

Play-Based Peer-Mediated Interventions for Children with Autism: A Systematic Literature Review

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Received: 3 January 2026 | Accepted: 1 April 2026 | Published: 15 April 2026

DOI: <https://doi.org/10.55057/ijares.2026.8.3.33>

Abstract: *Given the persistent social communication challenges faced by children with autism spectrum disorder (ASD) and the need to integrate play into peer-mediated intervention (PMI) frameworks within general education settings, this systematic review synthesizes evidence on the effects of play-based peer-mediated interventions (PB-PMI) on social, play, behavioural, and mental health outcomes in children with ASD. Following PRISMA guidelines, a systematic search of Scopus, Web of Science, and ERIC databases (2016–2025) identified 19 studies. Findings revealed that 89.47% of studies reported improved social communication, 42.11% documented gains in play skills, and 31.58% reported benefits in behavioural regulation and mental health. Intervention effects were moderated by age, language ability, cognitive level, and co-occurring conditions. However, only 58% of studies reported intervention fidelity, 37% assessed social validity, and 63% evaluated generalisation or maintenance with limited depth.*

Keywords: Play-based peer-mediated intervention, Children with autism spectrum disorder, Systematic literature review

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by difficulties in social communication and restricted and repetitive behaviours (American Psychiatric Association, 2013; CDC, 2025; Shaw, 2025). Its prevalence has seen a continued rise in recent years; in the United States alone, it was estimated to affect 2.93% of 4-year-olds and 3.2% of 8-year-olds in 2022 (CDC, 2025; Shaw, 2025).

In the natural educational environment, effective intervention measures need to be implemented to address the social impairments of children with ASD. Children with ASD commonly exhibit significant social communication difficulties, including challenges in understanding social cues such as speech, facial expressions, and gestures, difficulty initiating interactions, responding to others' social bids, and participating in and maintaining social interactions, as well as challenges engaging in play (Mehta, 1987; Bellini et al., 2007; O'Keeffe & McNally, 2023; Abualait et al., 2024). Although inclusive education practices have increased the placement of children with autism in general education settings, the very characteristics of their social difficulties can paradoxically lead to heightened social isolation, peer rejection, and even bullying, rather than the intended social participation. Although inclusive education practices have increased the placement of children with autism in general education settings, the very characteristics of their social difficulties can paradoxically lead to heightened social

isolation, peer rejection, and even bullying, rather than the intended social participation (Bauminger-Zviely et al., 2020; Chamberlain et al., 2007; Drye et al., 2025; Fasano et al., 2021; Hansen et al., 2017; Humphrey & Hebron, 2015; Kasari et al., 2011; Rotheram-Fuller et al., 2010).

Peer-mediated intervention (PMI) is an approach that promotes social interaction, communication, and various skills in children with autism spectrum disorder through peer behavioural interventions and social guidance (Chan et al., 2009; Chang & Locke, 2016; Steinbrenner et al., 2020). This intervention approach is particularly well-suited for inclusive environments and has the potential to facilitate the maintenance and generalisation of acquired social skills, achieving outcomes that are often difficult to attain through adult-mediated interventions alone (Carr & Darcy, 1990; Hu et al., 2018; Trembath et al., 2009; Vincent et al., 2023).

Currently, many research has confirmed the effectiveness of various forms of PMI. For instance, peer networks can foster reciprocal relationships for children with limited communication (Edelman et al., 2025). Peer-implemented Pivotal Response Training (PRT) can enhance communication skills and social initiation rates (Ashley & Fox, 2025; Boudreau et al., 2021). And, the integration of joint attention strategies can help maintain attentional focus and facilitate social play (Krier & Lambros, 2021; Hansen et al., 2023). With technological advancements, speech-generating devices and video modelling have also been integrated to improve interaction quality, although effects may fluctuate (Bastos et al., 2018; Thiemann-Bourque et al., 2018; Young et al., 2023).

Concurrently, the developmental significance of play for children is well-established. Play is defined as an interaction between an individual and their environment (including both physical and social environments), encompassing four essential elements: internal control, intrinsic motivation, freedom from the constraints of reality, and framing (Bundy, 2004). For children with ASD, who may show low engagement in adult-directed activities, play offers a uniquely intuitive, appealing, and naturalistic context for intervention (R. L. Koegel et al., 1987).

