

The Effectiveness of Contextually Supported Play Date Interactions Between Children With Autism and Typically Developing Peers

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Difficulties with social interaction are characteristic of autism. This study presents data illustrating the use of motivational strategies in play dates to improve the quality of social interactions between children with autism and their typically developing peers. Specifically, a multiple baseline design across participants shows how a contextual support package implemented during play dates can promote reciprocal interactions and improve affect. These results support the use of intervention strategies that target the pivotal area of motivation and provide evidence for using play dates as a context for intervention. The findings are discussed in terms of promoting quality interactions and encouraging friendship development.

DESCRIPTORS: autism, social development, play, inclusion

An extensive body of literature documents the significant role of peer relationships in the social development of typical children (Hartup, 1996; Newcomb, Bukowski, & Bagwell, 1999; Rose & Asher, 2000). Prior studies have shown the association between having high-quality peer relationships and a variety of developmental outcomes for these children (Hymel, Vailancourt, McDougall, & Renshaw, 2002; Parker & Asher, 1993). For example, researchers have suggested that peer-related school adjustment in middle-school boys may be associated with lower rates of later arrest (Walker, Stieber, Ramsey, & O'Neill, 1993) and that peer acceptance and friendship may also protect against loneliness and peer victimization for children at risk for poor outcomes (Asher & Paquette, 2003; Criss, Pettit,

Bates, Dodge, & Lapp, 2002; Ladd, Kochenderfer, & Coleman, 1997; Parker & Asher, 1993; Parker & Seal, 1996; Schwartz, Dodge, Pettit, & Bates, 2000). In addition, typically developing children who experience higher levels of peer rejection may be at risk for lower levels of adjustment and increased externalizing behavior (Dodge et al., 2003; Laird, Jordan, Dodge, Pettit, & Bates, 2001). The characteristic social deficits found in children with autism may place them at even higher risk for loneliness, poor-quality friendships, and social isolation (Bauminger & Kasari, 2000; Falvey & Rosenberg, 1995; Frea, 1995; Howlin & Rutter, 1987; Mesibov, Shea, & Adams, 2001). Therefore, interventions that increase opportunities for positive peer interactions may be critical to improve these children's social outcomes.

Researchers have used a variety of strategies for increasing opportunities for peer interaction, including the use of peer modeling and tutoring (Kamps et al., 1992), peer buddies (Laushey & Heflin, 2000), play groups (Wolfberg & Schuler, 1993), priming (Zanolli, Daggett, & Adams, 1996), and peer networks (Kamps, Potucek, Lopez, Kravits, & Kemmerer, 1997). These social interventions have traditionally been implemented for children with autism in school settings, but recent research has suggested arranging these social opportunities in other natural settings (Strain, Kohler, Storey, & Danko, 1994; Wolfberg & Schuler, 1999; Yang, Wolfberg, Wu, & Hwu, 2003) such as homes, after-school programs, and parks. Indeed, the literature reports that typically developing children regularly invite friends to play at their homes and that these social opportunities help children practice appropriate social skills and foster close friendships (Frankel & Myatt, 2003). Because of their role in promoting friendship development, social interventions conducted during play dates may benefit children who have difficulty with peer social interactions.

In implementing social interventions during play dates, several variables have been identified in the literature that may help promote successful play dates.

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Global summaries of portions of the data from this study are also discussed in Werner, Vismara, Koegel, & Koegel (in press).

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Several researchers have noted that environmental antecedents and contextual variables played a critical role in controlling social behavior with peers (Sasso, Mundschenk, Melloy, & Casey, 1998; Zanolli, 1997). Additional research has suggested the importance of incorporating motivational variables in intervention for children with autism (Koegel, Dyer, & Bell, 1987; Koegel, O'Dell, & Koegel, 1987). Similarly, researchers have also emphasized the importance of participation in meaningful choice-making (Brown, Belz, Corsi, & Wenig, 1993). This body of research suggests that incorporating mutually reinforcing activities during play dates may promote reciprocal interactions by motivating both children to participate. Natural contingencies and shared control of reinforcers can also ensure that both children with disabilities and their typical peers receive reinforcement from the activity (Kennedy & Itkonen, 1996). When these cooperative arrangements are used during play dates, the reinforcers become contingent on the children's interactions and thus may promote increased levels of interaction. In addition, support from a facilitator during these play activities may help promote successful interactions (Wolfberg & Schuler, 1993), and this support can be faded systematically as the children demonstrate improvements in reciprocal social behaviors (Odom & Watts, 1991).

