



ZERO TO THREE®

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The Developing Mind

How Scientists Investigate Social
Understanding

New Insight Into the Birth of
Social Intelligence

How Infants Learn About the
Minds of Others

Emotional Foundations of
Social Understanding

Also in This Issue:

Infant-Parent Psychotherapy

THIS ISSUE AND WHY IT MATTERS

For decades, students of early childhood development learned about the egocentric nature of the young mind. Theories of early cognitive development characterized young children as incapable of taking another's perspective and unable to separate their own beliefs, thoughts, and ideas from others. Over the past 10 years, however, researchers have gained remarkable insight into how and what infants can understand about the minds of others. The result is a revolutionary new understanding of early social cognition.

Ross Thompson, guest editor for this issue and a ZERO TO THREE Board member, describes young infants as "beginning psychologists" who enter this world as attentive observers, ready to absorb information and to be active participants in seeking to understand the social world. With remarkable speed and increasing sophistication, many of the essen-

tial foundations of social and emotional understanding are established by the child's second birthday.

Leading researchers from the fields of developmental and social psychology contributed to this issue of *Zero to Three*. They describe elegant experimental designs that demonstrate how, far from being egocentric, infants and toddlers have a surprising awareness of the emotions, interests, intentions, and goals of others. From the first moments of life, infants show a preference for human faces and voices, and can even imitate adult facial expressions. These first signs of social interaction—mutual eye contact, attending and responding, exchanging vocalizations—mark the emergence of "emotion sharing" which is central to how infants experience the quality of their relationships with others. And it is clear that the quality of the relationships between children and the significant adults in their lives has a tremendous impact on how development unfolds.

A new understanding of how much infants are taking in and processing about others raises compelling questions about how adults influence children's psychological development. If parents and professionals can better understand the many ways very young children strive to engage and understand others, they are better equipped to respond in ways that nurture and support their emerging skills.

I hope you find this issue of *Zero to Three* to be an exciting journey into the minds of infants and toddlers as they learn to navigate the complex world of human interaction.

Stefanie Powers, Editor
spowers@zerotothree.org



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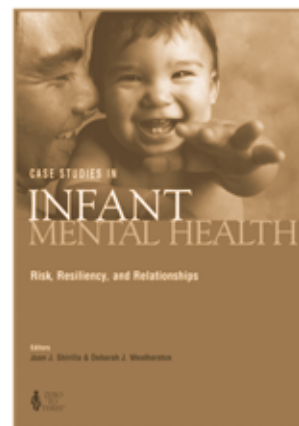
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The Psychologist in the Baby

ROSS A. THOMPSON

University of California, Davis

An 18-month-old toddler sits at a table with a friendly experimenter. Before them are two bowls of food: one containing broccoli, the other Goldfish crackers. As the toddler watches, the experimenter samples each food and, to the child's surprise, the adult obviously dislikes the Goldfish crackers (frowning and saying "Ewww!") and likes the broccoli (smiling and saying "Mmmm!")—contrary to the preferences of nearly all young children. The next thing that happens is equally surprising. The experimenter reaches her hand to the child between the two bowls and says, "I want

some more. Can you give me more?" Toddlers overwhelmingly respond by giving the experimenter the food she prefers—the broccoli—even though it is the food that toddlers themselves dislike (Repacholi & Gopnik, 1997).

It has long been both common wisdom and scientific certainty that infants and young children are egocentric. As Piaget argued, they have difficulty thinking beyond their own subjective viewpoint to understand that other people have different perspectives, beliefs, and preferences. Yet the conclusion of this study and many others is very different. Far from egocentric, infants and young children have a remarkably early awareness that other people have different views, feelings, preferences, interests, goals, and desires—and understanding these mental states in others becomes their consuming interest. How they begin to comprehend the psychological world of human beings has been one of the fascinating topics of developmental science during the past 10 years, with practical implications for how we think about young children and nurture their development.

The articles of this issue of the *Zero to Three* Journal profile some of this new research and its applications. The authors are among the leading scientists in the field, and together they offer a portrayal of early psychological understanding that turns upside down earlier beliefs about the developing young mind. Rather than pondering, as past investigators did, why it takes young children so long to understand another's viewpoint, scientists today are trying to understand how infants and

young children so quickly achieve the insights they do, and how their earliest understanding of the social and emotional world of human interaction provides a foundation for later understanding and social relationships.

Looking Into the Mind of an Infant

STUDYING THE THINKING of an infant or toddler is like an anthropological expedition: You do not speak the same language; you have different skills, interests, and background experiences; mutual understanding can be hard to achieve; and misunderstanding comes easily. One of the reasons there has been a revolution in our understanding of the minds of young children is that current researchers, like anthropologists, are relying on responses from their young subjects that are simple and easy to interpret. As in the broccoli study described earlier, simple behaviors like handing an adult the food she prefers are straightforward ways of revealing what that toddler understands about the adult's preferences. By contrast, earlier researchers tended to underestimate the thinking of infants and young children because they required responses that were too difficult. For example, asking a young child what would be a good snack for Mommy, as did early investigators of role-taking, was a conceptual challenge for young children who may not have been readily aware of adult food preferences (and who may not have had the vocabulary to describe them); so young children simply described what they would like to eat themselves.

In the articles of this issue and throughout research in this field, there are many examples

of simple but informative behaviors by which infants and toddlers reveal what they understand about the social world. One of the most powerful and early responses is looking. At an age when other behaviors are not well coordinated, newborns and young infants can regulate their gazing at objects, and they seek novelty and easily get bored with familiarity. Based on this, researchers like Henderson, Gerson, and Woodward (this issue, p. 13) present young infants with various carefully designed situations to determine which the infants look at the longest—indicating which is the newest and most interesting of the events they have seen—to reveal what they understand about what they observe.

Other research approaches are more sophisticated and creative. Developmental scientists observe a toddler's imitation to determine whether the young child imitates the specific behaviors of the partner or that person's intended action, as a way of understanding how well toddlers comprehend the intentions underlying behavior. If you are interested in knowing whether greater skill at

Abstract

Far from egocentric, infants and toddlers advance significantly in their understanding of others' feelings, desires, goals, intentions, preferences, and views during the first 2 years of life and, in so doing, establish the foundation for later social and emotional understanding. This article surveys those accomplishments, speculates about how they occur so effortlessly, describes advances in psychological understanding of the preschool years, and highlights the significance of these insights from developmental science for how we interact with very young children and nurture their social cognitive development and self-awareness.



grasping objects might enable young infants (who have limited fine motor skills) to better comprehend others' reaching and grasping, equip 3-month-olds with "sticky mittens"—tiny gloves with Velcro surfaces that can pick up toys that are also lined with Velcro—as did one research team whose work is described later in this issue (Sommerville, Woodward, & Needham, 2005). These studies reveal the creativity of research into the infant's developing mind, and also researchers' reliance on simple, readily interpretable responses.

We can see similar creativity in studies of young children. Scientists studying preschoolers' emotion understanding, for example, ask children to put pictures of facial expressions that have been previously identified as "sad," "mad," "happy," and "scared" onto puppets in response to short story prompts, rather than require children to provide complex verbal responses to the stories. Even when scientists use children's verbal behavior in their investigations of social understanding, they commonly examine casual mother-child conversations about children's feelings or peer interactions that have been recorded in the lab or the preschool. Or they examine how readily toddlers pick up new vocabulary (e.g., that an unfamiliar toy is called a "mog") that has been introduced in an experimental procedure that requires the child to understand the connection between what an adult says and what the adult is looking at or feeling.

Taken together, these studies illustrate how, in order to understand the minds of infants and young children, developmental scientists have learned to be sensitive observers of their behavior, careful not to require more of them than they are capable of. Researchers have also learned to be thoughtful in their interpretations. In these ways,

developmental scientists are just like anthropologists or, for that matter, those who care for young children.

Becoming a Baby Psychologist

TRY TO IMAGINE the challenge faced by a young infant who is carefully watching the behavior of the interesting people around her. What these people do is fascinating, important, and mysterious. One of the earliest things she learns is that people are different from other things in the world: They act on their own initiative, communicate, and most important, respond to her. But why people have these characteristics (in contrast with her stuffed bear) and why they act as they do become preoccupations of the infant. In a sense, babies are fascinated by the task of reading the minds that underlie the behavior of people—or in another sense, they are acting like young psychologists.

They begin this task early. Newborns enter the world with brains that are ready to absorb information and that have inborn preferences for the sight of human faces and the sound of human voices, and this makes them responsive to social stimulation (Mondloch et al., 1999). For example, newborns imitate adult facial expressions (Meltzoff & Moore, 1977) and are reinforced by the sound of a familiar voice, even though they are not yet ready for social interaction. To some developmental scientists, they are already exhibiting a simple awareness that other people are "like me" (Meltzoff, 2007).

By 2 to 3 months, infants are awake for longer periods and are more alert, and this affords opportunities for face-to-face interaction with an adult. In these social contexts, infants exchange with their caregivers animated facial expressions, vocalizations, gestures, mutual gazing, and other behaviors and, at the same

time, are learning some of the skills of social interaction: reciprocal turn-taking, mutuality in gazing and affect, and attending and then responding (Fogel, 1993). As noted by Markova and Legerstee (this issue, p. 26), emotional sharing is central to the infant's experience of the caregiver's attunement, and the responsiveness of the adult contributes to the baby's sense of efficacy as a social partner (e.g., "When I smile, Mommy smiles") and the pleasure that results.

Although these episodes of early face-to-face interaction are often described as a well-choreographed minuet, the reality for most parents is that they are more like a beginning dance class with missed cues and stepped-on toes. Developmental scientists have also recognized that well-synchronized interaction occurs less than a third of the time in face-to-face play, with the remaining time in uncoordinated interaction because infants become fussy, adults are distracted, or for other reasons (Tronick, 1989). Yet early social skills and understanding are also built from mistimed or nonsynchronous interactions as infants learn what they can do to repair interactive activity and put it back on track (Gianino & Tronick, 1988). In early social play, therefore, infants are faced with a more complex activity than merely responding to sensitively scaffolded social interaction. They are also learning that social interaction is dynamic and changing and are acquiring the skills to co-manage its course.

What else do infants learn from this activity? As attentive observers of their partners' emotional expressions, they are learning about the organization and meaning of these emotions. They understand, for example, how a mother's grin goes with a melodic "happy" voice and a pout accompanies a flat, low-pitched "sad" voice (Kahana-Kalman & Walker-Andrews, 2001), and they respond in an emotionally resonant manner to a mother's facial and vocal emotional expressions (Fernald, 1996; Haviland & Lelwica, 1987). During these early months, infants also expect that other people will respond to and interact with them, that different people (such as mothers and fathers) have different ways of interacting, and that people will provide assistance as needed (see Thompson, 2006b). Concerning the latter, distressed 6-month-olds begin quieting in apparent anticipation of the arrival of their mothers when they can hear her approaching footsteps—and protest loudly if she approaches but does not pick them up (Gekoski, Rovee-Collier, & Carulli-Rabinowitz, 1983; Lamb & Malkin, 1986). These expectations are the foundations of the internal working models that attachment theorists believe are the basis for secure or insecure attachments.

As the infant matures, interest in face-to-face interaction wanes naturally as something

exciting enters the picture: moving around on one's own. As a result, infants continue communicating emotionally with their caregivers, but now they do so across a distance, and this changes everything. Now it becomes necessary for an infant to understand what others are referring to when he hears an affirming voice or sees a warning expression, and he must also ensure that others understand what he is referring to when he shares an exciting discovery, wants something, or needs to find out more about something he has discovered. Parents are similarly motivated as they find themselves monitoring the whereabouts of their young offspring and using communication across a distance to do so and to ensure the child's well-being. Much of this back-and-forth communication and signaling is about other objects and people, whether a toy that attracts mutual attention, a stranger about whom the baby needs reassurance, or a DVD player that attracts prying little fingers (and a parent's cautionary warning).

It is not surprising, therefore, that developmental scientists describe the second half of the first year as the emergence of *secondary intersubjectivity* or *triadic interactions*. These terms describe infant-parent interaction about objects or events of mutual interest, such as food, toys, or other people, and these new experiences are associated with new discoveries about people's minds. As described by Henderson and her colleagues (this issue, p. 13), for example, infants at this age begin to understand how people's actions and feelings are related to what they are looking at. They begin to create joint attentional states with adults by looking in the direction of the adult's gaze or by looking from a toy to the adult's face and back to the toy again (Carpenter, Nagell, & Tomasello, 1998). They also follow the direction of an adult's pointing or gesturing, and they begin to use pointing to direct an adult's attention to something of interest (Tomasello, Carpenter, & Lizkowski, 2007). These months are also when social referencing emerges, when infants enlist an adult's attentional and emotional cues while responding to an ambiguous or uncertain event. Understanding that what Mommy is looking at influences her feelings, 12-month-olds will hesitate to explore a motorized robot when their mother looks at it with a wary expression but will easily approach the robot when she looks at it in a relaxed, unconcerned manner. In short, infants are beginning to understand how attention conveys what is "on your mind" which, in turn, affects emotions and behavior.

The ability to move about changes the infant in another important way. Every parent (including Piaget) notices how much more intentional and goal-oriented infants become when they are capable of independently reaching what interests them (a favorite toy, the

cat-food bowl, etc.). They persist in reaching for what attracts them, they angrily resist being deterred, and they will sometimes find alternative means of accomplishing their goals (such as trying to climb up on a shelf where the forbidden vase has been relocated). At the same time—perhaps as a consequence—infants also begin to perceive others' actions as similarly goal directed. The articles in this issue by Goodman and Tomasello (this issue, p. 21), and by Henderson and her colleagues (this issue, p. 13), document how infants' understanding of other people as intentional, goal-oriented actors blossoms during this period.

To Tomasello (1999), this is the beginning of the "9-month revolution," during which infants become capable of shared intentionality as they understand and participate in the goal-directed activity of other people. Understanding that other people are also motivated by their goals, 1-year-olds begin to act cooperatively when rolling a ball back and forth, pointing to something interesting (e.g., a puppy the adult has not seen), and participating in small ways as the adult dresses the child. In these and other instances, infants exhibit a remarkable psychological insight: People have mental goals that guide their actions, and they can participate in those goals.

These remarkable achievements in social understanding begin with the 9-month revolution, and continue into the second year and beyond. As toddlers become capable of doing more, shared intentionality becomes manifested in their efforts to complete the unsuccessful goal-directed actions of others (Meltzoff, 1995; Warneken & Tomasello, 2006). Having watched an adult accidentally drop a marker he has been drawing with, 18-month-olds will retrieve it for him, and they will imitate the intended actions of an adult they have observed even if the adult has been unsuccessful at completing their actions (see Henderson et al., this issue, Box 2, p. 16). As Goodman and Tomasello point out (this issue, p. 21), understanding an adult's intentions is also a catalyst for the explosion in language development during the second year that depends, in part, on a toddler's judgments about the adult's attention and intentional behavior when using new words. By the time of the second birthday, in short, many of the essential foundations of social and emotional understanding have become established. Infants have begun implicitly to grasp the basic mental events that underlie human action—attention and perception, goals and intentions, feelings and preferences—and to understand their interconnections (e.g., attention leading to emotion). The baby has become a beginning psychologist.

It is interesting to remember that this is the period when attachment security is



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taking shape, and one of the important (but unanswered) questions is how the infant's developing psychological awareness of other people influences the growth of attachment security. In their exploratory forays, for example, how do 1-year-olds perceive the goals and intentions underlying the caregiver's sharing discoveries, soothing distress, or deterring wayward activity (while often eliciting the child's anger)? As they interpret an adult's attention and emotions toward unfamiliar objects, do 1-year-olds similarly use social referencing to interpret the caregiver's emotional expressions about themselves? How are social expectations of nurturant care or assistance in distress colored by an infant's growing awareness of an adult's intentions underlying these behaviors? New discoveries about early achievements in psychological understanding during the first year provoke questions like these for those concerned with attachment relationships and the internal working models with which they are associated.

The Making of a Psychologist

WE ALSO WANT to know why these conceptual achievements occur so early and apparently so effortlessly for young infants. Although the answer is still unclear, developmental scientists agree that part of the reason is the nature of the infant mind. In many areas of developmental science, researchers are awed by the enormous capacity of infants to learn from early experience. Babies seem to be amazingly adept at figuring out how things go together on the basis of their everyday observations of objects, people, and the events around them and, equally remarkably, of distilling broader inferences—of gravity, of causality, of human



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mentality—on the basis of these observations. Infants also create for themselves valuable learning opportunities through their interactions with objects and people. Scientists' respect for the power of the infant mind is, of course, consistent with much of what we have been learning about the explosive growth of the brain during the early years.

Beyond the young mind's powers of induction, is more explanation needed? It is on this question that scientists disagree (Tomasello, 1999). Some point to the newborn's innate preference for human faces and voices, and to the baby's early sensitivity to human emotion, as reflecting intrinsic preparation of the brain to learn from and interact with a human world. Others point to neonatal imitation of human faces as the dawning of an enduring awareness that others are "like me" that provides the basis for achievements in psychological understanding (Meltzoff, 2007). In a sense, the young infant's ability to denote an identity between the social behaviors she observes and her own capabilities creates a conceptual bridge that fuels self-awareness as well as social cognition.

The final piece of this puzzle is the baby's interaction with other people. Indeed, social interaction contributes to a developing awareness that others are "like me" when caregivers, for example, respond in an emotionally resonant manner to the baby's emotional expressions. Moreover, when adults respond to the intentionality they perceive in the infant's efforts—punctuating their verbal responses to the baby's goal-directed activity with sympathetic grunts or affirmative exclamations when the goal is achieved—they not only convey "like me" but also highlight the goal-oriented structure of human activity. Care-

givers who are so attuned to the psychological orientation of infant behavior have been called "mind-minded" (Meins, Fernyhough, Fradley, & Tuckey, 2001; Meins et al., 2003), and much more remains to be discovered about how the everyday experiences of social interaction help to scaffold early developing understanding of the psychological world.

Later Achievements in Psychological Understanding

THE INSIGHTS INTO the psychological world achieved by infants and toddlers provide a foundation for later social and emotional understanding. This special issue, although focused on early social cognition, also draws attention to what follows. As noted by Warren, Denham, and Bassett (this issue, p. 32), for example, even complex social problem-solving skills used by older preschoolers have their basis in the growth of emotion knowledge during the first years of life.

As language develops, young children's explicit knowledge of mind and emotions becomes more apparent (see Thompson, 2006b, for a review of this research). By age 2, for example, toddlers can be overheard making spontaneous verbal references to emotions, their causes, and even emotion regulation (e.g., "I scared of the shark. Close my eyes," at 28 months; Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986). By age 3, they have begun to appreciate how emotions are connected to thoughts and expectations, such as the surprise a visitor feels after seeing giraffes on a farm (Wellman & Banerjee, 1991). They also understand how emotions are associated in predictable ways with fulfilled and frustrated desires. Somewhat later they comprehend the social purposes

of hidden or false emotions, such as showing delight when given underwear as a birthday gift by your grandmother (Banerjee, 1997).

The latter may not seem like a very desirable achievement, especially as it emerges at the same time that preschoolers become more capable of hiding the truth or lying. But discovering the privacy of personal experience is part of a much larger achievement in psychological understanding: the discovery that thoughts may be mistaken (Harris, 2006). A 3-year-old appears to believe that thoughts are a copy of reality: The mind's contents duplicate what is true in the real world. Hand him a candy box and, without opening it, ask him what is inside. Like anybody else, 3-year-olds expect to find candy. But when you open the box, the child will be surprised to find not candy, but pencils. Now ask: "What did you *think* was in the box before we opened it?" The 3-year-old will reply matter-of-factly: "Pencils." "What will another child think is inside the box before it is opened?" "Pencils." It is as if to a child of this age, mental events simply cannot be inconsistent with reality. The mind's contents are a copy of the world outside.

