The treatment of social skills deficits remains one of the most challenging areas in meeting the needs of people with autism. Difficulties in understanding social stimuli, in initiating and responding to social bids, and in appreciating the affect that is intrinsic to social interactions can be baffling for people with autism. Researchers and practitioners of applied behavior analysis have tried a variety of strategies for teaching social skills. This article examines a range of useful procedures for teaching social skills to people with autism, including skills that are adult mediated, peer mediated, and child-with-autism mediated. The authors also consider the potential of classwide interventions in inclusive settings, pivotal response training, and the use of scripts to teach social initiations.

Teaching Social Skills
to People With Autism

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Social deficits are intrinsic to the definition of autism. From Kanner’s (1943) original conceptualization to the most recent Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994), problems in social relatedness have been diagnostic of the disorder. In spite of their ubiquitous nature, the remediation of these symptoms remains one of the most daunting challenges for professionals who serve people with autism. Although major progress has been made in the past decade, much work remains to be done.

Observational research has documented the pervasive nature of the social symptoms of disorders on the autism spectrum. Among these social problems are difficulties orienting to social stimuli (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998), understanding facial expressions (Celani, Battacchi, & Arcidiacono, 1999), and responding to another’s distress (Bacon, Fein, Morris, Waterhouse, & Allen, 1998). People with autism have difficulty using gaze to communicate

In response to these pervasive and persistent problems, there have long been efforts to teach people with autism social skills. Early efforts in applied behavior analysis focused on such skills as making eye contact and exchanging hugs. Our programming efforts have grown more subtle and complex as the field has matured. More recent work has ranged from teaching young people with autism to offer assistance to a person in apparent distress (Harris, Handleman, & Alessandri, 1990) to teaching pretend play (Goldstein & Cisar, 1992) and sociodramatic play (Thorp, Stahmer, & Schreibman, 1995). We have taught children to initiate social contact (e.g., Taylor & Levin, 1998; Zanolli, Daggett, & Adams, 1996) and ask questions (Taylor & Harris, 1995).

The bulk of the research on teaching social skills using applied behavior analysis has been with young children. This includes preschool children (e.g., Gena, Krantz, McClannahan, & Poulson, 1996; Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Krantz & McClannahan, 1998; McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992; Odom, Chandler, Ostrosky, McConnell, & Reaney, 1992; Sainato, Goldstein, & Strain, 1992) and youngsters in elementary school (e.g., L. K. Koegel, Koegel, Hurley, & Frea, 1992; Pierce & Schreibman, 1995; Stahmer & Schreibman, 1992; Taylor & Harris, 1995; Werts, Caldwell, & Wolery, 1996). There has been some research on teaching social skills to adolescents (e.g., Haring & Breen, 1992; R. L. Koegel & Frea, 1993) but relatively little with adults (e.g., Farmer-Dougan, 1994).

The research on social skills has tested the full gamut of teaching technology in applied behavior analysis. This includes social scripts
(e.g., Goldstein & Cisar, 1992; Krantz & McClannahan, 1998), peer modeling (Carr & Darcy, 1990), cooperative learning groups, peer tutoring, classwide interventions (e.g., Kamps, Barbetta, Leonard, & Delquadri, 1994), pivotal skills (e.g., R. L. Koegel & Frea, 1993; Pierce & Schreibman, 1997), and incidental teaching (e.g., McGee et al., 1992).

In this brief article, we cannot provide a comprehensive summary of the state of the art in teaching social skills to children. Rather, we have selected some research that appears to us promising in helping young children master social skills and move toward spontaneous social behavior that is consistent with that of their peers. We focused on the relative contributions of adult-mediated and peer-mediated interactions, peer modeling, initiation by child with autism, classwide tutoring or intervention, and the use of scripts.

**WHO IS THE MOST EFFECTIVE AGENT OF MEDIATION?**

The research on teaching social skills to children with autism has looked at adults, peers, and children with autism themselves as the primary agents of change. Using each of these individuals as the focus has advantages and disadvantages, and in clinical practice they do not need to be mutually exclusive. However, there is some good work that has started to disentangle the impact of addressing social behavior from these different perspectives.