These strategies by themselves seem to have a positive impact on certain components of social interaction. However, little information is available with respect to the broader influence of these strategies on meaningful peer relationships. Combining these individually successful strategies into an intervention package may provide even more promising outcomes in terms of high-quality interaction and friendship development. In particular, the use of mutually reinforcing activities and adult facilitation of cooperative arrangements may provide an effective play date intervention context and promote clinically significant outcomes. The purpose of this study was to evaluate the effects of this contextual support package during play dates on socially valid aspects of peer interaction, including reciprocal interactions, displays of positive affect, and peer acceptance and friendship in the form of spontaneous invitations for play dates from peers.

Method

Participants

Two children with autism participated in this study. Both children were diagnosed according to the criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994) by two independent agencies. The participants, Megan and Kyle, were 8 and 9 years of age respectively. Megan was of European American descent and from an upper-middle-class family. Kyle was of European American and Persian descent and from a middle-class family. Megan and Kyle were both fully

included in typical classrooms with full-time aides. The Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984) and behavioral observations suggested that Megan was approximately 4 years below age level in socialization. Similarly, behavioral observations suggested that Kyle was also functioning approximately 4 years below age level in socialization.

Prior to the start of intervention, both Megan and Kyle had some use of communicative speech, but both children had severe difficulties with the pragmatic aspects of language. Specifically, both children rarely responded to their peers' questions and comments and showed difficulty engaging in reciprocal conversations. Megan and Kyle were specifically selected for participation in this study because they rarely engaged in social interaction with peers and had no consistent friends. Without adult facilitation, both Megan and Kyle were alone on the playground during their free time and had infrequent peer interaction outside the school setting; that is, these children were not involved in any extracurricular or recreational activities (e.g., camps, sport activities, after-school clubs) and were not invited by peers to participate in typical social activities, such as play dates, birthday parties, and sleep-overs.

Design

A multiple baseline design across participants was used to assess whether contextually supported play date activities would result in increased levels of reciprocal social interaction and higher affect between the participants and their peers relative to play dates without contextual support. Baseline data were collected over the course of approximately 3 months before the start of intervention for Megan and for approximately 8 months for Kyle. In addition, for Megan, a reversal to play dates without contextual support was conducted after the first two intervention probes and then the contextually supported intervention was reinstated and continued over the following months (Fig. 1).

General Procedure

For both Megan and Kyle, play dates occurred in natural settings (e.g., home, park, beach, zoo, bowling alley), and probes were taken during play dates with and without contextual support. In both conditions, social activities were arranged for the children with autism in which they were in proximity to typically developing peers. Therefore, both conditions presented opportunities for social interaction. Parents of the children with autism consulted with teachers and classroom aides to select responsible peers with similar interests and positive social behaviors. Informal child observations were also conducted in natural settings (e.g., school parks, home) to provide additional information about possible playmates. During both conditions, parents of the children with autism contacted the parents of same-age peers from their child's classroom or neighborhood and invited the peers to participate in a play

