Early Childhood Personnel Center

OVERVIEW OF PEER-MEDIATED INTERVENTION REVIEWS

Supplemental Material

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BACKGROUND

Peer-mediated interventions are interventions where like-aged peers are systematically taught to engage children with disabilities in positive social interactions, with the aim of helping children with disabilities acquire new, targeted social skills (Odom & Strain, 1984). Typically, peer-mediated interventions involve like-aged peers without disabilities, although there are examples of peer-mediated interventions in which children with disabilities were paired with peers who also had disabilities (cf., English et al., 1997; Garfinkle & Schwartz, 2002). Peer-mediated interventions started appearing regularly in the research literature during the 1970s (e.g., Apolloni et al., 1977; Solomon & Wahler, 1973; Strain, 1977; Strain et al., 1977) and have been used to enhance the social and play skills of young children with disabilities. An early seminal review of peer-mediated intervention (i.e., Odom & Strain, 1984) reported promising findings across many studies, laying the foundation for practice and research on the instructional technique for the years that followed.

Peer-mediated interventions are behaviorally-based interventions in which one or more like-aged peers are trained to deliver instruction or intervention to a target child (Odom & Strain, 1984). There are many ways in which the peers are trained to deliver the intervention including explanation (Kohler et al., 2007; Trembath et al., 2009), modeling (McGrath et al., 2003; Kern & Aldridge, 2006), role play (Hundert et al, 2014; Lee & Lee, 2015), and corrective feedback (Ganz & Flores, 2008; Jones & Schwartz, 2004). Within the framework of peer-mediated interventions, the peers play a pivotal role in scaffolding the interaction's social and communication skills by demonstrating target behaviors, initiating

interactions, and prompting and reinforcing desired behaviors (Odom and Strain, 1984). Consequently, children with disabilities are anticipated to experience enhancements in their social interaction skills (Belchic & Harris, 1994; Kohler et al., 2007), play skills (Nelson et al., 2007; Hundert et al, 2014), and communication (Thiermann-Bourque et al., 2017; Trembath et al., 2009).

Systematic reviews are often conducted after multiple studies are conducted on an intervention (e.g., Cooper et al., 2019; Cumming et al., 2003; Gage & Reichow, 2024; Page et al., 2021). The goals of systematic reviews of interventions are to locate, evaluate, and summarize existing studies on an intervention (treatment) to draw conclusions about the effectiveness of the intervention on a larger population than can be studied in an individual study. Systematic reviews locate and analyze what are referred to as "primary studies" – individual research studies in which an intervention is experimentally studied. There are now well-established methods for conducting and reporting systematic reviews (e.g., Cooper et al., 2019; Cumming et al., 2023; Page et al., 2021; Petticrew & Roberts, 2006) and systematic reviews are often considered to provide strong empirical (evidence-based) support for specific practices (e.g., Murad et al., 2016; Oxford Centre for Evidence-based Medicine, 2011). As the numbers of systematic reviews and meta-analyses continued to grow in intervention research, systematic methods for conducting overviews of reviews began to emerge (e.g., Becker & Oxman, 2011; Gates et al., 2022; Pollock et al., 2023).

An overview of reviews is a class of systematic reviews in which other reviews are located and included as the unit of analysis instead of studies. Whereas a study is the unit of analysis in a systematic review, a review is the unit of analysis in an overview of reviews.

Overview of reviews provide an opportunity to systematically locate and appraise a collection of reviews that have been conducted on a topic. As the number of systematic reviews (including meta-analytic syntheses) continues to increase (e.g., Ioannidis, 2016), the overview of review methodology has the potential to capture and maximize the use of prior work (i.e., syntheses) on a topic and possibly to allow the examination of broader research topics (Cooper & Koenig, 2012; McKenzie & Brennan, 2017).

Much research has been conducted on the use and efficacy of peer-mediated interventions over the past 50 years (e.g., Chan et al., 2009; Martinez et al., 2021; Odom & Strain, 1984). With dozens of studies demonstrating the positive effects of peer-mediated interventions, it has been classified as a recommended or evidence-based practice by many organizations (e.g., Division for Early Childhood, 2014; Hume et al., 2021; National Autism Center; 2015; Reichow & Volkmar, 2010; Wong et al., 2015) and is a frequently used practice in early childhood settings for children with disabilities. Given the large number of primary studies and reviews of peer-mediated interventions for young children under the age of five years old with or at risk of disabilities, we sought to summarize and synthesize the empirical evidence of this intervention practice by utilizing the overview of review methodology to maximize efficiency and benefits. We conducted an overview of reviews to specifically examine the following research questions:

(1) What are the characteristics of the reviews of peer-mediated interventions?;

(2) How have the focal and peer participants in peer-mediated intervention research been presented and characterized in reviews?;

(3) What are the intervention components or characteristics described in peer-mediated intervention reviews?; and

(4) What conclusions have extant systematic reviews (and meta-analyses) drawn on the effects of peer-mediated interventions for young children with disabilities, and on which outcomes?

METHOD

Overview of Reviews Method

We conducted an overview of reviews of peer-mediated interventions for young children with or at risk for delays or disabilities under the age of five years old. This overview was conducted using contemporary guidelines for overview of reviews (e.g., Pollock et al., 2023) and is reported consistent with contemporary standards set forth in the Preferred Reporting Items for Overview of Reviews (Gates et al., 2022).

Selection (Inclusion) Criteria

We included systematic reviews that included at least one primary study of a peer-mediated intervention that included at least one child with or at risk for delays or disabilities under the age of 5 years old. To be included, the review had to be systematic in that it provided a replicable search strategy and selection criteria. Reviews also had to have been published in peer-reviewed journals and written in English. We did not place a restriction on date of publication for a review to be included in this overview.

Search and Selection Methods

We searched Medline, APA PsycINFO, Education Resource Information Center (ERIC), Cumulative Index of Nursing and Allied Health Libraries (CINAHL), and Academic

Search Premier on October 4, 2023 using the search strategy shown in Supplemental Text 1. We also used "snowball methods" as recommended by Greenhalgh and Peacock (2005) by searching titles from the reference lists of included reviews and screened the reviews included in the Bowman-Perrott et al. (2023) overview of reviews to locate possibilities. We exported the records from the electronic database searches into Covidence (Veritas Health Innovation, 2020) for screening and selection. Two reviewers independently screened records by title and abstract based on eligibility criteria, with disagreements resolved through consensus. The remaining records were then screened at the full-text stage, in which the same two screeners independently screened the full text of each record against the eligibility criteria. Disagreements between reviewers were resolved through discussion with a third party.

Data Collection and Analysis

Consistent with methodological standards for overview of reviews (e.g., Pollock et al., 2023), data were extracted primarily from the data reported in the published articles of the included systematic reviews; when necessary, we examined the primary studies to confirm or extract specific or missing data for some variables. Across reviews, much of the data were presented in aggregate; when aggregate data were located, we typically chose to extract absolute range values instead of attempting to calculate a review-level mean. For all data extraction, two reviewers extracted the data independently, with disagreements resolved through discussion and consensus. Data were extracted on research characteristics (e.g., number of primary studies, primary study research design), focal and peer participant characteristics (e.g., number, age range, developmental characteristics),

intervention characteristics (e.g., type of peer-mediated interventions, setting, intervention agent, duration), and outcomes and results (e.g., dependent measure, number of participants showing positive treatment effect, effect size estimate) of the 10 reviews that focused on peer-mediated interventions. Outcomes (i.e., dependent variables) were described differently across reviews and across primary studies. For this overview, we created two primary outcome categories (1) social skills (e.g., initiations and responses, play, turn taking, social commenting) and (2) communication (e.g., independent manding, vocal nonsocial behaviors; nonlinguistic behaviors), and used a third category of "other" to capture the remaining outcomes (i.e., imitation, challenging behavior).