Play-Based Peer-Mediated Interventions (PB-PMI) represent a synergistic integration of these two effective approaches. Initially explored in children with ADHD (Cordier et al., 2009), PB-PMI harnesses the social validity and naturalistic context of peer mediation within the developmentally appropriate and motivating framework of play. Recent pilot studies have confirmed the feasibility and applicability of adapting such interventions for children with ASD (Henning et al., 2016). The theoretical underpinning posits that intervention techniques can offset the diminished playfulness resulting from core symptoms of neurodevelopmental disorders, thereby re-establishing a positive feedback loop of interaction (Cordier et al., 2009). Given the diverse classifications of play, this review adopts an inclusive approach, encompassing any study that involves a recognized play type (e.g., functional, symbolic, constructive, games with rules, or social play) within a peer-mediated framework.

Previous systematic reviews have established the effectiveness of PMI (Chang & Locke, 2016; Gunning et al., 2019) and play-based interventions (O’Keeffe & McNally, 2023) in isolation. These reviews have consistently highlighted critical research gaps, including insufficient measurement of intervention fidelity, generalisation, and maintenance, as well as a lack of comprehensive assessment of social validity, particularly concerning potential stigmatization (Chang & Locke, 2016; Gunning et al., 2019). Through their analyses, these

reviews identified issues in existing research, including insufficient measurement of generalisation and maintenance effects, the substantial resources required for peer training, and the tendency to overlook the intrinsic motivations and emotional experiences of both children with ASD and their peer participants during interventions (Boudreau et al., 2021; Chang & Locke, 2016; Gunning et al., 2019; L. K. Koegel et al., 2012).

However, to the best of our knowledge, there is currently a lack of systematic synthesis of research evidence specifically on play-based peer-mediated interventions as an integrated model. Given the unique advantages of PB-PMI, this review aims to synthesize all available evidence for children with ASD. This review has three main objectives:

- 1) To evaluate the intervention effects of play-based peer-mediated interventions for children with ASD.
- 2) To examine the measurement of intervention fidelity, social validity, and the generalisation and maintenance of intervention effects addressed in existing studies.
- 3) To identify directions for future research and practice to optimize the implementation of PB-PMI for children with ASD.

2. Methodology

This study employs a systematic review methodology, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines throughout the research process. A systematic literature review adheres to a clear and transparent procedure, involving a comprehensive search of the literature, rigorous evaluation of the quantity and quality of evidence, and synthesis of findings to draw evidence-based conclusions (Sataloff et al., 2021). By identifying, selecting, analysing, and synthesizing relevant articles from the Scopus, WoS, and ERIC databases, this study aims to explore the effects of Play-based Peer-Mediated Intervention (PB-PMI) on the social interactions, play, and skills of children with autism spectrum disorder (ASD), thereby achieving the research objectives.

2.1 Identification

In the first phase of the review, relevant articles were identified through a structured search process. Keywords and similar terms were generated based on dictionaries, thesauri, encyclopedias, and previous studies. Based on these terms, search strings applicable to the Scopus, WoS, and ERIC databases were developed (Refer to Table 1). Scopus was selected for its provision of comprehensive articles across various disciplines and its extensive coverage. WoS was chosen for its utility in understanding academic development trends, while ERIC was included for its more comprehensive coverage of articles in the field of education. Other databases, such as PubMed and Google Scholar, were considered but excluded due to coverage overlap and inconsistent quality. Using this approach, 1,071 studies were identified in the initial phase of the systematic literature review.

Table 1: Search strings

Database	Search strings
Scopus	TITLE-ABS-KEY ("peer-mediated" OR "peer mediated" OR "peer-assisted" OR "peer assisted" OR "peer-supported" OR "peer supported" OR "peer-based intervention*" OR "peer tutoring" OR "peer mentoring" OR "peer modeling" OR "peer interaction" OR "peer inclusion" OR "peer network*" OR "peer-assisted learning" OR "peer-assisted intervention*") AND (play OR "play-based" OR "play based" OR "play intervention*" OR "play skill*" OR "play interaction*" OR "play therapy" OR "structured play" OR "play activity" OR "social play" OR game* OR "game" OR "game-based" OR "game based" OR

	"play behaviour") AND (autism OR "ASD" OR "autism spectrum disorder" OR "autistic")
WoS	TS= (("peer-mediated" OR "peer mediated" OR "peer-assisted" OR "peer assisted" OR "peer play" OR "peer-supported" OR "peer supported" OR "peer-based intervention*" OR "peer tutoring" OR "peer mentoring" OR "peer modeling " OR "peer interaction" OR "peer inclusion" OR "peer network*" OR "peer-assisted learning" OR "peer-assisted intervention*") AND ("play" OR "play-based" OR "play based" OR "game" OR "game-based" OR "game based" OR "play therapy" OR "play intervention*" OR "structured play" OR "play activity" OR "social play") AND ("autism" OR "autism spectrum disorder" OR "ASD" OR "autistic"))
Eric	("peer-mediated" OR "peer mediated" OR "peer-assisted" OR "peer assisted" OR "peer play" OR "peer-supported" OR "peer supported" OR "peer-based intervention*" OR "peer tutoring" OR "peer mentoring" OR "peer modeling " OR "peer interaction" OR "peer inclusion" OR "peer network*" OR "peer-assisted learning" OR "peer-assisted intervention*") AND ("play" OR "play-based" OR "play based" OR "game" OR "game-based" OR "game based" OR "play therapy" OR "play intervention*" OR "structured play" OR "play activity" OR "social play") AND ("autism" OR "autism spectrum disorder" OR "ASD" OR "autistic")

