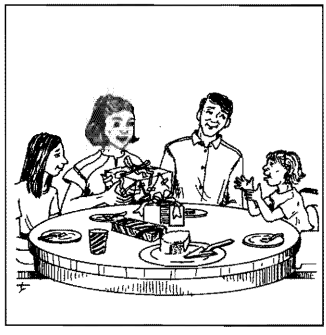
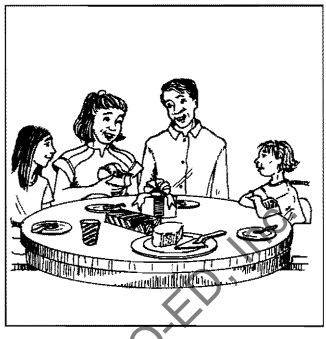
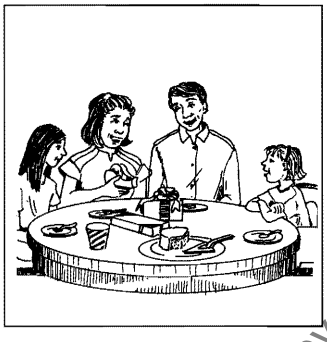
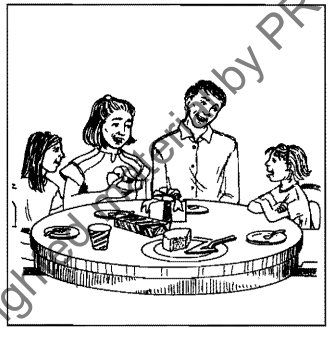
Introduction

Carefully read the following paragraphs, using the illustrations (larger versions on CD) to help you form a clear mental image of the depicted scenario.









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Imagine for a moment that you are a fly on the wall at the home of a family of four. The family members are seated around the dining-room table. The table has been mostly cleared, but there is about one third of a small cake on the table as well as several wrapped gifts, which are sitting in front of Mom. Mom reaches for the nearest package (which looks as if it has been dragged around behind a bulldozer all afternoon) and begins to open it.

"I **wonder** who **this** one is from," says Mom looking directly at Katie, who is 4 years old and the youngest member of the family.

"It's from **me!**" Katie beams. "And I wrapped it all by myself!"

Mom opens the package slowly; the suspense building. At last, she uncovers a small box, out of which she pulls a dispenser of Scotch tape.

"Scotch tape!!!" Mom exclaims, nothing short of glee in her voice. "Katie, I am **always** looking for the tape! What a thoughtful gift!"

Katie, still beaming, says, "**AND** I picked it out all by myself, too!"

At this point, you notice that Elizabeth, age 9, catches Dad's eye. They make eye contact, after which Elizabeth glances at Katie. Dad then also glances at Katie. Elizabeth

looks back at Dad to see him smiling at Katie. Dad then turns his gaze back to Elizabeth. Dad and Elizabeth share a conspiratorial grin—Elizabeth stifling a chuckle, her shoulders raised slightly.

In an instant, you infer several things, including the following:

1. It is Mom's birthday.
2. The family has already eaten birthday cake.
3. Katie is not yet an accomplished gift wrapper, but she is proud of her accomplishment, nonetheless.
4. Mom wants Katie to believe that she is really excited about the Scotch tape. In fact, Mom is probably really excited that Katie selected and wrapped her own gift; having more tape in the house is not quite the thrill her behavior would imply.
5. Katie believes that Mom is really excited about the Scotch tape, and this makes Katie happy.
6. Elizabeth believes that Katie believes that Mom believes that having another roll of Scotch tape really **is** a thrill. But Elizabeth also believes that, for Mom, it is truly the thought that counts. Elizabeth also believes that Dad shares her beliefs about Mom and Katie's beliefs about the gift.

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Although none of the aforementioned statements were explicitly stated, most people are readily able to infer them from context. They do so because they are skilled at observing and analyzing behavior. They discriminate and read or interpret a variety of cues, some of them quite subtle, with little or no effort. Theory and research suggest that although children with autism perceive, think, feel, remember, believe, guess, and engage in other cognitive processes, they do not appear to think about their own or other's perceptions, thoughts, emotions, and other cognitive processes such as remembering, believing, guessing, and so on (Baron-Cohen, 1988, 1995), or certainly not to the extent that typically developing children do (Leslie, 1994; Perner, Frith, Leslie, & Leekam, 1989).

Thinking about one's own mental states and processes is called "introspection." In the psychology literature, the ability to postulate the existence of mental states in others is most often referred to as "theory of mind" (Premack & Woodruff, 1978). Using a theory of mind, one is able to explain and predict another person's behavior (Baron-Cohen, 1988)—in other words, to take the perspective of another person. Researchers have proposed that the absence of this skill or ability underlies many of the social and pragmatic deficits that are characteristic of people with autism (Baron-Cohen, 1988, 1995; Leslie, 1994).

