Peer-Mediated Interventions to Increase the Social Interaction of Children with Autism:
Consideration of Peer Expectancies

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A variety of peer-related strategies to improve the social functioning of children with autism have been developed and empirically tested. Peer-mediated strategies typically involve the use of socially competent peers to model and reinforce appropriate social behavior. Promoting peer effort is an important component of such interventions and can be accomplished by altering peer expectations regarding their classmates with autism. Techniques include arranging situations or contingencies to promote optimal peer effort, teaching peers methods for reinforcing target skills in children with autism, teaching peers strategies for initiating interactions with children with autism, and teaching social skills to the children with autism. Peer-related approaches can be understood in the context of social learning theory. Several studies have shown that these strategies lead to substantial improvements in the social interactions of children with autism. Future research should continue to explore various peer-mediated socialization interventions, with an increased focus on the role of peer expectations.

Possessing social competence is fundamental to leading a normal, healthy life (Kennedy & Shukla, 1995; Pollard, 1998; Scott, Clark, & Brady, 2000). Inadequate social skills impinge on development by "(1) increasing behavior problems that result from not having the appropriate skills for social interaction, (2) increasing the likelihood for maladaptive behavior later in life, and (3) decreasing the positive developmental support and learning opportunities found in successful peer relationships" (Frea, 1995, p. 53). Children with autism are at an increased risk for such negative consequences due to their failure to imitate and understand the social nuances involved in entering and coordinating joint play activities, and their difficulty in interpreting social initiations made by other children (Wolfberg & Schuler, 1993).

Social skill consists of the ability to relate to others in a reciprocally reinforcing manner, and the ability to adapt social behaviors to different contexts (Schopler & Mesibov, 1986). Schopler and Mesibov suggested that children with autism do not experience a complete failure in social reciprocity, but their skills in that area are deficient in terms of spontaneity and flexibility. The authors contended, therefore, that the problem is in the social learning processes by which the skills are acquired and appropriately applied to different contexts. Others have noted that even when individuals with autism seem to desire social interaction, the necessary skills are missing (Scott et al., 2000).

Previous work by Lovaas (e.g. Lovaas, 1977; McEachin, Smith, & Lovaas, 1993), using the behavioral principles of Skinner (1953), showed that the behavior of children with autism is modifiable when an environmental agent selectively shapes and reinforces certain behaviors. Lovaas (1977) demonstrated that children with autism could be taught to orient toward another person, make eye contact, and vocalize in response to that person. With the success of teaching these prerequisite social skills established, the question of whether more complex interactional skills could be taught soon followed (Kennedy & Shukla, 1995). Early approaches primarily entailed use of adult direction (Rogers, 2000; a common strategy involved teachers' manipulating environmental contingencies by using social and token reinforcers for appropriate social behaviors (Kennedy & Shukla, 1995). However, major criticisms of such adult-mediated approaches were that they ignored the natural environment of children's social interactions and that social skills acquired through work with adults did not easily generalize to their peers (Rogers, 2000).

The field then turned to a consideration of peer-mediated approaches. The ultimate goal with social skills training is for children to be able to interact appropriately in their natural social contexts; thus, using peers to teach social skills precludes the additional steps required to transfer learning to interactions with peers (Rogers, 2000). Socially competent peers can model and reinforce appropriate social behavior (McEvoy & Odom, 1987). This is congruent with the contention of social learning theory that

learning occurs when a behavior is modeled and reinforced (Bandura, 1977).

Following this line of reasoning, the inclusion of children with autism in education settings with typical peers has become recommended practice (Kamps, Barbetta, Leonard, & Delquadri, 1994; Kohler, Strain, Hoyson, & Jamieson, 1997). However, despite the resultant increase in opportunities for peer modeling and interaction, teachers typically report little to no interaction between the two groups (Pierce & Schreibman, 1997b). For example, in a study of four preschool children with autism in an integrated classroom, the mere physical presence of typically developing peers did not lead to a significant increase in the social interaction behaviors of the children with autism (Myles, Simpson, Ormsbee, & Erikson, 1993).

