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Using Coaching with Preschool Teachers to Support the Social Skills of Children with and without Autism Spectrum Disorders

Abstract

The purpose of this study was to train and coach teachers to use naturalistic teaching strategies and examine the effects of naturalistic strategies on the social behaviors of young children with and without autism. Three preschool teachers participated in training and coaching sessions to learn how to facilitate social interactions between children with and without autism using naturalistic teaching strategies. The goal of the training and coaching was to increase the variety of strategies that the teachers used in their classrooms. Using single case methodology, data were gathered three times each week on teacher and child's behavior during choice/center time. Results indicated variability in teacher and child behavior. Two of the three teachers were more successful in balancing their use of social and physical strategies following intervention. Overall, following intervention, children engaged more in social play and they spent less time in individual play. Implications for practice and research are discussed.

Keywords: *Autism Spectrum Disorders, coaching, preschool teachers, naturalistic teaching, social behaviors.*

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Introduction

Autism Spectrum Disorder (ASD) refers to a range of complex developmental disorders that typically appear during the first three years of life (American Psychiatric Association, 2000). It is estimated that ASD affects 1 in 88 children aged 3 to 17 years in the U.S.; this is a significant increase from the previous 2003 estimate of one in 150 (Center for Diseases Control and Prevention, 2012; Kogan et al., 2009). Due to national trends indicating an increase in the number of individuals identified with ASD, there is a growing interest in developing effective interventions and appropriate social and behavioral support for individuals with autism in home, school, and community settings (Boyd, Odom, Humphreys, & Sam, 2010; Kamps et al., 2002).

Researchers suggest that atypical patterns of social development of children with autism begin in infancy (e.g., absence of eye contact and social smile with caregivers) and that delays, deficits, and atypical social behaviors are the "core features" of autism (Kanner, 1943; Kohler, Anthony, Steighner, & Hoyson, 2001; McConnell, 2002). Infants and toddlers with autism also show delays in early imitation, joint attention, and sharing affective emotions (Kohler et al.).

Koegel, Koegel, Frea, and Fredeen (2001) conducted naturalistic observations of young children (2-5 years old) with autism and their peers in inclusive settings. The researchers reported that the children with autism interacted with the same number of objects (e.g., toys) as their typically developing peers. However, the children with autism spent far less time engaged with each item. In addition, the children with autism rarely engaged in social-communicative interactions with other children, whereas their typically developing peers spent most of their time engaged in social-communicative interactions with other children. In a review of social behaviors of children with autism, McConnell (2002) noted that research consistently demonstrates that children with autism make and receive fewer social initiations, respond to fewer initiations, and engage in shorter interactions than their typically developing age mates.

While some children with autism demonstrate limited social skills, other children with autism participate in social interactions with peers. Trends toward inclusion in general education have resulted in an increased number of children with autism and other developmental disabilities being educated with their typically developing peers. Inclusive practices are necessary and important, but not likely sufficient, for promoting the social behaviors of children with autism. Targeted interventions are required to develop and promote social behaviors of young children with autism (Kasari, Freeman, & Paperalla, 2006; Laushey & Heflin, 2000).

Different programs and interventions have been used to increase the social behavior and social interaction of children with autism (Rogers, 2000) including peer-mediated interventions (e.g., DiSalvo & Oswald, 2002; Garfinkle & Schwartz, 2002; Kamps et al., 2002; Laushey & Heflin, 2000; Odom, et al., 1999) and teacher-mediated interventions (e.g., Crozier & Tincani, 2005; Kohler et al., 2001). In a review of interventions that facilitate social interactions of young children with autism, McConnell (2002) concluded, "under at least some conditions, children with autism can benefit reliably from social interaction skills interventions" (p. 365). He pointed out that "although empirical support for various intervention components exists, the literature

requires practitioners to assume a significant burden in developing a logistically feasible yet sufficiently powerful package for use in their classroom" (p. 368). Developing such interventions might require high levels of effort from early childhood teachers and might not be practical for teachers or feasible within many early childhood settings.

One promising approach that has empirical support and might be feasible to implement is *naturalistic teaching*. Naturalistic teaching strategies include the following milieu teaching procedures: modeling, incidental teaching, mand-model, and time delay (Hart, 1985). Through these strategies teachers can build on children's interests in natural environments while embedding teaching opportunities (see example of naturalistic teaching strategies in Table 2). Researchers have documented the effectiveness of naturalistic teaching strategies in promoting and enhancing communication skills (e.g., Halle, 1982; Hancock & Kaiser, 2002; Hart, 1985; Hart & Risley, 1975), but fewer studies have examined the use of naturalistic teaching strategies for promoting the social behaviors of young children with autism (Kohler et al., 2001).

Kohler et al. (2001) examined the impact of naturalistic teaching strategies on the social interaction skills of young children with autism. Teachers were introduced to naturalistic teaching strategies and received daily feedback and assistance (i.e., instruction, coaching, feedback, and encouragement) on how to use the naturalistic strategies to facilitate children's social interactions. The researchers reported that all four children who participated in the study exhibited higher levels of social exchanges (with peers or teachers) after the teachers received assistance with using naturalistic strategies. Child behavior change was maintained in the follow-up phase. The focus of Kohler and his colleagues' study was on increasing children's social behaviors with very limited information provided on teachers' implementation of the newly learned strategies.

Researchers have suggested that social emotional competence is critical to children's school success (Bowman, Donovan, & Burns, 2000; Peth-Pierce, 2000; Shonkoff & Phillips, 2000) and that children who have social emotional needs are less likely to benefit from typical intervention strategies (Sandall & Schwartz, 2002). Although various strategies for increasing social interactions of students with disabilities exist in the literature, teachers frequently do not feel competent or confident in working with young children with autism, specifically in the area of social behaviors (Schwartz, 2005). In addition, with the growing diversity in abilities and needs of the children in today's classrooms, it is important that teachers have knowledge of and experience with various types of strategies to reach and teach all the children in the classroom (Hitchcock, Meyer, Rose, & Jackson, 2002; Pisha & Coyne, 2001).

