Human beings are biologically adapted for culture in ways that other primates are not, as evidenced most clearly by the fact that only human cultural traditions accumulate modifications over historical time (the ratchet effect). The key adaptation is one that enables individuals to understand other individuals as intentional agents like the self. This species-unique form of social cognition emerges in human ontogeny at around 1 year of age as infants begin to engage with other persons in various kinds of joint attentional activities involving gaze following, social referencing, and gestural communication. Young children’s joint attentional skills then engender some uniquely powerful forms of cultural learning, enabling the acquisition of language, discourse skills, tool use practices, and many other conventional activities. These novel forms of cultural learning allow human beings to pool their cognitive resources both contemporaneously and over historical time in ways that are unique in the animal kingdom.

CULTURAL TRANSMISSION
A View From Chimpanzees and Human Infants

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Primates are highly social beings. They begin their lives clinging to their mothers and nursing, and they spend their next few months, or even years, still in close proximity to her. Adult primates live in close-knit social groups, for the most part, in which members individually recognize one another and form various types of long-term social relationships (see Tomasello & Call, 1994, 1997, for reviews). As primates, human beings follow this same pattern, of course, but they also have some unique forms of sociality that may be characterized as “ultrasocial” or, in more common parlance, cultural (Tomasello, Kruger, & Ratner, 1993). The forms of sociality that are mostly clearly unique to human beings emerge in their ontogeny at around 9 months of age—what I have previously called the 9-month social-cognitive revolution (Tomasello, 1995). This is the age at which infants typically begin to engage in the kinds of joint attentional interactions in which they master the use of cultural artifacts, including tools and language, and become fully active participants in all types of cultural rituals, scripts, and games. What I would like to do in this article is, first, to characterize the primate and human forms of sociality and cultural transmission, and, second, to characterize in more detail the ontogeny of human cultural propensities.

PRIMATE CULTURE

The most often-cited case of nonhuman primate culture is the case of Japanese macaque potato washing (Kawai, 1965). The story is this. In 1953, an 18-month old female named Imo was observed to take pieces of sweet potato, given to her and the rest of the troop by researchers, and to wash the sand off of them in some nearby water (at first a stream and then the ocean). About 3 months after she began to wash her potatoes, the practice was observed in Imo’s mother and two of her playmates (and then their mothers). During the next 2 years, seven other youngsters also began to wash potatoes, and within 3 years of Imo’s first potato washing, about 40% of the troop was doing the same. The fact that it was Imo’s close
associates who learned the behavior first, and their associates directly after, was thought to be significant in suggesting that the means of propagation of this behavior was some form of imitation in which one individual actually copied the behavior of another.

The interpretation of these observations in terms of culture and imitation has two main problems, however. The first problem is that potato washing is much less unusual a behavior for monkeys than was originally thought. Brushing sand off food turns out to be something that many monkeys do naturally, and indeed this had been observed in the Koshima monkeys prior to the emergence of washing. It is thus not surprising that potato washing was also observed in four other troops of human-provisioned Japanese macaques soon after the Koshima observations (Kawai, 1965)—implying at least four individuals who learned on their own. Also, in captivity, individuals of other monkey species learn quite rapidly to wash their food when provided with sandy fruits and bowls of water, on their own (Visalberghi & Fragaszy, 1990). The second problem has to do with the pattern of the spread of potato-washing behavior within the group. The fact is that the spread of the behavior was relatively slow, with an average time of more than 2 years for acquisition by the members of the group who learned it (Galef, 1992). Moreover, the rate of spread did not increase as the number of users increased. If the mechanism of transmission were imitation, an increase in the rate of propagation would be expected as more demonstrators became available for observation over time. In contrast, if processes of individual learning were at work, a slower and steadier rate of spread would be expected—which, in fact, was observed. The fact that Imo’s friends and relatives were first to learn the behavior may be because friends and relative stay close to one another, and thus Imo’s friends very likely went near the water more often during feeding than other group members, increasing their chances for individual discovery.

