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## Improving Social and Play Outcomes for Students with Significant Disabilities During Recess

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**Improving Social and Play Outcomes for Students  
with Significant Disabilities During Recess**

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**Abstract**

For students with autism, recess is often a missed opportunity to develop social competence and relationships. Although interventions have been developed to promote interactions and social skills for students with average or above average intellectual functioning, there has been less focus on students with autism who have below average intellectual functioning or who meet criteria for intellectual disability. In this single-case design study, we tested the efficacy of a combined peer-mediated and social skills instruction intervention on the interactions, play, and social skills of three students with autism who met their state's criteria for alternate assessment for students with significant cognitive disabilities. Social skills instruction featured video models that portrayed same-aged peers demonstrating individualized social skills on the playground. For all three students, there were substantial increases in interactions, play and social skills, and students and their peers provided positive feedback about the intervention.

*Keywords:* significant disabilities; autism; recess; peer-mediated interventions; video modeling

## **Improving Social and Play Outcomes for Students with Significant Disabilities During Recess**

Autism spectrum disorder (ASD) encompasses students with a diversity of support needs (American Psychiatric Association, 2013). Specifically, students with significant disabilities often struggle to develop social competence and connections at school (Carter et al., 2016). These challenges stem from underlying social communication impairment associated with autism, but can be exacerbated by how students with significant disabilities are commonly educated and supported (Giangreco, 2021). For example, students with significant disabilities are often taught in separate classrooms and schools where they only have limited opportunities to interact with peers without disabilities (U.S. Department of Education, 2021). Even when students with significant disabilities are placed in general education classrooms, they may not benefit from opportunities for social development without adequate supports. Observational data from general education classrooms shows that students with significant disabilities may sit on the periphery of the classroom with adult support staff instead of among peers and may have limited interactions with peers (Feldman et al., 2016).

Two evidence-based practices that can improve social outcomes for students with autism are peer-mediated intervention and video modeling (Hume et al., 2021). Distinct peer-mediated interventions have been developed to match different goals and contexts in schools. For example, peer support arrangements involve peers providing both academic and social support to students with significant disabilities in general education classrooms with coaching from an adult (Brock & Huber, 2017). Peer network interventions involve regular meetings to promote social support and participation during non-academic activities, such as lunch and after-school clubs and social events (Asmus et al., 2017).

Video modeling involves video exemplars of target behaviors and has been studied extensively to teach new social communication behaviors to children with ASD (Qi et al, 2018). Examples of specific social communication skills targeted by video modeling include requesting (Wert & Neisworth, 2003), conversation skills (Scherer et al., 2001), sharing (Marzullo-Kerth et al., 2011), and eye contact (Tetreault & Lerman, 2010). Based on their systematic review of this literature, Qi et al. concluded that video modeling met What Works Clearinghouse (WWC) standards as an evidence-based practice for improving social communication skills for children with ASD.

In a handful of studies, peer-mediated intervention has been paired with video modeling. For example, Dueñas et al. (2021) combined video modeling with a peer-mediated intervention to promote social communication behaviors of three preschool children with ASD. They found that this intervention package led to consistent effects on social communication exchanges that maintained and generalized to new contexts. In a different study, Bellini et al. (2016) tested a combination of video self-modeling and a brief peer-training intervention on social engagement for three preschool children with ASD. They implemented self-video modeling alone before adding the peer-training intervention. They found large effects for self-video modeling, and limited effects with the addition of the peer-training intervention.

In the present study, we paired peer-mediated intervention with video modeling to target social interactions and play for elementary students at recess. Recess is a particularly compelling context for intervention, because it represents an important opportunity to develop social competence and build social connections (Ramstetter et al., 2017). Longitudinal research shows that the degree to which children engage in social games at recess predicts their future social competence and school adjustment (Pellegrini et al., 2002). This critical opportunity for social

development has been cited as a key reason why recess should be mandated in all schools by the American Academy of Pediatrics (Ramstetter et al., 2010) and the National Association for Sport and Physical Education's Council on Physical Education for Children (2006).

Many students with autism spectrum disorder (ASD) miss out on these opportunities to develop social competence and connections during recess. Studies show that without interventions focused directly on social and play skills, children with ASD continue to be isolated even within a rich social environment (Goldstein et al., 1992; Pierce & Schreibman, 1997b). Even in inclusive settings, children with ASD are unlikely to attend to their peers as models or imitate their actions in the absence of a focused intervention (DiSalvo & Oswald, 2002). Harper et al. (2008), observed that students with ASD showed little to no interaction during recess time prior to intervention, and Brock et al. (2018) found that on average students with significant disabilities only interacted with their peers for 13% of recess. More often, these students spent their time engaged in solitary play (58% of recess), stereotypic behavior in the absence of any other play (13%), or simply standing or sitting still (12%; Brock et al., 2018).

Researchers have begun to focus on this problem by testing and developing interventions. In their systematic review, Brock et al. (2021) identified 37 experimental studies of recess-based interventions for elementary students with developmental disabilities. Overall, studies provided strong scientific evidence that recess-focused interventions can produce medium to large effects on social interaction and play. However, nearly all studies in the review focused on students with autism who had average or above average intellectual functioning. For example, Kretzmann et al., (2015), used an approach that involved paraprofessionals priming children for engagement, delivering social skills instruction, facilitating peer conversations, selecting and starting games, and supporting and sustaining engagement. The intervention was designed for students with

advanced reading skills, the ability to communicate verbally and have sophisticated conversations, and the ability to comprehend abstract ideas from verbal instruction (Kretzmann et al., 2015). In contrast, students with ASD and below average intellectual functioning require intervention that accommodates more limited verbal communication and use of Augmentative and Alternative Communication (AAC), involves repeated explicit instruction on social rules, and does not require acquisition of content through independent reading.

