A debate over the nature of social cognition was engaged very early in the history of developmental psychology. Piaget assumed that the child is naturally egocentric. Thus, even when the child uses a social tool such as language, it is put to egocentric use rather than to communicate. By contrast, Vygotsky assumed that the child is naturally social so that any nonsocial, egocentric use of language comes later in development. Despite this early debate—and the compelling arguments advanced by Vygotsky for acknowledging the very young child’s capacity for social engagement—it was Piagetian theory that dominated the study of cognitive development throughout most of the 1960s and 1970s. Against that backdrop, it is not surprising that the development of social cognition was largely construed as the gradual breakdown of egocentrism—or the slow emergence of the capacity for role taking. On this view, the child’s task was to increasingly recognize and make allowances for differences between self and other. Two influential texts that emerged from that era are The Development of Role-Taking and Communication Skills in Children by Flavell and his colleagues (Flavell, Botkin, Fry, Wright, & Jarvis, 1968) and Kohlberg’s (1969) chapter offering a cognitive-developmental approach to social cognition and to key issues in socialization.

In the following decade, a flurry of research with young infants gave pause to those wedded to the classic, Piagetian view of the young infant as egocentric. Several studies produced results that strongly suggested a capacity for sharing and mutuality from the earliest months. For example, Meltzoff demonstrated—albeit not without controversy—an early, imitative sensitivity to the facial and manual gestures of a partner (Meltzoff, 1976; Meltzoff & Moore, 1977). Trevarthen laid out a theory of early intersubjectivity (Trevarthen & Hubley, 1978). Scaife and Bruner (1975) published a pioneering
paper showing that infants can engage in joint attention with an adult partner before the age of 12 months. These various demonstrations showed that the young infant is nicely attuned to other people. At the same time, they did not in themselves lead to any radically new theorizing in the larger study of social cognitive development. Rather, they added to the growing list of findings showing that the young infant was much more competent than standard Piagetian theory might lead us to believe. They also showed quite clearly that experimental analysis of the infant’s social cognition was a feasible and potentially fruitful avenue to explore.

A FRESH START

Vygotsky’s developmental account had woven together two different strands. First, as a developmental psychologist, he emphasized functional changes that emerged in the course of development. In particular, he stressed the way that thought and language coalesce to form a new functional whole in the child’s mind. At the same time, Vygotsky took a comparative approach to development. The available findings in primatology suggested to him that no such coalescence took place in the course of chimpanzee development. Oddly enough, despite his strong interest in evolution and a biological approach to the genesis of knowledge, Piaget rarely adopted a comparative approach to cognitive development, and—given the dominance of Piagetian theory—no such comparative approach was taken to the study of social cognition.

A landmark paper by two primatologists—David Premack and Guy Woodruff (1978)—showed that the study of social cognition can benefit greatly from a comparative flavor. They asked if the chimpanzee has a theory of mind, by which they meant does the chimpanzee go beyond the observation of overt behavior to infer the goals and plans that guide behavior. To answer that question, they showed their chimpanzee subject, Sarah, film clips of a human agent struggling unsuccessfully with a practical problem—for example, trying to reach some bananas overhead. After seeing each clip, Sarah was invited to indicate what the agent would do next by choosing from among several possible illustrated continuations to the film clip. Sarah was quite successful in selecting likely continuations. For example, she judged that the agent trying to reach the bananas would pile boxes underneath the bananas rather than push boxes aside. Premack and Woodruff concluded that Sarah must have been able to figure out what the agent was trying to do and indicated his or her next steps appropriately in the light of that goal.

Commentaries on the results homed in on one further point. Ever since Kohler’s famous experiments on the problem-solving abilities of chimpanzees, we have known that they can solve practical problems such as those with the bananas: They can search for boxes, pile them up, and climb on them in order to reach up. So, said the commentators, maybe the chimpanzee is not such a sophisticated psychologist after all. Maybe the chimpanzee is simply projecting onto the human agent what it would do in similar circumstances.

To counter this possibility, various commentators suggested an alternative experimental setup in which the observing subject is invited to make a prediction about a mistaken or misinformed protagonist. Such a setup would oblige the subject to differentiate between what he or she would do in the circumstances and what the mistaken protagonist would do. In other words, a simple strategy of projection would be wrong—it would not make appropriate allowance for the subjective stance of the protagonist. Prompted by this challenge, Wimmer and Perner (1983) reported a set of studies in which children were invited to make predictions about a doll protagonist that was mistaken about the current location of an object. For example, the protagonist put his chocolate in one cupboard and then left the scene; his brother moved the chocolate to another hiding-place in his absence. Wimmer and Perner (1983) found that 4- and 5-year-olds could accurately anticipate where the protagonist would search for the chocolate on his return (i.e., in the cupboard where he had first put it) but younger children could not (i.e., they assumed he would search at its new hiding-place).

This clever experiment triggered an avalanche of replications and challenges. Some who had been raised on the Piagetian notion of egocentrism—such as myself—were impressed and surprised that 4-year-olds could solve the problem at all. Others, by contrast, were dubious about the failure of 3-year-olds and attempted various experimental manipulations in an effort to uncover greater competence at that age. Alongside this program of research in developmental psychology, two other related research programs rapidly got underway. First, Baron-Cohen, Leslie, and Frith (1985) discovered that autistic children, even those with a relatively advanced mental age, frequently fail a variant of Wimmer and Perner’s false-belief task. This led to a series of
studies aimed at assessing the extent to which the various symptoms of the autistic syndrome can be understood as an innate deficit in the normal development of a theory of mind. Second, Bryne and Whiten asked whether detailed field observations of nonhuman primates might reveal mind-reading skills similar to those found in human children (Byrne & Whiten, 1988; Whiten, 1991). For example, does a chimpanzee realize that another member of the group might hold a false belief, and might even be led to such a false belief by a deliberate act of deception? This comparative perspective—fueled by dialogue with developmental psychology and by debate in primatology among experimentalists—has kept the question of the biological origin of the child’s theory of mind in focus. Arguably, key aspects of the child’s theory of mind might be the result of some dedicated module, peculiar to the human species. Alternatively—as Vygotsky might have speculated—they might be better seen as the elaboration of an intuitive psychology found in the higher apes but transformed by their fusion with language and conversation. I return to these contentious issues later.

The three-pronged research program that emerged in the 1980s—comprising human development, developmental psychopathology, and comparative primatology—has increasingly assimilated a variety of older concepts and research traditions in social cognition. For example, studies of the development of metacognition (Flavell, Green, & Flavell, 1995) and of emotion understanding (Harris, 1989; Harris, Olthof, & Meerum Terwogt, 1981) have been transported into the capacious tent of theory-of-mind research. At the same time, other concepts and traditions have been mostly swept aside. For better or worse, few contemporary researchers debate the extent to which the young child is egocentric. Moreover, few look—as they once did (Graham & Weiner, 1986)—to social psychology or more specifically to attribution theory for an understanding of the development of social cognition.

What does this lively and relatively ecumenical program ignore? Most theory-of-mind research assumes that the child is equipped with categories for decomposing and explaining the workings of the prototypical human mind: timeless and universal. However, beneath that level of analysis, the child surely faces questions about what particular people are like as opposed to people in general—questions about the personality, skills, and reliability of specific individuals, especially those individuals whom he or she encounters firsthand in the context of the family or community. Some of those individual differences will occasionally boil down to differences in the very categories emphasized by theory-of-mind research: This individual is misinformed but that individual is not. However, there are other individual differences that have to do with enduring traits. For example, this individual is trustworthy but that individual is not. Attachment theory has long called attention to the fact that infants, even in the 1st year of life, are quite sensitive to individual differences among their caregivers—for example, they may be securely attached to their father but display an avoidant attachment to their mother. It would be hard to deny that such sensitivity is part of the child’s early social cognition. Yet, theory-of-mind researchers mostly ignore it. In a concluding section, I explore ways in which research on theory-of-mind might advance our understanding of children’s sensitivity to individual differences in trustworthiness.

INFANT SOCIAL COGNITION

Recent work on infant social cognition has been inspired both by the striking experimental results that began to appear in the 1970s and by the question of what precursors there might be to the relatively sophisticated understanding of false beliefs shown by 4- and 5-year-olds.

The Detection of Goal-Directed Agency

To the extent that human beings move autonomously, infants are in a position to distinguish them from inanimate objects. Indeed, from about 7 months of age, infants are puzzled by the spontaneous motion of inanimate objects but not that of people (Golinkoff, Harding, Carlson, & Sexton, 1984; Spelke, Phillips, & Woodward, 1995). However, human beings also engage in a particular class of movements—their movements are autonomous and directed at some goal or target. This is particularly obvious in the case of hand and arm movements. Human agents do not simply wave a hand; they reach out and grasp objects. Recent research has actively focused on such targeted movements with a view to diagnosing the extent to which infants interpret them as goal-directed.

A study by Woodward (1998) offers an illustrative example. Infants of 5 and 9 months were habituated to the sight of a human hand and arm reaching toward and
grasping one of two objects. Subsequently, infants saw an alteration in the reach: It was either directed to the same object along a different path; alternatively, it was directed to a different object along the same path. Infants treated the change of target object as more novel—as indexed by an increase in looking times. By implication, when infants watched the initial reach during habituation trials, they were more likely to encode the goal object that it was directed toward rather than the precise trajectory of the reach. As a result, they were more “surprised” by the change of target object than the change of trajectory.

At the same time, it is also clear that young infants do display some sensitivity to the trajectory of an object-directed movement: They expect it to be direct and efficient rather than unnecessarily circuitous. This fact has emerged in a series of experiments by Gergely and his colleagues (Csibra, Gergely, Biró, Koós, & Brockbank, 1999; Gergely, Nádasdy, Csibra, & Biró, 1995). Infants watched a film in which a “baby” circle went toward a larger, “mother” circle by moving up and over a barrier that separated them. After habituation, infants saw trials in which the barrier had been removed and the baby circle now either took the shorter, direct route toward mother or continued to follow the same up-and-over route—even in the absence of the barrier. Infants of 9 and 12 months looked longer at—and by implication were surprised by—the adoption of the indirect up-and-over route even though it corresponded exactly to the route taken during the previous habituation trials. Apparently, they expected the more direct route to be taken once the barrier was removed.

Summarizing across these studies on goal-directed movement, it appears that toward the end of the 1st year, infants encode the object that a movement is directed toward and generally anticipate that a movement will be direct and efficient rather than circuitous. How do infants establish such expectations? One possibility is that they learn a great deal from first-person experience. After all, by the end of the 1st year, infants will have engaged in countless deliberate, goal-directed behaviors. They will have reached for, and crawled toward, all sorts of objects. Arguably, such firsthand experience of efficient, targeted action leads infants to assume that a similar interpretation can be placed on many of the actions that they see others engaged in.

Three-month-old infants do not show the type of goal encoding that is evident among older infants. However, infants of this age are quite poor at reaching out to grasp an object themselves. If first-person experience is a vital ingredient in the interpretation of others’ actions, this early lack of goal encoding is just what we might expect. Sommerville, Woodward, and Needham (2005) examined the potential role of first-person experience. When 3-month-old infants were fitted out with Velcro mittens that enabled them to grasp objects more successfully, they were subsequently able to encode the goal structure of reaching and grasping actions. So, should we conclude that infants are attributing goals on the basis of their own experience of goal-directed actions with the Velcro mittens? Possibly, but not necessarily. When the infants wore the mittens, they had the experience of being an agent. However, they could also watch—spectatorlike—as they executed such successful reaches. Arguably, the psychological experience of being an agent is critical, but it is also possible that sustained visual monitoring of reaching is sufficient to teach infants to encode action in terms of its goals.

These various findings demonstrate that the simple act of reaching can serve as an informative vehicle for figuring out how infants encode goal-directed action—and on what basis they do so. Nevertheless, a focus on such simple, and discrete, actions does not do full justice to the interpretive problems facing the infant. Consider the 12-month-old seated in a highchair. He watches as his mother goes to the refrigerator, opens the door, removes a carton of juice, pours juice into a cup, and hands him the cup. As Lashley pointed out more than 50 years ago (Lashley, 1951), such actions can scarcely be produced as a set of moment-by-moment responses to a serially ordered set of stimuli in the environment. Rather, they depend on some internal organization enabling the agent to control his or her own behavior. Miller, Galanter, and Pribram (1960) argued that the production of action is best construed as a problem of hierarchical organization, in which subordinate goal-oriented sequences are organized into a larger, overall sequence. Because it has been difficult for psychologists to understand the production of a planned sequence of actions, we might assume that infants have virtually no understanding of such a sequence. Yet, in contrast to Lashley and his contemporaries, there is no sign that young infants initially approach the problem with any predilection for stimulus-response explanations. Arguably, some form of hierarchical, goal-based analysis comes naturally to them.

In a pioneering effort to understand whether and how infants parse the stream of action, Baldwin, Baird, Say-
lor, and Clark (2001) showed 10- to 11-month-old infants a video of an adult engaging in an everyday action sequence. For example, in one video a woman notices a towel on the floor, reaches for the towel and picks it up, then moves toward a towel rack and places the towel on the rack. After being familiarized with this sequence, infants were given two test sequences. In the completing video, a still-frame pause was inserted at the point where the woman had just grasped the towel. In the interrupting video, by contrast, a still-frame was inserted as the woman reached down to pick up the towel. Infants spent longer looking at the interrupting video than the completing video. Baldwin et al. (2001) plausibly interpret this differential reaction as evidence that infants recognize that within a normally continuous action sequence there are subunits. Hence, a pause inserted between two identifiable subunits is less disconcerting than a pause inserted in a subunit. As the authors acknowledge, however, it is not clear how far infants’ parsing into subunits is guided by a “top-down” appreciation of the subgoals that are completed in a larger hierarchy (e.g., in the case just described, an appreciation that the goal of grasping the towel has been completed) or by a “bottom-up” processing of cues that are correlates of such subdivisions. For example, if infants keep track of the direction in which an agent is moving, they might spot marked changes of direction and parse accordingly. Thus, in the case of the towel retrieval, they might parse a downward reach as one unit and an upward lift as another with little insight into the agent’s intended goals.

Such theoretical issues might seem a little arcane but from an infant’s point of view, they are likely to be quite practical. Consider a 12-month-old who is watching her father dip a spoon into a bowl of vegetables and then lift the spoon to her mouth. After attentively watching, the infant seeks to imitate—more or less—what he has done. On the top-down reading, she realizes that there are two goal-directed subunits: (1) lowering the spoon in order to fill it with food and (2) transporting this spoonful of food to her mouth. She tries to do the same. On the bottom-up reading, by contrast, she simply notes that the spoon is moved downward and then raised upward. She imitates her father by plunging the spoon into the bowl and lifting it up again. Whether the food is lifted to her mouth—or splattered over the table—is regarded as incidental.

Evidence for top-down processing has emerged from studies by Woodward and Sommerville (2000). When 11-month-olds watched an agent produce a single ambiguous single action—touching a box—they (understandably) showed no signs during a test phase of being able to decide whether the reach was aimed at the box itself or the toy inside the box. However, if they had previously seen the agent not simply touch the box lid but go on to extract the toy, they interpreted subsequent reaches to the box lid as directed at the contents of the box and not just at the box itself. By implication, watching the agent first touch the lid and then extract the toy led infants to interpret the action of touching the lid in light of the goal that it was ultimately directed at—recovery of the object. Further evidence of early top-down processing was reported by Sommerville and Woodward (2005). Infants watched an agent pull a cloth to retrieve a distant toy placed on the cloth. Subsequently, when they saw the agent simply pull a cloth they were likely to construe that action as aimed at retrieving the toy. A follow-up study with 10-month-olds revealed that this interpretation was only made by infants who could successfully retrieve objects with a cloth-pulling strategy, again suggesting—in line with the findings on 3-month-olds reported by Sommerville, Woodward, and Needham (2005)—that action production facilitates action interpretation.

Studies of imitation have also provided evidence of top-down processing. Carpenter, Call, and Tomasello (2002) invited 2-year-olds to open a box after watching an adult demonstrate the right technique—namely to pull at a wooden pin at the side of the box which enabled the front of the box to be lifted in a flaplike fashion. Most 2-year-olds failed to open the box after this demonstration. Why? Almost certainly, because when they watched the adult tug at the pin, they had no idea what she was trying to do—after all tugging at a protrusion is not standard operating procedure for getting inside a box. Support for this interpretation came from several other conditions in which children were first made aware of the adult’s goal and then copied her much more successfully. For example, in one condition, the adult first tugged at the front of the box, failed to lift it, and only then pulled at the pin to release the door. Similar results, albeit with slightly older children, emerged in a study of imitation by Want and Harris (2001). If 3-year-olds saw an adult try to extract a toy from a tube by first poking a stick into the wrong end of the tube, withdrawing it, and then poking it into the correct end, they were much more likely to select the correct end when it was their turn to retrieve the toy than were children who saw the adult select the correct end straightaway. Again,
it looks as if unsuccessful attempts highlight what an agent is aiming at so that the niceties of a successful attempt can be more easily encoded and reproduced.

In summary, recent evidence shows that infants rapidly come to see actions as goal-directed, and they generally expect such acts to be carried out efficiently. Two-year-olds, and arguably even younger children, also recognize that any given action can be embedded in an organized hierarchy; it is aimed at a subgoal, which in turn serves a superordinate goal. Toddlers are not equipped to understand complex, long-term plans such as building a house or a railroad. Nevertheless, it looks as if they have an intuitive grasp of the hierarchical structure of human action from an early age. It is somewhat ironic that this insight emerges so early—albeit at a tacit level. That same insight is regarded as a major turning point in cognitive science (Boden, 2006).

**Emotion and Preverbal Dialogue**

The understanding of emotion is, arguably, just one part of the child’s more general understanding of mental states. Nevertheless, we might expect to find that sensitivity to other people’s emotional states is one of the more precocious aspects of early mental state understanding. After all, except on rare occasions, people’s beliefs cannot be read from their faces and even their desires are not so legible. Their emotional states, however, come with an expressive signature that might be read even by infants during the 1st year of life.

Darwin’s writings on facial expression (Darwin, 1872/1998) have led to a systematic research program endorsing his claim that there is a universal, innate basis to the production of a small set of facial expressions (Ekman, 1973). However, Darwin made a nativist claim about the interpretation of facial expressions as well as their production. His argument was based on probabilistic reasoning and on analogy with other species: “Do our children acquire their knowledge of expression solely by experience through the power of association and reason? As most of the movements of expression must have been gradually acquired, afterwards becoming instinctive, there seems to be some degree of *a priori* probability that their recognition would likewise have become instinctive” (Darwin, 1872/1998, p. 353). With this hypothesis in mind, Darwin studied the emotional development of his own son and concluded that some degree of unlearned recognition was probably present. Thus, when his son’s nurse deliberately pretended to cry, his son—then aged 6 months—assumed “a melancholy expression.” Given the infant’s lack of experience of other people crying, Darwin reasoned that “an innate feeling must have told him that the pretended crying of his nurse expressed grief: and this, through the instinct of sympathy, excited grief in him” (Darwin, 1872/1998, p. 354).

