

**Critical Review:**  
**Is peer-mediated social skill intervention in school settings effective in increasing social communication in children with Autism Spectrum Disorder?**

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This critical review examines the current research regarding the impact of peer-mediated interventions in school settings on the social communication abilities of children with Autism Spectrum Disorder (ASD). A literature search yielded seven articles meeting the inclusion criteria. This critical review includes the evaluation of the following study designs: six single-subject designs and one randomized control trial. Overall, findings are highly suggestive that peer-mediated social skill interventions, implemented in school settings, improve the social communication abilities of children with ASD. Limitations of the evidence, recommendations for clinical practice and future research are discussed.

***Introduction***

Social communication skill impairments are a core feature of Autism Spectrum Disorder (ASD), which makes interacting with peers especially challenging. Individuals with ASD have particular difficulty “initiating interactions, responding to initiations made by others, demonstrating conversational reciprocity and maintaining social engagement” (Watkins, Kuhn, Ledbetter-Cho, Gevarter & O’Reilly, 2015).

Though one of the primary goals of education is to teach students the core curriculum, it is necessary that students learn appropriate social skills to be able to achieve “a productive place in a community” (Harper, Symon & Frea, 2008). Poor social interaction with peers influences a child’s success in school, their social and emotional development, as well as their overall quality of life. As such, social communication is a top priority during treatment. Though various social communication skill interventions for school-aged children with ASD exist, peer-mediated intervention (PMI) offers unique advantages (Watkins et al., 2015). PMI involves training typically developing peers, often classmates, on behavioural and social strategies to help engage children with ASD (Chang & Locke, 2016). Peers act as intervention agents, resulting in greater intervention access and generalization of skills for target students. Generalization is increased when facilitated in the school setting, where children spend most of their time.

It is therefore the goal of this critical review paper to determine whether peer-mediated interventions facilitated in school settings significantly impact the social communication skills of children with ASD. This inquiry is especially appealing because of the potential for increased transfer and carryover of social skills into children’s daily lives.

***Objectives***

The primary objective of this paper was to critically review the existing literature to determine the clinical use of peer-mediated social skill interventions in the school setting to improve the social communication abilities of children with ASD. The secondary objective was to provide recommendations for future clinical practice, especially in school settings.

***Methods***

**Search Strategy**

Various computerized databases, including Western Libraries, Google Scholar, and PsychInfo were searched using the following terms: [(peer-mediated) OR (peer-lead) AND (intervention) OR (instruction) AND (social communication) OR (social cognition) OR (social skills) AND (school-age) OR (preschool) OR (children) AND (autism) OR (autism spectrum disorder)]. Other articles matching the selection criteria were obtained from the reference lists of previously searched studies.

**Selection Criteria**

Papers included for review were required to describe the effects of peer-mediated interventions in the school setting on the social communication of children with ASD. Peers involved in these studies were required to be typically developing (TD). There were no specific exclusion criteria for the severity of the participants’ Autism diagnoses. Studies were excluded if the intervention did not take place in a school setting.

**Data Collection**

The literature search and selection criteria yielded seven appropriate studies. Papers analyzed in this review include: six single-subject designs and one randomized controlled trial.

## **Results**

### Multiple Baseline Design

The multiple baseline across subjects' design is a type of single subject design. The purpose of this design is to measure changes in behaviour due to intervention by comparing the effects to a baseline measure. This design is appropriate for this research question given the heterogeneity of the ASD population. It allows for each participant to act as his or her own control, which helps to account for the great variability that exists between individuals with the same diagnosis of ASD.

**Garrison-Harrell, Kamps & Kravitz (1997)** used a multiple baseline design across settings to investigate the effects of a peer network strategy on the duration of social interaction and social communicative skills for three students with severe ASD (ages 6-7). Five TD, same-age students were selected to form a peer network for each target student. The authors specified explicit participant eligibility criteria for both target students and TD peers. Additional information regarding the skills of the participants (i.e. scores from related objective, standardized testing) was also included. Target sites varied and were individualized based on the target students' preferences, using a combination of structured and unstructured activities. Peers were trained to use social strategies and communication modeling using paper based Augmentative and Assistive Communication (AAC) over three scheduled play and academic activities. The authors incorporated and measured the use of AAC systems though social interaction duration was the core measure of the study. Appropriate statistical analyses were conducted, adequate social validity measures were included, and acceptable reliability and validity were reported. This study also included various data collection systems to better monitor changes due to intervention.

