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WHY US AND NOT THEM?

> Had humanity not been the interested party,
> we would have been the fifth great ape.
>
> —**Richard Leakey (2005)**

> I sat gazing at a chimpanzee who sat on the other side of a fence, gazing at me. As a psychoanalyst, I have been taught to analyze the countertransference, which means that I try to formulate how this animal is making me feel. So I sat there and tried my very hardest to do that. I felt . . . something missing, I could not connect. I was reminded of the experience one sometimes get when relating to a child with autism . . . It was as if this chimp was not at home, mentally speaking.
>
> —**Peter Hobson (2004)**

Are humans just another ape, or an utterly different ape? No one can map the DNA of a chimpanzee, watch a bonobo striding upright on two legs or concentrating and excelling at object manipulations, or look a gorilla or orangutan in the eye and fail to be impressed by how similar we are to them. From Darwin onward, scientists have traced the anthropoid origins of emotions, ranging from satisfaction, loyalty, and joy to embarrassment, anxiety, shame, anger, and disgust.[1] Thus when the paleontologist Richard Leakey looks deeply into the eyes of a chimpanzee, he sees a kindred creature. And well might a psychiatrist like Peter Hobson wonder, "What is he thinking?" But when our hairy cousin returns that gaze, the film in his camera seems different. Thus, whereas Leakey the paleontologist emphasizes the profound

homologies between humans and other apes, Hobson the psychiatrist is more struck by differences between two closely related species.[2] Both are right.

Primatologists familiar with chimpanzee behavior will be quick to point out that Hobson's simian acquaintance scarcely knew him from Adam. Had Hobson actually had a prior relationship with that chimpanzee, the eyes returning his gaze might well have seemed less blank.[3] Certainly there are circumstances when chimpanzees sense how someone else feels. Chimpanzees yawn when someone else does, just the way humans do, and they seem to understand what to do when another ape seeks help, paying special attention to licking the inaccessible places, for example, when tending a fellow chimpanzee that has been wounded by a leopard. Apes seem especially helpful toward offspring or younger siblings.[4] When it occurs, empathetic-seeming behavior by apes makes a huge impression. Audiences are riveted when the renowned ethologist Frans de Waal tells the story of Kuni the captive bonobo who picked up a stunned starling. After a concerned keeper urged the ape to let the bird go, the bonobo made abortive attempts to get it to fly before climbing high in a tree where she "carefully unfolded its wings and spread them wide open" as she threw the bird up into the air.[5] But as de Waal himself stresses, we have to be cautious about interpreting what we see.

Yes, human-reared chimpanzees test surprisingly well at simple cooperation, like helping someone else extract something.[6] But in spite of their rudimentary understanding of what someone else is trying to do, these apes' capacity for attributing separate mental states to others (or else the extent to which they care to do so) seems limited. Furthermore, such intersubjective capacities as they can muster emerge more readily in competitive than in cooperative situations.

Consider one recent experiment. A psychologist placed food in various places, some items in full view of a dominant chimpanzee, others out of his sight, while a subordinate in an adjacent cage was allowed to watch. When both were released into the cage with the food, the subordinate took advantage of his advance knowledge to bypass food in plain sight and make a beeline for the hidden treats.[7] When tested in a noncompetitive situation, however, chimpanzees seem less concerned about others, especially if they do not have a previous relationship. Compared with human children, chimpanzees have excellent spatial memory and

are very good at discriminating quantities, but they test far less well on social learning or reading nonverbal cues having to do with hidden rewards or intentions.[8]

The strongest evidence for chimpanzees' lack of regard for others comes from experiments by the UCLA primatologist Joan Silk. As a Stanford undergraduate, Silk went to the Gombe Stream Reserve of Tanzania to study mother-infant behavior among chimpanzees. Subsequently, she became known for her work on macaques, baboons, and humans. But she never forgot her early experiences with chimpanzees. She knew that they sometimes engage in collective activities like hunting, and they share food under special circumstances, console a victim of aggression with a hug, or stay near a dying relative. Still, the extremely analytical Silk was skeptical of claims about chimpanzee empathy. She thought up a clever experiment to test just how eager they would be to help when given an opportunity to do so at no particular cost to themselves. Silk and her team deliberately opted to use individuals who were familiar with one another but not close relations.

Her subjects were trained to obtain edible rewards by pulling on one of two ropes. If the chimpanzee pulled the first rope, food was delivered to his own cage. If instead the chimpanzee selected the other rope, food was delivered to both the puller's cage and the cage adjacent to him. Did it make any difference to the chimpanzee in charge whether or not the adjacent cage was occupied by another animal, also eager to be fed? The chimpanzees behaved as if they couldn't care less whether or not their neighbor got something to eat. However, when researchers at Max Planck subsequently performed similar experiments using chimpanzees with prior relationships, they found that individuals who knew each other not only cooperated in obtaining food but kept track of "reputations." These captive chimpanzees exhibited a preference for collaborating with others who had demonstrated that they were good at rope-pulling.[9]

Additional experiments were set up at Max Planck to explicitly test Silk's conclusions. They seemed to confirm that the chimpanzees were "almost totally self-regarding."[10] Whether or not another chimpanzee also got a reward, or failed to, was just not that important to the chimpanzee subjects in these experiments. Like Silk's original paper, which was titled "Chimpanzees Are Indifferent to the Welfare of Unrelated Group Members," the new Max Planck work was titled "What's in It for

Me? Self-Regard Precludes Altruism and Spite in Chimpanzees." Both stressed the absence of spontaneous impulses to give or care about what others receive.

Undeniably, chimpanzees, especially when they reach out a hand to beg, embrace, or kiss another, pat another on the back, comfort, or even assist a fellow group member, seem eerily like us. We are still in the early days of comparing and contrasting the cooperative tendencies of other apes with those found in humans, and the results continue to be difficult to interpret. This is why some researchers characterize chimpanzees as by nature "highly cooperative creatures," while others focus on the fact that cooperation among chimpanzees has been documented only among specially trained chimpanzees or chimpanzees who have opportunistically learned how to cooperate under captive conditions or have been observed only when food is not involved.[11]

In my opinion, there is little question that human children are less self-centered, more spontaneously cooperative, and more strongly inclined to share than chimpanzees are. But then again, children are exposed right from birth to the same sort of human models that the captive chimpanzees who do better on tests of cooperation are exposed to. Nevertheless, the experiments by Silk's team as well as those from Max Planck and elsewhere seem to consistently show that chimpanzees—even those reared by humans—are just not terribly interested in understanding what someone else wants or intends. Unless specially trained, chimpanzees pay attention to what others know when they are competing, not when they are cooperating. By contrast, humans pay attention to others in both spheres.

