tentions, and desires may also be relatively late to develop. On gamelike cooperation tasks, 12-month-olds cannot coordinate their behavior with one another to achieve a goal; 18-month-olds do so only serendipitously; 24- to 30-month-olds can do so once they have accidentally discovered the relation between their activity, the peer's activity, and the outcome (Brownell & Carriger 1990). When 24-month-olds' peer partners do something that interrupts or interferes with their joint activity, the children are stymied, rarely responding to their peer partner, and they do not try to influence the partner's behavior; instead, they continue their own individual activity. By 30 months, they monitor their partner's behavior and sometimes direct the partner verbally or gesturally (Brownell & Carriger 1991), and, by 36 months, children can plan ahead, exchange roles, and teach a cooperation game to another child (Ashley & Tomasello 1998). It appears that very young children do not recognize the relevance of their peers' behavior for their own efforts toward a common goal, nor the relevance of their behavior for their peers' attempts to achieve the goal; that is, they do not understand or represent the joint causal structure of their own and their peers' behavior in relation to the goal. This sort of understanding may depend on advances in complex causal reasoning independent of the ability or motivation to share activities, emotions, or experiences.

Another key developmental ingredient is developing self-awareness. As a 12-month-old, without a sense of who I am as an individual, a peer's approach is not *about* me; it is merely an interesting change in the surround. I may watch in interest, or even smile since I know that smiles get positive responses. As a more self-reflective 24-month-old, I know that a peer's behavior may be directed to and about me. I can infer, for example, that his approach means that he desires something of mine, and I can respond accordingly. At 36 months, we can negotiate our shared or conflicting desires, intentions, and goals. With progressive differentiation of reflective self-awareness and corresponding advances in reciprocal understanding of others as mental agents, a young child can increasingly share mental states with peers.

How does the child come to understand and share behavior, emotion, and intention with others? Perhaps it is an outgrowth of the child's emotional relationships with adults, combined with growth in causal reasoning and the differentiation of self- and other-understanding, and driven by the need to explain or predict others' behavior in an increasingly complex and unpredictable social world (Zerwas et al. 2004). Any or all of these components may be uniquely human; or perhaps it is their coalescence late in the second year of life that is unique to humans. Describing and explaining the similarities and differences in the course of shared intentionality with peers and adults will bring us closer to understanding the mechanisms underlying the genesis and development of collaboration.

Homo sapiens, a localized species

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Abstract: Tomasello et al. point up the mutual interdependency of the unique human capacity for intersubjectivity and the evolution and institutionalization of culture. Since both intersubjectivity and cultural cooperation require localized knowledge, *Homo sapiens* is highly reliant on such knowledge and in that sense is a highly localized species, requiring special means to surmount cultural misreadings and to achieve translocal, or global, interconnection.

The references listed at the end of the article by Tomasello et al. confirmed my first impression. Comparative studies of the emergence of intersubjectivity in *Homo sapiens* and his primate forebears began only yesterday. Of the 149 references cited by Tomasello et al., 81% have appeared since 1990, with most of the rest of them in the 1980s. The exception is Meredith Crawford's famous 1937 study showing how individual chimpanzees got one of their fellows to help haul in a food tray too heavy for either of them to manage alone, a paper shallowly read at the time as "proving" primate cooperativeness. Note, by the way, that few indeed of the great classics of evolutionary writing are cited in this bibliography – not Darwin and not LeGros Clark, to take only two examples.

The study of human evolution has taken a new and astonishing inward turn, far more concerned now with whether and how primates recognize (or fail to recognize) each other's intentions, or whether and how they manage (or fail to manage) to collaborate with each other in support of their respective intentions, or (in general) what evolutionary steps were required for *Homo sapiens* to have achieved the ability to recognize what their conspecifics have in mind prior to their acting it out. The emphasis is on the preconditions of human culture. The sweep and freshness of these new inquiries come through stunningly in this lucid and fair-minded overview.