The other most widely cited case of animal culture concerns chimpanzees. There are a number of population-specific tool use traditions that have been documented for different chimpanzee communities, for example, termite fishing, ant fishing, ant dipping, nut cracking, and leaf sponging (Whiten et al., 1999). Some of these population differences are due to the different local ecologies of different groups of chimpanzees—the individuals of each group learn to solve the problems presented by their local environments using the resources available in that environment. But experimental studies have shown that there is more to it than this; chimpanzees can learn things from observing others using tools. What they learn, however, is less than might be expected. What they learn are the effects on the environment that can be produced with a particular tool; they do not actually learn to copy another chimpanzee’s behavioral strategies. For example, in one study, chimpanzees were presented with a rakelike tool and an out-of-reach object. The tool was such that it could be used in either of two ways leading to the same end result of obtaining the object. One group of chimpanzees observed one method of tool use and another group observed the other method of tool use. The result was that chimpanzees used the same method or methods to obtain the object no matter which demonstration they observed (what is called emulation learning). When human children were given this same task, they much more often imitatively learned the precise technique demonstrated for them (see Tomasello, 1996, for a review). Studies of chimpanzee gestural communication have found similar results. Young chimpanzees ritualize signals with group mates during repeated encounters; they do not learn the signals of group mates via imitation (Tomasello et al., 1997).

Chimpanzees and other nonhuman animals may thus engage in some forms of cultural transmission, defined very broadly as the nongenetic transfer of information, but they do not do this by means of imitative learning if this is defined more narrowly as the reproduction of another individual’s actual behavioral strategy toward a goal. In contrast, human beings
learn from conspecifics by perceiving their goals and then attempting to reproduce the strategy the other person uses in attempting to achieve that goal—truly cultural learning, as opposed to merely social learning (Tomasello et al., 1993). This small difference of learning process leads to a huge difference in cultural evolution, namely, it leads to cumulative cultural evolution in which the culture produces artifacts—both material artifacts such as tools and symbolic artifacts such as language and Arabic numerals—that accumulate modifications over historical time. Thus, one person invents something, other persons learn it and then modify and improve it, and then this new and improved version is learned by a new generation—and so on across generations. Imitative learning is a key to this process because it enables individuals to acquire the uses of artifacts and other practices of their social groups relatively faithfully, and this then serves as a kind of “ratchet”—keeping the practice in place in the social group (perhaps for many generations) until some creative innovation comes along. In using these artifacts to mediate its interactions with the world, each human child thus grows up in something like the accumulated wisdom of its entire social group, past and present.

One may object that there are a number of very convincing observations of chimpanzee imitation in the literature, and indeed there are a few. It is interesting, however, that basically all of the clear cases in the exhaustive review of Whiten and Ham (1992) concern chimpanzees that have had extensive amounts of human contact. In many cases, this has taken the form of intentional instruction involving human encouragement of behavior and attention, and even direct reinforcement for imitation for many months (e.g., 7 months of training in the case of Hayes & Hayes, 1952, and 4 months of training in the case of Whiten & Custance, 1996). This raises the possibility that imitative learning skills may be influenced, or even enabled, by certain kinds of social interaction during early ontogeny.

Confirmation for this point of view is provided in a study by Tomasello, Savage-Rumbaugh, and Kruger (1993). This study compared the imitative learning abilities of mother-reared captive chimpanzees, enculturated chimpanzees (raised like human children and exposed to a language-like system of communication), and 2-year-old human children. Each participant was shown 24 different and novel actions on objects, and each participant’s behavior on each trial was scored as to whether it successfully reproduced (a) the end result of the demonstrated action and/or (b) the behavioral means used by the demonstrator. The major result was that the mother-reared chimpanzees reproduced both the end and means of the novel actions (i.e., imitatively learned them) hardly at all. In contrast, the enculturated chimpanzees and the human children imitatively learned the novel actions much more frequently, and they did not differ from one another in this learning. Interesting corroboration for this latter finding is the fact that earlier in their ontogeny, these same enculturated chimpanzees seemed to learn many of their humanlike symbols by means of imitative learning (Savage-Rumbaugh, 1990).