For the purposes of this book, the terms *theory of mind* and *perspective taking* can be used interchangeably. In this introduction, I will (a) identify the behaviors and skills that either comprise perspective taking or that are hypothesized to be prerequisites for the acquisition of more complex perspective-taking skills and (b) review some of the most relevant research related to interventions that target and identify those skills in children with autism spectrum disorders. In subsequent chapters, I will present step-by-step teaching programs that are designed to systematically remediate some of the deficits in these skills.

Although most of the teaching programs in the first three chapters require little if any verbal language and can be adapted for nonverbal children, most of the teaching programs in Chapters 4, 5, and 6 require that expressive- and receptive-language functioning be near, and in some cases within, normal limits for typical 4- to 7-year-old children. It is not, however, within the scope of this book to review teaching programs designed to teach language skills to children with autism. Many such texts are available, providing curriculum outlines for basic instruction in imitation, matching, sorting, and so forth, as well as beginning, intermediate, and advanced language instruction for children with autism spectrum disorders (see the Resource Guide, in the Appendix, for references to Taylor & McDonough, 1996; Leaf & McEachin, 1999 and Sundberg & Partington, 1998). Moreover, this book is ideally meant to be a resource for teachers, consultants, and parents of young children with autism who are engaged in intensive Applied Behavior Analysis (ABA) intervention programs.

Primary Deficits Associated with Autism Spectrum Disorders

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Several compelling theoretical models hypothesize the primary deficits in autism, including (a) affective theory, which proposes that the social deficits observed in autism result from an underlying, primary disturbance in the ability to interact emotionally with others (Hobson, 1983; Kanner, 1943); (b) the cognitive theory of Frith, Leslie, and Baron-Cohen, which proposes a cognitive disturbance in the ability to infer mental states in others because of an underlying disturbance in (or a failure to develop) a complex cognitive mechanism which enables the formulation of metarepresentations (i.e., mental representations of mental processes; Baron-Cohen, 1988, 1995; Baron-Cohen, Leslie, & Frith, 1985); and (c) the intersubjectivity theory of Rogers and Pennington, which suggests the primacy of an impairment in the formation or coordination of specific self–other representations (Rogers & Pennington, 1991).

These models differ in terms of proposed core deficits, impairments in underlying structural mechanisms in the brain, cognitive abilities and limitations, and the interrelationships among the various symptoms. However, impairments in pretend or symbolic play, pragmatic-communication skills (including joint attention, eye-gaze tracking, and other forms of nonverbal communication), and theory of mind are proposed as central deficits, specific to autistic disorder, in all three of these models. Deficits in imitation, emotion detection and sharing, and abstract reasoning skills have also been proposed as key symptoms of autism spectrum disorders in one or more of these theoretical models.

Pretend-Play Deficits in Autism

Atypical play is one of the hallmark features and diagnostic criteria of autistic disorder (see the *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition, Text Revision* [*DSM-IV-TR*], American Psychiatric Association, 2000). Although children with autism are not characteristically impaired in the area of sensorimotor intelligence and, in fact, often demonstrate competence in playing with a variety of manipulative toys (e.g.,

puzzles, blocks, stacking rings, cups, etc.), findings suggest that deficits in symbolic-play skills are characteristic of autistic disorder (Baron-Cohen, 1987; Gould, 1986; Mundy, Sigman, Ungerer, & Sherman, 1987; Osterling & Dawson, 1994; Sigman & Ungerer, 1984; Stone, Lemanek, Fishel, Fernandez, & Altemeier, 1990).

Leslie (1994) argued that there are three fundamental forms of pretense and suggested that the emergence of pretense in typical children also heralds the emergence of theory of mind. The first of these three forms is *object substitution pretense.* To use Leslie's example of object substitution pretense, you can pretend that a banana is a phone by holding it up to your ear and talking into it.

The second form is *properties pretense,* in which you can pretend that objects have physical properties they do not really have. For example, you can pretend that a feather is as heavy as a brick by picking it up from the floor and feigning muscular effort or strain, or by touching a toy stove and pretending it is hot by quickly jerking away your hand while saying "ouch." In the third type of pretense, you can pretend that imaginary objects have an existence. For example, you do not need a banana, or any other object, to pretend you are holding and talking into a telephone. If you bring your empty hand to your ear, hold your hand as if grasping a telephone, and say, "Hello?" most people will immediately know you are pretending to answer the telephone.

Flavell, Green, and Flavell (1986) found that typically developing children between 4 and 6 years of age were able to discriminate appearance from reality when they were presented with misleading objects. For example, when they were shown a stone painted to look like an egg, typically developing 4-year-olds demonstrated no difficulty in discriminating reality from pretense. Baron-Cohen (1989a), however, found that children with autism failed at this same task. The children in his study were more inclined to make errors that were consistent with their perception rather than with their actual knowledge of the object, suggesting that the stone really was an egg.

