Creating a Common Table: Using Peer Mediated Intervention to Promote Social Communication Skills with At-Risk and Autism Spectrum Disorder Populations

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Abstract

Identifying an intervention that is effective for multiple populations can be a challenge. Given the potential range of students in an inclusive setting, the need to identify common strategies that promote skill development for multiple populations is essential. Professionals need to identify those strategies that promote skill development that meet the needs of the individual student as well as the other students in the classroom setting. An investigation was conducted using a three-part peer mediated intervention for two distinct populations. The purpose of this investigation was to examine how consistent strategies impacted diverse participant populations in the area of social communication. Results are discussed per participant population and how targeted common strategies can promote skill development of diverse populations, including those identified as being at risk or with a diagnosed disability.

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The process of social engagement involves a range of complex skills that are honed over time. Social interactions are essential for young children as they evolve into socially competent individuals. Minimal opportunities or missed opportunities can negatively impact social development and thus incur long-term deficits.

For children with diagnosed disabilities or developmental delays, the need for high quality, frequent social opportunities impact not only the social domain but all other domains, specifically communication and cognition (Diamond, Hong & Baroody, 2008). Social interactions with a range of peers provide a child with delays or disabilities opportunities to practice and perfect social skills in novel social situations. In addition, adult mediation bridges the awkward moments that impede engagement. According to the Division of Early Childhood recommended practices to promote social skills include a structured environment with a focus on socialization with peer models and promoting peer proximity, which are supported by responsive and imitative adults that will expand children's play and behavior (Wolery, 2005).

There are numerous interventions that promote social skill development and social competence. Interventions specific to populations with delays or diagnosed disabilities can be for an individual child or a large group (Choi & Kim, 2003; Gagon, Nagle, & Nickerson, 2007; Buggey, Hoomes, Sherberger & Williams, 2011). Identifying the most appropriate intervention

is based on attributes such as: age of child, type of disability or delay, adult support, peer support, environmental considerations, and specific skills sets that need to be developed (Raver, 2008).

Practitioners often use standards provided by professional accrediting agencies to guide their practice and professional development. Implementation of these standards, are due in part, to understanding emerging trends that affect young children and their families. Factors that reduce the use of the standards include lack of collaboration between families, other adults or other teachers, or limited understanding of the target skill, content area or developmental domain (Cochran et al, 2012).

Standards used by practitioners are expected to be evidence-based practices (Cooper, Heron, & Heward, 2007). Given shifts in policy it can be challenging for practitioners to identify and implement empirically validated interventions (McLean, Snyder, Smith & Sandall,, 2002). In general, standards that are evidence-based practices should be assessed using quality indicators. These indicators vary by research design. For example, single subject design quality indicators include a description of the participants, the setting, the dependent and independent variables, and validity considerations (i.e. external, internal and social) (Horner et al, 2005).

A vast number of studies can focus on a skill or developmental domain. Social skill development is one example of a topic with considerable investigation (Guralnick, 2001). It can be a challenge, when dealing with a topic that has been studied extensively, for a practitioner to identify those studies where there is confidence that it adheres to empirically based design conditions. Such studies allow the practitioner to more easily interpret the data and facilitate designing an intervention that will be most effective for the individual student and can be generalized to multiple populations.

If a practitioner is viewed as a consumer and an intervention is viewed as a product, then a consumer would ideally want to select the best product to use. Product or intervention selection depends on the "best fit" of intervention to student. That best fit is based on several criteria. Three basic criteria are: 1) focus on the target population, 2) using methods that have been empirically replicated, and 3) promotion and development of the targeted skill that can include adult support. As the consumer considers these components, they make a selection that has proven and efficient techniques and can assist them in predicting the level of difficulty to implement the intervention and the chances of success (Cooper, Heron, & Heward, 2007).

The practitioner can determine the needs of a single student or multiple students in a classroom setting. For young children at-risk for delays, aspects that address promotion of skills across developmental domains are valued; however, an intervention that addresses and promotes all developmental domains is likely beyond the scope of a single study. A practitioner would then consider what aspects of a developmental domain are in need of intervention as well as the impact that early intervention will have on later development. Focusing on a single type of delay or disorder narrows the scope for the practitioner. The selection of a behavior is likely to produce a positive effect in the natural environment of the student (Allyon & Azrin, 1968).

The first criterion of intervention selection is identifying interventions that focus on the target population. For example, an essential element to determine an effective intervention for a child with Autism is whether the intervention addresses one or more of the key dimensions of autism that are social communication and social interactions, restricted or repetitive actions with manifestation of those dimensions at an early age (American Psychological Association, Diagnostic, 2013). Given autism is a spectrum disorder; the range of functioning per aspect can be specific to the individual. Determining interventions that can be adapted to accommodate a range of functioning per dimension is beneficial for the teacher and their students.

A second criterion is replication of the intervention. An intervention that is reliable and useful based on both findings and limitations of an intervention provides the practitioner with the knowledge that the selection of that intervention will provide them with tested findings that can be used in their practice (Johnston & Pennypacker, 1980; Cooper, Heron, & Heward, 2007).

Interventions that have an extensive replication history specific to young children at-risk for delays include assessment to determine growth, focus on skills that span across multiple developmental domains or curricular areas and promote inclusive practices (Foster, 2010). When criteria for effective interventions are considered, there are opportunities to incorporate play as a context to promote developmental domains and address the child's need for participation in a variety of settings (McWilliam, 2005; Wolery & Hemmeter, 2011).

Intervention studies with multiple replications for children with ASD focus on parental involvement, incorporate behavioral strategies and are multicomponent interventions with an extended duration. (Levy, Kim, & Olive, 2006). Like populations at risk for delays, ongoing assessment of the target skills of the intervention is important as well as the extent that intervention strategies can be implemented in educational and community settings.

A third criterion is adult supported promotion of student learning and development. For young children, adult interaction that is child focused considers the natural environment, adaptation to meet the child's needs, and a method for data collection to make data-based decisions (Wolery, 2005). The combination of these three elements may take time and training, however an effective intervention considers these elements and incorporates them to increase effective implementation.

For young children, the adult role can be family members, teachers or other professionals. Their role is promoting skill development utilizing collaboration and promoting skill development in multiple settings. The key to successful promotion of skills is providing as much adult support as needed to promote the targeted skills. No matter what the intervention, it should be individualized and flexible with a support system that can provide information and guidance (Trivette & Dunst, 2005).

Like populations of young children at risk for delays, when working with ASD populations, the importance of collaboration cannot be understated (Morrier, Hess, & Heflin, 2011). Evidence based strategies specific to the needs of individuals with autism that are implemented with high fidelity maximize the probability of good outcomes (Strain, Schwartz, & Barton, 2011). For

ASD populations, an understanding of the unique social, language and academic needs are necessary competencies to target for intervention.