Learning to engage in reciprocal social exchange is a challenge facing every person on the autism spectrum (Rutter, 1985; Rutter, Mahwood, & Howlin, 1992). These interactions between children occur when they exchange social interactions, when their actions support each other, and when their actions become similar to each other (Cairns, 1979). Peer reciprocity is central to the development of social relationships and serves a variety of social functions (Dunn & McGuire, 1992). Because of this key role, it is of great concern that children with autism learn these skills and use them smoothly and comfortably.
**Adult-mediated strategies.** Most of the early work teaching reciprocal social skills focused on adults as mediators and as reinforcement agents of appropriate behavior (e.g., Strain, Shores, & Kerr, 1976; Strain & Timm, 1974). However, a major limitation of this approach was that, used in isolation, it encouraged the dependence of children with autism on adults. When adult support was withdrawn, there was a concomitant reduction in social behavior (Odom, Hoyson, Jamieson, & Strain, 1985). In addition, adult intervention may be intrusive or may alter the nature of the interaction once skills have been developed (McGee et al., 1992; Kliewer, 1995). As a result, researchers have emphasized the need for quick fading of adult support (e.g., Odom et al., 1992). Over time, the research shifted away from the focus on adults to considering the role that peers might play as mediators of change in reciprocal social skills of children with autism.

**Peer-mediated strategies.** A variety of peer-mediated procedures have been described in the literature (Lord & Magill, 1989; Odom & Strain, 1984). Odom and Strain (1984) identified three techniques for peer-mediated social interaction: proximity, prompt/reinforce, and peer initiation. Proximity involves placing typically developing, socially competent children together with children with autism. Usually, the peers are simply instructed to play with the target children and are given no other special training. Prompt/reinforce interventions involve training peers to prompt social behavior and to reinforce the use of such skills. Peer initiation training teaches them how to initiate to the child with autism. Interventions using this approach have been more successful at increasing interactions than at increasing initiations (Brady et al., 1984; Odom, et al. 1985).

Strategies that rely on the technique of proximity require little facilitation. Sheer proximity between children with autism and their typical peers is fairly common in inclusive environments (Johnson & Johnson, 1984; Rynders & Schlein, 1991; Rynders et al., 1993; Schleien, Mustonen, & Rynders, 1995). In one study, Roeyers (1996) assessed whether children with autism could benefit from a proximity intervention in which they had regular opportunities to interact with a typically developing peer. In this study, adults provided supervision but no intervention. Typically developing peers were simply told to
“do their best” to get the child with autism to play. Children in the treatment group demonstrated significant gains in social responsiveness and length of interactions, whereas no positive changes were observed in the control group. In spite of their gains, the children in the treatment group still had difficulties in initiation.

Although all of the peer-mediated approaches have produced positive changes, there is some consensus in the literature that the prompt/reinforcement and peer initiation procedures are more effective than proximity alone. Nonetheless, issues of generalization have been raised with the prompt/reinforcement and peer initiation procedures (e.g., Lord & Hopkins, 1986; Roeyers, 1996). The degree to which these trained behaviors approximate naturally occurring peer interactions is also questionable.

It is clear from the proximity literature that peer modeling alone is insufficient to bring about generalized and enduring social change in children with autism. It seems that simple demonstration of skills lacks the salience needed to produce changes in children with autism. Carrying modeling a step farther, Carr and Darcy (1990) taught children to play follow the leader through peer modeling and prompting. To be effective, the peer had to model and physically prompt the child with autism to engage in the task; asking the child with autism to watch was not sufficient to produce the skill.

The specific types of initiations that peers make to children with autism are also important. Most of the research has focused on teaching peers to make requests or ask questions. By contrast, Goldstein et al. (1992) taught peers to make comments to children with autism and found a marked increase in social behaviors. Peer comments, unlike a request or a question, do not necessarily demand a specific response from the child with autism.

Laushey and Heflin (2000) used a peer buddy system to build social interactions in two kindergartners with autism. This study employed an A-B-A-B reversal design to evaluate whether a peer buddy approach would increase non-adult-directed interactions. During the treatment phases, an active peer-training, buddy system program was implemented. During the return-to-baseline phase, the peers returned to a passive proximity peer-tutoring condition. The treatment entailed assigning a daily buddy, whose role was to stay with, play with, and
talk to his or her partner. Significant increases in social interactions occurred among the children with autism as a result of the peer buddy intervention. Specific skills examined included asking for an object and responding according to the answer given, appropriately getting the attention of another, waiting turns, and looking at or in the direction of someone speaking. Peer buddies were randomized, so the children with autism learned to respond to multiple peers, and some generalization of skills to a new classroom also occurred.

Peer children can learn to assess their own effort in being social partners for children with autism and thereby reduce adult intervention. Sainato et al. (1992) taught peers to get the attention of a child with autism, to initiate a play activity, and to respond appropriately to the child. The use of these social skills by the peers improved when self-evaluation strategies were used.