Talented researchers who often disagree continue to probe chimpanzee-human similarities and differences. Some of them may end up softening their conclusions about chimpanzee indifference. But what I do not expect to change is the contrast between the natural readiness of most people to help an unrelated travel companion (though under contemporary conditions this may be becoming less common!), and the absence of such giving impulses in apes living under natural conditions. Compared with other primates, humans are born far more eager to share the mental and affective states of others.

So far as most psychiatrists are concerned, caring about someone else's mental as well as their physical state (whether they might be hun-

gry, for example) is integral to human nature. The absence of such impulses to give and share feelings (as among children who are autistic) is taken as an indicator of pathology. If humans show a compassionate interest in someone else's mental state, it is taken for granted that these capacities are useful and in an evolutionary sense were adaptive.[12] No doubt, once acquired, such traits did aid the survival of group-living animals. But the premise that intersubjectivity must have been adaptive in the environments in which humans evolved is only convincing until someone asks: So how did other, comparably defenseless, savanna-dwelling primates like baboons, patas monkeys, or vervets manage to evade the lions that stalked *them?* If intersubjectivity was so useful for maintaining cohesive social groups, defending one's in-group from violent neighbors, or wiping out competitors, why didn't other social primates (those "demonic" neighbor-stalking chimpanzees in particular) evolve such gifts as well? Why us and not them?

LOGICALLY, LANGUAGE COMES LATER

The first time I ever considered the question "Why humans and not other apes?" the answer seemed obvious. Surely, I thought to myself, it is our innate capacity to learn language, our unique ability to use words to express what is on our own and on others' minds, which explains why humans can empathize with others through articulating their feelings and sharing their mental states, and which renders them capable of such effective cooperation. This is the view held by such eminent experts on chimpanzees as Jane Goodall. "What makes us human," she remarked recently, "is an ability to ask questions, a consequence of our sophisticated spoken language . . . Once you can discuss something and talk about it in the abstract and take lessons from the past and plan for the future—that is what makes the difference." But on further reflection, I find the focus on language unsatisfactory.[13]

Unquestionably, the uniquely human capacity for language enhances our ability to connect with others and exponentially increases the complexity of the information we can convey. But language is not just about conveying information, as in warning others to "Look out!" An animal alarm call does that. Even vervets (which are Old World monkeys, after all, not even apes) have specific calls that alert conspecifics to danger and

also inform them whether the threat is from the air and likely to be a predatory bird, as opposed to something scary on the ground, like a snake. Honeybees convey surprisingly precise information about the location of food (how far away and in what direction) by the type and duration of their ritualized "dance" movements. Animals have all kinds of ways of communicating information about their environment or state of arousal to other members of their species and to other species as well.[14]

The open-ended qualities of language go beyond signaling. The impetus for language has to do with wanting to "tell" someone else what is on our minds and learn what is on theirs. The desire to psychologically connect with others had to evolve *before* language. Only subsequently do the two sets of attributes coevolve. As Hobson puts it, "Before language, there was something else—more basic . . . and with unequalled power in its formative potential."[15] If we are looking for sources of human empathy, these emotion-laden quirks of mind had to evolve before the words came along to articulate them. Even before humans began actually speaking to one another in a behaviorally modern way, their immediate hominin ancestors already differed from other apes in their eagerness to share one another's mental states and inner feelings. In this sense, these creatures were already emotionally modern long before they became anatomically or behaviorally modern and were routinely using speech to converse with one another. The ancestors of people who acquired language were already far more interested in others' intentions and needs than chimpanzees are. What we need to explain is why.

EMPATHIC GLIMMERINGS AS OLD AS MAMMALS

All sorts of animals are sensitive to those around them. Mice have emotional reactions to the pain of other mice. They respond to the writhing of groupmates by becoming more sensitive to pain themselves.[16] The suffering of others is contagious, as well it should be. What is painful or alarming to another creature could well be dangerous to oneself. This is why fear is a particularly contagious emotion.

Many kinds of animals, whether cold-blooded or warm-blooded, winged or scaled, may tend others and be sensitive to their well-being. Most such cases involve parents. Male fish sense the presence of eggs

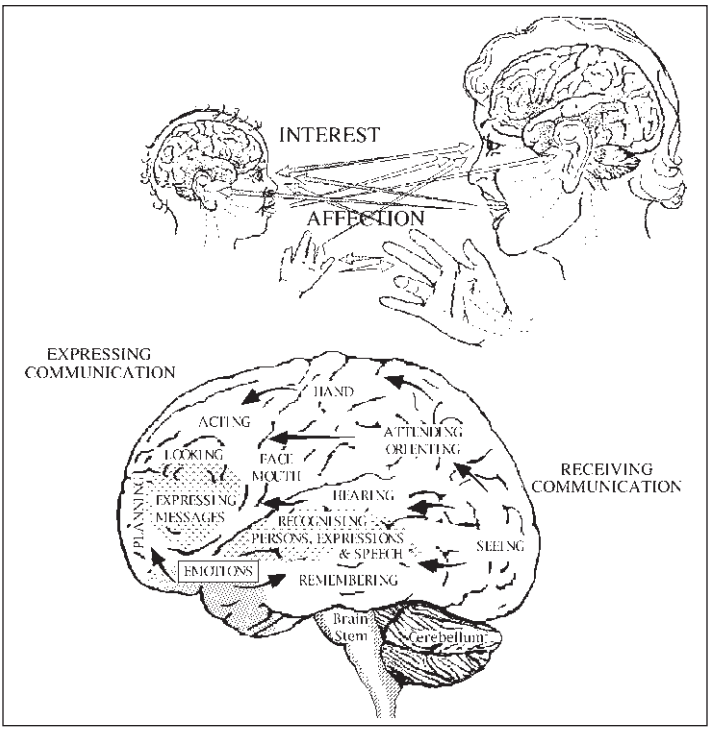
they are likely to have fertilized and fan the eggs with their tail to keep clean water circulating about them. Mother squid ensnare their own ballooning egg masses with long tentacles so as to brood them under the protective shadow of a mother's body. Even mother crocodiles or rattlesnakes will linger protectively near newly hatched or live-birthed young until babies are mobile enough to fend for themselves.[17] Wherever parental care evolved, it marked a watershed in the way animals perceived other individuals, with profound implications for the way vertebrate brains were structured.

Nowhere have these cognitive and neurological transformations been more revolutionary than among mammals. Mammal mothers fall in a class by themselves. One has only to recall a mother dog returning to her litter again and again, nosing each pup, alert to distress, sensing their needs, suckling babies, keeping them warm. The postpartum human mother who checks her baby every 15 minutes to be sure he is still breathing follows in this venerable tradition of compulsive concern.