Reading it leads me to a rather odd conjecture. May it not be the case that the unique result of human evolution – our newly acquired reliance upon conventionalized or institutionalized procedures for relating to each other and to the social world in general – that this is what makes ours the first and only "unspecies-like" species in the animal kingdom? I mean that in the sense that *unless* one human being has come to appreciate the "rules" of the cultural setting of those with whom he is interacting, he is unable to proceed collaboratively. In this sense, we as a species have become subdivided locally to a degree beyond any species that has ever existed. And this is not wholly by dint of being separated by different languages and their underlying perspectives, *pace* the Sapir-Whorf hypothesis.

The paradox, rather, is that *Homo sapiens* has become "localized" by having to depend upon learned, *culture*-specific modes of interacting. This local culture-specificity often *misguides* intercultural perceptions in a manner to create undesirable tensions and dangerous rivalry between local cultures. Localness has its costs: the tensions and misreadings it generates often deepen intercultural troubles at both the personal and institutional levels.

Our species has evolved in a most atypical way. We certainly did *not* evolve into some uniform steady-state species, as most speciation does. *Homo sapiens* has simply gone on changing, often massively, and in ways that confound the usual definition of species specificity. Once we develop a written language, for example, we begin leaving out of account even local intersubjective cues. And any monocultural technological innovation easily leads to misreadings of "other minds." When I and a medical colleague taught a priestly *marabou* how to use penicillin on the seriously ill in his Wolof Senegalese village, it was the success of his "renewed gaze" to Allah that most impressed the locals.

History, of course, further increases human localness, given its inevitably local perspectives. As devotees of the French *Annales* school put it, historians rightly search for the emergence of new *mentalités* produced by changing cultures (Furet 1985). They appreciate the power of the local.

As a species, then, we seem always to be *becoming* – differentiating, localizing, and even sublocalizing (as with class formation and the division of labor).

The universal-one-species dogma has, of course, been the dogma of colonialism in all its guises – that everybody everywhere *could* be the same if they were given the same cultural opportunities, the ones *we* have on offer. Beneath the compassionate surface of this ancient dogma lies the belief that *Homo sapiens* everywhere is capable of reading and appreciating what others in the human species have in mind – a dogma given a new lease on life by what's now called evolutionary psychology.

The enormous contribution of Tomasello et al. is to highlight the critical role of culture in support of human intersubjectivity and to demonstrate how this is made possible by our uniquely hu-

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man capabilities. It is this that leads me to emphasize the localness of intersubjectivity, for culture is always local.

I read their account as suggesting that *Homo sapiens* does not fit the usual definition of a species. By dint of our human dependence on cultural conventions, we have developed a degree of localness (or subspeciation, if one wants to be conciliatory with the past) that is unknown in any other species on the face of the earth.

Our bent toward "misreading" others in other cultures in the light of our local standards has led to distinctive, often lethal, intercultural scrappiness. Ironically, we as a species seem to be capable of the closest, most sensitive forms of intersubjectivity locally while, at the same time, remaining prone to gross intercultural misreadings where the intentions of others are concerned. And our local genius for devising ever-new procedures for using and expressing our minds often has the effect of further *sub*localizing us – as in the forming of social classes or by the creation of a castelike division of labor.

Yet, despite our genius for intersubjectivity and its cultivation, despite the localness of "subspeciation," *Homo sapiens* has also managed to create an ever-widening world of creative opportunities which, though it generates a chillingly greater killing rate than may be sustainable, would never have been imaginable by our ancestors.

Our localness, in a word, virtually disqualifies us as a species in the classical sense. We would do well to bear this in mind in considering the implications of the research reported in the brilliant account offered by Tomasello et al., for localness is now in ever-increasing tension with the universality that we aspire to in globalization.

Why do individuals with autism lack the motivation or capacity to share intentions?

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Abstract: Tomasello et al. highlight how in combination cognitive impairments and affective impairments help explain why individuals with autism do not enter fully into human culture. We query whether the motivational component is a later development in human ontogeny and whether the cognitive level of intention reading is intact in autism. A key question is what neuropsychological impairments underlie this cognitive–affective impairment.

