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Social Development

Difficulties with social relationships and interactions have been one of the hallmarks of autism from its first description (Kanner, 1943), and efforts to understand the nature of the social difficulties in autism, and to find effective treatments, have driven research and clinical and educational practice for the past 40 years. Several theoretical and developmental approaches to the social difficulties in autism have had significant effects on intervention strategies offered over the years. This chapter describes these approaches, as well as the main intervention techniques and the empirical support for such techniques.

DEVELOPMENTAL CONSTRUCTS AND THEORY

Kanner's (1943) original description of autism suggested that the basis for the social difficulties lay in a child's inability to form emotional ties ("affective contact") with parent(s). This view reflected two long-held assumptions in psychology: that one's initial relationship with parents forms a blueprint for all other relationships and that maternal-infant relations grow from an affective bond rather than from the feeding experience. Kanner suggested that a child with autism was biologically impaired in this capacity—a view that was echoed by many of the early autism theorists and practitioners (Rimland, 1964; DesLauriers and Carlson, 1969). Early approaches to intervention focused diffusely on a child's social and affective experience with others (Mahler, 1952; DesLauriers and Carlson, 1969; Bergman and Escalona, 1949), trying to

provide a normalized social-emotional experience that would set development in this domain on a more typical path, in the hope that once righted, it would flourish.

Attachment Constructs

Attachment constructs, first influenced by psychoanalytic principles, offer an orientation to the nature and treatment of social difficulties in autism that conceptualizes attachment relations as the most important social-emotional accomplishment of infancy and early childhood. Attachment theory grew out of the integrative work of John Bowlby (1969), who drew from early cross-species work and theory on infant-maternal relations to propose that the attachment relationship was a biological-behavioral control system. This control system, present in both caregivers and infants across the mammalian species, served to maintain proximity between infants and caregivers and thus to assure infant protection and care. Bowlby's theoretical work was carried forward in empirical studies begun by Mary Ainsworth and colleagues, and it represents one of the most thoroughly studied areas of infant development at the present time. For our purposes, two of the most important findings for autism from the body of attachment literature have to do with the role of parental sensitivity and responsivity to child cues in fostering secure attachments and the association between early attachment to parents and later peer relations in typically developing children.

For a long period of time, it was assumed that autism represented a failure of the attachment process, and this view continues to pervade many people's understanding of autism. However, a series of laboratory studies of attachment behavior in autism in the 1980s and early 1990s yielded the very surprising finding that children with autism met standard criteria for secure attachment patterns with their caretakers (Capps et al., 1994; Rogers et al., 1991, 1993; Shapiro et al., 1987). Furthermore, in comparison with children with other kinds of developmental delays of similar age and cognitive levels, children with autism did *not* demonstrate greater insecurity or lack of attachment relations in these settings. Two separate studies demonstrated that maternal sensitivity and responsivity affect attachment security in autism, as they do in typical development (Capps et al., 1994; Wehner et al., 1998) . However, several researchers have questioned the validity of the attachment construct in autism: more general measures of social reciprocity (Lord and Pickles, 1996; Tanguay et al., 1998; Kasari et al., 1990) indicate that some children with autism differ from other populations in many aspects of relationships with their parents and others, even though their performance on specific attachment measures may not differ.

Behavioral Constructs

The behavioral approach to the social difficulties in autism has also been present in psychology since the 1960s. The behavioral tradition emphasizes description of actual behavioral deficits and excesses, rather than underlying constructs about the nature of development (Lovaas et al., 1965). Behavioral interventions use the powerful tools of operant learning to treat symptoms of autistic spectrum disorders. This approach, which treated each social symptom as a separate entity, was radically different from the social relations traditions described above, which considered all social behavior as emanating from one main construct. As we review below, interventions based on behavioral approaches have consistently demonstrated short-term success at teaching individual social behaviors and establishing social motivators.

