

The Effectiveness Of Peer-Mediated Sandplay to Promote Social interactions among children with Autism
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Abstract

This study aimed at assessing whether playing with typically developing peers increased numbers of Social interactions in children with Autism Disorder (ASD). A version of a sandplay intervention previously investigated by Lu, Petersen, Lacroix, and Rousseau (2010), and modified to include peer-mediated play was used. The intervention explored the effects of sandplay with typically developing peers on engagement in social interactions by children with ASD. A multiple-case intervention design was used with three children with ASD with varying degrees of severity in functioning. While number of social interactions among the children did increase from baseline with the introduction of the peer-mediated sandplay intervention. While the results of the intervention are inconclusive, these results necessitate further investigation into this method of intervention for children with autism disorder, specifically with regard to ASD severity. Theoretical and treatment implications are offered, as well as directions for future research.

Keywords: Autism Disorder (ASD), sandplay, play intervention, peers.

Introduction:

The need for effective intervention strategies for children diagnosed with Autism Spectrum Disorder (ASD) has become increasingly clear in recent years due to the astonishing increase in the prevalence of this diagnosis. The CDC released a report in 2007 that stated one in 150 US children has ASD, with an annual increase of 10 to 17 % for this population (Epp, 2008). In response to the concern for the adaptability of youth with ASD, urgency exists among mental health professionals, clinical researchers, and academic providers to develop interventions and Programs that address the characteristic impairments of this group of children in ways that improve functioning and build necessary skills. From these efforts, a wide range of clinical training workshops, individual therapies, and social skills and play therapy programs have been developed to address the needs of this population of children (Epp, 2008).

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Impairments of ASD

In Diagnostician a Statistical Manual of Mental Disorders, 5th edition (DSM-5), Autism Spectrum Disorder (ASD) is characterized by deficits in social interaction and communication, as well as restricted, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). Individuals diagnosed with ASD exhibit these deficits to varying degrees with a three-tier severity classification. Individuals classified at Level 3 need “very substantial support” as they have severe deficits in both verbal and nonverbal social communication, significant inflexibility of behavior, and difficulty coping with change resulting in severe impairment in functioning. Individuals classified at Level 2 need “substantial support” as they have marked deficits in verbal and nonverbal communication and inflexibility in behavior , which interfere with functioning, however these deficits are less severe than in Level 3.

Lastly, individuals classified at Level 1 need “support” as they have deficits in social and Communication skills, as well as inflexibility in their behavior, that cause noticeable impairments in functioning, but these deficits are less severe than in Levels 2 and 3 (American Psychiatric Association, 2013, p. 52).

Social deficits include trouble with social-emotional reciprocity, underdeveloped use of eye gaze and body language. inability to form peer relationships, and a lack of spontaneous social sharing. Children on the autism spectrum display impairments in social communication, trouble beginning and maintaining conversations, and use of stereotyped language. Repetitive patterns of behaviors include a restricted range of interests, behaviors, and activities where children can become “stuck” on particular topics or interests, demand routines and rituals, and engage in stereotypic motor movements (American Psychiatric Association, 2013). Prior to the publication of the DSM-5 (American Psychiatric Association, 2013), these deficits were referred to as the Pervasive Development Disorders or PDDs, which included Autistic Disorder, Asperger's Syndrome, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS; American Psychiatric Association, 2000).

Another hallmark of children with ASD is their difficulty enacting imaginative play (Baron-Cohen, 1987; Charman & Baird, 2002), affecting their ability to play in the same manner as their typically developing peers. As stated in the DSM-5 diagnostic criteria, the behavior of these children is characterized by a “lack of shared social play and imagination (e.g., age-

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appropriate flexible pretend play)” (American Psychiatric Association, 2013. p. 54). children with ASD thus have trouble using pretending or symbolic play defined as “the capacity to Purposefully engage in imaginative activity or advanced pretense” (Wolfberg & Schuler, 2006, p.185) Much of the current research on treatment strategies for children with ASD has focused.

The term play intervention will be frequently used to refer to any method implemented to increase play development (or the attainment of play skills), specifically in children with ASD.

The play impairments characteristic of children with ASD are a crucial point of intervention to increase functioning. Before the problems with play and intervention strategies are discussed, it is imperative to address the broader literature on the importance of play in development. Theories about the role of play in the development of typical children, summarized below, include the theories of Vygotsky (1966; 1978) and Piaget (1962).

Vygotsky (1966; 1978) supported that play is a fundamental activity crucial for the development of symbolic capabilities, interpersonal skills, and social knowledge in children. Accordingly, play assists the development of many important skills children must acquire to function in the social world. Through play, children create meanings and understandings of the skills, values, and knowledge that are central to their culture and functioning as adults (Vygotsky, 1966; 1978).

In his theory of play, Piaget (1962) outlined incremental steps that typically developing children move through in their development of play. He stated that play begins at birth with imitation of caregivers and then develops into three main forms of play: (a) practice play of the sensorimotor stage, (b) symbolic play, and (c) games with rules. In the imitation stage (birth to 24 months) the child first imitates basic sounds and movements leading to the mimicking of complex gestures and speech. In the sensorimotor stage, practice or ritualistic play occurs, which is where the child repeats an act over-and-over to see if the same response will reoccur. Piaget stated that symbolic play begins to emerge at about 18 months as imitation of nonhuman objects occurs, such as pretending to be a dog. Further in this developmental stage, symbolic play arises, mice incorporates using other things to symbolize an object, or pretending an object is there.

At about the age of two, more advanced symbolic (or pretend) play emerges, Which will dominate play until about age five, where the child will create make-believe scenarios for themselves, such as pretending a swing is a rocket ship or creating an imaginary friend (Singer & Revensen, 1996).

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Parallel play develops during the preschool years, according to Piaget (1962), when children begin to sit next to a peer while they each play with their own toys and interact in minimal ways, such as through narration of what they are doing. The next stage of play development occurs around age seven and continues to age 11. During this stage, children begin to play games with rules, and this later becomes the world of play for adults (such as sports and board games). Games may be passed down and learned from older children or may be created from previous symbolic play to now include cooperative play with rules. During this stage, children typically form groups in which to play games and all of the children agree upon the rules. It is common for these games to involve competition (Singer & Revensen, 1996).