Lactating mothers date back to the end of the Triassic, around 220 million years ago. This is when babies began to be born so helpless that mothers needed to be attuned to the smell, sounds, and slightest perturbations in the condition of vulnerable young that had to be kept both warm and fed. Since any nearby newborns were likely to have issued from their own bodies, it was adaptive for mothers to perceive all neonates as attractive.[18] Mothers who had just undergone the hormonal transformations of pregnancy were especially susceptible.

Superacute hearing was just one of many ways that selection operated on mother mammals to render them responsive to others. New modes of hearing, sensitivity to touch and odors, along with new ways of distinguishing one's own young from others coevolved with cognitive frameworks for processing information about others.[19] My favorite example dates back to the age of dinosaurs. Confronted with the special challenge of signaling distress to their mothers without attracting lizards and other reptiles who might eat them, early mammals evolved the ability to emit high-frequency sounds. To this day, mammals can still detect sounds at higher frequencies than reptiles can, and a mouse pup that has strayed from its mother's nest will attract her attention by emitting ultrasonic squeaks that almost no one else can hear.[20]

So, while their mothers were evolving to be more sensitive to others,



Humans have brains specially adapted for sympathetic interactions and the forging of relationships. At birth, an enormous amount of brain tissue, especially in the neocortex, is already allocated to processing faces, facial expressions, gestures, and vocalizations of others. The processing of this information is also motivated and stimulated by older subcortical sections of the brain that are related to the emotions and memories of earlier interactions. (Trevarthen 2005)

baby mammals were evolving too. Natural selection favored babies who were sensitive to their mother's body warmth and smells, able to squirm close to her and latch onto her teats, and capable of signaling effectively (and safely) when separated. It is no accident that the first regions of the neocortex to form in utero are those that eventually represent and control sucking actions by the mouth and tongue. Once a baby is born, wriggles close to his mother, and locates a nipple, he will need to wrap his lips around it, latch tight, and suck so as to stay fed and, just as importantly, to further stimulate his mother's nurturing impulses. The tugging at her nipples stimulates the production of prolactin along with a surge of the neuropeptide oxytocin, with its pleasurable and soothing effects.[21]

Stimulating and conditioning its mother, making sure that she becomes addicted to nurturing, is actually a mammalian baby's first critical, if unconscious, mission. The neocortex, which first evolved among mammals and overlays older, reptilian portions of the brain, serves as the control center of the nervous system.[22] The neocortex equips baby mammals to form attachments to their mothers and helps get their mothers to bond with them. In time, the baby's neocortex will expand and develop into the main decision-making area of the brain. But it will also continue to equip grown-up mammals to bond with babies and to form multifaceted relationships with others.[23]

This requirement for mothers to bond with babies, and babies with mothers, meant that mammals' brains were designed for the formation of relationships in ways that the brains of other animals are not. The need for mothers to anticipate the needs of offspring is integral to several of the hypotheses that have been proposed to explain the evolution of mind reading. Prime among these is the "mind-reading mums" hypothesis. An important alternative hypothesis centers on the need of competitive social creatures to manipulate others, known as the "Machiavellian intelligence hypothesis." Both merit serious consideration.

THE MIND-READING MUMS HYPOTHESIS

The first social bonds ever forged were between a mother and her offspring. Her need to look out for vulnerable young remains the most widely accepted explanation for why, in most mammalian species, females are more affiliative and socially responsive than males are, even though there are important exceptions, as we will see in the next chapter. Such differences in sex roles are especially well documented in Old World monkeys.[24] Among langur monkeys, for example, females at every life phase are more attracted to infants than males are. Even females far too young to be mothers respond to infantile vocalizations, and they eagerly approach, attempt to touch, hold, inspect, and carry infants. More than 99 percent of all attempts to take babies involve females.[25] Except in extreme situations, and then only briefly to rescue (or maul) them, male langurs never carry babies.[26] Not only do more responsive mothers make better mothers, but among some monkeys, such as savanna baboons, the

more affiliative a female is and the more social contacts she maintains, the higher the probability that her offspring will survive.[27]

Although less clear-cut and also far more difficult to interpret due to the myriad ways behavior gets shaped by cultural expectations, sex differences in caretaking have also been observed in humans. In Western society, little girls are expected to be more socially responsive and affiliative than little boys are. Whether because of such social expectations or because of innate differences, girls seem more likely than boys to form secure relationships with their care providers, and girls more readily form secure attachments to allomothers, according to recent research done in Germany.[28] As early as two years of age, little girls are more likely to comfort others in distress than little boys are.[29] It's not that little boys do not comfort others, for they do. Rather, it usually takes stronger signals of distress to elicit their sympathy.[30]

Childhood differences in sensitivity to others, and particularly to their signs of distress, persist into adulthood and have been documented in new parents. The Canadian psychologist Alison Fleming has been one of the pioneers in this area. She and her colleagues found that it takes more urgent-sounding cries to get a father to respond to a fretting newborn than it does a mother.[31] Women also seem to be more sensitive than men are (that is, quicker and more accurate) when reading facial expressions.[32]

Impressed by such reports, the New Zealand psychiatrist Raewyn Brockway proposed that highly intuitive moms not only perceive what irks their babies—a skill that enhances their ability to care for them—but are also better equipped to guide immatures as they acquire survival-enhancing skills. Mind reading is advantageous to mothers, Brockway argues, because "good teaching utilizes an empathic awareness of the infant's point of view, both physical and psychological." Over the course of human evolution there would have been selection for "smarter, more efficient mothering or different kinds of learning, or perhaps, most critically, in different kinds of teaching. Even the simplest components of our current theory-of-mind capacities would have been useful for promoting the survival of offspring."[33]

Sensible as it seems to argue that women evolved to be more intuitive and empathetic than men because mothers need to be more sensitive to the needs of their infants, by itself this argument cannot account for

intersubjective aptitudes that appear to be uniquely human. All sorts of mammals enter the world helpless and vulnerable, none more so than baby apes. Possibly their mothers become conditioned to associate specific responses with calmer outcomes, or they may have some conscious sense of what their babies are and are not capable of and what they need. In any event, all Great Ape mothers in the wild are both extremely wary of their surroundings and extraordinarily responsive to the slightest sign of discomfort in their infants, swiftly adjusting them and holding them close.

Chimpanzee, orangutan, and gorilla mothers are more single-mindedly devoted than human mothers are, and for a much longer period of time. Their offspring would benefit from having gifted teachers sensitive to their pedagogical needs, just as human children do.[34] As Brockway readily acknowledges, even chimpanzee mothers will model appropriate skills, and in doing so display sensitivity to the limitations and learning needs of apprentices practicing important subsistence tasks. Yet apes do not teach or learn from others nearly so readily as humans do, and typically not at all.