We used the Johanna Briggs Institute's (JBI) Critical Appraisal Checklist for Systematic Reviews and Research Syntheses (Aromataris et al., 2015) to examine the methodological rigor or risks of bias of the included reviews. The JBI Checklist contains 11 items that helps to assess the methodological rigor of a review and the extent to which the review has potentially addressed possible causes of bias. We chose to use the JBI Checklist because we felt the items evaluated were consistent with expectations of reviews of interventions in the field of educational and social sciences and is consistent with current overview of review methodological recommendations (e.g., Lunny et al., 2018). Two reviewers independently evaluated the 11 items for each review with disagreements resolved through discussion and reaching consensus. Data were analyzed descriptively by creating a summary figure across reviews for each of the 11 items on the JBI Checklist.

We used the corrected covered area (CCA; Pieper et al., 2014) to quantify the degree of primary study overlap across included reviews. We calculated the CCA for the 10 reviews that focused on peer-mediated interventions specifically. The CCA was calculated as $CCA = \frac{N-u}{uc-u}$, where *N* was the number of included primary studies (including double counting), *u* was the number of primary studies (excluding duplicated reports), and *c* was the number of systematic reviews. We used Pieper and colleagues' guidelines for quantifying the level of CAA for slight (0 – 5%), moderate (5 – 10%), high (10 – 15%), or very high (> 15%) levels of overlap. We also used graphical methods (e.g., Bougioukas et al., 2021) to explore primary study overlap further.

We conducted descriptive and narrative syntheses of the outcomes reported in 10 peer-mediated intervention reviews. To synthesize the findings of the reviews, we first summarized the percentage of primary studies reporting positive findings within each review and aggregated this across the 10 reviews. We then examined the three reviews that conducted a statistical synthesis to examine the average effects reported in their analyses. Finally, we formulated conclusions regarding the evidence across reviews by exploring patterns in the aggregated data.

RESULTS

Review Selection

The electronic database search yielded 2,310 records; 1,505 remained after deduplication using Covidence. After removing 1,249 irrelevant records, we screened the full text of 256 records, of which 13 met our inclusion criteria. Our snowball selection process screened the titles of 559 articles that were included in the reference lists of these

13 reviews. We then screened 28 of these additional records at the full-text stage; 12 reviews (reported in 13 articles) met our inclusion criteria and are included in this synthesis. Collectively, 25 reviews (reported in 26 articles) met the inclusion criteria and are included in this synthesis (see Figure 1 for a flow diagram of review selection). Of the 25 reviews meeting our inclusion criteria, 10 reviews had a primary focus on peer-mediated interventions for children under the age of five with or at risk of disabilities and are the main focus of this synthesis (Chan et al., 2009; Chang & Locke, 2016; Chapin et al., 2018; Gunning et al., 2019; Ledford & Pustejovsky, 2023; Martinez et al., 2018; O'Donoghue et al., 2021; Watkins et al., 2015; Zagona & Mastergeorge, 2018; Zhang & Wheeler, 2011). Fifteen additional reviews (reported in 16 articles; Bellini et al., 2007; Camargo et al. 2014, 2016; Goldstein et al., 2014; Hanline et al., 2022; McConnell, 2002; Ozuna et al., 2015; Pollard, 1998; Reichow & Volkmar, 2010; Shivers et al., 2015; Therrien et al., 2016; Wang, 2009; Wang, 2011; Watkins et al., 2019; Whalon et al., 2015; Wong et al., 2015) met our inclusion criteria of the inclusion of at least one primary study of peer-mediated interventions involving at least one participant under the age of five with or at risk for disabilities or developmental delays. However, because these 15 reviews included other social skill interventions (i.e., interventions that were not peer-mediated interventions), we chose not to include these reviews in the primary syntheses of this overview. Characteristics of the 10 reviews of peer-mediated interventions including at least one participant under the age of five who has, or is at risk for a disability or developmental delay, are shown in Table 1 and details of the additional 15 reviews are provided in Supplemental Table 1.

Review Characteristics

Of the 10 included reviews, seven (70%) were systematic reviews with narrative syntheses without statistical syntheses and three reviews (30%; Chapin et al., 2016; Ledford & Pustejovsky, 2023; Zhang & Wheeler, 2011) were systematic reviews that included statistical syntheses (i.e., meta-analyses). In these 10 reviews, there were 47 unique primary studies that included a peer-mediated interventions with at least one child with or at risk for disability under the age of 5 years old (references for the 47 primary studies included across reviews are shown in Supplemental Text 2). The number of primary studies of peer-mediated interventions including children with or at risk for disabilities under the age of five in each review ranged from one (Chang & Locke, 2016) to 29 (Gunning et al., 2019). The included reviews are recent publications, with the oldest review being published in 2009 (Chan et al., 2009) and the newest review being published in 2023 (Ledford & Pustejovsky, 2023). Although the reviews are quite recent in publication, the year of publication of the primary studies spans four decades from 1986 (Odom & Strain, 1986) to 2019 (Severini et al., 2019). As shown in Figure 2, the decade of the 1990s had the most published primary studies (n = 18; 38%), with 12 studies (26%) published each in the 2000s and 2010s and 5 studies (11%) published in the 1980s. Examination of the search coverage dates showed only one review (Ledford & Pustejovsky, 2023) included articles published in the 2020s (records searched through June 2020), thus the most contemporary (i.e., published since 2020) primary studies of peer-mediated interventions for young children with disabilities would not have been included in the reviews located for this overview.

Across the 10 reviews, the cumulative number of included studies including children with disabilities under the age of 5 years old summed to 106. This figure represents a gross count of primary studies that includes a count of primary studies that were in included in more than one review. Across reviews, the total number of unique (unduplicated) primary studies was 47 (u = 47); 29 primary studies (62%) were included in more than one review. Four studies (Katz & Girolometto, 2013; Goldstein et al., 1992; Odom & Watts, 1991; Sainato et al., 1992) were included in five reviews and three studies (Ganz & Flores, 2008; Lee & Lee, 2015; Kohler et al., 1995) were included in four reviews. The primary study overlap of studies with participants under the age of five estimated by the corrected covered area (CCA) was approximately 13.95%, indicating a high level of overlap. We used the GROOVE tool (Bracchiglione et al., 2022) to create a summary citation matrix showing the percentage of pairwise overlap between reviews, which is shown in Figure 3. Supplemental Table 2 shows a study-level citation matrix to visually demonstrate the overlap of primary studies included across reviews.

Figure 4 shows a representation of the average ratings across reviews for the 11 JBI Appraisal Checklist items. The results of the appraisal suggest that the 10 reviews had, overall, few risks of bias. As seen in Figure 4, the category for which bias had the highest risk included a clear description of the inclusion criteria (40% of reviews were rated as not meeting the criteria) and in the description of the methods used to appraise the primary studies (30% of the reviews were rated as not meeting the criteria). Additional items that had a noticeable risk of bias included the methods for combining studies (30% of the reviews were rated unclear with the remaining 70% of the reviews rated as not applicable)

and the assessment of publication bias (100% of the reviews were rated as unclear); the ratings for these two items reflects the narrative nature of the syntheses of the majority of included reviews in this overview.

