

IMPLEMENTING RESPONSIVE INTERVENTION STRATEGIES WITH BILINGUAL
SCHOOL-AGE CHILDREN WITH AUTISM SPECTRUM DISORDER

by

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(Under the Direction of Jennifer A. Brown)

ABSTRACT

There are limited empirical guidelines for providing language intervention for school-age children with autism spectrum disorder (ASD) of bilingual and culturally diverse backgrounds. This alternating treatments study examined communication production of a bilingual child with ASD across Spanish and English contexts when participating in a responsive communication interaction intervention replicated across three school activities. Results show an increase in communication over the course of the four-week intervention with specific communication patterns across each language context.

INDEX WORDS: Autism spectrum disorder, Communication sciences and disorders, Child language disorders, Responsive intervention, Bilingual language intervention

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER	
1 INTRODUCTION.....	1
Support & Recommendations for Dual Language Intervention.....	2
Dual Language Intervention for Language Disorders.....	3
Dual Language Intervention for ASD.....	5
Purpose.....	7
2 METHOD.....	9
Participant.....	9
Setting, Interventionist, and Design.....	10
Measures/Data Collection and Reliability and Fidelity.....	11
3 RESULTS.....	13
Language Rate.....	14
Language Complexity.....	17
Language Acts Across Activities.....	18
Frequency of Language Form Across Activities.....	19
Frequency of Language Form Within Each Language.....	21

4 DISCUSSION.....	23
Communication as Function of Intervention Language Context.....	23
Limitations.....	25
Future Directions.....	26
REFERENCES.....	27
APPENDICES	
A Overview of Implemented Responsive Intervention Strategies.....	34
B Coding Manual.....	35
C Fidelity Checklist.....	37

LIST OF TABLES

	Page
Table 1: Descriptive information for participant.....	9
Table 2: Weighted average total language acts for each activity in language conditions.....	18
Table 3: Average frequency of language acts for each activity in language conditions.....	18
Table 4: Average frequency of language form in activities in the English-language condition...22	22
Table 5: Average frequency of language form in activities in the Spanish-language condition...22	22

LIST OF FIGURES

	Page
Figure 1: Total language acts across language conditions during all activities.....	14
Figure 2: Language acts according to form across language conditions during all activities.....	19

CHAPTER 1

INTRODUCTION

A large number of language treatment strategies and intervention programs for children with autism spectrum disorder (ASD) offer approaches to target the core deficit of impaired social communication. Given the variability of social, cognitive, and language impairment in children with ASD, selected intervention programs may be tailored to the child's individual language characteristics. The language profiles of children and adults with ASD range from non-verbal and minimally conversant to cogent and verbose (Paul & Norbury, 2012; Tager-Flusberg, et al., 2009). The evidence-base for comprehensive and focused intervention approaches continues to expand (Wong, Odom, Hume, Cox, Fettig, Kucharczyk et al., 2015; Odom, Boyd, Hall & Hume, 2010; Odom, Brown, Frey, Karasu, Smith-Canter & Strain, 2003). While these evidence-based interventions provide guidelines and strategies for treatment of core deficits for children with ASD, there is a gap in determining how to offer language intervention for children of bilingual and culturally diverse backgrounds.

Specifically for children from bilingual English-Spanish environments or who are exposed to Spanish at home and English at school, there are a number of considerations for language intervention, including socio-cultural expectations, socio-economic status, time of diagnosis and intervention, and native cultural norms (Tincani, Travers & Boutot, 2010; Chaidez, Hansen & Hertz-Picciotto, 2012; Magaña, Lopez, Aguinaga & Morton, 2013; Lopez, 2014). Moreover, the influence of social, cultural, and economic factors may depend on the family's country of origin and where they reside in the US (Estrada & Deris, 2014). Despite the offering

of evidence-based practices for monolingual children with ASD cited by the research analyzing the socio-cultural implications of providing services to bilingual English-Spanish speakers with ASD (Tincani, Travers & Boutot, 2010; Chaidez, Hansen & Hertz-Picciotto, 2012; Magaña, Lopez, Aguinaga & Morton, 2013; Lopez, 2014; Estrada & Deris, 2014), there is limited evidence or treatment guidelines in best serving their unique language profiles (Kohnert & Derr, 2004; Kohnert, 2013).