For example, in many areas of Africa, fat-rich kernels from cracked nuts are a very important food for both humans and other apes. During seasons when nuts are available, a typical chimpanzee will average around 3,450 calories per day from this resource. But it takes years of trial and mostly error to master the technique of nut-cracking. The faster they learn this skill, the better fed young chimpanzees and young humans will be.[35] Well-nourished youngsters can also be weaned sooner without the risk of starvation, leaving mothers more time to keep themselves fed. Earlier weaning and better nutrition for the mother translate into a shorter interval between the last birth and the next conception. Over a lifetime, such cumulative advantages contribute to higher maternal reproductive success. Over generations, quicker mastery of foraging techniques will mean evolutionary advantages for that lineage.

So why haven't chimpanzees been selected to develop the same sort of mind-reading skills that pay off in more efficient learning among humans? If mind-reading human mothers respond more flexibly to infant needs and are better equipped to rear and tutor offspring, why haven't other apes spent 6 million years evolving and refining their intersubjective aptitudes? A lovely hypothesis for mind reading still leaves us grap-

(Top) A child growing up in a gathering and hunting society watches attentively as his mother cracks mongongo nuts, a staple food among the !Kung. Learning just how to strike the extremely hard shells is a skill that can take years to master. (Bottom) During some seasons, chimpanzees as well spend hours cracking open the hard outer shells of palm oil and coula nuts by hammering them against a stone "anvil." Like their modern human counterparts, chimpanzee mothers patiently model how to hold the stone "hammer" or position a nut on the anvil, even allowing a grabby little apprentice to take tools or nuts right out of their hands. Although chimpanzee mothers do not actively teach, they remain sensitive to their infants' struggles. In the best pedagogical tradition, mothers may even allow a frustrated apprentice to take some of her own already extracted nut meats, a well-timed and encouraging reward. (Top: I. DeVore/AnthroPhoto. Bottom: © Tetsuro Matsuzawa)

pling with the question: Why us and not them? The next hypothesis, currently the most widely cited of the alternative explanations for mind reading, suffers from the same limitation.

THE MACHIAVELLIAN INTELLIGENCE HYPOTHESIS

The craftiness of a subordinate chimpanzee able to take advantage of inside information about what another chimpanzee knows is often explained with reference to Machiavellian intelligence. The hypothesis derives its name from Niccolò Machiavelli, whose advice to a sixteenth-century Italian prince has become associated with ruthless political manipulation (much as Karl Rove's advice did for a recent generation of American politicians). Most thoroughly developed by Andrew Whiten and Richard Byrne at St. Andrews University in Scotland, the Machiavellian intelligence hypothesis posits a 70-million-year legacy of extreme sociality combined with a universal primate urge to strive for status.

Higher primates possess a general social intelligence that equips them to differentiate probable kin from nonkin, assess the strengths and weaknesses of different individuals, keep track of past social interactions in order to predict who is currently dominant to whom or who is likely to reciprocate and who will not.[36] To cope with social complexity, monkeys and apes alike have to be what the primatologist Alexander Harcourt terms "consummate social tacticians."[37] Baboons, rhesus monkeys, and chimpanzees all keep track of the intricate and fluctuating status of other group members so as to select and maintain advantageous allies when competing with their fellows. Apes are if anything even more sophisticated than monkeys at gauging status fluctuations and assessing competitive intentions, combining typically primate social intelligence with a rudimentary theory of mind.[38]

Together with its corollary, the social intelligence hypothesis, the Machiavellian intelligence hypothesis has become the explanation of choice for why some higher primates excel at problem-solving tests involving what others can see or know—the better to manipulate or deceive them—and for why they have larger brains for their body size than do other mammals.[39] Indisputably, Machiavellian intelligence does a fine job of accounting for why a chimpanzee subordinate might disguise the fact that he has located some preferred food, enabling him to circle back

later and enjoy the fruits of his deception once the dominant animal is out of the way.[40] The same Machiavellian intelligence that renders primates adept at forging complex political alliances and deceiving others may also have helped chimpanzees coordinate joint activities like hunting. A band of males will fan out so that one or more males block any escape route that their prey, say a colobus monkey, might take. Then one of the males climbs up after the targeted prey. Even though it's not clear just how conscious or actually coordinated this behavior is, the hunters *act* as if they know what other animals will do and anticipate what the consequences are likely to be. Their actions have the earmarks of what we would call planning.[41]

Just as the need for empathizing and responding to the needs of vulnerable young helps to explain the development of specific areas in mammalian brains, so too the need for greater Machiavellian intelligence can help to explain the expansion of the neocortex. These planning portions of the brain were useful in assisting the common ancestors of humans and other apes to predict what others would do in competitive or predatory contexts.[42] But here's the problem. We still have to explain why humans are so much better than chimpanzees at conceptualizing what others are thinking, why we are born innately eager to interpret their motives, feelings, and intentions as well as to care about their affective states and moods—in short, why humans are so well equipped for mutual understanding.[43] Chimpanzees, after all, are at least as socially competitive as humans are. Attacks from conspecifics (both infanticide and deaths due to lethal raids by bands of males from neighboring groups) are major sources of mortality.[44] Male and female chimpanzees are even less abashed about striving for dominance status than men and women are.

And like humans, chimpanzees have a lust for meat, and they cooperate in rudimentary ways when hunting or making raids on other groups. Surely, chimpanzees would benefit from being able to outwit quarry or psych out competitors every bit as much as our ancestors did. So why didn't selection favor even greater and more Machiavellian intelligence in *Pan troglodytes*? If social intelligence evolved to help individuals wipe out their neighbors, surely chimpanzees needed it as much, or more, than humans did.

Such questions are so obvious that some readers are probably wondering why no one asked them before. The main reason is that we were

laboring under a wrong starting assumption about the capacities of social cognition in the common ancestor of humans and other apes. Most, perhaps all, researchers assumed that the ability of newborns to seek out faces, fixate on them (on eyes especially), gaze deeply into those eyes, and process information about the expressions observed there were uniquely human and acquired after our hominin ancestors split off from the long-ago common ancestor of humans and other apes. Because we took for granted that human infants' capacity for interpreting and imitating faces was unique, we presumed that it was a recent human acquisition absent in other apes.[45] Certainly scientists were aware of selection pressures favoring Machiavellian intelligence in other apes, but we assumed that nonhuman apes lacked the neural underpinnings to seek out, read, and imitate others' facial expressions—initial steps toward mind reading.

Mistakenly, we thought baby chimpanzees did not look into or imitate faces the way human babies did. As long as we assumed that only human newborns possessed the basic neural apparatus for assessing conspecific facial expressions, empathizing with what others were experiencing, and thereby reading their intentions, there seemed little need to ask why other apes never evolved better capacities for mind attribution. We simply took for granted that they lacked the basic equipment. All this started to change around the beginning of the twenty-first century, when revolutionary discoveries about what other apes are actually capable of forced reconsideration of the question of why humans are so much more inclined than other apes toward intersubjective engagement.