In this study we collaborated with early childhood teachers to develop and implement an intervention aimed at promoting social interactions of young children with autism. The purpose of this study was to examine the effects of naturalistic strategies on the social behaviors of young children with and without ASD. Data were gathered on both teacher and child behaviors in an attempt to examine the influence of teacher behavior on children behavior. Additionally, we assessed generalization (e.g., across settings, across children, and across time), and examined the social validity of the procedures and outcomes.

Method

Setting

Schools. This study was conducted during the spring semester in three preschool classrooms located in two schools in the Midwest. Both Schools A and B had enrollments of about 300 students. In School A (where Classroom 1 was located), 28% of the students were eligible for free or reduced lunch and 96% of the students were Caucasian. In School B (where Classrooms 2 and 3 were located), 77% of the students were eligible for free or reduced lunch, 52% were African-American, 27% were Caucasian, 12% were Hispanic and 10% were Asian.

Classrooms. Children attended the preschool classrooms 2.5 hours a day, five days a week. All three classrooms schedules were similar and included table activities, circle time, choice/center time, snack and outdoor/gym play. Staff in each classroom included one teacher and one paraprofessional.

All observations were conducted during choice/center time. Typical center times lasted 40 minutes and were set up in a way such that children could rotate at their leisure between three to five choices (e.g., sensory table, art table, blocks center). The adults floated between activities and facilitated play and peer interactions.

Blair was the teacher in Classroom 1, which included seven children (three males and four females), ages 40-59 months old. Six of the children were Caucasian and one child was biracial. All children received services under the definition of developmental delays of Part B of IDEIA, however one child had recently been diagnosed with autism. Sallee was the teacher in Classroom 2, which included 12 children (eight males and four females), ages 37-59 months old. Seven of the children were African-American, two were Hispanic, two were Caucasian, and one was Asian.

Five of the children received special education services (diagnoses included speech language impairments, other health impairments, autism spectrum disorder, and developmental delays) and seven children attended the preschool because they were considered ‘at risk’ for academic failure. Ellie was the teacher in Classroom 3, which included 15 children (seven males and eight females), ages 41-62 months old. Nine of the children were African-American, four were Caucasian, and two were Asian. Four of the children received special education services (diagnoses included speech language impairments, other health impairments, and autism spectrum disorder), and 11 children attended the preschool because they were considered ‘at risk’ for academic failure.

Participants

Teachers. Three female teachers (Blair, Sallee, Ellie), in their early 30s, each having earned a master degree in early childhood special education, participated in the study.

Children. Three children in each classroom were recruited to participate in this study. Table 1 includes a description of the nine child participants. The three teachers completed the *Ages & Stage Questionnaires: Social-Emotional Scale* (*ASQ:SE*, Squires et al., 2002) on all of the children in their classrooms. Based on the results of the *ASQ-SE*, three children were identified in each classroom and targeted for participation in the study: (a) a child with autism spectrum disorder who displayed difficulty in social behaviors (identified as C1); (b) a child who demonstrated difficulty in social behaviors but did not have autism, (identified as C2); and (c) a child who did not have difficulty engaging in social interactions (identified as C3). For a list of the *ASQ:SE* scores see Table 1.

For children ages 33 through 41 months, the cut off score on the ASQ:SE is 59. For children ages 42 through 65 months, the cut off score is 70. It is recommended that if the total score is above the cut off score the child should be referred for a mental health evaluation. To obtain more information on the targeted children, the teachers completed a modified *Communication and Symbolic Behavior Scale Caregiver Questionnaire* (CSBS, Wetherby & Prizant, 1993) on the three children with autism spectrum disorder in their classroom. Teachers were asked to describe how these three children communicated wants and needs, how they interacted with adults and peers, and their preferred objects, food, and people. The CSBS information was used to plan center time activities that would be engaging for our target children.

Table 1
Children Participant Descriptions

Name	Teacher	Age	Gender	Ethnicity	Disability	ASQ:SE
Kaleb	Blair	56 m	M	Caucasian	ASD	115
Hailee	Blair	40 m	F	Biracial	DD	80
Mercedes	Blair	50 m	F	Caucasian	DD	5
EJ	Sallee	37 m	M	African-American	ASD	235
Tayila	Sallee	59 m	F	African-American	NA	135
Jair	Sallee	49 m	M	Hispanic	NA	15
Gavin	Ellie	59 m	M	Caucasian	ASD	95
Terry	Ellie	54 m	M	African-American	NA	90
Tamiya	Ellie	59 m	F	African-American	NA	15

Note. ASD = autism spectrum disorder, DD = developmental disability; NA = not applicable; ASQ:SE = *Ages & Stage Questionnaires: Social-Emotional Scale* (Squires et al., 2002). For children ages 33 through 41 months, the cut off score on the ASQ:SE is 59. For children ages 42 through 65 months, the cut off score is 70.

Target children in Blair's classroom. Kaleb (C1) was a 56-month old Caucasian boy with autism. He had limited expressive language and communicated primarily using gestures, pictures, and a few single words. His teacher reported that Kaleb rarely engaged in play with

other children or adults. Kaleb demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 115 (cut off score of 70 for his age group). Hailee (C2) was a 40-month old biracial girl with developmental delays. She usually communicated with gestures, sounds, and short phrases. According to her teacher, Hailee liked to play for a short time with adults, but typically engaged in parallel play with other children. Hailee demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 80 (cut off score of 59 for her age group). Mercedes (C3) was a 50-month old Caucasian girl who used phrases to communicate with others. Mercedes frequently played with other adults and children in the classroom. She did not demonstrate any difficulties in the social-emotional domain of the *ASQ:SE* (her score was 5 while the cut off score for her age group was 70).

Target children in Sallee's classroom. EJ (C1) was a 37-month old African-American boy with autism. He had very limited expressive language and communicated primarily using gestures, sounds, and pictures (Picture Exchange Communication System; *PECS*). His teacher reported that EJ only played with the adults in the classroom. EJ demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 235 (cut off score of 59 for his age group). Tayila (C2) was a 59-month old African-American girl. She was very verbal and used phrases to communicate with others. According to her teacher, Tayila liked one-on-one attention from the adults in the classroom. Tayila demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 135 (cut off score of 70 for her age group). Jair (C3) was a 49-month old Hispanic boy who spoke both Spanish and English at school. Jair enjoyed playing with both adults and children in the classroom. He did not demonstrate any difficulties in the social-emotional domain of the *ASQ:SE* (his score was 15 with a cut off score of 70 for his age group).