The results of the study revealed the following: increases in frequency and duration of social interactions for all participants, increases in expressive language for all students, and some generalization between network activities. The authors acknowledged that the study was limited by its small size and the inability to draw conclusions regarding the influence of one specific procedure. Overall, this study provides highly suggestive clinical evidence that interventions implemented by peer networks in school settings are a functional, effective intervention for students with ASD.

**Harper, Symon & Frea (2008)** conducted a multiple baseline design across subjects to examine the effects of a peer-mediated, Pivotal Response Training (PRT) recess program to improve social interactions for two elementary school children with ASD (8-9 years old).

The study design included baseline, peer training, intervention and generalization sessions, which all took place in the school setting (i.e. classroom and recess areas). The authors included specific participant eligibility criteria, and clearly outlined the study's methods. Data collection was completed via event recording of 10-minute probes during morning recess. Two trained observers qualitatively coded and scored target students' observed behaviours. Inter-observer agreement and reliability was found to be high (>90%). Given the variability of participants as well as the students' differing abilities and needs, individualized measure tools were created. However, all goals centered on participant's initiations and turn taking within conversations with TD peers. Adequate social validity measures were also included. Appropriate statistical analyses were conducted, and revealed improved social peer interactions during recess for both target children. Increased levels of initiating and responding during generalization probes were also maintained.

The study is limited by its small sample size, potential confounding of other external variables, lack of long-term generalization data due to termination of the school year and lack of qualitative evaluative on effects of these procedures on peer perceptions of participants. Overall, this study provides highly suggestive evidence that a peer-mediated social skill intervention during recess time is a feasible intervention plan, resulting in increased social opportunities, improvements in quality of peer interactions and has the ability to foster independence for students with ASD.

**Katz & Girolametto (2013)** conducted a multiple baseline design across subjects to determine the effects of a peer intervention on social interactions of three preschool children (ages 4-5) with ASD. Three early childhood educators (ECE) in separate preschools implemented the program. Students with ASD from integrated preschool classrooms were selected based on explicit participant eligibility criteria, including additional information regarding the skills of the participants (i.e. scores from objective measures and standardized tests). Two TD, peer-nominated, same-age peers from the target student's classroom formed a peer network for each child with ASD. The study took place over four months at three childcare centres. The methods were clearly outlined. The study consisted of a series of the following: a series of baseline sessions, two ECE training sessions, five social skill student training sessions for all participating students (implemented by the ECE), twelve 20minute play sessions (i.e. intervention) and four to give follow-up sessions. Intervention and follow-up sessions were videotaped, and analyzed by observers using an interval coding system to measure the children's engagement in the

interaction. Adequate social validity and training fidelity measures were included. Acceptable reliability and validity were also reported.

Appropriate statistical analyses were conducted, including several visual analyses. The results of the study revealed increases in social engagement of the children with ASD. All three children were shown to improve the number and lengths of their extended interactions during play sessions with their TD peers. These gains were maintained 4-5 weeks post-intervention. As acknowledged by the authors, limitations of the study include: only training one caregiver and having interactions conducted only in structured activities. Overall, this study provides highly suggestive evidence that a peer-mediated social skill intervention in integrated preschool settings is effective at increasing social interaction skills.

**Mason, Kamps, Turcotte, Cox & Feldmiller (2014)** conducted a multiple baseline across participants to determine the efficacy of a peer-mediated social skills program in increasing levels of communicative acts for three participants with ASD (ages 6 to 8) at recess. Participant eligibility criteria was specified, and objective measures, including standardized tests were included to provide additional information regarding the students' abilities and overall functioning. School personnel, including an SLP and a paraprofessional were trained in the PNI, and conducted training for the participants. Four to six TD peers comprised the peer network for each target student. The peers had previous peer network training in a structured setting. Baseline data was collected at recess prior to intervention sessions. Each intervention session comprised of an instructional period followed by recess, where implementers prompted students to use strategies and praised strategy use following the session. Software was used to help researchers record the frequency count of communicative behaviours during the 10-minute observation period. Training fidelity, reliability and validity measures and social validity were reported and found to be high.

Appropriate statistical analyses revealed improvements in total communication acts for all three target students. The authors acknowledge that the study was limited by the small sample size and by having an inconsistent individuals implementing the therapy. The study could have been enhanced through the use of a component analysis to observe which behaviours or specific communication acts increased as a result of the intervention. Overall, this study provides suggestive clinical evidence that peer-mediated intervention during recess is a successful approach to help increase social communication in children with ASD.