One of the most interesting developments in peer-mediated strategies for building social skills has been the success of peer-implemented pivotal response training (PRT). PRT endeavors to increase pivotal behaviors or behaviors that are central to wide areas of functioning (R. L. Koegel & Koegel, 1995). PRT is an efficient means of producing generalized behavioral improvement, and it addresses issues such as motivation and responsiveness to multiple cues. Pierce and Schreibman (1995) taught peers to use PRT through role-plays, modeling, and didactic instruction. Peers learned a comprehensive package of skills, which were implemented with minimal adult supervision. In this study, the two children with autism maintained prolonged interactions with the peers. Furthermore, increases in initiations were noted as were increases in engagement and joint attention. The authors postulated that PRT may be helpful in addressing deficits in joint attention because it requires individuals with autism to direct their attention to objects and events in the natural environment. Additional hypotheses regarding the effectiveness of PRT include the possibility that the frequent and varied selection of activities serves as an establishing operation and increases the reinforcing value of the activities (Michael, 1993; Pierce & Schreibman, 1995). Pierce and Schreibman (1997) replicated their findings with two additional children with autism and eight peers.
The ultimate goal in teaching social reciprocity skills to children with autism is for these skills to reside in the child, not in the adults or peers who might prompt them. Although trained peers are very helpful in building social behaviors, children with autism may be in environments where such peers are unavailable. It is therefore essential to teach them to initiate interactions. In addition, initiation training ensures that children with autism have skills in orchestrating interactions, and not simply in responding to the overtures of others.

Oke and Schreibman (1990) did one of the first studies to demonstrate empirically the need for and the efficacy of training in initiation skills. In the first phase of this study, peers were trained to initiate to children with autism, and there was a predictable increase in the social behaviors of the children with autism. However, when rates of peer initiation decreased, the rates of social responsiveness in the child with autism also declined. By contrast, when the child with autism was taught how to initiate to peers, social responding increased again without the need for peer training, and concomitant reductions in challenging behavior were also evident.

Initiation skills of the child with autism may transfer across settings and across individuals. Belchic and Harris (1994) noted that initiation skills generalized to the playground, to an untrained child with autism, and to a sibling at home. In this study, children were first taught to initiate play to an adult trainer, and this skill was then transferred to children. Zanolli et al. (1996) successfully used priming sessions to increase the spontaneous initiations of children with autism. During the priming session, the child with autism was prompted to direct social behaviors to a trained peer.

One specific type of social initiation is requesting information. Taylor and Harris (1995) used a time delay procedure to teach three children with autism to request information by asking, “What’s that?” when novel stimuli were presented during an instructional task. All of the children learned to ask the question and generalized this skill across settings, people, and materials. Two of the three participants were able to acquire new information through this method. This study is noteworthy, as the failure to ask questions is a distinctive deficit of
children with autism that makes them discrepant from their typically developing peers.

One of the challenges to the demonstration of initiation skills is the issue of necessary adult mediation. Often, children with autism require prompting to initiate to other children. This alters the social context considerably and calls into question whether the child is truly initiating interaction. In response to this challenge, Taylor and Levin (1998) effectively used a small tactile prompting device to prompt a student with autism to make verbal initiations to adults about his play activities. A multiphase, multielement design was employed to assess the effectiveness of the device in prompting initiations in three play contexts. Teaching sessions focused on having the child talk about his play activities when the device vibrated. Follow-up probes were done with typically developing peers. The subtlety of the device in prompting the child with autism makes this an intriguing tool.

SOCIAL SKILLS TRAINING

Additional strategies for targeting social deficits focus on skill acquisition training for the individual with autism. Some of these strategies emphasize play skills. Children with autism tend to have limited and restricted repertoires of play (Baron-Cohen, 1987; Stahmer, 1995; Wulff, 1985), and symbolic play and sociodramatic play, in particular, are often lacking (Baron-Cohen, 1987; Mundy, Sigman, Ungerer, & Sherman, 1986).

Wolfberg and Schuler (1993) incorporated elements of the proximity approach and adult mediation in providing support for peer play. This included carefully designed play spaces and materials and the formation of balanced play groups. Using this structure, they found gains in language skills and in the generalization of skills by the children with autism.

