

This study assessed play and social behavior of young children with autism in inclusive school settings to identify important targets for intervention. Data were collected for five children with autism and for typically developing peers. All children with autism received intervention in one-on-one settings but did not have individual education plan goals that provided systematic intervention for developing play and social skills in their school settings. Results indicated the children with autism and their typically developing peers played with a comparable number of stimulus items (e.g., toys), but the children with autism engaged in these activities for shorter durations. Both children with autism and their typically developing peers engaged in similar levels of social interaction with adults. However, the children with autism rarely or never engaged in social interactions with their peers, whereas the typically developing peers frequently engaged in social interactions with other children. The results suggest important targets for intervention.

Identifying Early Intervention Targets for Children With Autism in Inclusive School Settings

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A trend toward inclusion has resulted in an increased number of children with disabilities attending their neighborhood schools and being educated in the same classrooms with their typically developing peers. The values of inclusion involve providing a normalized setting for children with disabilities, where opportunities for building friendships and having role models for socialization are available (Kohler & Strain, 1999; Nickels, 1996; Peck & Cooke, 1983). Moreover, social

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behavior change has shown to be greater in integrated settings than in developmentally segregated settings (Strain, 1983), further supporting the positive effects of the least restrictive environment for children with developmental disabilities.

In the early years of a child's life, an important developmental task is the formation of peer-related social behavior (Hartup, 1983; McGee, Feldman, & Morrier, 1997; Strain, Guralnick, & Walker, 1986). It is now a widely accepted fact that peers can contribute considerably to the development of social and communicative competencies. However, in light of significant communication delays exhibited in children with autism, considerable social isolation may exist, particularly with peers. This isolation may be further exacerbated given that social interactions with peers require different skills from those needed with adults. Unlike child-adult interactions, where adults tend to be the initiators and provide a highly responsive and often anticipatory social environment, child-child exchanges rely on the effective participation and balanced contribution of both partners (Guralnick, 1990, 1992; Odom, McConnell & McEvoy, 1992). As a result, children with developmental disabilities who appear socially competent with adults may fail to seem so with peers (Guralnick, 1990; Odom et al., 1992). Thus, without adequate child-child exposure and assistance, beginning very early on, children are not likely to gain the variety of experiences needed to learn social competence. Data collected from individuals with developmental disabilities are particularly troubling; these data indicate that the peer-related social behaviors of individuals with developmental disabilities often lag substantially behind their level of cognitive development (Guralnick, 1990).

It has been suggested that some children with developmental delays have difficulty engaging in group play, have difficulty forming reciprocal friendships, are likely to exhibit difficulty with new social relationships, and once involved in a social relationship, often may have difficulty in maintaining that relationship (Guralnick, 1990; Guralnick, Conner, Hammond, Gottman, & Kinnish, 1995). The importance of social competence in peer interactions for later adjustment, for acceptance by others, and ultimately, to one's quality of life

argues for its significance in the design of early intervention programs (Guralnick, 1990). Even though inclusive settings appear to be conducive to the development of skills required for social competence (Kohler & Strain, 1999; Roeyers, 1996; Strain, 1983; Zanolli, Daggett, & Adams, 1996), mere placement in inclusive settings does not guarantee positive outcomes and does not eliminate the need for specific social skills intervention (Guralnick, 1990; Sontag, 1997; Strain & Hoyson, 2000).

One difficulty in addressing social behavior is the widespread variations in defining appropriate social behaviors. Also, there is a wide variability of appropriate social behavior evident in typically developing children. In addressing these problems, behavioral observations offer a number of distinct advantages relative to other methods of assessing children's peer relationships. Such measures minimize the subjective bias inherent in more traditional assessment procedures, such as teacher and parent reports, and provide information on actual peer exchanges within a particular setting. Behavioral observations have been shown to be sensitive to intervention effects and are also more conducive to frequent repeated measures, making them ideally suited for evaluating treatment outcome (Foster & Ritchey, 1979).