But 4- and 5-year-olds have a very different idea. They can appreciate that they earlier had mistaken expectations about the candy box. Furthermore, they can imagine that someone else might be similarly fooled. In concluding thus, they have made a fantastic discovery that mental events are a representation of reality, not reality itself. In a sense, the mind has its own rules for functioning that are different from those of the reality it thinks about. And because of this, people can be mistaken about the world they are reasoning about because they misunderstand, or are fooled or deceived. Once this idea sinks in, after a couple of years children begin to grasp how mental interpretations, biases, and expectations can also alter how we perceive reality. And they can begin to grasp how emotional influences are also important to social understanding, such as our tendency to assume hostile intent in the behavior of those we dislike.

As young children achieve more complex social and emotional understanding, the differences in their emotional competence also become apparent. Some preschoolers develop considerable sensitivity to the feelings of other children. Others find themselves in conflict with peers owing to their difficulties in comprehending the motives and intentions of other children. Still others have difficulty becoming part of the social group because of their shyness and its impact on their social initiatives. Early emotional understanding is a significant ingredient to early social competence and, as Warren, Denham, and Bassett (this issue, p. 32) note, provides the foundation for the social

and emotional skills of middle childhood. The programs they profile to promote emotional competence in young children are one way of building on the science of early social cognition to enable preschoolers to better understand and respond to the feelings of others.

Parent–Child Conversation and Psychological Understanding

WITH LANGUAGE, researchers have another means of understanding how young children think, and parents have another means of guiding their thinking. Almost as soon as young children can be conversational partners—sometimes by contributing little more than a few words and sounds of agreement or inquiry—parents engage them in all kinds of conversations: discussions about the day’s events, descriptions of anticipated visits to the playground or the dentist, reminiscences about shared experiences in the recent past (e.g., getting an ice cream cone or visiting the zoo), arguments during conflict (e.g., about going to bed), or commentary about the child’s drawing, a storybook, or a television program. Parent–child conversations increasingly become part of the fabric of everyday life as young children become better conversational partners and use these discussions to learn about the wide variety of things that interest them. Among the most important things that interest young children are people’s feelings, thoughts, motives, traits, and other psychological processes.

Conversation with a parent can offer a revealing window into the mental and emotional experiences of other people, and even of the child herself (Thompson, 2006a). One reason is that adults have long lived in a world that is informed by their psychological inferences and judgments, so it is natural that they would impart these inferences to young children when they converse about everyday events (e.g., “Why did Daddy kick the wall, dear? Because he was mad at your older brother”). Another reason is that language provides an explicit lexicon that concretizes the variety of complex and elusive mental states that young children are trying to comprehend. For example, emotions are named as they are discussed, whether they are another’s feelings or the child’s own. In doing so, conversation becomes a forum for emotion understanding, especially of negative feelings like anger, fear, or sadness that young children may find disturbing or confusing. Moreover, *how* a parent talks about the psychological world can influence how children think about mental and emotional experience. Developmental scientists have shown that when parents speak in a rich and elaborative manner about shared experiences in the recent past,



PHOTO: MARILYN NOLT

for example, young children develop deeper memories of those experiences and acquire greater insight into people’s feelings and other psychological influences (see Thompson, 2006a, for a review). Two examples of how this occurs can be found in Box 1.

In research in our lab, my students and I have studied hundreds of parent–child conversations about different topics: recent shared experiences, occasions when the child felt sad or angry, situations when children misbehaved or were cooperative, and so forth. We have been interested in what mothers say, how they say it, and the broader relational context of their conversations with young children (Thompson, in press; Thompson, Laible, & Ontai, 2003). One discovery from this research is how much psychological knowledge is imparted by these simple conversations. In one study we analyzed the conversations of mothers with their 3-year-olds about shared events and storybooks depicting emotion. We found that when mothers spoke frequently about emotions in the event or the story they also described the causes and outcomes of emotion; they defined emotions for the child (e.g., “furious is when you are really, really mad”); they linked events in the child’s life with those emotions (e.g., “that’s how you felt when Molly knocked over your blocks”); and they requested information from the child about emotion to engage the child’s understanding (Ontai & Thompson, 2002).

It is not surprising that when mothers engage in conversations that are richly elaborative in this manner, their preschool children have greater emotion understanding (Thompson, 2006b). But emotion-rich conversations are also associated with other important outcomes of early social development. Laible and Thompson (2002) found

that maternal references to feelings during conflict episodes with children at age 2½ predicted children’s conscience at age 3, perhaps because references to people’s emotions put a human face on the reasons for cooperating and the consequences of misbehavior. Box 2 describes other research from our lab that illustrates the importance of the broader family climate in which these emotional conversations occur, especially for children in at-risk family environments.

What mothers say is important in the context of the broader quality of the mother–child relationship. We have found that mothers in secure attachment relationships with their children are more likely to initiate these kinds of rich, elaborative, emotion-related conversations than are mothers with insecure attachments (Raikes & Thompson, 2006; Thompson et al., 2003). Their behavioral sensitivity toward their children may be expressed, during the preschool years, in deep and thoughtful conversations with their offspring about the child’s feelings and the emotions of other people. Several of our studies have found, in turn, that securely attached children are more advanced in emotion understanding than insecure children (Laible & Thompson, 1998; Raikes & Thompson, 2006; Reese, 2002) and are also more advanced in conscience development (Laible & Thompson, 2000). Taken together, these findings raise the possibility that, during the preschool years, relational security is created and maintained for young children through the richly elaborative, sensitive conversations that children share with their mothers about significant events in their lives (Oppenheim & Koren-Karie, in press; Thompson et al., 2003).

These findings indicate that considerable understanding of the psychological world

Box 1. CONVERSATIONS ABOUT SHARED EXPERIENCES

Here is an example of a brief conversation between a 21-month-old toddler and his mother in London, where Weetabix is a popular (but bland) breakfast cereal (from Dunn & Brown, 1991, p. 97). It occurs late in the morning in the kitchen following a breakfast confrontation:

- Child:* Eat my Weetabix. Eat my Weetabix. Crying.
Mother: Crying, weren't you? We had quite a battle. "One more mouthful, Michael." And what did you do? You spat it out!
Child: (pretends to cry)

This shared reminiscence is, in most respects, simply a recounting of the morning's confrontation over breakfast. Researchers who study memory development note that the mother's sequential description of events and causal representation of the outcome are likely to strengthen Michael's subsequent memory for that experience. But incorporated into the mother's description of events are also several psychological lessons. By the mother's account, for example, Michael's crying results from his misbehavior (not from having to eat bland breakfast cereal). Mothers and toddlers get along better when little boys cooperate. When boys do not, there is likely to be a battle and crying may result. In addition to providing a memorable representation of the event, therefore, the mother has also discussed the child's feelings in a manner that conveys a moral lesson but also understanding of relationships and cooperation. Although it is unclear how many of these concepts are likely to be learned by a 2-year-old from a single discussion, as conversations like these become part of the landscape of parent-child interaction in the early years, these and other forms of psychological knowledge are likely to become incorporated into Michael's developing social and emotional understanding.

By comparison, here is an excerpt of a conversation in our lab between a 4½-year-old and his mother over a visit to his grandmother:

- Mother:* And what happened, honey, when Mom said we had to go?
Child: I felt awful.
Mother: And what did you do, do you remember?
Child: Cried and fussed. . . .
Mother: Yes, you did. And what did Mom say?
Child: "I don't want you up there screaming."
Mother: Right. 'Cause when we're a guest at someone else's house, the polite thing to do is to say thank you before we go, not to kick and scream, isn't it?
Child: Yeah.
Mother: Now when you kick and scream, what happens to other people? How do you think Onia felt then?
Child: She felt a little sad.
Mother: You think so? I bet you're right. What did she do?
Child: I don't know.
Mother: She took the girls and went upstairs so we could be by ourselves, so we could work out our problem.

In this conversation, the mother takes the child through the sequence of events in order to provide lessons about appropriate conduct when visiting a relative. But in so doing, she lingers to describe the feelings of the grandmother and others who witnessed their filial confrontation and to explain why they acted as they did. The associations between the child's feelings and behavior, the mother's response, and the feelings of the observers are explained in order for her preschool son to understand the consequences of his behavior on others—a more complex, sophisticated psychological lesson than for Michael.

is achieved when young children converse about everyday experiences with their caregivers. Just as important may be the benefits for young children's understanding of themselves and the close relationships they share with significant people.

Conclusion

UNDERSTANDING THE PSYCHOLOGIST in the baby can provoke the kind of "gee-whiz" response that often accompanies new discoveries about the developing mind. But the authors of these articles are also convinced that these discoveries have practical significance for how we nurture early psychological development. As adults become aware of the striving of infants and toddlers to unlock the mysteries of the human mind, we act in ways that participate in the child's discovery of the psychological world, whether through emotional sharing in face-to-face play, supporting the blossoming of goal-directed activity, sharing simple cooperative tasks or activities, or engaging in psychologically informative conversations. When infants point and we look, engage in social referencing and we emote, or call from a distance and we respond,

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S. Denham (1998)
New York: Guilford.

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A. F. Lieberman (1993)
New York: Free Press.

we help infants make conceptual connections between our actions and the underlying mental states they are discovering.

On a broader level, according to these contributors, the discoveries of psychological understanding in the early years provide a foundation for the skills of social problem solving of later childhood, cooperative activity with other people, and (according to Goodman & Tomasello, this issue, p. 21) the capacity to fully participate as a member of the cultural community. Although much more goes into these sophisticated accomplishments, at their core is the ability to understand other people as mentalistic and emotional beings that is an achievement of the earliest years of life. ♣

ROSS A. THOMPSON, PhD, is professor of psychology at the University of California, Davis. As director of the Social and Emotional Development Laboratory, he studies parent-child relationships and the growth of psychological understanding in young children, including emotion understanding, conscience development, and self-awareness. He also works on the applications of developmental science to public policy, including school readiness, early childhood mental health, and early intervention.

Box 2. EMOTION UNDERSTANDING IN FAMILIES AT RISK

In middle-class families, discussion of emotion might focus on relatively benign encounters with mean siblings or scraped knees. In families at socioeconomic risk, the circumstances in which young children experience and observe emotion can be much less benign, and might include domestic violence, a depressed caregiver, or threats to the child. We sought to investigate the development of emotion understanding for children in these circumstances.

The sample was recruited from Early Head Start, an early intervention program designed to provide family support and promote child development among families living in poverty (Raikes & Thompson, 2006). When children were 2 years old, mothers completed questionnaires concerning their depressive symptomatology, and the security of parent-child attachment was assessed. When children were 3 years old, children completed a measure of emotion understanding, and they were observed with their mothers discussing recent events when the child felt happy, angry, or sad. From transcriptions of these conversations, the frequency of references to emotion in their conversation was counted. We also obtained from mothers information concerning emotional risk factors (e.g., alcohol or drug abuse in the family, domestic violence, a family member with anger management problems).

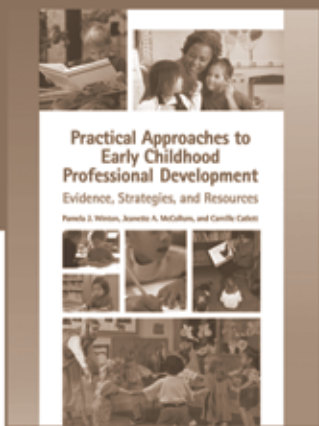
We found that maternal depression when children were 2 was associated with lower emotion understanding a year later. Young children whose mothers were depressed performed more poorly in their identification and description of others' feelings, perhaps because sad emotion was such a pervasive aspect of their family experience. In other analyses, we found that heightened emotional risk factors in the family environment were also negatively associated with children's emotion understanding. By contrast, a secure attachment was a benefit to children in these families. We found, as have studies in middle-class families, that securely attached children were stronger in emotion understanding than were insecure children. One reason is that securely attached mothers and their children talked more about emotion in the conversations we observed.

There were, in sum, both risk and protective factors in the growth of emotion understanding for children in at risk families. Emotional problems for the mother or in the broader family environment were clearly detriments to the growth of emotion understanding for young children. But a secure attachment could buffer these risks, especially through its influence on the richness of emotion knowledge attained through parent-child conversation.

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The Birth of Social Intelligence

ANNETTE M. E. HENDERSON

SARAH GERSON

AMANDA L. WOODWARD

University of Maryland, College Park

As adults, human beings are socially smart: Adults understand other people's thoughts, desires, beliefs, and goals and reason that people's actions are guided by these mental states. Adults do not view simple action sequences, such as a woman grasping and raising a glass of water to her mouth, as disconnected patterns of movements. Instead, they see these events as structured in terms of obtaining a goal (of quenching her thirst) and intentionally driven by desire (for a beverage). Understanding others' intentions is important to people's daily functioning and fundamental to the process of learning

from others. For these reasons, social intelligence is critical to social, cognitive, and language development.

To illustrate, consider the following situations involving two 18-month-olds at a park. Brandon and his father are playing near a basketball net. Brandon's father reaches into a bag, pulls out a ball, and walks toward the net while bouncing the ball. As Brandon's father gets closer to the hoop he raises his arm, and as he is about to release the ball, he trips. The ball flies out of his hands and bounces out of bounds. Another toddler, Sadie, is playing in the sandbox with a toy airplane and her mom is playing with a train; both objects are unfamiliar to Sadie. While Sadie's mom is playing, a truck with a shovel on it catches her eye and she proclaims, "Look! A backhoe!"

How might Brandon and Sadie interpret their caregivers' actions? In both situations, these actions are somewhat ambiguous. Brandon might think that his dad meant to drop the ball out of bounds or that his father meant to throw the ball into the hoop, but that tripping interfered with this goal. Because Sadie does not know the names of any of the objects in the sandbox, there are many possible referents of the new word that her mother has provided. What will Sadie think her mom was calling a "backhoe"? Will Sadie expect that other people will share knowledge of the meaning of the new word?

Recent research demonstrates that 18-month-olds are "socially smart" in these situations. For example, if Brandon's dad said, "Now you try," current scientific evidence suggests that Brandon would imitate the action that his father intended to do. Brandon would not imitate his father's accidental action and throw the ball out of bounds, but would instead attempt to toss the ball in the hoop. Evidence suggests that Sadie would use her understanding of intentions to pick out cues of her mother's attentional focus to identify which object her mom was referring to with the new word. Thus, despite the ambiguities inherent in these situations, Brandon can learn what to do with the ball and Sadie can identify which object is the backhoe.

These scenarios illustrate the social cognitive skills that are within the repertoires of most 18-month-olds (Baldwin, 2000; Carpenter, Akhtar, & Tomasello, 1998; Meltzoff, 1995). To appropriately interpret these situations, Brandon and Sadie need to understand the following features of action: (a) actions are structured by goals and intentions, (b) actions are informed by a person's attention, and (c) intentions belong to individual people, but some ways of acting are shared among all members of a group. The inferences made by Brandon and Sadie are the kinds of interpretations that toddlers make on a daily basis. These demonstrations of "social smarts" indicate that

toddlers apply their understanding of intentions to many different situations. A growing body of evidence suggests that this understanding does not come online as an epiphany at 18 months of age. Instead, the groundwork is laid much earlier in development. As we illustrate next, infants begin to make sense of others' actions in socially smart ways within the first 6 months of life.

The primary focus of this article is to review evidence surrounding the development of an understanding of intentions. However, we begin by describing two ways in which researchers study this development. In the sections that follow we highlight what infants understand about the intentional nature of human action. First, we review

Abstract

The ability to make sense out of the actions of others is critical to people's daily functioning. Adults are social experts: They understand that people's actions are directed at goals and are driven by intentions. In this article, the authors highlight key findings from studies examining infants' understanding of human action. These findings suggest that infants come to understand that intentions and attention guide human action within the first few months of their lives. By 13 months, infants understand that intentions are specific to individuals, yet there are some actions that are shared by all individuals within a group. Taken together, the evidence suggests that infants are well on their way to becoming social experts by their second birthdays.



evidence that 6-month-old infants know that actions are driven by intentions and directed at obtaining goals. We also show that, by 9 to 12 months, infants know that a person's actions are guided by their attention. Finally, we demonstrate that 13-month-olds understand that, although intentions belong to individuals, there are some actions that are shared by many individuals. Taken together, evidence suggests that these abilities are present prior to 18 months and serve as precursors to the rich social knowledge possessed by children like Brandon and Sadie.

How Researchers Study What Infants Understand

INFANTS' BEHAVIOR in everyday social settings seems socially smart—infants follow the gaze of others, direct the attention of others, respond appropriately to others' emotional expressions, imitate the actions of others, and are active participants in social interactions. However, precise scientific tools are needed to get a detailed account of what infants truly understand. One tool used to examine what infants know is the visual habituation paradigm, which uses infants' looking time to measure their understanding of observed events (see Box 1). This paradigm relies on the fact that humans tend to look at things that are novel. Infants are shown one event repeatedly until they become bored. Then, two different test events are presented, and longer looking to one event suggests that infants view the event as novel relative to the habituation event. In imitation paradigms, infants' selective imitation of particular parts of actions tells us what they view as the important aspects of demonstrated actions (see Box 2). Converging evidence from these paradigms suggests that, by 18 months, infants are well on their way to becoming social experts.

Understanding Actions, Goals, and Intentions

WHEN ADULTS VIEW intentional actions, they encode them according to their relation to a goal (e.g., she is reaching for the glass of water) rather than according to their physical properties (e.g., she extends her arm and closes her hand around an object). This helps them extract the most important part of an action—the goal. A study conducted by our group (Woodward, 1998, see Box 1) provided the first evidence that 6-month-old infants selectively attend to the goal of a simple grasping action. In this study, infants looked longer when a person's goal changed but not when she changed the direction of her reach, demonstrating that they saw the relation between the person and the object as the critical aspect of the grasping action during habituation. Critically, infants did not look longer when they saw a mechanical claw “grasp” the new object. Thus, infants, like adults, view actions as goal directed, and distinguish between goal-directed actions and other kinds of movements. Recent imitation findings provide converging evidence for this conclusion: By 7 months of age, infants selectively imitate action goals, but only when they view clearly goal-directed movements (Hamlin, Hallinan, & Woodward, in press).

Goals Often Occur With a Series of Actions

Very often, a person's intentions play out not in a single action but through a series of actions. For example, when someone is reaching toward a glass in a cabinet, this action is performed as part of a sequence of events with the final goal of having a drink. Evidence suggests that, by 12 months, infants are sensitive to the goal structure of a sequence of two actions (Sommerville, Hildebrand, & Crane, in press; Sommerville & Woodward, 2005; Woodward & Sommerville, 2000). In one study, infants were repeatedly shown an event in which an experimenter pulled on one cloth in order to attain an out-of-reach toy (the goal toy) at the end of that cloth (Sommerville & Woodward, 2005). After habituation, the sides of the toys were switched so that the goal toy was on a different cloth and the experimenter reached toward the old cloth (for a new toy) or a new cloth (for the old toy). Twelve-month-olds looked longer when the experimenter reached for the old cloth, suggesting that they understood the reach for the cloth as a means to achieve the ultimate goal, the toy. Understanding the goal of a sequence of actions is useful because it can help infants track the abstract goals that organize sequences of actions and understand indirect actions like tool use.

Goals Are Independent of Actions

An important element of understanding intentions is the realization that a person's intentions are independent of his or her particular actions. This realization allows individuals to extract meaning from a person's actions even when the intended action is not successfully completed. Evidence from imitation studies (see Box 2) demonstrates that, by 18 months, infants infer and imitate the intended actions of others (Hamlin et al., in press; Meltzoff, 1995). Understanding that actions are guided by intentions also allows individuals to differentiate between accidental and purposeful actions. Consider our example of Brandon and the basketball. If Brandon's father had ducked to avoid being hit by another ball thrown in his direction, rather than accidentally tripping, Brandon might infer that his father's action was intentional. Evidence suggests that, by 14 months, infants understand the difference between accidental and purposeful actions and selectively imitate only those actions they interpret as intentional (Carpenter et al., 1998). Further evidence suggests that 9-month-olds interpret actions differently depending on the context in which they occur (Behne, Carpenter, Call, & Tomasello, 2005; Gergely, Nadasdy, Csibra, & Biro, 1995).