2.2 Screening

At this stage, articles that align with the topic and content of this study were screened. First, duplicates were removed from the articles retrieved from the databases, resulting in 209 articles being retained, while 862 articles were further assessed. Second, to ensure that the analysed articles meet the research objectives and contribute to answering the research questions, predefined inclusion and exclusion criteria were applied for screening.

The first criterion focused on articles published between 2016 and 2025, as this timeframe reflects trends. As noted by Chen and Song (2019), it is important to focus on a relatively stable literature structure within the research field, and this period provides a sufficient volume of literature. The second criterion included only journal articles written in English to ensure clarity of understanding. The third criterion limited the article types to those supported by empirical data, excluding dissertations, notes, conference papers, reports, books, book chapters, study protocols, reviews, commentaries, and proceedings papers. Fourth, based on a review of titles and abstracts, studies with participant groups explicitly identified as having other special needs, rather than autism, were excluded. Finally, non-intervention studies and those clearly unrelated to the research topic were removed.

Based on the above criteria, a total of 774 articles were excluded, and 88 articles were included. A summary of the specific inclusion and exclusion criteria is provided in Table 2.

Table 2: Selection criteria

Criteria	Inclusion	Exclusion
Language	English	Non-English
Year of publication	2016-2025	<2016
Literature type	Journal (Article)	Dissertation, Note, Conference paper, Report, Book, Book chapter, Study protocol, Review, Commentary and Proceedings paper
Subjects	Autism spectrum disorder (ASD)	Other neurodevelopmental or psychiatric disorders

Intervention-related	Yes, Unclear	No
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2.3 Eligibility

During the eligibility phase, a thorough assessment was conducted to ensure that only articles genuinely relevant to the research context were retained, forming the foundation of this review. At this stage, the 88 screened articles were carefully read and examined. First, articles for which full-text access could not be obtained were excluded. Second, studies involving informal peer-mediated approaches or those unrelated to play-based interventions were removed. Additionally, the target population was limited to children aged 2–16 years, and studies focusing on participants outside this age range were excluded. Ultimately, 19 articles were included in the final analysis. The entire screening process is summarized in the PRISMA flow diagram, as shown in Figure 1.