In this study, we test an intervention that was developed specifically for students with ASD who meet diagnostic criteria for ID. The first component is peer-mediated intervention grounded in the principles of Pivotal Response Training (PRT; Pierce & Schreibman, 1997a). Peers are taught to use five practical strategies for engaging and playing with peers: (a) get your buddy to look at you, (b) ask your buddy to play something with you, (c) show and talk about how to play, (d) compliment your buddy, and (e) if you can't play at the same time, take turns. An adult teaches the peers the strategies and then coaches them to apply the strategies on the playground. This approach has increased the number of times that students with ASD and ID interact with their peers (Brock et al., 2018), but has a limited impact on social skills (Harper et al., 2008). Harper and colleagues used a multiple probe across participants design to test the effects of peer-mediated PRT on social interactions at recess for two elementary students with ASD. Both students experienced increased social interactions with peers, but the student with ASD and ID demonstrated limited progress on social skills. Brock et al. (2018) used a randomized controlled trial to test the same peer-mediated intervention on social interactions and play behavior of 11 elementary students identified with ASD during recess. There was a statistically significant effect on social interactions. Peer play increased over time, but this change was not statistically significant. The authors suggested that the lack of statistical

significance might stem from the design of this underpowered pilot study. Findings from both studies suggest that peer-mediated intervention is an effective means to change the recess context, providing students with new opportunities for peer play and social interactions. However, students may need additional supports to add new social skills to their repertoire (Harper et al., 2008).

Therefore, we propose pairing a peer-mediated intervention with video modeling that is designed to expand social skill repertoires. Specifically, we propose video modeling that provides explicit instruction on social skills that students can practice at recess. Several studies show promise for how video modeling can improve social skills during recess or play activities. For example, Buggey and colleagues (2011) showed that video modeling enabled students with ASD and significant support needs to approach and initiate interactions with their peers on the playground. Other studies used video modeling to target social skills on the playground for students with autism and less intensive support needs. In general, these approaches were effective (Bellini et al., 2007; Radley et al., 2014; Sansosti & Powell-Smith, 2008), but in some cases there found mixed results (Oh-Young et al., 2018). In Oh-Young et al., 2 of the 5 participants did not benefit from video modeling or the peer-mediated intervention.

In the present study, we combine a promising peer-mediated intervention that has been validated for students with ASD and ID (Harper et al., 2018; Brock et al., 2018) with a video modeling approach that has been successful with students with ASD and significant support needs (Buggey et al., 2011). Specifically, we address the following research questions:

1. What are the effects of a combined peer-mediated and video modeling intervention on interactions, peer play, individualized social skills for elementary students with ASD at recess?



2. How do students with disabilities, peers, and school staff perceive the feasibility and acceptability of the intervention approaches?

## **Method**

### **Participants: Students with Disabilities**

We recruited three students with ASD from the elementary school where the first author was employed as a special education teacher. To be included in this study, students must have (a) received special education services under the category of autism, (b) qualified for their state's Alternate Assessment for Students with Significant Cognitive Disabilities; (c) participated in an individualized education program (IEP) with an IEP goal that included a social or communication goal; and (d) rarely interacted with peers during recess. Students provided their assent, and their parents provided their permission prior to participation. Individual participants are described below. Test scores are provided from school records, which show a wide range of intellectual functioning. Two of the students (Abdul and Juan) were suspected to have intellectual disability, but none of the students had a primary or secondary educational label of intellectual disability.

### ***Abdul***

Abdul was an 8-year-old Black male in the first grade. Abdul exhibited deficits in communication, social skills, sensory difficulties and interactions with others. Abdul was identified as ELL because his family's first language was Creole; however, he used only English when he communicated. He received most educational services in a self-contained special education classroom with an 8:4 student-to-adult ratio and attended the general education classroom daily for a 30-min circle time lesson and weekly for Art and Music (each a 45-min session). Abdul had a standard IQ score of 44 (< .1 percentile) on the Kaufman Brief Intelligence

Test, second edition (KBIT-2; Kaufman, 2004). He had a General Adaptive Composite (GAC) standard score of 74 (4th percentile) on the Adaptive Behavior Assessment System—3rd Edition (ABAS-3; Harrison and Oakland, 2015). Abdul's IEP stated that he could communicate in five or more-word utterances (depending on his interest level) and his expressive, receptive, and pragmatic language skills were not age appropriate as compared with his same age peers, according to *Brown's Stages of Language Development* (Brown, 1973). He continued to exhibit difficulty with self-expression in all classroom experiences, specifically in the areas of commenting, requesting, or protesting his wants/needs; answering wh- questions appropriately; following two-step directions with embedded basic concepts; and attending to the speaker/listener.

### ***Juan***

Juan was a 7-year-old Hispanic male in the first grade. Juan's first language was Spanish, first language was Spanish, but he conversed with his teachers in English and received all of his instruction in English. Juan received services in a self-contained special education classroom for more than 60% of the school day with an 8:4 student-to-adult ratio and attended the general education classroom daily for a 30-min circle time lesson daily and weekly for Art and Music (each a 45-min session). Juan had a standard score of 43 on the KBIT-2 and a GAC of 64 (2<sup>nd</sup> percentile) on the ABAS-3. Juan used verbal language to communicate, and also used Picture Exchange Communication System to augment his speech (PECS; Bondy & Frost, 1994). Juan's IEP stated that he could communicate using up to five-word utterances given a model, and that his expressive, receptive, and pragmatic language skills were not age appropriate as compared with his same age peers according to *Brown's Stages of Language Development* (Brown, 1973). The IEP also stated he continued to exhibit difficulty with self-expression in most classroom

experiences, specifically in the areas of vocabulary development; formulating simple phrases to comment, request, or protest; following 1–2 step directions with embedded basic concepts; asking for help; and attending to the speaker/listener.