Characteristics of the focal and peer participants included in the primary studies are presented by study in Table 2. There were 114[1] children with or at risk of a disability under the age of 5 years old in the 47 unique primary studies, which is an average of about 2.5 participants per study. The gender breakdown of the participants of the primary studies was 88 males (77%), 18 females (16%), and 8 unreported (7%). The youngest participant in the included studies was 2 years 9 months old; this was the only study that included a participant under the age of three. Most participants were four years old (between 48 and 59 months old; *n* = 71) with one-third of the participants being 3 years old (between 36 and 47 months old; *n* = 39). Across reviews, the children had a range of disabilities including autism spectrum disorder (*n* = 100; 88%), developmental delay (*n* = 6; 5%), Down syndrome (*n* = 3; 3%), at risk (*n* = 3; 3%), Rett syndrome (*n* = 1; 1%), and pervasive developmental disorder (*n* = 1; 1%).

Because many of the primary studies included multiple peers for individual focal participants, we were not able to extract data on the peer participants that were specifically linked to the children with disabilities under the age of five but instead extracted data on all of the peer participants included in each primary study. Forty-three (91%) primary studies reported the number of peer participants involved in the peer-

[1] 114 represents the number of participants under the age of five in the 47 primary studies; many studies also included children over the age of 5, which are not included in this count.

mediated interventions. There were 423 peers across studies who ranged in age from three to 11 years. All but one primary study reported involving peers without disabilities in the peer-mediated interventions. Five studies (11%) indicated including at least child with a disability as a peers and one study (Lorah et al., 2014) evaluated the use of a peer-mediated intervention in which pairs of children with disabilities interacted together without the involvement of children without disabilities.

Table 3 provides details on intervention characteristics, including the intervention setting and the specific peer-mediated strategies for the 47 primary studies included across reviews. Because peer-mediated interventions typically include like-aged peers with typical development, nearly all studies occurred in inclusive natural settings, mostly classrooms in preschools or community-based childcare centers. There was greater variability across studies with respect to the specific peer-mediated intervention strategies used in the primary studies. Nearly all studies used multiple intervention techniques, with an average of 3.1 strategies used per study (range 1 to 6). The most common strategies included peer prompts (*u* = 33, 70%), peer initiations (*u* = 32, 68%), and peer proximity (*u* = 32, 68%). The use of peer reinforcement (*u* = 24, 51%), peer response and maintenance of interaction (*u* = 20, 43%), and shared materials and toys (*u* = 13, 28%) were less frequent strategies seen across the included studies. Over 80% (*u* = 38, 81%) of studies were conducted in inclusive classroom settings; 5 studies (11%) were conducted in clinical or separate school settings, 4 studies (9%) were conducted in home settings, and 1 study (2%) was conducted in a community museum (sum of studies is greater than 47 because one study was conducted in both a classroom and home setting).

Effects of Peer-Mediated Intervention on Children with Disabilities

Table 4 presents a summary of outcomes and findings for each review. Examination of the review-level data shows that most of the primary studies included across reviews had a social skill as one of the primary outcomes. Communication (i.e., non-social communication) was the next most reproted outcome, which was assessed as an outcome in at least one primary study in 8 of the 10 reviews (range 1 to 5 primary studies per review). As shown in Table 4, all ten reviews found positive findings on the effects of peer-mediated interventions on child outcomes for children with or at risk for disabilities under the age of five years old. For the 8 studies that presented narrative syntheses, a positive effect was shown in 67 of 80 (84%) opportunities. In the three reviews utilizing meta-analytic methods, the reviews also described positive effects and findings in favor of peer-mediated interventions for children under 5. Chapin et al. (2018) found a mean improvement rate difference effect size of 0.65 and 0.72 for children 3 year old children and 4 year old children, respectively, Ledford and Pustejovsky (2023) reported a log response ratio effect size of 1.12 (95% CI 0.48 to 1.77) across eight studies included in their review and Zhang and Wheeler (2011) reported a regression-based (i.e., Allison & Gorman, 1993) effect size of 1.78 for children aged 36 to 59 months across 20 studies included in their review. Due to the lack of a common standard for the interpretation of the magnitude of effects when using single case design effect sizes, interpretation of size or magnitude of the effects of peer-mediated interventions in the three meta-analytic reviews could not be made. Collectively, the findings across these reviews show strong and replicated empirical support for the use of peer-mediated interventions.

DISCUSSION

The findings from this overview extend the robust findings on peer-mediated interventions for young children with disabilities. Across multiple systematic reviews, peer-mediated interventions were shown to be effective for improving social skills and communication for young children with or at-risk of disabilities. Based on the characteristics of the included reviews, these findings extend primarily to young children with autism spectrum disorder between the ages of 3 and 5 years old who attend school in inclusive settings or other natural environments. Given the level of empirical support for the use of peer-mediated interventions for young children with or at-risk of disabilities, peer-mediated interventions can be considered an evidence-based practice and should be considered by practitioners when designing and implementing intervention programs for young children with disabilities.

An overwhelming majority of studies focused exclusively on children who had a diagnosis of autism spectrum disorder (cf., Ledford & Pustejovsky, 2023; Hanline et al., 2022; Therrien et al., 2016). When examining the participants in the primary studies included in the 10 peer-mediated intervention reviews, almost 90% of the participants were young children with autism spectrum disorder. Because children with autism spectrum disorder, by definition, have deficits in social skills and social communication, it is logical that much of the research on an intervention technique developed to address social skill deficits would include children who had autism spectrum disorders. We would like to note that in many reviews, “autism spectrum disorders” was a category that included a heterogeneous sample of children including children with autism and intellectual

disability, children with autism without intellectual disability (e.g., high-functioning autism), pervasive developmental disorder, and Rett syndrome. While it is promising that evidence from reviews that included children with autism and other disorders was located, less is known about the effectiveness of the intervention for young children with disabilities other than autism.

No primary study was included in all 10 of the peer-mediated intervention reviews of this overview. In fact, the maximum number of reviews in which individual primary studies were included was five, with the remaining primary studies being included in 1 to 3 reviews. While the overlap calculated by the CCA (13.95%) indicated a high degree of overlap, many studies were included in only one of the ten reviews (*n* = 19, 40%). There are likely multiple explanations for why 40% of the primary studies were only included in one review. The most prevalent reason is likely differences in inclusion criteria across reviews (e.g., Hennessy & Johnson, 2020); none of the reviews included in this overview had identical inclusion criteria. Differences in inclusion criteria included how peer-mediated interventions were defined (e.g., peer-mediated strategies alone v. intervention packages), research characteristics (e.g., study design), and participant characteristics (e.g., age, communication abilities). The way in which outcomes were defined and extracted across reviews also varied. Finally, there were also different purposes across reviews, which likely impacted the selection of child outcomes included in each review. Although the 10 peer-mediated intervention reviews have heterogeneity, they were all published systematic reviews of peer-mediated interventions for children with disabilities. Having a common purpose closely aligned across multiple rigorous systematic reviews adds to the

confidence of the conclusions made synthesizing across the reviews included in this overview.

Nine of 10 reviews included only studies that used single case experimental designs. The one review that included group design studies did so exclusively; Chang and colleagues (2016) noted other extant reviews of peer-mediated intervention conducted using single case designs leading to a decision to focus exclusively on group comparative designs. Chang et al. located one study (Kalyva & Avramidis, 2005) examining peer-mediated interventions for children with disabilities under the age of five years old. Although the findings from this study showed positive effects of peer-mediated interventions, additional research utilizing experimental designs other than single case experimental designs would help strengthen the demonstrated efficacy of the intervention technique.