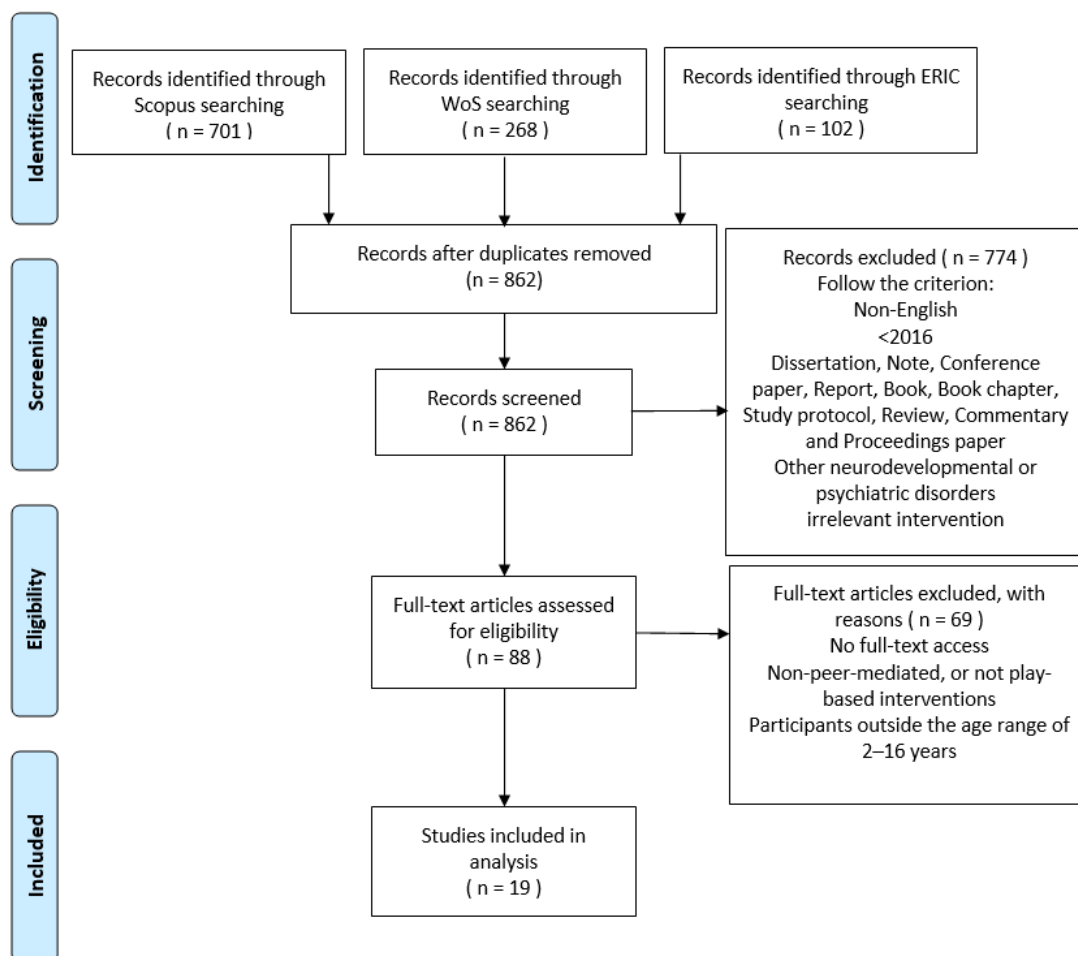


Figure 1: PRISMA flow diagram

2.4 Data Abstraction

This review employed a narrative synthesis approach to extract information from the 19 selected articles on PB-PMI, including participant characteristics, study design, intervention features, and intervention outcomes. The data were extracted and presented in tabular form to support the research objectives and research questions of this systematic review.

2.5 Quality Appraisal

To ensure the accuracy and reliability of data extraction, this study adhered to the methodology for evaluating evidence-based practices in autism spectrum disorder (Reichow et al., 2008). This approach includes assessments for both group research and single-subject research, providing a unified framework for diverse research designs and thus making it suitable for this review.

Within this framework, the specific primary quality indicators encompass participant characteristics, dependent variables, and independent variables. Secondary quality indicators include interobserver agreement, blind raters, procedural fidelity, generalisation and maintenance, and social validity. In the quality rating process, the strength of research reports is categorized as Strong, Adequate, or Weak.

3. Results

Through systematic search and screening, a total of 19 articles published between 2016 and 2025 met the inclusion criteria for this review. These comprised 9 randomized controlled trials and 10 single-case research design studies. The participants were children diagnosed with ASD, aged 2 to 16 years. All studies involved peer participation. Intervention settings included research clinics, special education resource classrooms, inclusive preschools or schools, theatres, and home. The types of play varied, encompassing constructive play, games with rules, symbolic play, among others. Overall, the majority of studies reported the effectiveness of PB-PMI for children with ASD, although individual differences were observed. This review will systematically synthesize the extracted data regarding participant characteristics, intervention outcomes, study quality, intervention fidelity, social validity, and the generalisation and maintenance of effects.

3.1 Participant characteristics

A total of 235 children with autism spectrum disorder (ASD) received and completed peer-mediated interventions across the included studies, alongside 403 typically developing (TD) peers. An additional 179 children with ASD were assigned to control groups. The study by Angelis et al. (2024) included three groups, comparing an expert-mediated intervention group, a no-intervention control group, and a peer-mediated intervention group. Regarding participant counts, data from Corbett et al. (2017; 2016), Ioannou et al. (2020), and Corbett et al. (2019) were derived from the same participant pool and thus were not double-counted.

The majority of participants were male, with a known total of 287 males and 60 females. Kent et al. (2021) did not report gender information for their participants. The age range spanned from 2 to 16 years. All participants were diagnosed with ASD based on assessment tools such as the ADOS-2 and DSM-5 criteria. Three studies (15.79%) explicitly reported the presence of co-occurring conditions among children with ASD, including ADHD, intellectual disability, language impairment, global developmental delay, and anxiety disorders (Briet et al., 2023; Fedewa et al., 2025; Kemp et al., 2019).

