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Prompting Peers' Use of Choices to Promote Communication in Children with Autism Spectrum Disorder

Abstract

The purpose of this research was to determine the effect of prompting a preschool student to use choice making with a peer identified with autism spectrum disorder. The researchers used a single case research design. Researchers provided prompting across three thematic play activities. Results show that there was an initial effect in the first activity, which may have resulted in a carry-over effect in the other two activities. While peer-mediated instruction can be an effective method for increasing the dosage of learning opportunities that children with autism spectrum disorder experience in early childhood settings, peers may need more training or ongoing support to sustain their interactions with the child in a meaningful way.

Keywords: choice making, autism spectrum disorder, peer-mediated intervention, early childhood

Introduction

Currently one in 59 children are identified with autism spectrum disorder (ASD; Center for Disease Control [CDC], 2020), and children are receiving their diagnoses of ASD at younger ages (Guthrie, Swineford, Nottke, & Wetherby, 2013; Henderson, 2009). The Division for Early Childhood (DEC, 2014) suggests and IDEA (Individuals with Disabilities Education Act, 2004) mandates that young children with disabilities, including ASD, receive their special education services in their natural or least restrictive environment. For preschool-aged children with ASD, this might be an inclusive early childhood special education (ECSE) classroom (Koegel, Matos-Freden, Lang, & Koegel, 2012). Inclusive ECSE classrooms offer access, support, and participation to all children despite any diverse characteristic a child might present (DEC/NAEYC, 2009). The benefit of these inclusive natural settings is they allow the child to practice various skills across daily routines and activities, increasing the

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likelihood they will use those skills in a functional manner and be able to generalize them to new settings, materials, and people (DEC, 2014; Johnson, Rahn, & Bricker, 2015; Stanton-Chapman, Kaisar, Vijay, Chapman, 2008). One area of targeted intervention for many children with ASD is social-communication, as this is a challenge for children with ASD (Dawson et al., 2004). Moreover, children, particularly those with disabilities, need frequent opportunities to practice social communication skills so that these skills are attained, which is why it is critical to incorporate multiple and varied opportunities to practice communication throughout daily routines and activities (Johnson et al., 2015). One way to embed opportunities to practice social communication skills across daily activities and routines is through providing prompts such as choice making (Coogle, Floyd, Hanline, & Kellner-Hiczewski, 2013).

Choice Making

Choice making is a time delay strategy that involves a play partner providing choices for the child with ASD, and then using wait time to provide an opportunity for the child with ASD to respond by selecting a choice (Coogle et al., 2013). Offering choices is a developmentally appropriate method for supporting children, because the child hears a language model by the play partner labeling items within the environment (i.e., the two or more choices), and then the child has the opportunity to respond and thus engage in a social communicative interaction. Offering choices also creates an interaction in which the child with ASD is pragmatically obligated to respond, and if he or she does not, it is appropriate for the partner to scaffold a response through prompting, wait time, and modeling the target communication. In addition, choice making does not require children with ASD to initiate an interaction, but it does engage them socially, providing opportunities for them to learn how to respond, reject, and take turns during an interaction. Thus, choice making can establish a foundation upon which to build other pragmatic interaction skills.

Although providing opportunities for children to practice target skills is important (Coogle et al., 2013; Grisham-Brown et al., 2000; Horn et al., 2000), research suggests that children do not receive the number of practice opportunities necessary to attain a skill (Pretti-Frontczak & Bricker, 2001; Rahn et al., 2019). For example, research has demonstrated that teachers provide opportunities most often during one-on-one activities with a child, and they typically utilize a limited number of opportunities (i.e., questions), and the opportunities that teachers provide do not always align with the child's individualized education plan (IEP) goals (Rahn et al., 2019). Moreover, research indicates that opportunities such as choice making should be used across daily activities and routines (Pretti-Frontczak & Bricker, 2001). Children with ASD need multiple practice opportunities to attain and generalize social communication skills, making it critical to identify strategies that can increase their number of practice opportunities. Allowing peers to serve as interventionists within natural routines and activities of the environment (e.g., free play, mealtimes, circle time) may be a promising way to increase the frequency of opportunities to practice skills.