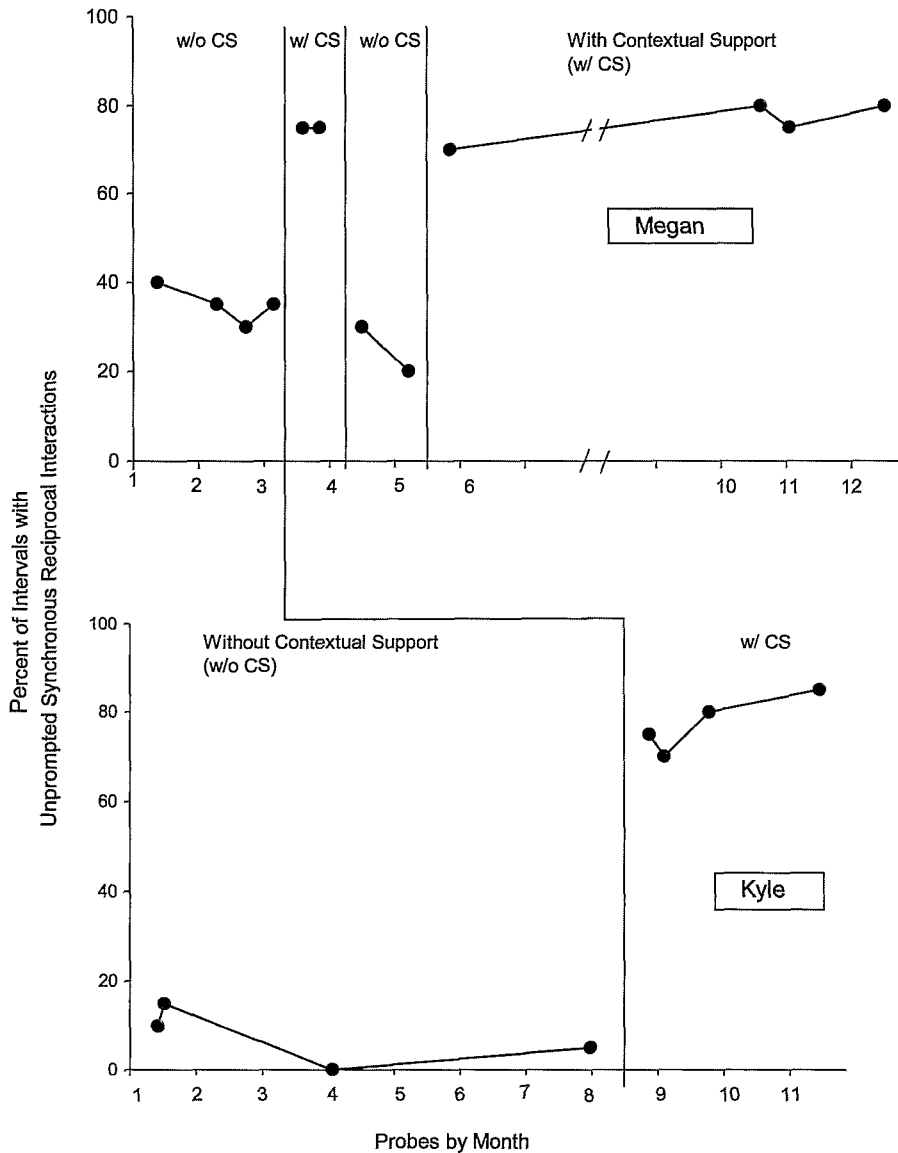


Figure 1. Percentage of intervals with unprompted synchronous reciprocal interaction during play dates with and without contextual support.

date. Parents were asked to try to arrange play dates approximately once per week. Over the course of play dates both with and without support, there were between nine and five different peers (Table 1) invited to participate in play dates for Megan and Kyle, respectively.

A graduate student who was unaware of the experimental hypothesis and had at least 3 years of experience working with children with autism served as a facilitator to promote successful social interactions. These graduate students, in collaboration with the parents, arranged play date activities and facilitated social interaction using the play date intervention strategies described below (i.e., mutually reinforcing activities

and adult facilitation of cooperative arrangements). Play dates were videotaped to assess the level of appropriate social interaction among the children, and representative probes were randomly selected from video tapes of the entire play date and scored by two independent observers.

Play Dates Without Contextual Support

This condition consisted of play dates as described above with no specific instructions provided, other than for the children to play together on activities in which they typically would engage. During these play dates, the children were responsible for selecting play activities. Both indoor and outdoor activities were available

Table 1
Activities During Play Dates With and Without Contextual Support for Megan and Kyle

Child	Probe	Peer	Setting	Activity
Megan	1 w/o CS	Peer 1	Megan's kitchen table	Coloring
	2 w/o CS	Peer 2	Megan's backyard	Chase w/silly string
	3 w/o CS	Peer 3	Neighborhood parking lot	Bicycle riding
	4 w/o CS	Peer 4	Megan's bedroom	Dolls
	5 w/CS	Peer 1	Megan's living room	Game ("Candyland")
	6 w/CS	Peer 1	Megan's kitchen table	Craft (tissue flowers)
	7 w/o CS	Peer 1	Megan's patio	Dress up
	8 w/o CS	Peer 5	Neighborhood pool	Swimming
	9 w/CS	Peer 6	Megan's kitchen	Baking cupcakes
	10 w/CS	Peer 7	Megan's dining room	Making necklaces
	11 w/CS	Peer 8	Megan's kitchen	Cookie decorating
	12 w/CS	Peer 9	Local bowling alley	Bowling
Kyle	1 w/o CS	Peer 1	Local park	Play with squirt guns
	2 w/o CS	Peer 2	Local park	Collecting bugs
	3 w/o CS	Peer 3	Beach	Surfing/swimming
	4 w/o CS	Peer 4	Kyle's living room	Board game ("Sorry")
	5 w/CS	Peer 4	Kyle's living room	Pictionary
	6 w/CS	Peer 4	Kyle's backyard	Painting
	7 w/CS	Peer 5	Kyle's living room	Board game ("Sorry")
	8 w/CS	Peer 3	Kyle's driveway	Basketball

to the children. Examples of activities included board games, dolls, painting, basketball, and riding bicycles. An adult was present to ensure child safety at all times.

