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REVIEW PAPER

Recess Should Include Everyone: a Scoping Review of Interventions Designed to Improve Social and Play Outcomes for Elementary Students with Developmental Disabilities at Recess

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Abstract

Recess represents a rich opportunity for social development, but students with intellectual and developmental disabilities (IDD) often do not fully realize these benefits. In this systematic review, we review 37 experimental studies in which students with IDD received interventions designed to improve social outcomes at recess. Overall, these studies provide strong scientific evidence that focused intervention can produce medium to large effects on peer interaction and peer play. A subset of studies reported effects on social skills and social status, although the presence and magnitude of effects was variable. Studies tended to focus on students with autism who did not have intellectual disability and involved a combination of classroom-based social skills instruction and support on the playground from peers or adults. We recommend that special educators deliver this combination of strategies to students with autism. Further research is needed for students with intellectual disability or multiple disabilities.

Keywords Peer-mediated intervention · Social skills intervention · Developmental disabilities

Recess is a rich opportunity to build friendships and learn important social skills. Through unstructured interactions, children learn how to cooperate, share, and take turns (Ramstetter et al. 2010). For example, children learn how to resolve conflict by considering another person's point of view and reaching a compromise (Pellegrini 2008). These benefits can last beyond elementary school, as researchers have demonstrated the degree to which children engage in social games at recess is predictive of their social competence and school adjustment in adolescence (Pellegrini et al. 2002). Indeed, the American Academy of Pediatrics has issued clear guidance that recess is a critical opportunity for social development that should be mandated in all elementary schools (Murray and Ramstetter 2013).

Unfortunately, many children with intellectual and developmental disabilities (IDD) do not fully benefit from opportunities for social development at recess. Developmental disabilities involve impairment in physical, learning, language, or behavior areas which begins in childhood and impacts an individual's daily functioning over a lifetime (CDC 2019). Some students with IDD and significant support needs do not have access to an inclusive recess (Pan et al. 2015). They only attend recess with other students with significant disabilities where they lack models for typical social interactions and play (Pan et al. 2015). Even when students with IDD do participate in an inclusive recess with typically developing peers, they may not experience the same positive social outcomes as other students. Compared to their peers, students with IDD have fewer social interactions at recess and are less likely to engage in peer play (Goldstein et al. 1992; Gresham 1984). In the absence of intervention, Brock et al. (2018) found that students with IDD only interacted with their peers for 13% of recess, and spent more than three-fourths of recess engaged in solitary play, stereotypic behavior, or standing or sitting still by themselves. Furthermore, students with IDD are at increased risk at recess for bullying and victimization (McNamara et al. 2018).

Despite a clear need to support the social development of students with IDD at recess, teachers often do not see recess as an opportunity for intervention. When asked, teachers recognize that their students with IDD struggle at recess, but typically think about recess as a break from instruction instead of an opportunity

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to intervene and improve social outcomes (Ramstetter et al. 2010; Ramstetter and Murray 2017). Teachers report that they have never considered the idea of intervening at recess, despite acknowledging that recess is a missed opportunity for their students to build social connections and develop social competence (Brock et al. 2018). Similarly, paraprofessionals are not typically directed to facilitate supports for students with disabilities during recess (Shih et al. 2019).

Fortunately, a growing body of literature demonstrates that recess-based interventions are a feasible and effective means to improve social outcomes for students with IDD. Researchers have been studying social interventions for students with IDD for over 20 years (e.g., Pierce and Schreibman 1997). These efforts have focused on many different IDD populations including students with intellectual disability (Han 2014), students with autism and significant support needs (e.g., Harper et al. 2008), and students with high functioning autism (e.g., Kasari et al. 2012). Researchers have reported promising outcomes on peer interactions (Brock et al. 2018), social skills (Harper et al. 2008), and social connections (Kasari et al. 2012).

Even with growing research evidence that supports recess-based interventions for students with IDD, there currently are no published reviews that synthesize the existing literature. Without such a review, it is unclear (a) how recess-based interventions are similar and different across studies and research groups; (b) the types of outcomes that have been targeted across studies; (c) the specific subpopulations of students with IDD who have been targeted; and (d) the degree to which these interventions have been shown to be effective across studies. These are critical issues that must be addressed before well-justified recommendations can be made to teachers about how to better support their students with IDD at recess.

In the present paper, we conduct a scoping review of the literature that addresses these issues. Specifically, we address the following research questions:

1. To what degree do recess-focused interventions improve social and play outcomes for elementary students with IDD at recess?
2. What are the characteristics of elementary students with IDD who have been targeted in these studies?
3. What intervention approaches have been used in these studies?