There are several reasons why children with autism in integrated classes may not model the social behaviors of their peers. Bandura (1977) stated,

> The failure of an observer to match the behavior of a model may result from any of the following: not observing the relevant activities, inadequately coding modeled events for memory representation, failing to retain what was learned, physical inability to perform, or experiencing insufficient incentives. (p. 29)

Although Bandura (1977) supported modeling as a form of learning, he argued that learning will not occur unless the models are attended to and perceived accurately. He posited that personal and environmental factors are interdependent, resulting in a continued reciprocal interaction between the person and the situation. Children with autism who are in an integrated classroom without any specific intervention to promote socialization are unlikely to attend to their peer models. In addition, most studies have found that without intervention, typically developing children prefer to initiate interactions with other typically developing peers. Children with autism are even less likely to attend to the social behavior of their peers if the peers are not making an effort to interact with them.

Peers' efforts to interact with children with autism may be influenced by the former's expectations about the children with autism. The importance of expectations was first demonstrated by Rosenthal's (1963) research on self-fulfilling prophecy. *Self-fulfilling prophecy* refers to the occurence of a behavior as a result of having been expected or predicted. Self-fulfilling prophecy research has led to an awareness of the role of the perceiver's own behavior and expectations in provoking responses of targets (Darley & Oleson, 1993). The perceiver brings to any interaction assumptions about the other person (Jones, 1990). The more distinctive and salient the target person's characteristics, the greater the influence of the perceiver's expectations on his or her behavior (Nelson & Klutas, 2000). Children with autism often display repetitive behaviors, stereotyped language, and idiosyncratic social interactions, which cause them to appear notably different to their peers. Such salient differences often lead to stigmatization of these individuals based on perceivers' attention to and misunderstanding of the differences (Harper, 1999).

The affect/effort theory suggests that expectations influence both an individual's affect and the degree of effort he or she exerts (Rosenthal, 1989). Children who are given a negative expectation about a social interaction partner have more negative affect, are less involved, make less effort to interact, and are less friendly toward their partner even if the partner does not have significant emotional or behavioral problems (Harris, Milich, Corbitt, Hoover, & Brady, 1992). A similar phenomenon could occur with children with autism: Peers are generally very aware of the differences in children with autism and may make less of an effort to interact because of their expectations based on those differences.

It is possible to overcome expectancy effects if the perceiver is aware of the expectancy and is highly motivated to change it (Darley & Oleson, 1993). Interventions have the capability to effect such changes in expectancies by employing specific behavioral strategies to counteract peer expectations and reinforce interactions with their classmates with autism. Altering expectancies is an important intervention goal because it will likely lead to greater peer effort to interact with children with autism, and to more opportunities for learning.

This article will review the research on peer-mediated social skills training strategies used with children with autism. The interventions use peers as models and reinforce the target child for engaging in interaction. As noted earlier, peers do not typically interact with children with autism. Furthermore, children with autism are not likely to attend, unbidden, to the behavior of peer models, which results in scant learning. Therefore, students' expectancies regarding their peers with autism must be altered to promote efforts to interact with and gain the attention of the children with autism.

Intervention Approaches

The review will be organized by the approach used to change peer expectancies. First, interventions that arrange the situation or contingencies to promote optimal peer effort will be discussed. These include integrated play groups, peer buddy and peer tutoring approaches, and group-oriented contingencies. Second, interventions that promote peer effort by teaching peers skills for initiating with and reinforcing children with autism will be discussed. These include peer networks, pivotal response training, and peer initiation training. Third, interventions that change peer expectancies and promote interaction by teaching social skills to the children with autism will be discussed. These include target child initiation training and initiation training of both the target child and peers. Finally, comparative studies will be reviewed.

Manipulation of the Situation or Contingencies to Promote Interaction

The following interventions involve arranging the situation or contingencies to promote peer interaction with children with autism. As noted earlier, increased

peer effort to interact enhances the likelihood that children with autism will attend to peer models—and thereby enhances learning. Specific methods include integrated play groups, the assignment of peer buddies, and group-oriented contingencies.