Three reviews (Chapin et al., 2016; Ledford & Pustejovsky, 2023; Zhang & Wheeler, 2011) included statistical syntheses across study findings (i.e., a meta-analysis). All three reviews conducted meta-analyses of single case experimental design studies, which remains an area where a common standard statistical method has not been identified. Across the three meta-analytic syntheses, three different effect size calculations were used. Chapin and colleagues used the improvement rate difference (Parker et al., 2009), Ledford and Pustejovsky used log response ratios (e.g., Pustejovsky, 2018), and Zhang and Wheeler utilized the regression method of Alison and Gorman (1993). The positive findings of these three meta-analytic analyses are supported by meta-analytic findings reported in other included reviews that included peer-mediated interventions with other social skills

interventions more broadly (e.g., Bellini et al., 2007; Camargo et al., 2014; Wang et al., 2009; Wang et al., 2011; Watkins et al, 2019, Whalon et al., 2015). However, the lack of a field-specific benchmark for the interpretation of the single case design effect sizes, making interpretation of the magnitude impossible. Once benchmarks are established it will be important to re-evaluate these findings in light of the new guidelines.

As seen in Table 3, all but one review contained children without disabilities as peers and only a handful of primary studies (i.e., English et al., 1997; Garfinkle & Schwartz, 2002; Kern & Aldridge, 2006; Lorah et al., 2014; Milam et al., 2018) indicated including children with disabilities as peers. Given the purpose of peer-mediated interventions is to help children who have less developed social skills acquire a more advanced repertoire of social behaviors on a level commensurate with their developmental age, it is not surprising that children without disabilities would be chosen as peers. While the primary aims of the studies of peer-mediated interventions have typically been increases in positive social skills or communication by children with disabilities, it is likely that the peers may also benefit by participating in the intervention. More work is needed to elucidate the benefits for all children when utilizing peer strategies in early childhood settings.

Limitations

First, while the findings of this overview point to strong effects of the intervention for children ages 3 to 5 years old with disabilities, less is known on the effectiveness of peer-mediated intervention for younger children (i.e., infants and toddlers with disabilities) with disabilities. Only one primary study included in the reviews (i.e., Goldstein et al., 1992) had a child under the age of three years old. Other primary studies did include children just over

three years (e.g., Barber et al., 2016; Kohler et al., 1997; Severvini et al., 2019; Thiemann-Bourque et al., 2016) thus, the intervention effects likely generalize to toddlers with disabilities, however, additional research is needed to better understand the effects of peer-mediated intervention for younger infants and toddlers with disabilities. Seconds, the outcome categories (i.e., social skills, communication) in this overview are purposefully broad. This was due to differences in the way in which dependent variables were operationalized in the reviews from which the data were extracted. Finding a more common set of outcomes that can be used across research may allow for more specific recommendations about specific effects of the intervention to be made in future overviews. Finally, while much of the research on peer-mediated intervention for young children with or at risk for disabilities has been conducted in classroom settings, less is known regarding the effectiveness of peer-mediated interventions when used in other naturalistic settings, such as community settings (cf., Schleien et al., 1995). Additional research along these lines could further our understanding of the best ways in which to engage peers to advance the social skills of young children with disabilities in the settings in which they interact.

CONCLUSIONS

The findings from the 10 included reviews show that peer-mediated interventions are an effective intervention for improving the social skills and communicative behaviors of young children with disabilities. Over 80% of the 47 studies included in the 10 reviews had positive findings. The three meta-analyses showed robust statistical analyses of the peer-mediated intervention, above and beyond the narrative/descriptive review of the evidence.

Thus, the use of peer-mediated interventions for children with or at risk of disabilities under the age of five is strongly supported by empirical research and has been shown to be an evidence-based practice when used in inclusive settings.

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TABLES

Table 1. Characteristics of 10 Included Reviews with Focus on Peer-mediated Intervention

Table 2. Participant Characteristics of Primary Studies for Children with Disabilities < 5 years old and Study-Matched Peers

Table 3. Intervention Characteristics of Studies Included in Peer-mediated Intervention Reviews

Table 4. Effects of Peer-mediated Interventions on Young Children with Disabilities

Table 1. Characteristics of 10 Included Reviews with Focus on Peer-mediated Intervention

Review (First Author and Year)	Search date (date range, if reported)	Review type	Study designs	Total # studies	Studies with CWD < 5			
					Studies	Sample size	Age range, in years	Disability
Chan (2009)	2007[a]	SR	SCD	42	*u* = 10	*n* = 22	2-11	ASD
Chang (2016)	June 2015	SR	GD	5	*u* = 1	*n* = 5	3-4	ASD
Chapin (2018)	2015 (1986 – 2015)	SR, MA	SCD	18	*u* = 17	*n* = 37	3-5	ASD
Gunning (2019)	2018 (1980 – 2018)	SR	SCD	31	*u* = 29	*n* = 67	2-5	ASD
Ledford (2023)	June 2020	SR, MA	SCD	9	*u* = 7	*n* = 18	3-8	ASD, DD, ID, DHH, at-risk
Martinez (2021)	2017 (2008 – 2017)	SR	SCD	18	*u* = 7	*n* = 16	3-8	ASD
O'Donoghue (2021)	n/r (1991 –2017)[b]	SR	SCD	25	*u* = 11	*n* = 26	3-5	ASD (mv)
Watkins (2015)	2014 (2008 – 2014)	SR	SCD	14	*u* = 2	*n* = 4	4-5	ASD
Zagona (2018)	2014 (2004 – 2014)	SR	GD, SCD	17	*u* = 3	*n* = 8	3-5	ASD
Zhang (2011)	2006 (1977 – 2006)	SR, MA	SCD	45	*u* = 19	*n* = 41	0-5	ASD

Note: CWD = children with disabilities; SR = systematic review; SCD = single case design; GD = group design; ASD = autism spectrum disorder; MA = meta-analysis; DD = developmental delay; ID = intellectual disorder; DHH = deaf/hard of hearing; ASD (mv) = autism spectrum disorder, minimally verbal; n/r = not reported; **Footnotes:** [a] – hand search for key journals completed for Jan. 2008 – Mar. 2009; [b] – range indicates range of years for article publication

Table 2. Participant Characteristics of Primary Studies for Children with Disabilities < 5 years old and Study-Matched Peers