Method

Inclusion Criteria

We included studies that met four criteria. First, study participants must have been elementary students in grades 1–6 who had an intellectual or developmental disability based on an educational or medical diagnosis. Examples included an educational diagnosis of intellectual disability, autism, or multiple disabilities; or a medical diagnosis of autism, Down syndrome, fragile X, or Asperger syndrome. Second, the study must have tested the efficacy of an intervention on social or play outcomes that were measured at recess. Social outcomes were defined as any behavior involving interactions or communication with typically developing peers at recess. Examples include rate of peer interactions, social status based on peer nomination, number of friendships, and use of social skills at recess. Play outcomes encompassed any variable associated with quantity of play, quality of play, and use of specific play skills at recess. We included studies in which the intervention was delivered in other settings (e.g., the classroom) if outcomes were targeted and measured at recess. Third, interventions must have been tested using an experimental design that met Council for Exceptional (CEC) quality indicators for experimental studies (Cook et al. 2015). Specifically, studies must have utilized a single-case design that offered three opportunities to demonstrate and replicate effects, or a randomized controlled trial in which participants were randomly assigned to treatment and control conditions. Fourth, studies must have contrasted an experimental treatment to a baseline or business-as-usual condition. Comparative designs, such as an adapted alternating treatment design or a randomized controlled trial that compared two different interventions, were excluded. We focused solely on demonstration designs so that we could conduct an apples-to-apples comparison of interventions relative to a baseline condition.

Search Strategies

We used multiple search strategies to ensure all studies meeting the above criteria were identified (see Fig. 1). First, in September 2019, we searched four electronic databases: PsycINFO, ERIC, Social Services Abstracts, and Education Research Complete Academic. The complete search string is provided in Fig. 1. This electronic search yielded 349 hits. We used a two-step process to screen articles. Based on the review of title and abstract, we excluded any study that clearly (a) did not include elementary students (ages 6–12) with developmental disabilities, (b) did not take place in a school, or (c) did not include original data (e.g., literature review, conceptual paper), and (d) did not involve an intervention. Next, we conducted a full-text review on all remaining 97 articles and applied the inclusion criteria listed in the section above. Twenty-five of these articles met inclusion criteria.

For each of these 25 articles, we conducted a backward search (i.e., reviewing reference list) and forward search (screening all peer-reviewed studies that cited an article using Google Scholar). We identified 5 additional studies through the backward search and 6 studies through the forward search. Finally, we conducted a hand search of the *Journal of Applied*