Target children in Ellie's classroom. Gavin (C1) was a 59-month old Caucasian boy with autism. Gavin communicated using gestures, sounds, and a few single words. His teacher reported that Gavin liked to play by himself, but occasionally played with adults in the classroom. Gavin demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 95 (cut off score of 70 for his age group). Terry (C2) was a 54-month old African-American boy who was very verbal and used phrases to communicate with others. According to his teacher, Terry played primarily with other adults in the classroom. Terry demonstrated difficulties in the social-emotional domain of the *ASQ:SE* with a score of 90 (cut off score of 70 for his age group). Tamiya (C3) was a 54-month old African-American girl who frequently interacted with adults and peers who were near her. Tamiya demonstrated no difficulties in the social-emotional domain of the *ASQ:SE*. Her score was 15 (cut off score for her age group was 70).

Design

A multiple-probe design across teachers (Kazdin, 2011) was employed in this study. In this design, the effectiveness of an intervention is demonstrated by observing changes in a participant's behavior only when intervention is introduced. This pattern of data renders threats to internal validity (e.g., history, maturation) implausible. The design of a *study within a study* (Meadan, Ostrosky, Zaghlawan, & Yu, 2009) allowed us to examine the effectiveness of teacher training and the influence of the strategies used by the teachers on the social behaviors of targeted children.

Procedures

The study included four phases plus maintenance: (1) baseline, (2) teacher training, (3) probes, (4) teacher coaching, and (5) maintenance. The first two authors provided teacher training and coaching to each teacher on an individual basis.

Baseline. Observational data on teachers and children were collected during choice/center time. Teachers were asked to interact with the children as they usually did. During baseline probes the primary researchers (i.e., first and second authors) were not present in the classroom.

Teacher training. The first two authors conducted two individual training sessions with the first two teachers and one training session with the third teacher. These trainings focused on naturalistic teaching strategies (see Table 2). For the first two teachers, one session focused on naturalistic teaching strategies that were deemed physical in nature (e.g., environmental arrangement, joining a child's play) and one session focused on naturalistic teaching strategies that were deemed social in nature (e.g., expansion, questioning). The type of session was counter balanced across teachers to prevent the influence of the order of training on teachers' behavior. Blair received training on social strategies first while Sallee received training on physical strategies followed by social strategies.

Each training session lasted approximately 45 minutes and was conducted at a place and time convenient for the teacher. Given time constraints, the third teacher received training on all strategies during one 90 minute session. The researchers followed a scripted training protocol and used a checklist to verify that all training components were addressed. Each training session included: (a) an introduction of the naturalistic strategies during which time the researchers reviewed a handout describing each strategy with examples for how the teacher could use the strategy in her classroom (15 minutes); (b) watching two short video clips of teachers using the strategies followed by a discussion about the strategies (10 minutes); (c) a brainstorming discussion about children in the classroom who had social and communication difficulties (5 minutes); (d) completing an action plan table (i.e., setting, strategies to use, materials needed) with ideas for how to use the targeted strategies to support the social behavior of all children in the classroom (10 minutes); (e) questions and concerns (5 minutes).

The teachers were asked to use the strategies presented to facilitate the social behavior of all children in their classroom. In an attempt to keep the identity of the three target children from the classroom teachers, they were not instructed to implement the intervention strategies with specific children, but rather were instructed to use the strategies with all children in their classrooms.

Probes. Following the training sessions, data on teacher and target children were collected during choice/center time. During these 2 to 4 probe sessions, the researchers who conducted the training were not present in the classrooms.

Teacher coaching. During the coaching phase, the first and/or second author came to the classroom during choice/center time and guided the teacher in using the targeted strategies in the natural

environment. At the beginning of each coaching session, graphed data of the previous sessions were shared with the teacher. Then, the researchers stayed in close proximity to the teacher and used prompting, modeling, feedback, and encouragement to support the teacher in using the strategies. Data were collected for 20 minutes of center time.

Maintenance. Following the completion of the coaching phase, maintenance data were collected on teachers and target children in Blair and Sallee's classrooms. Given the end of the school year, there were no opportunities to collect maintenance data in Ellie's classroom. This phase was similar in structure and procedures to the baseline phase.

Data Collection

Recording system. A 15-sec partial-interval recording system was used to assess teacher and child behavior. Observers were two doctoral students in special education who had experience with data collection procedures. The observers were trained on the observational code by the first two authors. Observers collected data using paper and pencil with a digital recorder and earpiece signaling them as to the beginning of each interval.

Each observation session lasted 20 minutes. In the first 3 minutes of the observation session the observers focused on the teacher, in the fourth minute of each observation the observers focused on target child 1 (C1, child with autism), and in the fifth minute the observers focused on target child 2 (C2, child with social-emotional deficits). This sequence of observation was repeated 4 times. The only change was that in the second and fourth rounds, target child 3 (C3, child without any social-emotional concerns) was observed instead of child 2. This sequence allowed the teacher to be observed 12 minutes per 20-minute session, while the child with autism was observed for 4 minutes and the two peers (C2 and C3) were observed for 2 minutes each.

Teacher behavior. Momentary time sampling was used and during each interval, the social and physical strategy the teacher was using at the end of the interval was recorded (see Table 2 for a description of each of the seven strategies).