Peer-Mediated Interventions

One intervention with documented effectiveness in promoting positive outcomes for children with ASD is peer-mediated intervention (PMI; Katz & Girolametto, 2013; Wong et al., 2014). PMI allows the teacher to pair a child with ASD with a peer without disabilities who provides the intervention, and PMI provides opportunities for peer-to-peer social interactions (Katz & Girolametto, 2013; Wong et al., 2014). Researchers have found positive effects of PMIs in the classroom and on the playground for children between the ages of 3 and 8 years with ASD (Katz & Girolametto, 2013; Sperry et al., 2010; Watkins et al., 2015). Positive outcomes associated with PMIs have included (a) increasing the number of opportunities for interactions between children with ASD and their peers, (b) increasing the frequency and length of interactions between peer-mediators and children with ASD, (c) increasing peers' use of prompts and reinforcement while interacting with children with ASD, and (d) enhancing the independence of peers and minimizing adult supports required during peer interactions (Katz & Girolametto, 2013; Sperry et al., 2010; Watkins et al., 2015; Whalon, Conroy, Martinez, & Werch, 2015).

Often PMIs used in early childhood settings are structured so that peer models are taught prior to an intervention how to interact and respond to their peers with

ASD (Ganz & Flores, 2008; Jung, Sainato, & Davis, 2008; Katz & Girolametto, 2013). For example, researchers using PMIs have taught peer models to initiate play with their peers with ASD by using prompts and reinforcement (Jung et al., 2008; Katz & Girolametto, 2013), or by using modeling and visual supports (Ganz & Flores, 2008). Although these results of PMI studies are promising for enhancing the inclusion of children with ASD, there is no research examining the effects of peer models serving as interventionists to target specific IEP goals, such that the child with ASD has multiple opportunities to practice the target goal within the inclusive ECSE environment (Watkins et al., 2015). Most studies of PMI involve training the peer prior to implementing treatment (Watkins et al., 2015). Researchers teach the peer what to do and have them practice it. When peers serve as models and interaction partners to address specific IEP goals within the ECSE environment, such training of the peer in advance is not always feasible. Instead, adults coach the peer to use a specific strategy so that the peer is the interaction partner with the child with ASD. The field currently does not have any data regarding whether these efforts result in any sustained effect on outcomes for the peers interacting with the child. Yet, this information is an important consideration when planning intervention, given the realities of intervention dosage within the classroom setting. Furthermore, using peers as the primary interaction partner during treatment to address social communication goals has practical importance because children with ASD need to learn to socially interact not just with the adults providing treatment (typically teachers, paraeducators, and clinicians), but also with the children in their classrooms.

The Current Study

The focus of the current study was to investigate whether a peer model could be prompted to offer choices to a child with ASD during three different play activities. Although PMI has documented effectiveness in improving targeted outcomes for children with ASD, little research has investigated the effect of systematically prompting peers to serve as the interventionists to embed a specific strategy aligning with an IEP goal within inclusive ECSE classrooms during center play. Furthermore, there is no research revealing whether such prompting during the interactions can result in the peer spontaneously offering choices, or continuing to offer choices after the interventionist stops providing prompts. Therefore, we sought to add to the existing literature by examining the following research questions:

1. Is there a functional relation between prompting a peer to use choice making and the peer's prompted and/or spontaneous use of choice making during play interactions with a child with ASD?
2. What are the child with ASD's associated communicative outcomes?

Method

Participants and Setting

One child with ASD, Kai, and one peer model, Julianna, participated in the study (both pseudonyms). Both were white non-Hispanic, four-year-old children who attended preschool in one public elementary school in a small Mid-Atlantic city. Kai was a male, identified with ASD. Based upon observation by the first author and confirmed by the teacher through self-report, Kai used vocalizations, single words, and two-word phrases to communicate in the classroom; however, he did not use his language to initiate communication or exchange information. For example, when Kai communicated, his communication was not directed at anyone. In addition, his teacher indicated that she had heard him say approximately 10 different words. Therefore, the teacher shared that one of his goals was using communication to express his wants and needs. Upon explanation of the research, the classroom teacher selected Julianna from several possible options to serve as the peer because she exhibited characteristics that aligned with those identified in the PMI literature (Katz & Girolametto, 2013; Sperry et al., 2010). For example, her teacher reported that she demonstrated strong language and social skills, had good attendance, inquired about where Kai was when absent, and demonstrated curiosity when he became upset.