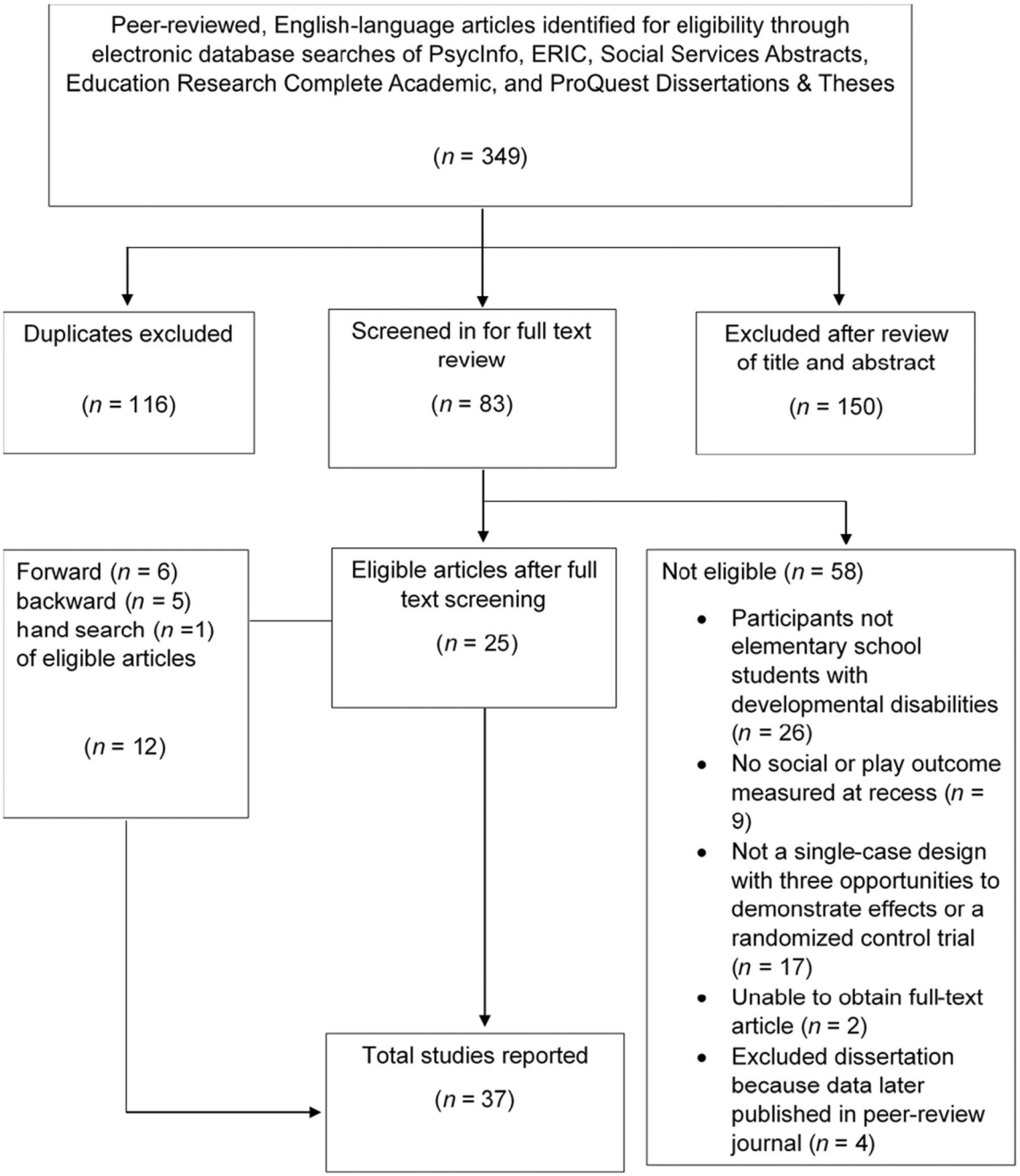

Fig. 1 Flow diagram of study search procedures

Behavior Analysis and *Exceptional Children* to ensure we had not overlooked studies. We searched all issues of these two journals since their inception. We identified one additional article that met inclusion criteria through this hand search. In total, we identified 37 articles that met inclusion criteria.

Student Characteristics

We coded student disability status, disability severity, and grade level. First, we coded if students met criteria for ASD and/or ID, the severity of intellectual disability, and the severity of autism symptoms. If authors reported that students had a specific severity of disability (e.g., moderate intellectual disability, severe autism), then we coded students accordingly. If authors did not provide a severity descriptor, but reported standardized diagnostic tests scores that can be interpreted in terms of disability severity, we coded disability severity as follows. For any test that yielded an intelligence quotient (IQ) on a standard scale, we interpreted scores as recommended in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychological Association 2013; > 70, no intellectual disability; 50–69, mild intellectual

disability; 36–49, moderate intellectual disability; 20–35, severe intellectual disability; < 20, profound intellectual disability). We applied autism severity descriptors when authors reported scores on the Autism Diagnostic Observation Schedule (ADOS; Gotham et al. 2006; mild, comparison score < 5; moderate, 5–7; severe, 8–10), the Childhood Autism Rating Scale (CARS; Schopler et al. 1986; mild to moderate, 30–36.5; severe, 37–60), the Gilliam Autism Rating Scale (GARS; Gilliam 2013; mild, 111–120; moderate, 121–130; severe, > 130), the Social Responsiveness Scale (SRS; Constantino and Gruber 2012; mild, 60–65; moderate, 66–75; severe, > 75), or the DSM-5 (mild, level 1; moderate, level 2; severe, level 3).

Next, we coded student grade level. If authors reported a student's grade level, we coded students accordingly. If an author did not report grade level but reported student age, we coded students age 6–7 as first grade, age 8 as second grade, age 9 as third grade, age 10 as fourth grade, age 11 as fifth grade, and age 12 as sixth grade.