These theories of play development by Vygotsky (1966, 1978) and Piaget (1962) create a backdrop for the importance of play as a driving force for the development of crucial areas of competency for children to function in the world. Through play, children learn communication, social skills, cognitive flexibility, experimentation with roles, and an understanding of emotional expression crucial to interacting with others and participating in their environment (Wolfberg, 1996).

Therefore, children's ability to engage in the creation of pretend play is tied to their ability to understand that different people have different understandings of objects and events (Hobson et al., 2009). In addition, children need to have an understanding of emotions and be able to identify with others when they exhibit feelings. Hobson and colleagues proposed the above theory of the development of pretend play in typically developing children, which can be used to explain the deficits present for children with ASDs. Children on the autism spectrum have difficulty identifying with and understanding the perspectives of others, as well as understanding that they themselves have flexible thoughts and feelings (Hobson et al., 2009). Thus, children with ASDs have "limited capacity to generate and introduce the kinds of pretend meanings that are essential to play" (Hobson et al, 2009, p. 13).

Specifically, functional and symbolic play have been shown to be associated with communication skills in autistic children, with higher developmental levels of play correlated with higher levels of language development (Mundy, Sigman, Ungerer, & Sherman, 1987).

Peer communication, play behaviors, and Joint attention in children with ASD have been shown to increase through improvements in Social interaction with social communication skills training (Walberg & Craig-Unkefer, 2010).

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Research has demonstrated the link between play development and the acquisition of social interactional skills, with evidence that children with ASD who have peer interaction problems also have difficulty with play (Lord & Magill, 1989). Furthermore, these play deficits exhibited by children with ASD impact their ability to interact with peers and form friendships due to their lower rates of meaningful play behaviors and play initiations (Lord & Magill, 1989). Literature has shown that children with ASD express desire for friendships (Daniel & Billingsley, 2010; Frankel & Whitman, 2011), although this is at a much lower rate than typically developing peers (Bauminger & Kasari, 2000). Importantly, research has shown that friendships act as a protective factor in the functioning of children with autism (Bauminger, Shulman, & Agam, 2004), particularly friendships with typically developing peers (Bauminger et al., 2008). However, development of peer relationships is difficult for children with ASD (Daniel & Billingsley, 2010). Specifically, children with autism are less likely to initiate interactions with typically developing peers; when they do initiate interactions, their peers are less likely to respond due to the vague approaches that the autistic children use (i.e., peers cannot tell that they are making a social approach; Lord & Magill-Evans, 1995).

Not only are children with ASD hindered in their play due to their deficits in appropriate social skills. but their play development can also be impacted by not having access to Opportunities to play with peers. Typically developing children may be discouraged from initiating interaction with children with ASD due to their lack of response, or children with ASD may not have as much access to typically developing peers due to classroom placement. This diminished access to peers, therefore impacts the ability for children on the autism spectrum to learn from peers who have developed play skills (Charlop & Walsh, 1986). As Wolfberg and Schuler (2006) state, social difficulties are exacerbated when children with ASD are excluded from their peers. They found that the more that autistic children are isolated from the play culture of their peers, the greater their social impairments become due to lack of exposure to the relevant play material of their cohort. Additionally the to longer children on the spectrum are isolated from their peers, the greater their social impairments become due to lack of exposure to the relevant play material of their cohort. Additionally, the longer children on the autism are isolated from their peers, the greater their social deficits can become, creating a self-perpetuating loop (Wolfberg & Schuler, 2006). As such, play has been supported as a predictor of social functioning for individuals on the autism

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spectrum, as children who engaged in fewer age-appropriate play acts exhibit more developmentally delayed social interactions (Manning & Wainwright, 2009).

Understanding the function of play as propelling forward a child's development in social and communication areas sheds light on the importance of improving the play of children with: ASD through intervention (Wolfberg & Schuler, 2006). Due to the important role that play has in the development of social and communication skills, it is crucial for children on the autism a. to hone their play abilities to improve their interactional skills. Therefore, play can be seen as an important key to intervening with this population to improve social functioning.

Sandplay

Children have always enjoyed playing in the sand, bringing their inner and outer worlds to gether through imagination. Different cultures have historically used sand in imaginal rituals of visioning.

During the thirties, sand tray therapy developed in Europe as the Lowenfeld World ‘Technique. Most sandplay therapists and writers (Allen, 1988; Carey, 1990) identify British pediatrician Margaret Lowenfeld as the first person to describe sandplay as a therapeutic | technique, formulate and articulate the associated theoretical principles, and train many practitioners worldwide. Lowenfeld (1979) credits a child with bringing small objects in her room over to the tray with sand and naming them sand trays “worlds.” A world can be seen as a picture of the psyche according to Lowenfeld (1979), who notes that “The World Technique” is characteristically a right brain mode. She states that the production of worlds seems to be halfway between dreams, which are an unconscious creation, and art, which draws from the conscious in the creation of structure and form (Lowenfeld. 1979).

Two additional pioneers of sandplay therapy deserve brief mention. A short time after Lowenfeld developed the “World Technique”, Erik Erikson developed the Dramatic Production Test (DPT) at Harvard in the 1930s, The DPT used miniatures in a defined space for therapeutic and diagnostic purposes and stemmed from his and Freud’s result. Children’s play was viewed as a series of visual and sensory images that expressed the child’s life and “only later could these images be put into words” (Mitchell & Friedman, 1994, p.25). (Mitchell & Friedman, 1994), A few years later, Charlotte Buhler saw the “World Technique” incorporated it into a diagnostic kit called the “World Test,” and distributed it to clinicians in the United States through the Psychological Corporation (Bradway, 1979). As with Erikson’s

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DPT, the “World Test” miniatures were not placed in sand, but rather on either a designated table or on the floor(Mitchell & friedman, 1994).

Linda Hunter (1998) has done extensive research on sandplay therapy and resiliency with children . her work focuses on children who have been labeled by society as “emotionally disturbed” and “bad” (Hunter, 1998). She notes that the children in her studies used the language of sand, water, and many, many small figures to explore inner strengths and find the resiliency that exists in their imagination” (Hunter, 1998). This investigation is makes a new contribution to the study of sandplay.