Integrated Play Groups. During integrated play groups, as used by Wolfberg and Schuler (1993, 1999), an adult provides a structured environment and guides participation between children with autism and socially competent peers. A key facet of this approach involves providing a supportive environment to optimize interaction rather than using adult direction. Other important components of this method are a natural integrated setting, well-designed play spaces that take into account accessibility and size, and play materials that promote interaction. Integrated play groups also typically establish a consistent schedule and routine, use a small number of familiar peers, and match play activities to the child's developmental level (Wolfberg & Schuler, 1993). An adult monitors the play situation for evidence of developing play skills, interprets for and coaches the peers, and encourages the children to engage in activities slightly more advanced than their current abilities (Wolfberg & Schuler, 1999). In addition, the adult encourages the target child to engage in and maintain interaction by using prepared cues, such as posters, when the child seems uncertain. Such prompts are faded as the child begins to incorporate the strategies on his or her own.

Wolfberg and Schuler (1993) used a multiple-baseline design for three target participants in three different integrated play groups. All children were 7-year-old boys diagnosed with autism who had very little appropriate play, participated in a high degree of repetitive play, and had little to no language. All participants nearly doubled the amount of interaction with peers involving attention to a common activity in the final treatment condition. All participants also engaged in less repetitive play and more functional play, and all but one child engaged in more pretend play. Parents and teachers reported similar improvements outside the experimental setting, indicating some social validity and generalizability. However, there is no evidence that parents were kept blind to study hypotheses. In addition, initial behavior gains were not maintained when treatment was withdrawn. Although this is evidence that the behavior gains were due to the treatment, it also demonstrates that the treatment effect was dependent on adult support.

Roeyers (1996) also examined the possible impact of integrated play groups. However, in his study, the typically developing peers were informed about autism, and each was assigned to a target child; in addition, adults were less involved. Roeyers randomly assigned 85 children diagnosed with autistic disorder or pervasive developmental disorder not otherwise specified to an experimental or control group. All children were between 5 and 13 years of age and lived in the Dutch-speaking part of Belgium, but information on their level of impairment was not provided. The experimental group significantly increased the amount of time spent in interaction, increased the length of sustained interaction, increased their degree of responsiveness to the partner's initiations, increased the number of social initiations made, and decreased the amount of time spent in self-stimulatory behavior compared with the control group. Most increases represented a change of 20% or more over behavior prior to the intervention. However, despite these positive results, the interactions of the target children remained inconsistent and idiosyncratic.

Peer Buddy and Peer Tutor Approaches. Peer buddy and peer tutor approaches focus on dyads with one typically developing peer and one child with autism, rather than a group of children. Peer buddy approaches involve assigning each child with autism to a buddy, who is told to stay with, play with, and talk to the child with autism. Laushey and Heflin (2000) investigated this approach with two 5-year-old children diagnosed with an autism spectrum disorder. Both children had some language and could read at the kindergarten level but experienced social difficulties. Using a reversal design, the results indicated that the children with autism increased their social interaction 36% and 38% during the treatment phase, as compared with the baseline phase, in which children were integrated but not assigned a buddy.

Peer tutoring approaches consist of tutor–learner pairs and promote the incidental learning of social behaviors through natural interactions. Peer tutoring approaches have generally been studied with high-functioning school-aged children with autism (Kamps et al., 1994; Kamps, Dugan, Potucek, & Collins, 1999). Kamps et al. (1994) examined the peer tutoring approach using a multiple-baseline-across-participants-with-reversal design. Participants included three 8- and 9-year-old boys with autism, who were high functioning in terms of language and intellectual abilities but lacked social competence, and all other children in a third-grade classroom. Each week, students were assigned a different tutoring partner. Tutoring produced increases in interaction from 80 to 120 seconds per 5-minute sample for the three children with autism. In addition, the mean interaction time of peers increased, and the children with autism displayed improved academic achievement.

Kamps et al. (1999) studied a slight variation of the peer tutoring approach by having moderate- to high-functioning school-age children with autism tutor typically developing first-grade students who were experiencing academic difficulties. An ABAB withdrawal design with replication was used to examine the impact of three 9-year-old children with autism and five fourth-grade girls tutoring six first-grade students. All three children had higher mean free time social interaction following the peer tutoring. In addition, the first-grade children who were tutored improved academically compared to those who were not tutored. A second part of this study used the same tutoring program with four 10- to 12-year-old children with autism as tutors. The results were similar but more variable and less dramatic.

Group-Oriented Contingency. Group-oriented contingencies require that all children in a class engage in a specified behavior in order to receive a reinforcer. Both studies that used this approach also provided social skills training prior to using the group-oriented contingency (Kohler et al., 1995; Lefebvre & Strain, 1989). Group-oriented contingencies promote the emergence of corollary, or untrained, supportive behaviors among the children to influence one another's performance. An advantage of this approach is that teachers are able to more efficiently manage large groups.