To date, most naturalistic behavioral observations tend to be obtained prior to treatment intervention and often do not include normative data. Thus, there is a definite need for more detailed information relating to typical children's social development (Rogers, 2000; Stone & La Greca, 1986) in context with their disabled peers if the quality and quantity of social behavior is to be targeted. Naturalistic observation of social behavior is an important assessment method and is essential in furthering our understanding of children's social relationships. The purpose of this study was to collect naturalistic observations of children with autism in inclusive school settings over a period of time. In addition, to further our understanding of these children's behaviors, the same data were simultaneously collected for their typically developing peers in order to systematically compare their peers' behaviors in that same setting.

METHOD

PARTICIPANTS

Five children, four male and one female, all diagnosed as having autism spectrum disorders by at least one outside agency and referred to our autism center, participated in this study. They were selected because their parents made the decision to place them in a classroom setting for typically developing children. An initial intake interview was conducted, and the children were all observed to have behaviors characteristic of autism according to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994), including communication delays, failure to develop cooperative play and friendships, lack of responsiveness to and interest in others, and repetitive and ritualistic behavior. Some of the children also exhibited aggressive and disruptive behaviors. Prior to the start of this study, medical doctors confirmed that the nature of the problems was not caused by testable physiological factors such as hearing or visual impairments. Furthermore, gross and fine motor skills appeared to be developing normally for all the children. Individual child descriptions follow.

Child 1. Child 1 was 3 years 8 months at the start of this study. He demonstrated high levels of self-stimulatory behavior, such as lying on his side and sifting sand through his hand for hours at a time. He also displayed a repetitive interest in books and exhibited excessive tantrums for 2 or more hours when this activity was disrupted. Aside from books, he had little interest in other activities. Cognitively, he was considered to be high functioning. His IQ on the Stanford Binet Intelligence Scale was 101. He scored 93 on the Leiter International Performance Scale. Receptive vocabulary, tested on the Peabody Picture Vocabulary Test-Revised (PPVT), was in the 93rd percentile. Receptive language, tested on the Assessment of Children's Language Comprehension (ACLC), was 92% correct on the vocabulary section, 90% correct on the two critical items section, 60% correct on the three critical items section, and 70% correct on the four critical items section.

Child 2. Child 2 was 10 years 7 months at the start of the study. School observations indicated that he had difficulty following teacher directives and completing assigned tasks, especially reading and comprehension tasks. He frequently needed to be redirected to tasks at school. During conversations, he typically made noises and responded with repetitive nonsense words or words unrelated to the topic. He also exhibited inappropriate and uncontrollable laughter, touched peers inappropriately, and was reported to parallel play rather than to interact with other children. He had a preoccupation with certain topics such as electricity and batteries, which were the only topics of conversation in which he would participate. Finally, his parents reported that he was afraid of the dark, mirrors, and several other specifically shaped objects. He was referred for special education services at 3 years 2 months for difficulties in comprehension of verbal information. At that time, there was concern due to his echolalia, inappropriate play, and repetitive stereotypic behavior. At the start of this study, he was considered to be functioning at a high level cognitively. His IQ on the Stanford-Binet was 122, the PPVT yielded a receptive vocabulary score at the 53rd percentile, and no errors were made on any of the levels of the ACLC.

Child 3. Child 3 was 3 years 3 months at the start of this study. Behaviorally, he frequently engaged in repetitive stereotypic mannerisms such as twisting his fingers in front of his eyes and twisting sticks and other objects between his fingers. Toy play lacked symbolism and tended to be stereotypic and repetitive in nature, such as breaking toys into their component parts and spinning objects. His language was marked by immediate echolalia of the last part of an utterance addressed to him. Cognitively, he was considered to be relatively high functioning, although his test performance was inconsistent due to numerous interfering behaviors. His IQ on the Stanford-Binet was 84, and he was untestable on the Leiter. His receptive vocabulary, tested on the PPVT, was at the 34th percentile. Receptive language on the ACLC was 90% correct on the vocabulary section, 80% on the two critical elements section, 50% on the three critical elements section, and 40% on the four critical elements section.