Darwin’s bold but plausible assertion of instinctive recognition has proved difficult to either verify or refute. What has emerged in the past 20 years is a small number of studies showing that young infants do respond appropriately to adults’ facial expressions. For example, Termine and Izard (1988) observed a differentiated reaction by 9-month-olds to their mothers’ displays of happiness versus sadness. Indeed, Haviland and Lelwica (1987) observed that babies of 10 weeks responded differently and for the most part appropriately to their mothers’ displays of happiness, sadness, and anger. Yet, even by the age of 10 weeks, it could be argued that infants have had some opportunities for learning.

A related but different research theme concerns the way in which infants come to expect their caregivers to be responsive and expressive. If infants are confronted by someone who deliberately remains still and unresponsive, they become upset (for a review of this so-called still-face paradigm, see Muir & Hains, 1993). By the age of 2 to 3 months, infants show considerable sensitivity to the contingent relationship between their own expressive movements and those of an adult partner. Although they interact normally with a live image of their mother via closed-circuit television they show signs of distress if they are shown a video rather than a live image of their mother (Murray & Trevarthen, 1985; Nadel, Carchon, Kervella, Marcelli, & Révarrat-Plantey, 1999). Indeed, by 3 months, infants are sensitive to the exact timing of the relationship between their own expressive movements and those of an adult partner—if a very subtle delay of 1 second is introduced into the live relay of their caretaker’s image, they become less attentive (Henning & Striano, 2004; Striano, Henning, & Stahl, 2005).

There is also credible evidence that infants do not simply acquire a global expectation—that caregivers are likely to be contingently responsive. Rather, they appear to acquire a more specific expectation that is guided by the expressive style of their primary caregiver. Thus, 3- to 6-month-old infants of mothers suffering from depression are likely to adopt a less ex-
pressive style than infants with nondepressed mothers. Indeed, there is some evidence that infants of depressed mothers “overgeneralize” this flat, interactive style, adopting it even when interacting with a stranger (Field, 1984; Field, Healy, Goldstein, 1988).

Such sensitivity to the expressive style of a caretaker should not, however, be surprising. Attachment theorists have long argued that infants are sensitive to the responsiveness and availability of a caregiver. By the age of 12 months, characteristic modes of interacting with a caretaker can be identified and these characteristic modes tend to remain stable. The research on early dyadic interaction simply alerts us to the possibility that these distinctive modes can probably be discerned well before the infant is 12 months of age and well before the infant is capable of the kind of active locomotion and distal contact that is generally studied by attachment theorists in the context of the Strange Situation.

In summary, even if it is still not clear whether Darwin was right to postulate an innate, interpretive mechanism for decoding the expression of emotion, there is evidence that infants rapidly come to distinguish positive from negative emotional expressions and respond appropriately to each. They also come to expect a caretaker to be expressive and indeed to respond in a very brief time frame to their own expressive movements. Finally, infants appear to discern the emotional styles of their caretakers and to attune their own expressive behaviors to that style.

Gaze Following and Social Referencing

At around 9 months, infants start to follow and direct the attention of a caretaker. As noted earlier, the phenomenon was first identified by Scaife and Bruner (1975). They found that when an adult turned to look either to the right or to the left, there was an increasing tendency with age for the infant to turn to look in the same direction (66% at 8 to 10 months, 100% at 11 to 14 months). Since this pioneering investigation, a variety of studies have described and analyzed the basic phenomenon in some detail. By 15 months, babies are able to differentiate not only one side from another but also the adult’s direction of gaze within a side (Morissette, Ricard, & Decarie, 1995). Carpenter, Nagell, and Tomasello (1998) studied infants’ ability to both follow and direct attention. In the study of following, an adult called the baby by name, then looked toward an object on the left or right with an excited vocalization, and then looked back and forth from object to baby. In a related condition, the adult added a pointing gesture to these various indicative behaviors. Gaze following increased in frequency between 9 and 13 months; point following also increased during the same age period and was generally somewhat more frequent.

In the study of directing, a stuffed animal was made to dance in midair or a puppet emerged from a partition. Adults pretended not to notice. A pointing gesture was credited if the child stretched toward the object and alternated gaze between object and adult’s face. Give/show was credited if the infant gave or showed the object, gazed between the object and the adult’s face, and vocalized as if to comment on the object. Both pointing and give/show increased markedly between 9 and 13 months with give/show being more frequent throughout. Taken together, these findings underscore the infant’s emerging ability to engage in a triadic relationship comprising the self, another person, and an object of (potentially) mutual attention.

Infants capitalize on such triadic relationships in the context of what has come to be called social referencing. They receive emotional information from a caretaker and regulate their behavior toward a given object in the light of that information. An illustrative—and influential—study was reported by Sorce, Emde, Campos, and Klinnert (1985). They looked at the influence of the mother’s emotional expression on whether babies would crawl over what they took to be a sharp drop (the so-called visual cliff). When the cliff was of intermediate height, such that babies hesitated to cross, most of them did cross if their mother smiled, whereas none of them did so if she produced a fearful facial expression.

Since identification of the basic phenomenon of social referencing, subsequent research has sought to analyze the exact mechanism involved. Two interpretations have seemed plausible. The caretaker’s facial expression might serve as a mood-changing signal that shifts the baby toward either confident exploration or wariness. On this argument, the baby need not draw any conclusions about what object or situation has provoked the mother’s emotion; rather, the baby simply resonates to the mother’s expressive signals—and ends up acting appropriately—proceeding forward if she smiles but coming to a halt or retreating if she looks fearful. The second interpretation builds on the gaze-following competence just described. Suppose that the infant notices not only the caretaker’s expression but also notes the object that she is attending to. The infant might treat the
expression as a predicate or comment that refers to the object in question. On this account, the mother’s emotional signal would not produce a broad shift toward either exploration or wariness; rather, it would produce a narrow shift in the infant’s emotional stance toward a particular object.

The study reported by Sorice et al. (1985) is open to either interpretation. Various follow-up studies, however, allow us to distinguish between them. These studies indicate that although mood effects cannot be completely ruled out, infants of 12 months and upward are indeed sensitive to the referential specificity of the emotional signal (Hornik, Risenhoover, & Gunnar, 1987; Mumme, Won, & Fernald, 1994; Repacholi, 1998). For example, in a study by Repacholi (1998) infants of 14 and 18 months watched as an adult, by means of her gaze direction and actions, expressed pleasure at the (hidden) contents of one box and disgust at the (hidden) contents of another. Although infants touched both boxes, they preferred to search for the pleasurable rather than the disgusting object. Moreover, infants remained loath to retrieve the disgusting object throughout the trial period of 45 seconds. Thus, infants appropriately interpreted the adult’s emotional signals as commentaries on the contents of the boxes and appropriately distinguished between the signals directed at each. This pattern of findings indicates referential specificity rather than a more global mood switch. Additional support for the claim that infants can understand referential specificity has emerged using techniques other than social referencing. Phillips, Wellman, and Spelke (2002) found that 12-month-olds, but not 8-month-olds, expected that an actor was likely to grasp the object that she had looked at with positive affect and were surprised when she did not.

Finally, it is worth underlining the limits on social referencing. As Baldwin and Moses (1996) have noted in a thoughtful commentary, it is tempting to conclude that infants seek out information from others. For example, when the infant approaches the visual cliff, comes to a halt, and looks up at his or her mother, it is tempting to assume that the infant is seeking information and guidance from the caregiver in the face of uncertainty. However, an equally plausible, indeed more plausible, interpretation is that infants are displaying an attention-based strategy rather than an epistemic one. More specifically, infants who feel uncertain or apprehensive may check back to their mother in anticipation of reassurance. They are not looking to their mother in anticipation of information. Thus, it is reasonable to suppose that infants seek reassurance and are then offered guidance, including referentially specific guidance; we have no need to presume that infants are tacitly posing a question of the mother regarding the situation that has provoked their uncertainty. That said, it is obviously reasonable to raise the possibility that infants at some point—either in the second year or later—do come to regard other people as sources of information—sources who can identify and name unknown objects, demonstrate how to use an unfamiliar tool, or bring a means-end sequence to fruition. I return to the question of when and how infants come to regard other people as potential informants in a later section.

**Comforting and Helping**

Among chimpanzees, acts of comforting and consolation are readily identifiable—especially in the aftermath of a conflict. De Waal and Aureli (1996) recorded affiliative contacts (kissing, embracing, grooming, gentle touching, and mounting) directed by bystanders toward victims of aggression. The frequency of such contacts was compared after severe aggression, mild aggression, and during randomly chosen baseline periods. In the minutes immediately following a bout of aggression, victims were much more likely to receive affiliative contact than during a baseline period, especially if the aggression had been severe rather than mild. By contrast, approaches to the aggressor were much less frequent. Were bystanders making a moral judgment and siding with victims? Conceivably, but more likely, they were simply sensitive to the higher level of distress expressed by the victims. Such selective comforting is not found throughout the primate order. For example, de Waal and Aureli (1996) found no postconflict elevation of contact among long-tailed macaques. Finally, it is worth noting that acts of consolation do not appear to be triggered by overt distress in the animal who is offering consolation. Visual records of such acts indicate that the victim may well be screaming but the consoler is not. By implication, consolers appear to grasp the distress displayed by a victim, not via some form of low-level contagion, but via some form of sympathy.

Do we find a similar set of consolation behaviors among human infants? In my view, the evidence points to a considerable continuity. To anticipate, human infants offer consolation, they do so in response to overt distress, and they do so based on sympathy rather than
low-level contagion. Consider the following episode reported by Wolf (1982):

When we came home this afternoon, I slipped and fell and came down really hard whacking my nose. I was in real pain and sat down on the rocker in J.’s room, holding and rubbing my nose. J. (14 months) was very sympathetic. He acted for me the way I do when he hurts himself. He hugged and patted me and even offered me his blanket that he uses when he’s hurt or tired.

Or consider the following reported by Hoffman (1976, pp. 129–130):

Michael, 15 months, is struggling with his friend Paul over a toy. Paul starts to cry. Michael appears concerned and lets go of the toy so Paul has it. But Paul continues to cry. Michael pauses, then gives his own teddy bear to Paul; Paul continues crying. Michael pauses again, runs to the next room, gets Paul’s security blanket, and gives it to him. Paul stops crying.

Finally, here is the following favorite of mine, reported by Dunn and Kendrick (1982, pp. 115–116):

Fifteen-month-old Len, was a stocky boy with a fine round tummy, and he played at this time a particular game with his parents that always made them laugh. His game was to come toward them, walking in an odd way, pulling up his T-shirt and showing his big stomach. One day his elder brother fell off the climbing frame in the garden and cried vigorously. Len watched solemnly. Then he approached his brother, pulling up his T-shirt and showing his tummy, vocalizing, and looking at his brother.

These apparent acts of consolation are difficult to explain as mere contagion. The child offers consolation but does not cry. The child makes obvious efforts to reduce the distress of the other person (e.g., via hugs, pats, comfort objects, and parlor tricks). Such efforts do not appear to be simply aimed at minimizing aversive expressions of distress—after all, the child will sometimes leave the scene (thereby escaping the distress altogether) but nevertheless comes back (e.g., with the victim’s security blanket).

Zahn-Waxler, Radke-Yarrow, Wagner, and Chapman (1992) carried out a longitudinal study of such comforting behaviors in the 2nd year of life. They recorded naturally occurring instances of physical comforting (e.g., hugs, pats, or kisses), verbal comforting (e.g., “You be okay”), verbal advice (e.g., “Be careful”), helping (e.g., putting on a bandage or giving a bottle) and miscellaneous interventions (e.g., getting mother to retrieve a rattle for a baby, sharing food, attempting distraction, and trying to prevent further injury). Up to the age of 15 months, acts of comforting were mostly physical, but beyond 18 months, the entire repertoire was displayed across the sample. The investigators also looked at the frequency with which distress elicited concerned behavior and observed a marked increment from the beginning of the 2nd year, when only about 10% of distress episodes elicited concern, to the end of the 2nd year, when about 50% of distress episodes did so. Moreover, this increment was stable across various contexts—it was found for naturally occurring episodes of distress, for simulated episodes (e.g., where the mother deliberately feigned hurt and distress), and for distress that children had caused themselves (e.g., by taking another child’s toy).

Recall that the chimpanzee data suggest that the act of comforting is not necessarily accompanied by any obvious distress on the part of the comforter. Much the same can be said of the human toddler. Zahn-Waxler et al. (1992) compared how often toddlers responded to another’s distress by getting distressed themselves and by offering comfort. The frequency of both types of behavior was comparably low at the beginning of the 2nd year; toward the end, however, comforting behaviors were much more common than distress reactions. In other words, older toddlers frequently offer comfort in the absence of any overt signs of distress. This is especially true when toddlers have not been the cause of the other person’s distress and are innocent bystanders.

In summary, concern for other people’s distress appears to emerge in the 2nd year of life. It is displayed whether or not children have caused the distress, and when they show concern for another’s distress, children are not necessarily distressed themselves. This emerging pattern of concern strongly suggests that toddlers appreciate the emotional state of the other person, and feel concern, even if they are not yet engaging in any sophisticated form of mind reading (Nichols, 2001).

Looking forward to developments in the 3rd and 4th year of life, it seems highly likely that this capacity for concern feeds into young children’s moral judgment. A solid body of evidence indicates that 3- and 4-year-olds regard various moral breaches (e.g., hitting another child or taking another child’s toy) as more serious than conventional breaches (e.g., putting toys away in the wrong place; Smetana, 1981). How do they come to that
conclusion? One possibility is that they are guided by adult feedback. For example, Hetherington and Parke (1999, p. 635) emphasize that mothers and other family members respond to social-conventional violations by focusing on the disorder that the act created (“Look at the mess you made!”), whereas they respond to moral transgressions by focusing on the consequences of the acts for others’ rights and welfare or by making pleas for perspective-taking requests (“Think about how you would feel if you were hit”). However, to the extent that mothers effectively respond to both types of violation—conventional as well as moral—it is far from clear that they thereby alert children to their differential gravity. A more probable explanation can be traced back to the capacity for concern at another’s distress that has just been described as emerging in the 2nd year of life. It is plausible to suppose that children will soon observe that certain types of misdemeanor, such as hitting another child or taking another child’s toy, cause distress, whereas other types of misdemeanor are met with indifference—at least by other children. For example, other children are likely to be indifferent if someone puts toys away in the wrong place. By implication, peers are likely to be excellent tutors, or, more precisely, the distress reactions of peers are likely to be an excellent cue to the serious nature of moral breaches as compared to the less serious nature of conventional breaches.

Consistent with this argument, preschoolers who are told about an unfamiliar action (e.g., “mibbing” another child) in a story context will conclude that it is akin to a moral breach if they are also told that the action in question causes distress (Smetana, 1985). Finally, it is worth dwelling on one further striking result reported by Smetana and her colleagues (Smetana, Kelly, & Twentyman, 1984): Preschool children with abusive and neglecting parents show no obvious difficulty in distinguishing between moral and conventional rules. This result is paradoxical if one assumes that parental feedback is a key element in making the distinction—as implied by Hetherington and Parke (1999). On the other hand, the result is quite plausible if one focuses on the role of peers and specifically of peer distress. The children were all attending preschools. Hence, irrespective of their home background they had an opportunity to discover how peers respond with distress to moral breaches but remain unmoved by conventional violations.

In conclusion, there is a fascinating continuity between the sensitivity that toddlers display to distress and hurt in other people and the relatively sophisticated moral judgments that they come to make at the age of 3 and 4 years. However, this is not to say that preschool children are constantly behaving like good Samaritans and always do what is right. We soon take a look at the dark side of early social cognition. First, however, it is useful to examine one further prosocial behavior: helping.

Offering Help and Cooperation

Although helping is obviously a benevolent form of behavior there are reasonable grounds for expecting that it might display a different ontogenetic and phylogenetic pattern when compared to comforting. As I emphasized earlier, comforting—whether among human toddlers or among chimpanzees—appears to be triggered by evident distress on the part of the comforted. The trigger for an act of helping is obviously different, more variable, and probably more complex. Recall the earlier discussion of toddlers’ ability to analyze an agent’s goal-directed action. Toddlers imitate an action sequence more effectively if the goal of that action sequence is made salient to them (Carpenter et al., 2002; Want & Harris, 2001). By implication, at least in certain circumstances, toddlers are well able to analyze the goal not only of a discrete movement or displacement but also of an action sequence with subgoals. When and how do toddlers start to offer assistance to someone whose action sequence goes awry or needs a helping hand?

Rheingold (1982) carried out a pioneering investigation into toddlers’ inclination to help an adult engaged in various household tasks. Children aged 18, 24, and 30 months were observed in a domestic setting as an adult (the child’s mother, father, or an unfamiliar adult) carried out various household chores such as laying the table or gathering up books. Even 18-month-olds offered help for more than half of the tasks. By 30 months, this figure rose to almost 90% of the tasks. Thus, toddlers were remarkably willing to offer assistance. Indeed, as Rheingold (1982) comments the children helped with alacrity: “They carried out their efforts with quick and energetic movements, excited vocal intonations, animated facial expressions, and with delight in the finished task” (p. 119).

How should this cooperative attitude be construed? On one interpretation, children may have been engaged in relatively low-level, albeit enjoyable, imitation of the adult’s actions. Seeing the adult carry a book and stack
it on the table, perhaps they did likewise. An alternative, richer interpretation is that children figured out the adult’s overall goal and saw themselves as contributing to that goal. Various pieces of evidence favor the latter interpretation. Children sometimes started to provide help when the adult announced their intention but had not yet begun to act. They also stated their intention to perform a task, appeared to know when the task was complete, and supplied elements that were neither suggested nor modeled by the adults.

Dunn and Munn (1986) provide complementary data on children’s willingness to help and cooperate with a sibling rather than an adult. They found that on average 18-month-olds cooperate with an older sibling 6 to 7 times each hour and by the age of 24 months that figure climbs to 10 to 11 times per hour. Not surprisingly, some of the collaborative acts are carried out in the context of pretend play but the majority are not. Moreover, as observed in the context of adult-child cooperation, collaborative acts cannot be reduced to imitation: Children take on complementary activities in pursuit of a common goal.

The capacity for such complementary activity was highlighted by Brownell and Carriger (1990) in a study of peer cooperation. Children ranging from 12 to 33 months were given various novel, practical problems that depended on their adoption of complementary roles for their solution. For example, to retrieve some toy animals, one child needed to stand away from and opposite to another child who rotated a handle that transported the animals in a cup toward the first child. Cooperation at 18 months was rare and possibly accidental. By 24 months, however, cooperation was generally rapid and effective.