Primary Study	Reviews[a]	CWD < 5 -years-old		Peers	
		n	Age Range[b] (% Male)	*n*	Age Range[b] (% Male)
Barber 2016	3[5,6,7]	3	36-52 months (100% Male)	3	48-60 months (nr)
Belchic 1994	2[4,10]	1	51 months (100% Male)	5	44-55 months (60^ Male)
Bellini 2016	1[4]	1	57 months (100% Male)	2	not reported (nr)
Carr 1990	3[1,4,10]	3	4 year-olds (100% Male)	1	5 year-old (100% Male)
English 1997	1[5]	2	47-58 months (100% Male)	6[c]	43-60 months (83% Male)
Ganz 2008	4[3,4,6,8]	2	53- 54 months (100% Male)	4	4-5 year-olds (25% Male)
Garfinkle 2002	3[3,4,10]	2	43-58 months (100% Male)	28[d]	3-6 year-olds (nr)
Goldstein & Cisar 1992	1[10]	3	preschool-aged (100% Male)	6	43-60 months (83% Male)
Goldstein et al. 1992	5[1,3,4,7,10]	3	33-45 months (100% Male)	10	39-64 months (50% Male)
Goldstein 1997	1[5]	5	40-59 months (20% Male)	8	preschool-aged (25% Male)
Hall 1996	1[10]	1	58 months (100% Male)	2	preschool-aged (nr)
Haring 1989	2[4,10]	2	56 months (100% Male)	10	preschool-aged (nr)
Hundert 2014	3[3,4,6]	1	56 months (100% Male)	41	3-5 year-olds (nr)
Jones 2004	1[4]	2	45-47 months (50% Male)	2	4 year-olds (67% Male)
Kalyva 2005	1[2]	5	46-55 months (100% Male)	25	preschool-aged (40% Male)
Katz 2013	5[3,4,6,8,9]	2	49-56 months (50% Male)	6	48-66 months (33% Male)
Katz 2015	1[6]	2	49-56 months (50% Male)	9	44-66 months (33% Male)
Kern 2006	2[4,9]	4	40-57 months (100% Male)	32[d]	2-5 year-olds (nr)
Kim 2010	1[5]	1	44 months (0% Male)	3	80-101 months (0% Male)
Kohler 1990	3[1,4,10]	2	4 year-olds (100% Male)	7	3-4 year-olds (nr)
Kohler 1995	4[1,4,7,10]	3	4 year-olds (100% Male)	6	40-62 months (100% Male)
Kohler 1997	1[4]	8	38-58 months (nr)	22	37-62 months (nr)
Kohler 2007	3[3,4,7]	1	57 months (0% Male)	6	4 year-olds (17% Male)
Lee 2015	4[3,4,6,7]	3	45-50 months (67% Male)	9	44-51 months (nr)
Lefebvre 1989	3[1,3,10]	1	53 months (100% Male)	6	43-65 months (50% Male)
Lorah 2014	1[3]	3	4 year-olds (67% Male)	3[e]	4-5 year-olds (67% Male)
McEvoy 1988	1[10]	1	4 year-old (100% Male)	6	62-69 months (50% Male)
McGee 1992	3[3,4,10]	2	43-49 months (100% Male)	3	53-59 months (0% Male)
McGrath 2003	2[4,7]	1	59 months (100% Male)	18	3-4 year-olds (56% Male)
Milam 2018	1[5]	4	45-53 months (50% Male)	8[c]	45-59 months (50% Male)
Nelson 2007	2[3,4]	4	45-53 months (100% Male)	nr	nr (nr)
Odom 1986	3[3,4,10]	3	4 year-olds (100% Male)	4	4-5 year-olds (75% Male)
Odom 1991	5[1,3,4,7,10]	1	42 months (100% Male)	4	4-5 year-olds (50% Male)
Pellecchia 2007	1[3]	2	4 year-olds (50% Male)	I	nr (nr)
Sainato 1987	2[1,4]	3	43-49 months (100% Male)	6	50-60 months (50% Male)
Sainato 1992	5[1,3,4,7,10]	3	43-56 months (100% Male)	3	47-55 months (33% Male)
Sawyer 2005	2[3,4]	1	4 year-old (100% Male)	nr	preschool-aged (nr)
Schleien 1995	1[1]	1	4 year-old (0% Male)	53	elementary-aged (nr)
Severini 2019	1[5]	1	38 months (0% Male)	4	36-63 months (nr)
Strain 1994	2[3,4]	2	3-4 year-olds (100% Male)	10	3-5 year-olds (nr)
Strain & Danko 1995	1[10]	3	3-4 year-olds (100% Male)	nr	nr (nr)
Strain & Kohler 1995	1[10]	3	3-4 year-olds (100% Male)	14	44-57 months (57% Male)
Thiemann-Bourque 2016	1[7]	3	36-55 months (67% Male)	7	40-59 months (nr)

Thiemann-Bourque 2017	3[4,6,7]	3	53-55 months (67% Male)	3	53-54 months (33% Male)
Trembath 2009	4[3,4,7,9]	2	3-4 year-olds (100% Male)	6	3-5 year-olds (50% Male)
Tsao 2006	2[5,10]	2	41-58 months (100% Male)	2	56-134 months (50% Male)
Zanolli 1996	3[3,4,10]	2	50-58 months (100% Male)	10[d]	4-6 year-olds (40% Male)

Note: [a] – Superscripts refer to review in which primary study was included: [1] – Chan 2009; [2] – Chang 2016; [3] – Chapin 2018; [4] – Gunning 2019; [5] – Ledford 2023; [6] – Martinez 2021; [7] – O'Donoghue 2021; [8] – Watkins 2015; [9] – Zagona 2018; [10] – Zhang 2011; [b] – months not included in table if not reported in primary study; [c] – study included one peer with a disability or delay; [d] – peers included children with and without disabilities, exact numbers not specified; [e] – all peers were children with disabilities; nr = not reported

Table 3. Intervention characteristics of studies included in peer-mediated intervention reviews

Primary study	Intervention strategies	Intervention setting
Barber 2016	IN, PR, R+	Center-based clinic
Belchic 1994	PR	Classroom
Bellini 2016	IN, PR, R+,	Classroom
Carr 1990	PR, R+, RM	Center-based school
English 1997	IN, PR, RM, PX	Classroom
Ganz 2008	IN, PR	Classroom
Garfinkle 2002	PX	Classroom
Goldstein & Cisar 1992	IN, PR, RM, PX	Classroom
Goldstein et al. 1992	IN, PR, R+, RM, PX	Classroom
Goldstein 1997	IN, PR, RM, PX	Classroom
Hall 1996	IN, PR, SM, RM, PX	Classroom
Haring 1989	PR, R+	Classroom
Hundert 2014	IN, PR, R+, PX	Classroom
Jones 2004	PX	Classroom
Kalyva 2005	SM, RM, PX	Classroom
Katz 2013	IN, PR, R+, PX	Classroom
Katz 2015	IN, PR, R+, SM, RM	Classroom
Kern 2006	PX	Classroom
Kim 2010	IN, PR, R+, RM, PX	Home
Kohler 1990	IN, PR, R+	Classroom
Kohler 1995	IN, SM, PX	Classroom
Kohler 1997	PX	Classroom
Kohler 2007	IN, PR, R+, SM, PX	Classroom
Lee 2015	IN, PR, R+, SM, PX	Classroom
Lefebvre 1989	IN, PR, R+, SM, PX	Classroom
Loarh 2014	R+, SM, PX	Center-based school
McEvoy 1988	RM, PX	Classroom
McGee 1992	IN, PR, R+	Classroom
McGrath 2003	IN, PR, R+, PX	Classroom
Milam 2018	IN, PR, RM, PX	Classroom
Nelson 2007	PR, PX	Classroom
Odom 1986	IN, PR, R+	Center-based school
Odom 1991	IN, PR, R+, SM, PX	Classroom
Pellecchia 2007	R+	Home, classroom
Sainato 1987	RM, PX	Classroom
Sainato 1992	IN, PR, R+, SM, RM, PX	Classroom
Sawyer 2005	IN, PR, R+	Classroom
Schleien 1995	IN, PR	Community museum
Severini 2019	IN, PR, SM, RM, PX	Classroom
Strain 1994	IN, PR, R+, PX	Classroom
Strain & Danko 1995	SM, RM, PX	Home

Strain & Kohler 1995	IN, SM, RM	Classroom
Thiemann-Bourque 2016	IN, RM, PX	Center-based school
Thiemann-Bourque 2017	IN, RM, PX	Classroom
Trembath 2009	IN, PR, R+, RM, PX	Classroom
Tsao 2006	IN, PR, SM, RM, PX	Home
Zanolli 1996	PR, R+	Classroom

Key: IN = peer initiation to focal child, PR = peer provision of a prompt to focal child; R+ = peer provides reinforcement to focal child; SM = peer and focal child share materials or toys; RM = peer contingently responds to focal child and helps maintain interaction; PX = peer stays in proximity to focal child

Table 4. Effects of Peer-mediated Interventions on Young Children with Disabilities