The interventions implemented for the investigations discussed considered these three criteria in design and implementation. In the first study, participants were at risk for developmental delays. In the second study, participants were students with a diagnosis of autism. Given the large number of students at risk for developmental delays (Boyle et, al, 2011) and the need to promote social communication for students with autism, both studies examined the effectiveness of an intervention to promote social communication skills that would generalize to the classroom. The intervention components took into consideration the consequences of limited social communication skills and how those limitations negatively impact peer relationships. By expanding, rather than limiting social communication skills to turn taking and scripted interactions (Stanton-Chapman & Snell, 2011; Jamison, Forston, & Stanton,-Chapman, 2012), the intervention for these investigations considered a range of skills that more fully represent the skills set associated with social communication.

Beyond intervention selection, there is the reflective process of practitioner skill and implementation. In terms of social competence, teaching and promoting social skills may appear intuitive; however teaching this domain requires both understanding and implementation of skills across multiple domains including social competence and communication. A practitioner may be an effective and social competent individual but ineffective in teaching skills associated with this domain. The lack of instructional proficiency may result in a practitioner being unprepared or underprepared to promote skill development (Uysal & Ergenekon, 2010).

For these investigations, specific attributes of social communication skill development were analyzed to compare the effects of one intervention on social skill and social competence of the participants from two distinct populations. The following research questions were examined: Was the intervention effective in promoting aspects of social communication (i.e. the use of comments and requests) for both young children at risk for delays (Study 1) and children with autism (Study 2)? Was the intervention effective in promoting language diversity and complexity for both young children at risk for delays (Study 1) and children with autism (Study 2)? Considerations were also examined in determining the best fit of interventions. The criteria were adherence to recommended practices for professionals that work with young children at risk for delays or exceptional populations and the efficiency of implementation.

Methods

The participant characteristics, interventionist characteristics, and settings and materials are provided separately for Study 1 and Study 2. As Study 2 is a replication of Study 1, there is one description of the experimental design and conditions and data collection procedures for both studies (Craig-Unkefer & Kaiser, 2002;2003; Loncola & Craig-Unkefer, 2005;2010).

Study 1

Participants

Six preschoolers between the ages of 3 years, 1 month and 3 years, 11 months participated in the study. The selected criteria were: (a) they demonstrated language skills at least 1.3 standard

deviations (SDs) below the level expected for their chronological age (CA) as measured by the Preschool Language Scale (PLS-3; Zimmerman, Steiner, & Pond, 1992); (b) they demonstrated fewer social skills (e.g., making friends, following directions, initiating conversations with peers) and/or more problem behaviors (e.g. have temper tantrums, appears lonely, shows anxiety, is sad or depressed) than typical 3-year-olds according to the Teacher Report of the Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990). Participants were excluded from participation if they had significant sensory impairments or a previous diagnosis of intellectual disabilities, behavior disorders, or pervasive developmental disorder.

All six participants attended a Head Start center in an urban area in a large metropolitan city. The participants were in three different classrooms for 3- and 4-year-olds. The characteristics of the six participants are described in Table 1. The participants were paired in mixed gender dyads as indicated in Table 1.

According to the results of the PLS-3 (Zimmerman, Steiner, & Pond, 1992), five of the six participant's auditory comprehension, expressive communication, and standard scores were between 1.5 and 1 standard deviation below the mean score and they would be considered as having a mild language disorder with one participant (Child A03) having the characteristics of a moderate language disorder. The scores for the Expressive Vocabulary Test (EVT;Williams, 1992) were within the average range for children their age with the exception of one participant (Child B01) who scored one SD above the mean.

Based on the scores for the SSRS (Gresham & Elliot, 1990) in the area of social skills, four of the six participants exhibited fewer social skills. Five of the six participant's scores in the area of problem behaviors were in the average range and one participant (Child B01) score indicated more problem behaviors.

Child Interventionists

Two child interventionists conducted baseline and intervention sessions. Both interventionists had experience working with at-risk, preschool age children. One interventionist was a doctoral level student and the other interventionist was an undergraduate student majoring in special education.

Table 1.
Participants for Study 1

	Dyad 1		Dyad 2		Dyad 3	
	Child A01	Child B01	Child A02	Child B02	Child A03	Child B03
Age (years/months)	3-09	3-05	3-05	3-06	3-08	3-06
Gender	Female	Male	Female	Male	Female	Male
PLS-3 Expressive Score [1]	81	73	79	77	71	77
PLS-3 Auditory Comprehension Score [1]	72	80	73	78	67	82

PLS-3 Total Standard Score [1]	74	74	73	75	66	77
EVT Standard Score [2]	121	90	92	100	92	95
SSRS Social Skills Score [3]	78	77	76	105	71	99
SSRS Problem Behavior Score [3]	112	128	107	107	104	104

[1] Preschool Language Scale-3 (Zimmerman, Steiner, & Pond, 1992)
[2] Expressive Vocabulary Test (Williams, 1992)
[3] As indicated by the Social Skills Rating Scale Teacher Report (Elliot & Gresham, 2008 and 1990)

Setting and Materials

Baseline and intervention sessions took place in two areas of a Head Start center, a gym and a classroom. Both areas were at least 2m x4m and had sufficient room to accommodate the participants and the interventionist.

Play materials used during baseline and intervention sessions included dramatic play toys (e.g., kitchen, grocery store, hospital), materials associated with careers, (e.g. school bus drive, teacher, gardener, doctor) and manipulative toys (e.g. cars, blocks, trains). These materials were similar to types of toys available in the classrooms of the participants. The toys were grouped into three play themes: (a) careers, (b) manipulative activities, (c) home living. Each activity included toys that provided the participants with a variety of options to explore during play. For example, in the hospital activity, toys included dolls and stuffed animals, doctor scrubs and doctor kits).

Study 2

Participants

Six participants were identified per teacher report based on the following criteria: between the ages of five- and eight-years old, with a diagnosis of mild/moderate autism and had received a passing score on a hearing exam. All six children attended an urban elementary school in a large metropolitan city. Children were excluded if they were hearing impaired, had a diagnosis of moderate to severe autism and/or had a secondary diagnosis of intellectual disabilities or exceeded the age limit of eight-years-old.

The participant's language, cognitive and adaptive behaviors were assessed. To determine receptive and expressive vocabulary ability, the Peabody Picture Vocabulary Test –III (PPVT-III, Dunn, and Dunn, 1997) and the Expressive Vocabulary Test (EVT, Williams, 1992) were used. The participants were paired in dyads as indicated in Table 2.

Participants' standard scores for the PPVT (PPVT-III, Dunn, and Dunn, 1997) ranged from as low as 40 (Child 1A1 and Child 2B3) to a high of 60 (Child 1A2). These scores were well below the expected age equivalent for all participants. There was a similar range of scores for participants on the EVT (EVT, Williams, 1992) with standard scores of 40 (1A1, 1A3 and 2B3) to 82 (1A2).