Ten studies (52.63%) indicated that participants with ASD were high-functioning (Aldabas, 2022; Angelis et al., 2024; B. Corbett et al., 2017; B. A. Corbett et al., 2016, 2019; Hu et al., 2018; Ioannou et al., 2020; Kent et al., 2020; Parsons et al., 2019b, 2019a), while two studies (10.53%) focused on children with low and extremely low functioning levels (Biggs et al., 2025; Briet et al., 2023). The remaining seven studies (36.84%) did not explicitly specify

functional levels (Coogle et al., 2019; Fedewa et al., 2025; Hatzenbuhler et al., 2019; Kemp et al., 2019; Morrier & Ziegler, 2018; Zhang et al., 2022; Ziegler & Morrier, 2022). Four studies (21.05%) reported the severity of ASD, ranging from mild to moderate and severe (Aldabas, 2022; Hatzenbuhler et al., 2019; Hu et al., 2018; Zhang et al., 2022). Seven studies (36.84%) provided detailed descriptions of the language expression and comprehension abilities of children with ASD (Biggs et al., 2025; Briet et al., 2023; Fedewa et al., 2025; Kemp et al., 2019; Kent et al., 2020; Parsons et al., 2019b, 2019a), among which two studies (10.53%) specifically focused on minimally verbal children with ASD (Biggs et al., 2025; Briet et al., 2023).

3.2 Intervention outcomes

This review summarizes the outcome variables of the interventions into the following aspects: social interaction and communication, play development, behavioural regulation, and mental health, as shown in Table 3.

Table 3: Summary of Reported Intervention Outcomes

Study	Social interaction and communication	Play development	Behavioural regulation and Mental health
Hu et al. (2018)	√		
Hatzenbuhler et al. (2019)		√	
Fedewa et al. (2025)	√	√	
Biggs et al. (2025)	√		
Angelis et al. (2024)	√		√
Briet et al. (2023)	√	√	
Aldabas (2022)	√		
Zhang et al. (2022)	√		√
Ziegler & Morrier (2022)	√		
Kent et al. (2021)	√	√	√
Ioannou et al. (2020)	√	√	√
Corbett et al. (2019)	√	√	
Parsons et al. (2019a)	√		
Kemp et al. (2019)	√	√	√
Coogle et al. (2019)	√		
Parsons et al. (2019b)	√		
Morrier & Ziegler (2018)	√		
Corbett et al. (2017)			√
Corbett et al. (2016)	√	√	

Note: Check marks (√) indicate that the study reported positive intervention effects in the specified domain. Absence of a check mark may indicate one of the following: (a) the domain was not measured; (b) effects were reported but not statistically significant; (c) the study did not report outcomes for that domain.

Improvements in social interaction and communication were the most centrally reported intervention outcomes, with 17 studies (89.47%) explicitly documenting positive changes in social initiation and response, pragmatic language, and non-verbal communication.

Multiple studies confirmed significant increases in social initiation and response. Hu et al. (2018) demonstrated a strong functional relationship between the intervention and social interaction for two out of three high-functioning children with ASD (aged 4–6 years). Aldabas (2022) employed a multiple-baseline across participants design with three 9-year-old children with ASD, finding significant improvements in social interaction duration, initiation, and response behaviours, with effect sizes (Tau-U) all exceeding 0.90. Ziegler and Morrier

(2022) investigated children with ASD aged 2-6 years across three inclusive classrooms and reported significant increases in social initiation (Tau-U = 0.58), with the most pronounced effects observed in children aged 4-6 years (Tau-U = 0.95). Biggs et al. (2025) implemented a peer network intervention combined with augmentative and alternative communication for minimally verbal children with ASD, one dyad demonstrated markedly improved interaction ratios, while another progressed from no interaction to establishing regular reciprocal interactions.

Two randomized controlled trials (Parsons et al., 2019a, 2019b) systematically evaluated the effects of pragmatic language interventions. Parsons et al. (2019b) studied 71 children with ASD aged 6-11 years and reported a medium effect size (0.57) in overall pragmatic performance for the intervention group. However, Parsons et al. (2019a) found that only approximately 32% of children achieved large effect sizes across all dimensions in the same year, further identifying the characteristics of those who benefited most, including relatively stronger contextual integration abilities, higher levels of separation anxiety, coupled with relatively weaker non-verbal communication skills, discourse organisation abilities, and expressive vocabulary. Notably, Biggs et al. (2025) implemented a peer network intervention combined with AAC for two minimally verbal third-grade children with ASD, one child transitioned from inappropriate interactions to more positive interactions, with response ratios increasing from 38.1% to 60.0% and vocabulary expanding from 2 to 8 words, increasing vocabulary diversity.