Kalff's (1980) method of sandplay has two distinct parts: the first part is for the client to make a picture; the second part is for the client to tell a story or narrative about the picture. Following a brief introduction she invites the client to look at the materials “until you find something that speaks to you and put it in the tray and then add to it as you wish” (Mitchell & Friedenani 735i, p.83).

The therapist serves as a companion in the sandplay process, rather than the controller or director(Baum,1994) and shares the experience, (Stewart, 1995). During the creation of a sandworld, the therapist usually close enough to the sandtray to observe what transpires, but not so close as to seem intrusive to the client (Stewart. 1995), and demonstrating unconditional positive regard for the client and her creation (Allen, 1988). Its often important to maintain an atmosphere of “concentrated silence” (Ryce-Menuhin, 1992, p.32): in this observation time. therapists should pay careful attention to what the client uses and does not use, as well as how he or she uses these objects (Earle, Earle, & Osborn, 1995), including their placement, groupings, and boundaries.

An important role for therapists is that of recording and dismantling the sandworld. Again, the process of recording varies among therapists. Some therapists photograph the sandtray or complete a protocol describing the content and process (Earle et al., 1995), or both. ‘Others may sketch the sandworld and/or take notes about the process (Ammann, 1991). Some therapists believe it is beneficial to give clients a photographic copy of a particularly meaningful creation for them to keep and possibly to journal about the sandtray process (Sweig & Sachs, 1993).

During sandplay therapy sessions, clients are encouraged to express themselves and are allowed to play with their scene by placing figures in the sandtray(Livingston,2002).

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Social Interactions

Research on social interaction is somewhat segmented as ‘scholars have struggled to reach consensus about what constitutes ‘social’ (Parten, 1932). As a result interactions have been described in multiple ways including pro-social and anti-social behaviours (see Hay, 1994 for review), positive social behaviour (Oden & Asher, 1977), social reinforcement (Charlesworth & Hartup, 1967) and social skills (Oden & Asher, 1977). Yet, despite this lack of consensus on what constitutes social interaction, one thing is clear; it is possible to describe interactions in terms of observable reciprocal behaviours that children exhibit (Driscoll & Carter, 2004, Miel & Dallos, 1996). From this perspective, data collection and observations focus predominantly on documenting behaviours since social interactions and play are believed to be “behaviours that appeared to enhance peer acceptance, friendships, or other positive relational outcomes” (Ladd, 1999: 335) and pro-social interactions are defined as “actions that intended to benefit another person” (Sheffer, 2008:325). Focusing on observable behaviours and actions as an exploration of interactions is often used in empirical studies, and Table 1 below shows the kinds of behaviours and actions that are often cited. This is not a comprehensive list but provides an idea of the ways in which interactions have been detailed.

Table 1- Examples of behaviours

Imitation	Smiling	Laughing	Giving tokens
Physical Contact	Helping	Sharing	Displaying kindness
Sympathy	Participating in The game	Taking turns	Talking hostile or threatening acts
Listening	Giving attention	Physically aggressive	Hair – pulling
Hitting	Pushing	Raising a fist in a threatening manner	
Throwing Grabbing Toys	Kicking	Pleasant conversation	

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One particularly useful approach for this study is the work of Pat Broadhead. Her Social Play Continuum (SPC), “charts actions and associated language through four, increasingly sophisticated levels of development” (Broadhead, 2001: 24). Broadhead lists a far more extensive range of behaviours (described by her as observable actions and language) than that Presented above and her framework provides a very detailed overview for observing children's interactions. A full list of these behaviours and actions is provided in Appendix 1. ; the continuum therefore provides a comprehensive ‘start list’ of actions and behaviours which we may expect to see when observing children in preschool.

Method

participants With ASD

Three student diagnosed with autism participated in the study . all participated had been diagnosed by independent psychiatrists or psychologists and attended public schools in Baghdad , these student were identified through contact with consultants from an agency that provides educational and behavioral support to students with ASD, the first three students who were recommended for the study, and for whom parent permission was obtained , were included Although the three students functioned at difficulties , as reflected in consultant , parent and teacher reports , in order to ensure confidentiality , all participant names have been changed.

Rafid. a7-years -old boy diagnosed with autism, was placed in a general education second-grade class, where he received the support of a full-time aide. Rafid’s full-scale IQ score on the Wechsler Intelligence Scale for Children-Third Edition (WISC-III, Wechsler, 1991) was 76, He received individual speech therapy and occupational therapy services, but all other instruction occurred with his regular classmates. Rafid exhibited limited social interactions. He generally spoke only to adults and played by himself on the playground while repeating cartoon phrases. Rafid showed several behaviors that interfered with social activities. such as verbal perseveration and stereo-typic behavior (e.g.. shaking his head, shaking his fingers, jerking body movements). He also displayed some verbally and physically aggressive behaviors (pushing, kicking, and swearing) toward adults and peers.

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saif, a 10-years -old boy diagnosed with autism. was in a fourth-grade class. His full-scale IQ on the WISC-III was 97. He received individual speech therapy services and resource room services that focused primarily on organizational, writing, and study skills but remained with his typical classmates for academic instruction (e.g., reading, math, science) and other school activities. saif engaged in only limited social interactions, rarely interacting with other students, put his head down on the table. Throughout the entire recess period, saif consistently remained alone on the playground swing and only spoke to other children if they initiated an interaction.

samir, a 7-years -old boy diagnosed with autism, was placed in a second-grade inclusion classroom, where he received instruction with 15 typical peers and 3 peers with other disabilities. samir received special services, including speech therapy, occupational therapy, physical therapy, and adapted physical education. He also shared an aide with one other student and received instruction from a special education teacher within the general education classroom. At his parents' request, samir's IQ was 78 , classroom observations of George suggested that his academic performance was significantly below second grade level (i.e., his academic work and performance expectations were modified). samir showed limited baseline levels of social interaction. During recess activities, he often followed peers without speaking to them or actively participating in any of the group games. samir was also observed to display negative verbalizations, including calling other students "losers" or telling them to "shut up," and negative or socially inappropriate behaviors, including taking toys or materials from other students, finger-flapping, and perseverative verbalizations.

None of the participants were involved in any other interventions directly targeting social skills during the study. Indirect social skills instruction may have occurred throughout the school day, because the participants were supported by school staff who provided prompting and feedback in these areas to meet the goals set forth in student Individualized Education Programs. For the purposes of the study, school staff members were neither encouraged to provide nor asked to avoid social skills instruction.