Table 2.
Participants for Study 2

	Dyad 1		Dyad 2		Dyad 3	
	Child 1A1	Child 2B1	Child 1A2	Child 2B2	Child 1A3	Child 2B3
Age (years/months)	6-04	6-07	7.00	8.03	7.05	8.01
Gender	Female	Male	Female	Male	Male	Male
PPVT [1]	40	42	60	45	52	40
EVT [2]	40	42	82	54	40	40

[1] Peabody Picture Vocabulary Test (Dunn & Dunn, 1997)
[2] Expressive Vocabulary Test (Williams, 1992)

Child Interventionists
One interventionist collected all baseline, and intervention data. The interventionist was a doctoral candidate in Special Education. She had a master's degree in Special Education and six years experience teaching young children with autism.

Settings and Materials
This study was conducted at a public school in a large metropolitan city. Baseline and Intervention sessions occurred in a sectioned off area of a large hallway in the school. Two accordion style dividers were constructed each measuring 4m x 2m. These dividers were placed in an L shape against a wall sectioning off a "U" shaped space that measured 4m x 4m and enclosed on three sides with the camera and tripod at the open end of the U. The area contained a table and two chairs.

Materials
Materials used in the baseline and intervention sessions were representative of play materials commonly found in classrooms of young children and consisted of dramatic play items including themes (grocery store, kitchen) and role playing materials (doctor, veterinarian). Manipulative items such as blocks and cars also were used. Materials were grouped into seven different play themes: Doctor, Vet/Zoo, Construction, Grocery Store, Farm, Housekeeping/ Kitchen, and Airport.

Procedures for Study 1 and Study 2

Design. A multiple baseline across dyads (Kazdin, 2010) was implemented to determine the effects of peer play intervention. Following the logic of a multiple baseline design, each successive dyad had increasingly longer baselines. Treatment was introduced to the second dyad when clear effects had been established for both children in the first dyad based on frequency of a class of descriptive statements of which comments were a component; treatment was introduced to the third dyad when effects were evident in the second dyad. Two experimental conditions were implemented: baseline and intervention.

Baseline Sessions. The baseline sessions were conducted at least three times per week. These sessions were 10 minutes and the following procedure was used: 1) the interventionist brought the two children in each dyad to the space designated for project use, 2) the interventionist invited the children to play with the toys arranged on the carpeted floor and engaged in minimal conversation with the children while they played. The interventionist did not prompt language or prohibit any behaviors except those that were harmful to peers or materials (e.g., hitting, throwing materials). Such behavior occurred infrequently.

Intervention Sessions.
The intervention sessions were conducted three to four times per week. Intervention sessions lasted 20 minutes. Once the interventionist brought the two children in each dyad to the space designated for project use, the three part intervention was conducted. At the conclusion of the session, the children were taken back to their classrooms. All sessions occurred during the morning at times convenient for classroom teachers. All sessions were electronically video recorded.

Intervention Components. An intervention with three components was implemented. The first component, the advanced play organizer, lasted approximately 5 min. During this component, the interventionist and the children developed a play plan specific to the play theme designated for the session. The structure of this component was: 1) the interventionist identified the play theme and (e.g., “Today we are going to go camping.”); 2) the interventionist and the children labeled the toys to be used; 3) the interventionist asked the children how they could play with the toys within the theme; 4) if the children could not make a play plan independently, the interventionist suggested roles for the children and ways to talk with each other (e.g., "Sophie you could go fishing and Shelby, you can make dinner.”) and role played and modeled ways for the children to use the toys and to talk to each other; 5) the interventionist told the children it was time to play and moved away from the immediate play area and sat approximately 3 m from the children.

The second component was a 10-min. play session. During this component, the children played with the toys and other materials provided. The interventionist sat away from the play area, watched the children, and used verbal re-directs and reflective statements to sustain and maintain the children’s play interaction. The interventionist did not prompt or comment when the dyad was engaged in an interaction.

The third component of the intervention, the review session, took place immediately following the play session and lasted approximately 5 min. The interventionist re-entered the play area and sat near the children. The interventionist and the children discussed the play that occurred in the preceding component. The interventionist asked the children what they played with during the play session. If the general question did not elicit a response from the children, the interventionist asked the children specific questions about how they played with the toys and what verbal exchanges had occurred between the children (e.g., “ Phoebe, what did you give the baby to eat? What did you say to Zach?, Phoebe, ask Jason to give you a toy?”). At the conclusion of the review session, the interventionist asked the children if they had fun playing together and if they wanted to play again. Finally, the children were thanked for their participation.

Data Coding and Reliability. The data collection procedures for baseline and intervention sessions were as follows: (a) the baseline play sessions, all three components of the intervention sessions, (planning, play session, review) were electronically recorded by the interventionists; (b) all video recorded play sessions were transcribed using the Systematic Analysis of Language Transcripts protocol (Miller & Iglesias,2008); (c) the transcription was verified by the interventionist who conducted the session; and (d) the play sessions were coded using the Peer Language and Behavior Code (Craig-Unkefer & Williams, 2002). This code measured child communication and interventionist behaviors.

Interobserver Agreement. Interobserver agreement was calculated on the Peer Language and Behavior Code (Craig-Unkefer & Williams, 2002) for 20% of the baseline and intervention sessions. Reliability observations were equally distributed across dyads and experimental conditions. Reliability was assessed using an exact agreement formula in which the total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100. Overall reliability for Study 1 for child behaviors was 89% (range 82-96). Overall reliability for child behavior for Study 2 was 82% (range 70-94).

Child Communication Measures. The child social communicative behaviors observed were descriptive and request utterances. Each category consisted of several types of behavior. Descriptive utterances are commentary between peers about activities or relevant events. Types of descriptives included: (a) peer-directed comments, (b) play organizer statements, and (c) acknowledgment responses. Requests are verbal inquiries between peers in the structure of a question. Types of request utterances included: (a) information requests, (b) yes-no questions, and, (c) action and stop-action requests. In the analysis of the data for these studies, only the peer directed comments and the requests are reported and discussed.

There were three different categories of diversity and complexity analyzed: total words used, vocabulary diversity, and four or more words. The dialogue of the participants that took place during the play sessions were analyzed using the SALT program (Miller & Chapman, 2008). Total words were the sum of all words spoken per participant in a session. Vocabulary diversity was calculated by counting the total number of different word roots. Four or more words calculations were determined by separating phrases or sentences with more than words used.

Results

The first research question addressed the effectiveness of the intervention to promote aspects of social communication (i.e. the use of comments and requests) for both young children at risk for delays (Study 1) and children with autism (Study 2). The baseline and intervention frequency of comments for participants in Study 1 are presented in Figure 1. In Study 1, the baseline frequency of comments per child had distinct patterns across dyads but on average both peers had similar average comment production. At the conclusion of each of the baseline sessions, all participants decreased the frequency of comments to fewer than five comments in a session or no comments. In the baseline phase, Dyad 1 (Child A01 and B01), Child A01 averaged 17 comments and Child B01 averaged 14 comments and Dyad 3 (Child A03 and B03), Child A03 averaged 12 comments and Child B03 averaged 14 comments. In both these dyads, all the participants decreased to five comments or less per participant in the last two or three sessions. Dyad 2 (Child A02 and B02) was consistently low in their use of comments throughout the baseline phase, with both children having an average of 2 comments across baseline sessions.