All sessions were completed in Kai and Julianna's classroom by one of two white, non-Hispanic, undergraduate research assistants who were unfamiliar with research and the purpose of the study (hereafter referred to as the coaches). The setting was an inclusive preschool classroom. The classroom was organized by centers (e.g.,

dramatic play, blocks, and tub table). Each session took place during choice time in the morning. During each session, Julianna and Kai sat and played with thematic toys that the coaches brought into the classroom to ensure the novelty of the items was consistent across each theme (i.e., Grocery Store, Doctor's Office, or Post Office). Toys included developmentally appropriate items that would typically be found in the sociodramatic play area of a preschool classroom. For example, for the Grocery Store theme, toys included a grocery cart, fruits, and vegetables; for the Doctor theme, toys included a doctor's kit, stroller, and a baby doll; and for Post Office theme, toys included envelopes, paper, and stickers. The goal was to follow the guidelines suggested by previous research, but to maintain what would typically be found in a classroom, and to maintain experimental control (across play routines). An iPad™ was used to video and audio record all sessions and was set up by the coach prior to each session. Upon completion of each session, Julianna received a sticker and Kai received gummies; these were desired items that the classroom teacher suggested we use to provide reinforcement to the children.

Research Design

A single-case multiple-probe design across thematic play routines was used to examine the effect of coaching Julianna to offer Kai choices on Julianna's prompted and spontaneous use of choice making (Horner & Baer, 1978; Gast, Lloyd, & Ledford, 2014). We selected a multiple-probe design because Julianna's use of choice making was not expected to change prior to the onset of intervention. We randomized the order in which we began intervention with each set of play materials to strengthen the design of our study (Kratochwill & Levin, 2010). Based on randomization, we introduced the prompting intervention during Doctor's Office, followed by Post Office, and then Grocery Store. Basic requirements for What Works Clearinghouse standards were met by introducing the independent variable systematically, using two observers to measure all outcome variables, and obtaining inter-observer agreement (IOA; Kratochwill et al., 2010). Our research met What Works Clearinghouse standards with reservations as the Post Office and Grocery Store intervention conditions had four, but not the required five, data points (to meet standards without reservations) within them due to feasibility within the school calendar.

Measures

A partial interval frequency coding system was used to code all observational data. Intervals were 10 seconds each across 6 min sessions, for a total of 36 possible intervals. We used the time codes on the videos to keep track of the intervals. We based this decision upon our previous research that indicated this was an adequate amount of time to see change, and we selected short, 10-second intervals in order to use a more sensitive measure that could capture regular teaching behaviors (Coogle, Storie, Ottley, Rahn, & Burt, 2019). In the event that a teaching behavior crossed two intervals, data coders only coded the behavior within the interval in which the behavior started to prevent inflation of the frequency of behavior occurrences. Upon completion of each session or series of sessions, each of the coaches (who were trained and achieved reliability in the coding system prior to the start of the study) viewed each video. Each coach coded the following four variables: (a) the number of intervals in which prompts were provided (i.e., when the coach asked Julianna to provide a choice to Kai), (b) the number of times Julianna responded to prompts (i.e., when Julianna provided a choice to Kai by labeling two items), (c) the number of intervals in which Julianna spontaneously offered choices to Kai (i.e., when Julianna offered a choice without being provided a prompt), and (d) Kai's weighted communication. Coaches recorded data on a coding form that included the frequency of prompts provided by the coach, Julianna's response to the coach's prompts to offer a choice, and Julianna's spontaneous use of choice making. We also used the Individual Growth and Development Indicator definitions to code Kai's gestures, vocalizations, single words and multiple words (Greenwood, Carta, Walker, Hughes, & Weathers, 2006; Juniper Gardens Children's Project, 2011). The coach who coded the data also was one of the coaches who implemented the sessions. In order to reduce the risk of bias in coding, the coaches were blind to the purposes of the study. In addition, they knew that another person was conducting random reliability checks of their coding and, therefore, they should strive for high accuracy across all coding sessions.