Regarding non-verbal communication, Parsons et al. (2019b) and Coogle et al. (2019) observed positive changes in non-verbal behaviours such as body posture. Two randomized controlled trials based on the SENSE Theatre intervention (B. A. Corbett et al., 2016, 2019) extended outcome measurements to social cognitive and neural levels. Corbett et al. (2016) found that the intervention improved automatic neural processing of social information, with the experimental group demonstrating significantly better delayed face memory compared to controls, and event-related potential measurements indicating changes in incidental face memory during passive viewing tasks. Corbett et al. (2019) further confirmed that the intervention significantly enhanced verbal theory of mind (Tau-U=0.62) and strengthened event-related potentials for facial memory, enabling better discrimination between repeated and novel faces, while the control group showed no pre-post differences.

Characteristics of play development in children with ASD were reported in eight studies (42.11%), encompassing play skills and the complexity of play engagement. Peer-mediated matrix training was found to effectively enhance play skills in children with ASD and facilitate multiple forms of generalisation. Hatzenbuehler et al. (2019) demonstrated that this intervention not only improved play skills but also promoted recombinative generalisation, person generalisation, setting generalisation, and creative play. Additionally, Kent et al. (2021) reported that the intervention group showed significant improvements in play abilities compared to the waitlist control group, with a medium effect size. In the matrix training study (Hatzenbuehler et al., 2019), children displayed varying levels of mastery and generalisation across imitation dimensions including characters, actions, locations, and vocalizations. Kemp et al. (2019) confirmed improvements in turn-taking behaviours during play among three children with ASD despite their differing co-occurring conditions.

Regarding play engagement and complexity, Fedewa et al. (2025) found that interactive play across all dyads substantially increased from extremely low baseline levels (averaging 0-9%)

and remained high after the withdrawal of teacher support (averaging 81-86%). PB-PMI also reduced solitary play behaviours in children with ASD while enhancing cooperative play. Corbett et al. (2016) observed that children in the experimental group, assessed using the Peer Interaction Paradigm, spent significantly more time engaged in group play on the playground compared to controls. Briet et al. (2023) further refined these findings, reporting strong intervention effects for social engagement (increased duration of interactive play) and medium effects for play complexity (increased duration of functional/symbolic play). Furthermore, intervention outcomes were moderated by the context of social initiation. Ioannou et al. (2020) reported that intervention outcomes were moderated by the context of social initiation: children with ASD showed significantly increased group play duration and reduced solitary play when invited, but improvements during non-invited play only reached marginal significance. These findings were corroborated by Corbett et al. (2019).

Six studies (31.58%) described significant effects of interventions on behavioural improvement and mental health. Regarding behavioural improvement, Zhang et al. (2022) found that peer-mediated structured play activities effectively reduced maladaptive behaviour patterns in children with mild to moderate ASD, though effects for children with severe ASD remained unclear. Kent et al. (2021) reported reductions in antisocial behaviour among children with ASD based on parent reports, while no significant changes were observed in children's self-concept or parent-child relationships. In a broader investigation, Angelis et al. (2024) conducted a randomized controlled trial demonstrating that both intervention groups (expert-mediated and peer-mediated) showed significant reductions in difficulties related to emotional problems, behavioural issues, hyperactivity, and peer relationships as rated by parents and teachers. The peer-mediated group outperformed the expert-mediated group on multiple indicators, with effects maintained at 30-day and 90-day follow-ups.

A consensus emerged across multiple studies that PB-PMI effectively reduce anxiety in children with ASD. Ioannou et al. (2020) implementing a peer-mediated theatre intervention with 77 high-functioning children with ASD, found that trait anxiety self-ratings in the intervention group were significantly lower than those in the waitlist control group. The study proposed a 'positive feedback loop' theoretical framework, explaining how the intervention promotes sustained improvement by reducing anxiety and increasing positive social experiences. Corbett et al. (2017) further confirmed these findings, showing significantly lower post-test trait anxiety in the intervention group, and that lower anxiety levels were associated with more frequent social interactions. While demonstrating intervention effects on anxiety, Parsons et al. (2019a) refined understanding by showing that higher levels of separation anxiety were associated with greater intervention benefits. A case study by Kemp et al. (2019) reinforced this pattern, showing that a child with ASD and severe anxiety progressed from crying and standing during baseline to full participation post-intervention, with non-overlapping data reaching 100%.

3.3 Study quality

This study employed the criteria established by Reichow et al. (2008) to evaluate the included studies based on primary and secondary quality indicators. The assessment revealed that 6 studies (31.58%) were rated as strong, 9 studies (47.37%) were rated as adequate, and 4 studies (21.05%) were rated as weak. Given the limited research available in this field, studies across all quality levels were retained without exclusion. Collectively, these studies provide reasonably reliable evidence base regarding the effects of PB-PMI.