Summarizing across these studies, it is clear that toddlers are disposed to cooperate. They spontaneously offer help to a parent, an unfamiliar adult, a sibling, or a peer. Sometimes they provide help to someone whose plan of action is already underway or established—they temporarily adopt the other’s goal as their own. Sometimes, they cooperate in a more symmetrical fashion as when they adopt complementary roles to further a game of pretend or a practical activity. In either case, it is apparent that children can adjust their goals to those of another person. It is tempting to take such cooperative activity for granted given its familiarity and spontaneity. However, it is worth underlining the possibility that it is a uniquely human trait. Indeed, Tomasello, Carpenter, Call, Behne, and Moll (2005) conclude that there are no published experimental studies showing that chimpanzees collaborate by playing different and complementary roles in an activity. If they are right, their conclusion underlines the importance of distinguishing between prosocial acts of comforting and prosocial acts of cooperation. Whereas chimpanzees may be capable of the former, the latter looks as if it is a powerful but unique human disposition.

**Hurting and Teasing**

In an earlier section, we saw that young children recognize others’ distress and that in the 2nd year of life they acquire a repertoire of strategies for alleviating that distress. The ability to recognize distress and some of its causal elicitors can be put to other uses. Children can deliberately seek to tease, upset, frustrate, and provoke. As one might expect, given the increased frequency of comforting in the 2nd year, there is a parallel increase in acts of teasing (Dunn & Munn, 1985). By the middle of the 2nd year, many incidents between siblings involve the removal of the sibling’s comfort object or an attack on some favorite possession. By 24 months, however—again in line with the pattern for comforting—the child’s repertoire becomes more elaborate. For example, one child teased her older sister by pretending to be her imaginary companion.

Sibling relationships are often characterized by an admixture of teasing and comforting (Dunn, Kendrick, & MacNamee, 1981). Moreover, it is often the older sibling who is the prime instigator of hostile interactions (Abramovitch, Corter, & Lando, 1979; Abramovitch, Corter, & Pepler, 1980; Dunn & Kendrick, 1982). Despite these overall tendencies, investigators also note huge variation across sibling pairs in the proportion of mutually hostile and mutually friendly encounters. For example, in some sibling pairs, there are virtually no mutually hostile interactions; in others, they occur about half the time.

Some children display a pattern of social interaction that seems to lie outside the range of behaviors observed in the hurly-burly of everyday family life. When children who have been subjected to physical abuse by their parents are observed in a preschool setting, they often display a bias toward hostile as opposed to cooperative interaction. More specifically, as compared to children from the same social class background but with no known history of abuse, abused children are likely to display more aggression and less helping and sharing...
(Hoffman-Plotkin & Twentyman, 1984; Trickett & Kuczynski, 1986). The response of abused children to the distress of other children is especially noteworthy because the pattern of concern described earlier appears to be disrupted. When abused toddlers were confronted by another’s distress in a day-care setting, they never responded with obvious concern. At most, they patted or attempted to quiet the crying child. Their more frequent response was to respond in a negative fashion, with hostile or fearful gestures or sometimes with direct physical attacks on the crying child (George & Main, 1979). A similar pattern of results emerged among abused preschoolers aged 3 to 5 years even though they had had the opportunity to interact with nonabusive caregivers and peers for 1 or 2 years in their day-care setting (Klimes-Dougan & Kistner, 1990).

These observations underline the fact that the gestures of comfort and concern described in the previous section, and identified as part of our primate heritage, are not irreversibly wired into the young child’s social cognitive repertoire. Whatever sensitivity infants and toddlers display to another’s distress, it is likely that active and benevolent concern for that distress is a relational mode that abused children experience with their abusive parents much less often than nonabused children.

MENTAL STATE UNDERSTANDING IN EARLY CHILDHOOD

When children move beyond infancy and begin to talk, it becomes somewhat easier to study the development of social cognition. We can analyze their spontaneous remarks and probe their understanding with a rich set of story formats. This shift in technique is especially evident in the study of children’s understanding of goals and desires.

Goals, Desires, and Intentions

Recall that Premack and Woodruff (1978) found that their chimpanzee subject was able to figure out what the actor in the film clip was aiming to do. We have also seen that infants are able to diagnose the goal that a human action is directed toward. Indeed, as discussed in the section on helping, toddlers will sometimes offer help or comfort by fetching an object that someone is trying to get or needs. Should we not assume that chimpanzees as well as human infants and toddlers realize that other people have wants? A somewhat leaner interpretation is plausible. Chimpanzees or young humans might be good at diagnosing the direction or goal that an ongoing action, or even a sequence of actions, is aimed at—its external, perceptible target—without an understanding of the mental state of desire that initiates and guides such actions or states.

Under what circumstances might we be prepared to attribute a more mentalistic concept of desire to young children? My guess is that there is no straightforward, acid test. However, what does emerge from approximately 18 months upward is the competence to talk about desires and to articulate various contrasts using the key concept of desire. Bartsch and Wellman (1995) analyzed the spontaneous utterances of a small group of children regularly observed and recorded between the ages of 18 months and 5 years. Bartsch and Wellman searched through approximately 200,000 utterances and identified about 12,000 that included mental state terms that they divided into two broad categories—thought and belief terms such as think and know and desire terms such as want, wish, and hope. They found that children begin to use desire terms from about 18 to 24 months. In addition, when children are between 24 and 30 months, they begin to produce various contrastive utterances. For example, they begin to contrast what they want with what they actually get or are about to get (e.g., “I want a turtle, but I can’t have one”). They also contrast what one person wants with what another person wants. Bartsch and Wellman (1995) plausibly conclude that children’s references to “wants” are not references to actions-tending-toward-goals. Rather, they are references to internal states that are different from, albeit linked to, the actions that they motivate and the goals that they are directed toward.

The available data from children’s spontaneous utterances also underline the fact that the concept of desire plays a central, organizing role in children’s emerging understanding of mental states. First, children refer to desires earlier, and more often, than they refer to cognitive states such as thinking and knowing. Second, they do so despite the fact that their parents talk about cognitive states as often as they talk about desires. Third, the early discussion of desires is not confined to English-speaking children. It appears also in studies of Mandarin- and Cantonese-speaking children (Tardif & Wellman, 2000). Finally, children with
autism—who show various problems in the understanding of belief—are relatively competent at talking about desires (Tager-Flusberg, 1993; Tan & Harris, 1991).

Experimental studies support the idea that 2- and 3-year-olds understand the way that desires are linked to actions and indeed to various simple emotions. For example, they understand that people will search for what they want and that if they obtain it, they will feel happy and that if they do not obtain it, they will persist in searching and feel sad or angry (Hadwin & Perner, 1991; Stein & Levine, 1987; Wellman & Woolley, 1990). Moreover, when invited to account for a story character’s actions 3-year-olds also offer explanations couched in terms of desires (Bartsch & Wellman, 1989).

How does children’s early understanding of desire connect with their understanding of intention? Recall that a long Piagetian tradition examined children’s understanding of intentions in the context of moral judgment (Piaget, 1932). The standard conclusion was that young children are relatively slow to acknowledge the relevance of intention to moral judgment, focusing instead on the gravity of the consequences as the primary index of the seriousness of the misdemeanor. More recent research, especially in the context of theory of mind, has sought to assess children’s understanding of intention in its own right. The link with moral judgment and moral responsibility has not been forgotten, but it is no longer so evidently center stage.

One important finding is that, contrary to the impression that might be gained from the older Piagetian literature, preschool children are able to distinguish between acts that are deliberate as compared to acts that are intentional. More specifically, when 3-year-olds engage in actions that go wrong; for example, if they inadvertently mispronounce a word in trying to repeat a tongue twister, they appropriately judge that the actions were not done “on purpose” (Shultz, 1980). However, it is also likely that 3-year-olds get by with a relatively simple, desire-based notion of unintended action, judging outcomes that are desirable as intended and outcomes that are undesirable as unintended (Astoning, 1991). Thus, it is important to probe the extent to which young children realize that desires and intentions do not always coincide. For example, I can intend to do many chores that I do not want to do, and I can want to visit far-off places that I have no current intention of visiting.

To explore children’s ability to make this distinction, Feinfeld, Lee, Flavell, Green, and Flavell (1999) presented 3- and 4-year-olds with stories in which the protagonist’s desire and intention were different. For example, in one story, the protagonist wants to go to one place (e.g., to the mountain) but, on mother’s instructions, intends to go to a different place (e.g., to the football field). However, because of a mistake by the bus driver, the protagonist ends up where he wanted to go and not where he intended. Four-year-olds performed quite systematically—they realized that the protagonist was trying and expecting to get to one place (e.g., the football field in the example just given) but wanted to go to a different place (e.g., the mountain). By contrast, 3-year-olds were much less systematic. Although they were generally accurate in identifying the protagonist’s preference, they were much less accurate in indicating what he was trying and expecting to do. Moreover, even when they did identify the protagonist’s intention correctly, they often added that the protagonist also intended to reach the other, more desirable goal. As Feinfeld et al. (1999) point out, one conceivable interpretation of these findings is that 3-year-olds have some difficulty in acknowledging the role that thinking and believing plays in the formulation of an intention. More specifically, intentions are generally formed with the belief—sometimes false—that one’s plan can be executed (Moses, 1993). In the next section, we look in detail at children’s understanding of belief.

Beliefs

A great deal of research effort has been devoted to documenting and probing children’s developing understanding of belief, and notably false belief. Indeed, the false-belief task has been the favored task for the refinement and testing of various competing accounts of the child’s theory of mind. For that reason, I use this section to serve a double purpose—to review the extent to which there is an emerging empirical consensus regarding the major landmarks in the child’s understanding of belief, and to provide an initial evaluation of those competing theories.

Three main tasks have played a role in the effort to assess children’s understanding of belief. First, in the unexpected displacement task, a protagonist, having put an object in one place, is unaware of its transfer to a new place during a brief absence, and on his or her return, expects it to be where it was originally put. Children are asked to say where the protagonist will look for the object—in the new or the old place (Wimmer & Perner, 1983). Second, in the deceptive container task, children
discovered that a familiar container (e.g., a Band-Aid box) contains some unexpected content (e.g., stamps), and are asked—in the face of this unexpected discovery—to indicate (a) what they originally thought to be inside the container and (b) what someone looking at it for the first time would think is inside it (Gopnik & Astington, 1988; Perner, Leekam, & Wimmer, 1987). Finally, in the appearance-reality task, children are shown a misleading object—for example, a sponge shaped and painted to look like a rock; they examine it, discover its true identity, and are then asked both about its real and apparent identity (Flavell, 1986). As will be clear from this brief description, all three tasks turn on the fact that a protagonist, lacking full perceptual access to the object or situation in question, comes to, or might come to, an erroneous conclusion. Children are asked to diagnose the protagonist’s erroneous conclusion, despite their current knowledge of the true facts.

Wellman, Cross, and Watson (2001) recently carried out a helpful meta-analysis of a large number of different studies covering all three types of task. They asked how performance changed with age and how it varied as a function of various potentially influential factors such as whether the child was actively involved in the displacement or switch or just a spectator. They obtained support for a very robust age-change between 3 and 5 years. At 30 months, children are more than 80% incorrect; at 44 months, they are 50% correct; and by 56 months, they are approximately 75% correct. Thus, children’s performance shifts from being systematically below chance (at 41 months and younger) to systematically above chance (at 48 months and older). Moreover, the age change is quite stable across various conditions of testing. It is unaffected by whether children are questioned about what a protagonist thinks or asked to predict the protagonist’s belief-based behavior. It emerges whether the target person is a story character, a puppet, or a real adult. It emerges whether the protagonist holds a false belief about an object’s location or its identity. Finally, it is unaffected by whether children are asked about their own false belief or that of another person.

Wellman et al. (2001) did find that certain factors help or hinder accurate performance. For example, an explicit indication that the protagonist is being tricked or deceived, active participation by the child in performing the critical object switch or change of location, or an explicit cue (verbal or pictorial) regarding the protagonist’s belief are all factors that help children to diagnose belief more accurately. Finally, the elimination of the target object (e.g., in the unexpected displacement task, the removal of the desired chocolate from the old location together with its consumption—as opposed to its transfer to a new location) helps children diagnose the protagonist’s search accurately. Nevertheless, as Wellman and his colleagues underline, each of these factors tends to help (or hinder) younger children and older children alike. There was no indication, for example, that younger children solve the false-belief task when it involves deception, whereas older children solve it irrespective of whether deception is involved. Rather, deception was a helpful factor across the entire age range. Similarly, the presence of the target object proved a hindrance across the entire age range. Thus, none of these factors do much to alter the observed gradient of improvement with age. In particular, there is no factor—or set of factors—that serves to unmask the competence of 3-year-olds and enables them to perform like 5-year-olds—or even to perform at above chance levels.

Armed with these empirical conclusions, Wellman et al. (2001) spell out plausible implications for theory. First, they note that the consistent age change, together with the failure to uncover a set of conditions under which 3-year-olds perform systematically above chance, undermines a family of theories implying that children have an innate, or early, capacity to understand false belief (Fodor, 1992; German & Leslie, 2000; Leslie, 2000). Such accounts have generally implied that such early understanding can be unmasked provided the child is tested under optimal conditions, notably conditions that minimize or eliminate various information-processing constraints. Yet, the meta-analysis failed to identify such conditions.

Second, they argue that even if room is made for the impact of information-processing constraints—particularly those identified by various executive function accounts (Carlson & Moses, 2001)—the fact that a consistent age change appears whether such constraints are maximized or minimized strongly suggests that some kind of conceptual change takes place between 3 and 5 years. The improvement that they consistently note cannot be exclusively attributed to the lifting of information-processing restrictions but probably implies the attainment of some type of conceptual insight.

Let us pause to consider each of these two claims in turn. Is it—as Wellman et al. (2001) conclude—time to abandon a nativist, modular stance toward the understanding of belief in the wake of overwhelming empirical evidence for conceptual change? As Moses (2001)
points out in a level-headed commentary, such a move might be a bit premature. First, as Wellman et al. (2001) concede, there are no studies of 3-year-olds in which all of the four optimizing conditions that they themselves identify have been brought together. It is feasible that such an optimal conjunction would lift the performance of 3-year-olds above chance. Second, it is important to keep in mind the fact that research on false-belief understanding has—need it be said?—focused on the understanding of false belief. Yet, there are many cases where we are called on to understand someone’s belief without knowing whether the belief is true or false because an accurate reading of reality is simply unavailable. Beliefs about the future fall into this category, as do many beliefs about the past. As an experimental illustration, consider a fascinating study conducted by Wellman and Bartsch (1988). They asked children to predict where the protagonist would look for his or her lost dog given that (a) the protagonist thought it was in place X; (b) the child participating in the study thought it was in place Y; and (c) the actual location of the lost dog was yet to be determined. Three-year-olds did very well in this task—much better than in a variety of closely matched conditions in which the nature of reality was not indeterminate. Thus, 3-year-olds predicted that the protagonist would be guided by his belief. Arguably, these findings need further confirmation. Can we be certain, for example, that 3-year-olds are not simply eliding the distinction between where the protagonist wants the dog to be—and where the protagonist thinks the dog is? Future studies might be aimed at setting up a clearer contrast between the protagonist’s desire (or hope) and the protagonist’s belief (or expectation). For example, the protagonist might hope that his dog has run off toward the park rather than the (dangerous) highway but nonetheless believe that the dog has actually gone toward the highway rather than the park. Still, the findings of Wellman and Bartsch (1988) definitely point to a way of escaping from the vast edifice of false-belief studies toward the less explored territory of what might be called indeterminate beliefs. Such an escape might ultimately offer succor to the nativists by showing that 3-year-olds do possess a useful, working notion of belief, even if they undeniably have trouble in understanding false beliefs.

What of the second conclusion reached by Wellman et al. (2001) that a conceptual change takes place between 3 and 5 years? This is a reasonable conclusion at this point in the research program. Still, it is worth underlining three important caveats. The first caveat is that even if a conceptual change is involved, the meta-analysis is not much help in deciding among various different candidates for the nature of that conceptual change, as Wellman and his colleagues concede. Thus, each of the following three candidates remains viable. First, it could be argued that what is emerging is a concept of belief—no more and no less. This is essentially the position adopted by Wellman himself (Bartsch & Wellman, 1995) together with various like-minded colleagues (Gopnik & Wellman, 1994). On this account, the period between 3 and 5 years marks the construction of a second major pillar of our everyday theory of mind. Children below the age of 3 years have a good understanding of desires and by the age of 5 years they have an understanding of desires, beliefs, and their relationship. Second, it could be argued that the emerging concept of belief is actually better seen as an insight into the way in which beliefs are formed on the basis of access to particular sources (Wimmer & Hartl, 1991; Wimmer & Weichbold, 1994). This focus on children’s understanding of the sources of belief is plausible because—as noted earlier in describing the three classic tasks used in false-belief research—the protagonist’s incomplete perceptual access is critical to his or her false belief. Third, it is feasible to claim that the child’s emerging insight into the nature of belief is part of a larger conceptual insight into various representational media, of which the mind is only one example, albeit a prominent one. In setting out this claim, Perner (1991, 1995) underlines the following puzzle—which he takes to be a major conceptual hurdle for the child. Consider an out-of-date road map; it shows a forest beside Highway 1. You know that the forest has long disappeared and a large housing estate has been built in its place. Nevertheless, you also appreciate that someone to whom you lend the map might mistakenly drive along Highway 1 expecting to see the forest. You understand, therefore, that the map—despite its misrepresentation of reality—can nonetheless be read as an accurate representation of reality. According to Perner, it is this conflicting function—misrepresenting while being taken to accurately represent—that stymies the 3-year-old in thinking about beliefs—or any medium, be it a map, a photograph, or a signpost that purports to represent reality accurately while not actually doing so.

The second caveat concerning the claim that a conceptual change occurs between 3 and 5 years is that even if any one of the three types of conceptual change
just described were to emerge as the most convincing account, we still need to understand the underlying engine of development. To make this point more explicit, let us suppose that the belief-focused account advocated by Wellman and his colleagues turns out to be the most convincing. This would still leave entirely open the question of how children come to construct such a concept. For example, is it by virtue of their first-hand experience of holding a belief, of acting, thinking, and talking in accord with that belief, and then discovering that the belief can still turn out to be false? Alternatively, is it explicable in terms of the modification of an increasingly untidy and nonpredictive desire-based theory? Or is it by virtue of hearing people’s (false) beliefs articulated in language? The meta-analysis gives very few clues to help resolve these questions—although it is worth noting that one factor—the provision of an explicit cue, such as a verbal statement of the protagonist’s belief—was one of the factors that boosted performance.