Child 4. Child 4 was 3 years 8 months at the start of the study. He would not sit in a chair for more than a few seconds. Instead, he engaged in disruptive behaviors, such as crying, falling off the chair, kicking, hitting himself and others, and so on. Even though he had approximately 10 words and word approximations that he would use infrequently (such as “push”), he was primarily considered nonverbal. In addition, his mother reported that he could understand at least 10 words (including “yes” and “no”). He was not toilet trained and could not dress or bathe himself, but he was able to partially use a fork and a spoon when prompted. Ritualistic behaviors included twisting twigs between his fingers, flapping his hands, and jumping up and down. He also had an intense interest in small objects such as toy cars, which he held for lengthy periods of time without engaging in any appropriate symbolic play. Cognitively, he was considered to be low functioning. He was untestable on all standardized measures.

Child 5. Child 5 was 3 years 4 months at the start of this study. She was untestable on the Stanford-Binet, the Leiter, the PPVT, and the ACLC. Behaviorally, she frequently engaged in stereotypic mannerisms, such as rocking back and forth while sitting, and was preoccupied with videotapes, oftentimes repeating parts of the video script. In addition, she frequently engaged in inappropriate repetitive behavior, generally masturbating on the corners of tables. She had a vocabulary of fewer than 20 labels and demonstrated the meaning of at least 10 words. However, her language was primarily marked by immediate echolalia of the last part of an utterance addressed to her. Cognitively, she was considered to be low functioning.

Comparison classmates. To provide an indication of typical behavior for nondisabled children in these individual settings, data were also recorded for typically developing classmates throughout the study in addition to those of the children with autism described above. None of the classmates had been diagnosed as having a disability, and all appeared to be functioning at age level or above according to their teachers and our observations in the classrooms. To provide a random and varied sample for comparison, data were recorded for a different

typically developing peer, who served as a comparison for each session.

SETTINGS

All sessions were conducted in the children's regular schools (preschools or early elementary regular education classrooms). To provide for external validity across a variety of individual school settings and different teachers, six different private and public school settings were employed. Children 1, 4, and 5 each attended a different preschool. Child 3 attended two different preschools during the course of the study. Child 2 attended an upper elementary (4th grade) class. For Children 1, 3, 4, and 5, data were recorded during "work time," when the children were allowed to work independently on an individually chosen task (e.g., puzzles, books, coloring, painting, play dough, etc.) available within the classroom. Data for Child 2, who attended elementary school, were taken during recess time. He had access to various activities such as swings, slides, bars, various ball games, and so on.

PROCEDURE

One or two observers recorded data continuously. Sessions were 20 minutes in length and occurred once or twice weekly. Observers were selected from a pool of seven, consisting of undergraduate students, graduate students, and licensed speech pathologists. All had completed at least one academic course in behavior analysis and had a minimum of one quarter of supervised data recording in a clinical setting.

Each observer used a stopwatch and a data sheet. For each 20 minute period, the recorder used the stopwatch to record the minutes and seconds that the child engaged in appropriate, on-task behavior. In addition, data were collected on task items utilized and social interactions. The individual behaviors recorded for both the experimental and comparison children are described in detail in the following.

1. The number of minutes the children appropriately engaged in a task was recorded for each child. Appropriate behavior was defined as the

child's engaging in a school task in a manner consistent with the school curriculum. Inappropriate behavior was identified as self-stimulatory behavior, disruptive behaviors (e.g., tantrums, aggressions, etc.), and off-task behaviors (e.g., staring into space).