### ***Franco***

Franco was an 8-year-old Hispanic male in the second grade. He had significant difficulty processing and using language, exhibited delays in adaptive behavior, self-regulation and had significant behavioral issues that adversely affected his educational functioning. He also exhibited a speech/language disability which adversely affected his educational performance, specifically related to socialization. Franco's first language was Spanish, but he conversed with his teachers in English and received all of his instruction in English. Franco received services in a self-contained special education classroom for more than 60% of the school day with an 8:4 student-to-adult ratio and attended the general education classroom an average of 4 times a week for a 30-min circle time lesson daily and weekly for Art and Music (each a 45-min session). Franco was not always able to stay for the complete duration in general education environment due to disruptive behavior. Franco had a standard score of 77 (9<sup>th</sup> percentile) on the KBIT-2, and a GAC of 74 (4<sup>th</sup> percentile) on the ABAS-3. Franco's IEP stated that expressive, receptive, and pragmatic language skills were not age-appropriate as compared with his same age peers, according to *Brown's Stages of Language Development* (Brown, 1973). He continued to exhibit difficulty with self-expression in most classroom experiences, specifically in the areas of commenting, requesting, or protesting in simple sentences; following two-step directions with embedded basic concepts; attending to the speaker/listener by using appropriate eye contact; turn-taking; and topic maintenance in a group setting.

### **Participants: Peers Without Disabilities**

We recruited three to five peers without disabilities to serve as network members for each student with autism. Based on recommendations from previous studies (Brock et al., 2018) we recruited peers who were dependable, demonstrated appropriate social skills, took direction from adults well, and who shared the same lunch/recess period. When possible, we targeted peers who met the above criteria and (a) shared the same native language as the target student and/or (b) had a history of positive interactions with the target student. We shared these criteria with general education teachers, who recommended specific peers. Twelve peers without disabilities participated in this research study. Abdul's peer network included one Black female, one Black male, one Multiracial female, and two Hispanic males. Juan's peer network included one Multiracial female, one White male, and one Black male who was fluent in Spanish. Franco's peer network included two Black females and two Hispanic females who were fluent in Spanish. Eight of the 12 peers had some previous interactions with the students with disabilities during a classroom buddy reading program in which they participated in a 45-min reading activity in the special education classroom about once per month.

### **Setting**

Students attended a large urban elementary school with over 500 students. The racial and ethnic makeup of the school was approximately 50% Black, 25% Hispanic, 15% White, 10% Multiracial, and 1% Asian. Initial peer training sessions were held in a special education classroom (without any other students present) during lunch. Peers brought their lunch to the special education classroom and sat at a large table with the first author for a one-time 25-min training session. Video modeling on individualized social skills goals occurred in the same special education classroom, immediately before students left for lunch and recess. The peer-mediated intervention was implemented on the playground during recess. The playground had a

set of swings, a jungle gym, two sets of monkey bars, a slide, a large soccer field with goal nets, a basketball court, a Gaga pit (i.e., a variant of dodgeball), six tetherballs, an area on the blacktop for racing, four-square court, jump ropes, and an open field to play other games (e.g., soccer). About 180 students were on the playground at one time, and they were supervised by 4-5 adults.

### **Design and Study Conditions**

We utilized a concurrent multiple probe across participants design (Ledford & Gast, 2018) to evaluate the effects of the two-part intervention (described below). We chose a multiple probe because we did not think it would be feasible to collect data every day. To enhance the rigor of this design, we randomly assigned students to the order in which they would receive intervention (i.e., who would receive the intervention, first, second, and third; Kratochwill, & Levin, 2010). We introduced the intervention for the student randomized to the first tier after we observed at least five stable baseline data points then introduced the intervention in subsequent tiers after the student in the previous tier demonstrated social interactions for at least 30% of intervals across two consecutive observations and all other students maintained stable trends.

The first author, a graduate student in special education, facilitated all intervention procedures. She was already working with the participants in this study in her capacity as a special education teacher. She had 9 years of experience working in a classroom for students with multiple disabilities. She did not have previous experience using video modeling or peer-mediated intervention at recess.

### **Measures**

All measures were collected on the playground across all conditions. Four trained observers recorded data on social interactions, play behavior, and individualized prosocial goals (see definitions below). Coding definitions were adopted from Brock et al. (2018). A partial

interval recording system was used in which we recorded if a behavior occurred at any point during an interval. We alternated between observing for 10 s and recording for 10 s. All variables were indexed as a percentage of intervals in the observation. We collected data for all participants during the student's 30-min recess period, beginning when the target student walked onto the playground and ending when the recess bell rang.

The primary dependent variable was the percentage of intervals in which social interactions between peers and target students occurred during recess. Social interactions were defined as any verbal or nonverbal communication directed by the student to a peer or from the peer to a student. We also recorded whether each interaction involved the target student directing communication to a peer (i.e., student-to-peer), or the peer to the target student (peer-to-student). If a peer initiated toward a group of students including the target student it was coded as an interaction if the peer's interactive behaviors were clearly directed toward or included the target student.