Thorp et al. (1995) used PRT to teach sociodramatic play to children with autism. Positive changes in play, social, and language skills, including an increased variety and creativity of play, were noted. The authors suggested that this strategy may be particularly appealing because of its ease of use and the children’s intrinsic motivation.
Another socially relevant skill is understanding and demonstrating appropriate affect. Gena et al. (1996) used a multiple baseline design to teach four individuals with autism to respond with appropriate affect. Affective responses had to contain appropriate verbal and facial reactions, be congruent with the presented scenario, and be emitted within five seconds of the presentation of the scenario. Response categories included talking about favorite things, laughing about absurdities, showing sympathy, showing appreciation, and indicating dislike. Results indicated increased responding within the categories for all participants. Effects were specific to the targeted response categories, and generalization occurred across time, settings, instructors, and scenarios.

SELF-MANAGEMENT TRAINING

Another skill that can significantly increase the success of social interactions is self-management. L. K. Koegel et al. (1992) taught children with autism to self-manage their responsiveness to others. Using a multiple baseline design, four children were taught to monitor the frequency of responses and to solicit rewards when the criterion had been achieved. The procedure was extended to community settings. It is noteworthy that adult mediation was minimal and that concomitant reductions in challenging behaviors occurred.

Self-management procedures can be used to build play behaviors. Stahmer and Schreibman (1992) taught three children with autism to play appropriately in the absence of a supervising adult. A multiple baseline design across children was employed, and participants were trained to use a wristwatch alarm to cue the target time interval. Reinforcement was available at the completion of intervals that consisted entirely of appropriate play. When the target duration reached 20 minutes, the experimenter would leave the room and on returning would ask the child, “Did you play correctly?” If the child responded accurately and had played correctly, the experimenter provided verbal praise and the interval continued. If the child played incorrectly, the child was corrected and the interval was restarted. The time that the child played alone without visits from the experimenter was gradually
increased. In addition to the fading of the experimenter, self-management materials were also faded. Skills were generalized to new settings, and two of the three participants maintained the skills at 1-month follow-up.

R. L. Koegel and Frea (1993) first taught two children with autism to differentiate appropriate and inappropriate instances of target behaviors and then to evaluate whether they had engaged only in appropriate behavior during a time interval. Three of the following five behaviors were targeted for each participant: facial expression and affect, eye gaze, nonverbal mannerisms, voice volume, and perseveration of topic. The participants learned to exhibit appropriate behavior in these contexts through the self-management technique. The study also found generalization to other, untreated social communicative behaviors and an improvement in overall appropriateness of the children’s social interactions. The authors suggest the possibility of identifying pivotal response classes of social communicative behavior.

CLASSWIDE INTERVENTIONS IN INCLUSIVE SETTINGS

When children with autism are in inclusive educational settings, it is important to meet their needs in ways that are minimally disruptive to class functioning and that appear normative to their peers. Classwide interventions using methods that benefit the entire classroom are one approach to this goal of full inclusion. Kamps and her colleagues (1992) taught social skills to an entire first-grade class that included 3 boys with autism, 2 children with physical disabilities, and 11 typically developing peers. The targeted skills included such things as initiating, responding to, and sustaining interactions, conversations, turn taking, sharing, and giving and getting help. Using a multiple baseline across children, they found positive change in the social behaviors of both the children with autism and their peers. Their findings also identified the importance of focusing on a few basic skills at a time with multiple opportunities to practice these skills.

In another study on classwide instruction, Kamps and her colleagues (1994) looked at classwide intervention for early elementary
school students with autism and their typically developing peers. Using a multiple baseline across children, they compared traditional instruction with a classwide peer-tutoring approach to teaching reading. Consistent with their earlier work with preschoolers (Kamps et al., 1992), this study showed that both the children with autism and their typical peers benefited from the classwide intervention. An important finding was the indirect effect of improved social interactions for the students with autism in the free time that followed the peer-tutoring sessions. Kamps et al. (1994) suggested that the structured peer interactions during tutoring sessions promoted acceptance by typical peers.

Work by Dugan and her colleagues (1995) examined cooperative learning groups to integrate two fourth-grade children with autism into a social studies class. They used an A-B-A-B reversal design to compare a teacher-led session with lectures and questions to cooperative learning groups with a team activity. The results showed that both for children with autism and their peers, there were measurable benefits in information gained and the duration of student interaction in the cooperative learning condition. Kamps et al. (1994) pointed to several factors in the success of these classwide interventions. One is to provide support for the interactions between the students. Another is the importance of the teacher’s adaptations in the curriculum for the students with autism. The authors also highlighted selecting curricular activities that lend themselves to interaction between the students.