Independent Variables

We coded the individual components of the intervention using five categories. These categories were developed iteratively to capture all the components utilized in the included studies. Categories included peer-mediated intervention (i.e., typically developing peers were trained by an adult to interact with the student), video modeling (i.e., the student watched a video that portrayed a person demonstrating a targeted social or play skill), reinforcement (i.e., the student was provided with social praise or tangibles after performing a target behavior in order to increase the likelihood that it would occur in the future), adult prompting on the playground (i.e., an adult reminded or provided assistance for the student to engage in a social, communication, or play behavior on the playground), and classroom-based social skills training (i.e., outside of recess time, teachers delivered direct instruction on social skills that could be generalized to recess). If an intervention included multiple approaches, we coded all categories that applied. For example, classroom-based social skills training was sometimes paired with video modeling (e.g., Radley et al. 2017), peer-mediated intervention (e.g., Owen-DeSchryver et al. 2008), or adult prompting (e.g., Kretzmann et al. 2015).

Experimental Design

We coded whether studies utilized a single-case design or a randomized controlled trial. For single-case designs, we coded the specific design (e.g., multiple baseline across participants, multiple baseline across behaviors, ABAB withdrawal designs).

Dependent Variables

We coded both the type of student outcomes that were measured in each study and the effects of the intervention on each outcome.

Types of Outcomes

We coded the types of student outcomes that were targeted and measured at recess. Types of outcomes included peer interactions (i.e., interactions between student and peers), time playing with peers (i.e., time engaged in peer play), gaining attention (i.e., approaching and gaining a peer's attention to start a conversation), solitary play (i.e., play in isolation of peers), social status (i.e., peer or teacher ratings of the student's social connections), adult perception of social skills (i.e., adult ratings on a questionnaire), challenging behavior (i.e., behavior that was inconsistent with recess rules), autism severity (i.e., measure of autism symptom severity), turn taking (i.e., alternating use of materials or roles in a game), stereotypic behavior (i.e., repetitive verbal or motor movements), child affect (i.e., observable signs of emotion), task completion (i.e., the target student's correct completion of steps on an activity schedule), friendship quality (i.e., a self-report of students' relationships with peers), and anxiety (i.e., measure of the student's worry, nervousness, or unease).

Study Effects

We summarized study effects differently depending on whether studies utilized a single-case design or a randomized controlled trial. For single-case design studies, we summarized effects by using success estimates (Reichow and Volkmar 2010). Success estimates are a ratio that summarizes visual analysis of the data in terms of the total number of experimental effects that were demonstrated (numerator) over the number of planned opportunities to demonstrate effects (denominator). If only a subset of participants in a study met inclusion criteria (e.g., Sansosti and Powell-Smith 2008), success estimates were calculated only for participants who met criteria. In a few multiple baseline across participant design studies, there were time points at which the intervention was introduced for multiple participants (e.g., Radley et al. 2017; McFadden et al. 2014). In these situations, we analyzed the data for only the first student.

For randomized controlled trials, we summarized effects using standardized mean effect sizes. Specifically, we divided the difference between the post-treatment experimental and comparison group means by a pooled standard deviation (i.e., Cohen's *d*; Borenstein et al. 2011). If authors did not report the post-treatment means and standard deviations, we calculated a Cohen's *d* by imputing the reported information (e.g., results of an analysis of variance) into the Campbell

Collaboration effect size calculator (Wilson 2020). When it was not possible to segregate effects for only the subset of interest, we report effects across all students (i.e., Corbett et al. 2017; Kretzmann 2012; Locke et al. 2019; Lopata et al. 2018).

Coder Training and Reliability

All coders were trained by (a) providing a detailed coding manual, (b) reviewing the coding manual through oral instruction, (c) assigning practice studies to code, and (d) providing detailed feedback on disagreements. Coders did not begin coding studies for this review until they achieved 95% agreement on a practice study. We calculated point-by-point agreement at each phase of the study. First, we calculated agreement on initial title and abstract screening for 53 (21.4%) of the 233 initial hits that were not duplicates. Agreement was 96.1%. Next, we calculated agreement for each individual variable that was coded during the full-text review for 17 (20.5%) of the 83 articles that were screened for full-text review. Average agreement across all variables was 92% (range 75–100%). Disagreements were resolved by having the two coders review the coding together and come to consensus. When consensus could not be reached, the coders consulted the first author.

Results

Student Characteristics

A total of 503 students with IDD were participants across studies. Of these 503, authors reported that 493 met criteria for only autism, 9 met criteria for both autism and intellectual disability, and 1 met criteria for only intellectual disability. When disability severity was reported, most students had mild autism (83%; i.e., 95 out of 114) or mild intellectual disability (71%; i.e., 3 out of 8). Numbers of students who met criteria for each disability severity descriptor are reported in Table 1.