Baron-Cohen (1987) further suggested that many children with autism have the capacity to engage in play requiring first-order representations (i.e., pretending to use a real or toy telephone) but not second-order representations, which are considered true symbols. An example of a second-order representation used in play would be a child *knowing* that a banana is a banana (i.e., a sweet, yellow, crescent-shaped fruit) but *pretending* that it is a telephone.

Leslie (1994) noted that as young, neurotypical children develop the ability to pretend, they also spontaneously develop the ability to understand pretense in others. He proposed that a single mechanism might be responsible for both abilities as well as for the ability to comprehend the concept of belief.

Lewis and Boucher (1988) found that although the autistic children in their study were able to engage in pretend play when instructed to do so, they were not observed to pretend in their spontaneous play. It is possible that pretend play is not as intrinsically motivating for some children with autism as it is for their neurotypical peers. Alternatively, Rogers and Pennington (1991) suggested that the deficits in symbolic play observed in children with autism might be because these children have a paucity of knowledge and experience in the social world and, therefore, spend an inordinate amount of time engaged in the physical manipulation of objects. They propose that if, as Piaget (1962) suggested, the purpose of play is to practice and maintain newly mastered schemas, the child with autism would have too few resources to form the subject and content of varied

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symbolic play scenarios. Rogers and Pennington (1991) also suggested that deficits in deferred imitation skills were potentially precursory to subsequent deficits in symbolic play. In any case, the pretend play of children with autism prior to intervention, varied considerably in terms of the quality and varied content of the play as well as the quantity of time spent engaged in pretend play.

Although pretend play does not necessarily develop as spontaneously in children with autism spectrum disorders as it does in their typically developing peers, researchers have had success in the teaching and generalization of pretend-play skills with children who have autism (Kasari, Freeman, & Paparella, 2006; Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993; Stahmer, 1995). Furthermore, in cases in which children with autism develop pretend-play skills without intervention but engage only infrequently in spontaneous pretend play (i.e., without being asked to do so), it should be possible to encourage spontaneous pretend play by providing positive reinforcement contingent upon the child's engagement in specifically targeted play activities, including the novel use of familiar toys and play materials, and the familiar use of toys and play materials in novel environments or with unfamiliar play partners.

Lifter et al. (1993) considered the developmental level of the child's play behavior when determining an appropriate starting point for teaching pretend play to preschoolers with autism. The Developmental Play Assessment (DPA), a leveled instrument used to assess the play of children with disabilities according to the frequency and variety of play activities at each level, was developed by Lifter, Edwards, Avery, Anderson, and Sulzer-Azaroff in 1988 and is described in Lifter et al. (1993).

Using the DPA, Lifter and her colleagues assessed preintervention play levels of study participants and selected three participants who demonstrated "readiness" for instruction in pretend play. Investigators then selected individualized teaching targets for the children, using the DPA's symbolic play categories of child-as-agent and doll-as-agent. Child-as-agent play is play in which the child acts directly as the agent of an action directed at a doll. In doll-as-agent play, the doll is the agent of the action. Children were considered ready for child-as-agent pretend-play instruction if their play included examples of activities considered prerequisites to the child-as-agent category.

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In addition to level of readiness, Lifter et al. (1993) considered each child's particular skill set, interests, or preferences. For example, one child used the brush from the DPA materials to brush his own hair during the initial assessment; therefore, one of the target pretend-play activities selected for that child was hair brushing, at the first level of the child-as-agent category. At this level the child might run the brush across the doll's head as if brushing the baby's hair. Alternatively, within the doll-as-agent category, the child might be expected to pick up the toy brush, place it in the doll's hand and move it across the doll's head as if the doll is brushing its own hair. Doll-as-agent play is considered to be at a developmentally higher level than is child-as-agent play. In the Lifter et al. (1993) study, while the play activities from the child-as-agent category were consistently acquired and generalized in many cases, the activities from the doll-as-agent category "were not acquired, despite a greater number of teaching trials" (p. 153).

Kasari et al. (2006) taught symbolic play to 21children with autism by using a highly effective combined approach that incorporated a 5- to 8-minute structured, adult-directed teaching session used to establish specific target play skills, immediately followed by a 20-minute milieu teaching session using child-driven teaching strategies to promote

generalization of those play skills. The adult-directed teaching session took place at a table, and behavior analytic teaching methods, including the use of prompts and contingent positive reinforcement, were used to "prime the specific treatment objective" (Kasari et al., 2006, p. 619). The naturalistic milieu teaching session took place on the floor with an expanded set of toys, and "the experimenter used techniques such as following the child's lead and interest in activities" (p. 619), narrating the child's play and manipulating the play materials to encourage the child's social communication. Using symbolic-play levels adapted from the categories used in Lifter et al.'s (1993) study, Kasari and colleagues (2006) also selected teaching targets based on assessments of individual children's pretreatment symbolic-play levels and toy preferences. Follow-up assessments demonstrated impressive collateral effects on language acquisition (Kasari, Freeman, Paparella, & Jahromi, 2008). It should be noted that for each of the children in this study, this approximately 30-minute daily intervention took place in the context of an intensive 6-hour-per-day ABA program.