In summary, the evidence suggests that, between 6 and 18 months, infants see others' actions as driven by intentions. With this foundation, infants can make sense of many of the actions produced by the people in their social worlds.

Actions Are Informed by Perception and Attention

TO THIS POINT, we have highlighted studies in which the actions have involved a direct physical relation between the action and goal-object (e.g., a person grasping an object). A second critical component to understanding intentions is the appreciation that a person's attention is linked to their actions. To illustrate, Sadie's mom was not referring to the object that she was holding, nor was it the object that Sadie was holding—it was the object at which she was looking. If Sadie only understood intentions in terms of physical relations between actions and goals, she would have assigned the new word to the object her mom was holding. However, Sadie, being like most 18-month-olds, was able to use her mom's eye gaze as an index of her attention and correctly determine that she was referring to the truck. In doing this, it is evident that Sadie understands that people's actions are guided by their attention. This knowledge about others' attentional states has its roots in the first year of life.

Box 1: Visual Habituation and Dishabituation Experiments

In this visual habituation study, Woodward (1998) examined whether 6-month-olds understand a simple reach as directed toward an object (and not simply as a physical motion).

First, infants were repeatedly shown trials in which a hand reached for one of the two toys (i.e., habituation). Infants were shown this event until they became bored (indicated by a decrease in time spent looking at the event).

In test events, the placement of the toys was switched. Infants then saw alternating trials in which the hand either reached for a new toy in the same place (i.e., new object) or the old toy in a new place (i.e., new side).

Infants looked longer to the new object trials than in the new side trials. Because infants look longer to events they see as novel, the longer looking to the new object trials suggests that these infants thought the object the hand grasped in habituation, rather than the place the hand reached, was the critical component.

However, one reason why infants may have looked longer to the new object trials is because they believe any two objects that they see paired together are linked (e.g., maybe infants just thought that the hand and bear "went together," not that the hand's action was directed at the bear).

To test this possibility, a second group of infants saw a claw perform the same actions as the hand. If infants were simply linking two objects (i.e., the claw and the bear), they should still look longer at new object trials (when the claw is now "grasping" the bear). Conversely, if they saw the actions of the human hand as directed at an object in the original condition, they should not look longer at either of the test trials in this case because the actions of an inanimate object like a claw are not driven by intentions.

Infants did not look longer to either test event.

In conclusion, 6-month-olds view human reaches as directed at goals but do not see the actions of inanimate objects as goal directed.

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Habituation



New Object



New Side



Habituation



New Object



New Side

BOX 2: IMITATION EXPERIMENTS

In this imitation study, Meltzoff (1995) examined whether 18-month-olds would imitate an intended action even when it was not fully completed.

Infants saw an experimenter either succeed at pulling apart a dumbbell or try to pull the dumbbell apart (but fail to do so). If the infants imitated only the physical actions that they saw, they would pull the dumbbell apart in the case when the experimenter succeeded but not when she failed. On the other hand, if they understood that the experimenter intended to pull the dumbbell apart even when she failed to do so, they would pull the dumbbell apart in both cases.

Infants imitated the “goal” of pulling the dumbbell apart both when they saw the completed action and the failed attempt, indicating that they viewed the action as intentional.

One possible reason infants might imitate the goal of pulling apart the dumbbell is because the physical movements provide a cue to the target action (i.e., this is what you do with this).

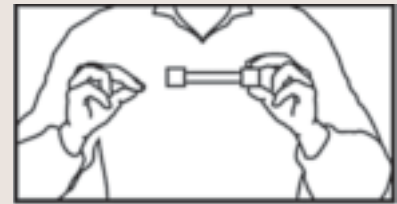
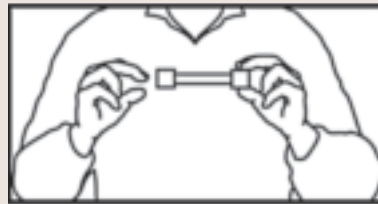
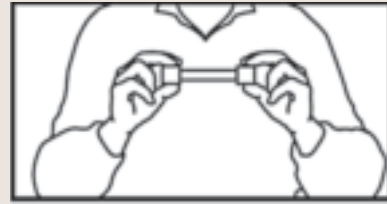
To test this possibility, in a control condition, infants saw mechanical pincers perform the same actions as the human.

If infants were using physical cues to predict the target action, they would still pull the dumbbell apart in this condition. If, instead, infants' actions in the previous condition were driven by their interpretation of the human action as intentional, they should imitate the physical action in the case when the pincers fail to pull the dumbbell apart.

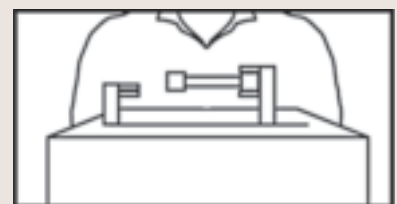
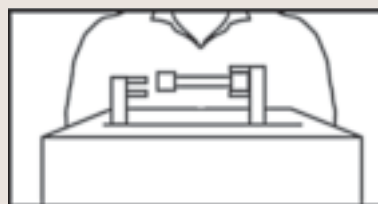
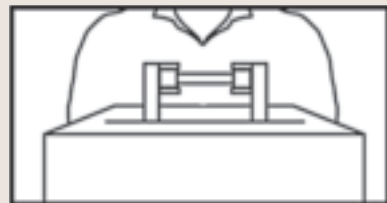
Infants only imitated the action of pulling the dumbbell apart when the pincers successfully produced this action.

In conclusion, 18-month-olds saw the human's failed attempt as intentional but did not see the same action produced by a mechanical device as intentional.

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Failed Human Attempt



Failed Mechanical Attempt

Gaze direction is perhaps the most prevalent and useful index of an individual's attentional focus. As adults, when a person turns his or her head and looks in a different direction, it is assumed that this individual is doing so in order to look at something. Evidence suggests that infants as young as 6 months use their eyes to follow gaze (Butterworth & Jarrett, 1991; D'Entremont, Hains, & Muir, 1997; Scaife & Bruner, 1975). Although infants' early gaze following may not truly reflect the understanding that changes in gaze result in changes in what people are attending to (Moore & Corkum, 1994), evidence from our laboratory and others suggests that this understanding emerges before infants' first birthdays.

In a series of visual habituation studies, our group set out to clarify whether infants understand the invisible connection between an individual's attention and his or her goal (Brune & Woodward, 2007; Woodward, 2003; Woodward & Guajardo, 2002). For example, infants were repeatedly shown an event in which an actor turned her head and looked at an object (Brune & Woodward, 2007; Woodward, 2003). For the test trials, the locations of the objects were switched and, for each trial, the actor looked to the same object as before (new direction) or at a different object (same direction). Although the 7-, 9- and 12-month-old infants all followed the actor's gaze (i.e., looked at the same object as the experimenter), only the 12-month-olds looked longer at the test events in which the person was looking at the different object. These findings offered the first direct evidence that, by 12 months, infants understand that people look at things in the world. Recently, Johnson, Ok, and Luo (2007) showed that infants as young as 9 months view gaze as goal directed in certain contexts.

Actions Are Guided by Attention

As adults, if a man is seen looking toward a coffee cup, one might make a number of inferences about his intentions (e.g., he might be thirsty or want to clean up) or about what he might do with the cup (e.g., raise it to his mouth or put it in the recycling bin). Evidence suggests that infants come to appreciate the relation between attention and action soon after they realize that a person's attention is directed at things in the world (e.g., Phillips, Wellman, & Spelke, 2002; Sodian & Thoermer, 2004). To illustrate, Phillips et al. examined whether 8- and 12-month-olds could use an actor's gaze to predict her subsequent actions. Infants were habituated to two scenes. In the first scene, an actor looked and smiled at an object. In the second scene, the actor held and looked at the same object. For the test trials, infants



PHOTO: MARILYN NOLT

saw the actor gaze at one object and then hold either the same object that she had previously gazed toward (consistent) or the other object (inconsistent). The 12-month-olds showed increased attention when the actor's attention was directed at a different object than the one she picked up. Eight-month-olds did not show this pattern, suggesting that they were unable to detect the oddity of looking at one object but acting on another. Thus, by 12 months, infants appreciate that information about a person's attention can be useful in predicting their subsequent actions.

Action Is Guided by Perceptual Experience

To fully interpret a person's intentions, it is important to determine whether a person is actually able to see something and realize that her perceptions may differ from another person's. To illustrate, recall that Sadie's mom was looking at a truck when she produced the new label. Consider how Sadie's interpretation of her mom's intentions would be affected if she could see two unfamiliar objects in the general direction of her mom's focus of attention, but one of the objects was on the ground outside of the sandbox (out of her mom's sight). In this case, to determine the correct word-object pairing, Sadie would have to realize that her mom could not see the object that was on the ground and, thus, infer that the word was referring to the object that her mom could see.

Adults can quickly determine whether a person has perceptual access to some information and what the person is likely to know. Evidence suggests that infants between 12 and 18 months of age can identify situations in which a person's perceptual access is limited (Brooks & Meltzoff, 2002; Moll &

Tomasello, 2004). Particularly impressive are the findings that infants can do this even when they have experienced something that the actor has not (Luo & Baillargeon, 2007; Onishi & Baillargeon, 2005; Tomasello & Haberl, 2003). To illustrate, Luo and Baillargeon showed that 12½-month-olds consider whether, or not, an actor had previously seen an object when they are inferring the actor's intentions. Infants watched an actor repeatedly reach toward one of two objects. The critical manipulation was whether the actor could see both objects during this phase (the infant could always see both objects). For half of the infants, the actor could not see one of the objects because it was hidden behind an opaque barrier. At test, the actor reached toward either the same object or a new object. The findings revealed that infants took into account the perceptual experience of the actor; infants looked longer at test events in which the actor grasped the new object, but only when the actor had previously seen both objects. Thus, when the actor could see only one object in the introduction phase, infants seemed to appreciate that they had no basis to predict which object she would want at test (when both were available). Thus, by 13 months, infants can identify when a person's perceptual access might be limited and use this information to predict their future actions.

Summary: Intentions, Attention, and Action

The findings reviewed thus far offer converging evidence that, by their first birthdays, infants understand quite a bit about intentions, attention, and action. By 6 months, infants understand that actions are directed at goals. Between 9 and 12 months, infants



PHOTO: EMILY J. RIVERA

come to appreciate that attention is directed at things in the world. By 14 months, infants have a good grasp (no pun intended) of when actions are intentional and use this information in a number of important ways. With these pieces of intention understanding in place, infants can make sense of others' intentions in a multitude of contexts. However, a complete understanding of intentions requires the appreciation that, although intentions belong to specific individuals, there are some ways of acting that are shared by all individuals within a group. Existing evidence suggests that 13-month-olds make such distinctions.

Intentions Belong to Individuals

CONSIDER A SITUATION in which an infant sees his father enter the kitchen looking frazzled. His father, who has misplaced his keys, proceeds to open and look in all of the cupboards and drawers. Seconds later, mom enters to make some lunch. She proceeds to open the refrigerator. Although his parents are both completing similar actions within a similar time frame, the infant should not assume that they share the same goal. This is because the actions of one parent do not provide information about the intentions of the other. This example highlights a critical feature of intentions: Intentions reside within individuals. As this is the case, paying attention to the person carrying out an action is critical for a complete representation of intentional action. Understanding the important link between an individual and his or her intentions helps infants learn how to extract important information as actions are occurring (e.g., who did what when). Furthermore, understanding that intentions belong to particular individuals

may be a precursor to understanding intentions as internal, mental states.

Recent findings from our group suggest that infants as young as 9 months appreciate the individual and specific nature of intentions (Buresh & Woodward, 2007). In this study, 9- and 13-month-olds repeatedly saw an event in which a male actor reached toward one of two objects, in a habituation paradigm similar to the one described in Box 1. One group of infants participated in habituation and test events with the same actor throughout the study. Another group of infants saw a different actor in test trials than they had seen in habituation. If infants appreciate that intentions reside within individuals, they should not assume that a different actor would grasp the same object that the habituation actor grasped. In this experiment, infants who saw the same actor throughout looked longer when he grasped a new object. In contrast, infants who saw a different actor at test did not look longer on either of the test trials. Thus, by 9 months, infants do not expect different individuals to have the same goal. These findings converge with those from other groups, suggesting that, by age 2, infants track the intentions of individuals (Moll & Tomasello, 2007; Onishi & Baillargeon, 2005; Tomasello & Haberl, 2003) and understand that it is inappropriate to extend one person's intentions to another (Graham, Stock, & Henderson, 2006; Henderson & Graham, 2005).

Shared Actions Within a Group

MANY ACTIONS THAT infants observe on a daily basis are driven by the intentions of individuals, but there are other actions for which it is acceptable (and actually expected) to extend actions

to a group. To illustrate, we return to Sadie, whose mom provided a label for an unfamiliar object. Although her mom may have her own intentions as to why she labeled that particular object, the form of her action (the labeling utterance) can and should be extended to other individuals. This is because words are conventional—the members within a given linguistic community share knowledge of what words mean and how they are used (Clark, 1983, 1993). If Sadie appreciates that labeling actions should be shared by others, she would generalize the word-object pairing across individuals (and use this label when talking to others; see Sabbagh & Henderson, 2007).

There is a growing body of evidence suggesting that very young children appreciate that word meanings can be extended to other individuals (Buresh & Woodward, 2007; Graham et al., 2006; Henderson & Graham, 2005). For example, Buresh and Woodward examined whether 9- and 12-month-olds appreciate that object labels are extended across individuals. In these studies, infants were habituated to an event in which an actor provided a novel label (i.e., “A modi. A modi.”) before grasping one of two objects. The test events were performed by either a different actor or the same actor from habituation. If infants appreciate that object labels are shared among individuals within the same language group, it was predicted that infants would look longer when the actor used the same word to refer to a different object, regardless of which actor completed the test events. Twelve-month-olds, but not 9-month-olds, looked longer when the test actor grasped the new object after producing the object label, regardless of the actor. Thus, by 12 months, infants distinguish between actions that reside within an individual and actions that are shared. These findings are particularly compelling because they suggest that infants do not see all intentional action in the same way.

In addition to implications for language development, infants' ability to identify actions that are shared by members of a group is important for social learning, one of the primary engines of cultural transmission (Csibra & Gergely, 2006). For instance, infants' ability to identify actions that are shared might play an important role in infants' acquisition of tool use and social rituals. Because the form of shared actions is critical, infants might attend to the form of the action being carried out rather than to the person completing the action if they know it is conventional. Infants' ability to identify actions that are shared demonstrates that infants' social intelligence provides the basis for acquiring social knowledge that is appropriate for the diverse communities in which infants live.

Conclusion

WE HAVE OFFERED a significant amount of evidence that the origins of human social intelligence can be traced to the first 12 months of life. By their first birthdays, infants come to understand three key aspects of human action (see Box 3 for ideas about how this understanding might develop).

1. Infants understand that human action is intentional and goal directed.
2. Infants appreciate that a person's attention is an important piece to identifying their intentions.
3. Infants appreciate that intentions are characteristics of individuals, but that certain actions are shared or are conventional forms of behavior.

These basic insights into human actions provide a foundation for toddlers' robust ability to learn from social partners. With an understanding of intentions, toddlers can apply their skills to learn about the meanings of new words (Akhtar & Tomasello, 2000; Baldwin, 1993; Bloom, 2000; Tomasello & Haberl, 2003), identify the referent of a person's emotional expression (Baldwin & Moses, 1996; Moses, Baldwin, Rosicky, & Tidball, 2001), and interpret others' behavior in increasingly complicated contexts (e.g., comprehension of sarcasm). Thus, within the first 2 years of their lives, infants develop a fairly sophisticated understanding of human action from which they can acquire the skills that are necessary to become functional members of their communities and species. ♀

Box 3: A Socially Smart Baby

Typically developing infants attain basic insights into others' intentions regardless of variations in their particular experiences. Some scientists infer from this that social intelligence must draw heavily on innate abilities. However, it is also possible that infants' social "smarts" derive from the common experiences all infants share. In particular, infants across the globe have their own goals and work hard to achieve them. For example, 4-month-olds work hard to get their hands on interesting objects, and older infants improvise with tools to obtain things they cannot directly grasp with their hands. Recently, we have begun to test whether these experiences controlling their own goal-directed actions provide infants with insight into others' goal-directed actions.

Three-month-olds do not typically understand a basic grasp as goal-directed and also do not produce well-organized reaches on their own. In a study by Sommerville, Woodward, and Needham (2005), 3-month-olds were given "sticky mittens" (mittens with Velcro on them) to wear while interacting with toys that were covered in Velcro. After experience apprehending the toys using the "sticky mittens," infants' responses to habituation events (as in Box 1) revealed that they now viewed others' reaches as goal-directed. In addition, infants who spent more time reaching for the toys with the mittens were more likely to understand that grasp was goal-directed in the habituation paradigm.

Other studies have shown that older infants trained to use a novel tool subsequently understand the goals behind others' tool use actions (Sommerville et al., in press). New work in our laboratory suggests that infants' own actions provide particularly powerful insights into the goals behind others' actions. Infants learn more from their own actions than from observing others'.

Together, these findings reinforce an important fact about development—infants create rich learning experiences for themselves routinely in their everyday actions. The best way to foster an infant's social cognitive development, or development in general, is to give him many opportunities to explore and act on the world.

ANNETTE HENDERSON, PhD, is a postdoctorate research fellow at the University of Maryland. Her research investigates the development of children's understanding of shared goals, such as linguistic conventions, and the role that this understanding plays in language development.

SARAH GERSON is a graduate student at the University of Maryland. Her research investigates the origins of infants' understanding of intentions in human goal-directed action. She is particularly interested in the mechanisms underlying infants' understanding of intentions and how experience affects this development.

AMANDA WOODWARD, PhD, is professor of psychology at the University of Maryland. She investigates infant social cognition and early language development. Her work has been recognized by several awards including the John Merck Fund Young Scholars Award (1994), the American Psychological Association (APA) Boyd McCandless Award (2000), and a James McKeen Cattell Sabbatical Fellowship (2003–2004). She is a fellow in Division 7 of the APA and of the Association for Psychological Science.

Learn More

INTERNATIONAL SOCIETY ON INFANT STUDIES
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The International Society on Infant Studies is a not-for-profit professional organization devoted to the promotion and dissemination of research on the development of infants. Membership in the society is open to anyone with an advanced degree in any discipline related to infant development.

MARYLAND INFANT STUDIES LABORATORY
www.bsos.umd.edu/psyc/woodward/lab/index.html

The Maryland Infant Studies Laboratory is directed by Amanda Woodward. The researchers investigate babies' understanding of the social world and how babies make sense of other people's actions.

OTHER INFANT LABORATORIES CITED IN THE ARTICLE

- Dare Baldwin's Lab:
<http://baldwinlab.uoregon.edu>
- Andrew Meltzoff's Lab:
http://ilabs.washington.edu/meltzoff/about_the_lab.html
- Jessica Sommerville's Lab:
<http://depts.washington.edu/eccl>
- Michael Tomasello's Lab:
www.eva.mpg.de/pscho/kids/kids_research.html

Play = Learning: How Play Motivates and Enhances Children's Cognitive and Social-Emotional Growth
Edited by Dorothy Singer, Roberta Michnick Golinkoff, and Kathy Hirsh-Pasek (2008)
New York: Oxford University Press.

This anthology consists of a wide variety of essays on the benefits of play for children's development and learning.

What's Going on in There? How Brain and Mind Develop in the First Five Years of Life

By Lise Eliot (2000)
New York: Boston

Written by a neuroscientist, this book offers a comprehensive overview of current scientific knowledge about infant and early childhood brain development.

The Scientist in the Crib: Minds, Brains, and How Children Learn

By Alison Gopnik, Andrew Meltzoff, and Patricia Kuhl (1999)
New York: Morrow

The authors provide a summary of what researchers have discovered about early cognitive development and attempt to dispel common myths.