Overarousal Theories of Autism

The third developmental theory to address the social deficits in autism, "withdrawal," goes back to the beginnings of interest in autism. This theory, first articulated by Bergman and Escalona (1949), studied experimentally by Hutt and Hutt (1964), and developed further by ethologists (Tinbergen and Tinbergen, 1972), postulates that children with autism find social interaction with others aversive. This is generally attributed to overly narrow thresholds or overly sensitive central nervous systems that cannot tolerate the arousing qualities of emotional engagement or sensory stimulation. Children's response to these aversive exchanges is to withdraw from them, seeking to reduce overarousal through repetitive activities with their bodies and objects. DesLauriers and Carlson (1969) suggested that there was also an "underaroused" subgroup in autism, for whom typical levels of social engagement were not arousing enough to be registered. The result of the ongoing and increasing withdrawal is a lack of opportunity to learn appropriate behavior and skills from other people. This theory continues today, expressed quite strongly in sensory integration approaches to understanding and treating autism (Ayres and Tickle, 1980). It has also been suggested by researchers and clinicians who focus on social engagement (Greenspan et al., 1997; Dawson and Lewy, 1989).

There is little empirical research to support an overarousal theory of autism. While the findings are not uniform (James and Barry, 1980), a variety of studies have failed to find evidence of overarousal to sensory stimuli (Bernal and Miller, 1971; Miller et al., 2000). In fact, the more typical finding is under-arousal, in comparison with other groups. Corona et al. (1998) examined overarousal in a social paradigm. Using psychophysiological measures of arousal in the face of strong adult affective displays in a naturalistic paradigm, Corona and colleagues found no evi-

dence that children with autism have higher levels of arousal than other children. In fact, in reaction to adult affect, there was much less response, both behaviorally and physiologically, from the children with autism than from carefully matched controls.

This study, and other research from Sigman's laboratory, emphasized the lack of social orienting to other's faces. Other investigators have also have begun to ask whether social orienting is particularly impaired in autism (Dawson et al., 1998). The social orienting question is currently compelling because of possible links to particular brain structures that play a very specific role in orientation to other people, including awareness of eye contact and directionality of gaze (as reviewed in Baron-Cohen et al., 1999) . Whether social orienting represents one of a variety of social behaviors that are impaired in autism, or whether it represents the pivotal social behavior that leads to the development of a much wider social repertoire, remains to be seen.

COMMONALTIES AND INDIVIDUAL DIFFERENCES

Given that children with autism, as a group, demonstrate widely differing levels of skills and of severity of symptoms, discussion of commonalties must occur at a general level. By definition, children with autism demonstrate impairments in relationships to peers, the use of nonverbal communicative behaviors within their social exchanges, the use of imitation, and symbolic or dramatic play. Peer interactions, and indeed social interactions in general, are characterized by low rates of both initiation and response. This is most marked in interactions for the purpose of sharing experiences and establishing joint foci of attention (Peterson and Haralick, 1977; Mundy et al., 1990; Mundy et al., 1987; Wetherby and Prutting, 1984; Corona et al., 1998). The use of nonverbal communication, including gestures and emotional expressions, is affected in young children, both expressively and receptively. As described in these papers, children with autism use fewer nonverbal gestures and a more limited range of facial expressions in their communications than children with other types of developmental disabilities of the same developmental and chronological age. Children with autism appear to pay less attention to other people's emotional displays than do comparison groups and to demonstrate fewer acts of empathy or shared emotion. Children with autism also demonstrate less imitation of other people's actions, movements, and vocalizations (DeMyer et al., 1972; Stone et al., 1997) .

Yet there are wide-ranging differences within the group of children with autism in their social interests and behaviors. In terms of general sociability, Wing and Gould (1979) suggested three subgroupings of children with autism based on social interests: aloof, passive, and active but odd. Aloof was defined as indifferent in all situations, particularly

marked with other children, though approaching to get needs met and often enjoying physical interactions. The passive group involved children who made few social initiations but responded positively to the approaches of others, both adults and peers. The active but odd group made initiations and responded to others: these children were interested in interactions and sought them out, but their ways of carrying out the interactions were unusual in their odd language, obsessional topics, and lack of understanding of others.