**McFadden, Kamps & Heitzman-Powell (2014)** conducted a multiple-baseline design across participants to investigate the effects of implementing a 7-month long Peer Network Recess Intervention (PNRI) on the reciprocal social communication behaviour of four children with ASD and their TD peers (ages 6-8). Participant eligibility criteria were specified and methods were described clearly and in sufficient detail. School personnel facilitated PNRI training program with the TD peers, comprised of: class-wide social skill lessons, priming prior to recess intervention, peer prompting and praise, adult feedback during recess and a token economy system. Interactions between target students and peers were qualitatively coded by: comment, request, play, organization, turn-taking, niceties, helping or non-verbal behaviour. A data collection software was used to record frequency counts and sequences of behaviour throughout the interactions. Adequate social validity measures were included, and acceptable reliability and validity were included.

Appropriate statistical analyses were conducted, and visual analyses across subjects were provided. PNRI was revealed to be effective in increasing specific communication behaviours in all four of the target children. Social communication behaviours remained above baseline levels in the absence of intervention. As acknowledged by the authors, the small sample size, time constraints in classroom schedules and reduced peer engagement in the intervention over time limited the study. Overall, the study provides highly suggestive evidence that a peer-network recess intervention is effective at increasing specific communication behaviours, including commenting and requesting.

**Pierce & Shreibman (1997)** conducted a multiple baseline research design across subjects and peer trainers to examine the effects of a peer-mediated Pivotal Response Training (PRT) program to enhance the social competency of two 7-8 year old children with ASD. Three TD peers comprised the peer network for each target student. Limited information was provided regarding specific participant eligibility criteria (i.e. details of formal ASD testing) and trainer/rater information, though some information regarding the participants' ASD diagnosis and overall functioning was described. Methods for intervention included five baseline sessions, videotaped peer-mediated in-school PRT play sessions (one/two sessions per day), and post-treatment assessments. Methods of peer training were described in depth and great detail, but more information regarding specific intervention sessions (i.e. duration) would have been beneficial. Raters qualitatively coded the groups during play sessions. Acceptable reliability and validity were reported.

Appropriate statistical analyses were conducted, and visual analyses of results revealed a statistically significant increase in the frequency and quality of the children's language use and generalization of skills with peers not part of the study. No change was found in terms of the amount of toys the target children played with, but there was a significant increase in the range of toys. Overall, the study provides suggestive evidence that PMI increases language use in children with Autism, which in turn allows them to be more proficient in their social interactions and play abilities.

#### Randomized Controlled Trials (RCT)

Randomized controlled trials are often referred to as the "gold standard" of intervention design and high quality studies. This type of design more strongly validates research outcomes because it limits the effects of extraneous variables on intervention effects, given the random assignment to intervention and control groups.

**Kamps, Thiemann-Bourque, Heitzman-Powell, Schwartz, Rosenberg, Mason & Cox. (2015)** conducted an RCT to investigate the effects of a PNI combining peer training and direct instruction on the social communication of 95 students with moderate to high functioning ASD (ages 5-6) in Kindergarten and grade 1. A block randomization procedure (by class) was used for the study. Members within a class were assigned to the same experimental group, and randomization of participants also included stratification for two levels of severity of ASD (moderate and high functioning). The authors explicitly specified inclusion criteria for all participants. School staff members, trained by researchers, implemented intervention for both the intervention (n=56) and comparison group (n=39). In addition to the direct intervention from school staff, four TD peers from each classroom were recruited to form a peer network for each student in the intervention group. Communication acts during peer interactions were recorded and coded by trained researchers based on direct observation and the use of a data collection software. Speech-language pathologists (SLP) also administered objective, standardized language assessments pre- and post-intervention.

Appropriate statistical analyses were conducted to assess changes in participants' total communicative acts to peers during non-treatment social probes, treatment sessions and generalization probes. Adequate social validity and training fidelity measures were included, as were acceptable reliability and validity. Analyses revealed significant increases in initiations during non-treatment and generalization sessions for the PNI group. Interestingly, no significant differences in total communication were found in the Kindergarten cohorts, however there was significantly more growth in

communication for the intervention groups in 1<sup>st</sup> grade cohorts. Overall, the study provided compelling evidence that peer-mediated social skill interventions for young children with Autism improve targeted skills and promote generalization.