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Baby Steps on the Road to Society

Shared Intentionality in the Second Year of Life

MIRANDA GOODMAN

University of California, Davis

MICHAEL TOMASELLO

Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

An 18-month-old and her mother are in a laboratory playroom with another adult who is attaching towels to a clothesline. The experimenter drops one of the clothespins, makes a sound of dismay, and reaches over the clothesline but cannot retrieve the clothespin. In a moment, the toddler steps away from his mother, takes the clothespin from the floor, and hands it to the adult. Later in the day, another child of the same age watches as the same adult hangs towels on the clothesline, but this time he deliberately drops the clothespin without making any attempt to retrieve it.

This child does nothing to retrieve the clothespin.

Why the difference? In each case, there was a lost object and a child who could assist. However, the adult in the first situation conveyed his need of the lost clothespin to complete his task, whereas this need was not apparent in the second. Remarkably, the toddlers in each situation correctly “read” the need and responded appropriately (Warneken & Tomasello, 2006).

In another experiment, a 2-year-old and his mother watch as two experimenters demonstrate a cooperative task. In the “elevator” task, the adults stand on opposite sides of a partition while one pushes an object through a tube from one side for the other to retrieve the object from the opposite end. When the child is invited to participate with one of the adults, he readily does so and knows what to do. Then something unexpected happens. After having been a cooperative partner, the adult no longer does his half of the task. He watches passively while the child pushes the object through the tube. The toddler looks at him, gestures toward the tube, and says, “Get it!”—as do many other children of the same age. Even many 18-month-olds try to get the adult to participate appropriately. It is interesting that when this experiment was repeated with chimpanzees, the chimps showed very little interest in reinstating the shared activity (Warneken, Chen, & Tomasello, 2006).

Research studies such as these are showing that, early in life, humans are uniquely attuned to the psychological experiences and intentions of other people. We can identify this psychological understanding as being uniquely human because our nearest primate kin are not equally adept at the types of cooperative activities described earlier. This attunement paves the way for many distinctively human skills and behaviors, one of the most significant of which is *shared intentionality*. Shared intentionality refers to collaborative activity in which participants share psychological states with one another (Tomasello & Carpenter, 2007). Such interactions range in complexity from the types of simple collaborations described earlier (e.g., assisting another person in completing a task, taking part in cooperative activity) to creating and agreeing on systems of government or religion (Tomasello & Carpenter, 2007). Early in life, shared intentionality sets the groundwork for critical developmental milestones such as language development and the emergence of pretend play. It is the foundation of social understanding.

Beginning at approximately 9 months of age, infants are becoming aware that others are unique individuals equipped with unique perspectives that motivate their actions and intentions. Infants learn that these perspectives can be followed (e.g., the baby looks at

what the adult is looking at), shared (e.g., both adult and baby turn their attention to a source of common interest), and even directed (e.g., the baby gets the adult to gaze at an object that has captured her own interest), yet infants of this age are frequently not given credit for their emergent psychological understanding. The more commonly held perspective among psychologists and practitioners alike is that young children are tightly shackled to their own point of view and, therefore, incapable of understanding the perspectives of others. Indeed, many developmental psychologists have argued that it is only when children reach 4 years of age and begin to develop “theory of mind” (e.g., understanding that others can hold beliefs

Abstract

From a surprisingly young age, children are capable of a level of sophisticated social understanding and interaction for which they are rarely given credit. Indeed, beginning as early as 9 months, children are gaining the skills needed to become active members of the unique culture and society into which they are born. This article explores the developmental trajectory of shared intentionality—collaborative activity in which participants share psychological states with one another—which starts infants on the road to full participation in human society in the second year of life. A better understanding of infants’ capabilities in sharing intentions with others will lead to richer and more appropriate interactions with them.



that are not true in reality) that they truly recognize others as psychological agents.

Such an underestimation of the social-cognitive skills of infants is not insignificant. If we believe that a child is incapable of seeing from any perspective other than his own or unable to truly share emotional states with people, we may underestimate the baby's true capacity for shared intentionality. We may miss how much infants and toddlers are striving to understand the intentions and goals underlying our own behavior as they seek to understand why people act as they do, and we may miss their efforts to integrate their own actions into ours. An 18-month-old can be a ready and willing participant, for example, in simple clean-up tasks (e.g., handing his caregiver his dirty dish after recognizing that this is what she wants him to do) but will not be able to do so if the caregiver quickly sweeps through clean-up herself. The better we understand the psychological development of young children, the richer our interactions with them will be, and the better we will be able to effectively support their future growth.

Learning About Others' Attention and Intentions

HUMANS ARE NOT BORN fully capable of shared intentionality. Much of its development takes place during the "9-month revolution," (Tomasello, 1995) during which time children acquire and begin acting on their understanding of other individuals as intentional agents. It is during this time that infants gain the critical (and uniquely human) ability to understand that individuals can attend to and perceive their environment both deliberately and selectively. They may choose which specific aspects of a situation to focus on and which to

ignore (Tomasello & Rakoczy, 2003). Such an understanding of attention (along with the understanding of intention that accompanies shared intentionality) allows for joint attentional activities. Imagine, for example, that a mother is walking toward her 12-month-old infant with a big smile, which the infant is reflecting back at her. Suddenly the mom stubs her toe, and her attention shifts to rubbing it while wincing painfully. The infant responds to this change in both attention and affect and begins grimacing while looking at her mom's foot. As this example illustrates, it is at this time that infants become capable of "tuning in" to the experiences of others—both others' attention and their intention.

It is important to note that the 9-month revolution emerges between the period of approximately 9–12 months. It would be well within the normal developmental range for a 9-month-old to be not yet capable of the behaviors and interactions described here. Furthermore, these skills continue to develop and increase in sophistication throughout the first 2 years of life, as demonstrated by the research examples given here.

Developmental Antecedents to the 9-Month Revolution

Although shared intentionality emerges around the time of a child's first birthday, we can identify its developmental antecedents in infants as young as 2 to 3 months old. A very young infant will attempt to share her emotional states with others (e.g., crying) to signal her distress. Emotion-sharing becomes more sophisticated, however, at approximately 6 months, when infants are no longer simply expressing their emotions to another person but instead begin to take turns exchanging emotions back and forth. A 6-month-old

interacting with her adult caregiver may be observed smiling immediately after her caregiver smiles, then shifting to a concerned expression if her caregiver has done likewise. This kind of emotion turn-taking indicates that the infant is capable of interacting reciprocally with other people (Trevvarthen, 1979). The animated sharing of gaze, smiles, touches, vocalizations, and excitement between a baby and an adult caregiver in face-to-face play richly illustrates this kind of dyadic interaction during the middle of the first year.

Triadic Interactions

Although infants as young as 6 months may be able to interact dyadically, an important change brought about by the 9-month revolution is the rise of *triadic* interactions. A triadic interaction involves the baby, an adult, and some third party with which the child and adult interact together. For example, a game of rolling a ball back and forth can be considered a triadic activity because it involves an infant and adult acting together with the ball (Warneken et al., 2006). Shared intentionality is a necessary component of triadic interactions, as the child must be able to understand that the adult has specific intentions toward the object with which they are interacting.

Imagine a triadic interaction in which a 1-year-old baby wants an adult to retrieve a jack-in-the-box sitting among other toys on the floor. The infant may direct his gaze toward the desired toy and reach toward it, which cues the adult where to focus his own attention. An important skill that emerges during the 9-month revolution is that of gaze following, which enables the baby to reliably look where the adult is looking and, likewise, to cue the adult with his own gaze. Once the adult has retrieved the jack-in-the-box, he then demonstrates for the infant how to wind the handle to make the toy work. If the baby is able to copy the adult's actions, then he has achieved another important skill of the 9-month revolution—imitative learning, which refers to the ability of a baby to act with objects in the way adults are acting with them. This means that the infant adopts the intentional actions of the adult (trying to get the toy to work), even if their actual actions are slightly different (the adults winds fast, and the baby winds slowly).

Of course, winding a jack-in-the-box results in a puppet suddenly popping out, accompanied by a burst of noise that can be frightening to a young child. The baby may look to the adult to see how he has responded to the outburst. If the adult does not exhibit a fear response, but instead shows pleasure and excitement, the baby may respond likewise. In doing so, the child has demonstrated social referencing, which is another achievement

of the 9-month revolution. (Walden & Ogan, 1988). Social referencing is when infants look to trusted adults for emotional cues to help them determine how to respond to uncertain or ambiguous situations. It aptly illustrates the baby's capacity for triadic interactions at the end of the first year.

Research Example

How do we know that triadic interactions emerge so much later than dyadic interactions or that we can infer that the baby has an understanding of shared intentionality? An example from the lab helps to elucidate both of these issues (Carpenter, Tomasello, & Striano, 2005).

A group of 12- and 18-month-old infants participated in a series of dyadic and triadic interactions requiring the infants to use role-reversal imitation in response to the actions of an adult partner. During the dyadic interactions, the adult performed a simple action, such as nose tapping, on either herself or the toddler. The adult then gestured to indicate that the toddler should perform the demonstrated action. The experimenters were interested in determining whether the children would imitate the action using role reversal (i.e., infants tapping the adult's nose if the adult had tapped theirs). Using role-reversal imitation would demonstrate that the toddler understood the intentions of the adult's actions (i.e., to perform a task on the other person), rather than simply mimicking their direct behavior literally (i.e., the child tapping on the exact same place that the adult tapped; namely, her own nose; Carpenter et al., 2005). Role-reversal imitation illustrates the child's engagement with the adult in a shared activity with complementary roles, both of which the child comprehends.

Several types of triadic interactions were also tested. The first involved imitation but not role reversal. The adult demonstrated for the child how to hide a small toy under a piece of cloth. The adult then handed both the cloth and the toy to the child and said, "It's your turn now." Triadic role-reversal tasks involved the use of two objects that needed to be put together (i.e., placing a block into a cup). The adult first demonstrated how the objects fit together; then she offered one piece of the toy to the child (the block) while holding out the other piece (the cup) to see if the child would put them together. Role reversal was tested by handing the child the opposite piece (the cup) to see if she would offer it to the adult so that the adult could put the block inside (Carpenter et al., 2005).

The findings indicated that, although children of both ages were capable of some types of role-reversal imitation, triadic role reversals were much more challenging for the 12-month-olds than they were for the 18-month-olds. The 12-month-olds were



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capable of tapping the adult's nose after the adult had demonstrated tapping on the child's own nose (dyadic role reversal) but much less capable of extending the cup toward the adult in triadic role-reversal situations. This was not surprising: Triadic role reversal requires coordinating not only the perspectives of oneself and another person, but also each person's action toward another object. Nevertheless, how remarkable that even 1-year-olds can understand an adult's intentions enough to *reverse* roles in their dyadic imitations (Carpenter et al., 2005).

Pointing

The types of triadic interactions described earlier—relying on the infant's ability to engage in gaze following, imitative learning, and social referencing—all require the infant to tune in to the attention and behavior that adults direct toward some third party (Tomasello & Rakoczy, 2003). What happens, however, when infants want the adults in their lives to tune in to what captures their own attention? It is not surprising that around the same period when infants are learning to follow the attention of their adult partners, they are also learning to communicate their own interests to others.

Obviously, it is easiest to direct another's attention through language (e.g., "Look at that black dog!"), but even preverbal infants are capable of expressing their interest and attention. This is primarily accomplished through communicative gestures, such as pointing, which emerge when the infant is approximately 12 months old. Instead of verbally identifying the black dog that has captured her attention, an infant can instead point her finger at it. Shared intentionality is a necessary prerequisite for meaningful

communication through gestures. Shared intentionality is predicated on the sharing of psychological states between partners. With her pointing finger, the infant is communicating her psychological state (interest in the dog) to her adult partner (Tomasello & Carpenter, 2007). Of course, as the child develops greater linguistic skills in the second year of life, her communicative abilities will correspondingly increase. In this way, pointing and other gestures are a developmental antecedent for later language use, as they represent the next step in the infant's attempt to communicate with her social partners. What began as the simple expression of emotion states at 3 months (e.g., crying when upset) and evolved into dyadic communication at 6 months (e.g., the infant taking turns expressing emotions with a partner) has become a triadic interaction (referring to another object or person) that will increase in sophistication throughout the second year of life.

Even at this early preverbal age, infants' communication takes place on a mental level. This is illustrated by the fascinating phenomenon of pointing to absent referents. Just as an adult may point to her own empty glass to request more drink or point to the place where something is missing, infants will do this as well, even before they can talk. For example, in the laboratory, infants love to point at dancing dolls on the wall. When they have disappeared, infants often point to the location anyway—perhaps requesting that they come back. The use of gestures shows that even preverbal communication goes beyond directing attention to concrete things in the here and now; it can also be aimed at adults' ability to imagine absent things (Tomasello, 2007).



Development in the Second Year

THE 9-MONTH REVOLUTION lays the groundwork for future development in many domains of social understanding and interactions. Throughout the second year, the ability to understand others' intentions and goals, to communicate one's own intentions and goals, and to engage in cooperative and collaborative interactions continues to develop. In some cases, the development is a process of growth in skill and understanding: For example, an 18-month-old will be more likely to successfully coordinate her cooperative actions with an adult than will a 14-month-old (Warneken et al., 2006). In other domains, such as language development, it may appear as if children are undergoing a major qualitative transformation. It is important to remember, however, that even as children rapidly change from nonverbal to talkative, they are building upon pre-existing skills (e.g., communicative gesturing) that arose, in part, during the 9-month revolution.

Language Development

Communicative gesturing gives infants the power of expressing what is immediately capturing their interest, but it can do little to express more complex thoughts or feelings, or concerns with the past or future. You can point to the black dog but not explain, "I saw a black dog yesterday." In contrast, linguistic symbols, such as words, have evolved to give humans the ability to direct attention in very specific ways. These symbols are culturally specific (what indicates *dog* in one society may not in another) and are also essential to the expression of cultural standards and perspectives. During the second year, children begin expressing the linguistic symbols

of their culture with ever-increasing frequency.

How does a child learn the language of her culture? It is primarily through their exposure to language from the adults in her life. If a child goes for a walk with her father every day, and each time they pass the yard with the black dog her father says, "Look at the dog!" while directing his attention in the dog's direction, the child will eventually learn that Daddy makes that particular series of noises when he wants her to notice the dog. Stated differently, her father's *intention* in making those noises compels her to notice the dog. This is why shared intentionality is a critical antecedent for the development of language. The child must understand the adult's communicative intentions to be able to put the right linguistic symbols together with the right objects.

When the child begins recreating words herself, she is engaging in a form of imitative learning at the cultural level. She knows Dad makes the sound "dog" when he wants to direct her attention toward that furry creature, and now when she wants him to look at the same thing, she should make the same noise. This form of imitative learning also requires role reversal: The child now wants to direct her father's attention precisely as he has directed her own attention in the past (Tomasello & Rakoczy, 2003).

Pretend Play

Shared intentionality is a developmental antecedent to language and also to pretend play. Imagine that a 3-year-old child and her mother are in the kitchen when the mother picks up a banana and begins talking into it as if it was a telephone, pausing as if having a conversation with another person. The

child laughs, then grabs the banana from her mother and begins to babble into it. The child has understood that, in this moment, Mom *intends* that this banana should serve as a telephone and not in its usual function as food. The child has also decided to play along with this new, imaginative use of a banana (Tomasello & Rakoczy, 2003).

Research supports the claim that pretend play is an outgrowth of shared intentionality. Surprisingly, there is virtually no evidence that children under the age of 2 years spontaneously engage in solo acts of pretend play. When brought into a lab and given the opportunity to use a variety of objects symbolically, children younger than 2 almost never did so without first seeing another person do likewise. Furthermore, when pretend play occurred, it was frequently accompanied by eye contact and shared smiles with the adult in the room. This suggests that the children were aware that they were working together with the adult to create a pretend reality where objects could take on imaginative new functions (Tomasello & Rakoczy, 2003).

The Broader Implications of Shared Intentionality

AS WITH ANY SIGNIFICANT developmental milestone, such as learning to walk or talk, shared intentionality is not something that the infant achieves and then quickly moves beyond. The

Learn More

ALTRUISTIC HELPING IN HUMAN INFANTS AND YOUNG CHIMPANZEES

Felix Warneken and Michael Tomasello
Science Magazine, March 2006, pp. 1301–1303
<http://www.sciencemag.org/cgi/content/full/311/5765/1301/DC1>

This Web site offers video footage of some of the experimental procedures described in this article. The authors show that human children as young as 18 months of age readily help others to achieve their goals in a variety of different situations.

THE CULTURAL ORIGINS OF HUMAN COGNITION

Michael Tomasello
1999, Harvard University Press

This book, written by article coauthor Michael Tomasello, expands on the concept of "shared intentionality" in much greater detail. Dr. Tomasello describes how many of our uniquely human characteristics, such as language and elaborate cultures, are outgrowths of this early capacity to recognize other humans as intentional agents.

ability to recognize others as intentional agents and to work collaboratively with them has a profound effect on how young children view the world, as well as on how they become socialized into the unique culture into which they are born.

Taking a Bird's-Eye View of the World

Let us return to the study in which infants were asked to perform role reversal imitation on the triadic task of placing two objects together. By 18 months, most infants were capable of reversing back and forth between the roles. We have argued that children are seeing the collaboration from a bird's-eye view in which all roles, including their own, are seen in the same impersonal way. The infant can see the shared goal (putting the objects together) as well as each separate role (putting or holding; Tomasello, 2007).

This bird's-eye view of the world extends beyond simple collaborative activities. As adults, for example, we may apply this view to how we understand our role in the workplace, where colleagues take on different roles to achieve the shared goal of creating some sort of product or service. With the growth of shared intentionality comes a new way to view our activities within the social world, which extends beyond infancy and throughout adulthood.

Outcomes of Shared Collectivity

In a sense, shared intentionality can be seen as the psychological foundation on which culture is built (Tomasello & Carpenter, 2007). It is what allows the seemingly arbitrary artifacts of our society (e.g., green pieces of paper with pictures on them) to take on meaning and significance (those green pieces of paper can actually be used to obtain

valuable things). At approximately 4–5 years of age, children begin participating in what can be called *collective intentionality*, which shifts shared intentionality from what is exchanged between two individuals to a much broader set of cultural standards and perspectives—learning not just how to do things but how one ought to do them to meet cultural expectations and norms. When considered in this broad view, it becomes all the more remarkable that children as young as 9 months are already developing the capacity for shared intentionality. Even before their first birthday, children have begun the process of becoming fully engaged members of society. It is time that the adults in their lives begin giving them credit for it. ♪



PHOTO: JANET BROWN MCCracken

MIRANDA GOODMAN is a graduate student of psychology at the University of California, Davis. She received her BA in psychology from the University of California, Los Angeles. Her research focuses on attachment in early childhood.

MICHAEL TOMASELLO, PhD, is a developmental psychologist and the codirector of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. His research involves identifying the unique cognitive and cultural processes that distinguish humans from their nearest primate relatives, the great apes. His developmental research has focused on how human children become members of cultural groups and the uniquely human skills and motivations for shared intentionality: joint intentions, joint attention, prosocial motives, and social norms.

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How Infants Come to Learn About the Minds of Others

GABRIELA MARKOVA

MARIA LEGERSTEE

York University, Toronto, Canada

The ability to understand the minds of others plays a significant role in our interactions with others. That is, we need to understand that others can experience and act upon emotions, desires, or thoughts if we are to explain and predict their behavior. The ability to understand others' minds is an important accomplishment of early social and cognitive development. From birth, infants demonstrate an awareness of the minds of others by the way they initiate communication and respond to others during early social interactions. Over time, the affective relationships infants

establish with their caregivers help them deepen their understanding of how people think. That is, infants develop from having an awareness of emotions and intentions to understanding desires and beliefs.

