors, including transactions based on shared values, the birth of bartering, and ultimately the establishment of explicit rules and trade regulations. It is only in recent time (maybe 10 to 15 thousand years) that public (external) memory systems such as symbolic tallying to record current and past transactions seem to have emerged. Such emergence could possibly have ratcheted up a host of other cultural artifacts, including complex writing systems by which the oral tradition articulating the memory of shared values became objectified (externalized) via public documents and decrees. The emergence of such inventions had a formidable, exponential impact on how we coexist and share as a species.

Regardless of the plausibility of such an account, the fact is that we have evolved to become *Homo negotiatus*, not only relating to one another by ways of forceful and instinctive reactions, but also by ways of seduction and lengthy intersubjective negotiation. Humans seem to find particular comfort and reassurance in actively aligning their own experiences with the experiences of others. This does not mean that intersubjectivity is a uniquely human trait. All group-living animals share experiences, all prone to emotional contagion. They alarm one another, fly together in the face of danger, and bunch up to fight back predators. However, humans have the special inclination to probe actively and seek for intersubjective agreement.

Humans have the insatiable need to feel and understand the same as others and, if that is not the case, they attempt by any means to reestablish any lost equilibrium with peers. This process is particularly evident in human mother and infant interactions that are universally characterized by complex affective mirroring and emotional coregulations (Gergely & Watson 1999; Rochat 2001; Stern 1985).

Learning to agree on the value of things by ways of negotiation and reciprocation (what all human children have to do in order to behave adaptively in the culture of their parents) entails the development of specific psychological capacities. These capacities are what set humans apart from any other species. It is the privilege of developmental researchers to witness how these capacities emerge in ontogeny.

Aside from the capacity to understand and share intentions that would presumably form the origins of cultural cognition (Tomasello et al.), I would like to suggest that one of the necessary building block of *Homo negotiatus* is first and probably foremost a unique sense of self. A sense of self that is evaluative in relation to others.

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