The group contingency method has been found to increase social interactions of 4- to 6-year-old children with autism (Kohler et al., 1995; Lefebvre & Strain, 1989). Kohler et al. used group-oriented contingencies with three 4-year-old children with autism and six typical peers ranging in age from 3 to 4 years. Prior to the study, none of the children with autism engaged in more than occasional interactions with peers, and only one child used appropriate play skills. A withdrawal-of-treatment design was used with alternating baseline, social skills training, and group contingency conditions. The classwide social skills training package was developed by Odom, Kohler, and Strain (1987) and included play organizer suggestions, share offers and requests, and assistance offers and requests. The class-wide supportive skills training included reminding one another to use these skills. The amount of time that children with autism and their peers engaged in social interaction increased from 28% to 65% during group-oriented contingency conditions. However, rates of interaction remained variable. Peer prompts ranged from 2.6 to 7.6 times per session during group-oriented contingencies but returned to zero during baseline phases. In addition, social interactions in which the peers used supportive prompts were longer and more reciprocal. These results occurred independent of teacher and adult praise.

Lefebvre and Strain (1989) examined the use of group-oriented contingency in a similar withdrawal-of-treatment design with three children with autism ranging in age from 4 to 6 years. The social skills training targeted specific behaviors, including: say your friend's name, face him or her, keep trying, ask for a toy and hold out your hand, listen and help, give a toy to your friend by placing it in his or her hand, and remember to give the requested toy. Group-oriented contingencies following the social skills training produced a higher rate of interaction than that found at baseline. However, there was considerable fluctuation in the amount of interaction that the three target children engaged in.

Peer Instruction in Social Interaction Strategies to Promote Interaction

The following interventions involve teaching peers specific social skill strategies to facilitate interaction with children with autism. Such strategies make it easier and more rewarding to interact with children with autism. Increased peer effort to interact enhances the likelihood that the children with autism will attend to the peer models and thereby enhances learning. Specific methods include peer networks, pivotal response training, and peer initiation training.

Peer Networks. Peer networks are based on the premise that an enhancement of peer understanding of, and interest in, children with disabilities will promote increased interactions. Peer network interventions thus develop a social support network by soliciting an intact group of peers to provide support for individuals with disabilities. Helping peers better understand and support children with autism is important because, as McEvoy and Odom (1987) noted, children with disabilities who have received training on how to interact with their peers will be successful only if there are receptive peers with whom to interact.

Two studies have used this approach with school-aged children (Garrison-Harrell, Kamps, & Kravitz, 1997; Kamps, Potucek, Lopez, Kravitz, & Kemmerer, 1997). Garrison-Harrell et al. used a multiple baseline design to investigate this method across three 6- to 7-year-old students who were diagnosed with autism. All target children were nonverbal or had minimal communication ability. Fifteen typical first-grade students were included in three peer networks of five peers per target child. Peers were taught how to use the target child's augmentative communication system; in addition, they were taught social skills, including initiating conversation, responding to conversation, giving compliments, sharing, providing instructions, and maintaining conversations. The target children then spent 20 minutes with their peer networks in three different settings, which were individualized to match the target child's interests. Following the intervention, peers reported higher acceptance of the students, and the target students increased the frequency and duration of their interactions across settings. However, these researchers did not test generalization to other settings. Kamps et al., using a similar strategy and sample, reported that the intervention improved interaction time for target students, and that the results generalized to nonintervention settings for two of the three children.

Haring and Breen (1992) used the peer network approach with two 13-year-old boys, one with autism and one with moderate mental retardation and severe language delay. Similar to the above studies, peers were taught how to initiate interactions with, reinforce, and prompt responses from target students. However, in this study adults also taught appropriate responses to target students, and one target child was taught to use a self-monitoring system. The results indicated an increased frequency of appropriate social interactions in nonstructured contexts. In addition, the peer network members reported improved attitudes and ratings of friendship toward the students with disabilities.