The third and final caveat concerns the future of research on the false-belief task. Consider the problem of conservation. Few, looking back at the various conflicting interpretations of that age change, would claim that we now have a definitive understanding of why or how it takes place. One plausible conclusion from the plethora of inconclusive research is that cross-sectional experimental analysis is just not potent enough to uncover the dynamics of developmental change. Moreover, in the case of conservation, it was far from clear what experiences in the child’s everyday environment might promote development. Hence, even when training studies were conducted and were effective, their relevance to conceptual change in everyday life, outside of the laboratory, was unclear. Does this mean that research on false belief will fade away, in much the same way as has research on conservation? One optimistic sign is that investigators are turning much more actively to a consideration of the type of variation in children’s everyday life that promotes understanding. The child’s language ability and the conversational environment to which the child is exposed are emerging as very important factors. I return to the role that language might play in promoting the understanding of belief in the context of an analysis of individual differences.

Perception, Knowledge, and Source Monitoring

False-belief tasks, and the conceptually related appearance-reality task, it was noted, turn on the child’s realization that perceptual access is a key to accurate knowledge. In the standard unexpected displacement task, the story protagonist ends up with a false belief because he or she was not present to witness the displacement. In the deceptive container task, the child (or some other person) has not witnessed the surreptitious replacement of the standard contents. In the appearance-reality task, the child has to identify what someone might conclude about the properties or identity of an object, in the absence of comprehensive perceptual access; for example, someone who has just looked at, but not touched, a sponge painted to resemble a rock, might take it to be a genuine rock—until they poke it.

Alongside this focus on what children understand about the consequences of blocked or restricted perceptual access, it is important to ask whether children also appreciate the consequences of appropriate perceptual access. A variety of related but distinct questions present themselves. Do children realize that appropriate perceptual access usually leads to knowledge? Can they distinguish among the various different sources of perceptual knowledge—seeing, hearing, touching, and so on? Do they differentiate between such perceptual sources and learning via the testimony of others? Finally, when do they realize that the judgment of someone with appropriate perceptual access should generally be trusted? As we shall see, these questions all speak to the wider issue of when and how children come to be insightful seekers and gatherers of information.

Three- and 4-year-olds are well able to report when someone can and cannot see an object (Flavell, Shipstead, & Croft, 1978) and they can position a doll so that it will not be seen by two doll policemen (Hughes & Donaldson, 1979). Young children also realize that seeing yields knowledge. For example, several experiments have established that 3- and 4-year-olds realize that someone who has looked into a box will know its contents, whereas someone who has picked it up but not looked inside will not know its contents (Pillow, 1989; Pratt & Bryant, 1990).

Children might conceptualize perceptual contact in an all-or-none fashion. Thus, they might assume that any kind of perceptual contact yields knowledge. Alternatively, they might have a more refined notion of perceptual contact, realizing, for example, that visual inspection is needed to identify an object’s color but manual inspection is needed to identify its hardness. O’Neill, Astington, and Flavell (1992) found a shift with age from a more global to a more refined understanding.
of perceptual input. Thus, 3-year-olds were poor at judging that color has to be judged by looking, whereas hardness is best gauged by manual inspection. Five-year-olds, by contrast, were much more accurate at realizing that our senses can provide modality specific information. O’Neill and Chong (2001) extended this conclusion to all five senses: Three-year-olds were quite inaccurate in both saying and showing how they had determined, for example, the smell of a bubble bath—even when they had just copied the experimenter and smelled the liquid in question. Four-year-olds were much more accurate.

A similar development appears to occur with respect to children’s differentiation between perceptual and nonperceptual sources of information. Gopnik and Graf (1988) informed 3-, 4-, and 5-year-olds about the contents of a drawer in three different ways: Children looked in the drawer, were told about the contents, or were given a clue. They were then asked how they knew the contents. Although 3-year-olds performed above chance, the performance of 5-year-olds was almost perfect. Moreover, even if 3-year-olds were correct on an immediate test, they were prone to forget their source in a delayed test.

Nevertheless, 4- and 5-year-olds do display a certain degree of amnesia about how they have come to know various facts (Taylor, Esbensen, & Bennett, 1994). Thus, whether they are reminded of a fact that they already know (e.g., that tigers have black stripes) or introduced to a fact that they do not know (e.g., tigers’ stripes provide camouflage) both age groups, especially the 4-year-olds, often claim immediately afterward that they have known both facts “for a long time.” Control procedures have established that children can judge time intervals in other contexts, for example, in assessing whether they have received a gift that day or “a long time ago.”

Summarizing these various studies, it appears that 3-year-olds can differentiate between those who have been supplied with information about an object—for example by looking into a box—and those who have no information about it at all. At the same time, they are poor at distinguishing among different sources of information. Thus, they are prone to confuse perceptual and nonperceptual routes (such as being told or making an inference), and they often fail to differentiate among particular perceptual routes, such as touching, looking, and smelling. Five-year-olds perform much more accurately on all these source-monitoring tasks—but, as noted, they have some difficulty in pinpointing the time of the learning experience.

It is important to note that all of these tasks call for children to reenact, to verbally identify, or to pinpoint in time their reliance on some particular source such as looking or telling. Whitcombe and Robinson (2000) showed that 3- and 4-year-olds are better at what might be described as procedural or online source monitoring. In their study, children were given limited or inappropriate perceptual access to an object—for example, they could only see a small red patch of a larger picture, or they could only feel an object inside a tunnel, and therefore not properly identify its color. Having ventured nonetheless to state the identity of the object, an adult with fuller or more appropriate access to the object proposed a different identity. When children were asked for a final judgment, they tended to yield to the better-informed adult. Moreover, when the roles were switched—so that the children were better informed than the adult—they tended not to yield. By implication, children were tracking who had better perceptual access and they either revised—or retained—their initial judgment in an appropriate fashion. Despite this accurate source monitoring at a procedural level, the familiar pattern of inaccuracy reappeared when children were asked to indicate the source of their final judgment. For example, children who had appropriately revised their initial judgment when the adult was better informed often made the mistake of saying that they knew the object’s identity because they had seen or felt it.

One interpretation of this type of accurate procedural source monitoring is that children follow a simple stay or shift rule. Specifically, they might stay with their own judgment if they have had a vivid and determinate perceptual encounter with the object but shift to the informant’s judgment if they have not. Thus, if they have been able to inspect a whole picture and establish that it is a strawberry—or look inside a tunnel and establish the identity of an object located inside it, children stay with their own judgment. If, however, they have only glimpsed part of the object or tried to identify its color by feel alone—and ended up by making a guess—they revise their judgment if another is offered.

On this argument, procedural monitoring would involve, at best, some sensitivity to the determinacy or certainty of one’s own perceptual encounters but it would not call for any monitoring of another informant. Robinson and Whitcombe (2003) tested this skeptical interpretation in a follow-up study. Children made an essentially uncertain judgment about an object, given their restricted perceptual access. They then heard an adult make a different judgment—sometimes on the
basis of better access but sometimes on the basis of equally restricted access. If children yield to another judgment whenever they are uncertain, they should have yielded just as often whether or not the adult was better informed. They did not. Children were much more likely to adopt the adult’s counterclaim when he or she was well-informed. In the future, we may expect to see more research intended to tease out the differences between “explicit” and procedural source monitoring. When children are uncertain, it is a useful strategy for them to seek and rely on information from someone else. Still, their reliance ought to be tempered by some sensitivity to how well-informed their interlocutor is. The findings of Robinson and Whitcombe (2003) suggest that even 3-year-olds have some competence at this type of fine-tuning.

Reviewing these diverse studies, it is evident that children’s accuracy in identifying the source of a piece of information improves with age. Between 3 and 5 years, children improve in their identification of one perceptual channel as compared to another, and they improve in identifying information based on perception versus testimony. At the same time, 3- and 4-year-olds appear to keep a surprisingly watchful eye on their informants. They defer to an informant who is better informed but resist one who is not.

Emotion

A great deal of research on emotional development has adopted what we might think of as the “continuity” position. Guided by Darwin’s emphasis on the similarities between human beings and animals in the origins and function of the expression of the emotions, this research tradition has approached emotional development in terms of the key issues of the production and comprehension of nonverbal signs of emotion—especially in the face. I reviewed some of the key findings from this research tradition earlier.

However, there is an important aspect of emotional development that this approach ignores. First, young children can communicate about emotion in language. No other species has that capacity—and there is good reason to keep in mind the possibility that that capacity transforms the emotional lives of human beings as compared to other species. Second, as I describe later, young children increasingly interpret both their own emotional experiences and those of other people in the light of their larger theory of mind. Again, that capacity calls into question the Darwinian “continuity” project, at the very least if it is taken to offer a comprehensive analysis of emotional development.

When do children start to put feelings into words and when do they begin to interpret emotions in relation to other mental states? Two and 3-year-olds already make references to basic emotions such as feeling happy, sad, and scared (Wellman, Harris, Banerjee, & Sinclair, 1995). They tend to talk mainly about their own emotions but references to those of other people, as well as those of stuffed animals and dolls, are also apparent. Moreover, they refer to likely future emotions and to emotions felt in the past. Thus, they talk about emotion in a referential and descriptive mode rather than an expressive mode. To clarify this distinction, consider the expressive terms: “Ouch,” “Yuck,” or “Oh!” These terms can be used to express a current emotion of the self but they cannot be readily used to identify a noncurrent emotion or one belonging to another person. Wittgenstein (1953) proposed that children’s early emotion talk is acquired and used in the expressive mode. However, close analysis of children’s comments on other people and their references to noncurrent emotion shows that that is not the case. More generally, it would be wrong to see children’s early emotion talk as a supplement to some preexisting nonverbal system for the expression of emotion. The evidence suggests that it is an altogether different mode of communication—it is descriptive, discursive, and referential.

When children refer to an emotion what do they have in mind? They might be referring only to the outward signs of the emotion—the tears or the smiles—or they might be referring to the experiential changes that an emotion generally entails. Wellman et al. (1995) found some indications that preschoolers differentiate between the experience of emotion and the actions and expressions that frequently accompany emotion. They also found that children think of emotions—unlike pains—as intentional states directed at an object or target. They realize that people are sad about something, afraid of something, or mad at someone. Here, we do see an important continuity with children’s interpretation of facial expressions. Recall that experiments on social referencing have established that toddlers in the 2nd year realize that an adult’s emotion is directed at a particular target—they do not treat it as a diffuse mood change.

Granted that young children talk about emotion with apparent sophistication, do they do so in an accurate
and appropriate fashion? More specifically, does the way in which they would describe an emotionally charged episode coincide with the description that an adult might supply of the same event? To explore this issue, Fabes, Eisenberg, Nyman, and Michealieu (1991) observed preschoolers aged 3 to 5 years in their day-care centers, and they approached bystanders following an emotional incident to ask for a description of what had happened. Three-year-olds gave an account of the target child’s emotion that matched an adult observer’s about two-thirds of the time and 5-year-olds did so about three-quarters of the time. For example, “She’s sad because she misses her Mom,” or “She’s mad because she thought it was her turn.”

How do children come to provide such accurate descriptions? One explanation that has appealed to various investigators (Lewis, 1989; Russell, 1989) is that children learn the typical script for any given emotion. They come to realize that there is some kind of standard elicitor (e.g., frustration in the case of anger; the unexpected in the case of surprise) together with an accompanying expressive and gestural pattern. When they see key features of the script, they identify the emotion accurately. The script-based analysis is consistent with the fact that preschoolers are quite good at describing the elicitors that would provoke various basic emotions such as sadness and fear (Trabasso, Stein, & Johnson, 1981). Such situational knowledge becomes richer and more differentiated as children get older so that they can describe situations likely to evoke more complicated emotions such as disappointment, relief, and jealousy (Harris et al., 1987).

There is, however, one important limitation of the script concept. It focuses on the external circumstances and observable behaviors that make up an emotional episode but it ignores the subjective appraisal that is frequently involved. What any given individual deems to be a frustration or surprise depends on the desires and beliefs that they bring to a situation. Are children sensitive to the crucial role played by these subjective appraisals? With this question in mind, Harris, Johnson, Hutton, Andrews, and Cooke (1989) asked 4-, 5-, and 6-year-olds to watch a naughty monkey who offered various animals either a nasty surprise (e.g., he gave the elephant whose favorite drink was coke a coke can with milk inside) or a nice surprise (e.g., he gave the horse whose favorite snack was peanuts a chewing gum packet with peanuts inside). Children were asked to say how the recipient of these gifts would feel both before and after discovering the contents of the container. As might be expected, all three age groups understood the role of desires: They judged that the recipient would feel happy if he eventually found his favorite drink or snack but sad otherwise. For the question about how the animal would feel before discovering the surprise contents, there was a marked age change. The youngest children mostly attributed to the animal an emotion based on the actual contents of the container—ignoring the animal’s mistaken belief about those contents. By contrast, the oldest children mostly did the reverse—they attributed an emotion based on the animal’s mistaken belief—ignoring the actual contents. By implication, all the children realized that the animal’s emotion would depend on his desires—as indexed by their answer to the question about how the animal would feel on discovering the actual contents—but their appreciation of the role of beliefs underwent a steep improvement with age.

At first sight, these results fit the pattern that has repeatedly emerged in other analyses. Children understand the role of desires well before they understand the role of beliefs. There is, however, a major deviation. The youngest group, with a mean age of 4 years, was quite poor at diagnosing the animals’ emotions with reference to their (mistaken) beliefs. Moreover, only about half the 5-year-olds were correct. It was only among the oldest group of children, with a mean age of 6 years, that the majority was correct. Yet, as we noted in the discussion of children’s understanding of belief, children generally understand a variety of false-belief tasks at around 4 to 5 years of age. Thus, even if 4- and 5-year-olds accurately predict a person’s thoughts, actions and utterances on the basis of his or her beliefs, they continue to have difficulty in predicting a person’s emotions on the basis of his or her beliefs.

Several subsequent studies have supported this intriguing conclusion. In a series of four experiments, Hadwin and Perner (1991) showed that children could appreciate a story character’s mistaken belief before they made use of this knowledge to make attributions of surprise. For example, 5-year-olds were at chance in attributing surprise, whereas all but one child correctly judged the protagonist’s false belief. Only by 6 years of age did a significant majority of children make correct belief-based attributions of surprise. A similar lag emerged for the attribution of happiness.

Bradmetz and Schneider (1999) replicated the same lag across five experiments and across two emotions (fear and happiness). Almost half the children ranging
from 3 to 8 years appreciated the false belief held by the protagonist but still made the incorrect emotion attribution. For example, when given a version of the story of Little Red Riding Hood, children frequently realized that Little Red Riding Hood mistakenly thinks it is her grandmother in the bed but then went on to say that she was afraid—and invoked the wolf to explain her fear, for example, “Because it is a wolf!” or “Because the wolf wants to eat her.” However, no child made a correct emotion attribution but failed the false-belief test. Thus, Bradmetz and Schneider (1999) document a robust lag between understanding belief and understanding the emotion that would be caused by that belief.

Finally, de Rosnay and Harris (2002) compared children’s performance on a story version of the nasty-surprise task (involving an animal puppet mistakenly expecting his favorite food) with their performance on a filmed version (involving a child mistakenly expecting to be reunited with his or her mother after an absence but actually encountering a stranger). In two experiments, children frequently erred on both the story and the film task by incorrectly identifying the protagonist’s emotion, despite correctly identifying the protagonist’s belief.

These various studies indicate that an appreciation of the role of beliefs in the elicitation of emotion is consolidated at around 6 years of age. This is not because 4- and 5-year-olds fail to understand beliefs, including false beliefs. There is a large body of evidence to show that they do—as described earlier. Indeed, as just stated, even in the same study, children will accurately diagnose a protagonist’s belief but fail to diagnose the concomitant emotion.

It is tempting to argue that such a lag is not surprising—children frequently grasp a concept without realizing all its implications. However, the puzzle is actually more acute. As described earlier, once children understand false beliefs, they immediately appreciate the implications for action. Thus, we do not find 3- and 4-year-olds who say that Maxi thinks his chocolate is where he left it but proceed to claim that he will search in the place to which it has been moved. Stated differently, recall that the meta-analysis reported by Wellman et al. (2001) showed that children solve the false-belief problem at approximately the same age whether they are quizzed about a protagonist’s thoughts or actions.

To summarize, the two central pillars of children’s theory of mind—desires and beliefs—are each relevant to their understanding of emotion. Moreover, in line with a large number of other findings, children acknowledge the key role of desires before they acknowledge the role of beliefs. An important unanswered question is why they are so slow to acknowledge the role of beliefs in causing emotion. No existing account of the child’s theory of mind offers a satisfactory explanation of this puzzle.

So far, I have discussed children’s attribution of so-called basic emotions: fear, anger, sadness, and so forth. Can the same focus on children’s understanding of beliefs and desires also explain children’s attribution of more complex emotions, notably those emotions that are frequently designated as social, such as guilt and pride? My reading of the evidence is that children need to consider not only a person’s desires and beliefs but also the way in which they assess themselves, and assume that others will assess them, in relation to various standards. Children who neglect these social considerations will fail to attribute guilt, pride, shame, and so forth in an appropriate fashion.

Earlier research on moral judgment by Piaget (1932) and by Kohlberg and his colleagues (Colby, Kohlberg, Gibbs, & Lieberman, 1983) analyzed children’s developing conception of why such standards should be upheld. However, these analyses did not focus directly on children’s attribution of guilt as a consequence of any failure to live up to those standards, the issue examined by Nunner-Winkler and Sodian (1988). They found that 4- and 5-year-olds consistently claimed that a story protagonist who had deliberately lied, attacked, or stolen from another child would feel happy. They justified this attribution by noting that the outcome—as seen from the point of view of the perpetrator, at any rate, was positive. He or she had, for example, stolen something desirable or successfully pushed another child off the swing.

By contrast, children around the age of 8 years claimed that the protagonist would feel bad or sad and they explained their attribution by reference to the misdeed or the protagonist’s bad conscience. By implication, young children are oblivious to feelings of guilt—this insouciance has come to be known as the “happy victimizer” phenomenon. It warrants analysis because, as Arsenio and Kramer (1992) point out, most adults would not have expected such a stance (Zelzo, Duncan, Barden, Garber, & Masters, 1986) and it raises the possibility that attempts to prompt children to be guided by their conscience may be fruitless, at least in the preschool years.
Various explanations of this marked age change can be ruled out. First, there is no evidence that young children think of hitting, stealing, and lying as acceptable. They judge them as bad—and they maintain that these actions would still be bad in hypothetical communities with no rules or punishment for such actions (Smetana, 1981). Indeed, Keller, Lourenco, Malti, and Saalbach (2003) confirmed that younger children are just as likely as older children to judge the protagonist’s actions to be wrong. More generally, these findings underline the fact that developmental changes in children’s moral judgment—the focus of the earlier research by Piaget and Kohlberg—do not offer an adequate explanation for age changes in the attribution of guilt.

Second, it might be that older children are more inclined than younger children to focus on the likelihood of punishment for such a misdeed. Indeed, being older, they might reasonably expect more chastisement. Analysis of children’s justifications lends no support to this interpretation either. When older children attribute bad feelings to the protagonist they scarcely ever explain that attribution by reference to punishment (Keller et al., 2003; Nunner-Winkler & Sodian, 1988).