Clearly, the descriptions of these groups also connote developmental differences, and, in fact, IQ scores and language levels correlate with these groupings (Wing and Gould, 1979) as do differences in patterns of brain function (Dawson et al., 1995) and differences in context (for example, a child may be aloof with peers but passively responsive to adults [Lord and Hopkins, 1986]). However, characterizing the patterns in this way may be useful to educators and clinicians, because it may help to focus interventions and set priorities. In a related vein, differences in temperament and amount of negative affect and behavior displayed in social interactions vary considerably within autism and may well figure in what differentiates children in the aloof and passive groups (Kasari and Sigman, 1997).

Mundy and Sigman's work on social responses demonstrated that continuing pleasurable social routines and regulating others' behavior to get needs met were types of social interaction that were not specifically affected by autism (Mundy et al., 1987). In a related vein, Dawson and colleagues demonstrated that an adult's imitation of a child's behavior elicited social orienting, interest, and engagement (Dawson and Galpert, 1990). Other affectively based approaches also target this early level of social involvement (Rogers, 2000; Greenspan et al., 1997). These affectively rich, simple dyadic interactions may provide an effective starting point for social interventions for the aloof group, who do not yet demonstrate much social interest.

There are also wide-ranging differences in the levels of play skills seen in young children with autism, again related to language and IQ levels, as well as age. Among toddlers with autism, Charman and colleagues (1998) reported that functional play and other object play was not impaired relative to clinical controls. Only the production of symbolic play acts was markedly deficient. However, when older children are studied, sensorimotor play also appears to be affected, with more repetitive and immature play seen in children with autism than in children with other developmental delays matched to the same developmental level (Libby et al., 1998; Stone et al., 1990). Several investigators have reported successful interventions for stimulating symbolic play development in preschoolers with autism (Thorp et al., 1995; Goldstein et al., 1988; Stahmer, 1995; Rogers and Lewis, 1989; see also Chapters 11 and 12).

Given the importance of symbolic play for normal development (Vygotsky, 2000; Piaget, 1962), this is an important target of early education for children with autism.

Communication is the means by which people carry out social interactions. The wide-ranging differences in communication skills that exist in young children with autism and their intervention needs are described in Chapter 5. Although it might appear that communication skills are a necessary prerequisite for building peer interactions, the large body of research in peer-mediated methods for socially engaging young children with autism suggests that no particular level of communicative ability is needed in order to work on social interventions (Lord and Hopkins, 1986). However, the form of the intervention strategy needs to be selected so that it fits with a child's current communicative abilities. Strategies that teach peers to initiate and persist in physical engagement (Odom and Strain, 1986) are quite important for preverbal children with autism, while strategies that teach a child with autism to make verbal initiations to peers (Krantz and McClannahan, 1993) target children with some speech.

PLANNING FOR INTERVENTION

The individual differences in autism most often linked to predicting outcomes have typically included developmental variables. Past research has indicated that IQ scores and level of language skill at age 5 are very strong indicators of future performance (Lotter, 1978; Lord and Schopler, 1989; Sigman and Ruskin, 1999). Even in some intervention studies, initial developmental rate appears to be related to level of attainment after intervention (Lovaas, 1987; Sheinkopf and Siegel, 1998; Smith et al., 2000).

However, there is some evidence that autism-specific behaviors also predict outcomes. Parents' reports of autism-specific characteristics of language and severity of repetitive and restricted behavior, gathered through interviews by or before the time their children turned 5, significantly predicted adaptive behavior scores 8 years later in a large sample of high-functioning persons with autism (Venter et al., 1992). Similarly, severity of social symptoms assessed from parental report was the strongest concurrent predictor of adult adaptive functioning in that study.

Setting Goals for Social Development

The process of education involves assessment of existing skills, defining what skills will be taught (setting goals and objectives), planning how the skills will be taught (teaching strategies), implementing the teaching plan, assessing student progress, and adapting the teaching strategy so that a student acquires the target skill (Cipani and Spooner, 1994). Most

educational programs and approaches for young children with autism fall into one of two theoretical frameworks: developmental or behavioral.