There is no question that play occupies a central role in the daily lives of typically developing children. Much of the social and communicative interaction between children takes place in the context of play. If we want children with autism to learn how to interact appropriately with their typically developing peers, helping them to become competent at pretend play would most certainly facilitate that process by providing a natural context in which such social interaction could occur. Furthermore, if children are able and motivated to engage in play, it can be used as a medium or milieu in which other skills can be taught using natural environment or incidental teaching methods (Hart & Risley, 1968; Kaiser & Hester, 1994; McGee, Krantz, & McClannahan, 1985; Pierce & Schreibman, 1995). Therefore, it follows logically that systematic instruction in pretend play should be an important component of early intervention programs for children with autism. Chapter 3 of this book is composed of teaching programs designed to teach children with autism spectrum disorders to engage in frequent, spontaneous, and nonrepetitive pretend-play activities. Suggestions for promoting reciprocal play interactions are also provided in Chapter 3.

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Joint-Attention Deficits in Autism

Perhaps one of the most fundamental social deficits in autism is in the area of joint attention. Joint attention has been defined as the use of "gestures and eye contact to coordinate attention with another person in order to share the experience of an interesting object or event" (Mundy, Sigman, & Kasari, 1994); for example, a person sharing his or her experience with a communication partner by pointing to objects or people engaged in interesting activities while alternating his or her gaze between the interesting object or event and the communication partner.

Another definition of joint attention refers to "three way exchanges that involve self, other, and object and may be expressed in the form of referential looks between people and objects, pointing, and showing gestures" (Kasari, Sigman, Mundy, & Yirmiya, 1990, p. 88). Using Wetherby, Yonclas, and Bryan's (1989) definition of intentional communication, Stone, Ousley, Yoder, Hogan, and Hepburn (1997) required that, in order for a behavior or series of behaviors to be scored as a communicative act, the children in their

study had to direct a motoric act and a vocal act, or both, toward an adult *and* "await a response" (p. 683).

Dube, MacDonald, Mansfield, Holcomb, and Ahearn (2004) suggested that from a behavior analytic perspective, the cognitive-developmental definition of joint-attention initiation might be interpreted as a mand (request) for the adult's attention, as compared with a mand for a specific object. Dube et al. proposed that the attention of an adult may, in turn, be associated with supplemental social reinforcement such as increased smiling, affectionate gestures, and verbalizations; ready offers of unsolicited assistance that may be needed to enhance or sustain the reinforcing value of an activity; or, in the presence of novel and potentially anxiety-provoking stimuli, either reassurance or the reduction or termination of any stimuli that may turn out to be aversive.

Children with autism have been shown to demonstrate significantly fewer joint-attention behaviors, even when compared to children with other developmental delays and disorders, including Down syndrome, intellectual disability of unknown etiology (Mundy, Sigman, & Kasari, 1990), and nonspecified language impairment (Stone et al., 1997), even when controlling for language level, mental age, or IQ (McArthur & Adamson, 1996; Mundy et al., 1990). In fact, while these skills develop in typically developing children during infancy (Trevarthen & Hubley, 1978), a conspicuous absence of these behaviors is considered another diagnostic hallmark of autism in toddlers and children of preschool age (Baron-Cohen, Allen, & Gillberg, 1992; Dowrick, Mars, & Mauk, 1996; Osterling & Dawson, 1994).

Osterling and Dawson (1994) used videotapes of infants at their first birthday parties to compare the behaviors of 11 children later diagnosed with autism to the behaviors of 11 children whose subsequent development followed a typical course. They found that a combination of four behaviors correctly classified 10 of the 11 children with autism in the sample, as well as 10 of the 11 typically developing children. These behaviors were pointing, showing objects to others, looking at others, and orienting to name. One variable alone, *looking at the face of another,* correctly classified 77% of the children by diagnostic group.

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Mundy and Crowson (1997) argued convincingly in favor of joint-attention behaviors being specifically included in both intensive early-intervention treatment regimens and outcome measures that evaluated the efficacy of those treatment regimens. They, along with others, argued that joint attention may be a "pivotal" skill—as defined by Koegel and Frea (1993) and Koegel, Koegel, and Schreibman (1991)—which, when established, may lead to important collateral changes in overall social functioning in children with autism. Once joint-attention behavior becomes spontaneous, the child's access to social information, shared social experience, and subsequent social reinforcement can increase (Charman, 2003). Research suggests that joint attention is positively related to language development in children with autism (Charman et al., 2003; Kasari et al., 2006; Kasari et al., 2008; Mundy et al., 1990) and negatively related to a disturbance in affective sharing (Kasari et al., 1990). It has also been proposed that joint attention may be a requisite skill for the development of theory of mind (Baron-Cohen, 1995).