Grade level was reported for students in 32 of 37 studies. Of these studies, interventions were implemented with 54 (21%) first-grade students, 68 (27%) second graders, 31 (12%) third graders, 56 (22%) fourth graders, 35 (14%) fifth graders, and 10 (2%) sixth graders. In 5 studies, the authors did not report age or grade level, which accounts for 249 students (50%).

Independent Variables

We coded each independent variable for five different intervention strategies (for a detailed study-by-study breakdown of these strategies, see Table 2). The most commonly used strategies included peer-mediated intervention (18 studies; 49%), video modeling ($n = 4$; 11%), reinforcement ($n = 18$; 49%), adult-delivered prompting ($n = 18$; 49%), and social skills training ($n = 25$; 68%). In most studies ($n = 31$; 84%), researchers used multiple approaches. Specifically, 15 studies used 2 approaches (41%), 11 studies used 3 approaches (30%), and 5 studies used 4 approaches (14%). The most common combinations of approaches were social skills training and peer-mediated intervention ($n = 16$; 43%), social skills training and adult-delivered reinforcement ($n = 14$; 38%), and social skills training and adult-delivered prompting ($n = 12$; 32%).

Experimental Design

We coded the type of experimental design for each study. Nine studies involved randomized controlled trials, and 28 involved single-case designs. Specific types of single-case designs included multiple baseline across participants ($n = 22$), multiple baseline across behaviors ($n = 2$), a multiple-probe design ($n = 1$), or a combination of designs ($n = 3$; e.g., reversal embedded within a multiple baseline design).

Dependent Variables

Type of Outcomes

The results of dependent variables measured across all 37 studies are reported in Table 3. The most commonly measured dependent variables were peer interactions ($n = 30$; 81%) and peer play ($n = 15$; 41%). Other dependent variables included gaining attention ($n = 11$; 30%), solitary play ($n = 6$; 15%), social status ($n = 3$; 8%), use of specific social skills ($n = 3$; 8%; e.g., using eye contact and socially appropriate voice volume), stereotypy ($n = 2$; 5%), adult perception of social skills ($n = 2$; 5%), ASD severity ($n = 2$; 5%), challenging behavior ($n = 1$; 3%), child affect ($n = 1$; 3%), task completion ($n = 1$; 3%), friendship quality ($n = 1$; 3%), and anxiety ($n = 1$; 3%). Most studies ($n = 25$; 68%) measured multiple outcomes.

Effects on Outcomes

Outcomes across all studies are reported by a dependent variable in Table 3. Success estimates are best interpreted as an indicator of consistency of effect (Reichow and Volkmar 2010) and Cohen's d can be interpreted as an indication of effect magnitude. We have adopted descriptors of magnitude for educational studies that were derived empirically from educational studies by Lipsey (1990): small, 0.15; medium, 0.45; and large, 0.90. Effects were consistent and small to very large for peer interactions. Effects were very consistent and large in magnitude for peer play. Effects were mixed for gaining attention, as effects were not demonstrated in about one-fourth of opportunities in single-case design studies, and there were both positive and negative effects in randomized

Table 1 Disability labels and severity of disability for students by study

Study	Intellectual disability (ID) status and severity						Autism spectrum disorder (ASD) status and severity					
	Students without ID or unreported (*n*=493)		Severity of ID for students with ID label (*n*= 10)				Students without ASD or unreported (*n*= 1)		Severity of ASD for students with ASD label (*n*= 502)			
	Status not reported (*n*=173)	Do not meet ID criteria (*n*=320)	Severity not reported (*n* = 3)	Mild ID (*n*= 5)	Moderate ID (*n*= 2)	Severe ID (*n*= 0)	Status not reported (*n*= 1)	Do not meet ASD criteria (*n*= 0)	Severity not reported (*n*= 388)	Mild ASD (*n*= 95)	Mild–moderate ASD (*n*= 11)	Moderate ASD (*n*= 5)
Alwahbi 2017		1[7]	1[1]	1[7]							2[5]	1[5]
Baker et al. 1998		2[7]						2[1]				
Biggs et al. 2018			1[1]					1[1]				
Bock 2007		4[7]							4[1]			
Brock et al. 2018		11[7]						11[1]				
Corbett et al. 2017		30[7]						30[1]				
Doody 2012	3							3[1]				
Han,2014				2[7]	2[7]			4[1]				
Hartzell et al. 2015	2		1[1]					2[1]				
Kasari et al. 2012		60[7]						60[1]				
Kim et al. 2017		2[7]						1[1]	1[1]			
Koegel et al. 2014	3							3[1]				
Kretzmann et al. 2015	24							20[4], 4[2]				
Kretzmann 2012	9							9[1,2]				
Licciardillo et al. 2008	4							4[1]				
Locke et al. 2019	89							89[1]				
Lopata et al. 2018		102[7]						102[1]				
Machalicek et al. 2009	3									2[3]		1[3]
Mason et al. 2014	3									3[3]		
McFadden et al. 2014	2									2[3]		
Miltenberger and Charlop 2014	3							3[1]				
Morrison et al. 2001	4									4[3]		
O'Hara and Hall 2014	2										2[1]	
Orton 2011	3							2[1]	1[1]			
Osborn 2015		3[7]						3[2]				
Owen-DeSchryver et al. 2008	1	2[7]						2[1]	1[1]			
Pierce et al., 1997		1[7]		1[7]				2[1]				
Radley et al. 2017	4							4[1]				
Rosenberg et al. 2015	3								1[6]		1[6]	1[6]