Procedure

Prior to beginning any research activities, institutional review board approval was obtained to conduct this research. In addition, we collected written informed consent from the parents of Kai and Julianna. We used our multiple probe schedule throughout the duration of the study. We collected one to three sessions per day depending upon the condition (e.g., we collected more sessions if it was a baseline session) and availability of children during choice time (e.g., sometimes children were pulled out of the classroom for speech language services). During all conditions, each play session lasted 6 minutes. The coach set up the play materials within an area of the classroom, and then the coach invited Kai and Julianna to come play (i.e., "Julianna and Kai, would you like to come play?").

Baseline

During baseline sessions, the coach used the staggered multiple-probe schedule created by the first author to provide Julianna and Kai the set of play materials for one of the play activities (i.e., Doctor's Office, Post Office, or Grocery Store). The coach observed the children and interacted with them by following their lead and responding when the children communicated with her; however, the coach did not provide any prompts or directions to the children. Rather, both children engaged with the materials and one another in any manner they desired.

I*ntervention*

During intervention, the coach observed the children playing for 1 min to identify the child's interests (i.e., observed the child's gaze and what toys they selected). During minutes 2-6, the coach provided approximately one prompt per minute for Julianna to provide Kai a choice between two play materials based upon Kai's interests (i.e., the coach would observe Kai's visual gaze toward the grocery foods, and then say "Offer Kai a choice between the apple and banana"). If Kai did not respond to the choice that the peer offered, the coach used a least-to-most prompting hierarchy to support Kai in responding to Julianna (DiCarlo, Baumgartner, & Caballero, 2016). Our hierarchy consisted of the coach prompting Julianna to say the child's name first (i.e., "Kai would you like the apple or banana?"). If Kai still did not respond, the coach used hand-over-hand prompting to support Kai in directing his attention to the choices provided by the peer and selecting a desired item. The coach decreased the use of prompts based upon the spontaneous use of choice making offered by Julianna. For example, if Julianna provided a choice to Kai spontaneously, the coach would not provide a prompt during that minute for her.

Maintenance

Maintenance took place in the same setting as intervention and began once intervention concluded. The coach provided no prompting during the maintenance condition. The coach interacted with the target children naturally in the same way as described during baseline.

Data Analysis

We graphed Juliana's prompted and spontaneous use of choice making. We used the six aspects of visual analysis (level, trend, variability, overlap, immediacy of effect and consistency of data) to answer our research questions (Horner et al., 2005).

Inter-observer Agreement

We calculated inter-observer agreement (IOA) using the total agreement method for the required percentage of sessions based on What Works Clearinghouse Standards (20% of videos across all conditions for the dependent and independent variables) (Kratochwill et al., 2013). An undergraduate student who was blind to the purpose of the study and procedures completed the reliability coding. IOA was 91% (range = 57% - 100%) for the coach's use of prompts for Julianna, 93% (range = 77%-100%) for the coach's use of positive reinforcement when Julianna offered Kai a choice, and 96% (range = 83%-100%) for when Julianna spontaneously offered Kai a choice.

Fidelity of Implementation (FOI)

An undergraduate student coded 25% of randomly selected intervention sessions using a fidelity checklist developed by the first and fourth authors. Although 20% is required based on What Works Clearinghouse Standards, we had the resources to code an additional 5% of sessions and chose to code these so that we could observe a greater number of sessions. When measuring FOI, we evaluated the number of prompts, positive feedback, and correc-

tive feedback provided to Julianna (i.e., prompts to offer more intense form of choice making), as well as prompts offered to Kai (i.e., hand-over-hand assistance to make a choice). FOI was 95% (range = 71%-100%).