3.4 Intervention fidelity, social validity, and the generalisation and maintenance

A total of 12 (63.16%) provided generalisation measurement outcomes. Regarding types of generalisation, in terms of person generalisation, Ioannou et al. (2020) and the Corbett (2017; 2016, 2019) used unfamiliar peers during assessments to demonstrate that the SENSE Theatre drama intervention successfully facilitated transfer to new interpersonal relationships. The matrix training study by Hatzenbuehler et al. (2019) also achieved person generalisation. Setting generalisation was the most frequently assessed type. Ziegler and Morrier (2022) found that children aged 4-6 years demonstrated clear generalisation to indoor free-play time, while children aged 2-4 years showed only partial or no generalisation. Fedewa et al. (2025) achieved partial success in generalisation to outdoor playgrounds, and Ioannou et al. (2020) along with the Corbett series also successfully demonstrated generalisation to playground contexts.

Regarding environmental generalisation, Parsons et al. (2019b) and Kent et al. (2021) confirmed successful skill generalisation from clinic to home environments at three-month follow-up assessments; the Corbett series demonstrated generalisation to home and community environments through parent reports. Regarding stimulus generalisation, Hatzenbuehler et al. (2019) achieved stimulus generalisation, with children able to engage in play using untrained materials. However, several studies showed inadequate generalisation assessment: Hu et al. (2018) did not assess generalisation to other environments; Biggs et al. (2025), Briet et al. (2023), and Aldabas (2022) did not systematically evaluate generalisation; and Zhang et al. (2022) completely omitted generalisation measurement. Notably, individual differences significantly influenced generalisation outcomes, with age (Ziegler & Morrier, 2022), language ability (Fedewa et al., 2025), and cognitive level (Briet et al., 2023) serving as important moderating variables.

4. Discussion

This review confirms that PB-PMI can effectively improve core social impairments in children with ASD and promote deeper internalization of abilities, with over 89% of studies reporting positive effects. Compared to previous PMI reviews, this study incorporates the critical element of play and further refines the hierarchy of effects. PB-PMI not only increases the frequency of social initiations and responses (Aldabas, 2022; Ziegler & Morrier, 2022), but also extends to pragmatic language (Parsons et al., 2019b), non-verbal communication (Coogler et al., 2019), and even the neural underpinnings of social cognition (B. A. Corbett et al., 2016, 2019).

Regarding play skill development, this review reveals that PB-PMI not only reduces solitary play behaviours and increases engagement in cooperative play among children with ASD (Fedewa et al., 2025; Ioannou et al., 2020), but also enhances the complexity of play itself and core social elements such as turn-taking and imitation (Briet et al., 2023; Kemp et al., 2019). Notably, Kent et al. (2021) found that children with lower baseline play abilities showed greater improvements, suggesting that PB-PMI may have a particular compensatory effect for those with significant play skill delays, though the underlying mechanisms require further investigation.

The positive impact of PB-PMI on mental health outcomes and behavioural problems addresses previous concerns regarding the neglect of participants' emotional experiences (L. K. Koegel et al., 2012). Multiple studies (B. Corbett et al., 2017; Ioannou et al., 2020; Kemp et al., 2019) consistently found that interventions reduced trait anxiety in children with ASD, establishing a 'positive feedback loop' whereby successful social experiences in turn enhance intrinsic

motivation and reduce social avoidance. This finding is difficult to replicate with adult-directed or highly structured interventions.

However, intervention effects showed substantial individual differences, moderated by age, language ability, cognitive level, and co-occurring conditions such as anxiety (Parsons et al., 2019a; Ziegler & Morrier, 2022). For instance, Ziegler and Morrier (2022) found that PB-PMI was more effective for children aged 4-6 years compared to those aged 2-4 years, suggesting the importance of developmental level and intervention timing. These findings not only validate the call by Chang and Locke (2016) to examine moderating factors but also provide preliminary evidence for developing personalized intervention approaches in the future.

Despite the generally positive intervention outcomes, this review identified inconsistent measurement of key indicators determining long-term value and ecological validity. Reports of intervention fidelity were relatively robust, with most studies meeting high-quality standards. This suggests that researchers increasingly prioritize ensuring scientific rigor in intervention implementation. However, Kemp et al. (2019) found that interventions remained potentially effective even when core strategy implementation was compromised (fidelity as low as 55.6%). Future research needs to investigate the dosage relationship between fidelity and outcomes and identify the most essential intervention components that ensure effectiveness.

Measurement of social validity was relatively weak, with only approximately 37% of studies conducting quantitative assessments. Although many studies indirectly demonstrated participant acceptance through observed positive changes, comprehensive measurement of subjective experiences among children with ASD, typically developing peers, and their teachers remains lacking. This falls short of the call by Gunning et al. (2019) to prioritize social validity. Within inclusive educational contexts, understanding the perceptions, motivations, and potential stigmatization risks of all participants (Bauminger-Zviely et al., 2020) is crucial for intervention dissemination and sustainable implementation.