These observations raise the very interesting possibility that a humanlike sociocultural environment is an essential component in the development of humanlike social-cognitive and imitative learning skills, no matter the species. That is, a sociocultural environment is essential not only for chimpanzees but also for human beings—a human child raised in an environment lacking intentional interactions and other cultural characteristics in all likelihood would also not develop human-like skills of imitative learning. The idea is thus that the learning skills that chimpanzees develop in the wild in the absence of human interaction (i.e., skills involving individual learning supplemented by emulation learning [see below] and ritualization) are sufficient to create and maintain their species-typical cultural activities, but they are not sufficient to create and maintain human-like cultural activities displaying the
ratchet effect or cumulative cultural evolution. The fact that chimpanzees and other great apes raised from an early age and for many years in human-like cultural environments may develop some aspects of human social cognition and cultural learning shows the power of cultural processes in ontogeny in a particularly dramatic way, although obviously these processes do not turn chimpanzees into humans capable of creating their own culture from scratch.

**HUMAN CULTURE**

We may conclude, then, that whereas chimpanzees clearly create and maintain social traditions broadly defined, these very likely rest on different processes of social cognition and social learning than the cultural traditions of human beings. In some cases, this difference of process may not lead to any concrete differences of outcome in social organization, information transmission, or cognition. But in other cases, a crucial difference emerges and this manifests itself in processes of cultural evolution, that is, processes by which a cultural tradition changes over time within a population.

Some human cultural traditions change over time in ways that seem to be adaptive and, moreover, in ways that seem to accumulate modifications made by different individuals over time in the direction of greater complexity such that a wider range of functions is encompassed—what may be called cumulative cultural evolution or the ratchet effect (Tomasello et al., 1993). For example, the way in which human beings have used objects as hammers has evolved significantly over human history. This is evidenced in the artifactual record by various hammerlike tools that gradually widened their functional sphere as they were modified again and again to meet novel exigencies, going from simple stones, to composite tools composed of a stone tied to a stick, to various types of modern metal hammers and even mechanical hammers (some with nail-removing functions as well; Basalla, 1988). Although we do not have such a detailed artifactual record, it is presumably the case that some cultural conventions and rituals (e.g., human languages and religious rituals) have become more complex over time as well, as they were modified to meet novel communicative and social needs. This process may be more characteristic of some human cultures than others, or some types of activities than others, but all cultures seem to have at least some artifacts produced by the ratchet effect. However, there do not seem to be any behaviors of other animal species, including chimpanzees, that show cumulative cultural evolution (Boesch & Tomasello, 1998).

Tomasello et al. (1993) argued that cumulative cultural evolution depends on imitative learning, and perhaps active instruction on the part of adults, and cannot be brought about by means of weaker forms of social learning such as local enhancement, emulation learning, ontogenetic ritualization, or any form of individual learning. The argument is that cumulative cultural evolution depends on two processes, innovation and imitation (possibly supplemented by instruction), that must take place in a dialectical process over time such that one step in the process enables the next. Thus, if one individual chimpanzee invented a more efficient way of fishing for termites by using a stick in a novel way that induced more termites to crawl onto it, youngsters who learned to fish via emulation from this individual would not reproduce this precise variant because they would not be focused on the innovator’s behavioral techniques. They would use their own method of fishing to induce more termites onto the stick, and any other individuals watching them would use their own methods also, and so the novel strategy would simply die out with the inventor. (This is precisely the hypothesis of
Kummer and Goodall [1985], who believe that many acts of creative intelligence on the part of nonhuman primates go unobserved by humans because they are not faithfully preserved in the group.) On the other hand, if observers were capable of imitative learning, they might adopt the innovator’s new strategic variant for termite fishing more or less faithfully. This new behavior would then put them into a new cognitive space, so to speak, in which they could think about the task and how to solve it in something like the manner of the innovator (standing in her “cognitive shoes”). All of the individuals who have done this are then in a position, possibly, to invent other variants that build on the initial one—which then others might adopt faithfully, or even build on, as well. The metaphor of the ratchet in this context is meant to capture the fact that imitative learning (with or without active instruction) provides the kind of faithful transmission that is necessary to hold the novel variant in place in the group to provide a platform for further innovations—with the innovations themselves varying in the degree to which they are individual or social/cooperative.1