A third possibility is that older children are more aware than younger children of the distress of the victim. Again, this seems unlikely because, as noted earlier, harm and distress are important factors leading preschoolers to judge certain actions as wrong (Davidson, Turiel, & Black, 1983; Smetana, 1985). Indeed, Arsenio and Kramer (1992) obtained direct evidence to rule out this interpretation. They asked children to comment on how the victim as well as the wrongdoer felt after a misdeed. The familiar age change emerged for attributions to the wrongdoer—whereas children in all age groups acknowledged that the victim would feel bad.

A fourth possibility is that children vary with age in their interpretation of the question. Maybe younger children assume that they are being asked to say how someone performing such a misdeed would actually feel—and conclude reasonably enough that a delinquent who hits and steals from other children would feel no remorse. By contrast, older children may assume that they are being asked to say how someone ought to feel. If this argument is correct, we might expect younger children to refer to bad feelings more often if they were asked how they themselves would feel. Keller et al. (2003) examined this prediction but found little support. Younger children were more likely to claim that they themselves would feel bad as compared to a story protagonist. However, the same effect emerged for older children—so that the greater overall tendency of older children to attribute more guilt remained.

The most plausible explanation of the happy victimizer findings is that there is a major shift in how children conceive of agents—including themselves. Preschoolers typically see people as agents who aim to get what they want and feel happy or sad depending on whether they have done so. Older children are more likely to see people as agents who assess actions, including their own, against normative and moral standards; if their actions meet those standards, they may feel proud but if they fall short they may—and indeed should—feel guilty or ashamed (Harris, 1989). Indeed, we may push this analysis a little further. Arguably, older children see everyone—victims as well as wrongdoers—as part of a moral order. In line with that proposal, Arsenio and Kramer (1992) found that older children are more likely to explain the feelings of victims and wrongdoers in relation to moral considerations. Making the same point differently, younger children—as we have seen—know that misdeeds cause a victim distress; what older children may appreciate, in addition, is that such distress is compounded by a sense of injustice on the victim’s part.

One reasonable yet troublesome objection to this general line of argument runs as follows. It might be argued that young children do feel guilt. To the extent that they feel guilt, they must appraise their actions in relation to normative standards, including moral standards. Some recent evidence appears to point firmly in that direction. Kochanska, Gross, Lin, and Nichols (2002) found that through the preschool years, preschoolers show a relatively stable tendency toward nonverbal displays of discomfort following a mishap; mothers’ ratings of their child’s proneness to guilt showed moderate correlations with such displays; and children who displayed more discomfort were more likely to abide by adult-imposed rules. If preschoolers actually do feel guilt, why are they prone to claim that wrongdoers will feel good rather than bad?

I think the most plausible answer to this question is a familiar one. The fact that children enter into a given mental state is no guarantee that they can diagnose that state in themselves or attribute it to others. We have already seen that this is the case for belief. Young children hold beliefs, including false beliefs. Nevertheless, it takes some time for them to recognize and attribute
such beliefs. Young children can also display emotions that are based on a mistaken appraisal of a situation—alarm at an intruder when there is none or surprise at an unexpected outcome. Again, it takes time for them to recognize and attribute such belief-based emotions. In the same way, children can feel guilt but may take time to recognize and attribute it. More specifically, children may know that they have done something wrong, and feel badly as a result, but in the absence of an interpretation of why they feel as they do, they may not recognize themselves as feeling guilty—even though observers would reasonably do so. This lag between the emergence of a psychological process in the child and the child’s capacity to recognize and attribute such a process is not confined to guilt. For example, children may hesitate as they read an anomalous sentence but when subsequently asked about whether there was something they did not understand, they will fail to recognize their comprehension problem (Harris, Kruithof, Meerum Terwogt, & Visser, 1981). Thus, we need not postulate an active process of repression or denial to explain children’s lack of insight and awareness. It is a normal developmental process.

In conclusion, the fact that preschool children display overt signs of guilt is no guarantee that they can make sense of what they feel after a wrongdoing or accurately attribute guilty feelings to another person. In future research, it will be fascinating to examine this claim in more detail. It will be important not only to observe displays of emotion in young children but also to ask them what they feel. If the preceding analysis is correct, preschoolers will often display emotions but deny any such feelings, whereas older children will be better placed to recognize how they feel.

**Thoughts, Memories, and the Stream of Consciousness**

Most adults share a variety of assumptions about the waking mind. We accept that it spontaneously generates a ceaseless flow of thoughts and feelings—what William James (1890) referred to as the “stream of consciousness.” This flow is deemed to be partly controllable—we can turn our mind to a particular plan or problem that we need to finalize—but there are also intrusive thoughts that come unbidden. Emotional concerns can have an especially dramatic influence on the stream of consciousness. Guilty ruminations over what we might have done differently, apprehension in the face of uncertainty, excitement about a potential success can all serve as attractors that redirect the flow of thought for varying lengths of time. Finally, we recognize that the contents of consciousness are limited—we cannot concentrate on two conversations at once or think concurrently about two unrelated problems. This limited capacity of consciousness is in some ways problematic—it means that when an emotionally charged thought intrudes, it is likely to interrupt, and even redirect the stream of consciousness. At the same time, it is a balm; in times of distress or anxiety, we can find solace by temporarily focusing on, and becoming absorbed in, some alternative activity, whether it is a book, a film, or an interesting conversation.

What do young children understand about these various aspects of our mental lives? Do they share adult assumptions about the ceaseless and partially controllable nature of the stream of consciousness? Research on this topic was spasmodic in the 1980s but is beginning to gather momentum—with important implications for the use of introspective self-reports from children in clinical settings. In a series of studies, Flavell and his colleagues have shown that preschoolers have a radically different view of our inner life from adults (Flavell, Green, & Flavell, 1993, 1995). For example, preschoolers do not consistently attribute any mental activity at all to someone sitting quietly or even to someone engaged in an activity such as reading or talking. This is not simply a problem in attributing mental activity to other people. Preschoolers are generally poor at acknowledging that they themselves have just been thinking and poor at saying what they have been thinking (Flavell et al., 1995). For example, after 5-year-olds had been asked by the interviewer to think about where they kept their toothbrush, they often denied that they had been thinking or acknowledged thinking but failed to mention either a toothbrush or a bathroom. Consistent with these findings, preschoolers are also often unaware of their ongoing inner speech (Flavell, Green, Flavell, & Grossman, 1997). In addition, when 5-year-olds were asked to try to have no thoughts at all for about 20 seconds, the majority claimed that they had succeeded. By contrast, the majority of 8-year-olds not only reported some mental activity but also reported specific thoughts (Flavell, Green, & Flavell, 2000).

How should this limitation be interpreted? Arguably, preschool children are providing accurate reports on their inner life but this does not seem likely. Especially when they have been prompted to reflect on a given
topic (e.g., where their toothbrush is kept) it seems plausible to assume that they have actually done so; it also seems unlikely that they can keep their minds empty for 20 seconds at a stretch. An alternative interpretation is that preschoolers have a faulty theory of the way that the mind works. They do not yet subscribe to the folk theory adopted by adults. Rather than thinking of the mind as a homunculus or processing device that is constantly active, they construe the mind as a container that may or may not house thoughts and ideas at any given moment. Although this explanation seems plausible, it is probably not the whole story. After all, older children are not only more likely than younger children to acknowledge that thinking is continuous but also to identify particular thoughts that they have had. By implication, children improve in their recognition skills. As the stream of consciousness goes by, they can increasingly identify specific mental contents borne along by that stream.

When stated in this manner, it is reasonable to ask whether certain mental contents might be more easily spotted than others. For example, despite their limited introspective ability, preschoolers might be better at picking out those mental states that have an especially vivid or intrusive aspect. Some findings lend support to this idea. For example, preschoolers can report with apparent accuracy on their ability to imagine an object in motion (Estes, 1998; Estes, Wellman, & Woolley, 1989). Indeed, the report by Estes et al. (1989) points to the intriguing possibility that preschoolers might be able to discover the way that their mind functions—and come to more accurate conclusions—in the context of a dialogue with adults. They found that 3- and 4-year-olds, who had at first balked at imagining a pair of scissors open and close, reported that they had successfully done so, when further prompted by the experimenter.

Preschoolers also show some appreciation of the quality of our mental life when asked about emotion. For example, even 4-year-olds acknowledge that an intense emotional reaction will wane over time. They make that claim whether the initial emotion is positive or negative and with respect to their own emotional experience as well as that of story characters. Moreover, children make the same claim in different cultures—for example, whether they are growing up in the West or in China (Harris, Guz, Lipian, & Man-Shu, 1985). Children might be simply espousing a folk theory and not accurately reporting on their own phenomenology but a plausible conclusion from these systematic findings is that the waning of intense emotion is a universal experience, acknowledged and understood by young children everywhere.

However, as adults we realize that our emotions do not always dissipate in a steady fashion. We are vulnerable to flashbacks and reminders that override, however temporarily, the underlying pattern of dissipation. Do young children understand such intrusive flashbacks? In an initial investigation of this question, children were asked about a story character who woke up on the day after an emotionally charged experience, and either started thinking about the experience again, or alternatively had forgotten about it (Harris et al., 1985). Six-year-olds claimed that the character would feel happier thinking about a positive experience rather than forgetting about it, but would feel happier forgetting about a negative experience rather than thinking about it. Four-year-olds were less systematic. They reached similar conclusions to the 6-year-olds for the positive experience but did not appear to grasp the benefits of forgetting a negative experience.

In a more extensive investigation of the same issue, Lagattuta, Wellman, and Flavell (1997) asked 3- to 6-year-olds to listen to stories in which the protagonist experienced a sad event and, subsequently, encountered a reminder. Children were told that the story character felt sad in the presence of a reminder and questioned to check if they were able to explain that the reminder had led the protagonist to think back to the earlier, sad event. The majority of 5- and 6-year-olds were able to articulate such explanations; but this was rare among 4-year-olds. Nonetheless, in a follow-up study in which the cues were identical to (and not just associated with) items involved in the initial event some 3-year-olds also provided such explanations, especially after they were explicitly asked whether the character was thinking back to the past event.

Finally, we may ask whether children have any appreciation of the limited capacity of consciousness. In an interview study with 8- and 13-year-old boys who had newly entered a boarding school and were sometimes feeling homesick, some tacit appreciation of that limit often emerged in their discussion of coping strategies (Harris, 1989). More specifically, boys often talked about the way in which absorbing activities helped them to stop thinking about home. For example, one 8-year-old explained: “I would try and forget all about it (home) or try and get my mind off it with going to play with my friends . . . or getting stuck into work or something like that.” Another explained: “Well if you were in the
dorms, you could read a book; if the lights were out you could try and get to sleep; if you were in the middle of a lesson just occupy yourself. [Interviewer: What does that do?] Well, once you get started and you’re really doing it, then you forget about being homesick and don’t really think about it.”

In summary, it is evident that children make rapid progress during the early school years in understanding the flow of consciousness. Whereas preschoolers seem to have little insight into the continuous nature of that stream, older children realize that the stream is more or less ceaseless. They also increasingly understand the way in which one type of mental content intrudes on—and for better or worse may displace—another. Such findings raise interesting questions about children’s grasp of the complicated nature of mental control. At some level, we adults assume that we can control our mental processes—for example, we can choose to concentrate on this or that topic. At another level, we also recognize that our self-control is partial—even as we concentrate, we cannot dictate the ideas that we generate and we cannot suppress intrusive and irrelevant thoughts. What children understand about this delicate issue remains to be explored.

LATER DEVELOPMENTS AND MATURE FUNCTIONING

Research on the child’s theory of mind has focused mainly on young children. The way in which that theory is carried forward or radically revised in later years has been much less studied. However, there are some issues that have attracted attention. In this section, I discuss three notable examples.

Understanding Doubt and Uncertainty

To the extent that 4- and 5-year-olds appreciate that someone with a mistaken belief effectively holds, and will act on, an inaccurate representation of reality, it is tempting to assume that children of this age appreciate that our everyday construal of reality is a question of interpretation: What one person represents as true, another person may deny. Indeed, some theorists have proposed that the onset of false-belief understanding marks the onset of what might be called an interpretive theory of mind.

Early dissent from this position was voiced by Michael Chandler (1988). He argued that such a conclusion overstates the young child’s achievement. The false-belief task—and its close cousins such as the appearance-reality task or the level 2 visual-perspective-taking task—calls for the child to understand that the belief formed by a given protagonist depends critically on the history of his or her perceptual access to the situation under consideration. More generally, granted knowledge of that history, it is possible to predict what belief the person will arrive at. For example, knowing that the protagonist in the false-belief task failed to observe an object’s unexpected displacement, it is possible to predict his or her mistaken belief that the object remains in its earlier location. Similarly, knowing that someone has only looked at—and not yet touched—a piece of sponge that has been fashioned and painted to resemble a rock, it is possible to understand that he or she will be misled by its visual appearance.

As Chandler emphasizes (Carpendale & Chandler, 1996; Chandler, 1988), however, there are many cases in which knowledge of a person’s perceptual history does not fully constrain the predictions that can be made about his or her beliefs. Consider a familiar ambiguous stimulus, such as the illustration of a duck-rabbit that is found in introductory psychology textbooks. Two observers looking at this picture may draw different conclusions about what is depicted. To that extent, the setup resembles the standard false-belief or appearance-reality setup. However, knowing the person’s perceptual history does not yield a prediction of which interpretation he or she will reach regarding the ambiguous figure. Similar remarks are applicable to ambiguous utterances. If there are three blocks, one blue and two red, children who are told to look under the red block might differ about which of the two red blocks they think is intended. Yet, knowledge of their individual perceptual histories will be of no assistance in deciding which child will opt for which block.

Carpendale and Chandler (1996) found that children’s understanding of the impact of such perceptually ambiguous information emerged more slowly than their understanding of perceptually inaccessible information. More specifically, 5-year-olds who did well on a standard false-belief task, and could explain why the central protagonist had a different belief from the other story character (given his or her lack of perceptual access to the unexpected displacement), could rarely explain why two children looked at an ambiguous picture or hearing
an ambiguous message would reach different conclusions. Eight-year-olds, however, performed much better. They explained the belief divergence in terms of the ambiguous nature of the stimulus. They realized that it was hard to predict which of the two interpretations any given observer would adopt although they also realized that other, more deviant interpretations—for example, that the ambiguous duck-rabbit illustration depicted an elephant—were unlikely. Chandler and his colleagues make a good case for distinguishing between children's understanding of information that is inaccessible and their understanding of information that is ambiguous. Even if 5-year-olds understand that some information is inaccessible, they are puzzled by the fact that some information is ambiguous.

Indeed, the cautionary conclusion reached by Carpendale and Chandler (1996) can be extended further. Some beliefs are relatively straightforward judgments about observable objects or events and such beliefs may well go wrong when perceptual access is blocked, but it is clear that we hold many different kinds of belief and we form those beliefs in various ways. For example, we also hold beliefs about what is right and wrong, about the past and the future, and about a large number of theoretical and metaphysical entities. In none of these cases, do we arrive at our beliefs by a simple act of perceptual observation. Given this “disunity” of belief, it is appropriate to ask whether children’s sensitivity to disagreement among individuals varies from one belief domain to another.

Evidence in support of this variation has been reported by Wainryb and her colleagues (Wainryb, Shaw, Langley, Cottam, & Lewis, 2004). They found that 9-year-olds show considerable sensitivity to the type of belief that they were invited to consider. For example, with respect to relatively straightforward moral beliefs—such as whether it is acceptable to hit or steal—9-year-olds generally insist that only one stance is right and they also insist that dissent is not acceptable. However, with respect to factual matters, although they again insist that only one stance is right, they are more tolerant of dissent. Finally, with respect to uncertain issues whether in the realm of fact or taste, they acknowledge that more than one stance could be right and that more than one stance is acceptable. Even 5-year-olds show some emerging sensitivity to these various domains of belief but, in line with the results of Carpendale and Chandler (1996), they are less sensitive to the potential ambiguity or uncertainty of certain issues.

Thus, instead of allowing that opposing judgments might both be right, they tend to claim that only one belief can be right.

The acknowledgment that more than one stance toward a given issue could be right is a clear recognition of uncertainty. However, children might adopt two different attitudes toward uncertainty. On the one hand, they might conclude that competing claims are equally valid and that there is no way to adjudicate between them. For example, in the case of ambiguous figures or taste preferences, one individual’s subjective appraisal is as good as another’s. On the other hand, children might recognize that in some domains competing claims are not equally meritorious. Insofar as they come to acknowledge ambiguity and uncertainty, do children generally adopt the first stance—treating all competing claims as more or less equal? Alternatively, do they show some appreciation of the second stance—recognizing that rational adjudication among competing claims is possible? The answer to this question is obviously important from an educational point of view. Any genuine understanding of debate—whether in science, politics, morality, or history—critically depends on the realization that competing claims are not equally valid and there are various criteria for their adjudication, depending on the domain in question.

Some evidence points to a pessimistic conclusion. When preadolescents have been assessed for their understanding of competing knowledge claims, they rarely acknowledge that such claims can be compared and evaluated. For example, Kuhn, Cheney, and Weinstock (2000) presented children, ranging from 10 to 17 years, and adults with competing claims in various domains and asked participants to say whether only one claim was right—and in those cases where each claim was acknowledged as having some merit to say whether it was possible to judge one as superior. Across all participants, the most frequent response pattern was to acknowledge that more than one claim might be right but to deny that adjudication was possible. Even when the claims pertained to the physical world (e.g., the structure of atoms or the functioning of the brain), less than half of the adult participants acknowledged that one could be judged superior; among the youngest age group interviewed (10-year-olds), only 20% acknowledged that adjudication is possible. Only among a specialist group of adults (all doctoral students in philosophy) was there universal acknowledgment that competing claims about the physical and social world are open to adjudication.
More encouraging results have emerged from studies in which children have been invited to consider the type of evidence that might resolve a given empirical question. For example, Sodian, Zaitchik, and Carey (1991) told children aged 6 to 9 years a story about two brothers who were trying to figure out whether a mouse in their house—which they had not been able to see—was big or small. Children were shown two boxes, one with a large opening, the other with a small opening and asked what the brothers could conclude if either one or the other box was baited with cheese, left out during the night, and checked in the morning to see if the cheese had been eaten. More than half of the 6- to 7-year-olds and the large majority of the 7- to 9-year-olds (a) suggested leaving out the box with the small opening, (b) understood the implications of the cheese being either gone or still there in the morning, and (c) realized that leaving out the box with the big opening would be inconclusive. Similar results emerged in a parallel study. Most children judged that inviting an aardvark to find buried mild-smelling food would test the sensitivity of its sense of smell but burying strong-smelling food would produce only inconclusive results. Indeed, children of this age understand how evidence bears not only on the properties of a given individual but also on the properties of a class or set. Six- and 7-year-olds realized that different patterns of evidence about how hard various tennis rackets (differing in size, shape, and strings) could hit the ball could be used to evaluate not only the rackets that were tested but also what type of racket to buy in the future (Ruffman, Perner, Olson, & Doherty, 1993).