A secondary aim of the intervention was to increase appropriate play with peers, defined as the target student engaging in behavior that meets two criteria: (a) target student behavior is actively or passively related to a play activity with peers, (b) target student behavior is consistent with recess rules and (when applicable) the general rules associated with a game. When students were not engaged in appropriate play with peers, we coded four other mutually exclusive play behaviors: appropriate solitary play, stereotypic play, breaking rules, and no play. Appropriate solitary play was defined as the target student engaging in behavior that (a) is consistent with recess rules (not causing harm or potential harm to others) and (b) does not revolve solely around stereotypic behavior. Stereotypic play was defined as the target student engaging in stereotypic behavior (e.g., hand flapping, spinning) in isolation of any behavior that would fall into the

appropriate play categories above. Breaking rules play was defined as the target student engaging in behavior inconsistent with recess safety or (when applicable) the general rules associated with a game. No play was defined as the target student (a) not engaging in any play behavior that could be categorized in any of the play categories above and (b) maintaining the same body position and not moving or engaging in other behavior.

We targeted individualized prosocial behaviors from each student's Individualized Education Program (IEP) goals. These behaviors were the basis for the video modeling instruction, which was aligned with our data collection of individualized prosocial goals on the playground. Prosocial behaviors are not mutually exclusive from social interactions or appropriate play with peers; instead, they represent more specific forms of interaction and/or play that align with the student's IEP goals. Abdul's goal was participating in a rule-based game, defined as actively engaging in a recess rule-based game and following the basic rules of the game. Juan's goal was initiating play, defined as approaching a peer, gaining the peers attention (by getting in the peer's visual range, or gently tapping on the shoulder if the peer was oriented in a different direction), and asking them to play using verbal or nonverbal (e.g., gestures, signs) communication. Franco's goal was taking turns with a peer, defined as (a) giving the peer a turn to play by either handing materials to a peer or saying "you" or "your turn" and allowing the peer to take possession of the materials, and (b) remaining within proximity (i.e., 2 meters) of the peer as the peer takes a turn.

### *Effect Sizes*

To calculate the magnitude of effects for each of the three dependent variables, we calculated a *d*-Hedges-Pustejovsky-Shadish (DHPS) effect size (Hedges, Pustejovsky & Shadish, 2013). DHPS is calculated using a hierarchical model to produce a between subjects effect size.

It was developed to correspond to Cohen's  $d$  so that the magnitude of effect can be interpreted on the same scale. We calculated DHPS using the macro for SPSS that was developed by Marso and Shadish (2014).

### ***Social Validity Surveys***

At the end of the study, we distributed social validity surveys to target students and peers who participated in the intervention, as well as teachers and instructional assistants who were not involved in the intervention but were on recess duty (i.e., spectators). All survey items are listed in Table 1 and were adapted from Brock et al. (2018). The survey was distributed by a graduate student who was not involved in the intervention who provided assistance to the students and peers as needed.

### **Procedures**

#### ***Baseline Condition***

In this business-as-usual condition, target students were not given any supports on the playground and were not given any social skills instruction that was specific to using social skills at recess. Peers did not receive any direction or support from adults in how to play with the target student.

#### ***Peer Training***

The day before the intervention condition began, the facilitator provided a 25-min training session to peers during their lunch period. Target students were not present at the trainings. Key concepts of the training included (a) introducing peers to the facilitator and to one another if they had not already met, (b) discussing the purpose of the peer network, (c) sharing background information about the target student, (d) teaching peers the five strategies that would help them interact and play with the target student (see below), (e) discussing confidentiality, (f)



scheduling regular check-in meetings, and (g) closing and questions.

The five strategies taught included: get your buddy to look at you, ask your buddy to play something with you, show and talk about how to play, compliment your buddy, and if you can't play at the same time, take turns. When teaching the five strategies, the facilitator read each strategy aloud, described it, modeled it, guided the peers to practice it through role play, and provided performance feedback based on the role play. Role play continued until students accurately demonstrated the strategy. Then the facilitator guided the students to brainstorm a list of ways they could apply the strategy with the target student at recess.

### ***Intervention Condition***

The peer-mediated intervention and video modeling were both implemented every day that the target student attended outdoor recess during the intervention condition (i.e., 18 sessions for Abdul, 15 sessions for Juan, and 10 total sessions for Franco). Video modeling was implemented immediately before students left the classroom to go to lunch and recess, and the peer-mediated intervention was implemented at outdoor recess.

**Video Modeling on Targeted Social Skills.** The facilitator created the videos using peers at the school. Videos were recorded, stored, and viewed on a tablet computer. Video modeling was delivered to the target students in their classroom immediately before they went to lunch and recess. At each session, video modeling instruction involved (a) watching a 1-min video that portrayed peers engaging in the targeted prosocial behavior, (b) talking through the steps of the prosocial behavior using a visual task analysis, (c) acting out the prosocial goal through role play with the facilitator, and (d) asking the student to identify a play activity at recess in which they would like to practice the targeted goal. Individualized prosocial goals included appropriately participating in a rule-based game (Abdul), initiating play with peers

(Juan), and taking turns during play with peers (Franco).