Table 2
Description of Naturalistic Teaching Strategies

Strategy	Description	Example
Physical Strategies:	*Use novel materials*: Using novel materials that a child has little experience with can elicit the child's interest to communicate and socially interact with others.	John loves building railroads and running trains over them. The teacher provides a handful of small plastic pieces and trains (different colors and sizes) during free play. She encourages John to talk about the trains, how he would build the railroad, compare the trains to each other etc..
	Join the Activity: When a teacher becomes part of an interaction between a child and his/her peer, she can facilitate the interaction between the two children by talking about /modeling /manipulating the materials.	John, Carol, and the teacher are standing by the sensory table and playing with sand. The teacher begins drawing a square in the sand and encourages the children to imitate her. The teacher asks Carol to name and draw a shape, and then the teacher and John imitate Carol. The teacher facilitates peer interaction by encouraging the children to talk about the different shapes.
	Invite the Child to Make Choices: When a teacher invites the child to make a selection between several materials or actions, she engages him in social interaction.	The teacher reads a book to John and his classmates about colorful leaves then she gives them choices about drawing leaves, gluing real leaves on a sheet, or creating leaf pictures using colored paper.
	Use Incidental Strategies: When a teacher manipulates the environment and does things that do not follow typical routines, this encourages children to comment or initiate conversations.	When John is done drawing a picture the teacher hangs it on the wall upside down. The teacher also brings out plastic apples at snack instead of real ones, and she pauses to wait and see what the children say or do.
Social strategies:	*Use Comments and Questions:* When a teacher utilizes descriptive language and verbal prompts, she encourages children to verbally respond and become socially engaged with a task.	The teacher asks John "I think that I'll put my car next to yours, is this ok or should I put it somewhere else?" or "Why are you coloring your turtle purple?"
	Require Expanded Talk: When a teacher uses open-ended questions to elicit more explanation and elaboration from the child about the activity she/he is engaged with, the child expands on his communication.	When John requests a ball, his teacher asks a question before giving the John the ball (e.g., "What color is the ball that you want?" or "What are you going to do with the ball?")
	Invite Interaction with Peers: When a teacher is alert to the available peer opportunities, she can invite a child to join a peer(s) in an ongoing activity.	The teacher tells John "Maybe you could join Sam and Lisa at the sand table and play with the new toys."

Child behavior. During each interval, the following child behaviors were recorded: (a) social interaction/play, including initiation and responding to teacher or peers, (b) isolate play, (c) onlooker behavior, (d) social initiation, and (e) responding to social initiation (see Table 3 for a description of the 5 child behaviors coded).

Table 3
Description of Child Behavior

Behavior	Description	Example
Social Interaction / Play	The target child is engaged in the mutual use or exchange of play materials with her/his peers/teacher, or is engaged in pretend play activities with her/his peers/teacher.	John, Tina, and Bill are pretending that they are having a meal together, and Tina says "Jack do you want more soup?"
Isolate Play	The target child plays alone with or without toys and does not make efforts to approach or talk to other children or adults, and he is not in close proximity to peers (within 3 feet). Examples include throwing a ball in the air, pushing a car, reading a book alone.	John sits in the reading center by himself and reads a book about trucks.
Onlooker Behavior	The target child is alone, watching other children with his head oriented toward the children, but he is not in proximity to or interacting with another child or adult.	John watches children playing with Legos, but he does not talk or interact with them.
Social Initiation	The target child initiates social interaction with a peer or an adult, including verbal or gestural behaviors directed toward a peer/adult in an attempt to elicit attention or access to objects/activities.	John looks at Lisa and points to the car she is holding.
Responding to Social Initiation	The target child responds to a peer or an adult initiation within 3-seconds of the initiation. This response may include verbal or gestural behaviors.	John says 'yes' to the teacher after she asks him if he wants to play with the new toy car.

Reliability. To assess inter-observer agreement, two observers independently coded 33% of the sessions, randomly sampled across baseline, intervention, maintenance, and generalization sessions. The primary observer and a reliability observer were trained to use the observational recording system in a preschool classroom (different than the preschools where the study was conducted).

The training continued until the observers reached 80% agreement across all categories. The reliability observer was naïve to the purpose of the study, and was not aware of the different phases during the study. Reliability data were calculated on the teachers' use of social or physical strategies and child behaviors. Overall reliability for teacher behavior was 82% (range = 74%-84%) and the overall reliability for child behavior was 81% (range = 74%- 87%).

Fidelity of training. The researchers followed a scripted protocol for each training session; to insure fidelity of the training they used a checklist to monitor the completion of each component of the training. In addition, three of the five training sessions were tape-recorded and a graduate student who was not involved in the study listened to the tapes and used the training fidelity checklist to assess what all components were covered in the training sessions. Fidelity of implementation for all three session was 100%.

Social validity. Teachers completed pre- and post-intervention questionnaires addressing the social validity of the intervention (i.e., the importance of the goals, procedures, and outcomes). The pre-intervention questionnaire included 10 questions that focused on teachers' perceptions of the purpose of social competence, strategies that promote social competence and their knowledge of social interaction strategies and competence in implementing social interaction strategies.

The post-intervention questionnaire included questions that focused on teachers' satisfaction with the procedures and outcomes of the intervention package. In addition, teachers rated their knowledge of social interaction strategies and competence in implementing social interaction strategies.

Results

The purpose of this study within a study was to examine the effect of the training and coaching on teachers' use of naturalistic strategies in their classrooms and to examine the effect of teachers' use of naturalistic strategies on children social behavior. Results indicated variability in both teacher and child behavior. Figure 1 includes the percentage of intervals in which the teacher correctly used physical or social strategies.