Support & Recommendations for Dual Language Intervention

Limited empirical support is currently available supporting or refuting existing dual language intervention recommendations. As controlled experimental studies on bilingual language interventions for children are not available, practitioners are currently limited to choosing from interventions designed for monolingual children or to designing an intervention based on knowledge of language development of typical bilingual and bicultural children. In determining the best way to conduct research to determine intervention efficacy, Thordardottir (2010) suggests that the complex intersection of factors including culture, language exposure, cognitive skills, and linguistic influence must be considered to establish functional communication targets.

The available experimental studies based on typically developing dual language learners conclude that children who receive training in both Spanish (first language; L1) and English (second language; L2) demonstrate gains in L2. Nedler and Sebera (1971) divided Spanish-speaking preschool students into three treatment groups: a planned bilingual early childhood educational program, a parent involvement program, and a traditional daycare center. They found that children in the bilingual education program showed greater gains on intellectual and language measures after a nine-month intervention period. Legarreta (1979) studied two groups

of Spanish-speaking kindergarteners; one group participated in a program that integrated Spanish (L1) as the main language of instruction and the other group's placement only used English (L2). The results revealed that those children in the program that incorporated both English and Spanish showed greater improvements when tested on English oral-language comprehension assessments than the kindergartners in the English-only program. García (1983) demonstrated that English (L2) prepositions "on" and "behind" were learned more easily by students with knowledge of Spanish (L1) prepositions. In providing narrative intervention treatment to an experimental group in Spanish and a control group in English, Schoenbrodt, Kerins, and Gesell (2010) demonstrated that the intervention improved communicative competence for both groups; however, they determined that intervention in L1 (Spanish) led to greater gains as compared to the performance of the control group who only received intervention in English.

Improvements in L1 have also led to overall language gains in both English and Spanish. Sandoval-Martínez (1982) demonstrated that, when divided into groups of Spanish-preferring or English-preferring children, Spanish-preferring children participating in bilingual Head Start programs showed improvement in language production and concept development as compared to Spanish-preferring children in the English-only program; however, it is important to note that the English-preferring children who participated in the study demonstrated similar gains when enrolled in either program.

Dual Language Intervention for Language Disorders

While research available to assist in designing treatment options to address these various factors is limited, these limitations are much more acute when a language disorder is present. Kohnert, Yim, Nett, Kan, and Duran (2005) argue that clinicians structuring interventions for children with language deficits should address how the intervention can facilitate the

development of skills relevant to the child's home and mainstream languages, as the child's academic performance is tied to cognitive ability in his or her first language. Research has also indicated that dual language learners with language impairment learn language at a decreased rate as compared to their typically developing peers, which suggests that these children will need support and input in their first language before learning a second language (Kohnert et al., 2005). There is no clinical evidence that providing support in the home language will slow the development or hinder the learning of a second language (Gutierrez-Clellen, 1999). In fact, a child's learning and language performance can be maximized when the first language is employed as an organized framework of language reference in learning the second language, and when the instruction is delivered in the child's L1 or in both languages (Gutierrez-Clellen, 1999). Similarly, Kohnert et al. (2005) found that second language proficiency and academic achievement increase in tandem as a result of systematic support for the child's first language.

Several experimental studies with bilingual children who have language impairment have also indicated the relationship between improvement in L1 and the impact the gains have on L2 acquisition. Perozzi and Sanchez (1992) compared the effects of two different language instruction conditions, English-only and Spanish-then-English instruction, on first-grade children's language outcomes. The Spanish-then-English instruction group demonstrated a faster rate of learning English prepositions and pronouns, requiring fewer trials to show acquisition in English; however, it was later determined that inappropriate assessment measures were utilized to identify the presence of a bilingual language disorder. The possibility exists that the children who participated in Perozzi and Sanchez's study were typical language learners (Gutierrez-Clellen, 1999). In providing reading intervention to increase language learning in both English and Spanish, Tsybina and Eriks-Brophy (2010) examined dialogic book reading by an SLP in

English coupled with parent training to perform the same task in Spanish to Spanish-speaking children with a language delay who attended a day care in comparison to a no-treatment control group. The treatment group learned a larger number of target words in English and Spanish than the control group. Gutierrez-Clellen, Simon-Cerejido, and Sweet (2012) demonstrated that Spanish-speaking skills predicted growth in English-language skills, as demonstrated by an expanded mean length of utterance in words and morphemes in a bilingual Spanish-English treatment group as compared to the English-only group of children.