The developmental approach uses a model of typical development to guide the educational process involving assessment, goal setting, and teaching. When carried out in an optimal way, this approach involves assessing each developmental area—motor, cognition, communication, and social development, among others—and using a child's successes, emerging skills, and failures to determine a child's zone of proximal development (Vygotsky, 2000). This zone indicates the set of skills that a child appears to be ready to learn next, based on his or her assessed performance. Those skills are then targeted for teaching. The developmental approach is widely used in early childhood education of both typically developing children and those with special needs.

Some advantages of a developmental approach are the ease with which it is conducted in early childhood settings, the many developmentally based curriculum assessment and teaching materials that are available, and the developmental training of those professionals typically involved in young children with special needs. Some drawbacks, when looking at education of children with autism, involve the fact that these children do not demonstrate typical patterns of development in several key areas (communication, language and speech development, social development). Nor do they necessarily learn through developmentally typical teaching practices (verbal instruction, imitation of teachers and peers, and independent learning), because these strategies are often dependent on a child's internal motivation to learn, to be like others, and to gain competence.

In a behavioral approach, a child's behavioral repertoire is evaluated according to the presence of behavioral excesses—presence of abnormal behaviors or of an abnormal frequency of certain behaviors—and behavioral deficits—absence or low frequency of typical skills (Lovaas, 1987). Behavioral teaching strategies are then designed to increase a child's performance of deficit skills and decrease the behavioral excesses. These strategies involve identifying the target of teaching, determining the appropriate antecedent and consequence for the target behavior, and using systematic instruction and assessment to teach the target behavior and assess student progress.

Some advantages of the behavioral research on changing social skills have been the measurement of generalization and maintenance, attention to antecedents and consequences, and use of systematic strategies to teach complex skills by breaking them down into smaller, teachable parts. Some drawbacks of traditional behavioral approaches are the complex data systems that often accompany them and that may impede their use in more typical settings, as well as the lack of training in their use that most staff members on early childhood teams receive. Personnel may sometimes

apply the strategies in highly artificial ways, particularly in extended one-on-one interactions, which prevents their easy use in group settings and inclusive settings. Newer behavioral approaches such as incidental teaching and pivotal response training stress naturalistic delivery, are used in group settings, and allow easier coordination with inclusion (Prizant and Wetherby, 1998; Anderson and Romanczyk, 1999). These strategies have demonstrated very effective outcomes, but are not as well known to the public, either parents or professionals.

Developing Goals for Improving Social Interactions with Adults

For very young children with autism, goals for specific social behaviors or skills identified in interactions with adults may focus on early prelinguistic behaviors, such as joint attention, turn taking, imitation, responding by gaze to adult initiations, and initiating social interactions with adults (Wetherby and Prizant, 1993). These interactions occur within a play context, so establishing and supporting toy play with an adult may be a goal for some children. As children grow older, interactions with adults may more often occur in classroom contexts. Although such classroom-based interactions may also occur in a play context, the nature of adult-child interactions will extend to behaviors necessary for participating and functioning independently in the classroom. Social skills–such as responding to adult directions, independently participating in the routines of the classroom, expressing needs to adults (e.g., need to go to the bathroom), and requesting assistance of the adult—all become important functional skills necessary for children to be successful in classroom settings.

Developing Goals for Peer Interactions

Interaction with peers is another dimension of children's social development that becomes increasingly important for children beginning at the age of 3. To identify potential intervention target behaviors for young children with severe handicaps (including autism), Strain (1983) observed groups of preschool children with and without disabilities who received high and low sociometric ratings from their peers. Children with high sociometric ratings engaged in more play organizers (i.e., suggesting a play idea, sharing, affection, and social initiations that involved assisting others) and responded more to peer social bids than children with low peer ratings. These social initiations have been used as targets or goals for interventions with young children with autism in a range of studies (see Odom and Ogawa, 1992). Other investigators (Goldstein et al., 1992) have used prelinguistic social-communicative behaviors, such as joint attention and pragmatic communicative forms (e.g., requesting, comments, and nonverbal responses directed toward peers), as outcomes for peer-

mediated interventions. Such skills may well be appropriate goals for many children with autism who have limited communicative abilities.