Pivotal Response Training. Pivotal response training, as described by Pierce and Schreibman (1995, 1997a, 1997b), involves using role-play techniques to teach peers how to provide target children with social reinforcement, including paying attention, letting the child choose,

varying toys, modeling appropriate social behavior, reinforcing attempts, encouraging conversation, extending conversation, taking turns, providing narration for play activities, and teaching responsivity to multiple cues. The approach is expected to increase social behaviors by providing multiple models who incorporate the target child's preferences in natural or loosely controlled contexts (Pierce & Schreibman, 1995).

Pierce and Schreibman (1995, 1997a, 1997b) tested this model in three studies using multiple-baseline designs. Participants in the first study were two 10-year-old children with autism who were socially nonresponsive and who had expressive verbal abilities similar to a typical 3-year-old's (Pierce & Schreibman, 1995). After several weeks of intervention, both children began to initiate play and social conversation with the trained peer, and these gains were maintained during a follow-up period. There was evidence of some response generalization, but only one child generalized to untrained peers. Two other studies involving 7- and 8-year-old children with autism (Pierce & Schreibman, 1997a, 1997b) yielded similar results, with less repetitive play and increased social conversation. Interactions with untrained peers reached levels near 100% after treatment, compared with near-zero levels at baseline, a change that is clinically as well as statistically significant (Pierce & Schreibman, 1997b).

Peer Initiation Training. The goal of teaching peers techniques for initiating interactions is that the children with autism will then be involved in more interactions in which they can receive reinforcement for appropriate responses. One line of research teaches typical peers to initiate "play organizers," which includes such things as share offers and requests, assistance offers and requests, and strategies to gain the target child's attention. In addition, peers are taught how to appropriately use affection and complimentary statements with children with autism.

This approach has been evaluated for use with preschool-aged children (e.g., Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Kohler, Strain, Maretesky, & DeCesare, 1990; Odom & Strain, 1986; Odom & Watts, 1991; Sainato, Goldstein, & Strain, 1992). Odom and Watts used a multiple-baseline design to investigate the utility of the peer initiation training approach with three children with autism between the ages of 3 and 5 years. All children engaged in infrequent social interactions and had communication abilities ranging from the 9- to 35-month levels. Four preschool-aged typically developing children received the peer-initiation intervention as described above. Though there was considerable variability across participants, the children with autism substantially increased their interactions during the intervention phase when teachers prompted the peers to use the initiation strategies. Odom and Watts also examined the impact of adding correspondence training/visual feedback in which the teacher provided reinforcement to the peers when they used the initiation strategies by giving a visual cue during the play session and providing a tangible reward following the play session. This feedback intervention, combined with the peer-initiation intervention, produced increased engagement from the children with autism in a setting where adults gave verbal prompts to the peers and a setting in which they only gave feedback. However, the peer initiation intervention alone without verbal prompts from teachers regarding initiation did not lead to increases in social interactions. Sainato et al. similarly found that teaching the peers initiation strategies was not enough to ensure that they would use them.

Though peer-initiation strategies have had success in increasing the social interactions of preschool-aged children with autism, those interactions have consisted primarily of responses, rather than social initiations (Odom & Strain, 1986; Odom & Watts, 1991; Sainato et al., 1992). Using a modification of the peer-initiation intervention developed by Odom and Strain, Mundschenk and Sasso (1995) investigated use of this strategy with 7- to 10-year-old children with autism. As in previous studies, peer initiations were found to increase the responses of the children with autism. In addition, responding generalized to nontrained peers when at least three trained peers were present. Peer-initiation training was also found to increase the rate of initiations by the children with autism from 2% to 7%. However, because the children with autism were not specifically taught social initiation and response skills, their interactions remained idiosyncratic.

Target Child Instruction in Initiation Strategies to Promote Interaction

The following interventions involve teaching target children initiation skills. If the children with autism increase the frequency of initiations to their peers, the peers are likely to change their expectations and make more effort to interact as well. Increased peer effort to interact enhances the likelihood that the children with autism will attend to the peer models and therefore enhances learning. Specific methods include target child initiation training and a combination of target child and peer initiation training.