Once the intervention was introduced, all dyads had similarly higher frequencies of comment production between partners. In Dyad 1, each participant had at least 20 comments per 10 minutes session with as many as 60 comments per 10 minute session. There was an interplay between partners as neither partner was consistently commenting more than their peer. Child A01 averaged 39 comments and Child B01 averaged 37 comments. Children in Dyad 2 displayed gradual and consistent progression over the duration of the intervention phase. Child B02 produced a higher number of comments than Child A02 from the seventh session until the conclusion of the phase, however Child B02 was, on average, within five comments of their peer. Child A02 averaged 25 comments and Child B02 averaged 30 comments. Dyad 3 was distinctive from the other dyads as, after session one in the intervention phase, there was an abrupt shift in the number of comments produced by each partner with Child B03 producing more comments for the majority of the sessions than Child A03. Also, there was a greater range in the frequency of comments between partners. Child A03 averaged 30 comments and Child B03 averaged 46 comments.

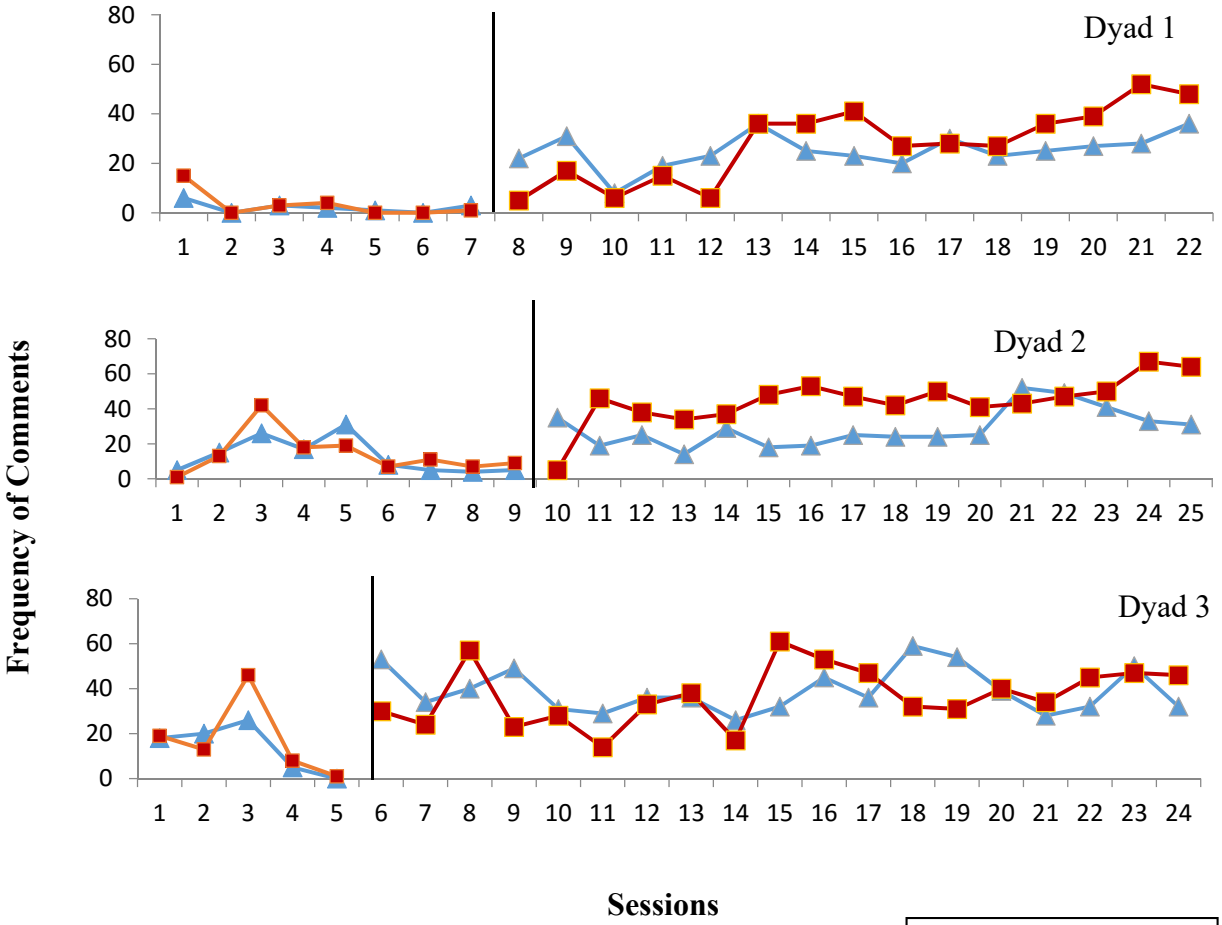

Figure 1. Comments Per Dyad for Study 1

In Study 2, there were distinctive starts with the same outcomes as the dyads ended the baseline phase. The baseline and intervention frequency of comments for participants in Study 2 are presented in Figure 2. Participants in Dyad 1 (Child 1A1 and 2B1) and Dyad 3 (Child 1A3 and 2B3) were consistently low throughout the baseline phase with some spikes by a single participant. In Dyad 2 (Child 1A2 and 2B2), Child 1A2 had an initial spike with a disproportionality higher number of comments than their peer but both partners had a consistent decrease over the baseline sessions producing five or fewer comments at the end of the baseline phase.

As the intervention phase began, children in Dyad 1 had increases above baseline with a dramatic divide in commenting in the session 2 but beyond that session, both children displayed consistency in comments with Child 1A1 commenting more than Child 2B1 but there was not a disproportionate amount of commenting between the two children and at the final session, they had the same number of comments. Child 1A1 averaged 10 comments and Child 1B averaged 22 comments. Dyad 2, like Dyad 1 had little overlap across sessions. Although Child 1A2 averaged 41 comments across all intervention sessions as compared to an average of 18 comments for Child 2B2, there wasn't a vast difference with one child dominating the interactions. Dyad 3 was more similar in their average commenting in the intervention phase. Child 1A3 averaged 26 comments and Child 2B3 averaged 15 comments. Child 1A3 had an increase in the 6th intervention session and then a decline to fewer than five comments in the subsequent session but slowly increased comments for the remaining sessions. Dyad 3 was distinctive in that the participants did not have one session where there were the same number of comments but were more similar in the average number of comments across sessions as compared with the other dyads.