MONKEY SEE, MONKEY FEELS WHAT IT WOULD BE LIKE TO DO

In 1996 an Italian neuroscientist who was part of a team carrying out routine studies on how particular motor skills are reflected in brain activity noticed something odd. The neurons that fired when a macaque grabbed a raisin also fired when the monkey simply watched the researcher pick up and eat a raisin.[46] Neuroscientists quickly christened this new class of brain structures "mirror neurons" because the same areas of the brain that would be activated by doing something are also activated just by watching someone else do the same thing. The serendipitous discovery of mirror neurons led to an explosion of speculation

and new research into "the neural underpinnings of embodied simulation" to learn how the brain reacts when we watch someone else do something.

Researchers hypothesize that mirror neurons allow creatures to vicariously experience what another individual is doing. By mentally going through the same motions, the mimic gains a better understanding of what the actor being copied is intending to do.[47] Thus, the discovery of mirror neurons generated enormous excitement among developmental psychologists and clinical psychologists as well as among neuroscientists. From the outset, researchers suspected that mirror neurons play a role in empathy as well as imitation. This was consistent with at least one theoretical model for how human infants first learn that other individuals have mental states and minds of their own. In this model, the developmental psychologist Andrew Meltzoff sought to integrate what neuroscientists were learning about neural structures with older theories about how babies observe, imitate, and learn.

Years before, Meltzoff together with Keith Moore reported that some human babies as young as 12 hours old possess the innate ability to imitate others. Hard as it was to believe when first reported back in 1977, and in spite of continuing debate over whether the responses by very young babies are actually imitation, indisputably some babies exhibited a complex responsiveness to others much earlier than previously assumed. Meltzoff's findings have been replicated in more than 13 different labs, not to mention in the homes of curious parents who can't resist making funny faces at their babies. My own babies are grown, but Meltzoff's tongue protrusion test remains one of my favorite ways to while away time at airports. Caught in the right mood, a baby will often respond to tongue protrusions by sticking out her tongue. After repeating his experiments with even younger newborns, Meltzoff quipped, "You can't get much younger than 42 minutes old." Meltzoff was convinced that he had documented that "a primitive capacity to imitate is part of the normal child's biological endowment."[48]

It has been known for a long time that humans, including babies, are fascinated by faces. Today we realize that a special region of the brain and special cells register and process information about faces.[49] Right from birth, human babies seek out any nearby face, and when they encounter their mother's face, they may gaze deep into her eyes as she

Like many readers of *Science* magazine back in 1977, I was astounded by two juxtaposed strips of photos. In the strip on top, a young and goofy-looking Meltzoff was photographed sticking out his tongue, opening his mouth, and pursing his lips. Just below, with eyes fixated on Meltzoff's face, an alert newborn performed an approximation of each expression. (Meltzoff and Moore 1977:75)

returns their gaze. In an inspired set of experiments, Meltzoff demonstrated that some of these very new babies were not just looking for faces but seeking to engage and perhaps also identify with them. To Meltzoff, early imitation implies that "seeing others as *like me* is our birthright."[50]

When Meltzoff's observations were originally made, most of us still took for granted that mutual gazing along with this early capacity of newborn babies to imitate what they saw was uniquely human as well as universal. This was consistent with the limited evidence we then had for other apes. Hypothesizing that a baby who first observed and then imitated someone else was mentally making an analogy between himself and that someone else, Meltzoff proposed "that infants' connection to others emerges from the fact that the bodily movement patterns they see others perform are coded as like the ones they themselves perform."[51]

Babies everywhere are fascinated by faces. Here a Himba mother in Namibia gazes into the face of her three-to-four-month-old baby, first making eye contact, then kissing him on the lips. Seconds later, the mother scrunched up her face to copy the baby's snorts and smiles as she touched him with her nose. The fascinated baby smiled back with flashing eyebrows and little snorts, occasionally sticking his tongue out. Even after the mother became distracted by conversation with other people, the pair would occasionally resume their mutual gaze. (Video by I. Eibl-Eibesfeldt/Human Ethology Archives, with summary of image context by Niko Larsen)

Once memories of such experiences are stored away, they become the basis for future assessments about both self and others, and the relationship between them. In Meltzoff's words: "Empathy and role-taking and all manner of putting yourself in someone else's shoes emotionally and cognitively seem to rest on the connection between self and other."

As soon as mirror neurons were discovered, Meltzoff began to wonder if they might help explain the unusually well-developed abilities for making connections with and imitating others that he had documented in human infants. He hypothesized that "the neuro-cognitive machinery of imitation lies at the origins of empathy and developing a theory of mind."[52] Combine mirror neurons with mutual gazing and imitation, and, for Meltzoff, mind reading follows. Convinced that he was on the right track, Meltzoff lapsed into poetic metaphor: "Through understanding the acts of others, we come to know their souls."[53] The men-

tion of souls leaves little doubt that developmental psychologists at the beginning of the twenty-first century still assumed they were dealing with exclusively human capacities. Eyes, long celebrated by poets as "windows" into the human soul, played a big role in such assumptions. But what is distinctive about human eyes that allows this unique depth of insight?

THE EYES HAVE IT

Post a photograph of two staring eyes above the coffeemaker in an office lounge and you are likely to discover—as a team of British psychologists did in 2006—that people pouring themselves a cup will be more likely to deposit the recommended payment (in that instance, fifty pence).[54] Humans are not unusual in this respect. From time immemorial, staring eyes possessed this special salience. Vertebrates with brains no bigger than an iguana's or a wild turkey's can sense if someone is looking at them. I can personally vouch for this after trying to sneak up on the wild turkeys at our farm in northern California. Somehow, they always know how to stay just out of view, not necessarily farther away, but just below some obscuring ridge so I cannot see them. Like many animals, Old World monkeys and apes find it unnerving to be stared at (though, curiously, this is not true for New World monkeys such as marmosets or tamarins).[55]

Like other apes, humans also perceive direct stares as threatening. But meanings conveyed by long looks can also be quite variable. Human eyes convey extra information about what an individual is feeling, looking at, and intending. True, other apes also focus, squint, and blink, and their eyes register patterns involving light and color the same way human eyes do. Other primates like baboons call attention to their eyes by lowering pale lids and "flashing" their brows upward in arches of great significance much like humans do. But humans communicate with their eyes more; many humans emphasize the direction of their gaze with a conspicuous white surround highlighting exactly where the pupils are pointed.[56] The direction of such people's gaze is thus easier to read than it is in other apes, whose gaze direction is obscured by a dark surrounding matrix. Only a sliver of white is ever—and then only occasionally—visible when an orangutan or chimpanzee glances sideways.