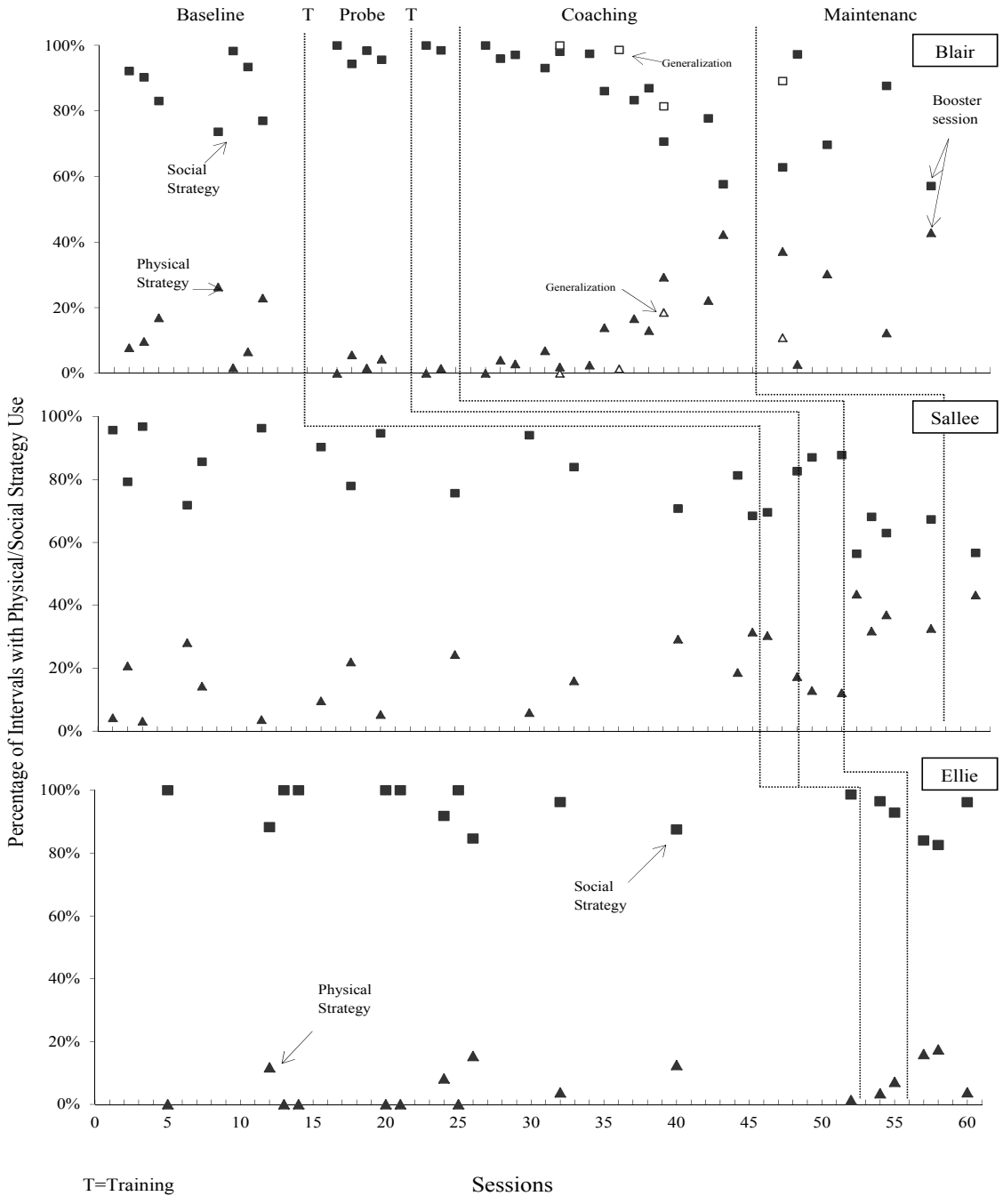

Figure 1. Percentage of intervals in which the teacher correctly used physical or social strategies

Prior to training and coaching, the teachers used a limited repertoire of strategies to support children with and without disabilities in their early childhood classrooms. The most frequently used strategies by teachers were social strategies, primarily asking questions. Blair used social strategies, on average, 87% of the intervals, Sallee used them 84% of the intervals, and Ellie used social strategies 96% of the observed intervals. There were no clear changes in teachers' behavior during the probes after training (i.e., the teachers continued to use the same social strategies in most observed intervals). During the coaching phase, two of the three teachers, Blair and Sallee, learned the new strategies and applied them in their teaching with more variability (i.e., they used both physical and social strategies in a more balanced way). Blair required a great deal of support in terms of coaching from the researchers and it was only after six individual coaching sessions that, she began to use more physical strategies and less social strategies in each session.

Visual inspection of the graph reveals clear systematic trends in Blair's data during the coaching phase, a decrease in percentage of intervals with social strategies and an increase in percentage of intervals with physical strategies. In Salle's data there is a clear change in level between the probe and coaching phases. During the coaching phase Sallee begins to use the social and physical strategies with more balanced frequency. The third teacher, Ellie, demonstrated extremely limited changes in her behaviors, possibly, due to the timing of the study (end of the school year). Overall, with coaching, two of the three teachers were more successful in balancing their use of social and physical strategies. During two of the maintenance sessions, Blair used less physical strategies and more social strategies, similar to baseline data. We conducted a booster session following the 4th maintenance session and reminded Blair about the importance of using a variety of strategies. Following the booster session, Blair used social and physical strategies with a similar frequency. We were able to collect only one data point for Sallee before the end of the school year. Sallee continued to use both social and physical strategies in the maintenance session.

Blair and Sallee indicated on the social validity questionnaire that they were very satisfied with the project goals, procedures, and outcomes (Wolf, 1978). For example, one teacher stated, "I think the outcomes were great for us – gave me a fresh outlook and the kids more opportunities for interaction!" Both teachers found the coaching component of the intervention one of the most beneficial aspects of the study. One teacher said, "I liked the coaching very much – it is helpful to have an extra set of eyes and ears as an objective observer. Sometimes we get caught up in our teaching and forget how much more we could be doing for our kids!"

As the third leg in the multiple baseline, Ellie was frustrated that the baseline phase was so long and that the training and coaching sessions were limited and conducted toward the end of the school year. She said, "Considering when the project was started, completing the final phase in the last week of school seems unfortunate." However, Ellie was pleased with the project goals and with the training and coaching sessions.

Changes in children's behavior were variable and inconsistent, which was not surprising given the short duration of the intervention. Due to the variability in the children's data we calculated and

compared means for child behavior during the baseline phase and the coaching phase. The average percentage of intervals that the children engaged in various social behaviors during baseline and the coaching phase are presented in Table 4.