Peers

Typical peers were selected to participate in the peer training intervention based on researcher observations in the classroom and recommendations from classroom teachers and classroom assistants. After a number of potential peers were suggested, the general education classroom teachers were allowed to choose the peers who would be contacted about

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involvement. Peers were selected based on the following criteria (described by McEvoy, Shores, Wehby, Johnson, & Fox, 1990): (a) student willingness to participate; (b) satisfactory attendance record in school; (c) overall compliance with instruction, and (d) student ability to make up any schoolwork missed during training. Before training was initiated, permission was obtained from the parents of the selected peers. Four typical peers from Rafid's second-grade classroom (two boys and two girls) and three typical peers from saif's fourth-grade classroom (one boy and two girls) participated in the peer training intervention. Two sets of peers from samir's second-grade classroom participated in the intervention: The initial set of peers consisted of only two students, both boys, because of difficulties in obtaining permission from the parents of the third selected peer. After it was determined that the training with these two peers was not succeeding in increasing peer interactions, a second set of three peers, all boys, was selected for participation.

Procedure

The study was conducted across the span of approximately 5 months. For each student with ASD, baseline data collection occurred for 3 to 6 weeks (baseline phase), followed by approximately two weeks during which the peer training intervention occurred. After completion of peer training, data were again collected during lunchtime and recess for up to 12 weeks to determine the effects of the intervention (post intervention phase).

Baseline

Baseline data were collected during lunchtime and recess because these two activities provided consistent opportunities for students to participate in social interactions, whereas other classroom activities either did not regularly encourage social interactions or generally discouraged such interactions. During baseline, researchers observed and recorded social interactions (described in detail later) between the students with ASD and their schoolmates throughout the lunch and recess periods. Observations were conducted at random approximately 1 or 2 days per week. Depending on school and student schedules, lunch observations typically lasted for 10 to 15 min, and recess observations generally lasted for 15 to 20 min. When making observations, researchers remained as far from the students with ASD as possible (generally 3-6 m) while still ensuring that they could hear any verbal interactions. If the observers were questioned by any of the students, including peer training participants, regarding their presence at the school,

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they replied that they were there to observe how students talked and played during lunch and recess.

Peer Training Intervention

After baseline data collection was completed, peers were taken in groups to separate locations in the schools, and training was completed by the first or fourth author. Training occurred in three sessions ranging from 30 to 45 min in length. To minimize disruptions to student and teacher schedules, students were removed from class-room activities only at times permitted by the classroom teachers. Some students participated in training during lunchtime and recess, while others were trained during nonacademic activities or free periods in the classroom schedule. Upon completing each training session, the second-grade students were allowed to choose a sticker. The fourth-grade students did not receive any tangible reward but were thanked for their participation. Upon completion of the study, all participating peers received a \$10.00 gift certificate to a neighborhood toy store. Students were unaware that this gift certificate would be provided before they received it. Data collection did not occur during the 2 weeks that the peer training intervention was conducted.

Phase 1. In the first phase of training, students were provided with a rationale for developing friendships with students with disabilities. The format of this training varied depending upon the age of the participating students. For the second-grade students, training consisted of reading and discussing a children's book about a boy with autism who was in an inclusion classroom (Owen- DeSchryver, 2002). This book describes the characteristics of the child with autism as seen from a classmate's perspective. The story notes that the boy often repeats cartoon phrases and spins in circles instead of engaging other children on the playground. It also describes Strategies that the classmate uses to befriend the student with autism. For the fourth-grade peers, training consisted of a modified circle-of-friends activity similar to the friendship awareness activity described by Fritz (1990). During this activity, students were guided to fill in names in four concentric circles on a chart, where each of the rings stood for a different level of relationship: loved ones and family members (e.g., parents, sib-lings) in the innermost ring, then close friends (e.g.. best friends), then acquaintances (e.g., other friends from school), and finally people paid to be with the student (e.g. teachers, coaches) in the outermost ring. This activity was used to illustrate how important it is for students with special needs to experience peer friendships rather than only relationships with paid adults.

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Phase 2. During Phase 2 of training. each group of students was led in a general discussion about the strengths and preferences of the classmate with ASD. Questions such as “What is Rafid good at?” and “What does Saif like to do?” were posed. The purpose of this phase was to help students recognize that all children, both children with and without disabilities, have special abilities and areas of need. To illustrate this point further, peers were asked to discuss their own strengths and weaknesses. Weaknesses were discussed in terms of “things you're still learning to do” (e.g., playing the foot ball, spelling difficult words) and “things [the class- mate with ASD] is still learning to do” (e.g., talking to other students, playing games on the playground, sitting in his seat during math class).

Phase 3. In the final phase of peer training, peers were involved in a guided discussion relating to five central themes, which were expressed as questions:

1. “When can you play with and talk to [student name] at school?” (e.g. recess, group work, computers)
2. “What are some topics you can talk about with [student name]?” (e.g., karate, movies, dinosaurs, school, animals, cartoons)
3. “What are some activities that you can do with [student name] during recess?” (e.g., tag, hide-and- seek, climbing, running races)
4. “How can you help [student name] learn to play?” (e.g., invite him to play the games with you, teach him the rules of the games, let him try more than one time, take turns with him)
5. “What can you do if [student name] doesn’t respond or shows unusual behavior?” (e.g., ask him questions again, move nearer to him, ask whether he wants to do something else, talk about something different, go near him and don't leave him alone, remind him of other things)

The purpose of this phase was to provide concrete information and strategies that would help peers during their interactions with the students with ASD. The researcher asked peers each of the above questions and then ‘guided the students to discuss appropriate responses. whenever necessary, answers were prompted by the Students were also provided with a series of worksheets on which the questions were typed, with space left beneath each question. To provide students with visual reminders of the strategies discussed, peers were guided to write or draw pictures of possible answers to the above questions on these worksheets and combine them to create a “friendship book.” When the training sessions were completed, peers were allowed to keep the books they had made for future review. As during the

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baseline phase. The assistant of researcher observed and recorded social interactions between the students with ASD and their schoolmates throughout the lunch and recess periods. Observations were again conducted at random approximately 1 or 2 days per week.