**Peer-mediated Intervention.** To support the peers to use the peer-mediated strategies, the facilitator provided check-ins before recess, intermittent support during recess, and check-outs at the end of recess. Check-ins occurred during the peers' lunch and never took longer than 5 min. The facilitator talked with peers about how they hoped to interact at recess with the target student, and then recorded their ideas on a dry erase board. The facilitator also shared the prosocial goal the target student was learning during video modeling instruction (e.g., initiating play, taking turns, or participating in a rule-based game), and the context that the skill was portrayed in the video (e.g., asking a friend to play on the monkey bars, taking turns on the swings, participating in basketball or soccer). During recess, the facilitator was present on the playground to provide support as needed (e.g., model how to interact or use the five strategies for peers, provide feedback to peers and the target students, talk to peers about targets, or reference the strategy sheet). Peers who were fluent in Spanish were encouraged to converse in Spanish with Juan and Franco. At the end of recess, the facilitator had a check-out with peers as they were lined up to go back into the school building. The facilitator asked the peers if they had been successful with the ideas she had recorded on the dry erase board, and then praised the peers for using the five strategies. This check-out never lasted longer than 3 min.

### **Procedural Fidelity**

This was measured in 2 ways. First, at each peer training meeting, the facilitator completed an 8-point fidelity checklist during the meeting based on the steps outlined in Brock et al. (2018) and described above in the Pre-Intervention section. A second observer attended two of the five peer training meetings (i.e., 40%) and independently completed the same 8-point checklist. The second observer's data indicated that all 8 elements were implemented at both

meetings. Second, at each 10-min video model training for the students' individualized prosocial recess goals, the facilitator (i.e., the first author) completed a 4-point fidelity checklist based on the steps outlined above in the Video Modeling section. A second observer attended two video model lessons for each participant and independently completed the same 4-point checklist. This represented 20-67% of all lessons for each individual participant, and 26% across all three participants. The second observer's data indicated that all 4 elements were implemented as designed in every lesson that was observed.

### *Observational Measures at Recess*

**Peer Proximity on the Playground.** We measured whether the target student was in close proximity to peers. Proximity was defined as one or more peers playing, sitting, or standing within 2 meters of the target students for at least 8 s out of a 10-s interval. This definition avoids counting proximity for intervals in which another student runs or walks by the student and is briefly within 2 meters of the target student. Average percentage of intervals of peer proximity and ranges are reported by student and experimental condition in Table 2.

**Use of Peer-Mediated Strategies.** We documented whether peers had implemented strategies associated with the peer-mediated intervention each day at recess.

**Facilitator Support on the Playground.** We recorded intervals in which the facilitator provided support to peers. Support was defined as talking to the peers about the target student, discussing any of the five strategies, modeling how the peers could interact with the target student, or prompting the peers to interact with the target student in a specific way.

### **Interobserver Agreement**

A secondary trained observer collected data with the primary data collector for 20% of probe baseline sessions and 35% of probe intervention sessions across participants. We

calculated overall agreement by dividing the total number of intervals in which the observers agreed by the total number of intervals for the observation. Overall mean agreement for all participants was 87% for interactions (range = 61–100%), 91% for appropriate play with peers (range = 79–100%), 92% for appropriate solitary play (range = 76-100%), 99% for breaking rules play (98-100%), 99% for stereotypic play (range 94-100%), 97% for no play (90-100%), and 92% for individualized social skills goals (range = 71–100%). Within the baseline condition mean agreement for all participants was 97% for interactions (range = 95–100%), 100% for appropriate play with peers (range = 100–100%), 97% for appropriate solitary play (range = 91-100%), 99% for breaking rules play (99-100%), 99% for stereotypic play (range 97-100%), 98% for no play (93-100%), and 100% for individualized social skills goals (range = 100–100%). Within the intervention condition, mean agreement was 82% for interactions for all students combined (range = 61–92%), 87% for appropriate play with peers (range = 79–100%), 90% for appropriate solitary play (range = 76-100%), 100% for breaking rules play (100-100%), 98% for stereotypic play (range = 94-100%), 96% for no play (range = 90-100%), and 88% for individualized social skills behaviors (range = 90–100%).

### **Results**

The effects of the intervention are described at baseline and intervention for each participant in Table 2. Across all observations, peers used an average of 4.3 strategies (range = 2-5). At the individual student level, Abdul's peers used an average of 4.4 strategies (range = 3-5), Juan's peers used an average of 3.7 strategies (range = 2-5), and Franco's peers used an average of 4.9 strategies (range = 2-5). Facilitator support was most frequent on the day that the peer-mediated intervention began (26% of intervals for Abdul, 8% for Juan, and 20% for Franco).

Support was faded over time and was far less frequent on the last day of intervention (4% of intervals for Abdul, 0% for Juan, and 1% for Franco).

The primary dependent variable in this study was percentage of intervals with social interactions (see Figure 1 and Table 2). During the baseline condition, the mean percentage of baseline intervals containing any social interactions ranged from 3% to 5% for all three participants (see Table 2). The overall effect size on social interactions was  $DHPS = 3.11$ .

After the introduction of the intervention, the percentage of total social interactions increased substantially across all three target students. Abdul's social interactions increased from a mean of 3% of intervals during baseline to a mean of 46% of intervals during intervention. Juan's social interactions increased from a mean of 3% of intervals during baseline to a mean of 69% of intervals during intervention. Franco's social interactions increased from a mean of 5% of intervals during baseline to a mean of 54% of intervals during intervention.

In Table 2, we broke down social interactions into (a) student-to-peer and (b) peer-to-student interactions. Both subsets of interactions increased substantially after the intervention was introduced. For all three target students, the mean percentage of baseline intervals containing student-to-peer interactions ranged from 1% to 2%. For all three target students, the mean percentage of intervention intervals containing student-to-peer interactions ranged from 20% to 49%. The percentage of baseline intervals containing peer-to-student interactions ranged from 2% to 4% and increased during intervention to a range of 45% to 65%.