Assessment Strategies for Developing Social Goals

In assessing the social repertoire and social needs of young children with autism, early childhood professionals need to turn to several different sources. Social development has not been as thoroughly researched as language development, and different aspects of social development require different approaches to assessment. One set of tools that provide a very global assessment of social development are adaptive behavior scales like the Vineland Adaptive Behavior Scales (Sparrow et al., 1984) or the Scales of Independent Behavior-Revised (SIB-R), (Bruininks et al., 1996). These tools are best used in setting general goals for the social domain, since they provide an overview of social functioning in various areas, but not a detailed look at social skill repertoires.

More detail about social development can be gathered with preschool curriculum assessments, most of which contain a social subscale. Some scales are standardized so that average levels are determined for children of different ages. Others are criterion-referenced, so they compare performance to a practical standard for particular behaviors. Such instruments include the Battelle Developmental Inventory (Newborg et al., 1984), the Learning Accomplishment Profile (LAP) (LeMay et al., 1983), the Michigan Scales (Rogers et al., 1979), and the Assessment, Evaluation, and Programming System (AEPS) (Bricker, 1993). These tools assess behaviors seen in typically developing children of various ages, and thus may be helpful in determining what skills a child already has, and what should be taught next from a developmental perspective.

For assessing social abilities within the context of parent-infant interactions, one may turn to traditional rating scales of parent-infant interactions (see Munson and Odom, 1996, for a review), measures of early symbolic communication and behavior (e.g., Wetherby and Prizant, 1993), or criterion referenced assessment of early development (e.g., the AEPS by Bricker, 1993). Since communication is the process by which people carry out social relationships, children's communication skills and needs are part and parcel of social development. Developing social goals and objectives needs to be carried out hand in hand with developing communication goals and objectives. Thus, assessing communication abilities and needs and making sure that teaching strategies for communication are integrated with social teaching strategies are crucial for developing skills that are functional and adaptive for a child.

Play, like communication, is an important social activity in early childhood. Play skills and needs, like communication, must be assessed and considered within the social domain. Developmental sequences of play have been published in various sources (Wetherby and Prizant, 1993;

Rogers et al., 1987; Fewell, 1994; Gowen et al., 1992). A recent study demonstrated that even when using a behavioral paradigm to teach symbolic play, children's learning was enhanced when the play skills taught were those that were developmentally appropriate next steps for a child (Lifter et al., 1993). Development of more mature play skills in both independent play and social play is important for the social development and peer interaction of young children with autism, since play is the glue that holds together peer interactions in early childhood (Nadel and Peze, 1993).

Social assessment needs to be carried out in ecologically valid situations. Observing the social repertoire of a young child with autism in a setting with familiar typical peers provides information about a child's current social repertoire that is unavailable in any other way. Assessing a child's actual behaviors with other children—including initiations, responses, length of rounds, interest in others, proximity to others, and level of social play—provides an important baseline against which to measure the degree to which interventions are having ecologically valid effects. Observational, sociometric, rating scale, and criterion-referenced measures are available for identifying specific goals and instructional target behaviors for young children with autism (a detailed review of these assessment instruments and techniques can be found in Odom and Munson, 1996). This assessment information, when paired with information about priorities, parents' concerns, the skills needed to be successful in the current educational settings, and the skills needed to be successful in the next educational setting, can serve as a basis for selecting functional social outcomes that practitioners could select for young children with autism.

INTERVENTIONS USED TO TEACH SOCIAL BEHAVIOR

Since social development is an extremely important aspect of education for children with autistic spectrum disorders, a child's social behavior with both adults and peers needs to be targeted for intervention, and intervention should take into account both specific evaluation of a child's current social skills and specific teaching goals and plans that address the social area.