Play Dates With Contextual Support

The contextually supported intervention condition was the same as the play dates without contextual support except that within the children's activities, the adults ensured that two components were present: the activities were selected so that they contained mutually reinforcing properties for both the child with autism and the typically developing peer, and the adult facilitator set up cooperative arrangements between the children within each activity. These components are described in detail below.

First, the activities were selected to be mutually reinforcing for both children. In particular, both children's interests were considered in selecting play date activities. This was done by consulting with parents and teachers to determine common interests between the two children for use during play dates. As an example, Table 1 provides examples of the mutually reinforcing activities used during contextually supported play dates for each of the two children in this study. These were activities preferred by both the child with autism and the individual peer invited to play during that play date.

Second, the adult facilitator (graduate student and/or parent) set up cooperative arrangements within the context of the play date activity. Cooperative arrangements consisted of structuring the play date activities in such a way that the participation of each individual was critical to the activity. For instance, when baking cookies, the adult facilitator might set up a cooperative arrangement by having one child hold the measuring cup while the other child poured the ingredients. Another example is when making a collage together, the adult

facilitator might have one child cut out the pictures while the other child glued them on the background. In this way, the facilitator ensured that access to the necessary materials for the activity was contingent upon peer interaction, making the children's collaborative participation required for a successful outcome.

Dependent Variables

The effectiveness of this intervention package was analyzed by comparing the play dates with and without contextual support on the basis of two dependent variables, synchronous reciprocal interaction and child affect. In addition, a supplemental measure of social validity was scored throughout all conditions.

Synchronous Reciprocal Interaction

Adapted from Siller and Sigman's (2002) definition of caregiver synchronization, synchronous reciprocal interaction was defined as both children engaging in social communicative behaviors related to the other child's current interest. These social communicative behaviors consisted of the children showing verbal initiations, verbal responses, nonverbal eye contact, facial expressions, and/or gestures in relation to their engagement in a joint activity. Synchronous reciprocal interaction was scored in 30-second intervals for both the target child and peer. Only intervals in which both children were engaging in unprompted synchronous interaction throughout the majority of the 30-second interval were scored as synchronous (typically, when the children engaged in social interaction they did so throughout the interval). For example, if one child was drawing a picture, the other child might initiate by asking a question (e.g., "What are you drawing?"), making a comment (e.g., "I like your picture"), handing a marker to the child, or assisting the child in drawing the

object, and then have these efforts be reciprocated by the peer (e.g., peer responds to question, makes eye contact, smiles, uses marker from peer). This would be scored as synchronous reciprocal interaction because both children's verbal and/or nonverbal behaviors were directed toward one another within the social activity. In contrast, while drawing, if one child made a verbal initiation (e.g., "What are you drawing?") but the other child did not reciprocate (e.g., child did not respond or left activity) or was prompted by the adult to reciprocate, this would not be scored as a synchronous reciprocal interaction because only one child's behavior was spontaneously directed toward the other child during the activity. Also, intervals with no verbal or nonverbal interaction between the children were scored as having no synchronous reciprocal interaction.

Affect

To assess the quality of play interactions between the target child and peer, play date probes were also scored for child affect. Specifically, affect ratings were generated for the target child and peer during each play date based on their overall affect during the probe. Adapted from existing affect scales in the literature (Koegel, Bimbela, & Schreibman, 1996; Koegel & Egel, 1979; Schreibman, Kaneko, & Koegel, 1991), the study used a 6-point Likert scale to assess overall affect based upon dimensions of enjoyment, interest, and comfort during the play date interactions. This scale was divided into three categories with negative affect assigned scores ranging from 0 to 1, neutral affect given scores of 2 to 3, and positive affect scores ranging from 4 to 5 (Table 2).