We measured the percentage of total intervals the target students engaged in appropriate play with peers during recess as a secondary dependent variable (see Figure 1). Immediately after the introduction of the intervention, the percentage of intervals where the target students engaged in appropriate play with peers increased substantially across all three target students.

Abdul's appropriate play with peers increased from a mean of 0% of intervals during baseline to a mean of 65% of intervals during intervention. Juan's appropriate play with peers increased from a mean of less than 1% of intervals during baseline to a mean of 95% of intervals during intervention. Franco's appropriate play with peers increased from a mean of 0% of intervals during baseline to a mean of 83% of intervals during intervention. The overall effect size on social interactions was  $DHPS = 2.99$ .

The third dependent variable in this study was each target students' independent prosocial behaviors as represented by IEP goals. Immediately after the introduction of the intervention, the levels of total intervals where prosocial behaviors were observed increased across all three target students (see Figure 1). Abdul's total intervals observed participating in a rule-based game during recess increased from a mean of 0% of intervals during baseline to a mean of 43% of intervals during intervention. Juan's total intervals observed initiating play with a peer increased from a mean of 0% of intervals during baseline to a mean of 12% of intervals during intervention. Franco's total intervals observed taking turns with a peer during recess increased from a mean of 0% of intervals during baseline to a mean of 30% of intervals during intervention. The overall effect size on individualized prosocial behaviors was  $DHPS = 0.83$ .

### **Social Validity**

Social validity survey responses from school staff, peers, and target students are reported in Table 1. The target students responded positively when asked if they liked recess, if they liked spending time with their peer buddies at recess, if they want to continue to play with their buddies at recess, and if they considered the peers in their network to be their friends (see Table 1). Abdul responded positively when asked if his peer buddies taught him new ways to play at recess, and Juan and Franco answered "no".

Peers responded that they enjoyed being a peer buddy at recess, and the majority (83%) would be willing to be a peer buddy again. They also reported there was not anything they did not like about being a peer buddy. The majority of peers (75%) reported they would recommend being a peer buddy to other students. Peers wrote that they enjoyed playing with their buddy (a few sited specific games), teaching or helping their buddy with new things, being friends, and seeing their buddy happy. Based on observer notes, another sign of positive social validity was that no peers expressed interest in stopping their participation, and many additional students asked to join the networks after they had already started. Although we were no longer training peers, those students who were interested were told they were welcome to play with the target students during recess.

School staff personnel (i.e., a general education teachers and two paraprofessionals who had recess duty some or all of the times during baseline and intervention) indicated that they observed students interacting and playing with friends during recess sometimes (i.e., 3/5; Franco) or often (i.e., 4/5; Abdul and Juan) during the intervention. School staff personnel reported they observed students making friends at recess sometimes (i.e., 3/5; Abdul, Franco) or often (i.e., 4/5; Juan), and observed peers providing support to students at recess often (i.e., 4/5; all three students) during the intervention.

### **Discussion**

We found a functional relation between a combined intervention (i.e., peer-mediated intervention and video modeling) and increases in social interaction, appropriate peer play, and progress on individualized social skill goals for all three students with ASD. Findings from this study extend the literature in a number of important ways.

First, this study replicates previous findings that peer-mediated interventions can increase

social interactions during recess for elementary students with ASD and significant support needs (Brock et al., 2018; Harper et al., 2008). These data confirm that recess is often a missed opportunity for social interaction, with little to no interaction with peers prior to intervention. Increasing social interactions during recess for students with significant disabilities is critically important, because it enables these students to capitalize on a natural opportunity for developing friendships with peers, thereby decreasing isolation and loneliness and increasing involvement in the school community.

Second, this study extends beyond previous findings by demonstrating increases in interactive play behavior. Prior to implementing the intervention, students in this study were observed walking in circles, standing under play equipment, standing near peers but not interacting with them, or playing on equipment alone. Immediately after intervention, rates of interactive play increased substantially. In an underpowered randomized controlled trial described by Brock and colleagues (2018), the authors reported a substantial effect size on interactive play but did not detect a statistically significant difference.

Third, this study shows that video modeling can be used in conjunction with peer-mediated interventions to promote progress on individualized prosocial behavior. The inclusion of children with ASD in education settings with typical peers has become recommended practice (Kohler et al., 1997). However, despite the resultant increase in opportunities for peer modeling and interaction, teachers typically report little to no interaction between the two groups (Pierce & Schreibman, 1997b). Explicit instruction increases the likelihood that students will acquire new skills, and increased interactions and peer play provide a context for practicing these skills at recess. Peer-mediated interventions provide peers with new skills and information for how to interact with a student with a disability, which increase social interactions and provides more



opportunities for the student with a disability to practice new prosocial skills. Indeed, effects on interactions and peer play were larger in this study than in a study on peer-mediated intervention alone (i.e., Brock et al., 2018), suggesting that there might be an additive effect for video modeling across all outcomes.

Fourth, student responses on social validity questionnaires indicate that both the target students and their peers enjoyed participating in the peer-mediated intervention. The feedback from peers and target students was almost completely positive. Additionally, anecdotal notes from recess observations indicated that during the study, peers who were not involved in the study often requested to participate or would naturally join in playing with the target students and peer buddies at recess.