The methods demonstrated to be effective are complex to deliver and require careful attention to delivery, maintenance, and generalization, as well as skill acquisition. Furthermore, as in any instructional area, objective data need to be gathered during the teaching process to assure skill acquisition, maintenance, and generalization (Krantz and McClannahan, 1998; Rogers, 2000). Studies of interventions aimed at improving social interaction for young children with autistic spectrum disorders have generally had significant methodological limitations, as indicated by comprehensive ratings of individual articles by McConnell (1999) according to

our guidelines (see Box 1-1 in Chapter 1). Almost all studies were pre-post designs or multiple baseline or ABAB designs without procedures to ensure blindness of evaluators to condition, as shown in Figure 1-1 in Chapter 1. About 60 percent of samples were well defined and included samples of sufficient size or replication across several subjects (see Figure 1-2 in Chapter 1). About 50 percent of the social intervention studies addressed generalization or maintenance across contexts, with 30 percent showing generalization from the teaching context to another natural situation (see Figure 1-3 in Chapter 1). This pattern reflects the commitment of most social interventions to changing behaviors in "real world" contexts, but also the difficulties of doing so with random assignments and independent evaluators blind to the intervention.

Intervention Techniques

Child-Parent Social Interactions

Dawson and Galpert (1990) described a pre-post study of 14 children aged 20 to 66 months and their mothers. The intervention involved teaching the parent to imitate a child in play with toys for 20 minutes each day for 2 weeks. Follow-up after 2 weeks demonstrated significant increases in the child's gaze to mother's face, increased number of toys played with, and increased number of play schemas used, as well as generalization to novel toys. Rogers and colleagues (1986, 1989) used a similar pre-post design to assess changes in child behavior of 13 pre-schoolers following 6 or more months of intensive intervention in a daily preschool program that emphasized positive adult-child interactions, play, and communication. Improvements in social-communicative play levels with a familiar adult, increases in child positive affect and social initiations, and decreased negative responses to mother's initiations during mother-child play were found. The changes were interpreted as demonstrating generalization of effects from the day program. Improvement in social interactions was demonstrated across three separate measures and with various partners, adding convergent validity to the impact of this model on social development in young children with autism.

Child-Adult Interactions

Two approaches for increasing interactions with teachers or other therapists have been demonstrated using multiple baseline approaches. One approach comes from the work of Laura Schreibman, Robert Koegel, and colleagues, using pivotal response training (PRT; see Chapter 12). Stahmer (1995) compared two interventions, symbolic play training and language training, using pivotal response techniques with seven verbal

preschool-aged children with autism. The children demonstrated increases in the targeted symbolic play skills and increased positive responses to adult initiations and in initiations to adults during the play training, but not during the language training, with maintenance for 3 months and generalization across settings and other adults.

Krantz and McClannahan (1998) used a script-fading procedure to increase social initiations to a teacher. The technique involved using a one-word written stimulus embedded in a child's independent play schedule. The stimulus prompted the child to approach an adult and initiate a joint attention request (look, watch me, etc.). The adult responded with comments but without any other reinforcing consequence. Three verbal preschoolers learned the procedure and maintained and increased initiations after the stimuli were faded. Furthermore, generalization was demonstrated through spontaneous use of unscripted initiations, as well as by generalization across new adults and new activities.

Child-Child Interactions

Peer Mediated Techniques for Increasing Interaction and Responses to Peers In the peer-mediated approach, developed over the past 20 years by Phillip Strain, Samuel Odom, Howard Goldstein, and their associates, typical peers are taught to repeatedly initiate "play organizers" such as sharing, helping, giving affection, and praise. Peers learn the strategies through role-play with adults and then are cued by adults to use those strategies with children with autism. Peers are reinforced by adults for their efforts, and the reinforcements are systematically and carefully reduced. The power of these strategies to increase social interactions of young children with autism, as well as generalization and maintenance, has been demonstrated in inclusive preschool classes, as reported in many published multiple baseline studies (Hoyson et al., 1984; Strain et al., 1979; Strain et al., 1977; Goldstein et al., 1992).