In general, then, human cultural traditions may be most readily distinguished from chimpanzee social traditions—as well as the few other instances of culture observed in other primate species—precisely by the fact that they accumulate modifications over time, that is, they have cultural “histories.” They accumulate modifications and have histories because the cultural learning processes that support them are especially powerful. These cultural learning processes are especially powerful because they are supported by the uniquely human cognitive adaptation for understanding others as intentional beings like the self, which creates forms of social learning that act as a ratchet by faithfully preserving newly innovated strategies in the social group until there is another innovation to replace them. We can see the relation between these social cognitive and cultural learning skills most clearly in early human ontogeny.

**THE ONTOGENY OF HUMAN CULTURAL LEARNING**

Human children grow up in the ontogenetic niche of their culture that, in a very real sense, exists before they are born (Kruger & Tomasello, 1996). But children also need to have some social cognitive skills if they are to exploit the preexisting cultural resources in a species-typical manner (Vygotsky, 1978). These skills cannot be simply presupposed, as is often the case in cultural psychology. This point is most clearly demonstrated by the unfortunate case of children with autism, the vast majority of whom lack the social cognitive skills necessary to participate fully in, or to appropriate, the artifacts and social practices characteristic of those around them (Baron-Cohen, 1993; Hobson, 1993). For typically developing children, the ontogeny of these social cognitive skills begins at the end of the first year of life.

**JOINT ATTENTION**

Six-month-old infants interact dyadically with objects, grasping and manipulating them, and they interact dyadically with other people, expressing emotions back and forth in a turn-taking sequence. But at around 9 to 12 months of age, infants begin to engage in interactions that are triadic in the sense that they involve the referential triangle of child, adult, and some outside entity to which they share attention. Thus, infants at this age begin to flexibly and reliably look where adults are looking (gaze following), use adults as social reference points (social referencing), and act on objects in the way adults are acting on them (imitative learning)—in short, to tune in to the attention and behavior of adults toward outside entities.
At this same age, infants also begin to use communicative gestures to direct adult attention and behavior to outside entities in which they are interested—in short, to get the adult to tune in to them. In many cases, several of these behaviors come together as the infant interacts with an adult in a relatively extended bout of joint engagement with an object (Bakeman & Adamson, 1984). Most often, the term joint attention has been used to characterize this whole complex of triadic social skills and interactions (Moore & Dunham, 1995), and it represents something of a revolution in the way infants relate to their worlds.

Infants begin to engage in joint attentional interactions when they begin to understand other persons as intentional agents like the self (Tomasello, 1995). Intentional agents are animate beings with the power to control their spontaneous behavior, but they are more than that. They also have goals and make active choices among behavioral means for attaining those goals. More important, intentional agents also make active choices about what they pay attention to in pursuing those goals (see Gibson & Rader, 1979, for the argument that attention is intentional perception). All of the specific joint attentional behaviors in which infants follow, direct, or share adult attention and behavior are not separate activities or cognitive domains; they are simply different behavioral manifestations of this same underlying understanding of other persons as intentional agents. Strong support for this view comes from a recent study by Carpenter, Nagell, and Tomasello (1998), who followed a group of infants longitudinally from 9 to 15 months of age and found that for any individual child, these skills emerged together as a group, with some predictable orderings among individual skills.