2. The number of stimulus items the children used during the minutes in which they were engaged in a task was recorded.
3. The number of social-communicative interactions the children exhibited was recorded. This included each time a child began or responded to a verbal social interaction (or nonverbal social interaction, for Child 4) with another child or an adult during the 20-minute period. Social interactions were recorded for interactions between the children with autism and adults and between the children with autism and their peers. Initiations ranged from gestures (for Child 4) to one word (e.g., "water"), to complete sentences (e.g., "Mrs. Brown, can I have a cup of water?"). A correct verbal response was counted if a child's response was appropriate and relevant to the pragmatic context, for example, if a child said "no" after another child asked, "Do you want me to pour this?"

RELIABILITY

Reliability measures were recorded for each of the children with autism and the comparison peers for all of the dependent measures during 29 unsystematically selected sessions across the five children. Specifically, for minutes engaged in a task, reliability was calculated by dividing the number of seconds that both observers agreed that the child was engaged in appropriate play by the number of seconds agreed upon plus the number of seconds not agreed upon, then multiplying by 100 to yield a percentage. In addition, the total number of stimulus items with which the children interacted during the 29 sessions was counted by each observer. Reliability was then calculated by dividing the number of agreements by the number of agreements plus disagreements and then multiplying by 100.

For social interaction, reliability percentages were calculated for the number of verbal and nonverbal social interactions the observed child made with peers and for the number of verbal and nonverbal social interactions the observed child made with adults. Reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and then multiplying by 100.

The average reliability for minutes engaged in a task was 91%. Average reliability on the number of stimulus items was 97%. For social interactions, the average reliability was 85%.

RESULTS

The first question asked in this study was, How did the amount of appropriate on-task behavior of children with autism compare with that of typically developing children in inclusive school settings? The results pertaining to this question are shown in Figure 1. Figure 1 shows individual session data for the children with autism and the mean (horizontal line) and standard deviations (shaded areas) for the typically developing peers. These data show that although the children with autism did engage in appropriate on-task behavior, they did so for much less time than their typically developing peers. That is, the children with autism only engaged in appropriate, on-task behavior about half of the time, in contrast to their typically developing peers who typically engaged in appropriate, on-task behavior for almost the entire session.

The second question asked in this study was, How many stimulus items did children with autism use in comparison to their typically developing peers? Figure 2 shows that the number of stimulus materials with which the children with autism interacted was comparable to the number of stimulus materials used by their peers. In other words, the number of stimulus items used by the children with autism in these inclusive school settings was similar to that of their typically developing peers (see horizontal lines and shaded areas, which represent means and standard deviations).

The third question asked in this study was, How did the social interactions of children with autism compare to those of their typically developing peers in inclusive school settings? The right portion of Figure 3 shows that the children with autism rarely or never initiated or responded to social interactions with their peers (with some variability for Child 2), whereas the typically developing children (see horizontal lines and shaded areas) initiated or responded to social