Joint-attention skills are a clear benefit to children with autism, but only recently has it been demonstrated that these skills can, in fact, be taught. Whalen and Schreibman (2003), Kasari et al. (2006), and Taylor and Hoch (2008) have demonstrated the efficacy

of interventions that focus on teaching joint-attention skills to children with autism by using a combination of highly structured and incidental teaching methods based on the principles of Applied Behavior Analysis. Furthermore, Gulsrud, Kasari, Freeman, and Paparella (2007) demonstrated that children with autism who mastered joint-attention skills in the context of intervention were more likely to engage in shared interactions with the intervener—including a greater proportion of coordinated joint looks at novel stimuli—than were children who received an intervention package designed to teach symbolic-play skills but not joint attention.

Not all children with autism engage in components of joint attention, such as pointing or looking in the direction of a distal point, without receiving specific instruction (MacDonald et al., 2006; Taylor & Hoch, 2008). Although most children with autism require direct intervention to engage in more complex or socially governed behaviors, such as *initiating* bids for joint attention and coordinating gaze shift between an object and a person, many children learn to respond to joint-attention bids from others (especially when the communication partner uses a distal point) without specific instruction (MacDonald et al., 2006; Mundy et al., 1994; Taylor & Hoch, 2008; Whalen & Schreibman, 2003). And while many children with autism will not require direct instruction on *all* components of joint attention, many will require some. It is therefore important to (a) understand those components and complex behaviors, (b) assess the degree to which they are present in students, (c) teach any that do not present spontaneously, and (d) enhance those that occur with less frequency or variety than is typical.

It can be argued that joint attention requires, as a prerequisite skill, that an individual understand the "facts of vision" (Lempers, Flavell, & Flavell, 1977):

> Knowing, for example, that normally at least one open unobstructed eye is necessary for vision, that eye-orientation indicates which objects are being viewed, that objects which are not occluded by any other and which stand along an imaginary straight line from a person's open eye(s) (that is, along their "line of sight") will be visible, and that what one person sees or does not see has absolutely no effect on what another person sees, etc. (Baron-Cohen, 1989b, p. 114)

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Research suggests that some of these skills are intact in children with autism when tested under contrived conditions (Baron-Cohen, 1989b; Hobson, 1984). However, this does not mean that children with autism routinely attend to the direction of eye gaze in others, nor does it mean that all children with autism will develop these skills without intervention. In his book *Mindblindness: An Essay on Autism and Theory of Mind,* Baron-Cohen (1995) proposed that having the capacity for theory of mind is predicated on earlier or more primitive skills, including the ability to determine both eye-gaze direction and intention in others. He suggested that the combination of these skills is a prerequisite for the development of the capacity for shared attention (joint attention), which is, in turn, a prerequisite for theory of mind. Of course, to ascertain another person's shift in eye gaze, one must be looking at that person's eyes. Diminished eye contact and deficits in orienting to the eyes and face of others is another hallmark feature of autism (Baron-Cohen et al., 1992; Robbins, Fein, Barton, & Green, 2001) and may contribute significantly to the problems children with autism demonstrate with gaze monitoring. Eye contact must therefore be addressed rigorously. Encouraging students with autism

to want to look at other people increases the likelihood of success when teaching more complex behaviors that require eye contact and gaze monitoring.

Another skill required for joint attention is the appropriate use and understanding of the protodeclarative point. The *protodeclarative point* is used to show or comment on an object to another person (i.e., indicating "Look at that"), whereas the *protoimperative point* is used to make requests (i.e., indicating "I want that"). These two types of pointing are discriminated in the literature primarily in terms of their respective functions. Baron-Cohen (1989b) found that children with autism were significantly impaired in the use and understanding of protodeclarative pointing, as compared to children in both typical and Down syndrome control groups, but not significantly impaired in either the use or the understanding of protoimperative pointing.

While many children with autism initiate social interactions to make requests for tangible reinforcers at a rate that is comparable to that of their typically developing peers, they initiate communicative acts significantly less than do their peers when the function of the act is more purely social, such as commenting or showing (Bondy & Frost, 1995; Stone et al., 1997).

Dube et al. (2004) emphasized the importance of analyzing the functions of joint attention, suggesting this would lead to the design of interventions that produce meaningful behaviors as opposed to mechanistic ones (i.e., rote chains of behaviors that are topographically similar to joint attention behaviors but do not serve the same functions). However, if one is to use existing strengths to remediate relative weaknesses, it makes sense to first establish a behavioral repertoire that is topographically similar or identical to joint attention by using contingent reinforcement strategies that motivate the child to learn a specific chain of motor behaviors (i.e., teach first within the context of the function of requesting objects). Once that behavioral chain can be reliably elicited, it can be prompted and reinforced in such a way as to gradually alter or expand upon its function. Chapters 1 and 2 include teaching programs that are designed to teach individual component and combined coordinated joint-attention behaviors to children with autism spectrum disorders.