Response Recording and Reliability

Target Measures

All observations were conducted by graduate students in clinical psychology who had extensive experience working with students with ASD in inclusive school placements. Observations occurred randomly, approximately once or twice per week, during lunchtime and recess. For all target measures, data were collected using a frequency recording system.

For the trained peers, data were collected on (a) the number of social initiations directed toward the students with ASD and (b) the number of responses by the trained peers to initiations made by the students with ASD. Data for trained peer initiations were pooled, reflecting the total number of initiations directed toward the student with ASD by the group of 2 to 4 typical peers who would be participating in the peer training (baseline phase) or who had participated in the peer training (post intervention phase). Data for trained peer responses were similarly pooled for the entire group of 2 to 4 peer training participants. Observers combined data in this manner with one exception. For the untrained peers, data were collected on (a) the number of social initiations directed toward the students with ASD and (b) the number of responses by the untrained peers to initiations made by the students with , ASD. These data were collected for the entire set of) untrained peers, and therefore included data from 20 to 50 . typical peers who did not participate in the peer training ; intervention but who did participate in lunch and recess in the same period as the student with ASD. The number of students varied greatly depending on the school and the number of same-grade classrooms slotted to participate in lunch and recess simultaneously. For each student with ASD, data were collected on (a) the number of social initiations directed toward peers and (b) the number of responses to social initiations made by his peers. Rates were then calculated for each of the target behaviors by dividing the number of occurrences of the target behavior during lunch and recess periods by the duration in minutes of the lunch and recess periods.

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Social Initiations

Social initiations were defined as positive social behaviors that began an interaction with another student (Davis, Langone, & Malone, 1996). Examples of behaviors that were scored as social initiations included handing a toy to another child; asking if the child wished to join an activity; offering assistance during play; greeting, questioning or praising the child, or commenting on the child's activity.

Responses to Social Initiations

Responses to social initiations were defined as positive social behaviors made toward a child that were preceded by a positive social initiation from that child (Davis et al., 1996) or by a response from that child. Examples of responses to social initiations included complying with another student's request, replying to a verbal interaction, or looking at a child in response to hearing him or her call one's name. Where a conversation occurred between a student with ASD and a peer, each consecutive verbalization after the first initiation was scored as a response. For example, if a peer asked the student with ASD whether the student with ASD wanted to play tag, this question was scored as an initiation. If the student responded, "Tag after lunch?" this remark was scored as a response. If the peer then answered, "Yes, over by the swing set." this statement was also recorded as a response. A behavior was recorded as a response only if it occurred within 10 s of a child's initiation or response.

Reliability

Reliability data were collected by an independent observer for 36% of sessions across the baseline and intervention phases (22% of sessions during baseline and 42% during intervention). Mean interobserver agreement was calculated for each of the target behaviors by dividing the frequency of the target behavior recorded by Observer 1 by the frequency of the target behavior recorded by Observer 2 and multiplying the result by 100. Across baseline and intervention phases, mean percentage agreement was 81% for initiations by trained peers, 83% for initiations by untrained peers, and 83% for initiations by the students with ASD. Mean percentage agreement was 87% for responses by trained peers, 83% for responses by untrained peers, and 81% for responses by the students with ASD.

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Design

Following standard research practice in the field, a multiple baseline design across the three participants with ASD was used to evaluate the efficacy of the peer training intervention (Kazdin, 1982; Tawney & Gast, 1984). Consistent with the logic of the multiple baseline design, the intervention was implemented for each participant following demonstration of low, stable baseline rates of peer initiations toward the students with ASD. Thus, the intervention occurred after varying baseline lengths: sessions for Rafid , Saif and Samir.

Results

Peer Initiations Toward Students With ASD

Figure 1 presents data on the rate of peer initiations toward the students with ASD. Peer initiations increased for all three participants following peer training. For Rafid, trained peer initiations increased from an average of 0.06 per minute in baseline to 0.32 initiations per minute following intervention. For Saif, trained peers showed no initiations during baseline and averaged 0.34 per minute in the postintervention phase. Finally, for Samir, trained peers averaged 0.01 initiations per minute in baseline. Group of trained peers averaged 0.10 initiations per minute following intervention, with a decreasing trend, and Group 2 of trained peers averaged 0.32 initiations per minute, with the last four sessions averaging 0.08 initiations per minute.

Figure 1 also presents the data for untrained peers. Even though the intervention did not target untrained peers, these peers also showed increased initiations toward the three participants with ASD during the post intervention phase. Untrained peers directed an average of 0.18 initiations per minute toward Rafid during baseline and 0.57 per minute following intervention. For Saif, untrained peers averaged 0.04 initiations per minute during baseline and 0.32 per minute during the postintervention phase. For Samir, untrained peers.