Table 4
Child Data: Average Percentage of Intervals

	Initiation		Responding		Individual play		Social Play		Onlooker	
	Pre	Int.	Pre	Int.	Pre	Int.	Pre	Int.	Pre	Int.
C1										
Kaleb	3.5	3.3	21.5	10.9	70.4	78.9	2.7	2.3	1.9	4.5
EJ	1.9	2.5	11.6	12.1	78.7	80.4	2.8	0.0	5.0	5.0
Gavin	5.1	6.3	4.8	2.1	60.5	20.1	23.4	62.6	6.2	5.6
Average	3.5	4.0	12.6	8.4	69.9	59.8	9.6	21.6	4.4	5.0
C2										
Hailee	9.8	6.9	11.6	11.6	34.5	25.7	41.7	46.3	2.4	9.4
Taylia	16.6	4.8	8.2	2.4	42.7	55.2	26.7	32.9	5.8	4.8
Terry	3.5	0.0	4.2	12.5	55.6	55.6	30.5	29.2	13.5	0.0
Average	10.0	3.9	8.0	8.8	44.3	45.5	33.0	36.1	7.2	4.7
C3										
Meredes	14.2	11.7	6.7	11.5	46.9	26.8	28.5	46.2	3.8	3.9
Jair	3.0	10.7	6.6	5.4	37.0	22.5	45.7	51.4	7.8	10.0
Tamayia	16.4	4.8	9.6	13.1	20.8	0.0	53.1	82.1	5.8	0.0
Average	11.2	9.1	7.6	10.0	35.0	16.4	42.4	59.9	5.8	4.6
Overall										
Average	8.2	5.7	9.4	9.1	49.7	40.6	28.3	39.2	5.8	4.8

Note. Pre = during the Baseline phase Int. = during the Coaching phase.

The category of behavior showing the most change between the baseline phase and the coaching phase, across all 9 target children, was social play (overall average change from 28.3% to 39.2%), showing that on average, the children engaged in more social play during the coaching phase compared to baseline. Interestingly, two of the three groups of children (C1 and C3) showed dramatic changes in social play from baseline to coaching (9.6 to 21.6 and 42.4 to 59.9 for C1 and C3, respectively). However, the data within each group of children (i.e., C1, C2, and C3) across all observed behaviors are extremely variable. Differences among the three groups of children (i.e., children with autism who displayed difficulties in social behaviors, children with difficulties in social behaviors, and children without difficulties in social behaviors) are presented in Figure 2. It appears that even after coaching, four of the children with social difficulties (C1 and C2) continued to spend more time in individual play and less time engaged in social play, compared to children labeled as C3. Average changes in behaviors across all children are illustrated in Figure 3. Overall,

during the coaching phase, data reveal that children spent more intervals engaging in social play compared to individual play.

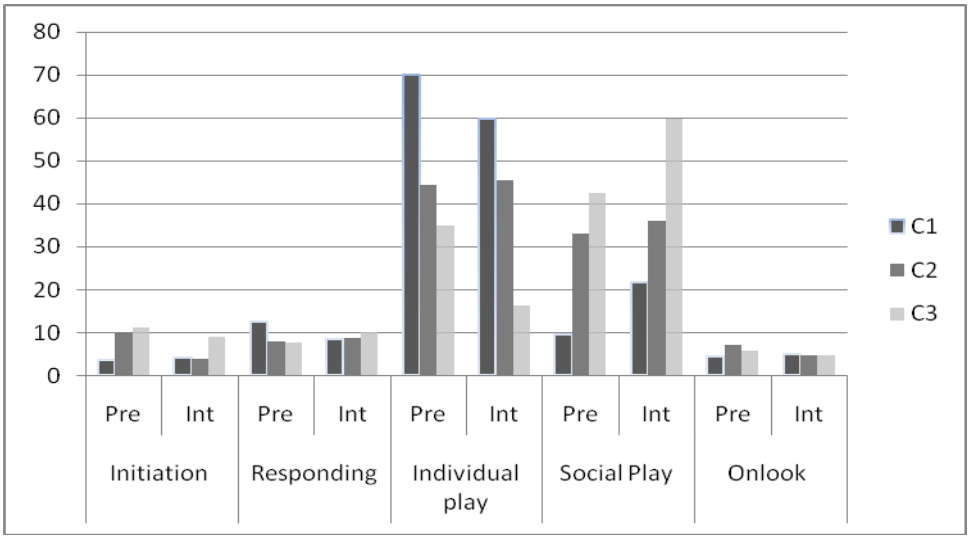

Figure 2. Average Changes Across Children's Groups during Baseline and Coaching

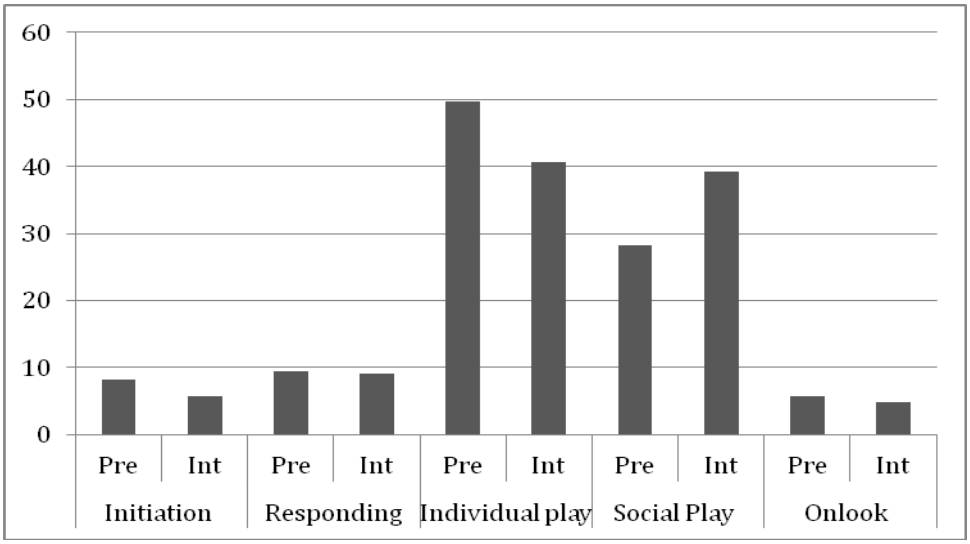

Figure 3. Average Changes in All Children Behavior During Baselin Figure 1e and During Coaching

Discussion

The purpose of this study was to teach and coach preschool teachers to use naturalistic teaching strategies to support the social behaviors of young children with and without autism. The goal of training and coaching was to increase the variety of strategies the teachers used in their classrooms. Results showed that training and coaching were effective for two of the three teachers to become more skilled at using a variety of strategies, with the percentage of physical and social strategies becoming more balanced. The third teacher, Ellie, received a limited number of training and coaching sessions, due to the end of the school year. Not surprisingly she demonstrated no changes in her behaviors. It is possible that with more intervention sessions, Ellie's use of the targeted strategies also would have changed.