Target Child Initiation Training. Belchic and Harris (1994) suggested that training children with autism to initiate and maintain play with their peers is crucial; such training can overcome the lack of relatedness typical in children with autism and can increase the reinforcement experienced by peer initiators. Interventions to increase the initiations of children with autism typically use some form of prompting and reinforcement to encourage initiations. The peer who is the target of the initiation is told to respond but not initiate. Interventions to increase initiations must take into account spontaneity, success, rate, the appropriateness of behaviors used to initiate, and the demands on the teacher (Zanolli, Daggett, & Adams, 1996). Zanolli et al. used a multiple-baseline-across-activities design in an intervention with two low-functioning 4-year-old children with autism. The intervention consisted of a "priming intervention," in

which the two children engaged in their preferred activities and were reinforced for directing teacher-prompted, low-demand social behaviors toward a trained peer. Following priming, the children participated in activity sessions in which teacher prompting was withdrawn and the peer provided reinforcement for initiations. During the intervention phases, the children with autism increased their spontaneous initiations above the average rate of initiations among typical peers without teacher prompt. The initiations were also varied in type, were appropriate, and were successful. This study did not test the generalizability of results to untrained peers.

Belchic and Harris (1994) asked a trained peer to initiate a social interaction with an untrained confederate in the presence of a child with autism. This study involved three preschool-aged children diagnosed with autism and five same-age peers. Prior to the intervention session with the confederate and peer, an adult trainer played with each child with autism and prompted and reinforced initiations. Some adult prompting was also used if the child did not interact with the confederate. Each child with autism reached the criterion of successfully initiating and maintaining social interaction with the confederate at a level equal to or higher than 75% of the time that the confederate spent with the peer. Once criterion was reached with one confederate, the procedure was repeated with a new peer. Less time was required to reach criterion with each subsequent peer. However, the extent of generalization to siblings and on the playground was variable for each child.

Target child initiation interventions have also been used with school-aged children with autism. Using an AB design, Brady, McEvoy, Wehby, and Ellis (1987) employed a loose prompting technique in which an adult prompted an 11-year-old child with autism to play with peers during a training session. The target child's spontaneous initiations increased with both trained and untrained peers. Gunter, Fox, Brady, Shores, and Cavanaugh (1988) used a similar approach, whereby the teachers prompted two children diagnosed with autism to initiate with peers, who were instructed to respond to the target child's initiations. Using a multiple-baseline design, they found that both participants increased their initiations and interactions when teacher prompts and praise were directly applied. However, only one child generalized to untrained peers in a new setting without teacher prompt.

Initiation Training for Target Child and Peers. Gonzalez-Lopez and Kamps (1997) used a strategy for increasing the interactions of children with autism that combined several approaches. First, peers were given information about disabilities and were taught behavior management skills, including giving easy instructions, prompting, reinforcing, and ignoring disruptive behaviors. The peers and the children with autism were then taught how to use greetings, how to initiate play, conversation strategies, imitation, how to follow instructions, how to share, turn taking, how to ask for help, and how to request things. During the last condition, teachers reinforced interactions by using a star chart. All intervention conditions consisted of 20-minute small play groups. A multiple-baseline design was used to evaluate this intervention with four children with autism ranging in age from 5 to 7 years who had at least moderate comprehension and some limited verbal communication. With the exception of one child, the mean frequency of interactions increased from 2.3 to 3.4 with social skills training and from 6.6 to 8.3 with social skills training plus reinforcement. In addition, behavior problems were reduced, which often increases the likelihood that peers will persist in interactions with children with autism. There was evidence, however, that the more disruptive children might require additional behavior management strategies.

Comparative Studies of Various Approaches

Comparative studies are important for determining which of various approaches produce the best results. Such studies can also help clarify the type of outcome an intervention achieves so that one can choose an intervention based on the target behavior. Odom and Strain (1986) compared peer-initiation training to a teacher-antecedent condition. Four preschool-aged children were prompted by teachers to use sharing and play organizer initiation strategies with three 4-year-old children with autism in one condition. In another condition, the teacher prompted the peer to stay near the child with autism and prompted the child with autism to play with the peer. The teacher-antecedent condition led to increased initiation behaviors, while the peer-initiation training condition led to increased responses from the children with autism. Both conditions resulted in increased sharing.