SCRIPTS

Scripts of social interactions have been used to enhance the ability of children with autism to interact with their peers. For example, Goldstein and Cisar (1992) taught groups of preschool children, including one child with autism and two typical peers, to enact sociodramatic scripts set at a carnival, pet shop, and magic shop. For example, in the carnival script, the roles were booth attendant, assistant, and customer in a carnival hoop game. Using a multiple baseline design, Goldstein and Cisar found that learning these scripts increased the interactions between all of the children during their play sessions.
They also found that the children with autism engaged in behaviors that went beyond the scripts and were an elaboration of the assigned roles.

Krantz and McClannahan (1993) used a script to facilitate peer initiations by children with autism. A multiple baseline design across four children ranging in age from 9 to 12 years old was used to assess the benefits of systematically fading a script for initiating interactions. These initiations were unprompted statements or questions that were directed at another child. The scripted interactions included sentences that addressed the other child by name and then asked, “Would you like some candy or chips?” or “Did you like to swing outside today?” Initially, the children were given manual guidance to read these items from a card, and then that guidance was faded. The scripts increased the initiations of the children with autism, and after learning the scripts, they were noted to recombine elements from the scripts and add new words to their initiations.

In another application of scripts, Krantz and McClannahan (1998) worked with three young boys with autism. In this study, they embedded scripts in the children’s photographic activity schedule. For example, the child might learn to look in his schedule and follow the instruction to play with a toy and direct a statement such as “look” or “watch me” to an adult sitting nearby. These simple scripts, a few words at the beginning-reader level, were faded. This intervention led to a marked increase in initiations to adults without the need for the verbal prompts (e.g., “Say, watch me”) that are often hard to fade.

**SOCIAL SKILLS AND INCLUSION FOR ADOLESCENTS AND ADULTS**

The social skills literature is quite limited for older students and adults with autism. One specific social initiation that has been studied is offering assistance. Harris et al. (1990) taught three adolescent boys with autism to offer assistance to someone stating that he or she could not complete a task. They used a multiple baseline across participants and a multiple baseline across tasks for each participant. The tasks
were specific to each participant but included daily challenges such as putting a key in a lock, buttoning a button, and taking a top off of a jar. Results indicated that the adolescents were able to learn to respond to the cues of others indicating the need for assistance. Generalization to a new person in the familiar setting was consistently demonstrated, although other types of generalization were more variable. This skill is an important one, as it is a component of social sensitivity.

When efforts have been made to build social skills in adolescents and adults, the impact and generalizability of these interventions has been limited (Odom et al., 1985). Haring and Breen (1992) used a peer initiation model to facilitate social interactions with peers. They designed a social support network strategy in which groups of same-age nondisabled peers provided support to teens with autism throughout the school day. The nondisabled students recorded the quantity and quality of interactions. Haring and Breen found that frequency and appropriateness of interactions increased. Furthermore, many classmates described their classmates with a disability as a friend at the completion of the project, and many opted to initiate contact of their own accord.

Farmer-Dougan (1994) used an incidental teaching procedure to increase the requests made by adults with autism or moderate to severe mental retardation. One interesting aspect of this study was that all of the participants, peers and targets, were individuals with similar disabilities. Peer tutors were trained to evoke an appropriate request for needed items for lunch preparation. Specifically, peers were taught to watch for an initiation, remove the desired item, ask for a correct response, wait for a correct response, and reward. The peer use of incidental teaching was highly effective in increasing appropriate requesting. Effects were maintained when the program was withdrawn, and generalization to other individuals and to other meals was evident. The authors pointed out several specific benefits of this approach. The procedure was relatively easy to teach and to implement. Furthermore, the procedure was extremely appropriate for a community-based setting because the residents interacted in family-like activities and received practice in relevant domestic skills.
SUMMARY

Social skills deficits are a hallmark characteristic of autism spectrum disorders. While applied behavior analysis practitioners’ efforts at remediating deficits have been highly successful in many realms of functioning, the impact on social deficits has been more modest. Social and affective deficits remain among the most formidable treatment challenges. Significant progress has been made in the development of methods to teach social skills and to build bridges between individuals with autism and their peers. Adult-mediated and peer-mediated strategies have both been successful means of building social responsiveness. Strategies aimed at building skills in the child with autism have also been fruitful. Among the most interesting of these are classwide interventions for inclusive settings and the use of scripts for developing complex social interactions. Much work needs to be done in assessing the relevance of this knowledge base to adolescents and adults with autism.

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