Dual Language Intervention for ASD

In providing language intervention specifically to children with ASD, it is necessary to consider that dual language learners may perform differently than monolinguals on social interaction scales. In a study of children diagnosed with ASD in which subjects were divided into three groups based on their language exposure (monolingual, simultaneous bilingual exposure, sequential post-infancy bilingual exposure), Hambly and Fombonne (2012) found that although there were no significant differences relating to language level, the two bilingual subgroups differed in amounts of bilingual exposure and the simultaneous group scored stronger on social interaction scales. Additionally, Valicenti-McDermott (2012) found that monolingual English-speaking and bilingual English and Spanish-speaking children with ASD demonstrated slight differences in communication skills with no significant difference in features of ASD. The bilingual children presented with higher rates of vocalizations and gestures than the monolingual children, with otherwise comparable language skills. However, Ohashi et al. (2012) found no statistically significant differences between monolingual-exposed and bilingual-exposed children with ASD on language and intelligence measures.

Contemporary behavioral and developmental multicomponent ASD interventions have garnered a significant evidence base in treating social communication deficits in children with ASD (Lane & Brown, 2016; Schreibman et al., 2015). Although some of these investigations have included bilingual participants and/or have involved encouraging family members to use intervention strategies in L1, there are no currently published experimental studies of this type of intervention explicitly delivered across languages. Many multicomponent ASD interventions include responsive interaction strategies, such as Early Social Interaction (ESI; Wetherby et al., 2014), Early Start Denver Model (ESDM; Dawson et al., 2010), Enhanced Milieu Teaching (EMT; Kaiser & Hester, 1994; Roberts & Kaiser, 2012), Family-Guided Routines-Based Intervention (FGRBI; Woods et al., 2004), Hanen More Than Words (Carter et al., 2011; Sussman, 2012), Joint Attention Symbolic Play and regulation (JASPER; Kasari, Paparella, Freeman & Jahromi, 2008), Pivotal Response Treatment (Koegel & Koegel, 2006), Responsive Intervention Training (RIT; Ingersoll & Schreibman, 2006), and Responsivity/Prelinguistic Milieu Teaching (RE/PMT; Yoder & Warren, 2002). In a systematic review of interventions that include responsive interaction strategies, Kong and Carta (2011) define responsive interaction intervention as a naturalistic intervention approach that incorporates the following strategies: following the child's lead, joint attention, contingent responses, noticing child signals, balanced turn-taking, imitating actions and language, expanding language, and language modeling. Responsive interaction intervention can be used as a stand-alone intervention or can be blended with other strategies as a means to increase children's social-emotional and/or communication development.

Responsive interaction and language strategies targeted specifically to social communication are frequently included in communication interventions for toddler and

preschool children with ASD who are minimally verbal, described as communication development levels ranging from prelinguistic to early language use and/or produce low rates of communication (Brown & Woods, 2015; Hampton & Kaiser, 2016; Kasari et al., 2014; Lane, Lieberman-Betz & Gast, 2016). Contingent responses to child interests and communication attempts through noticing's child interests, following child's lead, environmental arrangement, imitating actions and communication, expanding communication acts, balanced turn-taking, and language modeling are associated with increased child language output.

Recently, Kasari et al. (2014) extended the use of responsive communication intervention strategies to early elementary school students with ASD (ages 5-8) within the multi-component combined intervention of JASPER and EMT across speech-generating device and spoken words only treatment conditions. Results demonstrated that minimally verbal elementary school students with ASD increased their use of spoken language production as a function of the intervention. Extending examinations of responsive communication intervention strategies for elementary school children who are minimally verbal will provide useful information in intervention planning for this population.