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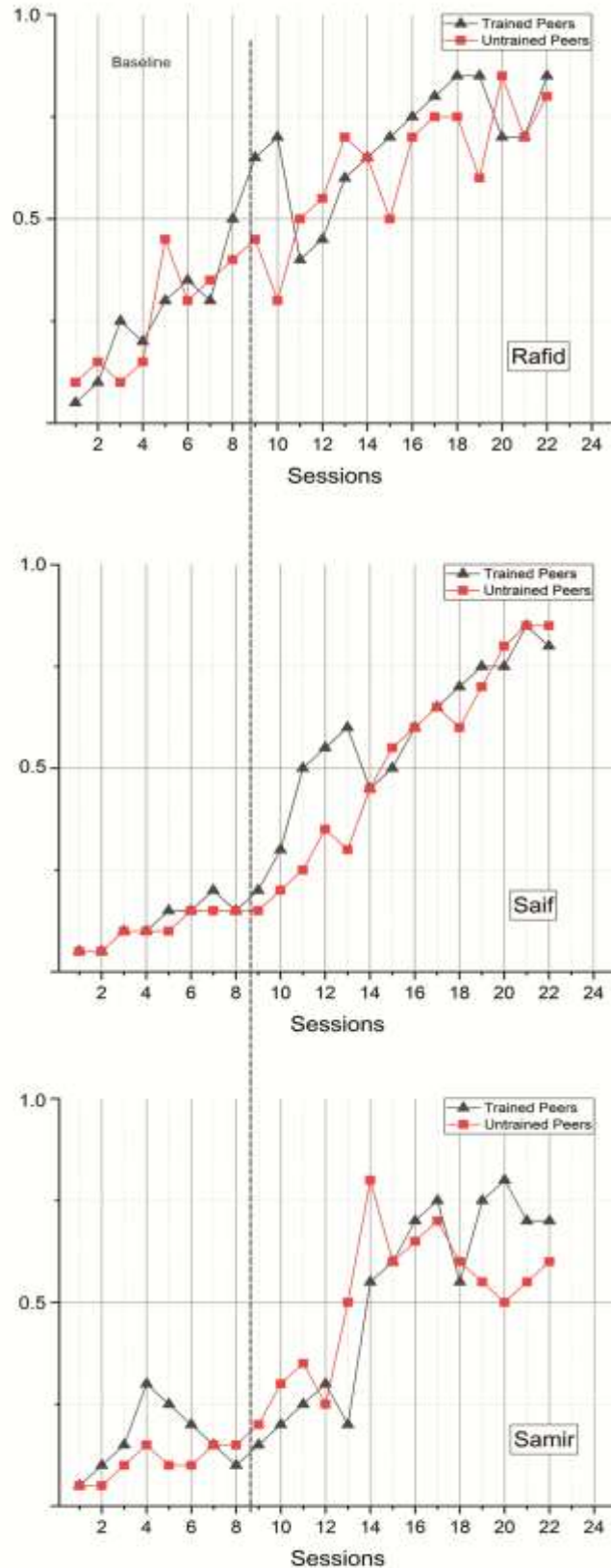


Figure 1

Peer Initiations per Minute Toward the Students With Autism Spectrum Disorders

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averaged 0.13 initiations per minute during baseline, 0.08 initiations per minute during the first phase of the peer training intervention (Group 1), and 0.32 initiations per minute during the second phase of the peer training intervention (Group 2).

Table 1 shows the number of social initiations and average initiations per session (i.e. during lunchtime and recess) directed toward the students with ASD. These data are aggregated for both trained and untrained peers, in Figure 1 social initiations are depicted separately for trained and untrained peers. For all participants, there were substantial increases in peer initiations following intervention. For example, whereas peers made only 32 initiations to Rafid in baseline, they made 256 initiations to him following intervention. As is shown, similar dramatic increases in the number of initiations directed toward both Saif and Samir were noted.

Responses by Students With ASD to Peer Initiations

Figure 2 depicts the rate of responses by students with ASD to peer initiations. Data were not recorded separately for responses to initiations by trained peers versus those to initiations by untrained peers. As shown, responses typically increased for the three participants following intervention. Rafid averaged 0.13 responses per minute in baseline and 0.45 per minute following

Table 2

Number of Combined Peer Initiations (Trained and Untrained Peers) Toward Students With ASD Across Baseline and Intervention Phases

Participant/Condition	Frequency of peer Initiations	Number of Sessions	Average Initiations per Session
Rafid	32	8	4
Baseline	256	7	32
Postintervention			
Saif	30	8	3.75
Baseline	374	11	34
Postintervention			
Samir	33	8	4.1
Baseline	23	5	4.6
Intervention Group 1	270	9	30
Intervention Group 2			

intervention. Saif showed an increase from 0.04 responses per minute in baseline to 0.60 per minute following intervention. Samir averaged 0.13 responses per minute in baseline, 0.07 responses per minute during the first phase of intervention (with Group I of trained peers), and 0.42 responses per minute in the second phase of intervention (with Group 2 of trained peers).

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Initiations by Students With ASD Toward Peers

The rate of initiations made by students with ASD toward their peers is also presented in Figure 2. Because the students with ASD were not aware that any of their peers had received training, it was not expected that the students with ASD would initiate interactions preferentially with either trained or untrained peers. Therefore observers did not record initiation data for trained and untrained peers separately. As shown, the mean rate of initiations increased for two of the three participants following the peer training.