#### *Discussion*

This critical review analyzed seven studies to determine the efficacy of peer-mediated social skill interventions in the school setting to improve the social communication abilities of children with ASD. All seven studies found increases in social communication behaviour in the target children with ASD. Overall, the studies provided highly suggestive evidence to support the use of this intervention.

A main goal of this critical review was to investigate the maintenance and generalization of social communication skills following PMI. The social demands children experience at school are near impossible to implement in a clinical setting. To promote generalization of skills, interventions in all of the examined studies were implemented in a naturalistic setting, i.e. school, with TD peers. Six of the seven studies revealed short-term maintenance of targeted skills following intervention. Though peers served as intervention agents, direct training from implementers was necessary and often took ample time. In five of the seven studies, implementers were outside researchers or staff, whereas two of the seven studies utilized teachers and school personnel who could continue to reinforce these strategies post-intervention. As integrated classrooms become more prevalent in school settings, it would be beneficial for more school personnel to be involved in the training process to continue to promote more long-term generalization of skills, and generalization beyond intervention-specific settings.

Other factors influencing overall generalization of skills for the target students, include the amount of support received throughout intervention and the type of intervention activity (i.e. structured or unstructured). Some studies included increased levels of support during intervention sessions, such as implementers frequently prompting TD peers to use the strategies, rewards for strategy use and debriefing efficacy of the intervention post-session with participants. Similarly, some studies investigated interventions during unstructured times (i.e. recess), where the children were able to select any activity of their liking. Other studies required participants to engage in specific activities, such as pre-selected games or classroom tasks. Regardless of the levels of support and the type of activity, intervention was found to be effective in improving targeted social communication skills in the

children with ASD. It would be beneficial for future research to compare more directly the effects of these specific factors on the efficacy of the intervention.

As previously mentioned, the ASD population is known to be heterogeneous. Each study examined in this review included explicit participant eligibility criteria, and of the seven studies, six provided in-depth descriptions of the target children's skills and overall functioning. In all of the six multiple baseline design studies, the sample size was limited, ranging from two to four target students. Though all studies yielded positive results, the authors cautioned that each child with ASD was unique and differed based on their level of functioning, supports received and varying abilities. Given this variability, three of the seven studies developed specific and individualized target goals and support for the target children based on their needs. While this individualization may not provide great support for generalization across all students with ASD, this specificity and naturalistic approach allowed for children to build on skills that were personally relevant to them (Garrison-Harrell et al., 1997). Additionally, future research should consider investigating whether this type of intervention may be more suitable for individuals with certain prerequisite skills, interests or abilities (Harper et al., 2008).

Finally, the goal of this paper was to examine the effects of PMI on social communication. The studies examined vary in their definition of social communication, which encompasses several behaviours that serve any function of communication. Most of the studies investigated the frequency and duration of social interactions, or total communicative acts. Some of the studies looked more explicitly at particular components of social communication behaviour including: initiating and responding in interactions, and the range of toys during play. Increases in total communicative acts often encompassed these various types of social communication behaviours, providing a general sense of the child's improvements, which was evident in all seven studies. Three of the seven studies also looked at subjective measures of social communication via teacher comments, parent reports and peer nominations. None of the studies examined other indicators of social engagement, such as proximity to peers or variability by activity and preferences. Given the complexity of the types of intervention packages administered in the studies, and the broad definition of social communication behaviour, it was sometimes difficult for the researchers to identify which component was influencing the outcomes. It would be beneficial for future research to complete a component analysis to further develop PMI programs, and understand the

effects of certain strategies on specific social communication behaviours.

### ***Clinical Implications***

Overall, there is highly suggestive evidence supporting the clinical use of school-based peer-mediated intervention in improving social communication of children with ASD. The evidence provided by the seven articles critically reviewed equips clinicians with meaningful information to help guide future research and enhance clinical practice, especially in a naturalistic setting such as school. Beyond the positive effects on the social communication behaviour of children with ASD, this feasible intervention has the potential to decrease the burden of teachers and clinicians. While this type of intervention has been shown to foster independence and improve the quality of peer interactions overall, it is important to consider the individual child with ASD and their needs. With the emergence of more integrated classrooms in the school setting, it is essential to continue to study this type of intervention and its effectiveness on developing social skills and communication for not only the children with ASD, but the impact on their TD peers as well.

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