Supplemental Measure of Social Validation

In addition to measures of synchronous reciprocal interaction and affect during play dates, data were collected throughout the study on the frequency of peer invitations. These data were based on parent report of the number of times each month that Megan and Kyle were invited over to play by another peer. Both participants' mothers were asked to keep track of the number of invitations their children received. The graduate student clinicians also communicated regularly with the parents to validate the frequency of these invitations.

Reliability

Interrater reliability was computed for 80% of sessions for both synchronous reciprocal interactions and

for affect. Two observers, one of whom was unaware of the experimental hypothesis and conditions, independently scored these sessions, and their results were compared with determine reliability. Reliability was calculated as the number of agreements divided by the number of agreements plus disagreements, times 100. In scoring synchronous reciprocal interaction, the 30-second intervals were coded as reciprocal, prompted reciprocal, or not reciprocal. For the purpose of reliability calculations, an agreement consisted of both observers giving the same rating for the same 30-second interval. For synchronous reciprocal interaction, the average percentage agreement was 87% (range 75%–100%). For affect ratings, category agreement was defined as both observers rating the affect in the same category (positive, neutral, or negative). For example, if one rater gave the session a rating of 3 and the other gave it a score of 2, this was considered to be category agreement because both observers ranked affect in the neutral range. Category agreement was 94%.

Results

Results for synchronous reciprocal interaction during play dates with and without contextually supported activities are presented in Figure 1. The multiple baseline design across participants showed that both Megan and Kyle initially engaged in low levels of synchronous reciprocal interaction with peers during play dates without contextual support. Synchronous reciprocal interaction during this condition ranged from 30% to 40% of intervals for Megan and from 0% to 15% of intervals for Kyle, with no obvious trends. During play dates with contextual support, both children showed immediate increases in the percentage of intervals containing synchronous reciprocal interaction, ranging from 70% to 85%. For Megan, a reversal was conducted after two intervention points, and Figure 1 displays the return to low rates of synchronous reciprocal interactions during subsequent play dates without contextual support. When contextually supported intervention was implemented again, the data showed a return to high levels of synchronous reciprocal interaction that continued over a period of several months. Overall, the results from Figure 1 indicated that for both Megan and Kyle, the play dates without contextual support were associated with low levels of synchronous reciprocal interaction,

Table 2
Affect Rating Scale for Play Dates With and Without Contextual Support

Negative Affect (0–1)	Neutral Affect (2–3)	Positive Affect (4–5)
Within the interaction, child (target child or peer) appears discontent (e.g., frowns, cries), avoids social participation (e.g., tantrums, leaves activity, avoids others), and appears not to be enjoying self (e.g., seems frustrated, tense, impatient).	Within the interaction, child (target child or peer) does not appear to be either happy or unhappy, may engage in the activity but does not show clear interest or enthusiasm in social participation, and does not seem either stressed or relaxed.	Within the interaction, child (target child or peer) appears to be enjoying self (e.g., smiles, laughs, shows humor), shows interest through participation (e.g., actively involved in the activity), and appears relaxed and comfortable.

whereas contextually supported activities during play dates were associated with high levels of synchronous reciprocal interaction.

Affect ratings during these play dates are presented in Figure 2. The multiple baseline design across participants showed primarily neutral affect during the play dates without contextual support and positive affect during play dates with contextual support for both Megan and Kyle. In particular, affect ratings during play dates without contextual support were all in the neutral range, with ratings of either 3 or 2. Affect ratings during play dates with contextual support were in the positive range, with ratings of 4 or 5. Affect ratings for the participating peer showed the same pattern. In fact, the target child and peer received equivalent affect ratings in all but one probe. These data suggest that

contextually supported activities resulted not only in increased levels of synchronous reciprocal interaction, but also in higher affect for both the target child and the peer.