### **Implications for Practice**

Findings from this study have implications for special educators, instructional assistants, and elementary educators. First, teachers and instructional assistants should treat unstructured times of the school day as an opportunity to promote social interactions and social skill development for students. We recommend special educators begin to shift views of recess as a break from providing instruction to time they can use to teach and practice social skills in a natural setting. Second, this study shows the importance of using peer-mediated and social skills interventions in tandem to promote improved social outcomes for students with ASD on the playground. Specifically, if teachers want to see improvement in students' interactions with peers, they would have better outcomes by directly teaching social skills that students can use at recess.

### **Limitations and Future Directions for Research**

Limitations to this study suggest avenues for future research. First, the three target

students in this study were all male, represented minority racial/ethnic groups, and spoke English as a second language. On one hand, studying these underrepresented groups is a strength of our study and we did recruit peers who were able to interact with peers in their primary language, but video modeling instruction was conducted only in English. In future studies, researchers might recruit more students and teachers from a range of backgrounds and consider providing video modeling instruction in the child's primary language. Second, this study focused on testing a combination of two strategies. In future studies, researchers might utilize comparative designs that allow them to experimentally contrast the combination of strategies to each strategy in isolation. Third, we contrasted the intervention to a business-as-usual condition in which peers did not receive any direction to interact with target students. In future studies, researchers might use a baseline condition in which peers are directed to interact with target students without further training or support, as this would isolate the effects of the training and support in the intervention condition. Fourth, only one baseline data point was collected for Abdul immediately before the intervention. In future studies, the design could be strengthened by collecting three consecutive data points closer together in time condition (What Works Clearinghouse, 2017). Fifth, standardized test scores reported from the school records do not reflect gold-standard measures and were administered in English, raising questions about whether the scores truly reflected the abilities of the students (Sullivan, 2011). In future studies, researchers could independently implement gold-standard instruments in the home language of the students. Sixth, the interventionist was also a data collector in this study. In future studies, researchers could separate intervention and data collection teams. In addition, future studies might consider collecting peer comparison data to determine normative levels of social interaction. Finally, we designed this study with the assumption that social engagement is optimal for students with

autism at recess. We make this assumption based on evidence that social skills and social connections are related to improved postschool outcomes such as employment and independent living (Haber et al., 2016), and evidence from this study that participants enjoyed peer interactions. However, we acknowledge that some students with autism may prefer to engage in solitary activity when presented with opportunities for peer interaction, and it is important to consider the interests of students with autism when designing interventions. Therefore, we recommend that researchers closely monitor peer-mediated interventions and make adjustments when interactions are not mutually enjoyed by peers and students with autism.

### **Conclusion**

Findings from this study show that a combination of peer-mediated intervention and video modeling can increase the social interactions, peer play, and social goals of students with ASD and ID during recess. By teaching students new social skills and partnering with peers to provide ample opportunities to interact and practice those skills, students with significant disabilities have the opportunity to experience social development, inclusion, and belonging at recess. Given the promise of this approach, there is no reason why recess should continue to be a missed opportunity for students with significant disabilities.

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**Table 1**

*Social Validity Responses from Students with Disabilities, Peers, and School Staff*

<b>Question</b>	<b>Abdul</b>	<b>Juan</b>	<b>Franco</b>
<i>Responses from Students with Disabilities</i>			
Do you like recess?	Yes	Yes	Yes
Do you like playing with (names of peer partners) at recess?	Yes	Yes	Yes
Did (name of peer partners) teach you a new way to play at recess?	Yes	No	No
Do you think (name of peer partners) at recess are your friends?	Yes	Yes	Yes
Do you still want to play with (name of peer partners) at recess?	Yes	Yes	Yes
Is there anything else you want to share?	“I like to play Basketball. People say we don’t hold the ball with hands.”	No	I Don’t Know
<i>Responses from Peers</i>			
	<b>I Agree Responses</b>	<b>I Disagree Responses</b>	<b>I Don’t Know Responses</b>
Do you enjoy supporting a buddy at recess?	12/12	0/12	0/12
Would you be willing to be a peer buddy again in the future?	10/12	0/12	2/12
Would you recommend being a peer buddy to other students?	9/12	1/12	2/12
What did you enjoy most about being a peer buddy at recess?	Playing with him. Teaching him new games. I like playing with Abdul. Playing together and being friends with my buddy. That we played together.	I liked that he was so kind and sweet and I loved playing with him. I liked playing with him. Playing with other kids.	I liked when we played bubbles. Teaching him new things and seeing Franco happy. Playing kickball with Franco. Helping Franco. He is a little funny.
Is there anything you did not like about being a peer buddy at recess?	No! No. Nothing. No, I love helping. I did not have anything.	No! No! No!	Nothing, well I do not like speaking out loud. Pointing and saying, “Look at my face, Franco”. The thing that is hardest is when Franco walks away and starts playing with something else.
<i>Responses from School Staff</i>			
	<b>Staff Rating for Abdul</b>	<b>Staff Rating for Juan</b>	<b>Staff Rating for Franco</b>
How often does the student interact with peers during recess?	4	4	3
How often does the student interact appropriately with peers during recess?	3	5	3
How often does the student make friends during recess?	3	4	3
How often do peers appear to provide social support to the student during recess?	4	4	4