Results

We report the results in the order in which we introduced PMI for each play activity. Graphed data are presented in Figure 1.

Julianna's Use of Choice Making During Doctor's Office

During baseline, Julianna used choice making during 1 interval in the first baseline session and during 0 intervals in subsequent sessions. When intervention was introduced, Julianna used choice making spontaneously in an average of 2.17 (range = 0-4) intervals per session, and prompted in an average of 6.66 (range = 4-9) intervals per session. Her data exhibited a gradually accelerating trend with little variability, and one overlapping data point between baseline and intervention (spontaneous use). Julianna received a prompt from the researcher during an average of 32% (range = 23%-50%) of intervals per intervention session. She used choice making in an average of 71% (range = 50%-86%) of intervals during which she was prompted. During maintenance, Julianna did not use choice making during any of the sessions.

Julianna's Use of Choice Making During Post Office

Julianna used choice making during 0 intervals in most baseline sessions; however, she used choice making during 1 interval in the fifth baseline session and during 9 intervals in the final baseline session. When intervention was introduced, Julianna used choice making spontaneously in an average of 2.50 (range = 0-5) intervals per session and prompted in an average of 6 (range = 2-9) intervals per session. Her data exhibited variability, with overlap between all data points in baseline and intervention. Julianna received a prompt from the coach during an average of 34% of intervals across intervention sessions (range = 17%-47%). She used the strategy in an average of 56% (range = 40%-64%) of intervals during which she was prompted. Julianna did not use choice making during any of the maintenance sessions.

Julianna's Use of Choice Making During Grocery Store

Julianna used choice making during 0 intervals in six out of eight total baseline sessions. She used choice making spontaneously during 9 intervals in the fifth baseline session and during 13 intervals in the seventh baseline session, with her use of choice making returning to 0 prior to the introduction of intervention. When intervention was introduced, Julianna used choice making spontaneously during an average of 4.25 (range = 2-8) intervals and prompted during an average of 6.50 (range = 2-9) intervals. Her data exhibited variability, with overlap between all data points in baseline and intervention. Julianna received a prompt from the researcher during an average of 31% of intervals across intervention sessions (range = 13%- 40%), and she used choice making in an average of 67% (range = 50%-75%) of intervals. In maintenance, Julianna used choice making during 1 interval in the first session, but did not use choice making in remaining maintenance sessions.

Julianna's Summary of Results

The data for the first activity revealed that upon introduction of the PMI, a small and delayed effect was observed for Julianna's use of choices. However, as Julianna began offering choices spontaneously during the Doctor's Office intervention condition, she also began offering choices spontaneously in the other two activities during their baseline conditions. She continued to offer choices spontaneously and when prompted during the intervention conditions for Post Office and Grocery Store activities. There was no observed effect on Julianna's use of choice making in the other two activities because her use of choice making overlapped entirely with baseline. For these reasons, we conclude that there was not a functional relation between the intervention and Julianna's use of choice making (i.e., only one demonstration, but not the required three demonstrations necessary for a functional relation). Maintenance data across activities was consistent with baseline.