Oke and Schreibman (1990) investigated the peer-initiation training strategy as well, comparing it to other peer training strategies and a target child training methods. Using a multiple-treatment design with reversal phases, one high-functioning 5-year-old child with autism, two trained 4- and 5-year-old peers, and one untrained 7-year-old peer participated in three different interventions. Intervention 1 involved peer-initiation training with sharing and play organizing strategies, as previously discussed. Intervention 2 also used this approach; however, peers received additional instruction in discrimination between parallel and interactive play. Intervention 3 focused on training the child with autism; the intervention included training in sharing, play organizing, and turn taking, similar to that given to peers in Intervention 1. Training the peer in initiation strategies (Intervention 1) led to increases in social interaction, but such interaction was highly variable. Intervention 2 produced higher and more stable interaction, but interaction dropped dramatically during a reversal phase in which peers no longer used the initiation strategies. After Intervention 3 was instituted, in which the child with autism was trained to initiate, the increases in interaction were maintained during a subsequent reversal phase. Interventions 2 and 3 both led to higher rates of interaction

than Intervention 1, but they did not significantly differ from each other. Notably, the target child's affect changed from neutral to positive only during Intervention 3. There was some evidence for generalization to an untrained peer, though generalization did not occur during free-play time at school.

Important Issues in Socialization Interventions

Various approaches used to change peer expectancies and increase the social interaction behaviors of children with autism were reviewed in the preceding section. Intervention techniques included (a) arranging the situation or contingencies to promote optimal peer effort, (b) promoting peer effort by teaching peers skills for initiating with and reinforcing children with autism, and (c) changing peer expectancies by teaching social skills to the children with autism. Having reviewed the various approaches, we next present issues related to the social validity, generalizability, and maintenance of intervention results. Peer expectancies will be presented as an area deserving further attention in intervention studies.

Though all of the reviewed studies reported substantial improvements in social interactions, the nature of the improvements varied substantially, both across studies and between participants. Frea (1995) noted that an important difficulty in producing stable and substantial improvements with socialization interventions for children with autism is that generally the interventions can address only a small facet of the problem, which leads to negligible changes in the amount or quality of social interaction. The social validity of the increases in interaction produced by peer-mediated interventions is also a concern. Many studies reported increases in responding or initiation by target children, but not both; yet both are required for reciprocity. In addition, though most studies reported increases in interactions, the results are rarely compared to the level at which typical children interact (Pollard, 1998), and there is a strong emphasis on quantitative measures rather than qualitative ones (McEvoy & Odom, 1987). Reliance on quantitative measures ignores the fact that often the interactions of children with autism remain idiosyncratic. The quality and complexity of interactions must also be considered if interventions are to truly affect naturally-occurring peer relationships (Mundschenk & Sasso, 1995).

Though peer-mediated interventions have shown promise and deserve further attention, maintenance and generalization of improvements in social interaction have been less pronounced (McEvoy & Odom, 1987; Kohler et al., 1997; Krantz, 2000). These are critical issues because social skills are necessary at most times, in all contexts, with most people (Kohler et al., 1997). Generalization is important across both settings and peers.

Setting events are important determinants of social behavior (Gaylord-Ross & Haring, 1987). Honig and McCarron (1988) confirmed the importance of setting for generalization. In their study of preschool children in unstructured playtime, circle time, structured play, and gym, the frequency of the interactions of children with autism varied by setting. In addition, McEvoy and Odom (1987) noted that the type of activity also influenced the child's interactional behavior. Furthermore, interactional skills learned with the assistance of one peer may not be used spontaneously with other peers (Belchic & Harris, 1994). Breen, Haring, Pitts-Conway, and Gaylord-Ross (1985) proposed the multiple-peer tactic, with the assumption that generalizability will increase if children are given the opportunity to practice with several peers who have different response characteristics. Bandura (1977) also suggested that diversity in modeling fosters behavior acquisition.

Though the use of multiple peers has been recommended as useful for increasing generalization, the impact on peers remains an important consideration in peer-mediated interventions. Peer response is especially important if a change in peer expectancies is necessary to promote interaction with children with autism. Peck, Donaldson, and Pezzoli (1990) addressed the impact of socialization interventions on peers through interviews with high school students who developed relationships with peers with handicaps. They found that the nondisabled students reported improved self-concept, reduced fear of human differences, increased tolerance of others, development of personal principles, and more relaxed and accepting friendships. Some difficulties they reported included social discomfort and discomfort in reaction to the physical characteristics of some students. Kamps et al. (1998) surveyed elementary school children who had been involved in social interventions for children with autism and found that peers were accepting and sometimes excited about participating in the activities with the children with autism. In addition, Pierce and Schreibman (1995) found that peer trainers reported that play sessions were challenging but also rewarding and educational. Thus, there is substantial evidence of the positive effects of these interventions for peers as well, including changes in negative expectancies regarding children with disabilities.