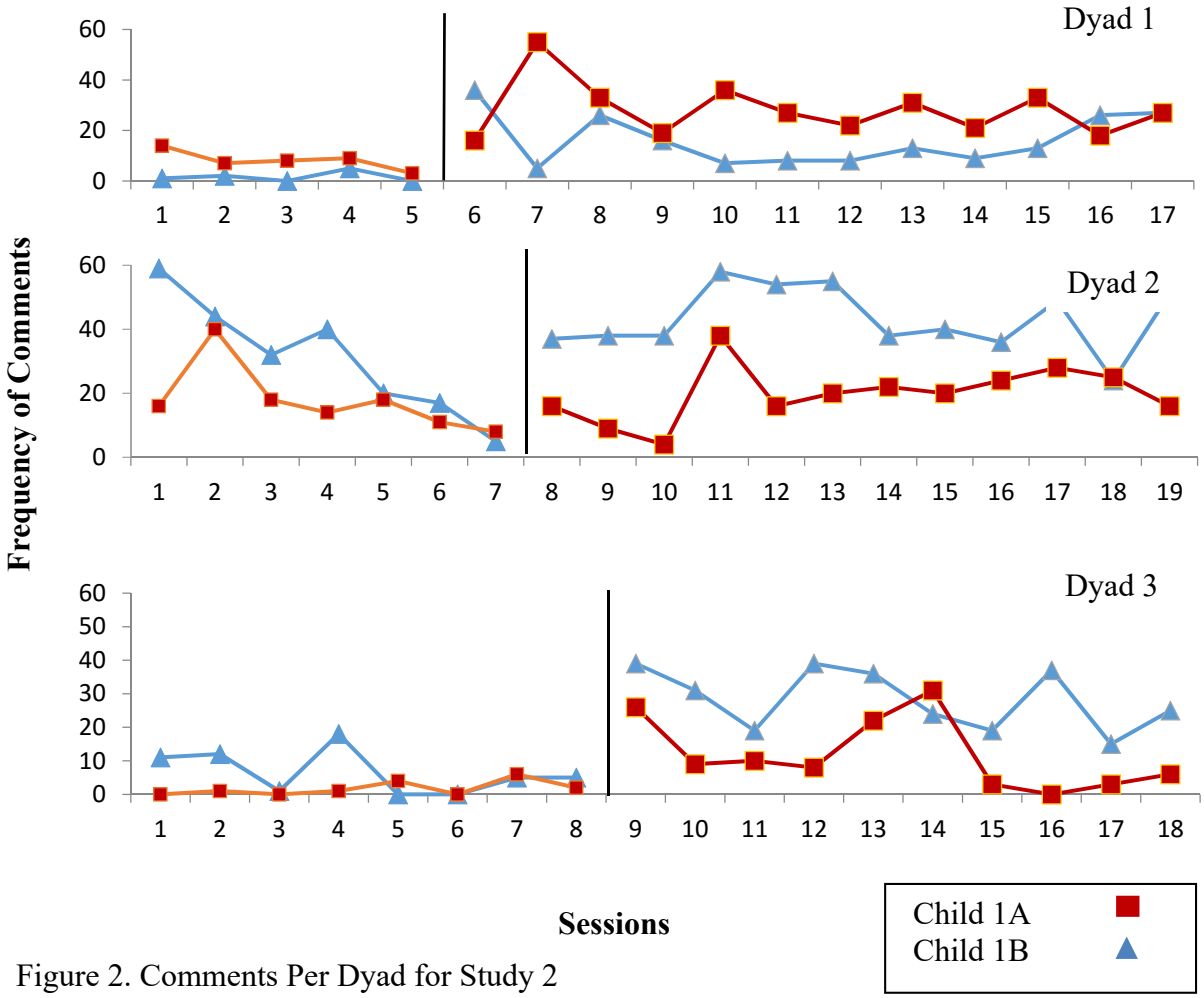

Figure 2. Comments Per Dyad for Study 2

Figure 3 compares the average number of comments for both studies across dyads. The baseline rates for participants in both studies had almost the same average comments. Study 1 participants had an average of 10 comments and Study 2 participants had an average of 11 comments. In contrast, the average comments in the intervention phase for Study 1 were 34 average comments across participants as compared to 24 average comments for participants in Study 2.

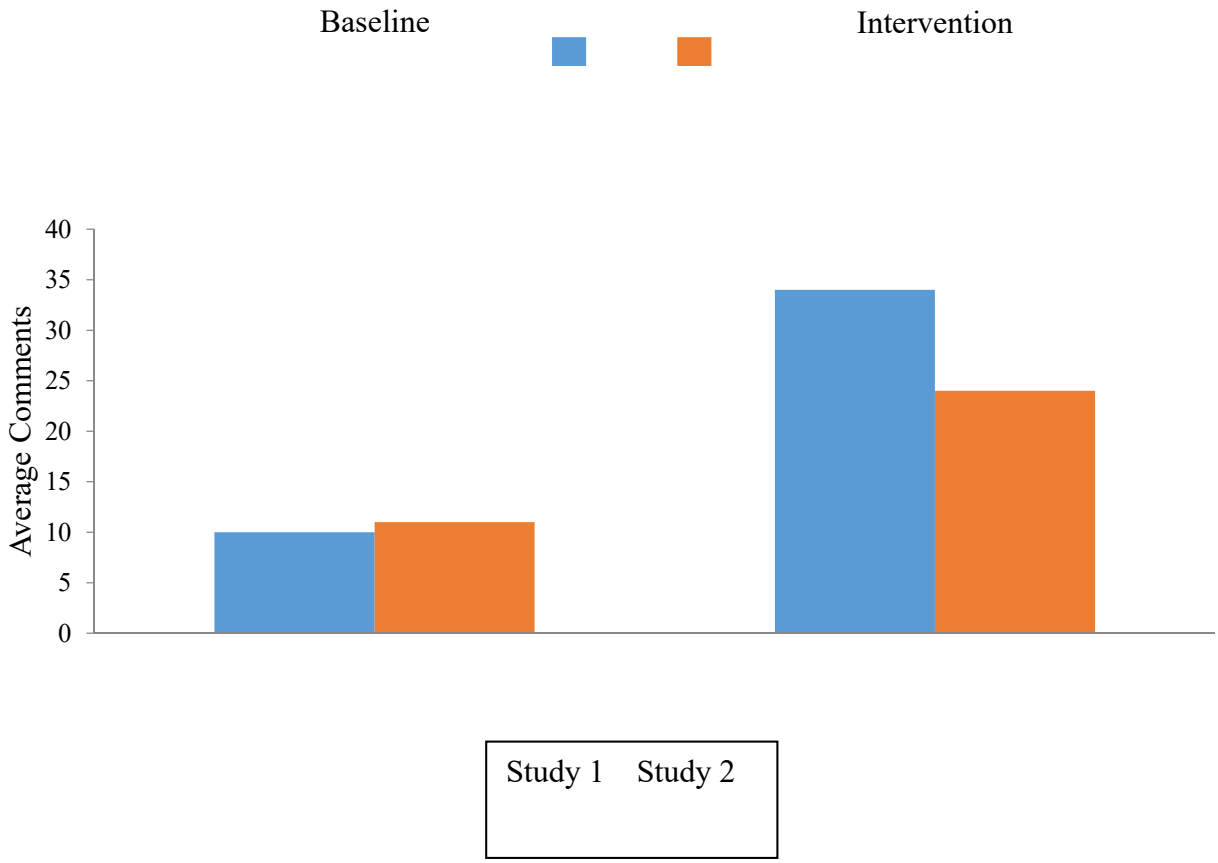

Figure 3. Comparison of Baseline and Intervention Frequency of Comments of Study 1 and Study 2

The baseline and intervention frequency of requests for participants in Study 1 are presented in Figure 4. In the baseline phase of Study 1, participants in Dyad 1 had few requests. Child A01 had a higher frequency of requests as compared to Child B01. Both participants in Dyad 2 had few or no requests in baseline. Participants in Dyad 3 had variable rates with Child A03 having a high rate of requests for one session, however the reason for this high rate was due to asking the same question repeatedly.