Note, however, that these are all questions that have definite answers, once the necessary observations have been made. For example, the mouse is big or small, not both. Similarly, size of tennis racket either does or does not affect how hard the ball can be hit. If the issue is acknowledged as one where each of the competing views may have some validity (e.g., competing views about how the brain functions), children, as well as many adolescents and adults, are unlikely to report any possibility of determining their relative merits.

Although children in their study did well in understanding the implications of various sorts of evidential test suggested by the interviewer, Sodian et al. (1991) also observed that few children were able to generate a conclusive test themselves. More generally, it is almost certainly easier to recognize the implications of evidence once it is provided than to think about what evidence would be informative and ways to gather it. This gap between evidence evaluation and evidence seeking may explain, at least in part, why preadolescents often conclude that empirical claims cannot be adjudicated. They have difficulty in conceiving of the type of evidence that would be decisive. For example, when asked whether it is possible to adjudicate between different accounts of the way that the brain works, many children—and indeed many adults—may not know what type of evidence would be informative.

In summary, young children understand that beliefs may diverge when observers differ in their perceptual access. They do not, however, immediately appreciate all the various ways in which beliefs may diverge. In particular, they are slower to understand the way that ambiguous or uncertain information may be differentially interpreted. Moreover, when the existence of uncertainty is acknowledged, children—and even some adults—show some signs of being overwhelmed. They are likely to conclude that it is impossible to adjudicate among beliefs. Still, elementary school children can often differentiate between decisive and inconclusive evidence when such evidence is explicitly presented to them. Further analysis of adolescents’ sensitivity to this central issue in epistemology is presented by Kuhn and Franklin (Chapter 22, this Handbook, this volume).

Understanding Second-Order Beliefs and Nonliteral Utterances

An old idea in social cognition is that development is marked by an increasing ability not simply to take the perspective of another person, as exemplified by the standard false-belief task, but to contemplate multiple, potentially intersecting perspectives. For example, Selman (1980) claimed that it was not until approximately 10 years of age that children began to articulate not only the distinct perspectives of particular actors in a given social situation but also the perspective that one actor might have toward the perspectives of other actors. In theory-of-mind research, the most direct analysis of this developmental trend has focused on the second-order false-belief task. Extending their pioneering studies of the standard false-belief task, Perner and Wimmer (1985) introduced a more complex, second-order task in which children were called on to assess what one actor would believe about the beliefs of another actor. For example, children heard a story in which one actor did not
realize that a second actor knew about an unexpected change of location; their task was to diagnose the first actor’s mistaken belief about the second actor’s belief. Perner and Wimmer (1985) found that children could solve the problem at around 6 to 7 years of age, well beyond the age at which the standard false-belief task is mastered but still in advance of what might have been expected on Selman’s role-taking theory.

Subsequent research by Sullivan, Zaitchik, and Tager-Flusberg (1994), showed that most kindergarteners are able to manage the second-order task if simpler stories with a deceptive context are used. Still, as we saw with the standard task, even if thematic changes alter the absolute level of difficulty, this need not compromise the claim that there is a developmental improvement in the ability to handle the second-order task.

The difficulty of the second-order task is especially evident among children with autism. Recall that most children with autism, even those with a relatively advanced mental age, fail the standard false-belief task. Baron-Cohen (1989) focused on the minority of children with autism who pass that standard task. When such children were tested on the second-order task—Baron-Cohen found a severe impairment even among those who were in their teens.

In an interesting analysis, Happé (1993) proposed that success on the second-order task might be connected to the understanding of figurative speech, particularly irony. She went on to show that subjects with autism and with mild learning disabilities who failed the second-order task did indeed have difficulty understanding ironic remarks. For example, when presented with a vignette in which a parent said “Nice job!” to a child who had made a mess while doing a household chore, children with autism were inclined to focus on the literal meaning of the remark and to interpret it as a compliment.

Follow-up work by Happé (1994) showed that the interpretation of stories containing nonliteral utterances was a sensitive diagnostic tool in assessing the social cognitive impairments of mature subjects with autism. Performance on the stories was closely related to performance on theory-of-mind tasks, although even those subjects who managed to pass all the theory-of-mind tasks showed impairments on the more naturalistic story materials relative to normal controls.

In summary, research on the child’s theory of mind has concentrated on the establishment of basic building blocks: children’s developing understanding of desire, belief, and emotion. Some investigators, however, have taken up a more traditional theme of research on social cognition: the ability to take multiple perspectives. Various studies show that the understanding of beliefs about beliefs is mastered at around 6 years of age by normal children—but considerably later, if at all, by children with autism. Competence on these so-called second-order tasks turns out to be linked in an intriguing fashion to another aspect of social cognition—the ability to appropriately interpret nonliteral utterances, notably irony. That said, difficulty in interpreting such remarks turns out to be a persistent impairment of subjects with autism, even among those who do well on both first- and second-order tasks.

Measures of Reflective Functioning among Adults

A great deal of research on the social cognition of adults has been conducted with little reference to developmental theory. Research on so-called reflective functioning among adults constitutes an important exception to that generalization. Both in its conceptualization and in its empirical yield, this line of research retains important links to developmental research. I briefly review some of the key findings.

In an influential study, Main, Kaplan, and Cassidy (1985) administered an adult attachment interview (AAI) in which they asked 40 middle-class mothers to reflect on, and describe, their relationships with their mothers during infancy and childhood. Memories of rejection, illness, and separation were probed as well as reasons for the parents’ behavior. A link emerged between maternal reflections on their childhood attachments and the type of relationship that mothers had with their own children. “Autonomous” mothers offered a balanced and consistent account of their childhood relationships; they tended to have securely attached children. “Dismissing” mothers often devalued their childhood relationships, had difficulty in recalling them, and seemed unaware of inconsistencies in their account; they tended to have insecure-avoidant children. “Preoccupied” mothers were often caught up in their childhood memories, recalled conflictual relationships, and had difficulty in providing a coherent, integrated account; these mothers tended to have insecure-ambivalent children.
Subsequent research has lent considerable support to the claim that such reflections predict the kind of relationship that parents establish with their children. In a meta-analysis, Van Ijzendoorn (1995) found a strong relationship between the parents’ attachment, as measured by the AAI, and the nature of their children’s attachment, as measured by standard instruments such as the Strange Situation or the Attachment Q-sort (AQS). This relationship emerged for fathers but more strongly for mothers. As noted by Van Ijzendoorn (1995), the findings are impressive in that the two measures are quite different—reflective discourse for the AAI and the coding of behavioral responses for the Strange Situation and the Attachment Q-sort.

Several other findings are worth stressing. First, although performance on the AAI calls for a good deal of reflective discourse, classification appears to be independent of verbal IQ (Bakermans-Kranenburg & Van Ijzendoorn, 1993). Second, in line with the assumption that it is the parent who influences the child rather than the reverse, a similar predictive relationship emerges even if parents are interviewed prior to the birth of the child (Benoit & Parker, 1994; Fonagy, Steele, & Steele, 1991).

How exactly should we interpret this intriguing link? One possibility is that the nature of mother’s early experience is critical. According to this “early experience” interpretation, mothers vary during their childhood in the way that they are mothered; that differential early experience eventually affects the way that they come to reflect on the past during the AAI, and it also affects the way that they relate to and nurture their own children. An alternative possibility is that the AAI is an index not so much of what mothers actually experienced as children but of their current capacity to reflect in a coherent fashion about intimate relationships. According to this “current reflective capacity” interpretation, mother’s psychological sensitivity—as indexed by her discourse during the AAI—is linked to the way that she continues—and mothers—her child.

It is too early to adjudicate between these two alternatives. Still, it is worth noting that we may be able to do so in the future. Recent longitudinal research indicates that attachment in infancy can be a good predictor of performance on the AAI during late adolescence (Hamilton, 2000) or early adulthood (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). Nevertheless, in a sample of disadvantaged families who experienced high rates of stressful life events, no such predictive link from infancy to late adolescence was found (Weinfeld, Sroufe, & Egeland, 2000). Similarly, disruptive effects of stressful life events, notably divorce, on continuity from infancy to late adolescence were also reported by Lewis, Feiring, and Rosenthal (2000). With respect to the latter two samples—where no relationship between early attachment and current performance on the AAI was found—it is possible to ask which measure is the more important for the prediction of later parenting—particularly the type of attachment that such adolescents will form with their own children. The early experience interpretation implies that early attachment would be the stronger predictor, whereas the reflective capacity interpretation implies that performance on the AAI would be the stronger predictor.

Beyond the question of whether it is the mother’s past experience or her current reflective capacity that is important, it is worth noting that we continue to have a relatively weak understanding of how exactly characteristics of the mother influence the child’s attachment. Maternal sensitivity has traditionally been emphasized by attachment theorists, but existing measures of such nonverbal responsiveness probably fail to capture the entire spectrum of transmission from mother to infant (Van Ijzendoorn, 1995). Recent research by Meins and her colleagues offers a way to broaden our assessment of that spectrum and promises to make connections with the concept of reflective functioning (Meins, Fernyhough, Fradley, & Tuckey, 2001). These investigators assessed maternal sensitivity in the usual fashion using the scale devised by Ainsworth, Bell, and Stayton (1971), but they also assessed maternal “mind-mindedness”—mothers’ tendency to comment appropriately on the ongoing mental states of their infant. As expected, maternal sensitivity was correlated with infants’ attachment security, as measured at 12 months but mind-mindedness proved to have an independent and somewhat stronger relationship to attachment security.

In summary, parents’ comments on their own intimate relationships are a good predictor of the type of relationship that parents form with their infants. In particular, mothers who offer a psychologically coherent and balanced account of their childhood relationship with their own mother as well as mothers who comment appropriately and accurately on their infants’ current mental states are likely to have infants who display a secure attachment. This striking relationship between psychological discourse on the part of the mother and emotional security on the part of the infant should en-
courage continuing collaboration and dialogue between two relatively distinct research communities—those who focus on social cognition especially as indexed by psychological discourse and those who focus on early attachment.

**HOW DO HUMANS DIFFER FROM OTHER NONHUMAN PRIMATES IN THEIR THEORY OF MIND?**

As noted earlier, the initial impetus for research on theory of mind came from research on primatology. In that context, the possible role of language was not highlighted in any obvious way. Indeed, if we think about the classic false-belief task, it is not inconceivable that a languageless creature such as a chimpanzee could solve it. After all, it calls for an appreciation of the way in which an observer might have incomplete perceptual access to the true state of affairs. That appreciation does not necessarily call for any linguistic ability. It could be based on observation of an agent’s lack of perceptual access at some given moment. As it happens, subsequent research with primates, notably chimpanzees, has mostly produced negative results when they have been tested on variants of the false-belief task (Call & Tomasello, 1999). In addition, despite an initially enthusiastic compilation of case notes from the field, suggesting deliberate deception among chimpanzees, doubts surfaced about the extent to which such ploys, deceptive though they might be, really did depend on a calculation of just what the dupe would falsely believe (Heyes, 1998). Perhaps, for example, they were guided by some past experience of the risks associated with acting in particular ways in full view of a rival or competitor.

In addition, three other streams of experimental research have suggested that chimpanzees are quite restricted in their psychological inferences. First, they seem to have a limited understanding of the link between seeing and knowing. They generally beg for food indiscriminately from humans who either can or cannot see them (Povinelli & Eddy, 1996), and they fail to realize that someone who has seen an event is likely to know more about it than someone who has not (Povinelli, Rulf, & Bierschwale, 1994). Second, chimpanzees do not seem to interpret fairly simple gestures or cues indicating a source of food. For example, if they know that food has been hidden in one of two boxes, and a trainer either gazes at, points to, or places a marker on the baited box, chimpanzees typically choose randomly as if unable to “read” the trainer’s action as a helpful communicative act (Call & Tomasello, 2005). Third, although chimpanzees appear to transmit tool-using techniques from one to another, so as to engender a form of local “culture” (Whiten, Goodall, McGrew, et al., 1999), this form of social transmission might not involve any systematic analysis of the intentions that underlie the model’s actions (Tomasello, 1996)—it might rest instead on a more superficial observation of motor actions or of ensuing outcomes.

Nevertheless, the most recent evidence has led to a more positive assessment of the chimpanzee’s mind-reading capacity. First, chimpanzees do display an ability to monitor one another’s orientation and intended actions, at least in competitive contexts. For example, Tomasello, Call, and Hare (2003) have tested chimpanzees in the following situation. A subordinate and a dominant watch from separate rooms as food is placed in each of two locations, one open and one partially screened, in a central area. The subordinate can see where each piece of food is placed. The subordinate is also able to observe the range of the dominant’s visual access and can observe that the dominant has seen the food at the open location but not at the screened location. The two animals are released into the central area, with the subordinate being given a brief head start. Under these circumstances, the subordinate appears to nicely calculate what the dominant has and has not seen. The subordinate heads for the food location that is visible only to her, thereby avoiding the risk of head-on competition with the dominant at the other food location. A variety of more pedestrian interpretations can be ruled out. For example, the subordinate is not reacting to the dominant’s overt behavioral choice because the subordinate’s food preference is manifest before the dominant’s door has been lifted. Nor do subordinates show a generalized preference for food at a partially screened location: When tested in the absence of a dominant, they show no such preference.

In a series of follow-up studies, the subordinate’s analysis of the dominant’s history of perceptual access was analyzed. There were two partially screened locations. When both the subordinate and the dominant watched food hidden at one of these locations, the subordinate approached that location less often than when only the subordinate had seen the hiding. By implication, the subordinate remembered what the dominant had and had not seen and avoided the food source if the
dominant knew about it. Again, plausible alternative interpretations can be ruled out. For example, it is not the case that subordinates steer clear of a food source that any dominant has monitored. Thus, if one dominant saw the hiding but a different dominant is present when an opportunity to retrieve the food arises, the subordinate shows less avoidance. By implication, the subordinate not only realizes and remembers that a food source has been spotted by a dominant but also realizes that such privileged access is available to one individual and not others. Summing up, these experiments indicate that chimpanzees realize that conspecifics have a particular field of vision, can see things in that field, and will act on what they have seen.

Tomasello et al. (2003) suggest that the more flexible, psychological analysis that they have uncovered is probably tied to larger features of chimpanzee social behavior. In their natural habitat, chimpanzees do compete for food, but they rarely, if ever, indicate food to another that they themselves could take. Thus, their ordinary living conditions promote sensitivity to the states and intentions of a competitor rather than the states and intentions of a collaborator or benefactor.

It is interesting to note that dogs do display such sensitivity to a benefactor. For example, unlike chimpanzees, domesticated dogs take advantage of communicative acts by their trainers when searching for food (Hare, Brown, Williamson, & Tomasello, 2002). This proclivity appears to be the product of selective breeding practices. It is not found among all members of the canine order—for example, wolves show no such sensitivity. Nor is early socialization in the company of human beings a critical factor. Puppies that have had little contact with human beings are also sensitive to human signals. Overall, the evidence is consistent with the claim that selection pressures operating over successive generations of domestic dogs have led to a robust island of social cognition. Needless to say, no such selection pressures have operated on chimpanzees, despite the fact that they are receptive to human domestication in certain respects.

Should we conclude then that chimpanzees’ sensitivity to the knowledge state and likely future actions of a dominant is a very local awareness, tied quite narrowly to contexts in which there is competition for food between conspecifics? Such a conclusion would be premature. In an ongoing series of experiments, Call and his colleagues find that chimpanzees differentiate between a human trainer who is ostensibly unable to hand over some food (e.g., he cannot extract it from a tube or accidentally drops it) as compared to a human trainer who is unwilling to hand over food (e.g., he proffers the food but teasingly withdraws it). Faced with the unwilling as opposed to the incompetent trainer, they are more likely to display signs of impatience by banging on the cage or quitting the test area (Call, Hare, Carpenter, & Tomasello, 2004). Thus, chimpanzees do have some ability to read intentions in noncompetitive contexts.

How then should the strengths and limitations of chimpanzee social cognition be described? Tomasello and his colleagues propose that chimpanzees can “go a bit below the surface” of ongoing action. They grasp the fact that bodily and head orientation toward a given target can predict subsequent approach to that target. Similarly, they grasp the fact that ongoing signs of goal-directed behavior—including unsuccessful attempts—are good clues to subsequent actions (Tomasello et al., 2003). At the same time, they emphasize that there are currently no clear indications that chimpanzees can penetrate deeper—to understand, for example, the way in which an agent might deliberate and plan before acting, especially in collaboration with a group member (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Thus, even if chimpanzees do read one another’s perceptual states and intentions in noncompetitive as well as competitive situations, there is little or no evidence that they have the capacity to engage in planned cooperation. In line with this conclusion, Hare and Tomasello (2004) report that chimpanzees performed much more skillfully in a food-finding task if the task is structured as competition rather than cooperation. On this view, the divide between chimpanzee and human child has to do with both the depth and richness of psychological understanding in the two species and the differential capacity for cooperative endeavors.

Povinelli and Vonk (2003) are skeptical that any analysis in terms of merely gradualistic or quantitative differences captures the full extent of the gap between chimpanzee and child. They propose instead that at some point in human evolution the capacity that we share with our primate cousins—to go below the surface features of particular actions—was ramped up to a qualitatively different mode of apprehension. Specifically, they argue that we human beings have an almost ineluctable tendency to assume that actions are caused by internal mental states. In turn, we regard mental states as having an ontologically distinct status from the actions that they guide. On this view, chimpanzees may “go below the surface” but never conceptualize a gen-
Lincoln G. Barnett

It is generally agreed that the food competition experiments reported by Tomasello and his colleagues do not allow us to decide between a lean and a rich interpretation of the strategies displayed by the chimpanzee subordinate. Maybe the subordinate is attributing visual experience and knowledge to the dominant but maybe the subordinate is using a much less sophisticated form of behavioral extrapolation: “Don’t go after food if D was present and oriented toward it when it was placed in position; such an orientation is a good cue that D will go after the food.”

The resolution of this debate in primatology is not likely to be rapid or straightforward (Povinelli & Vonk, 2004). Meantime, developmental psychologists may rejoice that the testing of human children is made a great deal easier by the fact that it is possible to talk to them about mental states, to ask them to make predictions about mental states, and to assess the degree to which they voice explanations in terms of mental states. In a later section, I explore the extent to which language is not only a means for the more sensitive assessment of the child’s social cognition but also an intrinsic part of human social cognition.