Review	Studies	Findings and conclusions on PMI of young children with disabilities
Chan (2009)	10	9 of 10 studies including CWD < 5 years old had positive effects; "Collectively, these [42] studies suggest that PMI is a potentially versatile and effective intervention approach" (p. 885)
Chang (2016)	1	1 of 1 study including CWD < 5 years old had a positive effect; "This review [across 5 studies] ... provides further support of the effectiveness of PMIs for children with ASD" (p. 9)
Chapin (2018)	17	16 of 17 studies including CWD < 5 years old had positive effects and showed a moderate and large effect, respectively, for PMI with children 3;0 to 3;11 and 4;0 to 4;11 years old (improvement rate difference effect size = 0.65 [SD = 0.29] and improvement rate difference effect size = 0.72 [SD = 0.07]); "This review [across 18 studies] provides evidence that [PMI] focused on teaching peers to support the communication of young children with ASD can result in positive changes in the social communication behaviors of children with ASD" (p. 453).
Gunning (2019)	29	22 of 29 studies including CWD < 5 years old had positive effects; "Positive findings [across 31 studies] lend support to the certainty of evidence demonstrated for PMI for preschool children with ASD ... PMI may be a particularly suitable intervention to support social development and social inclusion within inclusive preschool services" (p. 57)
Ledford (2023)	7	Meta-analytic finding showed very strong effects for PMI (log response ratio effect size = 1.12; 95% CI 0.48 to 1.77); "Results of both visual analysis and meta-analysis [across 9 studies] indicate positive outcomes for implementing peers and focal participants for improving broad social interactions during free play activities in preschool classrooms and homes" (p. 74)
Martinez (2021)	7	7 of 7 studies including CWD < 5 years old had positive effects; "The findings [across 18 studies] ... provide evidence that implementing PMI in general education settings is effective for improving the social competence of young children with ASD" (p. 225)
O'Donoghue (2021)	11	7 of 11 studies including CWD < 5 years old had positive effects, mixed findings in 4 of 11 studies; "The current review [across 25 studies] shows that [PMI] has the potential to increase interaction between children with autism and their peers in supportive communicative contexts." (p. 63)
Watkins (2015)	2	2 of 2 studies including CWD < 5 years old had positive findings; "The positive outcomes reported in these 14 studies suggest that PMI is a promising intervention for promoting social interaction between students with ASD and their peers in inclusive settings" (p. 1079)
Zagona (2018)	3	3 of 3 studies including CWD < 5 years old showed positive effects; "Overall, participants in the majority of the [17] reviewed studies demonstrated an increase in social-communication skills, including initiations, responses, and continuations" (p. 138)
Zhang (2011)	19	Meta-analytic finding showed very strong effects for PMI for children aged 3 to 5 years old; effect size = 1.78; "The overall effect sizes suggest that [PMI] were highly effective among children under eight years of

	age diagnosed with ASD for promoting social interactions" (p. 71); "more effective in younger children [children between 3 and 6 years old" (p. 69-70)

Key: CWD = children with disabilities; PMI = peer-mediated instruction; ASD = autism spectrum disorder; MA = meta-analysis; SD = standard deviation; CI = confidence interval

FIGURE CAPTIONS

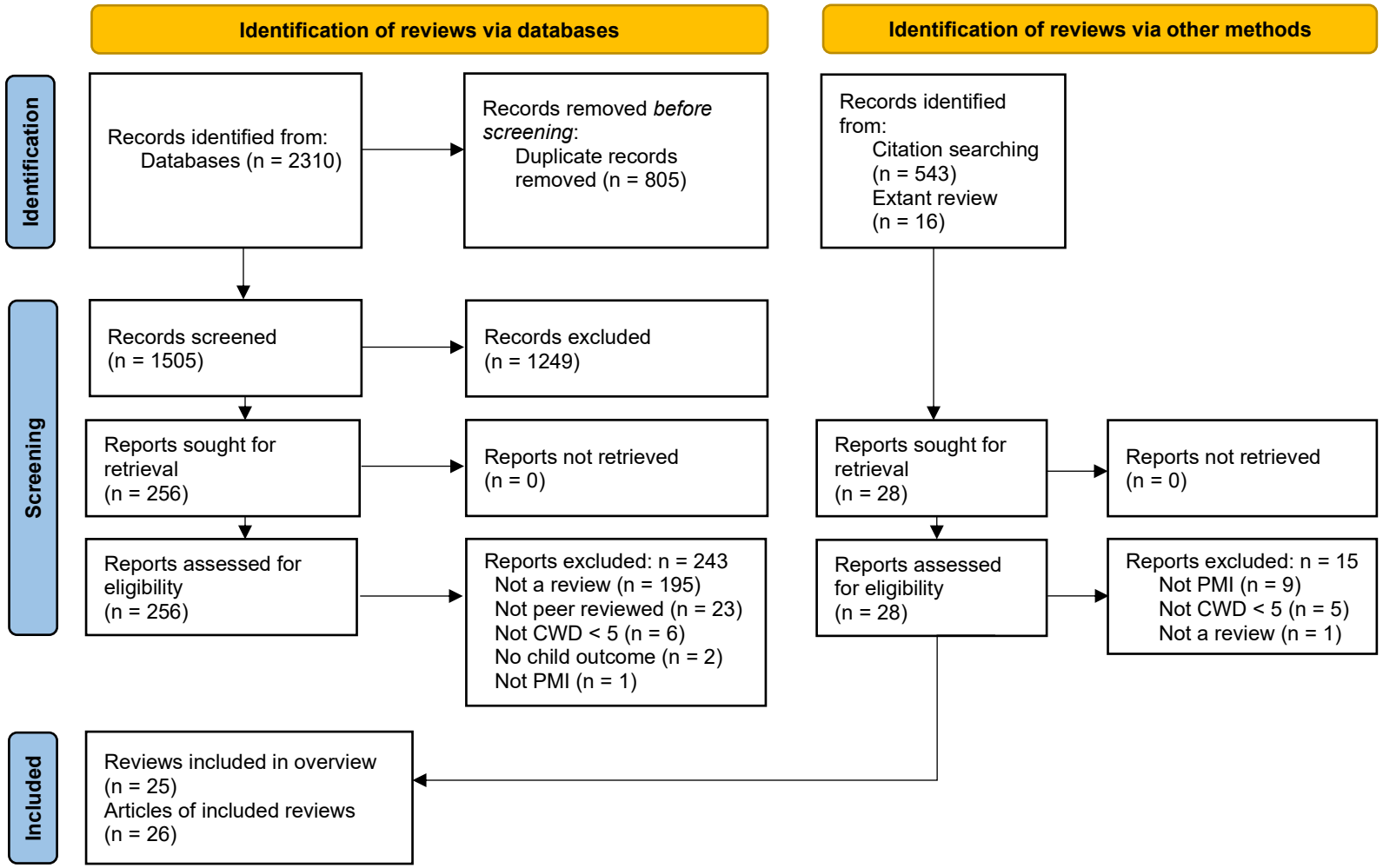
Figure 1. Flow Diagram of Review Selection

Figure 2. Year of Publication (in decades) of Primary Studies of Peer-mediated Interventions in 10 Primary Included Reviews

Figure 3. Graphical Representation of Overlap for OVerviews (GROOVE; Bracchiglione et al., 2022)

Figure 4. Critical Appraisal of Included Systematic Reviews

Figure 1. Flow Diagram of Review Selection



Flow Diagram adapted from: Page et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ, 372*, n71. https://doi.org/10.1136/bmj.n71

Figure 2. Year of Publication (in decades) of Primary Studies of Peer-mediated Interventions in 10 Primary Included Reviews