Children have an adultlike understanding of states of mind by 4 years of age. By this age, they can acknowledge different perspectives and can understand that others may have beliefs that differ from their own (Perner, 1991; Wimmer & Perner, 1983). But what do children understand about the minds of others before they are capable of such complex insights? Research has shown that 2-year-old children begin to use language to refer to their own and others' emotions (e.g., "love") and desires (e.g., "want"; Bartsch & Wellman, 1995). Even before children can verbally express themselves, they show their understanding of others' perceptions, emotions, and intentions by using communicative gestures (Legerstee & Fisher, in press). Moreover, when 10-month-old infants see a person trying unsuccessfully to carry out an action (e.g., put an object in a container), they complete the person's failed attempts

(i.e., put the object into the container themselves; Legerstee & Markova, 2008). Thus, 10-month-olds understand the intentions of others. Even earlier in the first year of life, infants reveal their understanding of others' minds by sharing emotions with them during interpersonal exchanges (Legerstee & Markova, 2007). The Affect Sharing Model (Legerstee, 2005) provides a framework to explain how infants develop the awareness of another's mind through social relationships. According to this model, infants are born with three important predispositions that allow them to learn about the minds of others: (a) the ability to recognize people as similar to them, (b) the awareness of their own and others' emotions, and (c) the recognition of the caregivers' attunement to the infants' emotions and needs. The interplay between these three predispositions results in affectively attuned relationships that are an important mechanism for infants' development of an understanding of the minds of others (Legerstee & Varghese, 2001).

Early Social Interaction

FROM BIRTH BABIES SHOW a preference for human faces and voices: Newborns prefer face like patterns (Goren, Sarty, & Wu, 1975; Johnson, Dziurawiec, Ellis, & Morton, 1991; Johnson & Morton, 1991), spend more time looking at their

mothers' than at strangers' faces (Bushnell, Sai, & Mullin, 1989; Field, Cohen, Garcia, & Greenberg, 1984), prefer human speech over other sounds, and recognize the voices of their mothers over those of female strangers (DeCasper & Fifer, 1980). Moreover, infants as young as 1 week old exchange gazes, facial expressions, vocalizations, and movements with others in a reciprocal fashion. Such interactions have been labeled proto-conversations (Bateson, 1971), because they have a turn-taking structure that very much resembles adultlike verbal communication. These proto-conversations may start by the baby examining our face. As a response we start smiling and commenting on what the baby is doing. Our behaviors may in turn encourage the baby to also start smiling and vocalizing as if in response to our acts, which then may

Abstract

The ability to understand the thoughts and feelings of others develops remarkably early in infancy. At birth, infants demonstrate an early understanding of the thoughts and feelings of others by sharing emotions with their caregivers. These early affective exchanges subsequently facilitate the development of a more complex awareness of others, such as coordinating and directing the attention of others to interesting things in the world. Thus, the quality of early social relationships plays an important role in guiding the development of how infants understand the minds of others beginning in the earliest months of life.

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evoke another response from us: “What are you saying? Are you telling me a story?”

This example suggests that not only do adults interpret infant behavior as meaningful and communicative during early social interactions, but infants also perceive the adults’ acts as meaningful and respond appropriately. Such sharing of experiences is the essence of what Trevarthen (1979) calls *intersubjectivity*; namely, the “linking of subjects who are active in transmitting their understanding to each other” (p. 347). During interactive exchanges, each person has knowledge about the mind of his or her partner (and they communicate this understanding to each other). In the first few months of life infants engage in *primary intersubjectivity* (Trevarthen, 1979), which occurs during interactions between infants and their caregivers, and which consists primarily of exchanges of emotions through gazes and vocalizations in a rhythmic turn-taking pattern, as described in the example above. Accordingly, the infant’s main goal during these early interactions is to establish connections with others.

Developing Connections With Others

THERE ARE DIFFERENT OPINIONS about the way infants develop interpersonal relationships with others. For example, some theorists argue that intersubjectivity is a result of infants’ perception of social contingencies. Specifically, these authors propose that from birth infants are able to detect only the effect their own actions have in the world, which is important for the development of an awareness of the self (e.g., by kicking the sides of the crib I become aware of my feet), but it is not until 3 months of age that infants begin to be sensitive to the type of contingent interactions provided by others (Gergely & Watson, 1999). According to these theorists, infants do not orient toward people before the age of 3 months, and thus are not able to establish interpersonal connections with others for the first few months of life.

Other theorists propose that infants establish intersubjective connections with people by detecting similarities between own and others’ actions (Meltzoff & Moore, 1997, 1999). For example, even newborn babies are able to imitate simple actions they see others perform, such as opening the mouth or sticking the tongue out (Meltzoff & Moore, 1977). These imitative games that infants play with people are exciting for the infants. Meltzoff and Moore (1977) argued that imitation is an “attention getter” and through it infants begin to perceive others to be “like me.” These authors argued that the infant’s ability to recognize people as similar through imitation is part of a reciprocal communica-



Ten-month-old infant completes the unsuccessful action of an adult.

tion system that allows them to understand and sympathize with others, and thus lays the foundation for understanding others’ minds (Meltzoff & Moore, 1997).

We propose that infants’ connections with the social world develop through sharing experiences, such as emotions, with sympathetic adults. When infants’ communicative behaviors are reciprocated, infants perceive the relationship as attuned and they distinguish that the adult is not only “like me” but also “with me.” It is through this recognition that infants develop an understanding of others’ minds (Legerstee, 2005).

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We have recently conducted a study that tested these different theoretical approaches (see sidebar on the *Foundations of Early Intersubjectivity*) and found that infants connect with others from birth by sharing emotions with them. Most important, our findings support the Affect Sharing Model (Legerstee, 2005), which predicted that infants’ early intersubjective capacities are facilitated by mothers who are attuned to the infants’ com-

municative behaviors. Thus, warm, responsive, and nurturing relationships with caregivers who harmonize their own behaviors with those of their infants enable infants to appreciate that others are similar to, responsive to, and engaged with them.

If infants connect with others through the sharing of emotions during attuned interactions, then the question arises of what infants understand about others’ behaviors during these early exchanges. In fact, very early in life infants develop expectations about their partners’ responses during social interactions. That is, infants expect people to communicate with them when mutual gaze is established. Evidence for this expectation is best revealed in a situation where the infants’ interactive partners suddenly stop communicating with them for no apparent reason. In a classic experimental situation, referred to as the still-face experiment, the adult maintains eye contact with the baby and continues to display a friendly face, but does not react in any way to the infant’s acts (Tronick, Als, & Adamson, 1979). Infants’ reactions to the still-face are quite consistent—they try to re-engage the adult with gazes, smiles, and vocalizations, but when their repeated attempts at engagement fail they become sad and turn away from the nonresponding adult.

However, in some real-life situations adults are unable to engage with infants. For example, mothers may be preoccupied or distracted by housework, the telephone, or older siblings. If infants are able to differentiate between situations where adults are not willing and where they are simply unable to interact with them, then they understand that

FOUNDATIONS OF EARLY INTERSUBJECTIVITY

We observed infants at 5 and 13 weeks of age in three conditions: (a) a natural interaction in which mothers interacted with their babies as they usually did at home; (b) an imitative interaction in which mothers were asked to imitate all behaviors of their infants; and (c) a random interaction in which mothers listened to their previous interaction with their baby through headphones and were asked to repeat what they had said and re-enact how they may have acted in that interaction.

We observed infants' gazes, smiles, and vocalizations as measures of their ability to discriminate between these three conditions. In addition, we assessed maternal attunement to the infants' behaviors during the natural mother–infant interactions and classified infants into high and low attuned groups.

Results showed that—at both ages—infants of mothers who were highly attuned to their children gazed, smiled, and vocalized more during the natural interaction than during imitative and random interactions. Overall, infants of low attuned mothers did not behave differently in the three interactions. (Markova & Legerstee, 2006)

intentions guide the behaviors of others. We examined this question in a study in which we manipulated mothers' intentions to interact with their 3-month-, 6-month-, or 9-month-old infants (see sidebar: *Intentions Make a Difference*). We found that infants became upset when the situation was optimal for social interaction to take place but their mothers were unwilling to communicate with them (similar to the still-face experiment). On the other hand, when circumstances did not permit mothers to interact in ways they usually did, infants waited patiently until normal interactions resumed. It was interesting that when infants interacted with a doll in the same situations as with the mothers, they did not react differently in the various interactions and treated the doll as an inanimate object in each scenario. Infants demonstrated the ability to differentiate between the changing intentions of the mothers and did not simply respond to the changes in the type of interaction. Thus, when mothers engage with their babies, they both share not only emotions but also intentions. Because early social interactions are characterized by mutual activity and sharing of experiences, infants are able to determine why the connection with others is broken and act accordingly.

When circumstances did not permit mothers to interact in ways they usually did, infants waited patiently until normal interactions resumed.

The evidence presented above supports the idea that infants' early social interactions with others are characterized by the sharing of emotions (Legerstee, 2005). Emotions reflect what others are experiencing (Fogel, 2001) and thus allow infants to attribute meaning to people's behaviors. Accordingly,

infants and their caregivers must share each others' emotions in order to communicate in a meaningful way (Bråten, 1992; Markova & Legerstee, 2006; Trevarthen, 1992). Because the sharing of emotions generates sympathy and comfort (Trevarthen, 1992), it is the crucial element of affective relationships. Moreover, caregivers' attunement to their babies' earliest communicative signals is crucial to infants' understanding of their own and others' behaviors. During attuned interactions with their caregivers, infants get a sense of being with the other, which allows them to understand that intentions underlie people's communicative behaviors (Legerstee & Markova, 2007). Interactions with others not only help infants to connect to and understand the social world, but also allow for more complex social interactions to take place, such as sharing experiences about the world around them.

From Sharing Emotions to Coordinating Attention

IN ORDER TO SHARE their experiences with others, infants observe people's faces and their gazes in particular. From birth, infants not only prefer the eyes of people over other facial features (Maurer & Salapatek, 1976), but they understand what others are attending to (Bruner, 1999; Fernald, 1989; Legerstee, 2005; Reddy, 1999, 2003; Stern, 1985; Trevarthen, 1979). Monitoring what others are looking at helps infants to gain information about people's interests and thus, what others are likely to act upon next. As such, the understanding that others attend to things around them is essential for developing an awareness of how people think (Phillips, Baron-Cohen, & Rutter, 1992).

Around 4 months of age infants become interested in things around them, such as toys, and begin to integrate their newfound object interest into interactions with people. Through monitoring the gazes of others, infants begin to realize that people may perceive the same things in the world as they do,

and subsequently learn to share their new experiences with others. Trevarthen (1979) called this the period of *secondary intersubjectivity*, in contrast to primary intersubjectivity, as described above, in which infants share emotions with caregivers during interactions. When infants see an interesting toy, they may gaze from the toy to their caregiver and then back to the toy, as if to find out whether the other attends to the same toy. Adults may respond: "That's an exciting toy. Should I wind it up again?"

Coordinating attention with others in this way reflects not only infants' understanding that they can share information with others, but also that people can make things happen in the world. Thus, sharing emotions with others through monitoring their gazes (i.e., primary intersubjectivity) may be the prerequisite for sharing and coordinating experiences about the world with them (i.e., secondary intersubjectivity). The caretakers' attunement to the infants' behaviors may facilitate the development of these skills (Bruner, 1990; Legerstee, 2005).

We have investigated the evolution from sharing emotions to coordinating attention in infants from 3 to 10 months of age and found that monitoring the gazes of mothers at 3 months predicted infants' coordinating attention with mothers at 10 months (Legerstee, Markova, & Fisher, 2007). Most important, we found this developmental pattern only in infants whose mothers were highly attuned to their infants' communicative acts. Caregivers who are attuned to their infants' feelings and attention not only establish relationships with their infants that are more supportive, they also provide more information about their own and the infant's minds (Stern, 1985). For example, when infants show interest in a particular toy, attuned caregivers may comment on their interest: "Do you like that toy? I think it is exciting." During such exchanges, caregivers interpret the infants' experiences, while also commenting on their own. In this way, sensitive and responsive behaviors of caregivers show infants that they can coordinate experiences with others and thus deepen their understanding of the minds of others (Legerstee et al., 2007).

Coordinating attention with others over objects reveals infants' attempts to engage in prelinguistic communication. Sharing experiences about the world with others in this way also plays an important role in the development of more advanced ways of communicating, such as using gestures and, subsequently, language. For example, when infants share a common focus of attention with their caregiver, they are able to determine the referent (e.g., a toy) of this common focus. When adults then comment on this

INTENTIONS MAKE A DIFFERENCE

We observed 3-, 6- and 9-month-old infants in four interactions with their mothers: (a) a natural interaction in which mothers were instructed to interact with their infants as they usually would; (b) a still-face interaction in which mothers were asked to maintain visual contact and a friendly face but otherwise to stop communicating with their infants; (c) an interaction in which mothers wore a mask but were instructed to interact with their infants as usual; and (d) a situation in which mothers appeared to drink from a bottle, and maintained visual contact with their infants, but did not speak.

In both the mask and bottle interactions mothers were unable to communicate

with their infants as they usually did, because something (i.e., mask, bottle) interfered with this activity. Thus, during these situations mothers provided infants with a reason why they did not communicate with them. In contrast, in the still-face condition, there was no apparent reason why mothers refrained from communicating with their infants. To ensure that infants were not only reacting to the changing perceptual features of the different situations, but to the changing motives of their mothers, infants were observed in the same four interactions with a doll.

Results showed that infants differentiated between the different situations

when interacting with their mothers. Specifically, as early as age 3 months infants showed more positive affect toward their mothers during the natural interaction than during the still-face, mask, and bottle interactions. In fact, they got very upset during the still-face conditions but not when mothers wore a mask or when they drank from a bottle. In contrast, no such differential responsiveness was shown during the doll condition—the infants treated the doll as an inanimate object, they stared, tried to reach for the doll, and sometimes got upset if they could not get hold of the doll. (Legerstee & Markova, 2007)

(1)



(2)



(3)



(1) Natural, (2) mask-face, and (3) still-face interactions with the mother.

(4)



(5)



(4) Natural and (5) mask-face interactions with the doll.

particular toy, they enable infants to learn names of objects (Tomasello & Farrar, 1986). Thus, secondary intersubjectivity is an important prerequisite for the development of language, which is first evident by using gestures to communicate.

Sharing Experiences Through Nonverbal Communication

BEFORE INFANTS BEGIN to speak, they use gestures such as pointing, showing, giving, and requesting to communicate nonverbally with others about aspects of the world (Bates, Camaioni, & Volterra, 1975). A specific type of gesture, declarative pointing, is particularly interesting because infants use this gesture to make nonverbal comments about something (e.g., “Wow, look at that! It’s beautiful.”), as opposed to simply requesting that people make things happen (e.g., “I want you to give me that.”; Camaioni, Perucchini, Bellagamba, & Colonesi, 2004; Legerstee & Barillas, 2003; Legerstee & Fisher, in press).

Infants may progress from the ability to coordinate their attention with others over toys to the more complex understanding that they can direct others to objects of interest in the world around them through declarative pointing. In a recent study, Legerstee and Fisher (in press) showed that when infants and caregivers play together with toys, infants observe the actions of their caregivers and coordinate their attention to those objects with them. Infants then progress from attending to caregivers and to the objects in which the adults are interested to using declarative pointing to actively direct the caregivers’ attention to the objects the infant finds interesting. Caregivers who are attuned to the infants’ behaviors then reciprocate these communicative acts, and thus facilitate the infants’ understanding that they can share their own experiences with others. In support of this idea, a recent study showed that infants of highly attuned mothers produced more declarative pointing than do infants of less attuned mothers (Legerstee & Barillas, 2003).

Conclusions

INFANTS DEVELOP an increasingly sophisticated understanding of the minds of others from birth. Newborn infants share emotions with their caregivers and at 3 months of age they distinguish different communicative intentions of adults during interpersonal exchanges. Monitoring people’s gazes during these early interactions is an important prerequisite for coordinating attention with others at 10 months, which, in turn, provides the basis for using declarative pointing to direct others’ attention to interesting aspects in the world. These

behaviors reflect infants’ growing awareness of the minds of others, and are facilitated and deepened through attuned behaviors of caregivers.

Infants may progress from the ability to coordinate their attention with others over toys to the more complex understanding that they can direct others to objects of interest in the world around them through declarative pointing.

It is remarkable that infants’ early communicative behaviors are not simply reactions to events in the environment or randomly occurring acts that others respond to, but instead are tools that infants use to connect with others and to share experiences with them (Newson, 1979). That is, what infants do gives meaning to what adults do, and vice versa. Because during these early interactions infants expand their understanding of others’ minds, we must consider the role of both infants and caregivers in order to get a clear picture of the development of early awareness of the minds of others (Tronick, 1982). In Trevarthen’s (1979) words: “In the first functional stage of human communication the infant recognizes the mother and invites her to share a dance of expressions and excitements. The infant needs a partner but knows the principles of the dance well enough, and is not just a puppet to be animated by a miming mother who ‘pretends’ her baby knows better” (p. 347).

Accordingly, the task that caregivers face is not necessarily to teach infants to understand them, but to become skilled at understanding their infants (Bateson, 1979). That is, caregivers must set the stage so that infants can learn from their own experiences. Specific behaviors of caregivers play an important role in how infants develop an understanding of others’ minds. Caregivers who are affectively attuned to their infants’ communicative bids have infants who are more capable of learning from social interactions. Consequently, infants of highly attuned caregivers are not only open to the interactive signals of their caregivers but also to those of various other communicative partners. This openness to communicative acts of people enables infants to learn and motivates them to share experiences. Thus, interactions with

socially responsive caregivers promote and modify children’s growing abilities to understand the minds of others. §

GABRIELA MARKOVA is a doctoral candidate in the department of psychology, York University, Toronto, Canada. Her dissertation proposal investigating infant communication skills in interaction with peers has been awarded the York University President Fellowship and the Norm Endler Research Grant.

MARIA LEGERSTEE, PhD, is director of the Centre for Infancy Studies and professor in the department of psychology, York University, Toronto, Canada. She is the recipient of the Faculty of Arts Dean’s Award for Outstanding Research contributions. Her work has appeared in books published by Cambridge University Press and by Raffaello Cortina, Italy. She is coeditor of a special series of the *Journal of Infant Behavior and Development*, and of the forthcoming *Handbook of Jealousy: Theories, Principles and Multidisciplinary Approaches* (Wiley Blackwell Publishing).

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At the Centre for Infancy Studies, researchers are interested in the development of communication, emotion, and attention in the first 3 years of life. Studies of how infants communicate are revealing the process of how an awareness of mental states develops in infants, and studies on interpersonal interaction and its effect on the development of communication are revealing an important mechanism that promotes the development of a Theory of Mind in infants.

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The Emotional Foundations of Social Understanding

HEATHER K. WARREN

SUSANNE A. DENHAM

HIDEKO H. BASSETT

George Mason University

Emotional competence and social cognition are important pieces of the social interaction puzzle, as they are the central mechanisms by which infants and children can achieve successful and satisfying relationships with others. Emotional competence is as vital to human development as any type of learning, and early in life, children are surprisingly adept at several components of emotional competence, including (but not limited to) emotion expression, emotion understanding, and emotion regulation (Denham, 1998). Children need these skills to successfully manage their emotions during social interaction (Saarni, 1999).

Emotional development contributes to children's growing social understanding and competence. Emotion researchers have developed substantial empirical evidence to support the hypothesis that healthy emotional development is associated with adaptive functioning. As a result, prevention and health promotion programs for children have increasingly focused on the development of emotional competencies to prepare children for success in school and in life, (Committee for Children, 1991; Denham & Burton, 1996; Domitrovich, Cortes, & Greenberg, 2007; Izard, Trentacosta, King, & Mostow, 2004; Webster-Stratton, 2001). In this article, we discuss three achievements central to social interaction: emotion expression, emotion understanding, and social information processing.