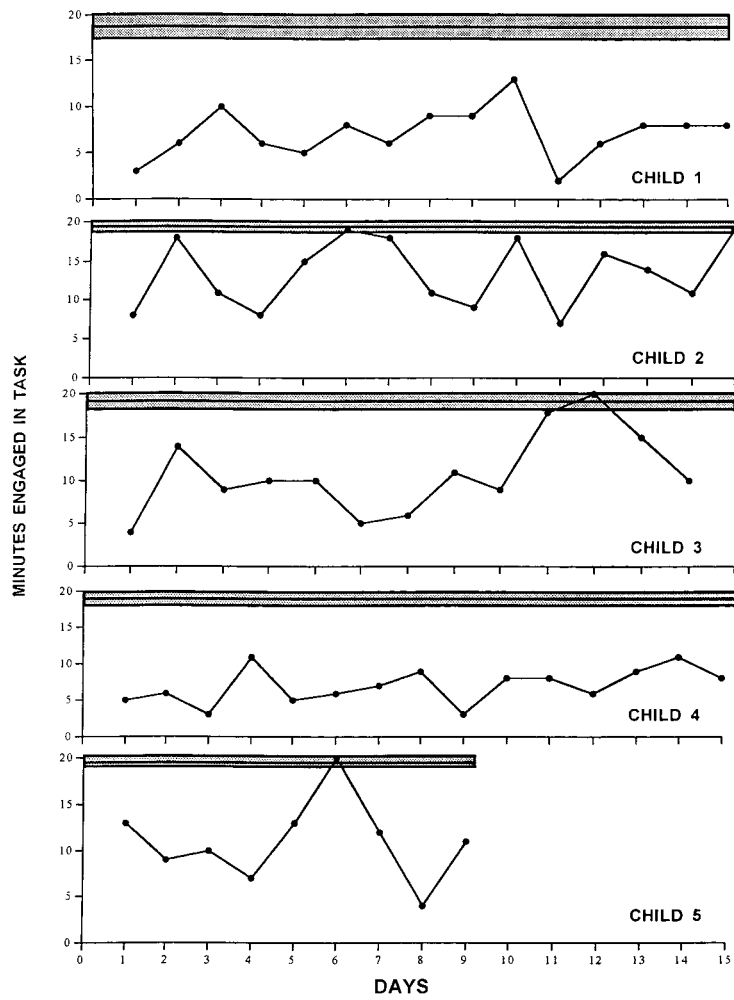


Figure 1. The number of minutes each participant spent appropriately engaged in a school activity.

NOTE: The horizontal line represents the average number of minutes each participant's peers engaged in school activities, and the shaded areas show peer standard deviations.

interactions with their peers an average of approximately 15 times per 20-minute session (with a range of an average of approximately 5 to 33 social interactions per session).

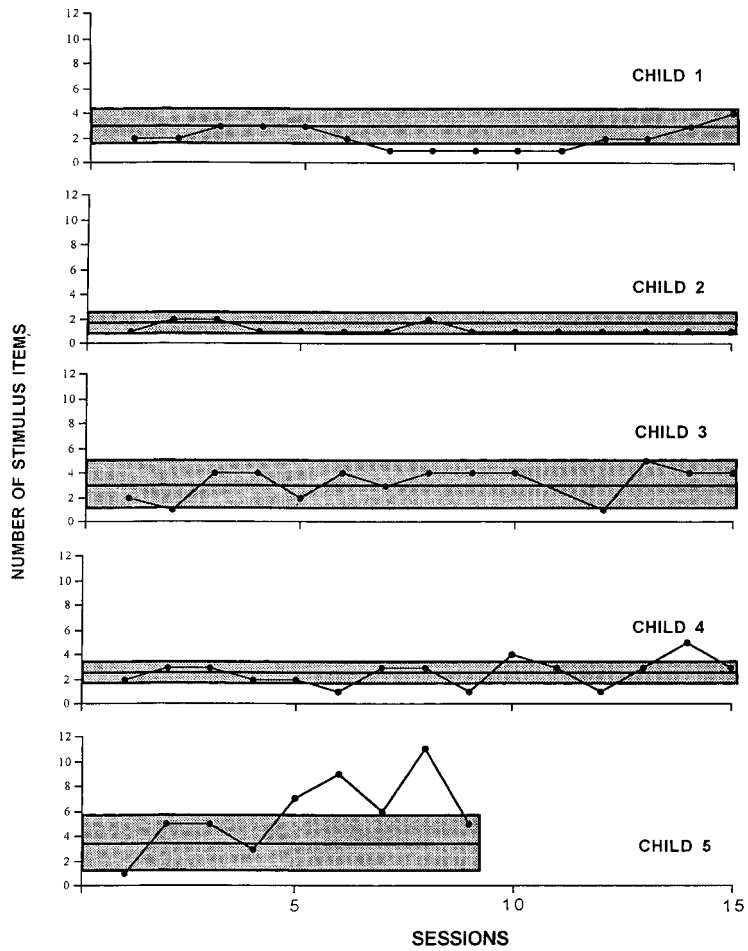


Figure 2. The number of stimulus items used by each participant.
 NOTE: The horizontal line represents the average number of stimulus items used by each participant's peers, and the shaded area signifies peer standard deviation.