Tomasello et al. do the field a great service by highlighting how *in combination* cognitive (or representational) impairments *and* affective (a motivation or capacity to share attention) impairments help explain why individuals with autism do not enter fully into human culture. It is important to emphasize that the developmental and behavioral impairments shown by individuals with autism cannot be explained by cognitive deficits alone (whether in theory of mind, executive function, central coherence or other cognitive processes [for a review, see Burack et al., 2001]). As recognized by the authors, this is a view long championed by some commentators, most notably Hobson (1993, 2002), and rings true to Kanner's (1943) original description of children with "inborn autistic disturbances of affective contact."

Do the authors mean to suggest that the motivational affective component is a *later-developing* component (than understanding the basics of intentional action) of the system in human ontogeny? This seems unlikely because, from the outset in human development, cognitive and affective development are intertwined. For example, studies that have adopted detailed analysis of infant–adult (usually caregiver) interactions have demonstrated that infants are sensitive to and engage in back-and-forth "protoconversations" from as young as 2 months of age (Bateson 1975; Trevarthen 1974). These involve rhythmic attunement of mother and infant vocalizations with the mother protracting, amplifying and enhancing versions of the infant's sounds (Papousek 1989; Trevarthen et al. 1999). Such exchanges are affect laden; the vocal protoconversation is accompanied by other sympathetic reactions that are non-imitative such as smiles, mutual gaze, hand gestures and affective vocal expressions. Stern (1985) has called these "supportive emotional colored attunements." Clinically some parents of children with autism report that their babies were unresponsive in the first months of life (Wing 1996), suggesting that they might not be as motivated as other children to enter into such exchanges.

Are the authors sure that evidence that the cognitive level of intention reading is intact in autism secure? They cite two studies that have found that children with autism produce the target action following a "failed demonstration" in Meltzoff's (1995) behavioral re-enactment task (Aldridge et al. 2000; Carpenter et al. 2001). Previously we have argued that non-social learning processes including stimulus enhancement and emulation learning might account for such findings (Charman & Huang 2002; Huang et al. 2002). In an earlier study, we used one such task with toddlers with autism, and only 3 of 20 children with autism spectrum disorders copied the experimenter's action of lighting the box by bending down with their head (Charman et al. 1997). It would also be of interest to know the emotional reaction of the children with autism tested by Carpenter et al. (2001). Whilst we are told that "they looked to the light in anticipation, seemingly indicating their appreciation of the goal-directed nature of this action," we do not know whether the children with autism responded as many typical children do with gales of laughter, smiles, and quizzical looks at the experimenter. Footnote 4 also indicates that chimpanzees produce the target action following failed attempt demonstrations in the behavioral re-enactment procedure (and indeed at baseline presentation when no action is demonstrated). This response is presumably via non-social learning processes such as those already mentioned as well as natural object affordances. This is not to argue that intention reading is not involved in imitation situations. Rather it is intended to emphasize that in typical development it is there in combination with non-social learning and with affective engagement (try playing imitation games with toddlers and keeping a straight face). It might not be correct to think of one part of this system as intact in children with autism and another impaired. Clearly, the system as a whole does not function as it should, and this might involve both the cognitive and the affective components of the system (Tager-Flusberg 2001).

A key area of investigation in autism is to identify what neuropsychological impairments underlie this affective impairment, whether the deficit is best understood in terms of motivation or capacity, and to determine which brain systems subserve these impairments and how their function might be disrupted. A useful model of the components that such cognitive-affective capacities require is that of a social information-processing network (SIPN [Nelson et al., 2005]). SIPN involves the *detection* of a stimulus as social; an *affective* engagement with the social stimulus; and a *cognitive-regulatory* component (akin to theory of mind) that helps decide and enact a response to the stimulus. Each node is associated with particular neural systems, and there is converging evidence that these systems are structurally and functionally impaired in individuals with autism (Baron-Cohen et al. 2000; Frith & Frith 2003; Nelson et al., 2005).

Interestingly, there is convergent evidence from such research that the cognitive and the affective components of the system might be more intertwined that we once expected. For example, Schultz et al. (2003) found that the fusiform face area was activated during a social attribution (theory of mind) task. Hypoactivation of this region in individuals with autism whilst processing faces is the best replicated functional imaging finding in the field (Schultz et al. 2000, 2003). Klin et al. (2003) remind us that within an "enactive mind" framework cognitive development is in part dependent on what is seen as salient in the environment. Several models of de-

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