**IS THERE A UNIVERSAL CORE TO THE HUMAN THEORY OF MIND?**

In arguing for a universal core to the human theory of mind, stable across diverse cultures, Fodor (1987) observed, “There is, so far as I know, no human group that doesn’t explain behavior by imputing beliefs and desires to the behavior. (And if an anthropologist claimed to have found such a group, I wouldn’t believe him)” As Avis and Harris (1991) noted, Fodor might have couched his incredulity in less hypothetical terms. In a classic monograph on the Dinka of southern Sudan, the Oxford social anthropologist Godfrey Lienhardt (1961) asserted just such an absence of mentalistic explanation: “The Dinka have no conception which at all corresponds to our popular conception of the ‘mind’ as mediating and, as it were, storing up the experiences of the self. . . . What we should call the ‘memories’ of experiences, and regard therefore as in some way intrinsic to the person . . . appear to the Dinka as exteriorly acting upon him” (p. 149).

The available evidence tends to bear out at least part of Fodor’s proposition. First, Wierzbicka (1992) has suggested that all human languages contain terms that roughly refer to wanting, thinking, and knowing. Second, cross-cultural studies have shown that children from radically different cultural backgrounds understand false beliefs even if the age of mastery is variable. Children growing up in industrialized centers of Western Europe, North America, and Asia solve the false-belief task at around 4 to 5 years of age (Wellman et al., 2001). Much the same age of mastery emerged in a more wide-ranging comparison of children attending urban preschools in India, Thailand, Canada, and Peru as well as a village preschool in Samoa (Callaghan et al., 2004).

On the other hand, Vinden (1999) found that Mofu children from Northern Cameroon and Tolai children from Papua New Guinea could generally solve false-belief tasks only at around 7 years of age. Vinden also tested Tainae children in Papua New Guinea, but a variety of problems—including the reluctance of young children and females to be tested and difficulties in formulating one of the key test questions in the vernacular—render the results hard to interpret. The potentially crucial role of language was highlighted in another study reported by Vinden (1996). She tested 4- to 8-year-old Junín Quechua children growing up in a remote Quechua village in Peru. Most children passed an appearance-reality task—although there was a clear improvement with age. However, most children failed to solve false-belief tasks even when the same materials were used as for the appearance-reality task. They could usually say that an object that looked like a rock was really a sponge, but they often erred in saying what they had thought the object was before they touched it and what a newcomer would think it was before touching it. However, in Junín Quechua, “What would he think” is rendered by a phrase meaning (roughly) “What would he say.” Thus, Junín Quechua children may have been unfamiliar or uncomfortable with the phrasing of the false-belief questions.

Summing across these studies, there is persuasive evidence from many different settings that children come to an understanding of false belief by about 5 years of age. Nevertheless, some reports indicate that children do not master the standard test until about 7 years of age—or persist in failure even beyond that age. For the moment, caution is needed in interpreting delayed mastery.
As acknowledged by Vinden (1996), language difficulties may play an important role. Studies of Western children provide convergent evidence of the critical role of language and there is every reason to expect that language will be equally important in non-Western settings.

How do children from different cultures fare on other mental-state tasks? With respect to emotion, we saw in an earlier section that children readily link particular situations with particular emotions and then gradually realize that individual desires and eventually beliefs may modulate a given individual’s reactions to a situation. Only a limited amount of research has examined this claim in a cross-cultural context, but the scattered findings lend some support to the universality thesis. For example, Harris et al. (1987) asked children in Europe and a remote village of Nepal to describe what situations would be provoked by various emotions. Children in both settings suggested appropriate elicitors for various basic emotions. Vinden (1999) found that Mofu and Tolai children could predict from about 5- or 6-years that someone would be upset by an unexpected loss—not finding some fruit where it had been left.

Avis and Harris (1991) showed that most Baka 5-year-olds growing up in the rain-forests of Southeast Cameroon understood that someone approaching a pot and wrongly believing it contained food would be happy before lifting the lid but sad afterward. Tenenbaum, Visscher, Pons, and Harris (2004) observed a similar understanding of belief-based emotion among Quechua children ranging from 8 to 11 years. However, Vinden (1999) found little evidence for the understanding of belief-based emotions among the Mofu or Tolai.

Harris and Gross (1988) reported that children in Western Europe, North America, and Japan all come to differentiate felt and expressed emotion at around 6 years of age. Sissons Joshi and MacLean (1994) obtained similar findings among children in India. For the time being, we do not know whether and how children from a preliterate community come to make that distinction but like the concept of false belief, the concept of hidden, unexpressed emotion seems a good candidate for universality.

In sum, although linguistic obstacles have sometimes led to inconclusive results, children growing up in non-Western settings, including traditional rural villages, acquire an understanding of belief at roughly the same age as Western children. They can also identify what situations will provoke particular emotions and use that knowledge to anticipate how someone will feel. Some children in these setting also understand belief-based emotion. Regarding various other aspects of mental state understanding, we have, as yet, no evidence. In particular, there has been very little exploration of the possibility that certain basic concepts—for example the distinction between expressed and experienced emotion and the incessant flow of consciousness—are elaborated in culture-specific ways. Certainly, the existing evidence for some degree of cross-cultural stability in the acquisition of key concepts should not be taken to mean that there is no cultural variation in the way that these concepts are put to work and elaborated (Harris, 1990; Lillard, 1998, 1999).

**CHILDREN WITH AUTISM**

Research on the normal development of a theory of mind was given an important boost in the United Kingdom by a related program of research on children with autism. In 1985, Baron-Cohen, Leslie, and Frith reported that only 20% of a group of children with autism passed a variant of the false-belief task compared to approximately 80% of normal children and children with Downs syndrome of comparable mental age. Leslie (1987) proposed a theoretical explanation by arguing that the well-known limitations in pretend play that are one of the diagnostic signs of autism reflect an innate, modular deficit in the conceptualization of various mental states including belief as well as pretence. My aim here is not to provide a comprehensive review of the syndrome of autism but rather to describe ways in which children with autism depart from—and thereby highlight—the standard pattern of development.

Subsequent research moved rapidly ahead in confirming that children with autism do have a wide-ranging difficulty in grasping false beliefs. First, even if some children with autism succeed in passing variants of the standard task, they frequently fail more complex versions that call for an understanding of beliefs about beliefs (Baron-Cohen, 1989). Second, children with autism are poor at deliberately creating a false belief by lying. For example, even if prompted to mislead a thief but help a friend, they tend to naively help both. This is not due to any insurmountable tendency to be cooperative. When prompted, they are able to act selectively by physically blocking the thief but helping
the friend (Sodian & Frith, 1992). Third, children with autism show just the type of problems with emotion understanding that would flow from a difficulty in understanding beliefs. Whereas they perform quite well in grasping familiar links between situations and emotions (realizing, for example, that a birthday generally provokes happiness but a loss provokes sadness), they perform much less well than controls matched for verbal ability in understanding belief-based emotions (Baron-Cohen, 1991).

Nevertheless, the temptation to conclude that children with autism provide an instance of cognitive development with the theory-of-mind module neatly excised should be resisted. First, in line with normal children, the degree of difficulty that children with autism display on standard false-belief tasks is correlated with their language ability. Thus, autistic children with a verbal mental age of 6 to 7 years have approximately a 20% probability of passing the false-belief task, whereas those with a verbal mental age of 11 to 12 years have approximately an 80% probability of passing (Happé, 1995). Indeed, children with autism could be said to need a greater verbal ability than normal children to achieve the same theory-of-mind result. After all, among normal children a verbal mental age of 4 to 5 years is sufficient to yield a high probability of passing the standard false-belief task.

Second, the apparently clear-cut difference between children with autism and children with some other mental handicap such as Down’s syndrome in performance on the false-belief task turns out to be less clear than it originally appeared. More specifically, mentally handicapped children also display a lag, albeit one that is less marked, than that shown by children with autism (Yirmiya, Osnat, Shaked, & Solomonica-Levi, 1998).

Third, there is increasing evidence that children with autism perform quite well on tasks that call for an understanding of other allegedly central concepts for a theory of mind: desire and perception. Tan and Harris (1991) showed that children with autism assert, and re-assert, their desires—even in the face of an interlocutor who initially thwarts them. In addition, longitudinal studies of the spontaneous language production of children with autism show that despite a paucity of references to the cognitive states of knowing and thinking, they do often refer to desires and perceptions (Tager-Flusberg, 1993). Finally, children with autism perform quite well on visual perspective-taking tasks (Hobson, 1984; Reed & Peterson, 1990).

One potential interpretation of these findings is that children with autism follow the same developmental road map as normal children but at a much slower pace—a proposal made by Baron-Cohen (1989). By implication, their problems do not reveal a modular excision but rather an abnormally slow rate of growth in such a module. This interpretation is consistent with the fact that many children with autism do eventually pass the false-belief landmark and with the fact that a minority even comes to an understanding of beliefs about beliefs. It is also consistent with the observation that children with autism have no particular difficulty in talking about their own desires or those of other people. After all, there is solid evidence that the understanding and discussion of desires emerges early in the course of normal development (Bartsch & Wellman, 1995; Harris, 1996; Tardif & Wellman, 2000)—before an understanding and discussion of beliefs. Arguably, children with autism show no obvious delay on the earliest landmarks of a theory of mind but do so increasingly—as their slowed rate of development dictates.

However, this simple delay-based account runs into difficulties if we take a look at so-called precursors or early indices of a theory of mind. If children with autism perform more or less normally with respect to desires, we might expect them to perform without difficulty on all co-occurring or antecedent indices of a theory of mind. Yet, they display clear limitations in three areas: (1) the development of joint attention, (2) engagement in pretend play, and (3) concern for others in distress. I briefly take up each of these in turn.

As discussed earlier, normal infants start to show joint attention behaviors in the 1st year of life. By either following or directing the attention and gaze of another person, they establish a triadic relationship comprising the self, the other person and an object of mutual attention. Children with autism show important restrictions in joint attention (Mundy, Sigman, & Kasari, 1993). Indeed, longitudinal research has suggested that deficits in joint attention are an important early marker for a likely later diagnosis of autism. Baron-Cohen, Allen, and Gillberg (1992) targeted a group of 18-month-olds who had an older sibling with autism and who on genetic grounds therefore were at risk themselves. A small number of these children showed deficits in both joint attention and pretend play; follow-up studies confirmed that these children did go on to receive a diagnosis of autism. Finally, there is no evidence that these difficulties with joint attention are eventually overcome, as one might expect on a
developmental delay hypothesis (Klin, Jones, Schultz, & Volkmar, 2004).

One of the defining features of autism—ever since Kanner’s original description of the syndrome—has been a limitation in pretend play. Later experimental analysis has revealed that children with autism are not completely deficient at pretend play. First, with prompting, they engage in simple object-directed pretense (Lewis & Boucher, 1988). Second, if asked to watch an adult engage in object-directed pretense—for example, a pretend pouring or pretend squeezing—they perform competently in working out the likely pretend consequences (Kavanaugh & Harris, 1994). Nevertheless, even if the findings indicate a basic competence for both the production and comprehension of pretense, they also indicate persistent restrictions on fertility and generativity (Harris & Leevier, 2000; Jarrold, Boucher, & Smith, 1996; Lewis & Boucher, 1995). Moreover, as noted earlier, a delay in the onset of pretense, in combination with deficits in joint attention, appears to be an early marker for autism (Baron-Cohen et al., 1992).

Finally, children with autism differ from normal children and mentally retarded children in their responses to the distress of others. When an adult feigns distress or pain, children with autism are less likely to attend to the distressed person, more likely to remain engaged in toy play, and less likely to display concern. This finding has emerged among toddlers with autism (Sigman, Kasari, Kwon, & Yirmiya, 1992) and persists into adolescence (Sigman & Ruskin, 1999).

Taken together, these findings indicate that children with autism do not simply exhibit a delay in the acquisition or onset of an otherwise normal theory of mind. They show early difficulties with joint attention, pretense play, and empathic concern that appear to be quite persistent. Yet, they also show relatively normal progress on an aspect of a theory of mind (notably the understanding of desires) that is generally taken to emerge after the onset of joint attention, pretend play, and empathic concern. These findings imply that the gradual confluence that we see in normal children, more specifically the joint recourse to beliefs and desires in explaining behavior, may bring together two initially separate ontogenetic streams. Stated differently, the findings from autism suggest that the acquisition of a theory of mind is not a single, indivisible process. Children with autism understand some parts of the puzzle but not others.

INDIVIDUAL DIFFERENCES IN PRETEND PLAY AND THE THEORY OF MIND

As noted in the discussion of autism, Leslie (1987) argued that children’s ability to engage appropriately in pretend play, either alone or with a partner, implies that they understand the mentalistic nature of pretense. He further argued that this alleged capacity for metarepresentation sets the stage for an understanding of belief. Various commentators have concluded that Leslie’s rich analysis of early pretense is wrong (Currie, 1998; Harris & Kavanaugh, 1993, pp. 75–76; Jarrold, Carruthers, Smith, & Boucher, 1994; Nichols & Stich, 2000; Perner, 1993).

Two persuasive objections have emerged: one conceptual and the other empirical. First, contrary to Leslie’s analysis, young children could surely engage in pretense even if they did not possess any insight into the mental state of pretending. After all, there is a great deal of evidence that children can hold a belief—including a false belief—well before they show any signs of understanding beliefs as mental states. Toddlers might construe pretend play as a special form of action rather than a special mental state. So, they might think of the pretend action of pouring tea (e.g., the lifting and tilting of an empty teapot) as a special type of action—one that resembles genuine pouring in the motor gesture involved but which is also different in being directed at make-believe tea as opposed to real tea. To see the thrust of this alternative analysis, consider our appreciation of what a mime artist is doing. We see him peel an invisible banana, lift it to his mouth, and bite it. We readily conclude that he is now eating the banana but we do not need to consider the process of mental representation that might be taking place in his mind. It is enough for us to see him directing familiar gestures at an imaginary banana. Similarly, toddlers might construe pretend gestures as familiar actions directed at imaginary props.

The second objection is empirical. Studies indicate that even 4-year-olds, let alone toddlers who are just starting to engage in pretense, do not systematically appreciate that certain mental states are a necessary condition for particular pretend acts. For example, they do not realize that knowing that a kangaroo hops is a necessary condition for pretending to hop like a kangaroo (Joseph, 1998; Lillard, 1993; Sobel, 2004).

However, even if we accept these two arguments against the particular theoretical analysis advanced by
Leslie, it is still plausible that a relationship does exist between the capacity for pretend play and the eventual understanding of belief. One supportive point, noted by Leslie (1987) and corroborated by a good deal of subsequent research, is that even if children with autism are not incapable of pretend play they do show restrictions in generativity and they often show a marked delay in their understanding of false beliefs. It is tempting to see some connection between these two problems. Further evidence for such a connection has emerged more recently from the study of normal children. For example, the frequency of joint proposals (e.g., “You have to stay in my arms” or “Let’s make cookies”) and of role assignments in the course of pretend play (e.g., “You be mommy”) are correlated with children’s performance on theory-of-mind tasks (Astington & Jenkins, 1995; Jenkins & Astington, 2000). Similar findings have emerged from other studies (Schwebel, Rosen, & Singer, 1999; Taylor & Carlson, 1997; Youngblade & Dunn, 1995).

It is worth emphasizing, however, that in these various studies, although measures of joint pretend play or role-play correlate with measures of performance on theory-of-mind tasks (typically false-belief and/or appearance-reality tasks), the same does not hold for other aspects of pretense. For example, there is no consistent evidence that the amount of pretense, the diversity of pretend themes, the impersonation of a machine, or engagement in solitary pretend play correlates with performance on theory-of-mind tasks. Thus, role-play, but not pretend play in general, is associated with the understanding of belief (Harris, 2000).

In the next section, the evidence for a strong link between language ability and theory of mind will be reviewed. Granted that relationship, it is appropriate to ask if the relationship between pretend play and theory-of-mind understanding holds up if we take into account the possible contribution of children’s language ability. As it happens, this possibility was examined in all the studies cited earlier. In each case, the relationship between pretend play and theory of mind was maintained even when language ability was controlled for, with language ability variously measured in terms of vocabulary, mean length of utterance (MLU), or syntax (Harris, 2005).

In summary, there is a good deal of evidence showing a correlation between children’s pretend role-play and their performance on standard theory-of-mind tasks. That correlation holds up when another potent predictor of children’s theory-of-mind performance—their language ability—is taken into account. How should we explain this relationship? Given the objections raised earlier against Leslie’s analysis, we need to look elsewhere. Indeed, Leslie’s analysis would predict the understanding of belief to be correlated with pretense in general rather than role-play in particular. The findings just reviewed suggest instead that pretend role-play is linked to children’s performance on standard theory-of-mind tasks. This link can be interpreted as support for simulation theory, which assumes that the solution to classic theory-of-mind tasks can be reached via a form of role play, in which one’s own current situation and knowledge are temporarily set to one side (Harris, 2000). Still, it must be acknowledged that the link between role-play and theory-of-mind performance rests for the moment on correlational data only. Indeed, in one recent correlational study, there was some indication that earlier false-belief understanding predicts later role assignment and joint proposals rather than the reverse (Jenkins & Astington, 2000). Moreover, there have been no intervention studies to assess whether training in role-play leads to better performance on standard theory-of-mind tasks. Nonetheless, we do have the suggestive findings of an earlier research tradition (Smilansky, 1968) showing that educational programs in dramatic play have beneficial effects on children’s social cognition in general.

THE RELATIONSHIP BETWEEN LANGUAGE AND THEORY OF MIND

As discussed at various points throughout this chapter, human beings can observe other people’s facial expressions and bodily posture for clues to their future intentions. Nonetheless, human beings, unlike any other species, can also talk to each other about their thoughts and feelings. A probable hypothesis is that children’s understanding of thoughts and feelings varies with their opportunities to engage in such conversation (Harris, 1996, 1999). There are now four lines of evidence that converge on that claim. First, children’s language ability has proved to be a consistent and potent predictor of their performance on assessments of mental-state understanding. Second, children deprived of ordinary access to everyday conversation, notably deaf children,
exhibit a marked delay in their understanding of mental states. Third, parental language that is rich in references to mental states appears to improve children’s performance on standard theory-of-mind tasks. Finally, intervention studies that make heavy use of language and explanation produce clear gains in understanding. I discuss key findings from each of these four areas and then ask in more detail about the theoretical implications.

Accuracy in the attribution of beliefs and emotions is strongly correlated with language skill among both normal children and children with autism (Cutting & Dunn, 1999; Happé, 1995; Pons, Lawson, Harris, & de Rosnay, 2003). One possible interpretation of that correlation is that children’s early understanding of mental states facilitates the development of language. Recent investigations of early word learning have shown that young children notice what their conversation partner is attending to, or has in mind, when he or she introduces a new word and they use that information to decode the intended referent (Baldwin & Moses, 2001; Waxman & Lidz, Chapter 7, this Handbook, this volume). Arguably, children who are particularly sensitive to their interlocutor’s thoughts and attitudes might be at an advantage in building their vocabularies or in decoding complicated utterances.