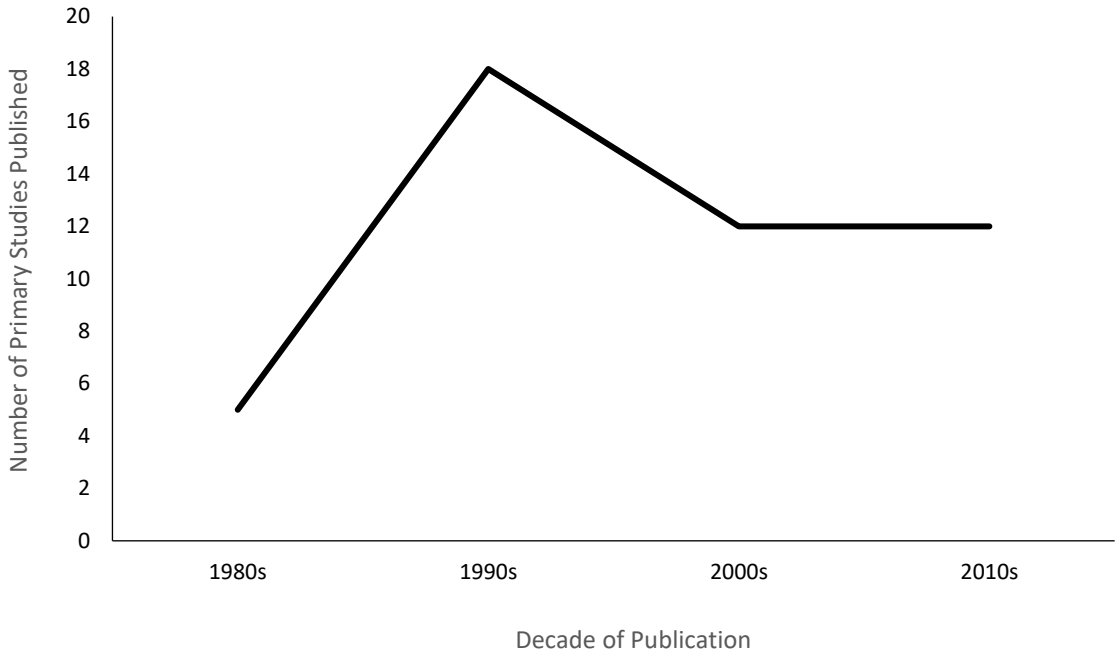


Figure 3. Graphical Representation of Overlap for OVerviews (GROOVE; Bracchiglione et al., 2022)

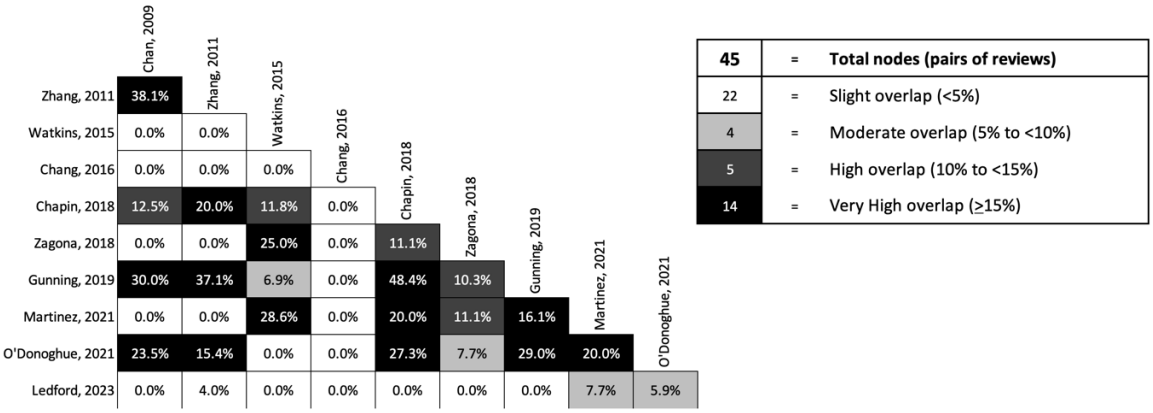
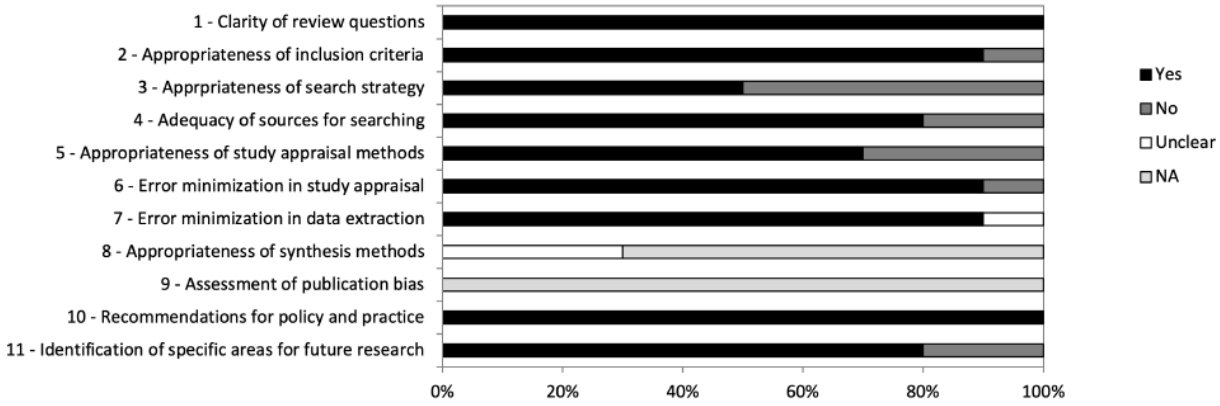


Figure 4. Critical Appraisal of Included Systematic Reviews



SUPPLEMENTAL MATERIALS

Supplemental Table 1. Reviews that included peer-mediated interventions for children under 5 years old and other social skills interventions

Supplemental Table 2. Citation Matrix Showing the Overlap of Primary Studies Across Included Reviews

Supplemental Text 1: Search Strategy for Medline, APA PsycINFO, Education Resource Information Center (ERIC), Cumulative Index of Nursing and Allied Health Libraries (CINAHL), and Academic Search Premier

Supplemental Text 2. References of Primary Research Studies Included in Reviews

Supplemental Table 1. Reviews that included peer-mediated interventions for children under 5 years old and other social skills interventions