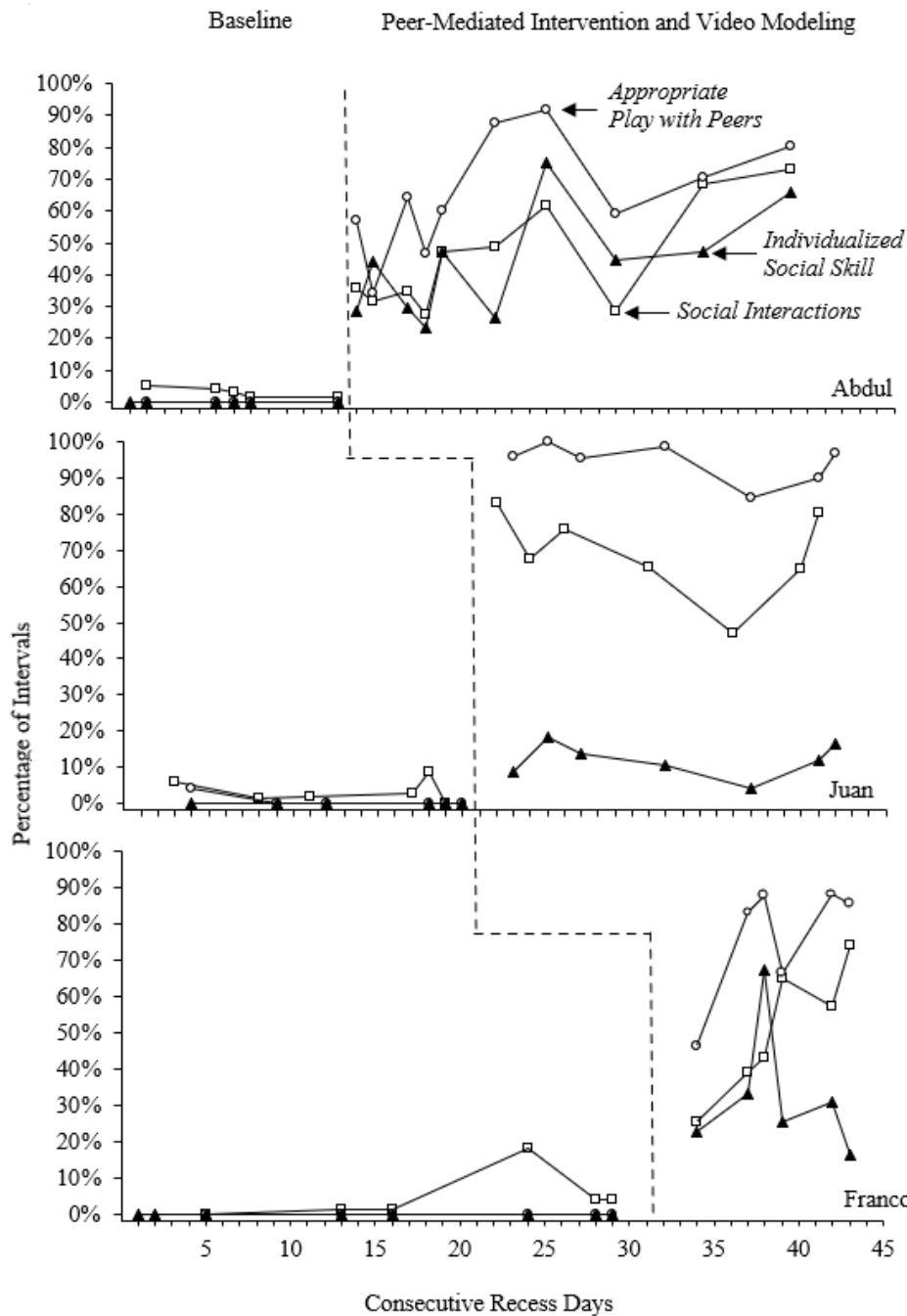
*Note:* Responses for each peer in the network are reported separately. Yes = agreed with statement, No = did not agree with statement, I don’t know = was unsure about the answer. 1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = almost always.

**Table 2***Means and Ranges of Observational Measures by Participant and Study Condition*

Variable	Abdul		Juan		Franco	
	Baseline	Intervention	Baseline	Intervention	Baseline	Intervention
Any social interaction	3% (1–5)	46% (27–73)	3% (0–9)	69% (47–83)	5% (0–18)	54% (25–74)
Student-to-peer interaction	1% (0–4)	20% (12–35)	2% (0–9)	49% (27–65)	2% (0–3)	29% (12–64)
Peer-to-student interactions	3% (1–5)	45% (25–71)	2% (0–3)	65% (44–81)	4% (0–16)	48% (18–73)
Peer proximity	40% (12–66)	76% (50–94)	47% (12–77)	93% (83–100)	36% (1–73)	87% (56–99)
Appropriate play with peers	0% (0–0)	65% (34–92)	<1% (0–4)	95% (85–100)	0% (0–0)	83% (46–88)
Appropriate solitary play	87% (80–99)	29% (5–52)	70% (9–100)	3% (0–10)	38% (13–100)	12% (0–28)
Breaking rules	1% (0–3)	<1% (0–2)	0% (0–0)	0% (0–0)	<1% (0–1)	0% (0–0)
Stereotypic play	0 (0–0)	0% (0–0)	0% (0–0)	0% (0–0)	44% (0–72)	3% (0–12)
No Play	12% (1–18)	6% (0–10)	29% (0–91)	2% (0–10)	17% (0–45)	6% (0–24)
Individualized Goal	0% (0–0)	43% (23–75)	0 (0–0)	12% (4–18)	0% (0–0)	30% (16–67)

**Figure 1**

*Effects of Peer-Mediated Intervention and Video Modeling on Social Outcomes at Recess*



Percentage of intervals with appropriate play with peers (open circle), social interactions (open square), and demonstrated specific social skill associated with their IEP (closed triangle). Individualized social skills included participating in a rule-based game (Abdul), initiating play (Juan), and turn-taking (Franco).