Purpose

The effectiveness of responsive communication intervention strategies coupled with the positive effects of dual language interventions highlights a gap in the research and an opportunity to address the needs of the growing population of English and Spanish-speaking children with ASD who are minimally verbal. This project aims to explore impact of responsive intervention strategies on language outcomes for bilingual school-age children with ASD specifically addressing these research questions for a bilingually exposed elementary school student with ASD who is minimally verbal:

1. Do communication rates differ as a function of intervention being providing in English or Spanish?
2. Do communication rates and forms differ across activity phases, within and across English and Spanish delivered intervention?

CHAPTER 2

METHOD

Participant

This study included Bruno, a six-year old participant diagnosed with ASD, who is enrolled in a K-2 self-contained special classroom. Bruno is a bilingual Spanish-English speaker, whose family's primary language is Spanish and who is exposed to English at school. Specific child demographic and developmental characteristics are listed below in Table 1.

At the time of the intervention, Bruno was receiving special education services for autism, impairments in expressive and receptive language, and social communication. Developmental test scores, eligibility, and services provided were reported by school personnel; see Table 1 for descriptive characteristics. At the time of the study, Bruno was saying two-to-three word utterances in English and his level of spoken language in Spanish was unknown. Teachers reported that Bruno occasionally used single words in Spanish. Conversely, his receptive language was a relative strength, as demonstrated by his ability to follow multi-step directions and participate in age-appropriate academic subjects.

Table 1 Descriptive information for participant

Age at the start of study	6 years, 10 months (82 months)
Race/Ethnicity	Hispanic
Primary special education eligibility	Autism
School-based related services received	Speech, Adaptive Physical Education
Additional Diagnoses	N/A
ASDS score	Total scores of 92 and 90

GARS-2 quotients	106, from each rater
Cognitive	<50 SS (DP-3)
Adaptive Behavior	54 SS (ABAS-II), 64 (DP-3)
Communication	Language delay, equivalent to 10-18 months

All tests were administered in September and October 2015 when child was 56 months old. *ABAS-II* = Adaptive Behavior Assessment System, second edition. *ASDS* = Asperger's Syndrome Diagnostic Scale. *DP-3* = Developmental Profile, third edition. *GARS-2* = Gilliam Autism Rating Scale, second edition. *SS* = Standard score.

Setting

The study was completed in an elementary school in the southeastern United States. Intervention sessions were carried out across three activities. The activities took place in school spaces familiar to the student: most of the mealtime sessions took place in the school cafeteria, the free play sessions in a play area in the child's self-contained special education classroom, and book reading in an open hallway space designated for pull-out services.

Interventionist

A master's student in Communication Sciences and Disorders with 9 years of English- and Spanish-language teaching experience conducted the intervention. This person received introductory training in ABA at the behavioral technician level, had one year of experience working with children with language disorders, and was specifically trained in responsive communication intervention strategies.

Design

An adapted alternating treatments design (AATD; Sindelar, Rosenberg & Wilson, 1985; Wolery, Gast, & Ledford, 2014) with replication across three activity phases was implemented to compare the participant's communication behaviors in English versus Spanish. An AATD is a type of single case design where two functionally autonomous intervention sets or conditions are

introduced. In this study, the intervention conditions differed based on the language in which responsive communication intervention strategies were delivered – Spanish or English. In each condition, the interventionist delivered intervention strategies, as well as any other verbal communication, in the specified language only. A list of the intervention strategies is included in Appendix A. The order of intervention conditions for baseline and intervention phases was randomly assigned for each activity phase and counterbalanced within phase. The activity phases in which the intervention conditions were replicated included: mealtime, free play, and shared book reading.

Dependent Variable

The dependent variable is the frequency of child language acts within each session. The total produced language acts were recorded as, and therefore could be further analyzed at the communication forms level (i.e., single, word, 2- to 3- word phrase, complete sentence). Additionally, a weighted language calculation, where a single word = 0, 2-3 words = 2, and a complete sentence = 3, was also used to describe child language. This calculation offers point values for length of utterance not only to highlight language act frequency, but also to account for language complexity, providing further insight into the child's rate of communication.