However, longitudinal research does not support this line of interpretation. Astington and Jenkins (1999) assessed the language ability and theory-of-mind performance of a group of preschool children on three successive occasions over a period of 7 months. Theory-of-mind performance was not a predictor of subsequent gains in language. However, language ability at the initial assessment proved to be a good predictor of subsequent improvement in theory-of-mind performance. Thus, children who had superior language skills at the beginning of the study—particularly in the domain of syntax—made more progress in their subsequent conceptualization of mental states. Similar findings were reported by Watson, Painter, and Bornstein (2001) over a longer period of time. Children’s language ability at 24 months was a good predictor of their theory-of-mind performance at 48 months.

Further strong evidence that language facilitates the acquisition of a theory of mind has emerged from the study of deaf children. Deaf children perform poorly on standard theory-of-mind tasks compared to hearing controls. This difficulty is not attributable to deafness per se. Deaf children who learn to sign fluently in early childhood—typically deaf children born into a family with a deaf adult who is a fluent signer—perform at a level similar to that of hearing controls. By implication, it is the delayed access to language and communication—which is typical of deaf children of hearing parents—that impairs performance (Peterson & Siegal, 2000).

Still, two different interpretations of that impairment are feasible. Arguably, those deaf children who are slow to enter into conversation and communication are at a disadvantage in processing the narrative that is normally used to pose a theory-of-mind problem. Alternatively, deaf children do understand the test narrative well enough. Their difficulty arises because they have a genuine difficulty in understanding mental states and notably beliefs. Support for the second alternative was obtained by Figueras-Costa and Harris (2001). Even when deaf children were given a nonverbal test of false belief, one that made minimal demands on their verbal comprehension, they still performed poorly. Moreover, Woolfe, Want, and Siegal (2002) found a delay among late-signing deaf children when they used a pictorial rather than a verbal test of false-belief understanding. Thus, late-signing children appear to be genuinely delayed in their conceptualization of beliefs. It is not that they have difficulty in grasping a verbal test procedure.

Families vary in terms of the conversational environment that they offer a young child. Three recent studies indicate the contribution that the mother’s language style makes to children’s mental-state understanding. Meins, Fernyhough, Wainwright, Das Gupta, Fradley, and Tuckey (2002) asked whether mothers’ mind-mindedness—the proclivity to treat their infant as an individual with a mind of its own influences later theory-of-mind understanding. To assess mind-mindedness, they identified comments by mothers that were appropriately geared to their 6-month-infants’ current focus of attention and demeanor—for example “You know what that is, it’s a ball” or “You’re just teasing me.” The frequency of these mind-minded comments predicted children’s success on a composite theory-of-mind measure more than 3.5 years later. Ruffman, Slade, and Crowe (2002) found that mothers’ mental state language during picture-book sessions at earlier time points in the child’s 4th year predicted children’s later theory-of-mind performance at later points in that same year. The reverse pattern did not hold—thus, earlier theory-of-mind performance by the child did not predict mother’s later pattern of discourse. Finally, in an assessment of 5- to 6-year-olds, de Rosnay, Pons,
Harris, and Morrell (2004) found that mothers’ mentalistic descriptions of their child and the child’s own verbal ability were positively associated both with correct false-belief attributions and with correct belief-based emotion attributions. Moreover, mothers’ mentalistic descriptions predicted children’s correct emotion attributions even when the sample was restricted to those who had mastered the simpler false-belief task.

Taken together, these correlational studies suggest that mothers whose conversation is rich in psychological references promote their children’s mental state understanding; there is little evidence for the reverse direction of influence. It also looks as if mere loquacity on the part of the mother is not sufficient to promote mental state understanding. Ruffman et al. (2002) found that it was specifically mothers’ mental state discourse rather than other aspects of their conversation (e.g., descriptive or causal talk) that predicted children’s theory-of-mind performance. Moreover, aspects of the mother-child relationship that might be thought to play a role proved to have little independent impact on mental-state understanding. In particular, the nature of the child’s attachment proves to have no predictive significance—once the mother’s discourse is taken into account (de Rosnay, Harris, & Pons, in press; Meins et al., 2002). Finally, mothers’ psychological orientation has a sustained influence. It is evident not only among 3-year-olds but also among 6-year-olds. Her influence definitely reaches beyond the standard index of children’s developing theory of mind, namely false-belief understanding.

Confidence in correlational findings is always boosted when they can be supplemented by intervention studies. Two recent interventions are especially informative. Lohmann and Tomasello (2003) gave children a series of misleading objects but offered minimal verbal comment, the impact on children’s mental state understanding was negligible.

These four lines of research, from different laboratories using diverse techniques on a heterogeneous sample of children all confirm a reasonable intuition: Children’s own language competence and their access to conversation, especially conversation that deals explicitly with mental states, promotes their theory of mind. This convergence is one of the most exciting developments in recent research on theory of mind and confirms the vigor of the field (Harris, de Rosnay, & Pons, 2005).

**TAKING STOCK**

Research on the child’s theory of mind has been conducted primarily in the cognitive-developmental tradition: the child is seen as a thinker trying to explain, predict, and understand people’s thoughts, feelings, and utterances. Less attention has been paid to the consequences of such social cognitive skill for the child’s social and intellectual relationships. Below, I briefly review research that begins to address these two lacunae. I discuss the way in which children’s understanding of mental states affects their peer relations and their trust in the claims made by other people. I then attempt to take stock of how—after more than 25 years of intense investigation—we should conceptualize the understanding of mind that we see emerging in young children.

**Social Cognition and Peer Relations**

Insofar as children gradually acquire a theory of mind, it is reasonable to ask about the implications of these conceptual changes for children’s wider social behavior. Investigators who have examined this issue have focused on the possibility that children with more advanced social cognition will perform better on various measures of social interaction, particularly with peers.
This predicted link has emerged in several studies of preschool children. Denham, McKinley, Couchoud, and Holt (1990) examined the relationship between preschoolers’ accuracy on an emotion-attribution task and their popularity amongst peers. Children with a better understanding of the causes of emotion were more popular with peers, even when the effects of age and gender were controlled. In a study of “hard-to-manage” children, aged 3 and 4 years, Hughes, Dunn, and White (1998) found that poor understanding of emotion was linked to various interpersonal difficulties (e.g., antisocial behavior, aggressiveness, restricted empathy, and limited prosocial behavior), whereas Dunn and Cutting (1999) found that 4-year-olds’ with a good understanding of emotion cooperated and communicated more effectively with a close friend during play. Finally, in a longitudinal study of 4- and 5-year-olds, Edwards, Manstead, and MacDonald (1984) found that accuracy in identifying the expression of emotion was correlated with popularity one or 2 years later, even when initial popularity was taken into account.

A similar link between emotion understanding and peer relationships has emerged among school-aged children. Dunn and Herrera (1997) found that 6-year-olds’ ability to solve interpersonal conflicts with their friends at school was predicted by their emotion understanding at the age of 3 years. Cassidy, Parke, Butkovsky, and Braungart (1992) reported a positive relationship between children’s emotion understanding and their popularity with peers during the 1st year of obligatory schooling. Finally, in a study of 11- to 13-year-olds, Bosacki and Astington (1999) found a positive relation between emotion understanding and social skills as judged by teachers.

These various findings strongly suggest that the understanding of mental states and notably the understanding of emotion facilitates children’s interactions with peers both before and during the school years. These are correlational findings, and short of proving the link by means of an intervention study, we cannot be certain of the exact causal relationship. Nevertheless, the link between competence at the identification and analysis of emotion and later peer relationships is encouraging.

On a more cautionary note, Cutting and Dunn (2002) found that there are costs as well as benefits to superior social cognition. Five-year-olds were assessed during their 1st year at school for their sensitivity to teacher criticism. Children’s understanding of false belief and mixed emotions measured 1 year earlier—when they were in preschool—proved to be a good predictor of their sensitivity. More specifically, children who showed a better understanding of thoughts and feelings in preschool were likely to derogate their ability, when asked to imagine receiving criticism from a teacher for a minor error. As Cutting and Dunn (2002) point out, these findings raise important questions about the longer-term impact of social cognitive skills. On the positive side, they may indeed help children to navigate the playground and peer relationships more effectively. At the same time, they may render children more vulnerable to the inevitable slings and arrows of social life, including interactions with teachers.

**Social Cognition and Trust**

For the most part, investigators have neglected a domain in which children’s social cognition is likely to have far-reaching implications: their credulity with respect to other people’s claims. Consider the dictum of the Scottish Enlightenment philosopher, Thomas Reid (1764/1970): “In a word, if credulity were the effect of reasoning and experience, it must grow up and gather strength, in the same proportion as reason and experience do. But if it is a gift of nature, it will be the strongest in childhood, and limited and restrained by experience; and the most superficial view of human life shows, that the last is really the case, and not the first” (pp. 240–241). Is there evidence that children become less credulous with age? One of the central findings in theory-of-mind research is that most normal children beyond the age of 4 years realize that sincere claims and beliefs may be false. It would be reasonable to expect that insight to render children less credulous.

Indeed, recent findings confirm that preschoolers do increasingly display selective trust and doubt in the claims made by particular people (Clément, Koenig, & Harris, 2004; Harris & Koenig, in press; Koenig, Clément, & Harris, 2004). When preschoolers are presented with two informants, one of whom makes various claims that the child knows to be true but the other makes either false claims or confesses ignorance, they subsequently trust the hitherto reliable informant but doubt the hitherto unreliable informant. For example when shown an unfamiliar object and offered different names for it by the two informants, children trust the hitherto reliable informant.
Two developmental phases are apparent in children's selective trust (Koenig & Harris, 2005a). Three-year-olds trust a hitherto reliable informant—by seeking information from her and endorsing her claims—and doubt a self-confessedly ignorant informant. They are less selective when invited to choose between a reliable informant and an inaccurate informant. Four-year-olds are selective in both cases: They trust a reliable informant and they doubt not only an ignorant informant but also an inaccurate informant. Arguably, 4-year-olds, attribute inaccurate claims to an informant's mistaken beliefs and adopt an appropriately skeptical stance toward that person’s later assertions.

Beyond the particularities of the age change in trust and doubt, these findings call attention to the way that children use their emerging theory of mind to make trait attributions in the cognitive sphere. After a brief exposure to a distinctive pattern of reliability on the part of particular informants, preschoolers anticipate that those informants will continue to differ in terms of their future epistemic reliability. In some ways, there is nothing remarkable about this result. Attachment theory has long insisted, and provided evidence for, the claim that infants can gather and retain information about a caregiver’s past emotional availability and use that to forecast how he or she will respond in the future. However, attachment theory has generally emphasized the infant’s ability to anticipate a class of overt behaviors on the part of a caregiver—particularly, the caregiver’s physical availability and emotional responsiveness. The findings on selective epistemic trust suggest that preschoolers are capable of a deeper type of attribution. They do not base their trait attributions on particular regularities in the overt behavior of their informants—at the behavioral level, mistaken claims have nothing in common with one another. Rather, they base their predictions on regularities in the psychological status and more specifically the epistemic reliability, of their informants (Koenig & Harris, 2005b).

Further evidence that preschoolers are able to assess the epistemic reliability of their informants and do not just focus on behavioral regularities emerged in a study that examined the scope of children’s attributions. As in prior experiments, 3- and 4-year-olds were presented with two informants. One proved reliable in that she named a set of familiar objects accurately; the other informant, by contrast, proved unreliable in that she admitting to not knowing the names of any of the objects. Subsequently, children were shown various novel objects and asked if they knew what they were for. Once they had acknowledged not knowing, children were prompted to seek help from either of the informants. In addition, each informant then offered a different demonstration of what to do with the object. Finally, children were asked to provide their own demonstration. As in previous studies, children were selective: They tended to ask for help from, and trust the help supplied by, the reliable as opposed to the unreliable informant. Thus, after witnessing the differential reliability of the informants in the verbal sphere, children made a relatively global assessment of their epistemic reliability. They displayed selective trust in the information that the two informants provided in the nonverbal sphere of object use (Koenig & Harris, 2005a).

Granted that children increasingly display selective trust and doubt in particular informants how exactly is that selectivity established? We may envisage two different mechanisms. In line with the thrust of Reid’s dictum, children might start off by trusting every informant on first encounter. To the extent that informants continue to prove reliable (e.g., say nothing that contradicts what the child knows already and respond appropriately to questions) children would retain—but not add to—their initial stock of trust in that informant. However, whenever informants prove unreliable—by acknowledging ignorance in response to questions or by saying something the child knows to be false—children would accumulate doubt. On this account, selectivity is brought about by growing doubt with regard to unreliable informants rather than by any increment in trust.

Consider, however, a reasonable alternative. Arguably, children add to their stock of trust in an informant whenever he or she makes a claim that the child knows to be correct. Thus, children would be much more likely to believe the claims of familiar as compared to unfamiliar informants. Familiar informants—unlike unfamiliar informants—would generally have ample opportunities to prove themselves trustworthy. On this account, selectivity is brought about by cumulative trust in reliable informants rather than by any increment in doubt.

The first model fits the intuition that a person’s false assertions are more distinctive—and make a deeper impression on us—than their true assertions. For example, an evidently false statement by a politician can dramatically undermine their reputation for probity. The second
model fits a different intuition, namely that young children are especially likely to trust the claims of familiar caregivers more than those of relative strangers. Whichever model ultimately proves correct, it is clear that the development of children’s epistemic trust is a tractable but neglected domain of research in social cognition. To the extent that theory-of-mind research has shown how young children attribute mental states, the stage is set for understanding how they make different attributions to different individuals depending on their past history.

**Emerging Contours in the Child’s Theory of Mind**

In this final section, I highlight selected major findings and draw them together into a larger conceptualization of the child’s theory of mind. Four such findings stand out. First, if we study the progressive steps that children take in understanding mental states, there is now ample evidence that certain mental states are mastered more easily and in advance of others. One particularly robust finding from normal children is that they can conceptualize and talk about individuals’ goals and preferences before they can conceptualize and talk about individuals’ epistemic states of knowledge and belief (Bartsch & Wellman, 1995; Tardif & Wellman, 2000). A second, emerging finding from the primate literature is that chimpanzees are able to monitor the perceptual states and the associated goals of conspecifics (Tomasello, Call, & Hare, 2003), yet we have no comparable evidence showing that chimpanzees are capable of understanding beliefs (Call & Tomasello, 1999). A third finding from the study of autism is that despite their well-established difficulty in understanding beliefs (Happé, 1995; Yirmiya, Osnat, Shaked, & Solomonica-Levi, 1998), children with autism show no major impairment in understanding perceptual states (Reed & Peterson, 1990) or desires (Tager-Flusberg, 1993; Tan & Harris, 1991). A fourth finding from the study of deaf children echoes the pattern established for children with autism: Deaf children born into a non-signing family display a marked lag in the understanding of beliefs (Peterson & Sigal, 2000) but no detectable lag in understanding perceptual states (Peterson, 2003) and frequent references to desires (Rieffe & Meerum Terwogt, 2000).

A plausible implication of these various findings is that even if investigators often talk in terms of having—or lacking—a theory of mind, it is more appropriate to acknowledge a bifurcation: The understanding of perceptual states and goals can be achieved despite the handicaps of autism, despite restricted access to language as in the case of deaf children—and indeed despite the absence of any access to language, as in the case of nonhuman primates. By contrast, as discussed in an earlier section, the understanding of beliefs varies with language ability and with access to conversation. Why should there be this schism? My own speculation, set out elsewhere (Harris, 1996, 1999, 2005) and briefly elaborated here, is that among normal children, there are various mind-reading abilities that are probably part of our primate heritage: The ability to detect goals and to monitor perceptual states is part of that heritage, even if we have not yet fully established the degree of variation in the primate order. However, from approximately 2 to 3 years of age, a uniquely human capacity begins to emerge, namely that young children can do so by talking about absent objects and noncurrent events, any two in—
interlocutors will rarely share exactly the same knowledge base or perspective. Effective conversation therefore depends on the ability of each interlocutor to acknowledge that divergence and to allow for it in conveying what they know, think, and feel about the topic in question. Indeed, many of the speech acts of ordinary conversation—conveying information, asking a question, querying an assertion, or issuing a denial—all turn on the fact that different interlocutors have different perspectives. Studies of nonegocentric communication by preschoolers suggest that they display an early sensitivity to such variation (Menig-Peterson, 1976; O’Neill, 1996; Sachs, & Devin, 1976; Shatz & Gelman, 1973; Wellman & Lempers, 1977).

These comments underline the fact that cooperation that is directed at some practical goal typically has a different set of ground rules from conversation. In the context of pragmatic cooperation, partners can frequently act on the assumption that they share a common goal and a common set of beliefs about how to attain that goal. In the context of conversation, by contrast, differences in perspective and belief, and the acknowledgment and articulation of such differences, are of vital importance for the success and coherence of the conversation. Indeed, the voicing of shared beliefs and common knowledge scarcely amounts to a conversation at all. This key feature of conversation leads to the reasonable expectation that children who often participate in conversation—especially children that involves an exchange of viewpoints rather than the negotiation of a pragmatic goal—are likely to perform better on those theory-of-mind tasks that call for an understanding of differences in knowledge and belief. As discussed in an earlier section, there is now ample evidence for this prediction. Deaf children who have access to a native signer in their home perform better on standard false-belief tasks than deaf children who lack such access (Peterson & Siegal, 2000). Children with caregivers who frequently talk about what particular individuals think and know also do well on standard false-belief tasks (Ruffman et al., 2002). Finally, experimental interventions in which such viewpoints are articulated serve to promote false-belief understanding (Hale & Tager-Flusberg, 2003; Lohmann & Tomasello, 2003).

In conclusion, an intriguing irony emerges as we look back over the past 25 years. A major inspiration for research on theory-of-mind was an experiment not with children but with a chimpanzee, Sarah (Premack & Woodruff, 1978). If my analysis is correct, however, cumulative research increasingly reveals that the type of goal understanding that Sarah displayed has a very different phylogenesis and ontogenesis from the belief understanding that human children display. Goal understanding is connected to the analysis and pursuit of practical activities. Belief understanding is intimately connected with the ability to engage in conversation with no practical end in sight.

My guess is that we have yet to appreciate just how far children live in different conversational worlds. Not only do families vary in the extent to which they enunciate and discuss conflicting psychological reactions, they also vary in the extent to which they enunciate and discuss conflicting moral, scientific, religious, and historical claims. Moreover, just as family discourse has an impact on children psychological understanding, so it is plausible that family discourse has an impact on children’s epistemological understanding. In any given domain, some children will be sensitized to the way that divergent claims can be adjudicated but others will scarcely recognize that alternative claims exist.

REFERENCES

References 853


Pratt, C., & Bryant, P. (1990). Young children understand that looking leads to knowledge (so long as they are looking into a single barrel). *Child Development, 61*, 973–982.


References 857