An individual's behavior is often affected by the expectations that his or her peers bring to the situation (Jones, 1990). Therefore, it is essential that future studies on socialization interventions for children with autism focus on the impact of peer expectancies. Though using peers, rather than adults, as models has been suggested as the most effective strategy for increasing the interactions of children with autism (Rogers, 2000), the importance of peer expectancies in their role as intervention agents has not been examined. Research has established the influence of teacher expectations on student behavior (e.g., Rosenthal, 1963), and this principle must not be forgotten when the role of teacher is being played by a peer.

Research has shown that without intervention, typically developing peers prefer to interact with each other (e.g., Myles et al., 1993). Therefore, specific strategies must be included in socialization interventions to change their expectancies regarding interactions with the children with autism. Based on the affect/effort theory, it is anticipated that

a change in affect and effort should be noted following a change in expectancy (Rosenthal, 1989). The attending of children with autism to peer models would likely be fostered by an increase in peer effort to interact with them.

The *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition* (American Psychiatric Association, 1994) describes children with autism as having markedly impaired awareness of others and states that "individuals with this disorder may be oblivious to other children" (p. 66). Social learning theory suggests that one acquires new behavior by seeing the behavior modeled and receiving reinforcement, but this can be effective only if the child with autism pays attention to the model (Bandura, 1977). Yet, interventions rarely focus on measuring the attention paid by the children with autism to the intervention agent. The role of changes in peer expectancies to promote attention to the peer models is also often overlooked.

There is evidence that expectancies can be altered when the perceiver is made aware of them and is sufficiently motivated (Darley & Oleson, 1993). Therefore, interventions have the potential to promote peer effort through changing peer expectancies regarding children with autism. The present review suggests that there are several ways to do this, including arranging the situation or contingencies to promote optimal peer effort, teaching peers skills for initiating and reinforcing children with autism, and teaching the children with autism social skills. While all of these are plausible mechanisms for altering peer expectancies and promoting peer effort, the studies generally did not focus on this as a specific intervention goal. To promote optimal learning with peer-mediated strategies, peer expectancies should be more carefully studied.

Future Directions

In the previous section, important considerations for social interventions were discussed, including the social validity, maintenance, and generalizability of the results of intervention studies and the importance of considering peer expectancies. This final section will present conclusions and suggestions for future directions in the development of interventions to increase the social behaviors of children with autism.

There is evidence that social interventions involving peers hold promise for enhancing the socialization of children with autism. The research on peer-mediated interventions is growing, but there is still a great deal to be undertaken. Improved generalizability and social validity should be primary goals of future research. More comparative studies are needed to determine which interventions are most effective, and for which outcomes. Similarly, studies are needed to determine which components of the interventions result in the positive effects (Pollard, 1998). For example, details such as how many trained peers are necessary for increases in interaction and generalization should be more carefully considered (Mundschenk & Sasso, 1995). In addition, the impact of how peers are chosen should be systematically studied, with investigation of whether or not random assignment leads to increased generalizability. Characteristics of the children with autism, such as severity of impairment and age, should also be more carefully studied.

An overlooked but very important area of consideration is the role of peer expectancies. Altering peer expectations so that peers make greater effort to involve children with autism is one tactic for increasing attention. Poor attending to the environment is an undisputed area of deficit for children with autism, and change in that alone would be a positive step toward socialization. In addition, the importance of attention in learning (Bandura, 1977) must not be underestimated. Future studies should focus on both enhancing and measuring attention. The methods for promoting peer effort should be compared to determine which strategy most effectively draws the attention of the children with autism. More direct approaches for increasing attention should also be considered, such as providing both visual and verbal cues. Finally, learning should be measured in addition to performance (Bandura, 1977). Typically, studies on interventions to increase the socialization of children with autism measure changes in overt behaviors, such as the frequency or duration of social interactions, and the learning process is often overlooked. Pinpointing when and how learning best occurs will lead to greater refinement of intervention approaches.

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