In contrast, the left portion of Figure 3 shows that interactions with adults were about the same for both the children with autism and their typically developing peers. That is, although the number of social interactions the typically developing children made with adults was on average much lower than the number of social interactions they

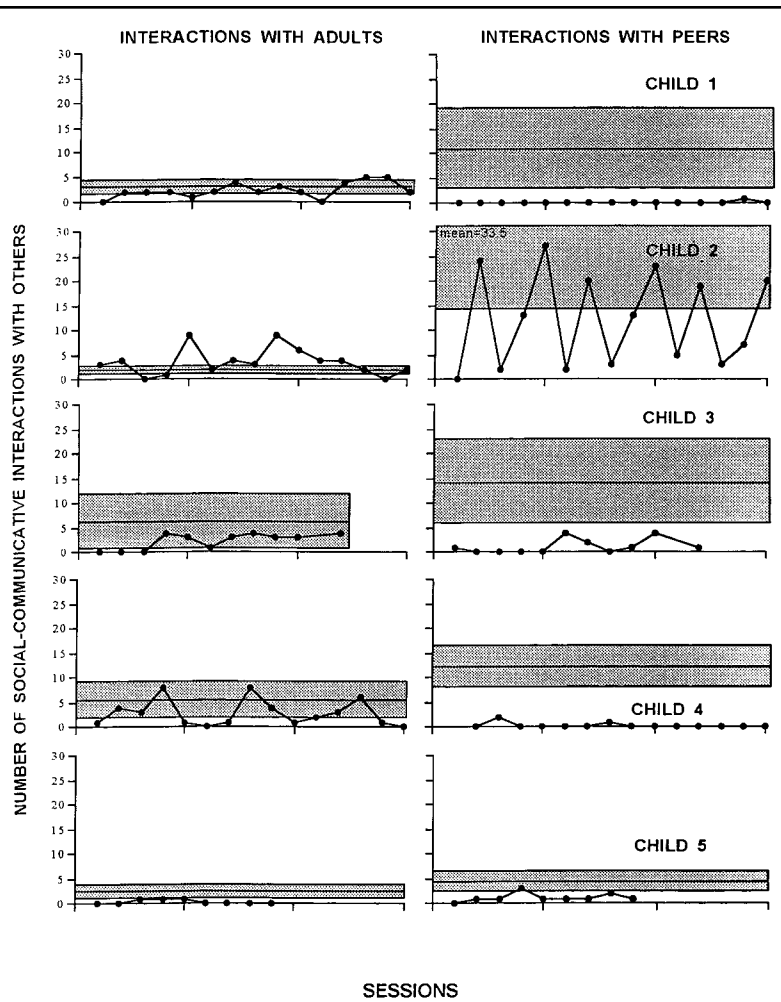


Figure 3. The number of social-communicative interactions each child made with adults and peers.

NOTE: The horizontal line represents the number of social-communicative interactions each participant's peers made with adults and other children, and the shaded area shows the peer standard deviation.

made with their peers, they did engage in some social interactions, and that number was similar to the number of social interactions the children with autism made with adults.

DISCUSSION

The results of this study showed that, with respect to classroom materials, the children with autism interacted with approximately the same number of task objects as did the typically developing children. However, the amount of time spent engaged with the task objects was far less for the children with autism. With respect to social interactions, both the children with autism and the typically developing children interacted with adults and other children in the classroom. However, the amount of social interaction was similar only with respect to interactions with adults. The children with autism rarely engaged in social-communicative interactions with other children, whereas the typically developing children engaged in most of their social-communicative interactions with other children throughout the class period.