IMITATIVE LEARNING

This social-cognitive revolution at 1 year of age sets the stage for the infants’ 2nd year of life in which they begin to imitatively learn the use of all kinds of tools, artifacts, and symbols. For example, in a study by Meltzoff (1988), 14-month-old children observed an adult bend at the waist and touch its head to a panel, thus turning on a light. They followed suit. Infants engaged in this somewhat unusual and awkward behavior, even though it would have been easier and more natural for them simply to push the panel with their hand. One interpretation of this behavior is that infants understood that (a) the adult had the goal of illuminating the light and then chose one means for doing so, from among other possible means, and (b) if they had the same goal, they could choose the same means. Cultural learning of this type thus relies fundamentally on infants’ tendency to identify with adults and on their ability to distinguish in the actions of others the underlying goal and the different means that might be used to achieve it. This interpretation is supported by the more recent finding of Meltzoff (1995) that 18-month-old children also imitatively learn actions that adults intend to perform, even if they are unsuccessful in doing so. Similarly, Carpenter, Akhtar, and Tomasello (1998) found that 16-month-old infants will imitatively learn from a complex behavioral sequence only those behaviors that appear intentional, ignoring those that appear accidental. Young children do not just mimic the limb movements of other persons; they attempt to reproduce other persons’ intended actions in the world.

Although it is not obvious at first glance, something like this same imitative learning process must happen if children are to learn the symbolic conventions of their native language. Although it is often assumed that young children acquire language as adults stop what they are doing, hold up objects, and name these objects for them, this is empirically not the case. Linguistics lessons such as these are (a) characteristic of only some parents in some cultures,
(b) characteristic of no parents in no cultures for words other than concrete nouns and some actions; that is, no one names for children acts of “giving” or prepositional relationships such as on or for. In general, for the vast majority of their language, children must find a way to learn a new word in the ongoing flow of social interaction, sometimes from speech not even addressed to them (Brown, 2000). In some recent experiments, something of this process has been captured as children learn words in situations in which the adult is not specifically intending that they learn a word, the referent is not perceptually available when the word is said, and there are multiple potential referents in the situation that the child must choose among on the basis of various kinds of adult social-pragmatic cues. For example,

- In the context of a finding game, an adult announced her intentions to “find the toma” and then searched in a row of buckets all containing novel objects. Sometimes, she found it in the first bucket searched, smiling and handing the child the object. Sometimes, however, she had to search longer, rejecting unwanted objects by scowling at them and replacing them in their buckets until she found the one she wanted (again indicated by a smile and the termination of search). Children learned the new word for the object the adult intended to find regardless of whether or how many objects were rejected during the search process (Tomasello & Barton, 1994).

- Also in the context of a finding game, an adult had the child find four different objects in four different hiding places, one of which was a very distinctive toy barn. Once the child had learned which objects went with which places, the adult announced her intention to “find the gazzer.” She then went to the toy barn, but it turned out to be “locked.” She thus frowned at the barn and then proceeded to another hiding place saying, “Let’s see what else we can find” (taking out an object with a smile). Later, children showed that they had learned “gazzer” for the object they knew the experimenter wanted in the barn, even though they never saw the object after they heard the new word and even though the adult had frowned at the barn and smiled at a distractor object (Akhtar & Tomasello, 1996; Tomasello, Strosberg, & Akhtar, 1996).

- An adult announced her intention to “dax Mickey Mouse” and then proceeded to perform one action accidentally and another intentionally (or sometimes in reverse order). Children learned the word for the intentional, not the accidental, action regardless of which came first in the sequence (Tomasello & Barton, 1994).

Tomasello et al. (1993) called this kind of imitative learning cultural learning because the child is not just learning things from other persons but is learning things through them—in the sense that he or she must know something of the adult’s perspective on a situation to learn the active use of this same intentional act. The adult in the above scenarios is not just moving and picking up objects randomly; he or she is searching for an object, and the child must know this to make enough sense of the adult’s behavior to connect the new word to the adult’s intended referent. The main theoretical point is that an organism can engage in cultural learning of this type only when it understands others as intentional agents like the self who have a perspective on the world that can be followed into, directed, and shared. Indeed, a strong argument can be made that children can only understand a symbolic convention in the first place if they understand their communicative partner as an intentional agent with whom one may share attention—because a linguistic symbol is nothing other than a marker for an intersubjectively shared understanding of a situation (Tomasello, 1999). As a point of comparison, children with autism do not understand other persons as intentional agents, or they do so to only an imperfect degree, and so they are very poor at the imitative learning of intentional actions in general (Smith & Bryson, 1994); only half of them ever learn any language at all, and those who do learn some language are very poor in word-learning situations such as those just described (Baron-Cohen, Baldwin, & Crowson, 1997).
COGNITIVE REPRESENTATION