Generalisation and maintenance represent shortcomings in existing research. Although some studies assessed maintenance and various forms of generalisation, the depth and breadth of assessment varied considerably. Most studies employed short maintenance periods (ranging from one week to three months), with only a few (Angelis et al., 2024) conducting long-term follow-up extending to 90 days. Regarding generalisation, setting generalisation (from clinic to playground) was most frequently assessed, while evidence for person generalisation (transfer to novel peers) and stimulus generalisation (use of novel materials) remained relatively limited, with notable individual differences. These findings confirm concerns raised by Parsons et al. (2019a) regarding difficulties in maintaining long-term generalisation and explain why certain skills may fail to transfer to everyday contexts. Although PB-PMI provides naturalistic environments, achieving lasting skill change may require more systematic, longer-term maintenance strategies and diversified generalisation training.

5. Future Directions

First, participant heterogeneity represents a primary challenge for future research. This review found that intervention outcomes were significantly moderated by age (Ziegler & Morrier, 2022), language ability (Fedewa et al., 2025), cognitive level (Briet et al., 2023), and co-occurring conditions (Parsons et al., 2019a). However, current research inadequately addresses

children with severe ASD (Zhang et al., 2022) and those with co-occurring intellectual disabilities (B. Corbett et al., 2017; Ioannou et al., 2020). Future research should employ precise matching based on multidimensional characteristics and conduct in-depth investigations into the role of peer characteristics, including the peer preferences of children with ASD (Biggs et al., 2025), the psychological experiences of peers (Briet et al., 2023), and comparisons of effectiveness with adult-mediated interventions (Angelis et al., 2024; Hatzenbuehler et al., 2019).

Second, methodological quality requires further enhancement, particularly in measuring ecological validity indicators. Existing samples predominantly comprise males and participants from Western regions, necessitating inclusion of more geographically and culturally diverse samples, with examinations of intervention transferability to regular classroom settings and resource-limited contexts (Aldabas, 2022; Briet et al., 2023; Fedewa et al., 2025). Nearly every study called for more systematic measurement of maintenance and generalisation, assessing both short-term effects and long-term maintenance, evaluating not only setting generalisation but also person and stimulus generalisation. Furthermore, social validity measurement requires urgent strengthening, with future research comprehensively collecting subjective experiences from teachers, peers, and children with ASD to address concerns regarding stigmatization risks. Finally, future research should focus on identifying predictive factors, expanding outcome measures, and investigating active intervention ingredients. It is recommended to incorporate problem behaviours and inappropriate play behaviours into dependent variable systems (Hatzenbuehler et al., 2019; Hu et al., 2018), conduct more refined dimensional coding of existing indicators (Morrier & Ziegler, 2018), and introduce multimodal physiological indicators such as cortisol (B. Corbett et al., 2017). Critically, multiple studies have emphasized the importance of intervention component analysis. Kemp et al. (2019) found that interventions remained effective despite imperfect fidelity, suggesting that intervention effects may stem from peer relationships or the inherent appeal of play itself, rather than all prescribed technical steps. Future research should employ component analysis designs to identify key active ingredients and advance PB-PMI toward more precise intervention approaches.

6. Limitations

First, this review only included Chinese and English literature published between 2016 and 2025. Although the selected databases are highly representative, the findings are based on published literature, which may be subject to publication bias towards positive results. This could lead to the omission of some earlier studies or an overestimation of overall intervention effects. Second, the included studies varied considerably in research design, intervention protocols, and participant characteristics. This substantial heterogeneity precluded subsequent meta-analysis or systematic comparisons. Finally, some studies received weak quality ratings, and most had small sample sizes, limiting the generalizability of findings.

7. Conclusion

The findings of this review indicate that play-based peer-mediated interventions have positive effects on enhancing social communication abilities, play skills, and improving behavioural issues and mental health outcomes in children with ASD, with some studies demonstrating generalisation and maintenance to a certain extent. This approach shows promising applicability in inclusive educational settings, as its model of leveraging peer influence within natural, engaging play contexts aligns particularly well with children's developmental

characteristics and the principles of inclusive education. However, significant individual differences in intervention outcomes were observed, subject to complex moderation by child characteristics and social contexts. Considerable room for improvement remains in current research regarding intervention precision, methodological rigor, sample representativeness, and particularly the systematic assessment of generalisation and maintenance, as well as investigation into the active ingredients of interventions.

Acknowledgement

The authors would like to express sincere gratitude to everyone who contributed, both directly and indirectly, to the completion of this study.

Conflict of Interest Statement

This study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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