Table 1 (continued)

Study	Intellectual disability (ID) status and severity						Autism spectrum disorder (ASD) status and severity					
	Students without ID or unreported ($n = 493$)		Severity of ID for students with ID label ($n = 10$)				Students without ASD or unreported ($n = 1$)		Severity of ASD for students with ASD label ($n = 502$)			
	Status not reported ($n = 173$)	Do not meet ID criteria ($n = 320$)	Severity not reported ($n = 3$)	Mild ID ($n = 5$)	Moderate ID ($n = 2$)	Severe ID ($n = 0$)	Status not reported ($n = 1$)	Do not meet ASD criteria ($n = 0$)	Severity not reported ($n = 388$)	Mild ASD ($n = 95$)	Mild–moderate ASD ($n = 11$)	Moderate ASD ($n = 5$)
Sabey 2015	4							4[1]				
Sansosti and Powell-Smith 2006		3[1]							3[4]			
Sansosti and Powell-Smith 2008		2[7]						1[1]	1[5]			
Shih et al. 2019		80[7]							80[2]			
Vincent et al. 2018	5							5[1]				
Wiegand 2003		2[7]		1[7]					3[1]			
Wilson 2017		4[1]						4[1]				
Wood et al. 2014		13[7]						13[1]				

[1] Based on author description; [2] based on ADOS scores (mild, comparison score < 5; moderate, 5–7; severe, 8–10); [3] based on CARS scores (mild to moderate, 30–36.5; severe, 37–60); [4] based on DSM levels (mild, level 1; moderate, level 2; severe, level 3); [5] based on GARS scores (mild, 111–120; moderate, 121–130; severe, > 130); [6] based on SRS scores (mild, 60–65; moderate, 66–75; severe, 76 or higher); [7] based on any type of IQ test (none, > 70; mild, 50–69; moderate, 35–49; severe, < 35)

Table 2 Intervention components by study

Study	Peer-mediated instruction	Video modeling	Reinforcement	Adult prompting	Social skills training
Alwahbi 2017	✓				✓
Baker et al. 1998				✓	✓
Biggs et al. 2018	✓				
Bock 2007					✓
Brock et al. 2018	✓		✓		✓
Corbett et al. 2017	✓	✓			
Doody 2012					✓
Han 2014					
Hartzell et al. 2015			✓	✓	✓
Kasari et al. 2012			✓	✓	
Kim et al. 2017				✓	
Koegel et al. 2014		✓			
Kretzmann et al. 2015				✓	✓
Kretzmann 2012	✓		✓	✓	✓
Licciardillo et al. 2008			✓	✓	✓
Locke et al. 2019	✓			✓	✓
Lopata et al. 2018			✓		✓
Machalicek et al. 2009			✓	✓	
Mason et al. 2014	✓		✓	✓	✓
McFadden et al. 2014	✓		✓		✓
Miltenberger et al., 2014			✓	✓	
Morrison et al. 2001			✓	✓	✓
O'Hara and Hall 2014			✓	✓	
Orton 2011	✓		✓	✓	✓
Osborn 2015	✓		✓	✓	✓
Owen-DeSchryver et al. 2008	✓				✓
Pierce and Schreibman 1997	✓				✓
Radley et al. 2017	✓	✓			✓
Rosenberg et al. 2015			✓		✓
Sabey 2015			✓		✓
Sansosti and Powell-Smith 2006					✓
Sansosti and Powell-Smith 2008	✓	✓	✓	✓	
Shih et al. 2019	✓			✓	✓
Vincent et al. 2018			✓	✓	
Wiegand 2003	✓		✓		✓
Wilson 2017	✓				✓
Wood et al. 2014					✓