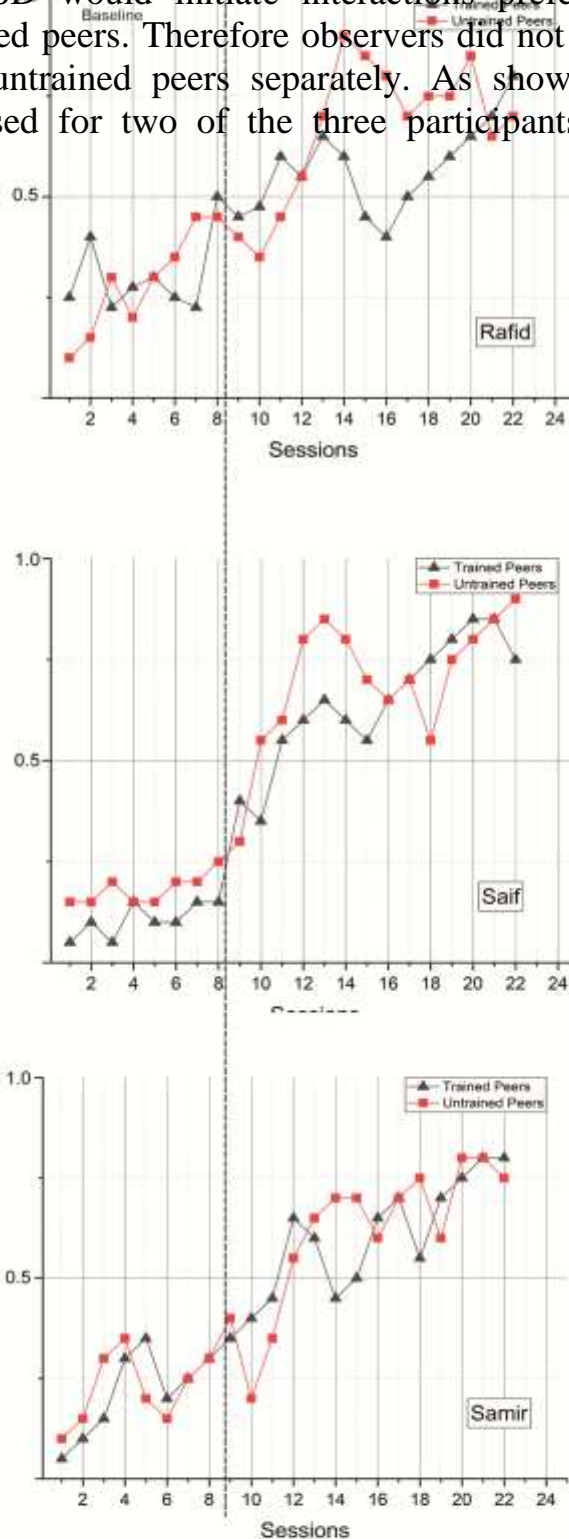


Figure 2

Initiations and Responses per Minute by the Students With Autism Disorders

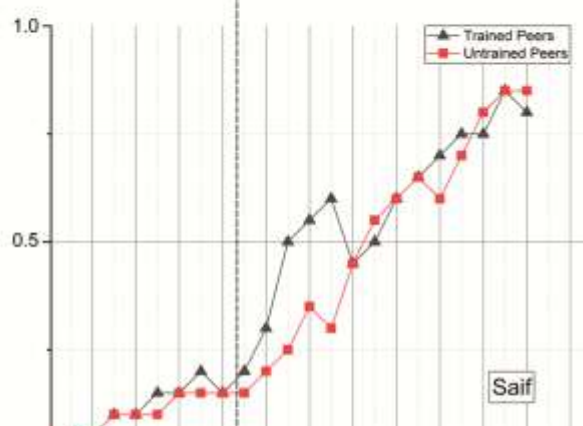
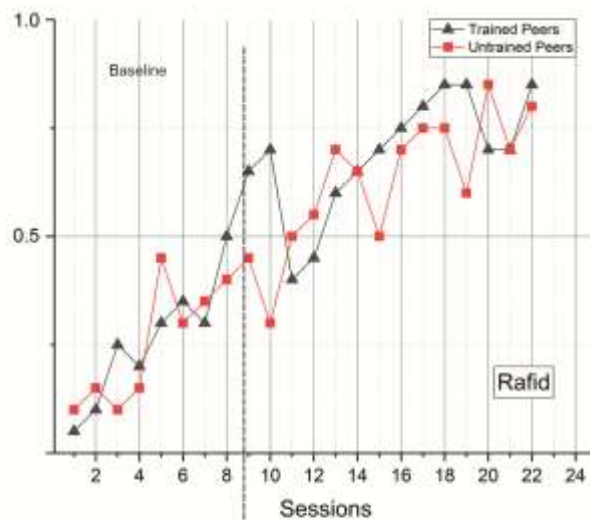
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intervention. John showed similar rates in baseline and postintervention phases, with 0.28 initiations per minute during baseline and 0.33 per minute following intervention. David showed an increase from an average of 0.01 initiations per minute in baseline to an average of 0.43 per minute following intervention. For George, data reflected a low level of initiations, 0.07 per minute, during baseline. In the first phase of intervention (Group 1), initiations remained relatively stable at 0.05 per minute, but in the second phase (Group2), there was an increase in initiations to an average of 0.29 per minute.

Peer Responses to Initiations Made by Students With ASD

Figure 3 shows data for peer responses to initiations made by the students with ASD. Peer responses include data for both trained and untrained peers combined. Rafid's peers averaged 0.08 responses per minute in base-line and 0.23 per minute following intervention. Saif's peers averaged 0.01 responses per minute in baseline and 0.53 per minute following intervention. Samir's peers averaged 0.04 responses per minute in baseline, 0.04 per minute in the first phase of intervention, and 0.20 responses per minute during the second phase.



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Discussion

Consistent with previous research on peer training, the current study demonstrates that peer training can be a viable strategy for increasing interactions between typical peers and students with ASD (Kamps et al., 2002; Kohler et al., 1995; Lee & Odom, 1996; Strain, 1983). Importantly, this investigation focused on social behaviors that took place in natural social contexts in public schools—specifically, lunchtime and recess—thereby addressing ecological validity issues relevant to typical school settings. While the generalizability of the current findings is subject to the limitations of a study design involving only three participants, the results provide further evidence for the effectiveness of peer-mediated interventions in building social interactions between students with ASD and their classmates.

students with ASD may be more likely to rebuff their peers, leading the peers to reduce their initiations temporarily. As is also depicted in Figure 1, Group I of trained peers for Samir did not show increased initiations following training. Researchers have not yet determined why some peer training interventions are successful while others are not, but the present study points to some potential variables meriting further investigation. Only two out of three peers originally targeted participated in the initial training group for Samir. The fact that Samir's Group was smaller than the other training groups may have interfered with the success of peer training for one or both of two possible reasons. First, previous research has suggested that generalization of social behaviors between typical peers and students with ASD may improve when multiple peers are trained (Pierce & Schreibman, 1997). While there are many potential reasons for this, one possibility is that when multiple peers are trained, the peers may provide supportive prompts to one another during interactions with students with special needs (Kohler et al., 1995). Second, in the present investigation the training involved a discussion-oriented, guided exchange of ideas between peers and facilitators, a format that may have been less effective when fewer peers were involved.

The current investigation also illustrates the potential mediating role of peer gender in the success of peer training interventions, Whereas the peer groups for the other participants consisted of mixed gender groupings, the initial group of peers selected for training with Samir involved only boys, based on both teacher recommendation and classroom observations where Samir appeared to demonstrate a strong interest in playing with his classmates who were boys. The data from the study indicate a substantial increase in peer initiations immediately following the training of the three

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girls who made up Group 2 of peer training. This is consistent with previous research summarized by Center and Curry (1993) suggesting that at elementary ages, girls are “more responsive” to students with special needs (p. 233), and is also supported by anecdotal observations of students in inclusive settings that indicate that girls, particularly at young ages, tend to be more nurturing and mature than boys and thus may respond better to this type of training. Additional research on other peer characteristics, such as popularity, might also be useful guides for professionals selecting peers to participate in training. Garrison-Harrell and Kamps (1997) selected peers for a peer networking intervention based on the social status of the peers (i.e., their popularity), but to date there is very little substantive research on the peer characteristics associated with successful implementation of such interventions.