Emotion Expression

FROM BIRTH, the emotions children experience and express deliver important information to others and to themselves. The first 8 to 9 months of life are marked by the emergence of emotional expressions broadly referred to as *basic* or *primary* emotions (Izard & Malatesta, 1987; Lewis, 2000; Sroufe, 1995). Newborns show distress, pleasure, and interest in or attention to the environment. By 3 months of age, joy, sadness, and disgust emerge. Anger and surprise appear between 4 and 6 months of age,

and fearfulness emerges still later, in the first 8 or 9 months of life.

During this first year, infants also learn how these different emotions look and sound in others. Five- to 7-month-olds can reliably make the distinction between expressions of the basic negative and positive emotions (Bornstein & Arterberry, 2003; Walker-Andrews & Dickson, 1997), and babies as young as 4 months old have demonstrated this ability when interacting with their primary caregiver (Montague & Walker-Andrews, 2002). Infants also demonstrate expectations about what an emotion is "made of" by showing a preference for emotional displays in which the expression of the voice and the face match (Walker-Andrews, 1997). They respond appropriately to expressions of emotion (even in the context of another language) by reacting positively to "approval" vocalizations, and negatively to "reproach" vocalizations (Fernald, 2006). They discriminate dynamic representations of facial expressions first, at about 3 months of age, and somewhat later they grasp static representations, such as a photograph (see Walker-Andrews, 1997, for a review).

Social Referencing

As these basic emotion concepts develop, infants quickly learn how to acquire information about their social world. They pick

up on others' subtle indications of emotions directed toward other people and other "things" and use this information to guide their behavior. This process, called *social referencing* (Saarni, Mumme, & Campos, 1998), enables children to learn when to approach or avoid people, events, or objects, and it develops between 9 and 12 months of age. Infants use both facial (Barrett, Campos, & Emde, 1996) and vocal (Mumme, Fernald, & Herrera, 1996) information to guide their understanding of their experience with various people, places, and things. With the acquisition of social referencing, infants' early understanding of others' emotional states grows profoundly, and likewise, their interaction with the world becomes exponentially wider.

Empathy

Empathic involvement in the emotions of another (i.e., "feeling") and empathy-related reactions (i.e., "doing") are particularly noteworthy achievements in the development of the emotional building blocks of social

Abstract

The infant and toddler years are a watershed of development in the emotional domain. These skills lay the foundation for positive social interactions and, ultimately, academic and life success. This article describes the development of three skills that are central in creating successful relationships: expressing emotion, understanding emotion, and processing social information. These foundational skills are increasingly targeted in preschool curricula promoting social-emotional competence.

interaction.¹ Experiencing and expressing empathy involves involvement in another's emotional plight (Saarni, 1999) as a result of the recognition of another's emotional state or condition. An empathic response is very similar or identical to what the other individual is perceived to experience (Eisenberg et al., 1996). For example, when 2-year-old Megan sees her mother's expression of pain at a stubbed toe, she winces too.

Empathic-related responding is considered to serve as a motivating factor for assisting others in need (Lennon & Eisenberg, 1987) by directing focus to the other person's emotion in conjunction with, yet distinct from, one's own emotions (Roberts & Strayer, 1987). Toddlers may freeze their activity or intently examine the person in distress and sometimes demonstrate clumsy attempts to provide aid (Zahn-Waxler & Radke-Yarrow, 1990). As indexed by both behavior and expressiveness, empathic responses increase during the preschool period (Denham, 1998).

Emotion Understanding

FROM APPROXIMATELY 18 MONTHS OF age, two noteworthy achievements in emotional development become evident. First, by this age, infants begin to realize that not everyone reacts the way they do; that is, children develop the expectation that other people may have different emotions or different preferences from their own (Meltzoff, Gopnik, & Repacholi, 1999; Repacholi & Gopnik, 1997). This understanding of the self-other distinction paves the way for children to more accurately obtain information about social interaction. In general, this skill set is often related to the demonstration of socially competent behavior (Walker-Andrews, 2005).

Second, children acquire their first emotion words late in the second year, at approximately 18 to 24 months (Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986; Wellman, Harris, Banerjee, & Sinclair, 1995). The skill of emotion language affords children greater flexibility when interacting with their social environment, enabling them to comment on their own experience, influence others' behavior, and respond with greater empathy to other preschoolers' distress (Miller, Eisenberg, Fabes, & Shell, 1989). The spontaneous use of emotion language, such as the terms *happy*, *sad*, *mad*, and *scared*, is the earliest to appear,



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commonly expressed by 2½ years (Wellman et al., 1995). Toddlers of this age appear to be most articulate in describing internal states of sleep and fatigue, distress, pain, pleasure, and dislike, with elaborated references to anger and fear being less common (Dunn, Bretherton, & Munn, 1987).

The spontaneous use of emotion language, such as the terms happy, sad, mad, and scared, is the earliest to appear, commonly expressed by 2½ years . . .

Emotion Identification

Research suggests that children's ability to produce the appropriate label for emotions progresses in a fashion similar to the basic emotions they are likely to be exposed to and express early in development. That is, children appear to be able to label expressions of happiness first and most accurately, followed by sadness and then anger, whereas they have the most difficulty labeling fear (Denham & Couchoud, 1990; Michalson & Lewis, 1985). The emergence of these labels, known as *emotion identification*, seems to parallel cognitive research which suggests that individuals form concepts organized around a "prototype" of the most frequently occurring features of a set of examples (Smith & Medin, 1981).

A synthesis of the literature suggests that the ability to verbally and nonverbally label emotion expressions increases from

2 to 4½ years of age. Older children demonstrate more accuracy than younger children, and receptive identification (e.g., pointing) exceeds expressive identification (e.g., naming) for both younger and older children (Denham & Couchoud, 1990). This progression appears whether children are assessed using photographs (Camras & Allison, 1985), pictorially (Denham & Couchoud, 1990), or in person (Felleman, 1983) and whether they are presented with face or voice alone or together (Stifter & Fox, 1987).

In general, infants start out showing greater attention to their own feelings than to those of others, gradually showing more interest in the feelings and desires of others. In observations of naturally occurring conversations, 24-month-olds referred almost exclusively to their own desires and feelings, whereas by 36 months, they demonstrated more interest in referring to the feelings of others (Brown & Dunn, 1991). By toddlerhood, however, most children are able to refer to a range of feeling states in both self and other, in a variety of contexts (e.g., pretend play, games, conflict, and sibling interactions), for a range of social functions (Dunn et al., 1987), and to past as well as future states (Lagattuta & Wellman, 2002; Wellman et al., 1995).

The Functions of Emotions

Between 24 and 36 months of age, children also use emotion language to obtain comfort, support, or attention, or to otherwise meet their own emotional needs (Dunn, Brown, & Beardsall, 1991), to humor themselves, or to influence others' emotions, both positively and negatively (Brown & Dunn, 1991). For example, observations in naturalistic settings

¹ Theorists still disagree on which (and the extent to which) various cognitive developments (e.g., perspective taking, self-concept, appraisal, attribution) are necessary and sufficient for the experience of more complex emotions, such as empathy (Izard, Ackerman, & Schultz, 1999). Furthermore, context is often considered paramount in definitive observations of these emotions, because they are not considered to have unique expressive behavior or facial components.



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suggest that children increasingly use feeling and internal states to tease or comfort others between 24 and 36 months of age. After the age of 3 years, children also demonstrate the ability to answer questions about the emotional states of unrelated third parties who lack any shared social history, as with newly introduced story characters (Denham, 1986). It appears that the development of the ability to talk about feelings may therefore contribute to the children's effectiveness as actors and receivers in social situations to comfort, tease, excuse, forgive, or otherwise support or build connections with others.

Emotion language also affords children the opportunity to move beyond labeling an emotion and obtain further understanding of typical situations that might elicit certain feelings in themselves and others. Children begin to both explain the causes of emotions and seek explanations from others (Bretherton & Beehly, 1982; Dunn & Brown, 1994). Children as young as 2½ years of age use descriptive terms about emotion to talk about their causal basis, and they appear to master negative emotions before they can identify different causes for positive ones (Masters & Carlson, 1984). Often preschoolers label all negative situations as *sad* or *bad* and then gradually learn to differentiate anger-eliciting situations from sadness-inducing ones. The distinction between fearful emotions and situations from other negative emotions comes last. Although preschool children can sometimes explain fearful emotions (e.g., "afraid of the dark" or "scared of a monster under my bed"), it is uncommon for them to articulate the reason for their fearful feelings (Lieberman, 1993).

Somewhere between 2 to 3 years of age, young children become knowledgeable about how a person's desires connect to his or her emotions; that is, they can connect feeling good or happy to getting what one wants and feeling bad or sad to when one's desires are blocked (Stein & Levine, 1989; Wellman & Banerjee, 1991; Wellman & Woolley, 1990). Moreover, when young children talk about

situations that would usually cause happiness or sadness, they usually describe getting or doing what one desires as the cause of happiness and not getting or doing what one wants as leading to sadness (Harter & Whitesell, 1989). This connection between the objective features of situations and to other's mental states in those situations is viewed as a major advancement in emotion understanding during the preschool years (see Harris & Lipian, 1989; Thompson & Lagattuta, 2006; Wellman & Lagattuta, 2000).

Young children's expectancies about the behavioral *consequences* of various emotional states do not appear to be as consistent as their understanding of the causes of emotional states. In general, cross-sectional interview data suggest that, although young children (4- and 5-year-olds) are generally accurate in understanding the effects of emotion on their performance in school and their judgment of others, they do not appear to have a strong grasp on the influence of emotion on aggressive behavior or self-control (Carroll & Steward, 1984). Only some 4- and 5-year-olds realize that anger might decrease self-control, and surprisingly few preschoolers report that they would expect anger to increase their aggression. This discrepancy may indicate that children first develop the understanding of one's own emotional response (and its causes) before they develop a coherent understanding of how that response may affect one's own and others' behavior.

Taken together, these findings suggest that toddlers and young children gradually become psychologically minded in a way that promotes social inquiry. Children then use this information to "test the waters" of social interaction. As their everyday social interactions increase in frequency and complexity, young children must learn how to engage in a process of responsible decision making as they negotiate their relationships with others. They must learn to process social information—to encode and analyze social situations, set social goals, determine effective ways to solve differences that arise between them and their peers—and then be able to perform these behaviors (Crick & Dodge, 1994).

Social Information Processing

A CHILD'S STYLE for processing the increasingly complex social and emotional information she encounters during her daily interactions predicts her success in social interactions. The steps in social information processing, beginning with observing and interpreting the situation and ending with a response, lay the foundation for responsible decision making in social exchanges (Crick & Dodge, 1994; Lemerise & Arsenio, 2000; Rose-Krasnor & Denham, in

press). Children who are biased toward interpreting ambiguous situations as hostile are more aggressive toward their peers. Inaccuracy in this interpretation, even by preschool, is associated with long-term problems with peer relations, including conduct disorders (Coy, Speltz, DeKlyen, & Jones, 2001; Crick & Dodge, 1996; Webster-Stratton & Lindsay, 1999).

As their everyday social interactions increase in frequency and complexity, young children must learn how to engage in a process of responsible decision making as they negotiate their relationships with others.

Children's goals and strategies for negotiating social situations also matter. Aggressive children are often focused on blocking their social partners' goals in favor of their own. They are less concerned about what they can learn from the interaction or how to maintain it, unlike their more competent peers (Hart, Ladd, & Burleson, 1990; Neel, Jenkins, & Meadows, 1990). In contrast, preschoolers who are able to predict how to achieve positive outcomes in social situations are better liked by their peers (Musun-Miller, 1993). These studies emphasize how the entire range of the social problem-solving skill set is important for successful social interaction.

Children are constantly attempting to understand their own and others' behavior, and emotions convey crucial interpersonal information that can guide interaction (Dodge, Laird, Lochman, & Zelli, 2002). Take the example of a child trying to join a group of other preschoolers working together on a puzzle. First, the child needs to encode information from the setting: the context, others' behavior, and the others' affect, as well as his own. Next, the child needs to interpret this information embedded within the emotional context of the situation. For instance, the child interprets the other children's emotions or motivations depending on his own emotional arousal. An intensely shy child might perceive facial expressions as less than friendly. An anxious child's perception of another's expression of frustration in fitting pieces together may be construed as anger. After the child interprets the situation, he needs to consider various alternative means of joining the group on the basis of his goals; here again, the shy child, fearful child, and

anxious child might all have very different goals.

In summary, there are numerous possibilities for the manner in which peer interactions may unfold. Children must learn to consider the consequences of how they choose to interact with others (Shure & Spivack, 1982). Being able to skillfully infer others' emotions, use pragmatic language skills, and solve social problems are all positively associated with the quality of peer relationships (Bierman, 2004; Crick & Dodge, 1994; Landa, 2000; Nowicki & Duke, 1994). In turn, the ability to develop relationships by cultivating friendships and peer acceptance represents crucial developmental skills and is strongly predictive of broad adaptive functioning (Denham & Almeida, 1987; Greenberg, Kusché, & Riggs, 2004; Youngstrom et al., 2000).

Emotional Development Curricula

AS A RESULT of the growing documentation of the importance of supporting children's socioemotional competence in young populations (Bryant, Vizzard, Willoughby, & Kupersmidt, 1999; Campbell & Ewing, 1990; Eisenberg & Fabes, 1992; Eisenberg et al., 1996; Hubbard & Coie, 1994; Miller & Olson, 2000), preschool programs are adapting emotion-related curricula for younger and younger populations. These programs recognize that young children need opportunities to develop and refine their repertoire of skills for understanding and handling emotions in themselves and others. Preschool programs have used a

variety of approaches, such as Denham and Burton's (1996) social-emotional intervention; the *Dina Dinosaur* program from the *Incredible Years* curriculum (Webster-Stratton, 2001); the *Second Step* program for violence prevention (Committee for Children, 1991); the *Promoting Alternative THinking Strategies (PATHS)-Preschool* curriculum (Domitrovich et al., 2007); and Carroll Izard's emotion course for young children (Izard et al., 2004). The curricula most often target children's emotion-related skills on a general level by first addressing *emotion identification*—helping children recognize and label one's

own (and others') emotions when they occur (Denham & Couchoud, 1990; Michalson & Lewis, 1985). This ability will eventually enable preschoolers to use the appropriate language labels to describe their experiences.

In these early lessons, preschoolers are, in effect, taught how to be emotionally self-aware. They learn the distinction between emotional expression and emotional experience. That is, the feelings that they now know how to label are described as being experienced "on the inside." Different scenarios are used to help the children think about their own feelings on the inside, such as, "How would you feel if someone pushed you while you were playing together?" Teachers are trained to encourage children's generalization of this skill across emotional contexts by noticing a child's expression of emotion and pointing out the important internal information that the emotion is providing the child. Children are also encouraged to "use their words" when they are experiencing an emotion by stating, "I feel . . ."

To build on their skills in emotion identification, children become ongoing monitors of their own feelings throughout their day in various real and pretend situations. A greater awareness of their own emotions helps to prepare the children for using emotional self-regulation techniques. For example, one goal of the *PATHS-Preschool* curriculum (Domitrovich et al., 2007) is to clarify the difference between feelings and behaviors. All feelings are okay to feel, but all behaviors are not okay to do (Domitrovich et al., 2007; Greenberg, Kusché, Cook, & Quamma, 1995). This distinction also becomes essential when children are later taught how to enact the three steps required to "do the turtle technique" for self-regulation (Schneider & Robin, 1978). In this way, preschoolers can eventually learn how to



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control uncomfortable feelings to prevent unacceptable behaviors.

Similarly, the *Second Step* curriculum for preschoolers (Committee for Children, 1991) uses a building-block type of approach to train children in increasingly complex affective skills. In the first unit of the *Second Step* curriculum for preschoolers, children are asked to discuss and identify the physical, facial, verbal, and situational cues related to six basic emotions: feeling happy, sad, angry, surprised, scared, and disgusted. Later, children practice interpreting others' emotional expressions and discuss how expressing emotion in general varies for different individuals and communities. Thus, whereas the PATHS curriculum appears to place an early emphasis on self-understanding, the *Second Step* lessons immediately follow emotion identification training with lessons on how to accurately detect, understand, and appropriately respond to the feelings of others to develop empathic responding.

Later, units in *Second Step* (i.e., anger management and emotion regulation) offer more of a self-reflective structure. These lessons in emotion self-awareness and awareness of emotion regulation strategies are then paired

TEACHING EMOTION REGULATION

Kindergarten teachers report at least half of the students in their class lack the social skills needed for success (Rimm-Kaufman, Pianta, & Cox, 2000). In order to remain calm in situations that are upsetting, disappointing, or frustrating, children need to integrate cognitive, behavioral, and emotional skills (Halberstadt, Denham, & Dunsmore, 2001). When faced with an adverse situation, a successful coping response includes recognizing one's own emotional response, the cognitive awareness of the need to "calm down," the use of behavioral strategies, such as taking a deep breath, and by "using words" to express the problem and come up with a solution.

Parents can teach children about awareness of their own emotions by coaching and modeling appropriate reactions, and by talking about emotions when an opportunity presents itself (Warren & Stifter, in press). Teachers also play an important role in helping children learn how to handle emotions appropriately by identifying and intervening with children who need extra help with these skills. Several empirically based preschool social-emotional competence interventions with cognitive-behavioral lessons are available for use in the classroom. For example, the preschool PATHS curriculum (Domitrovich, Cortes, & Greenberg, 2007) uses the "Turtle Technique" (Robin, Schneider, & Dolnick, 1976) to teach young children about emotion regulation. The technique is unique both because it teaches self-control in interpersonal domains, and because it includes a system for generalization throughout the day. Through a series of lessons, children learn a metaphorical story about a young turtle with both interpersonal and academic difficulties that arise because the turtle does "not stop to think." These problems are manifest in the young turtle's aggressive behaviors, which are related to numerous uncomfortable feelings. With the assistance of a "wise old turtle," the young turtle learns to develop better self-control by going into its shell to think before responding.

closely with problem-solving and behavioral skill development to decrease disruptive and aggressive behavior. Lessons cover the internal experiential aspect of emotions, specifi-

cally with respect to anger recognition skills (e.g., feeling "hot" or "cold"), stress reduction techniques, and use of positive self-statements to avoid angry behavior.

Learn More

COLLABORATIVE FOR ACADEMIC, SOCIAL AND EMOTIONAL LEARNING (CASEL)
www.casel.org

CASEL is based in the Department of Psychology at the University of Illinois at Chicago. The organization was created to promote the importance of social and emotional learning in academic settings, by providing practitioners and school administrators with the guidelines, tools, informational resources, policies, training, and supports they need to improve and expand their social-emotional learning programming.

Books:

ZINS, J. E., WEISSBERG, R. P., WANG, M. C., & WALBERG, H. J. (2004). *Building academic success on social and emotional learning: What does the research say?* New York: Teachers College Press.

LANDY, S. (2002). *Pathways to competence: Encouraging healthy social and emotional development in young children*. Baltimore: Brookes.

DENHAM, S. (1998). *Emotional development in young children*. New York: Guilford.

SAARNI, C. (1999). *The development of emotional competence*. New York: Guilford.

BRACKETT, M. A., & KATULAK, N. (IN PRESS). The emotionally intelligent classroom: Skill-based training for teachers and students. In J. Ciarrochi & J. D. Mayer (Eds.), *Improving emotional intelligence: A practitioners guide*. New York: Psychology Press/Taylor & Francis.

Electronic media:

EXPLORING FIRST FEELINGS

21 min. Produced by Institute for Mental Health Initiatives. Available from Child Development Media, 5632 Van Nuys Blvd, Suite 286, Van Nuys, CA 91401. Tel. 800-405-8942. Fax: 818-989-7826. Web site: www.childdevelopmentmedia.com. Purchase: \$115 for the set plus shipping and handling.

This classic video uses footage of parents and caregivers interacting with their young children. This tape illustrates milestones in the emotional development of infants and toddlers. The video portrays six overlapping stages of healthy emotional development showing a parent or caregiver providing a supportive environment for each stage. Includes *First Feelings: Milestones in the Emotional Development of Your Baby and Child*, 247 pages, by Stanley Greenspan, MD.