Figure 3 shows data on one social validity outcome of these play date interactions within the context of the multiple baseline design. The figure shows the number of invitations Megan and Kyle received from their peers to come over and play across the course of both the baseline sessions and the intervention period. The data show that invitations from peers for both Megan and Kyle did not occur during baseline sessions. However, during intervention, as synchronous reciprocal interactions improved, both children began receiving more invitations from peers. Megan was receiving two or three invitations per month at the end of the inter-

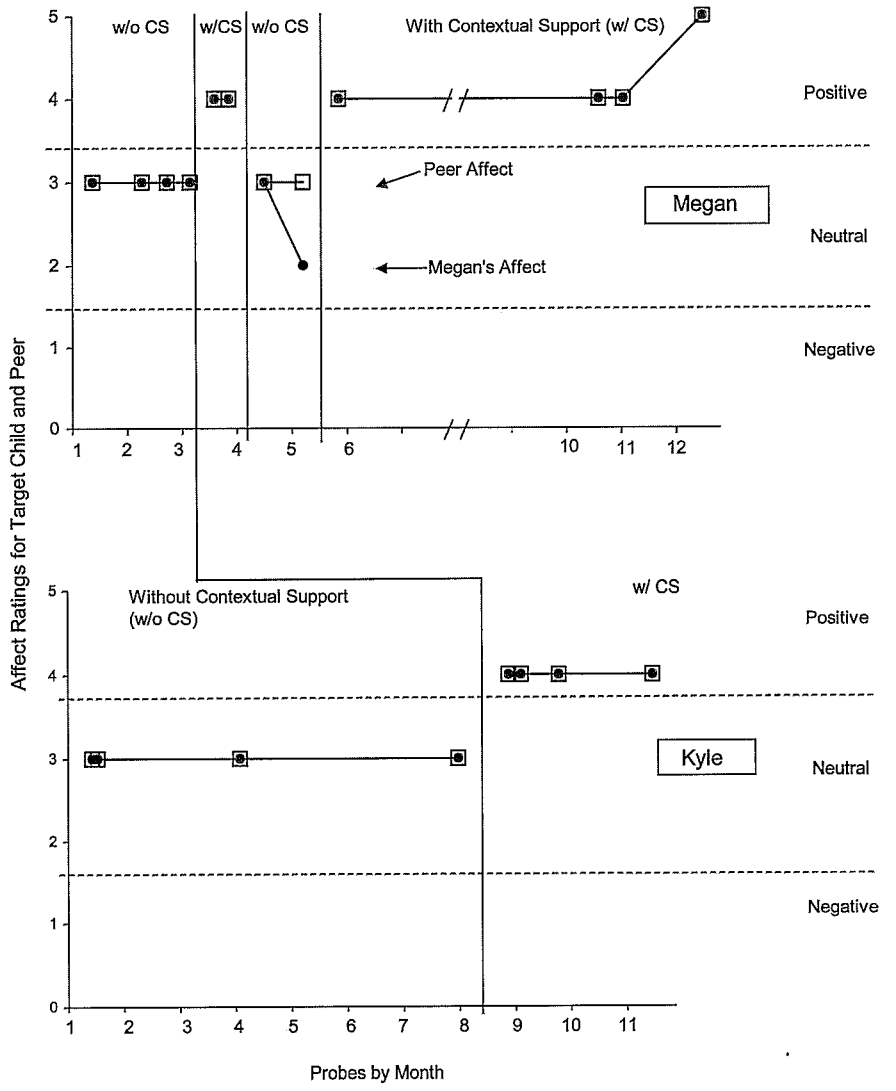


Figure 2. Overall affect ratings for target child and peer during play dates according to the following scale: negative affect (0-1), neutral affect (2-3), and positive affect (4-5).