Variables found to be important in maintenance and generalization include the characteristics of the peers, methods of prompting and reinforcing peers, fading reinforcers, ages of children, and characteristics of the setting, as well as the use of multiple peer trainers (Brady et al., 1987; Sainato et al., 1992). Self-monitoring systems for the peers have also been used successfully (Strain et al., 1994). These interventions have been found most powerful when delivered in inclusive preschools, but they have also been used successfully by parents and siblings in homes (Strain and Danko, 1995; Strain et al., 1994).

Oke and Schreibman (1990) extended the use of play organizers in a case study involving one child, a high-functioning 5-year-old. They added two procedures to the peer-mediated techniques: they trained a typical peer to discriminate between and differentially attend to parallel play and

interactive play, which increased and stabilized responding of the target child. They also trained the target child to use peer-initiating procedures. The second addition had four important effects: maintenance of high rates of social engagement during the reversal phase, a decrease in inappropriate behaviors, normalization of child affect, and maintenance and generalization across peers (but not across settings).

An important feature of these peer-mediated procedures is the use of typical peers rather than adults, because studies have demonstrated that interactions established between children with autism and adults do not easily generalize to peer partners (Bartak and Rutter, 1973). Though they can be highly effective, peer-mediation approaches are complex to deliver, requiring socially skilled typical peers and precise adult control during training of peers, managing and fading reinforcement, and monitoring ongoing child interaction data. However, these approaches are manualized (Danko et al., 1998) and well described in many publications.

Peer Tutoring Using Incidental Teaching McGee and colleagues (1992) trained and reinforced typical peers in an inclusive classroom to use teaching techniques and take turns with their peers with autism in 5-minute teaching segments. The multiple baseline design included both the implementation phase and two fading periods, in which adult prompts to the peer tutors were systematically withdrawn. Results for three children with autism demonstrated long-term (5-month) increases in reciprocal social behavior and social initiations, as well as higher peer acceptance. The typical peers also maintained greatly increased rates of social initiations toward the children with autism across the fading of adult prompts. However, these gains generalized to other times during the preschool day for only one of the three children.

Adult Instruction in Social Games Goldstein and colleagues (1988) taught sociodramatic scripts to two trios of preschool children consisting of two typical peers and a child with social, communicative, and behavioral problems (presumably, autism). Each child was trained in each of three related social role scripts (e.g., cook, customer, and waiter in a restaurant). Following training, child interaction and generalization across settings and other behaviors improved during free play periods at preschool. However, the effects depended on continued teacher prompts in role-playing activities, and they did not result in general increases in social exchanges across the preschool day.

Social Stories Developed by Gray and Garand (1993), social stories involve written narratives about certain social situations that are difficult for the child involved. Since this technique involves the use of print, it is generally targeted for older children with reading skills. The effective-

ness of this technique with young children has not yet been established (Norris and Dattilo, 1999).

Comprehensive Early Intervention Models for Teaching Social Interactions

Behaviorally Based Programs

Although the various programs based on behavioral treatment differ in a number of ways, behavioral work in the social arena is based on similar approaches. This grouping includes the program at the University of California at Los Angeles (Lovaas, 1987) and its various replications, as well as the Princeton program (McClannahan and Krantz, 1994). The first social interventions involve responses to a teacher, with interventions generally focusing on eye contact, imitation, and response to language. Play skills with toys are also taught. As children master speech and a number of other basic skills and appear ready to learn in group settings, behavioral techniques from the "shadow" teacher support interactions with peers. In these approaches, social skills are taught directly, like any other skill, through establishment of an antecedent-behavior-consequence chain.

Neobehavioral Approaches

More recently developed approaches, like the Walden Program (McGee et al., 1999) and the Learning Experiences, Alternative Program (LEAP) approach (Kohler et al., 1997; Strain et al., 1996) have used more naturalistic behavioral teaching to develop peer interactions and communication skills. Both approaches, as well as the pivotal response training approach described by Koegel and colleagues (1999), carefully apply behavioral teaching paradigms embedded in natural or naturalistic social interactions to focus on social development as the primary thrust of the intervention.