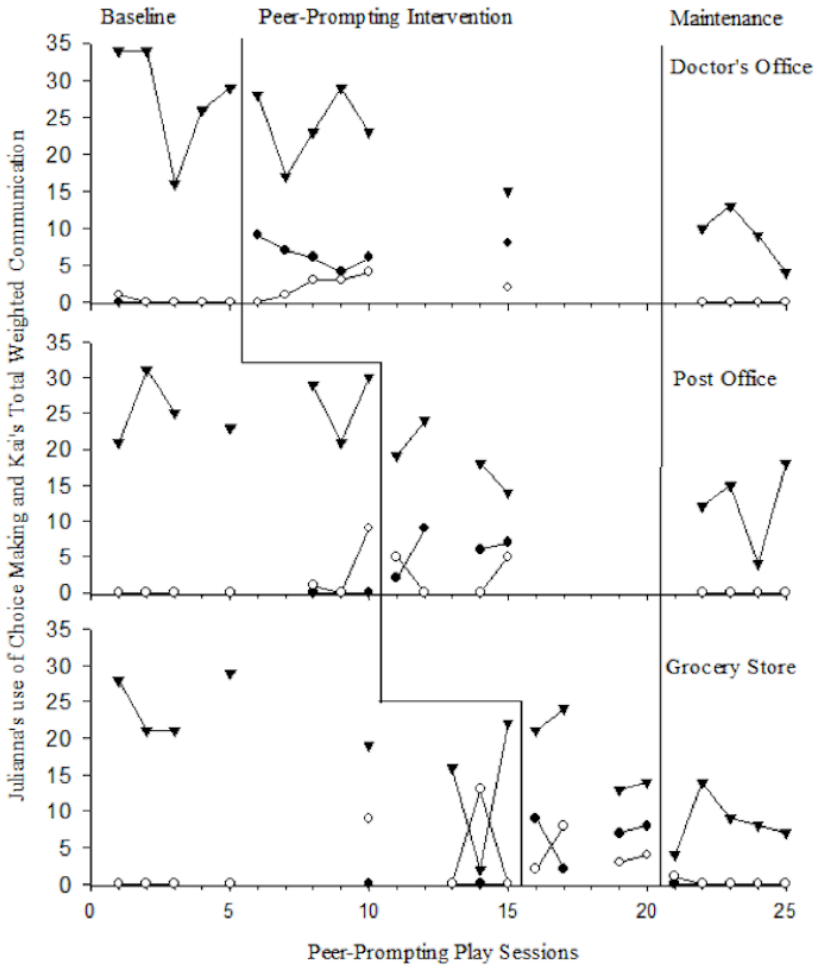

Figure 1.
Frequency with which Julianne (peer) offered prompted choice making (closed circles) and spontaneous choice making (open circles) to Kai along with the total weighted expressive communication used by Kai (triangles) across play-based activities.

Kai's Communication During Doctor's Office
During baseline, Kai's weighted communication range was 16-34 with his average being 27.8 (see Table 1). He used gestures (range = 0-6; mean = 2.6), vocalizations (range = 13-24; mean = 19.6), single words (range = 0-2; mean = 1), and multiple words (range = 0-3; mean = 1.2). During intervention, Kai's weighted communication range was 15-29 with his average being 22.5. He used gestures (range = 0-12; mean = 5), vocalizations (range = 5-19; mean = 15.17), and single words (mean = 0-2; mean = 1.17). During maintenance his weighted communication range was 4-13 with an average of 9. He used gestures (range = 0-5; mean = 1.75), vocalizations (range = 2-12; mean = 6), single words (range = 0-1; mean - .25), and multiple words (range = 0-1; mean = .25).

Kai's Communication During Post Office
During baseline, Kai's weighted communication was a range of 21-31 with the average being 25.71. He used gestures (range = 0-1; mean = .29), vocalizations (range = 15-24; mean = 20.71), single words (range = 0-4, mean = 1.42), and multiple words (range = 0-2; mean =.71). During intervention, his weighted communication ranged from 14-24 with the average being 18.75. He used gestures (range = 1-5; mean = 2.5), vocalizations (range = 3-16; mean = 11.75), and single words (range = 0-5; mean = 2.25). During maintenance his weighted communication ranged from 4-18 with a mean of 12.25. He used gestures (range = 0-1; mean = .25), vocalizations (range = 3-16; mean = 10.5), and single words (range = 0-2; mean = .75).