Peer-mediated instruction, instruction included typically developing peers; video modeling, intervention included video modeling either by peers or adults; reinforcement, the intervention included reinforcement delivered to the student with a disability; adult prompting, intervention involved an adult prompting the student with a disability to engage in behavior on the playground; social skills training, the intervention involved direct instruction on social skills outside of the time that the children were playing

controlled trials. In 6 studies, students experienced small to very large reductions in solitary play, although there was a small increase in one study. There were small and moderate increases in social status in three studies, and no effect in a fourth study. For other specific social skills, effects were inconsistent across single-case design studies (i.e., effects demonstrated in 65% of opportunities).

Discussion

For many students with IDD, recess is a missed opportunity for peer interaction and social development. However, with focused intervention, it is possible to improve outcomes for these students at recess. In this scoping review, we analyzed all experimental studies that tested an intervention to improve

Table 3 Success estimates and effect sizes by dependent variable across studies

		Single-case designs		Randomized controlled trials
Dependent variable	Number of studies	Success estimate	%	*d*
Interaction	29 (SCD 24; RCT 5)	107/118	91	0.21, 0.87, 1.13, 1.27, 1.36
Time playing with peers	15 (SCD 13; RCT 3)	22/22	100	0.77, 0.89, 1.34
Gaining attention	10 (SCD 8; RCT 2)	46/60	77	−0.15, 0.47, 0.53
Solitary play	6 (SCD 0; RCT 6)	-	-	−2.37, −1.47, −0.49, −0.44, −0.31, −0.29, 0.19
Social status	3 (SCD 0; RCT 3)	-	-	0.03, 0.35, 0.74, 0.76
Specific social skills	3 (SCD 3; RCT 0)	26/40	65	-
Adult perception of social skills	2 (SCD 0; RCT 2)	-	-	0.4, 0.44,
Challenging behavior	2 (SCD 1; RCT 1)	3/3	100	−1.34
ASD severity	1 (SCD 0; RCT 1)	-	-	−1.15
Turn taking	1 (SCD 1; RCT 0)	4/4	100	-
Stereotypy	1 (SCD 1; RCT 0)	4/4	100	-
Child affect	1 (SCD 1; RCT 0)	2/2	100	-
Task completion	1 (SCD 1; RCT 0)	3/3	100	-
Friendship quality	1 (SCD 0; RCT 1)	-	-	1.62
Anxiety	1 (SCD 0; RCT 1)	-	-	0.22

RCT, randomized controlled trial; *SCD*, single-case design. Success estimates (Reichow and Volkmar 2010) are a ratio of the number of experimental effects that were detected through visual analysis over the number of opportunities to demonstrate an effect. We report author-reported Cohen's *d* values when provided. When they were not provided, we used the available information to calculate effect size ourselves

social outcomes at recess for elementary students with IDD. Specifically, we examined student characteristics, intervention approaches, and the degree to which these interventions improve social and play outcomes for these students. We identified 37 studies that tested interventions for students with intellectual and developmental disabilities at recess. Overall, findings across studies provide strong scientific evidence that teachers can improve social outcomes at recess using focused interventions. Most studies involved intervention approaches that paired classroom-based social skills instruction with additional supports at recess, included students with autism who did not have intellectual disability, and focused on the number of times students interacted with their peers as a primary outcome. These findings extend our understanding of the literature in a number of ways.

First, results across studies provide strong scientific evidence that focused intervention can increase the number of times students with IDD interact with their peers at recess as well as the time they spend playing with peers. One or both of these outcomes was measured in 34 of the 37 studies in this review, with very consistent demonstrations of effects across single-case design studies and small to very large effect sizes across randomized controlled trials. These effects are very encouraging, as increased interactions and peer play provide the desired natural context for students with IDD to naturally learn and practice social skills (Ramstetter et a. 2010). In addition, increasing engagement with peers provides opportunities to build friendships with others and become a more integral part of classroom social networks. Indeed, a subset of studies in this review confirm that increasing peer interactions and play leads to improved social skills such as gaining attention and turn taking. Students experienced moderate increases in social status based on ratings from peers and teachers in three experiments, although there was a negligible effect in a fourth study.