It is important to emphasize as well that when the child learns linguistic symbols, what he or she is learning is a whole panoply of ways to manipulate the attention of other persons, sometimes on a single entity, based on such things as

- generality (thing, furniture, chair, desk chair)
- perspective (chase-flee, buy-sell, come-go, borrow-lend)
- function (father, lawyer, man, American) (coast, shore, beach)

And there are many other perspectives that arise in grammatical combinations of various sorts (She smashed the vase versus The vase was smashed). Consequently, as the child internalizes a linguistic symbol—as he or she learns the human perspective embodied in that symbol—he or she cognitively represents not just the perceptual or motoric aspects of a situation; rather, he or she cognitively represents one way, among other ways of which he or she is also aware, that the current situation may be attentionally construed by “us,” the users of the symbol. The perspectival nature of linguistic symbols thus represents a clear break with straightforward perceptual or sensory-motor cognitive representations, and indeed this perspectivity is what gives linguistic symbols their awesome cognitive power (Tomasello, 1999). It even allows children to learn linguistic means for conceptualizing objects as actions (He porchèd the newspaper), actions as objects (Skiing is fun), and many other metaphorical construals of things (Love is a journey).

FROM THE SOCIAL TO THE CULTURAL

To summarize, human beings share the majority of their cognitive skills and knowledge with other primates—including both the sensory-motor world of objects in their spatial, temporal, categorical, and quantitative relations, and the social world of behaving conspecifics in their dominance and affiliative relationships. And all primate species use their skills and knowledge to formulate creative and insightful strategies when problems arise in either the physical or social domain. But humans have additional cognitive skills on top of those shared with other members of the order; human beings possess a species-unique cognitive adaptation that is in many ways an especially powerful cognitive adaptation because it changes in fundamental ways the process of cognitive evolution.

This adaptation arose at some specific point in human evolution, perhaps fairly recently, presumably based on some genetic and natural selection events. This adaptation consists of the ability and tendency of individuals to identify with conspecifics in ways that enable them to understand those conspecifics as intentional agents like the self, possessing their own intentions and attention, and eventually to understand them as mental agents like the self, possessing their own desires and beliefs. This new mode of understanding other persons radically changed the nature of all types of social interactions, including social learning, so that a unique form of cultural evolution began to take place over historical time, as multiple generations of developing children learned various things from their forebears and then modified them in a way that led to an accumulation of these modifications—most typically as embodied in some material or symbolic artifact. The ratchet effect thus produced radically changed the nature of the ontogenetic niche in which human children develop ontogenetically so that, in effect, modern children encounter and interact with their physical and
social worlds almost totally through the mediating lenses of preexisting cultural artifacts, which embody something of the inventors’ and users’ intentional relations to the world when using them. Developing children are thus growing up in the midst of the very best tools and symbols their forebears have invented for negotiating the rigors of their physical and social worlds. Moreover, as children internalize these tools and symbols—as they learn to use them through basic processes of cultural learning—they create in the process some powerful new forms of cognitive representation based in the intentional and mental perspectives of other persons.

Thus, my account for how a single human cognitive adaptation could account for all of the many differences in the human and nonhuman primate cognition is that this single adaptation makes possible an evolutionarily new set of processes, that is, processes of sociogenesis, that have done much of the actual work—and on a much faster time scale than biological evolution. Perhaps this single novelty changed the way in which human beings interacted with one another. And with much effort over much historical time, these new ways of interacting transformed such basic primate phenomena as communication, dominance, exchange, and exploration into the human cultural institutions of language, government, money, and science—without any additional genetic events. The transformations in the different domains of human activity as a result of this new adaptation were not necessarily instantaneous. For example, human beings were already communicating with one another in complex ways when they began to understand one another as intentional agents, and so it took some time, perhaps many generations, for this new understanding of others to make itself felt and thus for symbolic forms of communication to emerge. The same would hold true of the other domains of activity, such as various forms of cooperation and social learning, as this new kind of social understanding gradually enabled new kinds of social interactions and artifacts. Figure 1 presents an oversimplified and certainly nonexhaustive listing of some domains of human activity and how they might have been transformed by the uniquely human adaptation of social cognition as it worked itself into the social interactive process across many generations of human history.