There were increases in frequency of requests for all dyads once the intervention was introduced. Participants in Dyad 1 had a steady progression and were similar in their rates of requesting, Child A01 had an average of 15 requests and Child B01 had an average of 14 requests. Child B01 was less consistent across all intervention sessions producing more or less than the more consistent and stable Child A01.

With the exception of two intervention sessions, Dyad 2 participants had similar rates of requesting across sessions with both participants having an average of 15 requests in the intervention phase. Like Dyad 1, there was an exchange per session between the peers with one requesting slightly more than the other but no dominant and consistent requester.

One participant in Dyad 3 had consistently higher rates of requesting than their peers; however, this dyad had higher rates of requesting than the other dyads. Child A03 had an average of 32 requests and Child B03 had an average of 20 requests. After the sixth intervention session, Child A03 consistently produced more requests while Child B03 had variable rates of production but never reduced production of requests to a baseline rates.

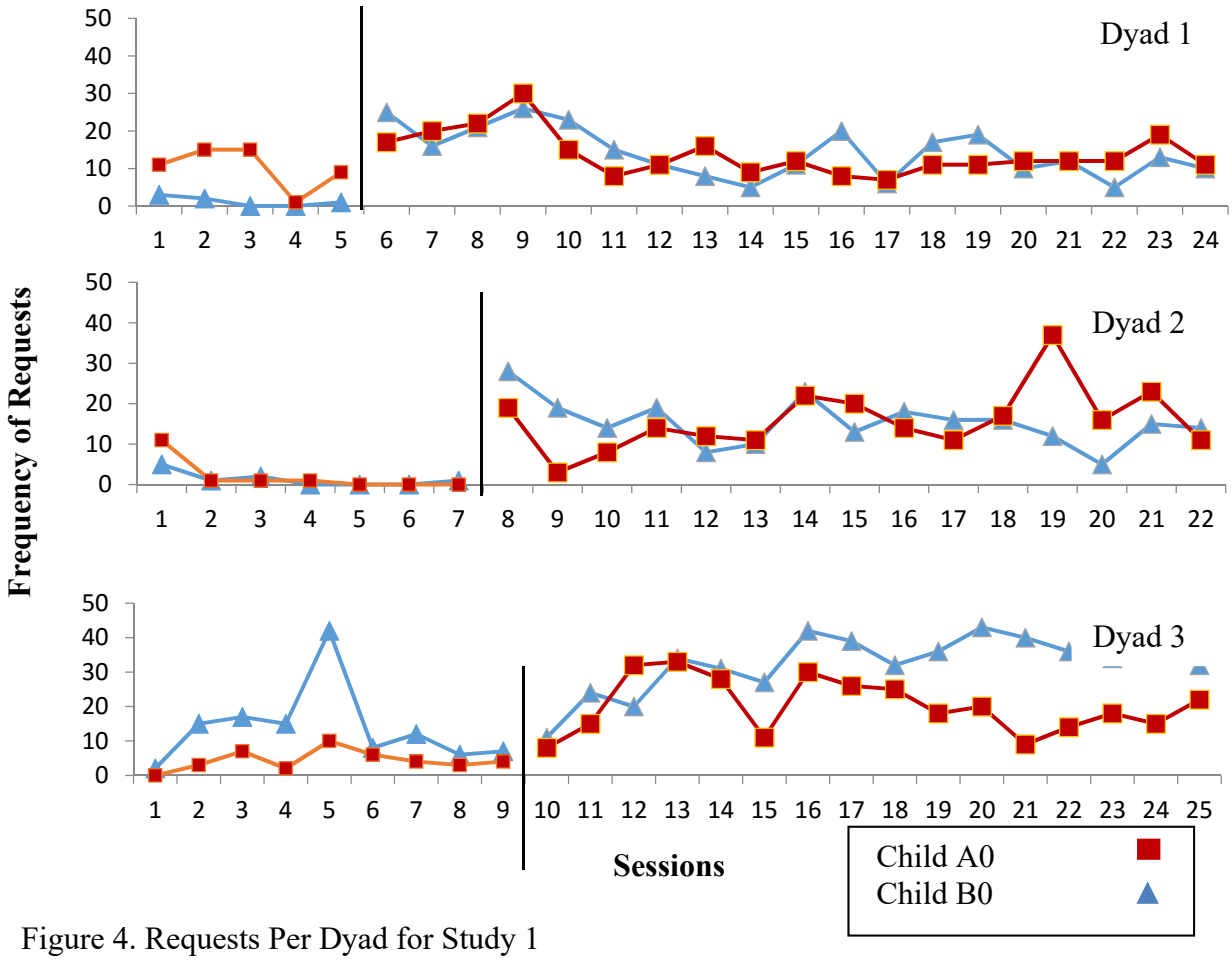

Figure 4. Requests Per Dyad for Study 1

Participants in Study 2 used fewer requests as compared to participants in Study 1 and in comparison to their own frequency of comments. The baseline and intervention frequency of requests for participants in Study 2 are presented in Figure 5. Dyads 1 and 3 had relatively flat rates of requests in baseline. Dyad 2 had variable rates of requests in baseline but ultimately averaged 4 or less requests at the end of the baseline phase.

For Dyads 1 and 3, the implementation of the intervention increased use of request for one participant but not the other. Child 1A1 and Child 2B3 produced one or no requests throughout the intervention phase. The partners for both participants (Child 2B1 and 1A3) did produce more requests that their peers. Dyad 2 participants were more consistent and more matched in their use of requests averaging between 10 and 15 requests across the phase.