Second, most studies taught students social skills in classroom-based instruction, and then used additional strategies to ensure that these skills generalized to the playground. These additional strategies included peer-mediated intervention and adult-delivered prompting and reinforcement. This combination of strategies may be particularly well suited for delivering sufficient intensity of instruction to ensure that students initially acquire social skills in the classroom, and sufficient support to ensure that they successfully generalize these skills to the playground. In addition, peer-mediated interventions are designed to increase opportunities for peer interaction and make peers more receptive to attempts by students with IDD to practice social skills. This creates a context where students are more likely to naturally encounter positive reinforcement for prosocial behavior, increasing the likelihood that they will continue to maintain these behaviors over time (Brock et al. 2018).

Third, in cases that disability severity was reported, a large majority of students had a diagnosis of autism and did not have intellectual disability, and most had mild or mild–moderate autism symptoms. Therefore, it is only reasonable to make strong claims of efficacy that are specific to this

subpopulation of students. Based on the most recent estimates from the US Center for Disease Control (CDC), about two-thirds of children with autism do not have intellectual disability (Baio et al. 2018). For the one-third of students with autism who also meet criteria for intellectual disability, students with intellectual disability alone, and students with multiple disabilities, additional research is needed to make strong claims of efficacy. Focusing more research on students with the most significant support needs is critically important, because these students are at risk for the poorest social outcomes (Newman et al. 2011) and likely require more intensive interventions compared to students with less significant support needs.

Implication for Practice

Findings from this study have implications for special educators. First, these findings demonstrate that recess can be an effective time to intervene with students who have intellectual and developmental disabilities. Therefore, we recommend that special educators view recess as an opportunity to intervene with students with IDD who have social and communication deficits. In cases that teachers are eating lunch or fulfilling other responsibilities during recess, teachers might train and direct the paraprofessionals who are supervising recess to effectively facilitate peer-mediated intervention or deliver prompting or reinforcement on the playground (Brock et al. 2018; Kretzmann et al. 2015). Second, when delivering social skills instruction, teachers should focus specifically on skills that can be used on the playground. Examples of skills that have been targeted in the literature include appropriately gaining peer attention, sharing play materials, maintaining eye contact, and using socially appropriate voice volume. Then, teachers should design supports on the playground that enable students to generalize these skills. In this review, promising forms of support on the playground included peer-mediated intervention, and adult-delivered prompting and/or reinforcement for prosocial behaviors. Third, given that the majority of this research focuses on students with autism who do not have intellectual disability, teachers should closely monitor how students with intellectual disability and multiple disabilities respond to these interventions and make data-based adjustments as needed.

Limitations and Future Directions

Limitations of our review process suggest potential avenues for future literature reviews. First, we were interested in elementary-aged students and therefore excluded all studies involving preschoolers and kindergartners. We did this because we anticipated that interventions would need to be tailored differently to this younger population. In future reviews, scholars may wish to focus on the play of very young children with disabilities. Another limitation is that given the lack of consensus around a standardized effect size for single-case designs, we elected to use a descriptive measure that indicates consistency of effects but not magnitude of effect (i.e., success estimates; Reichow and Volkmar 2010). As empirical evidence emerges to support effect size metrics, researchers may be able to confidently summarize magnitude of effects in future reviews.

Limitations of the reviewed research literature also suggest avenues for future research. First, in many studies that we reviewed, authors did not indicate whether students with autism also had intellectual disability, nor did they describe student disability severity. In future studies, we strongly recommend that authors include this information so that the reader can understand for whom an intervention might be effective. Second, many research groups used different research-created protocols to measure the same type of dependent variable (e.g., peer interactions; peer play). In future studies, researchers might collaborate to use common measures to enable readers to make more direct comparisons of outcomes across studies. For example, we recommend that researchers either publicly post or make available upon request their protocols for measurement. Third, only a few studies in this review involved implementation by teachers and paraprofessionals. In future studies, we recommend that researchers partner with teachers and paraprofessionals to test the degree to which interventions are effective with authentic implementation agents under real-world conditions. Additional directions for future research may include testing approaches across outdoor and indoor recess, testing differences between students with ASD and students with other developmental disabilities, and studying the degree to which effects maintain over longer periods of time.

Conclusion

Recess is often a missed opportunity for social interaction and development for students with IDD. In this review, we found strong experimental evidence that focused intervention can improve peer interaction and peer play for students with autism who do not have intellectual disability. Based on evidence that focused interventions can indeed improve outcomes at recess, we strongly recommend that teachers treat recess as an opportunity for intervention. With well-designed approaches that leverage direct instruction and peer-mediated intervention, there is no need for recess to continue to be a missed opportunity for social development for students with IDD.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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