Table 1.
Kai's Total Communication

	Gestures	Vocalizations	Single Words	Multiple Words	Weighted Communication
Doctor's Office					
Baseline Range	0-6	13-24	0-2	0-3	16-34
Baseline Average	2.6	19.6	1	1.2	27.8
Intervention Range	0-12	5-19	0-2	0	15-29
Intervention Average	5	15.17	1.17	0	22.5
Maintenance Range	0-5	2-12	0-1	0-1	4-13
Maintenance Average	1.75	6	.25	.25	9
Post Office					
Baseline Range	0-1	15-24	0-4	0-2	21-31
Baseline Average	.29	20.71	1.42	.71	25.71
Intervention Range	1-5	3-16	0-5	0	14-24
Intervention Average	2.5	11.75	2.25	0	18.75
Maintenance Range	0-1	3-16	0-2	0	4-18
Maintenance Average	.25	10.5	.75	0	12.25
Grocery Store					
Baseline Range	0-2	2-26	0-2	0-2	2-29
Baseline Average	.5	16.43	.63	.63	19.75
Intervention Range	0-2	3-13	4	0-1	13-24
Intervention Average	.5	8.75	4	.25	18
Maintenance Range	0-3	1-14	0	0	4-14
Maintenance Average	1	7.4	0	0	8.4

Kai's Communication During Grocery Store

During baseline, Kai's weighted communication ranged from 2-29 with a mean of 19.75. He used gestures (range = 0-2; mean = .5), vocalizations (range = 2-26; mean = 16.43), single words (range = 0-2; mean = .63), and multiple words (range = 0-2; mean = .63). During intervention, Kai's weighted communication ranged from 13-24 with an average of 18. He used gestures (range = 0-2; mean = .5), vocalizations (range = 3-13; mean = 8.75), single words (range and mean = 4), and multiple words (range = 0-1; mean = .25). During maintenance Kai's weighted communication ranged from 4-14 with an average of 8.4. He used gestures (range = 0-3; mean = 1), and vocalizations (range = 1-14; mean = 7.4).

Summary of Kai's Results

We observed variability in Kai's associated communication outcomes. He did not increase his weighted communication across any of the three activities; however, some of his communicative behaviors increased during intervention. For example, he demonstrated increases in his gestures during Doctor's Office. During Post Office he increased his average use of gestures and single words. During Grocery Store, he increased his use of single words during intervention. He did not sustain these increases during maintenance.

Discussion

Research has demonstrated that providing children opportunities to practice target outcomes is effective for enhancing outcomes, and therefore, this is an important component of instructional delivery for children (Rahn et al., 2019; Grisham-Brown, Hemmeter, Schuster, Collins, 2000; Horn et al., 2000). However, research has also documented that children do not receive the number of opportunities necessary to obtain new skills (Pretti-Frontczak & Bricker, 2001; Rahn et al., 2019). Therefore, one important consideration is how to increase the dosage of opportunities provided. Previous research has supported educators to provide children opportunities to practice target outcomes (Coogle et al., 2019). Although this research has demonstrated effectiveness, it is important to consider other individuals in the classroom who can provide naturalistic opportunities to enhance children's target outcomes. Within inclusive classrooms, peers without disabilities can model target skills and with support they can enhance their interactions with children with ASD. Therefore, this research adds to the literature by focusing on peers to provide opportunities for children with ASD to practice target outcomes such as social communication within center play.

This research supports previous findings that suggest when peers are provided support their interactions with children are enhanced (Katz & Girolametto, 2013; Sperry et al., 2010; Watkins et al., 2015). This

research adds to the literature by targeting a naturalistic time delay strategy, choice making, with children in an inclusive classroom who are identified with ASD (Kaiser & Hampton, 2017). This is important as children with disabilities need multiple opportunities to practice target skills within their everyday activities and routines (Johnson et al., 2015). Supporting peers to provide this intervention with children identified with ASD within inclusive environments may be one way to increase the opportunities children receive to practice target skills.

Julianna's Use of Choice Making

Visual analysis indicated that upon implementation of intervention in the first play activity, Julianna began to use choice making across all play activities. Because we only observed one demonstration of an effect (but not three), we cannot say that our intervention had an effect on the choices she provided. We hypothesize that when we began providing coaching to Julianna in the first activity, she had a carryover effect into the other two activities, which limited our experimental control. This outcome is important for researchers to consider when using multiple-probe designs. Namely, replication across three contexts with the same participant may not be optimal for single-case studies because the participant may generalize their outcomes. Although this has clinical significance, it prohibits the determination of a functional relation from the study. This finding is important, as it may suggest that upon implementation of coaching, peers may require little support in generalizing their use of strategies such as choice making to new play routines.