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Insight, Perspective Taking, and Theory of Mind

Evidence suggests that most children with autism do not understand the basic concept of the brain being an organ with mentalist functions (Baron-Cohen, 1989a). Tager-Flusberg (1992) compared language samples from children who had autism with samples from a control group of children with Down syndrome who were matched by age and language. The language samples were taken over a 1- to 2-year period. Findings suggest that while children in the autistic sample were comparable to controls in their talk about desire, perception, and emotion, they differed significantly in their use of language to solicit attention and to refer to cognitive mental states. For example, children with autism did *not* use the words *believe, figure, forget, guess, idea, mean,* or *trick,* whereas children with Down syndrome did use these words.

Tager-Flusberg (1992) argued that the paucity of the language children with autism used to talk about cognitive states "reflects an impaired ability to reflect on their own and other people's minds" (p. 172) and considered the possibility that without having the language to talk about cognitive states, these children could expect difficulty in social understanding and social relationships. In some respects, this could be considered a chicken-or-egg problem. However, regardless of how you look at it, children with autism need to learn the vocabulary used to describe cognitive processes or internal events as well as the vocabulary used for describing feeling states (e.g., *bored, lonely, discouraged, jealous*) if they are to be successful at articulating insight, taking the perspective of others, and in conveying that understanding to other people.

Inferring Intention

Baron-Cohen (1995) suggested that a basic building block in the process of learning to infer intention in others requires the child to predict and explain behavior in terms of the other person's (or agent's) goal or desire. Individuals are inclined not only to notice motion but also to identify the agent responsible for that motion. For example, if we are driving and see a ball roll out into the middle of the road, we instantly slow the car and look for the child (person) who is responsible for propelling that ball. We know that the ball didn't just roll by itself. Furthermore, we anticipate that the child might also run into the road because he wants (desires) to retrieve the ball.

People use clues from their environment to predict the behavior of others and navigate through their complex social world. If, for example, two people are standing on the curb at the airport with suitcases, one is soliciting the attention of (waving at) a cab driver and the other is soliciting the attention of (waving at) a porter, we infer in an instant which traveler is coming and which is going. We assume that one needs (desires) a ride away from the airport and the other wants (desires) help with his bags. Furthermore, we automatically register this information without effort and often without the slightest bit of interest in the events we have just apprehended.

A child with autism can certainly see the people with the suitcases and, if he or she attends to the people long enough, also notices them wave. Many children with autism, however, do not look beyond "what" is happening to "why" it is happening. If asked what each person wants, the child with autism might be able to figure it out and answer correctly. Consequently, it might be true that many children with autism do not automatically explain and predict the behavior of others in terms of desire or goal, even though they can draw such inferences once their attention is drawn to the task (Baron-Cohen, Leslie, & Frith, 1986).

Some children with autism cannot readily make inferences without being taught to do so. Like skill acquisition in many areas, however, it is not that children with autism cannot learn these skills; in many cases, children with autism need to be taught and encouraged to practice skills that other children seem to learn on their own.

Emotion Recognition, Belief, and False Belief

Studies suggest that while children with autism demonstrate the ability to recognize simple emotions such as happy and sad (Baron-Cohen, 1991; Ozonoff, Pennington, &

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Rogers, 1990), they have considerably more difficulty in recognizing the belief-based emotions of surprise and disappointment.

Between the ages of 4 and 6 years, typical children begin to understand that what a person believes—even if that belief is false—can affect his or her emotional state (Harris, Johnson, Hutton, Andrews, & Cooke, 1989). Baron-Cohen (1991) found that children with autism were able to predict whether a doll would be happy or sad upon receiving a preferred or nonpreferred brand of cereal. However, while they were able to predict emotion based on whether another person received something desirable or undesirable, the children were unable to predict emotion when it was based on belief. In one of several tests in this study, children were shown a small box of a familiar brand of cereal and asked what they thought was inside the box. They were then shown that the cereal inside the box (A) had been replaced with a different brand of cereal (B). Subsequently, they were shown a doll and told that this doll's cereal preference was A. Based on this information, children with autism were not able to predict that the doll would be initially happy to receive a box which she *believed* to contain her favorite cereal, only to be surprised and sad or disappointed to discover, upon opening the box, that the favorite cereal had been replaced by a nonpreferred brand of cereal.