It is this ratio of white to dark that magnifies intensity and lends

emotional meaning to facial expressions, generating the psychological response to eyes that are open wide in fear or surprise.[57] It is the flash of white that jolts our amygdalae when we notice another person startle. It would be pointless for a marauding chimpanzee on patrol (even assuming that a chimp could talk or carry a gun) to tell his comrades, John Wayne–style, "Don't shoot 'til you see the whites of their eyes." No matter how close the enemy came, defenders would be unlikely ever to see any whites of eyes unless their enemies were human beings. This difference suggests that eyes capable of communicating information about intentions may have evolved in collaborative rather than competitive contexts. Information thus conveyed was beneficial to the signaler as well as the receiver.[58]

Such differences are one reason why it was taken for granted that humans were the only apes that engaged in mutual gazing, imitated facial expressions, and used eyes to attribute mental states to others. This view fit with Meltzoff's ideas about the importance of imitation in empathy. Our supposed uniqueness in these respects was also consistent with Tomasello's proposal that "human beings, and only human beings, are biologically adapted for participating in collaborative activities involving shared goals and socially coordinated action plans." It followed that human babies would be born with special physical attributes and aptitudes for reading mental states and intentions, and communicating their own. What a lovely conceptual package—as long as it lasted. If only other apes would stick to their side of the Rubicon!

Over the past decade or so primate psychologists have documented mutual gazing in both monkeys and apes, and have observed one monkey following the gaze of another. They also now recognize that nonhuman apes (chimpanzees, for example) will sometimes signal by pointing with a hand or finger—especially if they were reared in close association with human role models.[59] Even if mirror neurons turn out to be important for understanding how individuals come to empathize with others, by themselves mirror neurons could scarcely be sufficient to explain the development of human-caliber empathy, since other primates possess mirror neurons as well.

Then in a stunning reversal of something behavioral scientists had long taken for granted, comparative psychologists discovered that chimpanzee newborns sometimes fixate on eyes, seek out faces, gaze into oth-

ers' eyes, and even engage in Meltzoffian-style imitation of facial expressions. The neural equipment that supposedly allowed humans to read intentions and minds is right there in baby chimpanzees and possibly other primates as well.

ONCE WE LEARNED THAT OTHER APES BOTH GAZE AND IMITATE . . .

Years ago, Darwin noted that it is not incorrect ideas that impede scientific progress but "false facts." In the case of the wrong hypotheses, other researchers "take a salutary pleasure in proving their falseness," and they are soon corrected. But when wrong facts get enshrined in the literature, they "often long endure."[60] The problem for those of us thinking about comparative infant development in apes was that for many years we wrongly assumed that face-to-face gazing and imitation did not occur in other apes. This turns out to have been an error, albeit one that in retrospect is understandable.

Systematically monitoring the visual gaze of a nonhuman ape is no easy task. Not only are ape mothers extraordinarily protective, but throughout the first months of life baby chimpanzees mostly sleep or suck on their mother's nipples, and they rarely fuss or fidget. Baby apes are actively alert to the world around them for only about 10 percent of each day.[61] In spite of such difficulties, in 1991 the psychologist Hanus Papousek undertook the first-ever comparative study of mother-infant eye gazing in humans, captive gorillas, and bonobos. Based on what he was able to see, Papousek reported that "eye-to-eye gaze for prosocial purposes was unique to humans."[62] Since this discovery was pretty much what psychologists had expected, Papousek's initial finding went unchallenged for another decade. As late as 2002 (and in some circles to this day) it was taken for granted that the long, loving, reciprocated "extended mutual gaze" was "a human-specific adaptation . . . essential for developing a rich understanding of others' mental states, often called 'a theory of mind.'"[63] But, once again, closer scrutiny of other apes under more empathetic conditions compelled scientists to rethink the differences between other apes and us.

The psychologist Kim Bard, currently director of the Centre of the Study of Emotion at the University of Portsmouth in England, was

among the first to challenge the conventional wisdom. She began to systematically study mutual gazing in chimpanzees at a time when most of the rest of us still assumed such behavior did not occur. She learned that chimpanzee mothers spend about 12 minutes of every hour looking at their newborns. Half of the time the mother seemed to peer directly into her baby's face. Some mother chimpanzees looked at their babies even longer. Occasionally mothers would use one hand to turn their infant's head toward their own face while continuing to gaze. Approximately ten times an hour the infant peered back.[64]

In addition to their mother's face, some babies looked into the eyes of their human keepers. The chimpanzee babies most prone to extended eye-to-eye contact with humans were the ones who had been separated from their mothers and were especially eager to reestablish *any* kind of contact. Since the chimpanzee babies who had been seeking eye contact in her studies also tended to be reared by mothers who themselves had spent a lot of time in close association with humans, Bard proposed that eye gaze in chimpanzees was "culturally" regulated and depended on circumstances.[65] That is, chimpanzees were adopting some of the interpersonal styles of the people they spent time with. The more exposure to human caretakers young apes had, the closer their sociocognitive responses came to those of human children in realms like intention-reading, give-and-take games involving objects, or engagement with others about their responses to objects.[66]

Bard's suspicions about the importance of rearing context were strengthened by what her colleagues in Japan were learning.[67] To this day the prize for the most intimate and expressive gazing goes to a baby chimpanzee named Ayumu. He was born in 2000 to a female chimpanzee named Ai, who had been born in Africa in 1977 and brought to Japan. From 1978 onward, Ai worked closely with the psychologist Tetsuro Matsuzawa at the Primate Research Institute at the University of Kyoto. Abandoning conventional laboratory protocols, Matsuzawa (who referred to his star chimpanzee pupil as his "partner" rather than his research subject) treated the chimpanzees he studied as friends. In the process, he pioneered a more intuitive approach for probing the perceptual and cognitive abilities of our closest primate relatives.

In addition to the usual greetings and reassurances that any good psychologist would provide his animal subjects, Matsuzawa's collabora-

tion with Ai was punctuated by hugging, cuddling, mutual grooming, and scratching as well as long bouts of just hanging out together. The gentle and debonair lab director spent hours with a brush, patiently combing the hairs down Ai's back. Over a 30-year-long relationship, Ai has learned to trust Matsuzawa as a close associate who behaves more calmly, benevolently, and predictably than any of the more impulsive members of her own species.