These findings are consistent with previous studies examining the social interactions of children with autism and their peers (McGee et al., 1997; Sigman & Ruskin, 1999). Overall, the major difference between children with autism and their typically developing peers appears to be related to peer social interactions. Specifically, children with autism demonstrate fewer peer-related social interaction behaviors, including not being the recipients of social bids and showing little interest in peers (McGee et al., 1997). In addition, children with autism appear to be less socially engaged with peers, make and accept fewer initiations, and spend more time playing by themselves, in comparison to their peers (Sigman & Ruskin, 1999).

The results of this study can be related to several interesting areas in the literature in light of the current trend toward increasing the number of children who are fully included in school settings. First, despite the great variety of functioning levels of the children with autism who participated in this study, none of the children demonstrated complete absence of play or social interaction behavior. This is true notwithstanding the fact that none had received any formal and systematic support with social skill and friendship development. The quality of interactions were not assessed in this study; therefore, we are limited to commenting only on the quantity. However, the significance of peer social relationships for emotional functioning and later psychological

adjustment (Cowen, Pederson, Babigian, Izzo, & Trost, 1973) cannot be undervalued and needs to be addressed in the very early years (McGee et al., 1997; Strain & Hoyson, 2000). Further research in this area would be beneficial.

Related to the above point, although the older child who participated in this study showed more variable patterns of social interactions with his peers, all of his sessions were below his peers' average level of responding, and well over half of the sessions were below the range of his peers' responding. This issue of persistent failure to learn the necessary socialization skills over time was raised decades ago in Kanner's follow-up study of his original sample approximately 30 years later (Kanner, 1971; Kanner, Rodriguez, & Ashenden, 1972). It was reported that the original clients remained extremely aloof and continued to experience significant difficulties in interpersonal relationships. This also supports the findings of this study, demonstrating the need to target these areas.

Inclusion is now being considered as a primary goal in special education research and practice. However, without proper social support and systematic implementation of social skill and friendship development, such efforts can be problematic (Gresham, 1986; Guralnick, 1990). Although scientific studies that demonstrate the importance of specialized and systematic social skill and friendship development are available in the literature (e.g., Baker, 2000; Baker, Koegel & Koegel, 1998; Harrower, 1999; McGee, Almeida, Sulzer-Azaroff & Feldman, 1992; Odom & Strain, 1986; Pierce & Schreibman, 1997; Strain & Kohler, 1998), many are not available to educators (Rogers, 2000). The present study, along with others, again stresses the fact that without assistance, these important behaviors are not likely to develop with ease.

Another interesting issue relates to the comparable levels of child-adult interactions between the disabled children and their peers. Although there were generally low levels across all children, it may be possible that because the children with autism received a great deal of intervention with adults, some of the children with autism appeared to be more at ease when initiating social interactions with them. This further suggests the importance of incorporating peers in social skill support programs.

In relation to the child-child social interactions, there was quite a bit of variability across both the disabled and nondisabled children. In spite of this fact, all of the children with autism had levels that were greatly lower than the range of typical children, suggesting that regardless of verbal and cognitive ability (note that Children 1 and 2 scored quite high on standardized language and IQ tests), they still demonstrated considerable need for social and play development. While some have suggested that the degree of cognitive impairment may be the primary underlying disability affecting social behavior in autism, this study suggests that even those with relatively little cognitive impairment may exhibit depressed levels of socialization.

In summary, the purpose of this study was to assess, through behavioral observation, some characteristics of the play and social interactions of children with autism. On the positive side, although no systematic socialization treatment had been implemented with any of the participants, all of them demonstrated some appropriate social interaction with adults and peers. This study also demonstrates that specific behaviors, such as time engaged in tasks and peer-related social interactions, may be in significant need of intervention and support in this population. As a result, including systematic and long-term social skills training and social support as an integral component of early intervention programs may be warranted.

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