Changes in teacher behavior following the training alone were not evident, suggesting that professional development that includes only short individual training sessions is not strong enough to result in change in behavior. This finding supports previous research that found that training alone is not enough to promote teacher behavior change (Kretlow, Wook, & Cooke, 2011). Kretlow et al. (2011) suggest that coaching may help teachers apply the methods they learn in professional development activities "because it is more individualized, more concrete, and more relevant to their own students" (p. 242). Professional development that results in positive behavior change is time consuming and requires modeling, prompting, and feedback. The teachers who participated in the current study stated that they appreciated the presence of another person in the classroom and the immediate and specific feedback they received about needed changes.

Another interesting variable to consider when interpreting the results of this study is related to teacher 'buy-in.' There could be a connection between the teacher's buy-in to the specific intervention and the study results. From the beginning of the study, Ellie seemed hesitant about the procedures and the observation schedule. It is possible that if we focused more on explaining the potential outcomes of the intervention (e.g., share other teachers' experiences) that results would be different. There is no doubt that collaborating with teachers and gathering on-going feedback (social validity) from them will help ensure positive outcomes and satisfaction with an intervention. If teachers perceive the goals, procedures, and outcomes of an intervention as important and acceptable, the chances that they will continue to implement the intervention are higher (Kazdin, 1980; Wolf, 1978).

In this study we used a *study within a study* design that allowed us to examine the effectiveness of our training and coaching intervention on teacher behavior and also the effectiveness of the teachers' use of the naturalistic strategies on children's social behavior. Changing behavior, for both adults and children, takes time and with this type of design, assessing children's behavior change following teachers' behavior change typically requires extensive time. Although across all children there was an increase in the time that children spent engaged in social play, two of the children with autism continued to engage in very limited social play following intervention. Even during the intervention, two groups of children, those with autism and those who displayed

difficulties in social behaviors but who did not have autism, behaved differently than the group of children without difficulties in social behaviors. It is possible that more intense intervention (e.g., increase in the number of coaching sessions per week, direct teaching of specific skills might be necessary to realize more positive outcomes. In a tiered approach to intervention, some strategies are considered universal and apply to all children (i.e., classwide intervention) while other strategies are considered secondary and tertiary and they provide additional support to children who have additional needs. In addition, it is possible that a more sensitive observation tool is required to detect small changes, over a short period of time, in the behaviors of both teachers and the children.

Limitations and Implications

There are several limitations to this study and important implications for both research and practice. The study was conducted with only three teachers/classrooms and, therefore, the generalization of the findings beyond these (or similar) teachers/classrooms is limited. Future research could examine the effectiveness of the intervention with more early childhood teachers who represent a wide range of diversity (e.g., education, years of experiences, and classroom makeup). In addition, the baseline phase was long for two of the teachers, while the intervention phase was short due to the end of the school year. Therefore, there is very limited information on the effectiveness of the intervention for the third teacher. It is possible, that with a more intense intervention (e.g., more sessions, longer coaching phase) all three teachers would have shown a change in their behavior that would last longer (i.e., using both physical and social strategies to promote social behavior). Collecting data for longer time following intervention might also reveal more changes in child behavior as a result of changes in teacher behavior. Future researchers might want to examine the effectiveness of different interventions to promote social skills of children with ASD with different 'intensity' levels, over longer periods of time.

The teachers who participated in the study commented that the coaching component of the intervention was very helpful for them. As described by other researchers (e.g., Hsieh, Hemmeter, McCollum, & Ostrosky, 2009; Kretlow et al., 2011), professional development that takes the format of in service days or workshops is not enough to change teachers' behavior. Teachers need both training and coaching to learn and practice new strategies. There is a need to develop strong systems of support for teachers to address the increased diversity of abilities and needs of the children in their classrooms. This system of support should include accessible materials, examples, and demonstrations (e.g., videos) on evidence-best practices in the natural environment along with the availability of staff to coach teachers in recommended practices. The diversity of abilities and needs of the children in the today's early childhood classrooms also calls for knowledge on a variety of strategies that could be used by the teachers.

Although there has been increased focus on the development of academic and cognitive skills of young children social-emotional development and competence are critical to adjustment and academic success in life (Webster-Stratton & Reid, 2004). In fact, Head Start's *Child Development and Early Learning Framework* "identifies 11 domains that represent the overarching areas of child development and early learning essential for school and long-term success including social-emotional development, cognitive and general knowledge, language and

literacy, approaches to learning, and physical development and health" (Joseph, Sandall, Porter, Lane, Shapiro, & Nolen, 2011, p. 8). All early childhood teachers should have the knowledge of and experience with a variety of evidence-based strategies to use with diverse groups of children, including those with ASD, to support children's learning and development across domains. This study, with its focus on social emotional development, is one step toward achieving this goal.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed. text rev.). Washington, DC: Author.

Boyd, B. A., Odom, S. L., Humphreys, B. P., & Sam, A. M. (2010). Infants and toddlers with autism spectrum disorder: Early identification and early intervention. *Journal of Early Intervention, 32,* 75-98. doi:10.1177/1053815110362690

Bowman, B., Donovan, M., Bums, S. (Eds,), & the Committee on Early Childhood Pedagogy of the National Research Council, (2000). *Eager to team: Educating our preschoolers.* Washington. DC: National Academy Press.

Center for Diseases Control and Prevention (2012). Retrieved from http://www.cdc.gov/index.htm.

Cook, R., Klein, D., & Tessier, A. (2004). *Adapting early childhood curricula for children in inclusive settings*. Columbus, OH: Pearson Prentice Hall.

Crozier, S., & Tincani, M. (2005). Using modified social stories to decrease disruptive behavior of a child with autism. *Focus on Autism and Other Developmental Disabilities, 20*, 150 - 157.