So completely did Matsuzawa gain Ai's trust that in 2000 when she gave birth for the first time, she rewarded her human friend with unprecedented access to her newborn, access denied even her closest chimpanzee relations. Over the years, Matsuzawa's methods were used with other chimpanzees as well, leading the Kyoto team to dogma-shattering insights into the sensibilities and capabilities of *Pan troglodytes.* Chimpanzees raised by both their mothers and human others not only proved to be far more engaging as newborns than anyone had previously realized but mastered an impressive array of cognitive tasks. With special training, four-year-old Ayumu and his peers were actually better than university students at memorizing number sequences and then rapidly punching them onto a computer screen.[68]

Prior to Matsuzawa, scientists seeking to observe or film a baby chimpanzee face-to-face had to first remove the baby from its mother and rear it under highly artificial conditions. Never before had anyone other than the mother been allowed such privileged access to a newborn chimpanzee actually being reared by its own mother. Days after Ayumu's birth, Matsuzawa became the first person to observe and film the ephemeral "fairy" smiles that flit across the pale pink face of a newborn chimpanzee during Rapid Eye Movement sleep. Prior to that moment, neonatal smiles (which thanks to Matsuzawa we now know begin in utero) had been presumed to be uniquely human.[69]

Born smiling, chimpanzees keep right on doing so. Two months after Ayumu's birth, Matsuzawa and his team videotaped the baby chimpanzee's wildly enthusiastic (and infectious) "social" smiles in response to photographs affixed above the lens that portrayed either his mother's face or the face of his mother's very responsive human friend, Matsuzawa, who had become the baby's trusted friend as well. Baby Ayumu's response to his mother was the same gleeful greeting that Ai reserved for Matsuzawa himself, only there was no camera behind Matsuzawa's eyes

When Matsuzawa looked into his face, Ayumu returned his gaze, with eyes lighting up, radiating infectious glee. It would be impossible for another ape, chimpanzee, or human not to respond. Just watching Matsuzawa's videos, my own countertransference was complete. Needless to say, I smiled back. (Nancy Enslin/T. Matsuzawa)

to film it. In line with Peter Hobson's assessment of how much relationships matter for the development of social cognition in children, Matsuzawa showed that early relationships matter for chimpanzees as well.

INTERACTIVE FOUNDATIONS WITH A NEW DIMENSION

Could a baby chimpanzee, gazing into someone else's face and interacting with others, also identify with—perhaps even empathize with—others sufficiently to imitate the expressions on their faces the way human babies do? Neural equipment dedicated to registering eye gaze is built into the brains of most vertebrates, but it is especially well developed in humans. Within days of birth, human newborns seek out eyes and will look longer at any face if there are eyes there looking back. Soon after, babies spontaneously smile or laugh on making contact. By six months of age, little humans not only are attracted to eye gaze but also begin to evaluate just what the person observed is gazing at.[70] A direct gaze produces stronger neurological responses than an averted one.[71] Visually engaging

eyes and face-to-face gazing play a key role in the mind reading and imitation process among infants. It has even been suggested that gazing's importance may help explain why children born blind are prone to difficulties developing connections with others.[72]

As if Ayumu's revelations were not enough, another little chimpanzee was born at Matsuzawa's institute, and unfortunately, as not infrequently happens with apes artificially reared in captivity, the mother failed to care for her. Within 24 hours of birth, the keepers transferred the newborn to an incubator for bottle-feeding. Masako Myowa, one of the students working with Matsuzawa, saw in this tragic separation an opportunity to find out just what the imitative capacities of a baby chimpanzee actually are. Myowa already knew that apes readily learn to use tools and solve problems by first watching others and then imitating the way others solve the same problem.[73] Indeed, chimpanzees reared by people may be even better at imitating what people do than human babies are.[74] From watching Matsuzawa with Ai, Myowa understood how important the relationship between subject and investigator could be, and also (in line with Bard's research) realized that human-reared chimpanzee newborns were likely to react to human facial expressions. Chimpanzees reared by humans were probably going to be even more prone to respond to facial expressions than those raised by their own mothers. Thus, Myowa reasoned, if other apes possess any capacity to respond to or imitate facial expressions, the little female she was rearing would be a good prospect to prove it.

Myowa's hunch paid off, resulting in an astonishing series of photographs. Literally aping Meltzoff and Moore's famous experiment, the photos chronicled a wide-eyed baby chimpanzee responding to the funny faces Myowa made by sticking out her tongue, opening her mouth, protruding her lips, and to all appearances enjoying this process very much. Myowa's little apprentice turned out to be even more persistent in responding to mouth movements than human babies are.[75]

At least that's how the little chimpanzee behaved at first. By 12 weeks after birth, however, the baby who had previously seemed so responsive and eager to imitate Myowa lost all interest in doing so. She had begun to respond at about five weeks and continued through eleven weeks, and then bam! Myowa contorted her face in all sorts of odd configurations, but got no response. The game had lost its appeal. In subsequent

experiments, other baby chimpanzees followed the same course.[76] Then in 2006, a team of cognitive neuroscientists claimed to have demonstrated that newborn monkeys (rhesus macaques) also imitate facial expressions. But once again, the urge to do so faded by day seven.[77] Even though other primates are turning out to be far better at reading intentions than primatologists initially realized, early flickerings of empathic interest—what might even be termed tentative quests for intersubjective engagement—fade away instead of developing and intensifying as they do in human children.[78]

In 1996, following the same format used by Meltzoff in 1977, Masako Myowa showed that a human-reared female chimp between 5 and 11 weeks of age would respond to a human experimenter who stuck out her tongue, opened her mouth, or protruded her lips by doing likewise. (M. Myowa-Yamakoshi)

The documentation of facial imitation in nonhuman primates leaves many questions unanswered. Were the little macaques separated from their mothers really imitating the experimenters or just desperate to engage somebody, anybody, by making contact any way they could? Even though chimpanzee and human newborns stick out their tongues in response to someone else doing so, is this really what we mean by intentional imitation?[79] Are the responses seen in very new babies really continuous with the more self-conscious and elaborate imitation human children exhibit at older ages? Recent findings by the psychologist Susan Jones suggest they may not be.

Jones studied how willing 162 infants aged 6 to 20 months would be to imitate as their parents put a hand on their heads, stuck out their tongues, tapped on a table, wiggled their fingers, clapped their hands, or made funny little "eh, eh" noises. Overall, children younger than 12 months seemed to her less involved in "behavioral matching" than in responding to novel and interesting stimuli in their environment. It took most of the first two years, she determined, for true imitative ability to

develop. Rather than a single "competency" present at birth, Jones proposed that this more self-conscious imitative capacity only emerges over time as children acquire an understanding about their body parts and what they can do.[80] In other words, the responsiveness that is present at birth in humans—and also, we now know, in chimpanzees (and perhaps macaques)—is not the same imitative capacity apparent in human infants later on. By the second year of life, the human child has developed a sense of self and begun to combine it with new understanding about bodily competencies in ways that other apes never do.

Interpreting such experiments is fraught with difficulties. For one thing, we lack anything like a complete understanding of what the neurological differences between chimpanzees and humans actually are. Nor can we be sure that the common ancestors of both chimpanzees and humans possessed the requisite neural basis for early processing of facial expressions, but my guess is that they did.