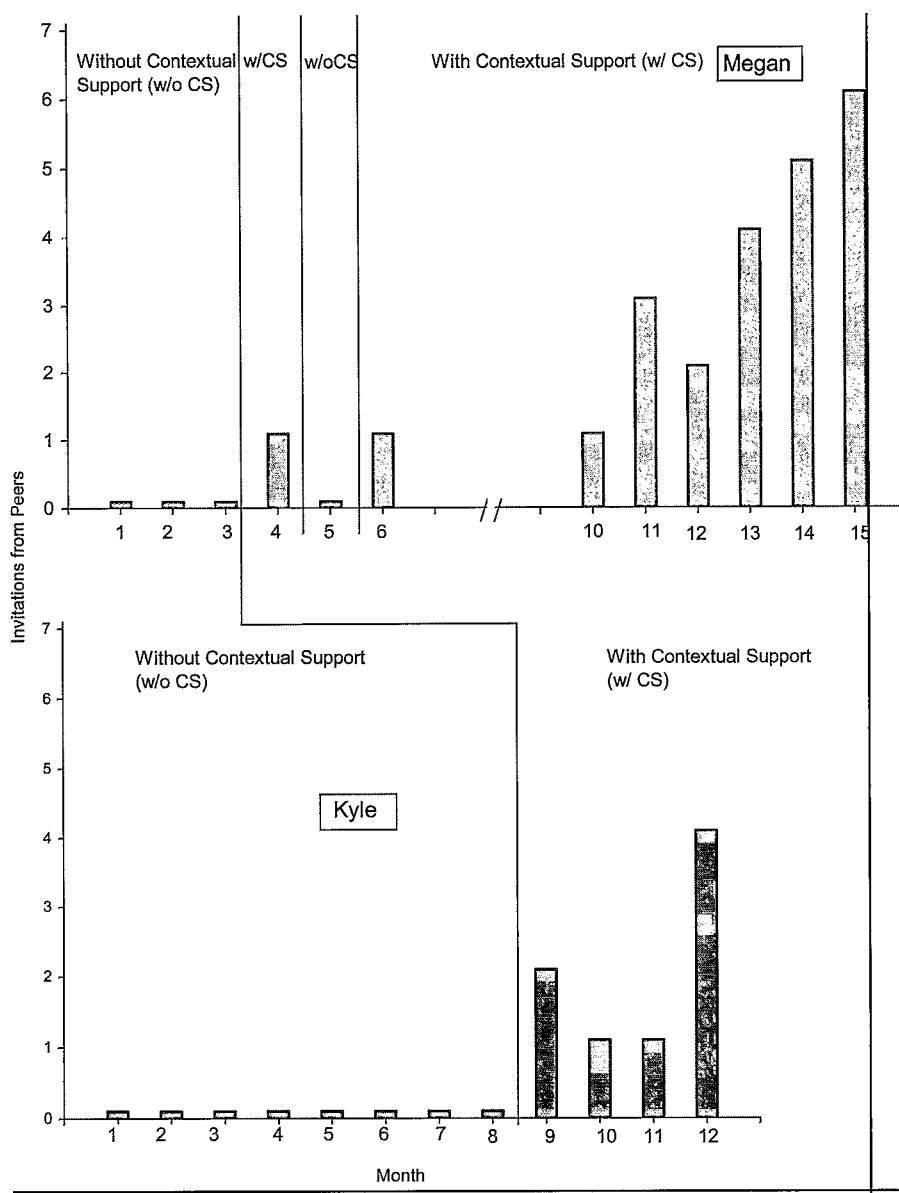


Figure 3. Number of play date invitations received from peers each month for Megan and Kyle.

vention, and these numbers continued to increase in the months after the intervention. In Kyle's case, by the last month of the intervention, the number of invitations had increased to four. These data suggest that in addition to improved reciprocal interaction and higher affect, the play dates initiated by Megan and Kyle's mothers resulted in peers making efforts to seek additional interaction with their children by inviting them over to play more often.

Discussion

The results of this study suggest that the contextual support intervention package consisting of mutually reinforcing activities, and adult facilitation of cooperative

arrangements, had a broad impact on reciprocal social interaction and positive affect for both participants. In both cases, though these results should be considered preliminary, they were observable over an extended period of time. Supplemental measures of social validity also showed more frequent invitations from peers for both children.

Synchronous Reciprocal Interaction

Research on peer relationships during typical development has suggested that play dates at home are often a regular occurrence and seem to be a critical component in the development of close friendships in childhood (Ladd & Hart, 1992; Newson & Newson, 1976). Estimates of frequency differ among researchers, but

Frankel and Myatt (2003) suggested that children usually have one or two play dates per week. For children with autism, though, play dates occur rarely, if ever, which may have a negative effect on opportunities to develop friendships.

This study provides a methodology for improving the quality of interactions during play dates between children with and without disabilities. Specifically, the study's use of a contextual support intervention package produced significant increases in unprompted synchronous reciprocal interaction for both the children with autism and their peers. Despite the ample opportunity for peer interaction during play dates without the contextual support intervention, the children did not maintain social interactions until the contextual support intervention package was implemented. With the implementation of the intervention package, the children then showed that they were capable of high levels of reciprocal interaction. These results provide evidence for the success of the contextual support intervention package in promoting high levels of reciprocal interaction during play dates. Importantly, these reciprocal interactions were not directly prompted by the facilitator; the data reported represent unprompted interactions only. This means that the intervention package consisting of mutually reinforcing activities and adult facilitation of cooperative arrangements created a context to support increases in spontaneous social interaction. Thus the antecedent manipulations involved in the contextual support package were enough to promote high levels of synchronous reciprocal interaction for these children, who had not shown these high levels before.