DiSalvo, C. A., & Oswald, D. P. (2002). Peer-mediated interventions to increase the social interaction of children with autism: Consideration of peer expectancies. *Focus on Autism and Other Developmental Disabilities*, *17*(4), 198-207. doi:10.1177/10883576020170040201

Garfinkle, A. N., & Schwartz, I. S. (2002). Peer imitation: Increasing social interactions in children with autism and other developmental disabilities in inclusive preschool classrooms. *Topics in Early Childhood Special Education*, *22*(1), 26-38. doi:10.1177/027112140202200103

Halle, J. W. (1982). Teaching functional language to the handicapped: An integrative model of natural environment teaching techniques. *Journal of The Association for Persons with Severe Handicaps, 7*, 29-37.

Hancock, T. B., & Kaiser, A. P. (2002). The effects of trainer-implemented enhanced milieu teaching on the social communication of children who have autism. *Topics in Early Childhood Special Education*, 22(1), 39-54. doi:10.1177/027112140202200104

Hart, B. (1985).Naturalistic language training techniques. In S. F. Warren & A. K.
Rogers-Warren (Eds.), *Teaching functional language* (pp. 63-88). Austin: Pro-Ed.

Hart, B., & Risley, T. (1975). Incidental teaching of language in the preschool. *Journal of Applied Behavior Analysis, 8*, 411-420. doi:10.1901/jaba.1975.8-411

Hsieh, W. Y., Hemmeter, M. L., McCollum, J. A., & Ostrosky, M. M. (2009). Using coaching to increase preschool teachers' use of emergent literacy teaching strategies. *Early Childhood Research Quarterly, 24,* 229-247.

Hitchcock, C., Meyer, A., Rose, D., & Jackson, R. (2002). Providing new access to the general education curriculum: Universal Design for Learning. *Teaching Exceptional Children, 35*(2), 8-17.

Joseph, G. E., Sandall, S. R., Porter, A., Lane, V., Shapiro, R., & Nolen, E. (2011). *School readiness for all children: Using data to support child outcomes*. Seattle, WA: National Center on Quality Teaching & Learning, University of Washington.

Kamps, D., Royer, J., Dugan, E., Kravits, T., Gonzalez-Lopez, A., Garcia, J. & Kane, L. G. (2002). Peer training to facilitate social interaction for elementary students with autism and their peers. *Exceptional Children*, *68*(2), 173-187.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2*, 217-250.

Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: A randomized controlled intervention study. *Journal of Child Psychology and Psychiatry, 47*, 611-620. doi:10.1111/j.1469-7610.2005.01567.x

Kazdin, A. E. (1980). Acceptability of alternative treatments for deviant child behavior. *Journal of Applied Behavior Analysis, 13,* 259–273.

Kazdin, A. E. (2011). *Single-case research designs*. New York, NY: Oxford.

Koegel, L. K., Koegel, R. L., Frea, W. D., & Fredeen, R. M. (2001). Identifying early intervention targets for children with autism in inclusive school settings. *Behavior Modification*, *25*(5), 745-761. doi:10.1177/0145445501255005

Kogan, M. D., Blumberg, S. J., Schieve, L.A., Boyle, C. A., Perrin, J. M., Ghandour, R.

M. van Dyck, P. C. (2009). Prevalence of Parent-Reported Diagnosis of Autism Spectrum Disorder Among Children in the US, 2007. *Pediatrics, 124*(4), 1–9

Kohler, F. W., Anthony, L. J., Steighner, S. A., & Hoyson, M. (2001). Teaching social

interaction skills in the integrated preschool: An examination of naturalistic tactics. *Topics in Early Childhood Special Education*, *21*(2), 93-103. doi:10.1177/027112140102100203

Kretlow, A. G., Wood, C. L., & Cooke, N. L. (2011). Using in-service and coaching to increase kindergarten teachers' accurate delivery of group instructional units. *The Journal of Special Education, 44,* 234-246. doi:10.1177/0022466909341333

Laushey, K. M., & Heflin, L. J. (2000). Enhancing social skills of kindergarten children

with autism through the training of multiple peers as tutors. *Journal of Autism and Developmental Disorders*, *30*, 183-193. doi:10.1023/A:1005558101038

Meadan, H., Ostrosky, M. M., Zaghlawan, H. Y., & Yu, S. Y. (2009). Promoting the social and communicative behavior of young children with Autism Spectrum Disorders: A review of parent-implemented intervention studies. *Topics in Early Childhood Special Education, 29*(2), 90-104.

McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Journal of Autism and Developmental Disorders*, *32*(5), 351-372. doi:10.1023/A:1020537805154

Odom, S. L., McConnell, S. R., McEvoy, M. A., Peterson, C., Ostrosky, M. M.,

Chandler, L. K… Favazza, P. (1999). Relative effects of interventions supporting the social competence of young children with disabilities. *Topics in Early Childhood Special Education, 19*(2), 75-91. doi:10.1177/027112149901900202

Peth-Pierce, R. (2000). *A good beginning: Sending America's children to school with the social and emotional competence they need to succeed.* Bethesda, MD: Child Mental Health Foundations and Agencies Network (FAN), National Institute of Mental Health.

Pisha, B. & Coyne, P. (2001). Smart from the start: The promise of Universal Design for Learning. *Remedial and Special Education, 22*(4), 197-203.

Rogers, S. J. (2000). Intervention that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders, 30,* 399-409. doi:10.1023/A:1005543321840

Sandall, S. R., & Schwartz, I.S. (2002). *Building blocks for teaching preschoolers with special needs*. Baltimore: Brookes.

Schwartz, I. (July, 2005). *Blending approaches to meet the needs of young children with autism: The DATA project*. Paper presented at the 12th International Conference on Learning, Granada, Spain.

Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development.* Washington, DC: National Academy.

Squires, J., Bricker, D., Twombly, E., Yockelson, S., Davis, M. S., & Younghee, K. (2002). *Ages & stages questionnaire: Social emotional* (ASQ:SE). Baltimore: Brookes.

Webster-Stratton, C. & Reid, M. J. (2004). Strengthening social and emotional competence in young children - The foundation for early school readiness and success: Incredible years classroom social skills and problem-solving curriculum. *Infants and Young Children, 17* (2), 96-113.

Wetherby, A., & Prizant, B. (1993). *Communication and Symbolic Behavior Scale-Normed Edition*. Chicago, IL: Applied Symbolix.

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*(2), 203-214.