Both ape and human newborns exhibit a powerful urge to connect with and engage others. Almost all spontaneously stick out their tongues, and some percentage of human and chimpanzee neonates are more prone to do so if they see someone else do it. Apes raised by humans may be especially susceptible, but humans (also of course raised by humans) are prone to develop such traits even further. Over time, human infants become increasingly sophisticated at learning not just what attracts attention but what appeals to others, which may be what is happening with imitation. All the same, if chimpanzees are less prone to imitate and learn from others by observing, if they are not as good at mind reading as children are, the difference cannot be attributed to a lack of the basic brain equipment.

For example, consider dogs and why they do not copy their masters' facial expressions. These domesticated descendants of wolves happen to be unusually good at reading human cues, perhaps even more sensitive to human cues like pointing to where a treat is hidden than many chimpanzees are.[81] Nevertheless, dogs are no good at imitating a protruding tongue or other weird facial expressions, and this surprises no one. Dogs descend from cooperatively breeding wild ancestors, after all, and subsequently coevolved with humans and became dependent on bipedal alloparents for provisioning. But the basic neuromuscular underpinnings for this sort of facial imitation are simply not present in canines.

We now know that some other primates possess mirror neurons and

also look into the faces of those near to them, engage in deep mutual gazes, and imitate what they see there. They may even experience rudimentary empathy for the travails and suffering of others and (so long as it does not require giving up desirable food) voluntarily help others or share food with them. Since we've learned that such capacities are present (even if not always employed or expanded upon), we are confronted with a conundrum that until recently scientists did not even realize we had. We are challenged to explain why prosocial impulses became so much more developed in the line leading to the genus *Homo*. Why us and not them?

A BIZARRE DIGRESSION

Neither in humans nor any other ape does the initial impetus to connect need to be learned. Rudimentary wiring for intersubjective engagement seems to be there. But by seven weeks little humans up the ante, vocalizing with vowel sounds, and by ten weeks begin to laugh. Children spontaneously seek to engage others and do not need to be coached or bribed to do so.[82] Although it is frequently assumed that such smiling and other facial expressions occur only in response to social stimuli or else must be learned, even babies born blind, who have never seen anyone make faces, start to smile around six weeks of age in response to touch, bouncing, or the sounds of a familiar voice.[83] It seems possible then that even in a social vacuum human babies would spontaneously practice smiling and other means of social engagement. The closest demonstration of this point is an appalling experiment that I came across while trolling through the old psychological literature on smiling.

Back in the 1930s, an American psychologist named Wayne Dennis and his wife managed to adopt one-month-old twin girls through the Social Services Department of the University of Virginia Hospital and then proceeded to rear the babies in virtual isolation, out of sight of one another, visited only by the experimenter/adoptive parents. Whenever the Dennises were in the same room with the babies, they made every effort to keep their faces blank and deliberately refrained from giving the babies expressive templates to imitate. For their first 26 weeks, no one ever smiled or spoke to either Del or Ray, as the babies were called. Yet the normal onset of smiling in the socially deprived twins was only

slightly delayed. From the fifteenth week onward the babies almost invariably greeted the still-faced experimenters "with a smile and a vocalization" whenever one of them opened the door and entered the room. Only after the twins were six months old did the psychologists decide to return the infants' smiles and speak to them.[84]

I was unable to learn anything about what became of these unfortunate children. After wrestling with myself over the advisability of including this story together with all its ethical and scientific lapses, I decided that it was in some ways instructive. Although the experiment is (mercifully) unlikely to be repeated, the observations are consistent with the premise that, like the fairy smiles of newborn chimpanzees and humans, social smiles and laughter emerge spontaneously, although social smiles (unlike neonatal smiles?) are triggered by some stimulus in the environment (including even a nonresponsive blank-faced caretaker entering the room). More conclusive work on this subject will require the kind of ingenuity, empathy for other apes, and patience so beautifully demonstrated by Matsuzawa and his colleagues, scientists keenly aware that it is no less cruel or distorting of natural inclinations to separate a nonhuman primate baby from an attachment figure than to rear human babies in isolation.

RESOLVING THE PUZZLE

Even at this early stage in our understanding of what baby humans and other apes do spontaneously and what they do in response to social invitations from others, the revelations coming out of Kyoto and elsewhere demonstrate beyond question that other apes have the rudimentary neural equipment to seek out eyes and faces, and they register information about the expressions they see there sufficiently for at least some baby apes to imitate them. Nevertheless, after a while nonhuman ape babies seem no longer interested in this activity and differ from humans in this respect. Human infants either continue to develop and perfect imitative abilities or else (like chimpanzees) abandon the early imitative game and begin to develop a different repertoire of imitative properties.

Like early hominins, the ancestors of these laboratory chimpanzees would have benefited from being able to engage, imitate, and learn from others. After all, the common ancestors of chimpanzees and humans

probably hunted in groups. They also bore offspring who would have benefited from being able to learn faster from mothers sensitive to their struggles. Ancestral apes would surely have benefited from being better at guessing what someone else intended—from being better able to read the mental states of apprentices as well as of social competitors or potential allies. Yet as they grow up, other apes remain mired in their immediate desires and needs, leaving us to ponder why Mother Nature did not favor better and better mind readers among the ancestors of modern chimpanzees as well as among our own. How did it happen that eagerness to enter into the mental and emotional states of others and engage them developed in one line of apes but not the other?

The fact that other apes are born with the equipment to engage and imitate others but soon lose interest in doing so leaves unresolved much about the original "Why us and not them?" question. What was it about the rearing conditions of infants in the genus *Homo* that led to the evolution of more persistent and sophisticated monitoring of group members, of seeking out and gazing into the faces of others, reading their expressions, and gleaning information about their mental states? And what was the payoff? How did such gifts enhance the survival of their possessors? Right from birth, humans develop (as the psychiatrist Daniel Stern likes to say) "in a soup of other people's feelings and desires."[85] So just what were the special ingredients in that soup?

Of the handful of psychologists who actually spend time pondering what life was like for youngsters millions of years ago, most take for granted that early hominin infants were cared for in the same way as chimpanzees, gorillas, orangutans, and bonobos are today—that is, exclusively by their mothers. This has been a fundamental tenet of "attachment theorists," as we will see in Chapter 3. Until recently, it is certainly what I believed as well. However, in the next chapter I explain why—in spite of the many similarities—chimpanzees and other nonhuman apes are not the appropriate prototypes to use when reconstructing early hominin childcare.

In the next two chapters I review the many different ways that infant primates are cared for, and I contrast observed infant care among wild Great Apes with the childcare practices of people still living as nomadic hunters and gatherers. These observations make clear that infants in foraging societies confront challenges unlike those faced by any other apes.

I will argue that this was probably the case among our hominin ancestors as well, although the existence of such different modes of childcare and their implications for answering the question "Why us and not them?" have long been overlooked. So what were the main differences in the ways hominin and other ape infants were reared?