**CONCLUSION**

It is very difficult to keep one’s eye simultaneously on similarities and differences. But that is what we must do if we are to understand human culture in its evolutionary context. Human culture emerged evolutionarily from primate social organization, which forms its foundation. Primate social organization includes the recognition of individuals, the forming of long-term social relationships, and many complex cooperative and competitive activities. Differences between groups of primates within the same species demonstrate that there is much flexibility in primate cognition and learning and that much information may be passed along socially in primate groups.

But human cultures pass along information in a different way and so end up with different kinds of social (cultural) organizations. Because human beings understand one another in special ways—that is, because human beings have certain species-specific, social-cognitive skills—they engage in various forms of cultural learning and instruction. This leads to a species-unique pattern of cumulative cultural evolution, characterized most dramatically by the creation of artifacts with histories such as languages and other social institutions. Human children then grow up in the midst of the accumulated cultural products of their culture, and, given that they have the requisite social-cognitive skills, this allows them to benefit—in a
way not possible in other species—from the accumulated knowledge and skills of all the previous individuals in their culture, past and present. These cultural processes, more than anything else, make human cognition and social organization so dazzlingly complex.

**NOTE**

1. I should acknowledge at this point that things may not be quite as black-and-white as I have made them out to be. In a very interesting article titled “Why Culture Is Common, but Cultural Evolution Is Rare,” Boyd and Richerson (1996) hypothesize that humans and other primates both engage in the same kinds of social and imitative learning, but there may be a quantitative difference. Thus, chimpanzees may have some imitative learning abilities, but they may display them less consistently than humans or in a narrower range of contexts than humans—or it may even be that only some chimpanzee individuals have these skills. Boyd and Richerson argue that a rarity of key

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**Figure 1:** Some Different Domains of Social Activity Transformed Over Historical Time Into Domains of Cultural Activity by the Uniquely Human Way of Understanding Conspecifics

<table>
<thead>
<tr>
<th>Social Domain</th>
<th>Cultural Domain</th>
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<tbody>
<tr>
<td>Communication</td>
<td>SIGNALS</td>
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<tr>
<td></td>
<td>(intersubjective, perspectival)</td>
</tr>
<tr>
<td>Gaze of Others</td>
<td>GAZE FOLLOW</td>
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<tr>
<td></td>
<td>(intersubjectivity)</td>
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<tr>
<td>Social Learning</td>
<td>EMULATION, RITUALIZATION</td>
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<tr>
<td></td>
<td>(reproducing intentional acts)</td>
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<tr>
<td>Cooperation</td>
<td>COORDINATION</td>
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<td></td>
<td>(role taking)</td>
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<td>Teaching</td>
<td>FACILITATION</td>
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<td></td>
<td>(mental states of others)</td>
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<tr>
<td>Object Manipulation</td>
<td>TOOLS</td>
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<td></td>
<td>(intentional affordances)</td>
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<td></td>
<td>SYMBOLS</td>
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<td></td>
<td>(intersubjective, perspectival)</td>
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social learning processes could make cultural evolution of the cumulative type impossible. The basic problem would be that there is too much slippage in the ratchet as, for example, one individual might imitatively learn another’s innovation, but then no other individuals could imitate her, or the individuals who did attempt to imitate her would do so only very poorly. The basic argument is thus that there is a quantitative difference in social learning skills that leads to a qualitative difference in the historical trajectories of the resulting cultural traditions. In either case, however—whether the difference in human and ape social learning skills is more qualitative and absolute or more quantitative and relative—the effect is that human beings currently have the social-cognitive and cultural learning skills to create, as a species, some unique cognitive products based on cumulative cultural evolution.

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