INFANCY: EMOTIONAL AND SOCIAL WORLD RELATIONSHIPS

15 min. Produced by Magna Systems. Available from Child Development Media, 5632 Van Nuys Blvd, Suite 286, Van Nuys, CA 91401. Tel. 800-405-8942. Fax: 818-989-7826. Web site: www.childdevelopmentmedia.com. Purchase: \$90 plus shipping and handling.

The video marks four stages of emotional milestones in infancy and how emotional closeness is experienced through synchrony, social referencing, and finally, separation-individuation.

BABIES AND YOUNG CHILDREN WITH EACH OTHER

50 min. Produced by Pikler-Loczy Association. Available from Child Development Media, 5632 Van Nuys Blvd, Suite 286, Van Nuys, CA 91401. Tel. 800-405-8942. Fax: 818-989-7826. Web site: www.child-developmentmedia.com. Purchase: \$125 for the set plus shipping and handling.

This video explores the development of the social contacts of babies and young children from the ages of 4 months to 2½ years. The children are filmed in the Loczy home residence in Budapest through three overlapping periods of development.

EARLY SOCIALIZATION: FROM BIRTH TO AGE TWO.

1999. 23 min. Available from Films Media Group. P.O. Box 2053, Princeton, NJ 08543-2053. Tel. 800-257-5126 Fax 609-671-0266 Web site www.films.com. Purchase \$150 plus shipping and handling.

Life outside the womb requires an ability to interact with others right from day one. This program clinically tracks the social development of two young children, Max and Ellie. Video footage taken during their first 24 months demonstrates their progress from awareness and bonding; to communication by vocalization, facial expression, body language, and speech; to attachment to key adults; to parallel play, sharing with peers, and the rudiments of negotiation. In addition, Max and Ellie's parents provide their observations on the children's socialization and discuss some of the challenges of parenthood.

Children are also taught how to identify their own personal triggers that arouse angry internal feelings, and this is followed by lessons in which teachers model how to use self-talk to cool down in the moment. These skills are practiced through repeated modeling and rehearsal of problem-solving steps (See Teaching Emotion Regulation sidebar).

The aforementioned curricula demonstrate some of the different ways in which preschool programs are promoting emotional competence in an attempt to improve social competence and, ultimately, improve children's academic and life success. On one hand, science has theoretically articulated (Eisenberg et al., 1996; Halberstadt, Denham, & Dunsmore, 2001) and empirically demonstrated (see Denham, 1998, for a review) the many strengths that young children have in the emotional realm. These findings have informed (and continue to inform) developmentally appropriate practice. On the other hand, it is clear that practitioners are still in need of assessment instruments that characterize young children's emotion skill and social information-processing strengths and weaknesses—instruments that do so in developmentally appropriate, contextually relevant ways (Denham, 2005; Hirsh-Pasek, Kochanoff, Newcombe, & deVilliers, 2005; McKown, 2007). With funding from the National

Institute of Child Health and Human Development and the Administration for Children and Families, our own research group has partnered with Virginia Head Start programs and private child care centers to take on this task. We are developing a toolkit for preschool programs that includes assessments of emotion knowledge, emotion regulation, emotion-related behavior, and aspects of social problem solving.

The growing list of programs extending and adapting emotion-related curricula for increasingly younger children suggests that practitioners have recognized both (a) the surprising depth of skill that children should have mastered in the emotional realm by the time they have reached early childhood and (b) the challenges that children face in developing successful peer relationships when their ability to manage their own emotions is tested. Infants, toddlers, and young children lead rich emotional lives with increasingly complex social challenges. Understanding early emotional and social development and helping to facilitate optimal functioning is an important and exciting prospect for all those who interact with young children. ❧

HEATHER K. WARREN, PhD, is an associate professor of research at George Mason University.

She is co-investigator on a study, funded by a grant from National Institute of Child Health and Human Development (NICHD), focusing on the refinement of portable, cost-effective, and developmentally appropriate assessment of social-emotional skills for young children. Her research focuses on the interface between social-emotional and social-cognitive development and early school readiness, and on the application of this knowledge to applied settings.

SUSANNE A. DENHAM, PhD, is university professor of psychology at George Mason University. She is principal investigator on a study on social-emotional assessment for school readiness, funded by a \$2.2 million grant from the NICHD. Her scholarly work has, for the past 2½ decades, centered on preschoolers' (and older children's) social-emotional development and its socialization and promotion. Before this, she worked as a school psychologist with developmentally delayed preschoolers.

HIDEKO HAMADA BASSETT, PhD, is a postdoctoral research associate at George Mason University. She completed her graduate work at George Mason University under the supervision of Susanne Denham, with whom she is continuing research on social and emotional development in a postdoctoral position.

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Core Concepts in Infant–Parent Psychotherapy

MARIAN BIRCH

Port Angeles, Washington

From conception through the third year of life, there is, in Winnicott's (1960) pithy phrase, "no such thing as a baby." There is, rather, the dynamic, nonlinear system (Sander, 1975) of the infant-and-caregiving environment. The caregiving environment is, most immediately, in most cases, the mother; equally critically, it is the web of familial, social, and economic relationships and resources that support the mother so that she is able to find within herself the psychological and physical resources to successfully rear a healthy, happy, and competent child. A mother can no more parent successfully without such environmental support than

an infant can thrive and grow without a mother (Hrdy, 1999).

The tasks of the infant–parent psychotherapist include addressing internal obstacles that impede the parent from accessing the support she needs, as well as practical assistance in identifying and accessing available resources. When babies grow up and have their own babies, their capacity to find and accept the help they need from others is directly and strongly correlated with the kind of caregiving they received as infants. In terms of attachment theory, a securely attached infant grows up to become a mother who is able to use relationships with others to meet her need for support. An anxiously attached infant, barring intervening help, becomes a mother who has significant constrictions in her ability to do so. The infant with no organized attachment strategy is likely to become a mother with no organized strategy for obtaining the support she needs, and who, in powerful and automatic ways,

perceives others as threatening, not helpful. Similarly, the mother's representation of her infant and her ability to be sensitively responsive to her infant are shaped to a significant degree by her own early experience and the way it is registered in her psyche (Main, Kaplan, & Cassidy, 1985).

Our intention, as infant–parent psychotherapists, is to expand the mother's range of choices in both spheres: in response to her infant and in meeting her own psychological and practical needs.

When the infant–parent dyad is not working well, it is often because the mother has rigid defenses against being aware of and experiencing what Tronick (1998) called "a dyadic expansion of consciousness" within the dyad. On the mother's side, this dyadic expansion of consciousness, when accessible, provides her an entrance into a long-forgotten world of primitive nonverbal feeling and experience that permit her, for example, to distinguish a hungry cry from a tired cry, or, in the case of many mothers in developing countries, to unerringly hold the baby out at arm's length at the moment just before he pees.

When a mother cannot tolerate this primitive way of knowing, it is usually because she received inadequate help, when she herself was an infant, in tolerating, managing, and regulating her own primitive preverbal feelings. Thus, in her infancy, she experienced her affects as overwhelming and traumatic, not as reliable signals to herself and her caregivers

about needs and wishes. Her infantile distress and arousal met with neglect, abuse, intrusion, projection, and negative attributions. Furthermore, her subsequent experiences may not have afforded her an opportunity to revise her early, infantile ways of coping with these failures of caregiving with more mature and adaptive mechanisms.

This is the help that we come, as infant–parent psychotherapists, at the 11th hour, to offer. Our objective is to exorcise the ghosts in the nursery, which cloud the mother's perception of and ability to respond to her infant. But, of course, these selfsame obstacles are the chief impediment to the mother's accepting any help we have to offer.

We cannot expect the mother to have a "realistic" view of our helpful intentions and purposes in intruding ourselves into her life, any more than she has a realistic view of her baby's motives for occupying so much of the territory formerly known as her life. We do not take her wariness, hostility, and evasive vagueness personally. We do not waste too much breath trying to persuade her that we are different from the others—the parents, teachers, doctors, social workers, and so forth—who have disappointed her in the past. Instead, we try to understand how she experienced those disappointments and how they shaped her, and in our way of doing so we try to offer a different experience of being listened to, understood, and cared about.

This importantly includes acknowledging and perhaps even apologizing for the inevitably intrusive, humiliating, and insufficient aspects of our presence in her life. It also includes acknowledging that our interest, caring, and helpfulness are professional. In the brutally crude terms of one of my clients, we are paid to care. This falls far short of what our clients want—and may need.

It cannot be overemphasized how sensitive, deeply personal, and intimately tied up

Editor's Note: The following excerpt is from the first chapter of *Finding Hope in Despair: Clinical Studies in Infant Mental Health*, edited by Marian Birch, to be published by ZERO TO THREE in June 2008. In this excerpt, the editor describes the core concepts, techniques, and challenges of therapeutic intervention with infants and very young children and their families. In the other chapters in the book, clinicians provide detailed case studies of interventions that felt like "heartbreaking failures." Each case study is followed by a response from another clinician who comments on the challenges and the outcome of the intervention.

with self-esteem and her evil stepsisters—self-doubt and self-loathing—is the territory that we presume to enter. Often we come with only a flimsy and awkward excuse for an invitation. “Your CPS [Child Protective Services] worker, or your pediatrician thought you needed help.” How special does that make a mother feel?

We, as therapists, do not like to think about this. We have our own self-esteem issues and probably would not be doing this kind of work if we did not have some fairly deeply rooted need to help. To be effective, and to survive as infant–parent psychotherapists, we have to let go of this need, or at least, loosen its grip.

The current dominant model is that we help parents become more sensitive, responsive, and protective of their babies through the therapeutic relationship itself: We have to become more sensitive, responsive, and protective of the parents. In the words of Jeree Pawl, we “do unto others as we would have others do unto others” (J. Pawl, personal communication, October 30, 2007).

This doing unto mothers what we hope mothers will do for their babies—provide sensitive, attuned, and comforting responses—has been described by Fonagy, Gergely, Jurist, & Target (2002, p. 403) as “the creation of an interpersonal situation where the potential for reflective function could be specifically and safely exercised.” We believe that our cumulative interactive exchanges with the mother help her to think about her own and her infant’s feelings and experiences as meaningful and understandable by another and by herself. We are trying to provide an attuned, supportive relationship, a holding environment, a container within which the mother can reflect on and resolve some of the obstacles to attunement, mutuality, and growth in her relationship with her infant.

Work with infants and families is tremendously challenging. It requires us to keep a therapeutic focus and balance in the often chaotic, distracting, and disturbing settings in which our clients live. To maintain such balance, it is absolutely essential to have ongoing consultation, supervision, and training. There must be dedicated time for the therapist to think about the system she is trying to join—time away from the infant–caregiver system and the multiple and often conflicting demands it makes for her attention and intervention. She also needs help seeing herself in the system, such as the opportunities that individual supervision and clinical case review with peers and consultants can provide.

The Therapeutic Challenges We Face

IN HER RADICAL INNOVATION in psychoanalytic practice, what she referred to as “psychotherapy in the kitchen,” Selma

Fraiberg and her colleagues (1975, p. 394) grafted a set of techniques that had long been central to the practice of nursing and social work onto an essentially classical, ego psychological model of psychotherapy. These techniques were home visiting, case management (including referral and advocacy), and educational guidance. Furthermore, Fraiberg et al. (1975) defined the patient of infant–parent psychotherapy as the dynamic relationship between an infant and his or her caregiving environment. This was a conceptualization that was far closer to family systems theory (Bateson, Jackson, Haley, & Weakland, 1956) than to the American ego psychoanalysis to which Fraiberg et al. claimed allegiance. Stern (1995) 20 years later likewise defined the patient of infant–parent psychotherapy as the infant–parent relationship.

Fraiberg et al.’s (1975) “parameters,” or special modifications of classical psychoanalytic practice, emerged in the 1970s and ’80s, in the same historical context as other adaptations (e.g., Heinz Kohut, Kurt Eissler, and Harold Searles) to the classical mode of a rigorously “neutral” analyst who facilitated psychological change through interpreting the patient’s free associations and, in particular, “resistances” and “defenses” (Mitchell, 1988). The classical model was viewed as effective only for “neurotic” patients—those whose problems stemmed from maladaptive efforts to manage unacceptable impulses. Its practice and its failures had led to increasing awareness of different kinds of emotional problems that required different techniques (Fonagy, 2001). The rehabilitation of John Bowlby and Melanie Klein, both of whom emphasized the central motivational role of relatedness, from the status of psychoanalytic

pariahs, which they had endured in the 1950s and ’60s, also began in this period.

Fraiberg et al. (1975) explained that their parameters, their new techniques—(a) home visits, concrete and emotional support, and developmental guidance; and (b) dyadic relationship as patient—made it possible to offer therapeutic services to families who lacked the inner and outer resources required to come to office appointments. This was initially discussed in terms of the logistical difficulties frequently facing parents with infants. It gradually became clear in practice, however, that the inability to access center-based services often reflected deep-seated distrust and disorganization in relationships. Such techniques were seen as concrete, operational statements of the therapist’s implicit and explicit offer to meet the family where and as they were. Again, the goal of this practice was to engage distrustful caregivers in a therapeutic endeavor on behalf of the infant.

The practice of home visiting provided an incredibly rich and immediate access point or “portal of entry” (Stern, 1995) for collecting clinically relevant data. After an hour in a family’s home, the therapist often was privy to data that would take years to gather in an office setting—if, in fact, it could ever be gathered there at all.

It has seldom been acknowledged, either in infant mental health or in psychoanalysis, just how much these adaptations changed the therapeutic situation. Let us examine, then, the further implications of these innovations for the therapist’s understanding of her role and of what is supposed to be happening in therapy.

In several ways, the dominant model of infant–parent psychotherapy obscures and



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complicates the issues of informed consent and professional boundaries. The adaptation of home visiting forfeits one of the key features of office-based psychotherapy, namely, the patient indicates his engagement in a therapeutic endeavor by his physical presence (Clarkin, Kernberg, & Yeomans, 2006; Greenson, 1967). In addition, the formal setting of an office—often with signs, diplomas, and professional books—conveys implicitly that the therapist is offering specialized skills and services. Home visits and case management services (e.g., helping to locate housing or complete legal paperwork) make it more difficult to communicate clearly that the goal of therapy is to help the caregiver to overcome internal, mental obstacles to growth. The special quality of the patient's transference and the therapist's countertransference feelings and enactments (Bromberg, 1998), as a kind of "play" that occurs in the protective haven of the therapy, is easily obscured when the therapist actively seeks to engage the family in its own setting. The caregivers' wishes that the relationship with the therapist would actually function, on a permanent basis, as a replacement for their own tormented ties to their families of origin are implicitly validated by this active, unconditionally accepting approach. Further complicating matters, our emotional availability to the caregivers is actually far from unconditional: We are motivated by a primary goal of promoting the infant's healthy development, not the optimal future for the caregivers.

A further consequence of working in the home, with a dependent infant present, is that it is much riskier to invite and work with profoundly regressive and intense feelings and states. An office offers the safety of

a private, anonymous haven that the patient chooses to come to and that she can leave behind. Likewise, the therapist in an office can be emotionally engaged with the patient's intense and primitive material safe in the knowledge that the hour will end, there are no lethal weapons on site, and the patient is almost always able to pull himself together and leave, or at least sit in the waiting room until he can. In our work with parent–infant dyads, we are always titrating the depth to which our dialogue can go against the ever-present physical and emotional need of the infant, as well as our own sense of safety (Lieberman, 2000).

The hypothesis that the therapist's provision of warm, sensitive, attuned responsiveness leads to the caregiver's enhanced capacity to provide the same to the infant has led to an emphasis on strength-based, supportive interventions (Fraiberg, 1980; McDonough, 2000; Olds, 2005; Pawl, 1995). This approach is a far cry from the often painful "interpretations of resistance" prescribed by the old classical model (Greenson, 1967). We try to find something positive and growth-promoting to admire and validate in the parent–infant relationship. Although we often observe situations and interactions that profoundly disturb us, we also often feel that we cannot address them directly lest we lose the fragile alliance with the caregiver. Finding the boundary between being supportive versus colluding with subtle forms of neglect and maltreatment can be extraordinarily difficult. If we believe in the unconscious, it is inevitable that our concealed feelings of worry, revulsion, anger, and fear have an impact even though we do not openly express them. We need better ways to think about that (displaced) impact.

Like the public health nurse, and like the social worker, the infant–parent psychotherapist may provide developmental guidance and concrete support. However, rather than being ends in themselves, these activities are understood as ways of establishing the kind of relationship with the infant and its caregivers that, because it is sensitive, nurturing, and warmly positive, facilitates the caregivers' abilities to relate to the infant in similar growth-promoting ways.

This trickle-down effect is beautifully captured in Jeree Pawl's (1995) koan-like "do unto others as you would have others do unto others." It is presumed to work by altering the caregivers' internal working model of relationship, rooted in their own infancy, so that it is more flexible, hopeful, and generous and less rigid, fearful, and withholding (Lyons-Ruth, 1998; Main & Hesse, 1990; Slade, 1999).

This can work beautifully when there is a clearly identified parent or caregiver who

claims the child and when this caregiver or parent has a psychological makeup that permits him or her to alter and soften life-long unconscious strategies for maintaining psychic coherence within the timeframe set by the infant's inexorable developmental processes.

The therapist must also be able to maintain a balance in her attention to and investment in both caregiver and infant. Therapy must focus on optimizing this relationship as opposed to the oft-wished-for happy ending for one or the other of the dyad (Seligman, 2000).

What happens if one or more of these conditions are not met?

Contemporary writing about psychoanalytic work with adults and children has been marked by a very dramatic and rich expansion of the concept of countertransference. Writers such as Stephen Mitchell (1988, 2000), Thomas Ogden (1986), and Philip Bromberg (1998), to name but a few, have vastly enlarged our understanding of the ways that, in Freud's terms, "the analyst turns his unconscious like a receptive organ to the unconscious of the patient" (1912, p. 118) and uses the behaviors, thoughts, affects, images, and impulses that are evoked in him as a rich source of "data" about the clinical situation. With these discoveries has come a profound acknowledgment of the fallible humanity of the analyst; that, in the words of Harry Stack Sullivan (1953), "We are all much more simply human than otherwise" (p. 32). Harold F. Searles, a psychoanalyst renowned for his Herculean efforts to treat schizophrenic patients psychoanalytically, has eloquently complained that the more classical view of the neutral and abstinent analyst requires the analyst to be a person who somehow transcends the ordinary human vulnerability to confusion, envy, destructiveness, and perversity, and is able to listen to extraordinarily painful and disturbing material with the serenity of a Mother Teresa.

With few exceptions, within the field of infant–parent psychotherapy, the therapist is still expected to be superhuman in this way. Yet infant–parent psychotherapy evokes what are arguably the most intense and disturbing countertransference responses imaginable.

Intimate work with an infant in distress is guaranteed to stimulate the therapist's loving and protective feelings. To a lesser extent, the kinds of narcissistic hungers that are assuaged by producing a healthy child, the longings and impulses that Erikson (1952) so graciously called generative, are also engaged. When the child is actually in a life-threatening predicament, as may be the case in medical crises or instances of parental or institutional neglect or abuse, these countertransferential feelings take on a terrifying immediacy and power.