Although we did not observe three demonstrations of an effect, it is important to note that most PMIs train the peer ahead of time and ensure they can deliver the intervention independently; however, in this study we selected a peer model given the PMI criteria and the coach provided direct prompts to the peer model to use choice making. We wanted to see if the peer (Julianna) could do this without extensive training ahead of time, and indeed she could (in fact she did this very well and generalized her use of the strategy to the other 2 play activities). We wanted to see if she would spontaneously apply the strategy, and indeed, she did.

Additionally, analysis of our results indicates the peers may or may not be able to maintain offering those choices once prompts are discontinued. It is difficult to determine this with certainty. We wanted to determine if Julianna would maintain use of the strategy when the coach stopped prompting, but unfortunately, she did not maintain her use of choice making. It is important to note that during maintenance we removed all coach supports, instead of gradually fading the supports or offering periodic maintenance supports as one would to ensure maintenance of other school-related skills. It is possible that Julianna interpreted the removal of prompts as a signal not to continue offering choices. It may have been beneficial to remind Julianna about how she can offer choices prior to the play routine starting so that she would have a better understanding of what was expected during this interaction.

Kai's Communication Outcomes

Although not our primary focus for this study, we were interested in Kai's associated communication outcomes. We did not observe growth in his overall weighted communication; however, during intervention of Doctor's Office he increased his mean use of gestures. During intervention of Post Office, he increased his average use of gestures and single words, and during Grocery Store, he increased his use of single words.

Limitations

Although our data suggest that coaching may have had a positive effect on a peer's use of choice making, clear limitations exist. We did not see a replication of an effect over all three play activities, and consequently, we cannot determine that it was the coaching that caused change in the peer's use of choice making.

Implications for Practice and Future Research

This work provides an important foundation for future practice and research. Researchers have demonstrated the positive effects of providing opportunities for children to practice target skills on child outcomes; however, research has also suggested that teachers do not consistently provide an adequate number of opportunities for children to attain skills (Pretti-Frontczak & Bricker, 2001; Rahn et al., 2019). One reason for this limited implementation may be

due to the challenges associated with providing effective instruction for a large group of children with various needs. Therefore, this study provides considerations for enhancing the quality of the PMI and the PMI literature by focusing on coaching peers to target specific IEP goals for young children with ASD in inclusive ECSE classrooms.

In addition, this study provides a foundation for future research. Using a design of multiple probes across three or more participants may allow researchers to see a visual effect of the intervention if a carryover effect does occur across activities for one dyad, as was the case in this study. Providing intervention for a longer period of time and fading the intervention by providing a reminder to the peer before the play routine (e.g., remember you can offer your friend choices of toys to see if he or she wants to play) could also be helpful in supporting the peer in maintaining their use of strategies such as choice making. Researchers might also consider examining associated child outcomes using a more sensitive measure. For example, we were interested in Kai's communication; however, a more sensitive measure may have been communication exchanges between Kai and Julia or a measure of functional communication (communication directed at another individual).

Conclusion

Whereas research has shown that PMIs can have a positive effect on interaction between children with ASD and their typically developing peers (Katz & Girolametto, 2013; Sperry et al., 2010; Watkins et al., 2015), in previous research these have not been specific to choice making or young children with ASD in inclusive ECSE classrooms, nor have they focused on opportunities for children to practice target IEP goals through play. This study extends the literature by focusing on a new participant group (peers without disabilities and children with ASD in an inclusive ECSE classroom) and a novel type of intervention (coaching peers to use a specific strategy [choice making]). This research provides a foundation that practitioners and researchers can use to inform next steps in PMI research. It is important that children, particularly children with disabilities, have multiple opportunities to practice a skill in the environments and during the activities that are typical for them. Using coaching within a play interaction during center play to support the peers of children with disabilities in their use of strategies can be an effective way to increase the number of opportunities a child receives to practice skills, and could potentially benefit the social communication of children with ASD.

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