Interactive Approaches

In Greenspan and Wieder's Developmental Intervention model (Greenspan et al., 1997) interventions are built on "circles of communication," reciprocal social interactions with adults that over time increase the length and complexity of social interactions. These are child-centered—built on children's spontaneous behavior and adult responses that are carefully fit to children's current developmental and communicative capacities. Positive emotional valence is highly valued. This model has been evaluated in one large review of records (Greenspan et al., 1997).

Denver Model

In the Denver approach, social interactions with adults are taught in two ways. Initiation and maintenance are taught through the use of "sensory social exchanges." These exchanges are naturalistic child-centered social activities in which a child makes choices, initiates pleasurable interactions with an adult, and continues them through several rounds, using whatever communicative behavior a child has available. Social responses are taught through adult-directed interactions, as are toy play skills. Imitation of peers' and adults' motor actions and object actions is taught through direct teaching and through prompting in typical social exchanges. Peer interactions are taught in inclusive preschool settings, in which both typical peers and children with autism are prompted to initiate object actions with each other (e.g., giving, taking, and passing objects); to imitate each other in play; and to engage in social routines like circle games, songs, and similar activities. Pre- and post-testing demonstrated significant gains in social skills after participation in the Denver program (see Rogers et al., 2000) for a detailed discussion of the Denver model).

TEACCH

The TEACCH (Treatment and Education of Autistic and Related Communication Handicapped Children) approach emphasizes individual functioning in a group setting, and its focus on social interaction comes particularly through communication training, participating in group activities, following instructions and routines with others, and taking turns (Watson et al., 1989). In a TEACCH classroom, the staff teaches many toy play skills, games, and object skills, which can in turn be used to facilitate social interaction (Schopler et al., 1995).

Convergence of Techniques Across Program Models

The various techniques used can be grouped into three strategies: (1) adult-directed instruction of specific components of social interactions, like eye contact, response to gestures, toy play skills, and social speech; (2) child-centered approaches in which adults follow children's leads, stimulate and continue interactions, and in general scaffold higher level and longer rounds of interaction; and (3) peer strategies in which either adults or typical peers prompt and sustain social engagement. Each technique has demonstrated success in teaching some aspects of social interaction. Comprehensive programs that heavily emphasize social development make use of some or all of these strategies in various ways.

The choice of strategies, in addition to reflecting the theoretical orien-

tation of the intervenor, must also reflect individual differences among children. For children who exhibit very little appropriate spontaneous behavior, adult-directed instruction may be the most effective approach to acquiring new behaviors, with more child-centered and peer strategies used to build fluency, generalization, and maintenance. For children who generate more appropriate behavior in the face of new stimuli, child-centered approaches may be as effective as (or more effective than) adult instruction in building a wider repertoire of skills. The need to tailor instruction to the individual learning styles and needs of each child requires that educators of children with autism be fluent in a wide range of educational strategies across various theoretical traditions. In this way, the educator can maximally individualize instruction and achieve the best results possible. It is axiomatic that methods that do not result in educational gains should be replaced by other approaches.

FROM RESEARCH TO PRACTICE

More empirical data are available to support the efficacy of behavioral interventions than developmental interventions. However, no comparative studies have been published that support one methodology over another. The field has very little data on effectiveness of developmental approaches for social development in early autism. Given the popularity of developmentally appropriate practices in other areas of early childhood education, empirical studies of the effectiveness of developmentally based interventions are needed to determine their relative value for stimulating growth in young children with autistic spectrum disorders.

Comparative studies of varying approaches are needed. Given the current debates about the appropriateness of various approaches and their relative effectiveness in modifying social behaviors, the field needs comparative studies of the social outcomes achieved by various approaches to intervention for young children with autism. Informative studies would include very careful control of independent variables so that the approaches themselves, and not the hours or child/adult ratios, are compared.

Studies that examine interactions of learner characteristics and rate of progress under varying educational methodologies are also needed. The social strengths and needs of young children with autism vary widely. No one approach would be expected to be appropriate for all children. There is a need for sophisticated studies that carefully examine the interactions among program variables and child variables in the social domain, so that real individualization can be achieved.