					Studies of PMI with CWD < 5[a]				
Author and Year	Review type	Search date (range)	Study design	Total studies	Studies	Sample size	Age range (years)	Disability	Findings and conclusions of PMI of young children with disabilities
Bellini (2007)	SR, MA	2005 (1980 – 2005)	SCD	*K* = 55 (10 PMI)	nr	nr	PS[a]	ASD	Findings specific to PMI for CWD < 5 years old not reported.
Camargo (2014/2016)	SR, MA	2012 (1980 – 2012)	SCD	*K* = 19 (5 PMI)	*u* = 1	*n* = 3	2-5	ASD	Medium effects sizes (*Tau U* = 0.5, 0.6) shown in two studies with CWD < 5 years old
Goldstein (2014)	SR	n/r[b]	GD, SCD	*K* = 67 (23 PMI)	nr	nr	PS[a]	ASD	Findings specific to PMI for CWD < 5 years old not reported.
Hanline (2022)	SR	2020 (2010 – 2020)	SCD	*K* = 39 (32 PMI)	nr	nr	PS[a]	PDD, SLI, ASD, DD, DS, VI, CD, HI, ID,	"This review adds to existing knowledge by documenting that including peers in interventions for young children with a variety of disabilities results in positive change in a range of behaviors of young children with disabilities including social, communication, cognitive, play, and academic behaviors" (p. 181)
McConnell (2002)	SR	2001 (Oct.)	GD, SCD	*K* = 55 (16 PMI)	*u* = 9	*n* = 38	3-6	ASD	"Peer-mediated procedures represent a robust treatment approach for social interaction deficits among young children with autism" (p. 363)
Ozuna (2015)	SR	2013 (2009 – 2013)	SCD	*K* = 16 (3 PMI)	*u* = 2	*n* = 7	3-5	ASD	"The current results [for the 3 PMI studies] were mixed, with one intervention reporting results that indicated a high effectiveness … and a third that was effective in responding but not in initiating joint attention" (p. 112)
Pollard (1998)	SR	1996 (1986 – 1996)	SCD	*K* = 7 (2 PMI)	n/r	n/r	PS[a]	ASD	"Positive results were achieved in these [PMI] studies" (p. 8)
Reichow (2010)	SR	2008 (July)	SCD	*K* = 66 (10 PMI)	*u* = 3	*n* = 9	3-5	ASD	"In sum [across 10 PMI studies], interventions that train peers to deliver treatment has much support and should be considered a recommended practice for all individuals with autism" (p. 160)
Shivers (2015)	SR	n/r	SCD	*K* = 17 (9 PMI)	*u* = 6	*n* = 21	3-12	ASD	"The results of this review [of 17 studies] find sibling-mediated interventions … lead to positive outcomes for

		(1983 – 2012)[c]							children with ASD across a variety of skills and methods" (p. 693)
Therrien (2016)	SR	2015	SCD	*K* = 19 (17 PMI)	*u* = 4	*n* = 12	1-6	CP, ASD	"The positive results reported [across these 19 studies] showed that with support [including PMI], children who use AAC and their peers could interact more frequently during the school day" (p. 89)
Wang (2009)	SR, MA	2008 (1997 – 2008)	GD, SCD	*K* = 38 (9 PMI)	*u* = 1	*n* = 3	2-3	ASD	"Effectiveness of PMI strategies to improve social skills in children with autism remains to be questionable due to the low PND scores
Wang (2011)	SR; MA	2008 (Jan) (1994 – 2008)	SCD	*K* = 14 (9 PMI)	*u* = 3	*n* = 9	4-6	ASD	"The results of the current review [across 9 studies] indicate that [PMI is] effective in improving social behavior of children with ASD" (p. 566)
Watkins (2019)	SR, MA	2017 (1997 – 2017)	SCD	*K* = 28 (9 PMI)	*u* = 2	*n* = 7	3-4	ASD	"… PMI, which [is] recognized as [an] evidence-based practice by [the National Professional Development Center], resulted in large effects [across 11 studies] and should also be considered recommended intervention for this student population" (p. 502)
Whalon (2015)	SR, MA	2013 (Oct) (2000 – 2013)	SCD	*K* = 37 (6 PMI)	*u* = 3	*n* = 8	3-5	ASD	"Overall, peer-related social competence interventions delivered in school settings produced a moderate to high impact regardless of intervention type (i.e., child-specific, peer-mediated, multi-component, and collateral skill)." PMI specific studies (n = 6) with children aged 4-10 had large effect sizes (NAP = .95; Tau-U = 0.87) (p. 1526)
Wong (2015)	SR	2011 (1990 – 2011)	GD, SCD	*K* = 456 (15 PMI)	nr	nr	PS[a]	ASD	Positive effects of PMI were shown for social, communication, joint attention, play, and school readiness outcomes for preschool-aged children with ASD (see Table 3).

Key: PMI = peer-mediated interventions; CWD = children with disabilities; SR = systematic review; SCD = single case design; nr = not reported; PS = preschool; ASD = autism spectrum disorder; MA = meta-analysis; GD = group design; PDD = pervasive developmental disorder; SLI = specific language impairment; DD = developmental delay; DS = Down syndrome; VI = visual impairment; CD = conduct disorder; HI = hearing impaired; ID = intellectual disorder; CP = cerebral palsy; NAP = nonoverlap of all pairs

Note: [a] – reviews did not report the ages participants by study, but the inclusion criteria for the review indicated inclusion of preschool-aged children; [b] – year of publication of included studies (1982 to 2011 – search date not reported); [c] – year of publication of included studies (1983-2012 – search date not reported)

Supplemental Table 2. Citation Matrix Showing the Overlap of Primary Studies Across Included Reviews

	Chan, 2009	Chang, 2016	Chapin, 2018	Gunning, 2019	Ledford, 2023	Martinez, 2021	O'Donoghue, 2021	Watkins, 2015	Zagona, 2018	Zhang, 2011
Barber et al., 2016					X	X	X			
Belchic & Harris, 1994				X						X
Bellini et al., 2016				X						
Carr & Darcy, 1990	X			X						X
English et al., 1997					X					
Ganz & Flores, 2008			X	X		X		X		
Garfinkle & Schwartz, 2002			X	X						X
Goldstein & Cisar, 1992										X
Goldstein et al., 1992b AI	X		X	X			X			X
Goldstein et al., 1997					X					
Hall & Smith, 1996										X
Haring & Lovinger, 1989				X						X
Hundert et al., 2014			X	X		X				
Jones & Schwartz, 2004				X						
Kalyva & Avramidis, 2005		X								
Katz & Girolametto, 2013			X	X		X		X	X	
Katz & Girolametto, 2015						X				
Kern & Aldridge, 2006				X					X	
Kim, 2010					X					

Kohler et al., 1990	X			X								X
Kohler et al., 1995	X			X				X				X
Kohler et al., 1997				X								
Kohler et al., 2007			X	X				X				
Lee & Lee, 2015			X	X			X	X				
Lefebvre & Strain,1989	X			X								X
Lorah et al., 2014			X									
McEvoy et al., 1988												X
McGee et al., 1992			X	X								X
McGrath et al., 2003				X				X				
Milam, 2018					X							
Nelson et al., 2007			X	X								
Odom & Strain, 1986	X			X								X
Odom & Watts, 1991	X		X	X				X				X
Pellecchia & Hineline, 2007			X									
Sainato et al., 1987	X			X								
Sainato et al., 1992	X		X	X				X				X
Sawyer et al., 2005			X	X								
Schleien et al., 1995	X											
Severini et al., 2019					X							
Strain & Danko, 1995												X
Strain & Kohler, 1995												X
Strain et al., 1994			X	X								
Thiemann-Bourque et al., 2016								X				
Thiemann-Bourque, 2017				X			X	X				
Trembath et al., 2009			X	X				X			X	

Tsao & Odom, 2006			X	X
Zanolli et al., 1996	X	X		X

Supplemental Text 1: Search Strategy for Medline, APA PsycINFO, Education Resource Information Center (ERIC), Cumulative Index of Nursing and Allied Health Libraries (CINAHL), and Academic Search Premier

1. Peer mediat*
2. Peer support
3. Peer strategies
4. peer training
5. peer mentoring
6. peer modeling
7. peer network
8. peer tutoring
9. peer teaching
10. peer assistance
11. stay play talk
12. peer budd*
13. buddy skills
14. buddy system
15. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
16. infan* OR toddler* OR preschool* OR kindergarten* OR prekindergarten OR prek OR pre-k OR “young child*” OR daycare OR “day care” OR childcare OR “child care” OR “nursery school” OR “head start” OR “birth to 3” OR “birth to three” OR “early childhood”
17. delay* OR disabilit* or disorder* OR handicap* OR impair* OR retard*
18. 15 and 16 and 17

Supplemental Text 2. References of Primary Research Studies Included in Reviews

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