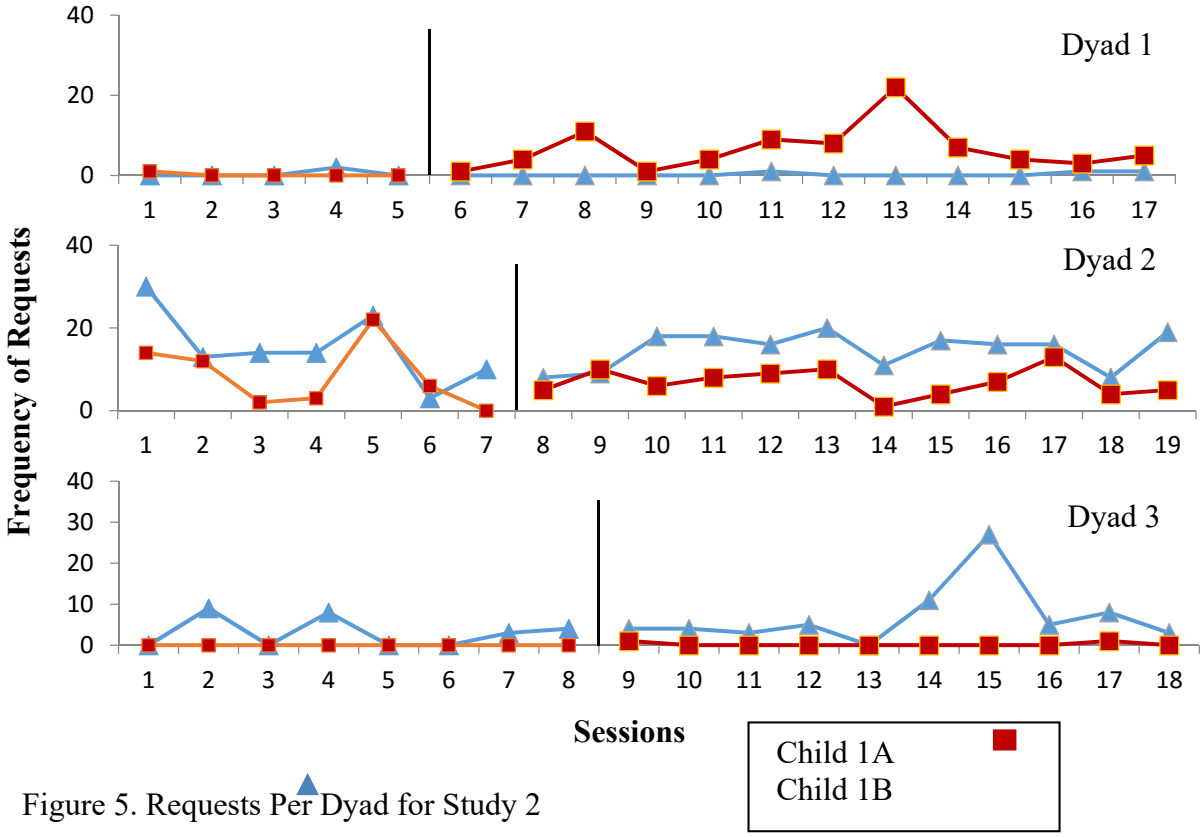

Figure 5. Requests Per Dyad for Study 2

Figure 6 compares the average number of requests for both studies across dyads. Like the baseline rates across participants in both studies of comments, both groups had almost the same average requests. In the baseline phase, Study 1 participants had an average of 6 requests and Study 2 participants had an average of 5 requests. In contrast, the average number of requests during the intervention phase for Study 1 was 19 average requests across participants was higher while in Study 2, there were 7 average requests across participants.

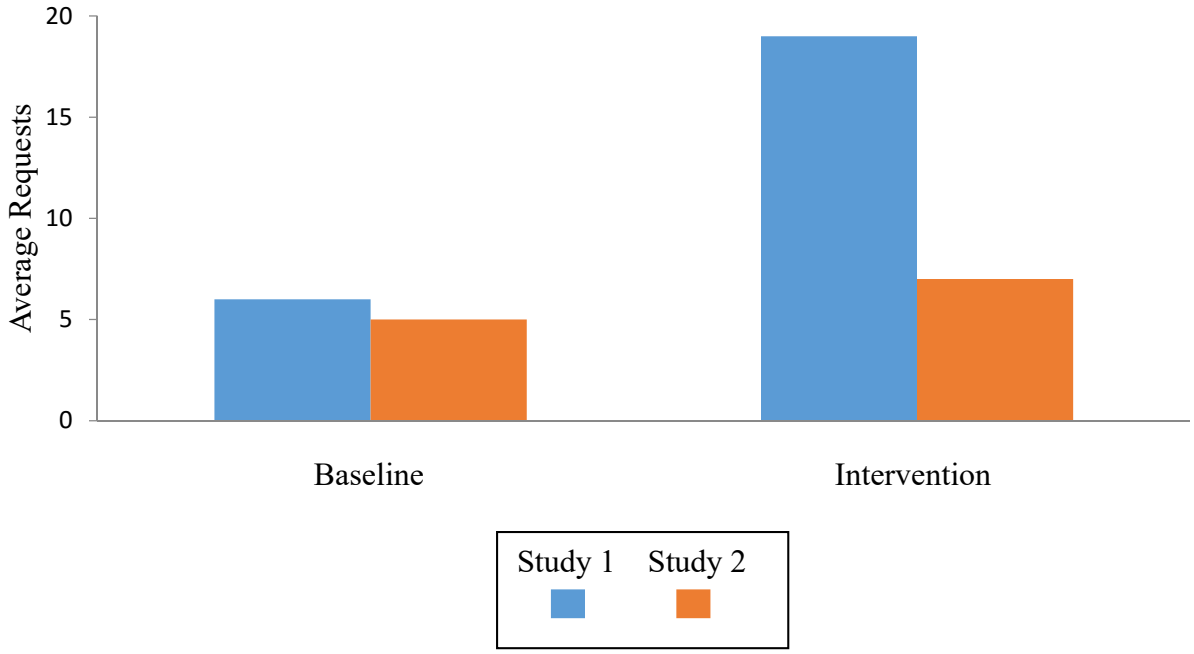

Figure 6. Comparison of Baseline and Intervention Frequency of Requests of Study 1 and Study 2

The second research question was to determine if the intervention was effective in promoting language diversity and complexity for both young children at risk for delays (Study 1) and children with autism (Study 2). Table 3 has the average total words used and the range of the total words. Table 4 displays vocabulary diversity and Table 5 displays four or more word utterances.

All participants in Study 1 had gains in the intervention phase in total words used. Across participants, the average total words used in baseline were 51 words. The average words used in intervention across participants were 150 words. Comparing gains between dyads, Dyad 2 participants had the greatest gains with an average of nine words used in baseline and an average of 127 words used in intervention.

Participants in Study 2 had an average of 69 different words in baseline and 109 different words in intervention. An interesting pattern developed within each of the dyads. One participant from each dyad had triple digit words produced in both the baseline and intervention phases while the other participant had double digit word production across both phases. The imbalance may have been due to the repetition of words by a single participant; therefore to better understand this occurrence, vocabulary diversity was calculated.