Perhaps the most unexpected and central finding of the present study is that initiations toward the students with ASD increased for untrained—as well as for trained peers following intervention. These untrained peers included other students involved in lunchtime and recess activities who were all in the same grade as the students with ASD but not necessarily from the same classroom. Changes in peer initiations were clearly linked with the intervention phase for all three participants, except for Group 1 of Samir’s peers. For Samir, it was not until trained peer initiations increased after Group 2 was trained that there was a concomitant increase in initiations by untrained peers. This finding may suggest that the underlying mechanism associated with the increase in untrained peer initiations was the changing behavior of the trained peers rather than other variables such as the presence of the researchers.

While the specific variables accounting for the significant increase in initiations by untrained peers were not directly explored in the present investigation, there are several possible explanations. The effect might be explained in terms of modeling (Bandura, 1969; Elliott & Vasta, 1970; Hartup & Coates, 1967), whereby untrained peers observed and modeled the behavior of trained peers who engaged in interactions with students with ASD.

Another interesting implication of the present study is that it may not always be necessary to devote significant instructional resources to social skills instruction for students with ASD if peers are adequately trained. As shown in Figure 2, although the students with ASD were not directly targeted by the intervention and did not participate in training to facilitate interactions, they often demonstrated more initiations to their peers in the postintervention

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phase. This finding is similar to that described by McGee et al. (1992), who found that one of three participants showed increased initiations after intervention was implemented even though the intervention targeted only peers.

In the present study, both the peers and the students with ASD showed an increase in the rate of responses during intervention (see Figures 2 and 3). It is possible that the peer training was partly responsible for the improvement in responses by peers, as peers were provided with information that may have helped them to respond more effectively during their interactions with classmates with ASD. It is also possible that the increased frequency of initiations by the students with ASD created a larger number of opportunities for peers to respond, leading directly to a larger number of responses. This is the case for both the students with ASD and the peers, as the frequency of opportunities to respond increased for both groups following intervention. These results further illustrate the fluid, and necessarily reciprocal, nature of social interactions, indicating that interventions targeting one component (social initiations by peers) may have simultaneous effects on another component (initiations by students with ASD) and, potentially, reciprocal effects on yet another component (responses by peers). One benefit of this reciprocity is that each initiation by a peer allows the student with ASD an opportunity to practice a response. DiSalvo and Oswald (2002) indicated that a major goal of peer training is to teach peers to initiate social interactions with students with ASD more frequently so that the students with ASD can be involved in more interactions, each of which provides an opportunity for reinforcement for appropriate social responding. One can therefore speculate that as students with ASD become the recipients of more frequent initiations from peers, they are likely to become better, more efficient, and more appropriate responders because they will have the opportunity to Practice and perform social skills repeatedly, rather than Just performing them on a few sporadic occasions. There are, however, several important issues not addressed in the present investigation. It is unclear whether the intervention was successful in making long-term changes in the social environment, as no follow-up data were collected. Additionally, the study did not address whether the intervention was associated with changes in qualitative aspects of the social interactions between students with ASD and their peers. It is possible that the peer training intervention increased the frequency of interactions and allowed students greater Opportunities to respond to their peers but did not affect social relationships in a meaningful way. Future

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studies might better address qualitative changes in social interactions by using a data collection system that allows measurement of changes in the duration of interactions or in subtle aspects of student behavior, such as the level of engagement or affect of students with ASD. Indeed, Lord (1995) suggested that affect may be a more salient domain for study than social initiations in determining the effectiveness of peer-mediated interventions for students with ASD. Future studies on peer-mediated interventions would also benefit from incorporating social validity data. Such data could be collected from parent, teacher, lunch or recess aide, peer, or participant reports of changes in social relationships and opportunities that might be direct or indirect results of the intervention. For instance, data might be collected on the participation of the student with ASD in extracurricular activities, parties, and other social events with classmates. While formal social validity data were not collected in the present study, anecdotal reports suggested that the intervention was not disruptive to classroom activities and was valued by most parents, teachers, and peers who were involved.

In sum, the present investigation replicated and extended previous research demonstrating that peer-mediated interventions can successfully increase interactions between students with ASD and their peers. More important, it showed that increasing initiations between students with ASD and their peers by training a small number of peers may also have positive effects on interactions with untrained peers as well. This finding may have important practical implications in the present educational climate. The pressures of the current system are such that there is little classroom time available to devote to social skills instruction, particularly in grade levels focusing heavily on academic outcomes. If the social opportunities between students with ASD and a broad base of peers can be increased through strategies that target only a few peers, professionals will be providing students with ASD with a great service while ensuring that critical instructional time is not being diverted from the academic curriculum for the majority of students. Future research on peer-mediated interventions should address complex, critical variables such as peer and student characteristics associated with successful peer training, as well as qualitative changes in social interactions between students with ASD and their peers. To ensure that the outcomes of peer-mediated interventions legitimately induce long-term, socially valid changes in social relationships and opportunities.

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فاعلية العلاج بالرمل الذي يتوسطه الاقران لتعزيز التفاعل الاجتماعي لدى اطفال التوحد

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المستخلص :

هدفت هذه الدراسة الى تقييم فيما اذا كان اللعب مع الاقران المماثلين في النمو تزداد لديهم عدد مرات التفاعل الاجتماعي لدى الاطفال المصابين بالتوحد . حيث تم استعمال نسخة تدخلات اللعب بالرمل ، التي تم الفحص بها مسبقا من قبل (لو ، وبيترسن ولاكروكس ، وروشيو عام (2010) . وعدلت لتتضمن اللعب بوساطة النظراء . استكشف ان التدخل في لعبة الرمل مع الاقران المناظرين في النمو يؤثر على الارتباط في التفاعل الاجتماعي من قبل الاطفال المصابين بالتوحد . حالات متعددة من التدخل صممت واستعملت مع ثلاثة اطفال مصابين بالتوحد بدرجات متفاوتة من الشدة في اداء الوظائف . بينما ازداد عدد مرات التدخلات الاجتماعية بين الاطفال عن خط الاساس مع مقدمة تدخل لعبة الرمل للنظراء . في حين جاءت نتائج التدخل غير حاسمة . ان هذه النتائج تستلزم اختيار اخر في طريقة التدخل لأطفال اضطراب التوحد ، وما تقدمه التطبيقات النظرية والعلاج ، فضلا عن اتجاهات البحث في المستقبل .