Several studies have shown that children with autism are generally unable to attribute a false belief to another person (Baron-Cohen, Leslie, & Frith, 1985, 1986; Leslie & Frith, 1988; Perner et al., 1989). Using a modified version of Wimmer and Perner's (1983) puppet-play paradigm, Baron-Cohen et al. (1985) investigated the understanding of false belief in children who had autism. The children were presented with a scene in which there were two dolls, a basket, and a box, all in clear view. Their procedure was described as follows:

> There were two doll protagonists, Sally and Anne. First, we checked that the children knew which doll was which (Naming Question). Sally first placed a marble into her basket. Then she left the scene, and the marble was transferred by Anne and hidden in her box. Then when Sally returned, the experimenter asked the critical Belief Question: "Where will Sally look for her marble?" If the children point to the previous location of the marble, then they pass the Belief Question by appreciating the doll's now false belief. If, however, they point to the marble's current location, then they fail the question by not taking into account the doll's belief. These conclusions are warranted if two control questions are answered correctly: "Where is the marble really?" (Reality Question); "Where was the marble in the beginning?" (Memory Question). (p. 41)

Baron-Cohen et al. (1985) demonstrated that only children with autism, when compared with both typically developing children and children with Down syndrome, were unable to predict another person's behavior when predicated on false belief or deception. In contrast, Wimmer and Perner (1983) found that typically developing children were able to pass this test at 3 to 4 years of age. In light of this finding, as well as the finding that even the group of children with Down syndrome, who had more severe intellectual disability, were able to pass this test, Baron-Cohen and his colleagues (1985) concluded that the failure of the children with autism to predict another person's behavior when that person is operating under the assumption of a false belief constitutes a specific deficit

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that is largely independent of general intellectual ability. In a subsequent study, the same investigators demonstrated similar results using picture sequences that required far less language (Baron-Cohen et al., 1986). A summarized account of the procedures, including drawings of the picture sequences used, can also be found in *Mindblindness* (Baron-Cohen, 1995.)

Using a different testing procedure to test the same basic ability, Perner et al. (1989) showed each child a familiar candy container and asked what the child thought was inside. The child was then shown that it contained pencils and was asked what he or she originally thought was in the container when it was first presented and also what the next child would think when the procedure was repeated. As expected, children with autism performed poorly on this test.

Baron-Cohen (1995) made the point that understanding or passing tests such as these requires the same level of skill that it takes to understand why, in the fairy tale, Snow White buys and takes a bite of the poison apple. She does so because she (falsely) believes her wicked stepmother to be a harmless old woman. She believes this because she did not see her wicked stepmother put on the disguise and therefore did not *know* it was *really her* selling the apples. To follow this logic, one must understand the notion that a person's knowledge and beliefs are determined by the information to which they have access, and that different people have access to different information.

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Nested Beliefs, or Second-Order Belief Attribution

Nested beliefs, or second-, third- (and so on) order beliefs can best be described as beliefs about beliefs. In each of the previously discussed studies investigating autistic children's relative ability to make false belief attributions, at least some of the children in the autistic samples were able to pass the false belief tests. However, Baron-Cohen (1989c) found that none of the children with autism in his sample were able to pass a test of second-order belief attribution. In the example of Snow White, the reader's understanding that the wicked stepmother *believed* that Snow White *believed* her to be a poor old woman would be an example of second-order belief attribution.

Returning to the family birthday party scenario described at the beginning of this introduction, one can find several examples of nested beliefs, including second-, third-, and fourth-order beliefs. Following a written or spoken explanation of the nested beliefs depicted in that scenario may be confusing. However, according to theory, most 7- to 10-year-old children would readily make these attributions if they were seated around the same table or watching a videotape of this scenario. Furthermore, they would do so quickly and seemingly effortlessly, though they may not be as readily able to convey their understanding of these attributions articulately. Leslie (1994) described this processing task as "time pressured" and "on line" because inferences must be drawn "fast enough to keep up with the flow of behavior in a conversation or other interaction" (p. 211). In other words, this processing ability in typically developing children becomes virtually spontaneous or automatic. Baron-Cohen (1995) suggested that the speed of processing and accessibility to consciousness, among other characteristics of the manner in which these skills are manifest, can also result from "'over-learning', whereby skills become automatized" (Bates, 1993, p. 57). If that is so, might it also be possible to remediate social deficits to within normal limits in some people with autism via overteaching?

Consider the analogous task of learning a foreign language as a second language. Most people know individuals who, having spent substantial time immersed in another language and culture, particularly at a very young age, assimilate to the culture and can speak the foreign tongue with all the fluidity and nuance of a native speaker and without any detectable foreign accent. Consider also the skill with which some people are able to play a musical instrument. "Practice makes perfect," goes the old adage; none of us are born to instinctively or automatically play the "Flight of the Bumblebee," yet, with sufficient practice, especially beginning at a very young age, there are peope who can do so flawlessly.