The improvements in synchronous reciprocal interaction indicated that the children were capable of participating in reciprocal interactions but needed the contextual support package to engage in higher-quality social behaviors. These findings are consistent with the research on the difference between acquisition, performance, and fluency deficits (Gresham, Sugai, & Horner, 2001) and on interventions for social skills, including scaffolding (Schuler & Wolfberg, 2000; Wolfberg & Schuler, 1999). In Megan's case, the reversal to the condition involving play dates without contextual support showed that the effect was dependent on the contextual support intervention package and, at least at first, was too fragile to be maintained without this support.

Affect

Affect ratings showed distinct differences between the play dates with and without contextual support. The data suggested that both the target child and peer showed higher levels of enjoyment, interest, and comfort during contextually supported activities. Frankel and Myatt (2003) proposed that continued mutually enjoyable interactions during play dates could be considered indicative of play date success. In this study, high

levels of affect during supported play interactions indicated mutual enjoyment and may therefore suggest that play dates were being viewed as successful by the children. This provided some hope that these children would want to participate in future play dates together.

Reciprocal Invitations

The data on peer invitations may have indicated increases in the peers' desire to spend additional time with Megan and Kyle and may suggest that the play date intervention influenced some aspects of friendship development. However, whereas our study showed increases in peer invitations as a result of our intervention package, we did not directly analyze the individual variables that may have contributed to these invitations. For example, the increased frequency and success of play dates may have improved the parents' skills at facilitating positive interactions. In turn, these successful experiences could have had a positive impact on the parents' confidence in interacting with parents of typically developing peers. Further research will be needed to investigate additional variables that may influence increases in invitations by peers. Indeed, in response to the increasing interest in friendships as desired intervention outcomes for children with disabilities, Sasso et al. (1998) suggested the need for including measures more directly related to friendships in reporting results of intervention. Specifically, invitations to parties and sleep-overs, as well as peer interest in interacting with the target child after school, were suggested as socially relevant measures. The increasing number of invitations from peers in this study represented the peers' continued interest in interacting with both children more frequently. Strain's (2001) article, emphasizing the important role of reciprocal interaction in friendship development, suggested that the high levels of unprompted synchronous reciprocal interactions observed in this study may have been influential in the increases in peer invitations that were found.

The increases in peer invitations seemed particularly important because friendship development and peer acceptance were main goals and had not been achieved before the intervention. The fact that the frequency of peer invitations increased from zero to more typical levels, such as one or two per week, is promising for these children's chances of continued friendship development and relates to the literature that emphasizes friendship as an increasingly important developmental goal and socially valid outcome for children with disabilities (Amado, 1993; Brown, Odom, & Conroy, 2001; Freeman & Kasari, 2002; Gresham, et al., 2001; Hurley-Geffner, 1995; McEvoy & Odom, 1987; Nickels, 1996; Strain & Schwartz, 2001; Turnbull, Pereira, & Blue-Banning, 1999).

Although this study showed promising outcomes resulting from the contextual support intervention package, these data should be considered preliminary in na-

ture, given some of the following limitations. First, the limited number of participants and similar participant characteristics (e.g., age, functioning level, socioeconomic status) suggest the need for replication of these results with varied populations. Refining this play date package for use with children of varying ages and developmental levels will be important in further addressing the social intervention needs of children with autism. This type of information may advance our knowledge on teaching the use of reciprocal social behaviors to help create meaningful relationships between children with and without disabilities (Apple, Billingsley, & Schwartz, 2005). Also, the implementation of a reversal design with one of the participants addresses some of the concerns of using a multiple baseline design with only two participants; however, future investigation is needed to support these preliminary results.

Future research is also needed to examine additional valid components for promoting effective play dates. Further analysis of the possible influence of variables such as setting and activity on child behavior will also be helpful in interpreting the results. Lastly, the inclusion of measures of fidelity of implementation in future studies will be important in further defining necessary intervention components and in informing parents and professionals of strategies for achieving meaningful outcomes. Future replications of these findings, particularly the increased number of peer invitations, may further clarify critical areas for ongoing intervention. The findings from this study provide initial information for the development of effective social intervention packages to be implemented in the natural environment, and suggest optimism that these interventions may have socially significant influences on the development of improved peer interactions and relationships for children with autism.

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