Table 3
Average Total Words Used in Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	47 (6-83)	176 (111-224)	Child 1A1	23 (4-66)	41 (13-103)
Child B01	89 (33-156)	161 (63-216)	Child 2B1	39 (22-65)	108 (48-169)
Child A02	8 (0-23)	136 (101-179)	Child 1A2	201 (49-327)	262 (109-366)
Child B02	10 (0-31)	118 (39-172)	Child 2B2	102 (17-226)	98 (45-138)
Child A03	87 (21-256)	144 (117-175)	Child 1A3	37 (4-84)	113 (63-137)
Child B03	68 (2-131)	169 (47-192)	Child 2B3	14 (2-38)	35 (5-79)

Table 4
Vocabulary Diversity For Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	25 (6-44)	75 (47-105)	Child 1A1	8 (4-15)	15 (8-27)
Child B01	40 (23-62)	76 (42-108)	Child 2B1	20 (12-31)	46 (27-71)
Child A02	7 (0-19)	62 (44-82)	Child 1A2	79 (34-113)	96 (57-131)
Child B02	10 (0-29)	60 (20-83)	Child 2B2	34 (7-54)	39 (27-60)
Child A03	40 (20-62)	67 (52-103)	Child 1A3	14 (0-33)	35 (24-48)
Child B03	33 (2-52)	69 (33-88)	Child 2B3	6 (1-17)	14 (4-35)

Vocabulary diversity across studies is displayed in Table 4. As with the measure of total words used, there were gains across all participants from baseline to intervention for this measure. In Study 1, participants used an average of 25 different words in baseline as compared to 68 different words in intervention. Participants in Study 2 used an average of 26 different words in baseline and an average of 40 different words in intervention. The gains for this measure were similar for both study participants.

Another indicator of vocabulary diversity is the use of four or more word utterances. In Study 1, on average, all participants had gains in use of four or more words from baseline to intervention. The ranges provided indicate consistent increased shifts between the two phases. There were fewer changes for all participants in Study 2 for this measure. The average number of four or more word utterances was unchanged from three of the participants and there were decreases in the average number of four or more word utterances for two of the participants. Of the three measures used to determine language diversity and complexity, total words and diversity of words had changes that indicate the intervention did promote language diversity and complexity.

Table 5
Four-or-More-Word Utterances for Baseline and Intervention Per Participant

Study 1			Study 2		
Participant	Baseline (Range)	Intervention (Range)	Participant	Baseline (Range)	Intervention (Range)
Child A01	8 (0-15)	36 (15-53)	Child 1A1	1 (0-4)	1 (1-3)
Child B01	17 (6-37)	32 (8-51)	Child 2B1	2 (2-3)	3 (2-6)
Child A02	1 (0-3)	23 (15-31)	Child 1A2	8 (7-12)	7 (3-12)
Child B02	2 (0-8)	22 (5-52)	Child 2B2	4 (1-6)	3 (2-5)
Child A03	15 (2-41)	30 (15-48)	Child 1A3	4 (0-11)	4 (3-6)
Child B03	12 (0-20)	42 (7-61)	Child 2B3	2 (0-4)	2 (0-2)

Discussion

The purpose of this study was to examine the how consistent strategies impacted diverse participant populations in the area of social communication. The results of the intervention indicated gains were made across all participants on a range of measures specific to the domain of social communication. The potential relevance of this study was to identify interventions that are parsimonious and provide teachers with a best fit model that can be used with a range of populations. An additional aspect of this study is the identification and use of strategies that adhere to recommended practices for professionals may work with distinctly diverse populations.

Social communication has a range of definitions and can consist of many skills but for the purposes of this study, the cognitive social learning model developed by Ladd and Mize (1983) and adapted by Elliot and Gresham (1993) was the conceptual basis for the intervention. The intervention incorporated the key elements of this model: 1) the interventionist provides the participants with instruction of the use of specific social behaviors, 2) once instruction is completed, the participants have the opportunity to rehearse the behaviors, 3) after practice, the interventionist provides feedback and reinforcement on the use of the skills, and 4) once the skills have been demonstrated by the participants, there are opportunities for maintenance and generalization.

The determination of the effectiveness of the intervention was based on specific skills: the use of comments and requests and language diversity and complexity across two distinct participant

groups: children at-risk for delays and children with Autism Spectrum Disorders. There were two distinct investigations implementing the same intervention. There were consistencies between the studies in the structure and process. They were the co-equal status of the participants grouped in dyads, consistent measures, and experimental design.

In addition to the structural consistencies across studies, there were also consistencies in the results of each of the studies across measures. Results indicated that there were gains across measures for the participants for both studies. Participants in Study 1 had consistent gains from the baseline phase to the intervention phase for all measures. Participants in Study 2 had gains from the baseline phase to the intervention phase for the majority of the measures with exceptions in requesting.

There were gains in commenting and requesting for both participant groups. Comparing baseline averages to intervention averages across studies, the most substantial gains were specific to comments. Although both participant groups had gains in requests when comparing the two phases, participants in Study 1 used more requests, on average, than participants in Study 2.

Comments and requests are the building blocks of social communication (Meadan, Halle, Ostrosky & DeStefano,2008). Promoting these skills at an early age increase the likelihood of not only social development but children's overall development (Noonan & McCromick, 2014). Linking the strategies implemented in these studies to recommended practices provides further validation.

For young children at-risk for developmental delays or have a diagnosed disability, interventions with a focus on social competency need to be flexible and allow for implementation in a range of settings and groupings. The current studies explored a range of options in terms of settings and participant pairings. In the first study, the participants were at-risk for delays and paired in dyads. Both participants were at-risk for delays, which is a novel approach as the more characteristic grouping is with a typical peer. In the second study, both participants had a diagnosis of autism. Again, this pairing option was not characteristic of studies that have focused on the promotion of social skills for individuals with autism (Wang, Parilla,& Cui, 2012;Reichow, Steiner, & Volkmar, 2013)

In addition to alternate grouping, the settings for each of the studies utilized both regulated settings that allowed the participants to acquire skills that would increase the likelihood of sustained social engagement such as developing a plan for social engagement, acquiring specific phrases or actions that sustain interactions, and reflecting on the social interaction. The ability to practice in a regulated setting and then transition to a classroom setting with a range of peers increases the likelihood of both the generalization and maintenance of behaviors.

There were limitations in both studies that would have provided additional information to the effectiveness of the interventions. First, a social validity measure of teachers or other professionals that work with these populations could have been conducted to determine if the strategies used could be effective in a range of settings and implemented by a range of professionals (teachers, parents, paraprofessionals). Second, generalization and maintenance

measures would have provided further evidence of the long term effects of the interventions for the participants.

Professional educators that are focused on informing their practice seek information that is relevant to their current instructional needs. Identifying instructional strategies that can be adapted and implemented with diverse student populations requires knowledge of best practices as well as the ability to discern those strategies that are evidence based. The results of these studies identify an intervention that is practical and evidence based and promotes social communication skills that impact overall student development.

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