In 1999, Arietta Slade wrote the following:

Therapy concerns itself over and over again with loss, separation, and reunion—both in its consideration of such events in patients' lives, and in the constant separations and reunions that are intrinsic to the therapeutic process. And just as losses, separations and reunions have meaning for patients, so do they have meaning for therapists. Similarly, just as being cared for may be quite evocative for patients, so may the experience of caring be evocative for therapists. Many therapists have suffered early loss and abandonment; naturally, they will vary in the degree to which they have reconciled and come to terms with these experiences. And, regardless of the degree to which a therapist has come to terms with his or her

own early experiences, different patients will engage the therapist's attachment dramas in different ways. (p. 589)

When a child or infant is dangerously uncared for or maltreated in his family, finding the appropriate therapeutic stance can be very challenging. On the one hand, these situations seem to call for an intense level of therapist activity. The ethics of standing by as a child appears to slip away into physical or psychological death is tricky. On the other hand, activity may be a defense against thinking and feeling, including thinking that, in reality, the therapist's power and influence are often very limited. Sometimes it seems there is no other option than standing by; at other times, one's most sincere and strenuous efforts are unavailing. There are few things more painful

and difficult in life than watching helplessly as a beloved child slips away. The feelings are not just feelings of grief, but inevitably of failure and self-reproach. Adults are supposed to be able to protect and care for children. Perhaps, given the actual impossibility of the task, we are supposed to have illusions that we can. Anyone whose career has involved him or her for any length of time with high-risk infants and their families has had such comforting illusions remorselessly eroded. Again and again, we have seen children we have grown to care for overwhelmed by circumstances beyond our control, and we see the window of opportunity for growth and healing in a place of safety slam shut. To continue in this work is to find a way to bear this without burning out or shutting down. This is the challenge we all face. ♠

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BRAIN DEVELOPMENT

The human brain begins forming very early in prenatal life (just 3 weeks after conception), but in many ways, brain development is a lifelong project. That is because the same events that shape the brain during development are also responsible for storing information—new skills and memories—throughout life. The major difference between brain development in a child versus learning in an adult is a matter of degree: The brain is far more impressionable (neuroscientists use the term *plastic*) in early life than in maturity. This plasticity has both a positive and a negative side. On the positive side, it means that young children's brains are more open to learning and enriching influences. On the negative side, it also means that young children's brains are more vulnerable to developmental problems should their environment prove especially impoverished or un-nurturing.

Q: Which plays a more important role in brain development, nature (genes) or nurture (environment)?

A: Genes and environment interact at every step of brain development, but they play very different roles. Generally speaking, genes are responsible for the basic wiring plan—for forming all of the cells (neurons) and general connections between different brain regions—while experience is responsible for fine-tuning those connections, helping each child adapt to the particular environment (geographical, cultural, family, school, peer-group) to which he belongs. An analogy that is often used is wiring a phone network: genes would specify the number of phones and the major trunk lines that connect one relay station to the next. Experience would specify the finer branches of this network—the connections between the relay station and each person's home or office.

For example, each of us is born with the potential to learn language. Our brains are programmed to recognize human speech, to discriminate subtle differences between individual speech sounds, to put words and meaning together, and to pick up the grammatical rules for ordering words in sentences. However, the particular language each child masters, the size of his vocabulary, and the exact dialect and accent with which he speaks are determined by the social environment in which he is raised—that is, the thousands of hours he has spent (beginning even before birth) listening and speaking to others. Genetic potential is necessary, but DNA alone cannot teach a child to talk.

Q: Does experience change the actual structure of the brain?

A: Yes. Brain development is "activity-dependent," meaning that the electrical activity in every circuit—sensory, motor, emotional, cognitive—shapes the way that circuit gets put together. Like computer circuits, neural circuits process information through the flow of electricity. Unlike computer circuits, however, the

circuits in our brains are not fixed structures. Every experience—whether it is seeing one's first rainbow, riding a bicycle, reading a book, sharing a joke—excites certain neural circuits and leaves others inactive. Those that are consistently turned on over time will be strengthened, while those that are rarely excited may be dropped away. Or, as neuroscientists sometimes say, "Cells that fire together, wire together." The elimination of unused neural circuits, also referred to as "pruning," may sound harsh, but it is generally a good thing. It streamlines children's neural processing, making the remaining circuits work more quickly and efficiently. Without synaptic pruning, children wouldn't be able to walk, talk, or even see properly.

Q: How does nutrition affect the developing brain?

A: Brain development is most sensitive to a baby's nutrition between mid-gestation and 2 years of age. Children who are malnourished—not just fussy eaters but truly deprived of adequate calories and protein in their diet—throughout this period do not adequately grow, either physically or mentally. Their brains are smaller than normal because of reduced dendritic growth, reduced myelination, and the production of fewer glia (supporting cells in the brain which continue to form after birth and are responsible for producing myelin). Inadequate brain growth explains why children who were malnourished as fetuses and infants suffer often lasting behavioral and cognitive deficits, including slower language and fine motor development, lower IQ, and poorer school performance.

A baby's birth weight—and brain size—do depend on the quality of his or her mother's nutrition during pregnancy. Pregnant women should gain about 20% of their ideal pre-pregnancy weight (e.g., 26 lb for a 130-lb woman) to insure adequate fetal growth. This requires consuming an extra 300 calories per day, including 10–12 extra grams of protein.

After birth, brain growth depends critically on the quality of a child's nutrition. Breast milk offers the best mix of nutrients for promoting brain growth, provided that breast-fed infants receive some form of iron supplementation beginning around 6 months of age. (Most infant cereals are fortified with iron, and breast-fed babies require this supplementation at 6 months whether or not their mothers are iron-deficient.) Iron deficiency has been clearly linked to cognitive deficits in young children. Iron is critical for maintaining an adequate number of oxygen-carrying red blood cells, which in turn are necessary to fuel brain growth. Bottle-fed babies should receive formula that contains iron.

Because of the rapid pace of myelination in early life, children need a high level of fat in their diets—some 50% of their total calories—until about 2 years of age. Babies should receive most of this fat from breast milk or formula in the first year of life, and breast milk remains an excellent source of liquid nutrition into the toddler years. However, whole cow's milk can be introduced after the first birthday, and provides an excellent source of both fat and protein for toddlers in the second year. After 2 years of age, children should begin transitioning to a more heart-healthy level of dietary fat (no more than 30% of total calories), including lower-fat cow's milk (1 or 2%).

Q: How developed is the brain by birth?

A: Although it has already undergone an amazing amount of development, the brain of a newborn baby is still very much a work-in-progress. It is small—little more than one-quarter of its adult size—and strikingly uneven in its maturity. By birth, only the lower portions of the nervous system (the spinal cord and brain stem) are very well developed, whereas the higher regions (the limbic system and cerebral cortex) are still rather primitive.

The lower brain is therefore largely in control of a newborn's behavior: All of that kicking, grasping, crying, sleeping, rooting, and feeding are functions of the brain stem and spinal cord.

Even the striking visual behavior of newborns—their ability to track a bold moving object, like a red ball of string, or to orient to Mom or Dad's face—is thought to be controlled by visual circuits in the brain stem. When pediatricians conduct a series of reflex tests on the newborn, they are primarily assessing the function of these lower neural centers. These reflexes include the doll's eye maneuver (the baby's eyes stay focused forward when his head is turned to one side), the "Moro" or startle response (baby splay out arms and then slowly closes them in response to a sudden movement or feeling of falling), and even the remarkable stepping reflex (the baby "walks" when you hold him up with feet touching a flat surface).

The human brain takes time to develop, so nature has ensured that the neural circuits responsible for the most vital bodily functions—breathing, heartbeat, circulation, sleeping, sucking, and swallowing—are up and running by the time a baby emerges from the protective womb. The rest of brain development can follow at a more leisurely pace, maximizing the opportunity for a baby's experience and environment to shape his emerging mind.

Q: What role do parents play in a baby's brain development?

A: Parents are another important part of the developmental equation. Infants prefer human stimuli—your face, voice, touch, and even smell—over everything else. They innately orient to people's faces and would rather listen to a speech or singing than any other kind of sound.

Just as newborn babies are born with a set of very useful instincts for surviving and orienting to their new environment, parents are equally programmed to love and respond to our babies' cues. Most adults (and children) find infants irresistible and instinctively want to nurture and protect them. It is certainly no accident that the affection most parents feel toward their babies and the kind of attention we most want to shower them with—touching, holding, comforting, rocking, singing and talking to—provide precisely the best kind of stimulation for their growing brains. Because brain development is so heavily dependent on early experience, most babies will receive the right kind of nurturing from their earliest days, through our loving urges and parenting instincts.

In spite of all the recent hype about "making your baby smarter," scientists have not discovered any special tricks for enhancing the natural wiring phase in children's brain development. Normal, loving, responsive caregiving seems to provide babies with the ideal environment for encouraging their own exploration, which is always the best route to learning.

The one form of stimulation that has been proven to make a difference is language: infants and children who are conversed with, read to, and

otherwise engaged in lots of verbal interaction show somewhat more advanced linguistic skills than children who are not as verbally engaged by their caregivers. Because language is fundamental to most of the rest of cognitive development, this simple action—talking and listening to your child—is one of the best ways to make the most of his or her critical brain-building years.

Q: Are there any differences in the development of boys' and girls' brains?

A: Yes, but they are subtle, and are a product of both nature and nurture.

Neuroscientists have known for many years that the brains of men and women are not identical. Men's brains tend to be more lateralized—that is, the two hemispheres operate more independently during specific mental tasks like speaking or navigating around one's environment. For the same kinds of tasks, females tend to use both their cerebral hemispheres more equally. Another difference is size: males of all ages tend to have slightly larger brains, on average, than females, even after correcting for differences in body size.

Electrical measurements reveal differences in boys' and girls' brain function from the moment of birth. By 3 months of age, boys' and girls' brains respond differently to the sound of human speech. Because they appear so early in life, such differences are presumably a product of sex-related genes or hormones. We do know that testosterone levels rise in male fetuses as early as 7 weeks of gestation, and that testosterone affects the growth and survival of neurons in many parts of the brain. Female sex hormones may also play a role in shaping brain development, but their function is currently not well understood.

Sex differences in the brain are reflected in the somewhat different developmental time-tables of girls and boys. By most measures of sensory and cognitive development, girls are slightly more advanced: Vision, hearing, memory, smell, and touch are all more acute in female than male infants. Girl babies also tend to be somewhat more socially attuned—responding more readily to human voices or faces, or crying more vigorously in response to another infant's cry—and they generally lead boys in the emergence of fine motor and language skills.

Boys eventually catch up in many of these areas. By age 3, they tend to out-perform girls in one cognitive area: visual-spatial integration, which is involved in navigation, assembling jigsaw puzzles, and certain types of hand-eye coordination. Males of all ages tend to perform better than females on tasks like mental rotation (imagining how a particular object would look if it were turned 90 degrees) while females of all ages tend to perform better than males at certain verbal tasks and at identifying emotional expression in another person's face. (It is important to emphasize that these findings describe



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only the average differences between boys and girls. In fact, the range of abilities within either gender is much greater than the difference between the "average girl" and the "average boy." In other words, there are plenty of boys with excellent verbal skills and girls with excellent visual-spatial ability. While it can be helpful for parents and teachers to understand the different tendencies of the two sexes, we should not expect all children to conform to these norms.)

Genes and hormones set the ball rolling, but they do not fully account for sex differences in children's brains. Experience also plays a fundamental role. Consider, for example, the "typical" boy, with his more advanced spatial skills; he may well prefer activities like climbing or pushing trucks around—all of which further hone his visual-spatial skills. The "typical" girl, by contrast, may gravitate more toward games with dolls and siblings, which further reinforce her verbal and social skills. It is not hard to see how initial strengths are magnified—thanks to the remarkable plasticity of young children's brains—into significant differences, even before boys and girls begin preschool.

But this remarkable plasticity also provides parents and other caregivers with a wonderful opportunity to compensate for the different tendencies of boys and girls. For example, it is known that greater verbal interaction can improve young children's language skills. So the "typical boy" may especially benefit from a caregiver who engages him in lots of conversation and word play. On the other hand, the "typical girl" may benefit more from a caregiver who engages her in a jigsaw puzzle or building a block tower—activities that encourage her visual-spatial integration. The point is not to discourage children from sex-typical play (since pushing trucks or playing with dolls are great activities for any young child), but to supplement those activities with experiences that encourage the development of many competences.

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Ask the Expert

ROSS A. THOMPSON

ZERO TO THREE Board Members answer your questions about best practices and provide practical information you can use in your work with infants, toddlers, and their families.

MEET: Ross Thompson, PhD, is a professor of psychology at the University of California, Davis. Dr. Thompson's work focuses on early personality and socioemotional development in the context of close relationships. Dr. Thompson has served twice as associate editor of *Child Development*, was a Senior NIMH Fellow in Law and Psychology at Stanford University in 1989-90, and served on the Committee on Integrating the Science of Early Childhood Development of the National Academy of Sciences (1998-2000). He is the author of numerous books and has received the Boyd McCandless Award from the American Psychological Association, and the Ann L. Brown Award for Excellence in Developmental Research.

Changing Views of Social Development

Q: For so long we believed that infants and young children are egocentric and have little understanding of people's thoughts and feelings. What caused researchers to change their views?

A: Quite simply, evidence began to accumulate that young children are not so socially insensitive. Some of the evidence came from everyday observations of young children. Watching a 2-year-old tease an older sibling or comfort a distressed friend, any observer could see non-egocentric social understanding at work. And sometimes when young children appear egocentric, it is instead due to limitations in their social knowledge or experience. When a toddler offers her teddy bear to a distressed parent, it is probably because few toddlers know how to comfort a sad adult, so she offers something that works for her.

Once researchers began to question whether young children are as egocentric as earlier believed, they realized that some research tasks that allegedly demonstrated egocentrism were probably too complex for young children. Being asked to indicate how a three-dimensional landscape would look to someone sitting across from you is a conceptually challenging assignment—it's no wonder that young children were unable to do it and appeared egocentric. When the tasks were simplified, however, children showed far greater social and emotional understanding. Developmental researchers sometimes debate whether research tasks today are too easy and infants and toddlers are credited with too much insight from simple responses like looking and reaching. But it is clear that young children are far more aware of people as psychological beings than we had earlier thought.

Q: Does this new understanding have practical value?

A: I think it does. We respond to young children based on what we think they understand. When we realize that they are trying to comprehend people's intentions, thoughts, and feelings, we can interact with them in ways that help—such as by providing emotional signals (of

reassurance or caution) when infants look to us after confronting something new, or explaining to a toddler why a sibling is angry, or enlisting an 18-month-old in building a block tower with a shared goal, or explicitly contrasting a 2-year-old's intentions with those of a friend when they are in conflict. It is fascinating to be with an infant or young child, mindful of their expanding understanding of the social world.

This knowledge is practically important for another reason. We used to believe that infants and young children could not experience depression or post-traumatic stress because they did not have the psychological maturity to be vulnerable to emotional psychopathology. We now know that this is untrue. As we begin to understand how young children are developing a sense of themselves and others from early social experiences, we can better understand their early vulnerability to emotional and behavioral problems when they are living in abusive families or with a parent who has an affective disorder.

Q: Is our understanding of early childhood changing in other ways?

A: I believe that we are in the midst of an historic revolution in our understanding of young children. The first stage of that revolution began in 1997 with the "I Am Your Child" campaign that advanced public awareness of early brain development. Since that time, the realization that the brain experiences explosive growth during the early years has become part of our thinking about early childhood.

The second stage of this revolution, also emerging over the past 10 years, is public concern with school readiness. The realization that children do not enter school equally prepared to learn has focused attention on the early influences that account for these differences.

A third stage of this historic revolution is underway—it is our growing realization of the depth and vulnerability of young children's emotional lives. Early childhood was always seen as a period of carefree joy and delight, but growing evidence that young children can

be depressed and show signs of post-traumatic stress, that the origins of conduct disorders can be observed as early as age 2, and that other serious emotional and behavioral problems emerge in the early years challenges the traditional view of carefree childhood. When young children grow up in difficult family environments, or are biologically vulnerable to emotional problems, the foundations of enduring mental health problems can emerge.

Together with our growing awareness of early social and emotional understanding, these influences are transforming our thinking about young children—with practical consequences. Research on developing brains and minds has changed the public conversation about early child care: no longer can we describe care settings as adequate if they are merely safe, and parents are now concerned about early education.

Q: So how do we best communicate developmental science to the public?

A: As practitioners, our challenge is to anticipate the questions raised by these monumental changes in public thinking about infants and young children. What does the importance of brain development mean for how we care for infants and toddlers? We need to communicate that relationships, not DVDs, are the best stimulation for an expanding mind. If school readiness begins early, what experiences best prepare young children for classroom learning? We need to convey that school readiness has origins in letter and number skills but also in the growth of self-regulation, self-confidence, motivation to learn, and social and emotional capabilities. If early childhood is important, what are the best public investments in giving young children a good start? There are many exciting potential answers to this question that are currently being debated. By starting with what people have learned about the early years, and addressing the questions they are asking about the meaning of this new knowledge, we can help translate that knowledge into wise public policy.



Jargon Buster

Given the multidisciplinary nature of our work with infants, toddlers, and families, we often come across words or acronyms that are new or unfamiliar to us. To enhance your reading experience of this issue of *Zero to Three*, we offer a glossary of selected technical words or terms used by the contributing authors in this issue. Please note that these definitions specifically address how these terms are used by the authors in their articles and are not intended to be formal or authoritative definitions.

Phrase	What it means
Affect Sharing Model	The Affect Sharing Model (Legerstee, 2005) provides a framework that explains how infants develop the awareness of another's thoughts and feelings through their social relationships. (Find it in Markova & Legerstee, page 26.)
Habituation	Habituation is the tendency for humans to have a decreased response to something when it becomes familiar. Habituation has been widely used in infant research because it can allow experimenters to assess an infant's ability to discriminate between objects or events. Experimenters first present an object or event until it is familiar and no longer sustains the child's attention. Then experimenters present the second stimulus and measure the infant's response. Looking longer at one event suggests that the infant views that event as novel relative to the habituation event. (Find it in Henderson, Gerson, & Woodward, page 13.)
Intention Understanding	Intention understanding is a term used to describe how infants come to know that people have thoughts, desires, beliefs, and goals, and that they act in ways that are consistent with these mental states. (Find it in Henderson, Gerson, & Woodward, page 13.)
Intersubjectivity	Intersubjectivity (Trevarthen, 1979) is the interaction between two people who are active in transmitting their understanding to each other. Infants become capable of intersubjectivity with a responsive caregiver early in the first year. Primary intersubjectivity begins during the first few months of life, when infants and their caregivers exchange emotional and social signals with each other. Secondary intersubjectivity begins during the second half of the first year, when infants and their caregivers share their interest and understanding of another object (e.g., a toy, another person). (Find it in Markova & Legerstee, page 26.)
Proto-Conversations	Proto-conversations are interactions between infants and their caregivers that involve the exchange of gaze, facial expressions, vocalizations, and movements in a reciprocal fashion prior to the infant's ability to use words. (Find it in Markova & Legerstee, page 26.)
Shared Intentionality	Shared intentionality is collaborative activity in which participants share the same psychological state. Shared intentionality sets the groundwork for critical developmental milestones, such as language development and pretend play, and provides the foundation for social understanding. (Find it in Goodman & Tomasello, page 21.)
Triadic Interactions	Triadic interactions are when the baby, an adult, and a third party (e.g., a toy, another person) interact together. (Find it in Goodman & Tomasello, page 21.)
	<p>Legerstee, M. (2005). <i>Infants' sense of people: Precursors to a theory of mind</i>. New York: Cambridge University Press.</p> <p>Trevarthen, C. (1979). Communication and cooperation in early infancy: A description of primary intersubjectivity. In M. Bullowa (Ed.), <i>Before speech: The beginning of interpersonal communication</i> (pp. 321–347). New York: Cambridge University Press.</p>

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July: Current Issues and Trends in Child Welfare Services

September: Supporting Language Development—Research, Policy, & Practice

November: The Children of Immigrants

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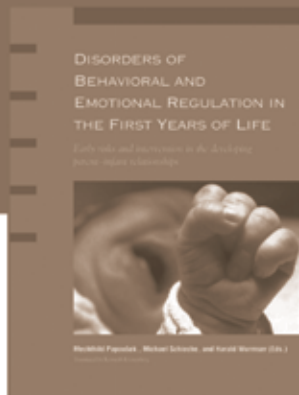
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the Developing Parent–Infant Relationship*

MECHTHILD PAPOUŠEK, MICHAEL SCHIECHE, and HARALD WURMSER
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