Consider the possibility that, if autism is diagnosed early, and subsequent intervention begins early and intensively, many of these skills can be taught at, or close to, the age at which they would typically emerge on their own. Might acquisition of these skills, within a developmentally appropriate time frame, be related to prognosis? This is an empirical question, but one that certainly warrants study.

The language of social communication and perspective taking is a complex combination of verbal and nonverbal communication responses that appear to be coordinated, combined, and recombined automatically and effortlessly in a fluent, native speaker. To help learners with autism develop automatic, real-time social-processing skills, one needs to maximize opportunities for practice, first by finding ways to teach these skills with great repetition, and then by looking for opportunities to promote and systematically program for generalization and spontaneity in more naturalistic settings. This is not to say that with intensive early intervention all, or even most, children with autism who have general intelligence and language skills falling within normal limits will develop the *capacity* to automatically make nested-belief attributions, or, for that matter, to make false- or nested-belief attributions at all. In fact, the population of people with autism appears to be extremely heterogeneous with regard to the capacity for the acquisition of perspective-taking skills. Some children with autism may not be able to acquire the capacity to make false- or nested-belief attributions or even to understand simple social inference. For others, it may be a struggle, though a *wholly worthwhile struggle*, to acquire joint-attention skills or symbolic play.

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It is likely that with comparable intervention, some children with autism will acquire the capacity to make nested-belief attributions automatically, whereas others may be able to arrive at these attributions only when given sufficient time to think and analyze. Still, going back to the foreign language analogy, were you living in a foreign country, would it not make your life more comfortable to understand the language with effort, even if you miss bits and pieces, and speak the language with a strong or halting accent, than not be able to speak or understand it at all? Chapters 4, 5, and 6 contain teaching programs designed to teach emotion detection and perspective-taking skills at beginning, intermediate, and advanced levels.

You will notice that all six chapters begin with a chapter overview, which will include natural-environment teaching suggestions, and after most of the teaching programs, there are suggestions for generalization that are specific to the teaching programs. As is the case with any skill that anyone learns in a single setting under a prescribed set of conditions, people generalize skills with different degrees of facility. Many children with autism have particular difficulty with generalization, requiring systematic programming across environments, with different people, using different materials, before they

begin to demonstrate the skill spontaneously, routinely, and independently, and until the skill can be maintained by naturally occurring reinforcement. I strongly suggest that parents and teachers work on as many of the suggestions for generalization as possible—preferably all of them. Furthermore, many of the teaching programs provided in this book are simply "jumping off points" meant to offer examples from which you will need to generate additional examples until your student has achieved generalization. And most importantly, be sure to have fun with your student or child while you attempt to teach these important skills.

CD-ROM Reproducibles

Many of the teaching programs in this book involve scenarios that require significant passage comprehension. Illustrations of single scenes, as well as comic strip–like picture sequences, are provided to enhance comprehension. These illustrations are presented as thumbnail sketches, paired with the corresponding scenarios in the body of this book and provided on the CD-ROM so that you can print a large version of each scene or set of scenes on a separate page for your student to look at as you read the scenario that corresponds with that illustration. You might ask the student to color the illustrations before reading the scenarios to increase his or her familiarity with the characters and depicted scenes.

Finally, reproducible forms, for tracking your student's progress relative to the acquisition of the step-by-step skills presented in the following teaching programs, can be found on the CD-ROM, provided for your convenience. Teachers of students involved in intensive ABA programs should apply the same rigorous data-collection standards and procedures they would to measure any other skills, and they will likely have their own data-collection forms for that purpose. The forms provided on the CD-ROM are meant to be used for more general, but no less essential, record-keeping purposes, especially relating to the tracking of IEP goals and objectives. Most importantly, these forms should be used to encourage and record regular practice to promote generalization and prevent skill loss.

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Record the date that you introduce each new step of the teaching programs as well as the date that you consider the skill mastered, at least in the context of formal instruction. Adding comments, such as examples of your student's independent responses or specific areas of difficulty will be helpful in writing IEP Progress Reports and formulating future IEP goals and benchmarks.

To monitor the generalization of newly acquired skills, place checkmarks in the appropriate boxes after each generalization suggestion. Placing a checkmark in the box for prompted responses indicates that you are continuing to prompt and reinforce the skill in the natural environment. Placing a checkmark in the box for emerging generalization indicates that your student is beginning to use the skill spontaneously but that continued prompted and reinforced practice is required. Placing a checkmark in the box for generalization indicates that your student is spontaneously using the skill in the natural environment, automatically and with roughly the same frequency as his or her typically developing peers. Adding comments such as examples that document your student's

spontaneous use of the skill in the natural environment, or specific areas of difficulty with generalization, will also be helpful in writing IEP Progress Reports and formulating future IEP goals and benchmarks. Tracking your student's progress using these forms, or your own data collection forms, will encourage regular practice, promote generalization, and prevent skill loss.

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