Independent Variable

The independent variable consisted of language-specific responsive communication intervention strategies (see Appendix A) – (a) responsive communication intervention in Spanish; and (b) responsive communication intervention in English. The alternating intervention conditions were replicated across three activity phases.

Analysis

The total language acts were plotted as a function of time over intervention sessions across the two intervention conditions and replicated across the three activity phases. Visual analysis of graphed data was used to determine if there was an intervention effect between Spanish and English delivered responsive communication intervention strategies. Additionally, data are presented for each language form.

Procedures

Baseline and intervention sessions consisted of 5-minute sessions with the interventionist and child participating in the measured activity. A research assistant video-recorded the sessions. In baseline, the interventionist did not specifically use any responsive communication intervention strategies. She greeted the child in the specified language (e.g. “Hi Bruno. Let’s play”; “Bruno, I’d like to eat with you”; “Hola Bruno. Vamos a jugar”; “Bruno, quiero comer contigo”), asked a yes/no or “test” question (e.g., “Do you like oatmeal?” “What color is your block?” “Qué comes?” “Qué color es el bloque?”) two times during the 5-minute baseline session, and stayed physically near the child. The interventionist responded in the specified language to any specific explicit communication act toward him, but did not seek out opportunities to use the responsive communication intervention strategies. To demonstrate a stable trend, three baseline sessions were recorded in each language conditions (i.e., 6 baseline sessions per activity).

In the intervention sessions, the interventionist used responsive communication intervention strategies (see Appendix A) in the specified language. She limited the use of yes/no questions, “test” questions, and directions. However, given the child’s limited expressive language, questions were used to provide the interventionist clarification for requested or

protested actions or objects. Eight intervention sessions in each treatment condition were conducted for each activity phase.

Measures/data collection

Data collection consisted of frequency counts of language acts across both languages. At the time of the project, a research assistant traveled to the school with the interventionist and video-recorded each session. Each session was uploaded to a desktop computer that was equipped with Noldus Observer XT software. Each communication act that the child produced was coded according to form (i.e., single word, 2-to-3-word utterance, or a complete sentence, or jargon-like). The coding manual is included as Appendix B.

Reliability and Procedural Fidelity

The primary coder (i.e., the author) completed data collection on all session recordings, a total of sixty-six recorded sessions, and a trained undergraduate research assistant completed reliability on 30% of videos ($n = 20$) across phases for interobserver agreement reliability. The research assistant was trained to 80% agreement with the primary coder before independently coding reliability video sessions. Consensus reliability was used for any session in which 80% agreement was not met on initial coded sessions. IOA values ranged from 80% to 100% with an average IOA of 85.7%.

Procedural fidelity was calculated as number of items with a “yes” response divided by the total number of items ($n = 14$) multiplied by 100. See Appendix C for fidelity checklist. A trained observer completed the fidelity checklist on 30% of sessions ($n = 20$). Average fidelity across sessions was 97% with a range of 85.7% to 100%.

CHAPTER 3

RESULTS

The purpose of this study was to examine the effect of delivering responsive intervention across two language conditions replicated across three activity phases. The results reported include: (1) total language acts across activities and language conditions, (2) language complexity, (3) differences between activity phases, within and across both language conditions, and (4) rate of communication using specific language forms (i.e., single word, 2-3 words, complete sentence) across activity phases, and within and across English- and Spanish-language conditions.

Bruno's total language acts in each condition (responsive language intervention delivered in Spanish; responsive language intervention delivered in Spanish) across activities are presented in Figure 1. These data illustrate his rate of communication functionally related to intervention condition. Weighted language acts are presented in Table 2 to characterize his language complexity. To examine the impact each activity had on his rate of communication, differences between frequency of language acts across activities are compared within and across English and Spanish condition sessions in Figure 2. Bruno's use of language forms is presented in Tables 3-5 to highlight differences in language complexity across activities as well as within and across language conditions.

Language Rate

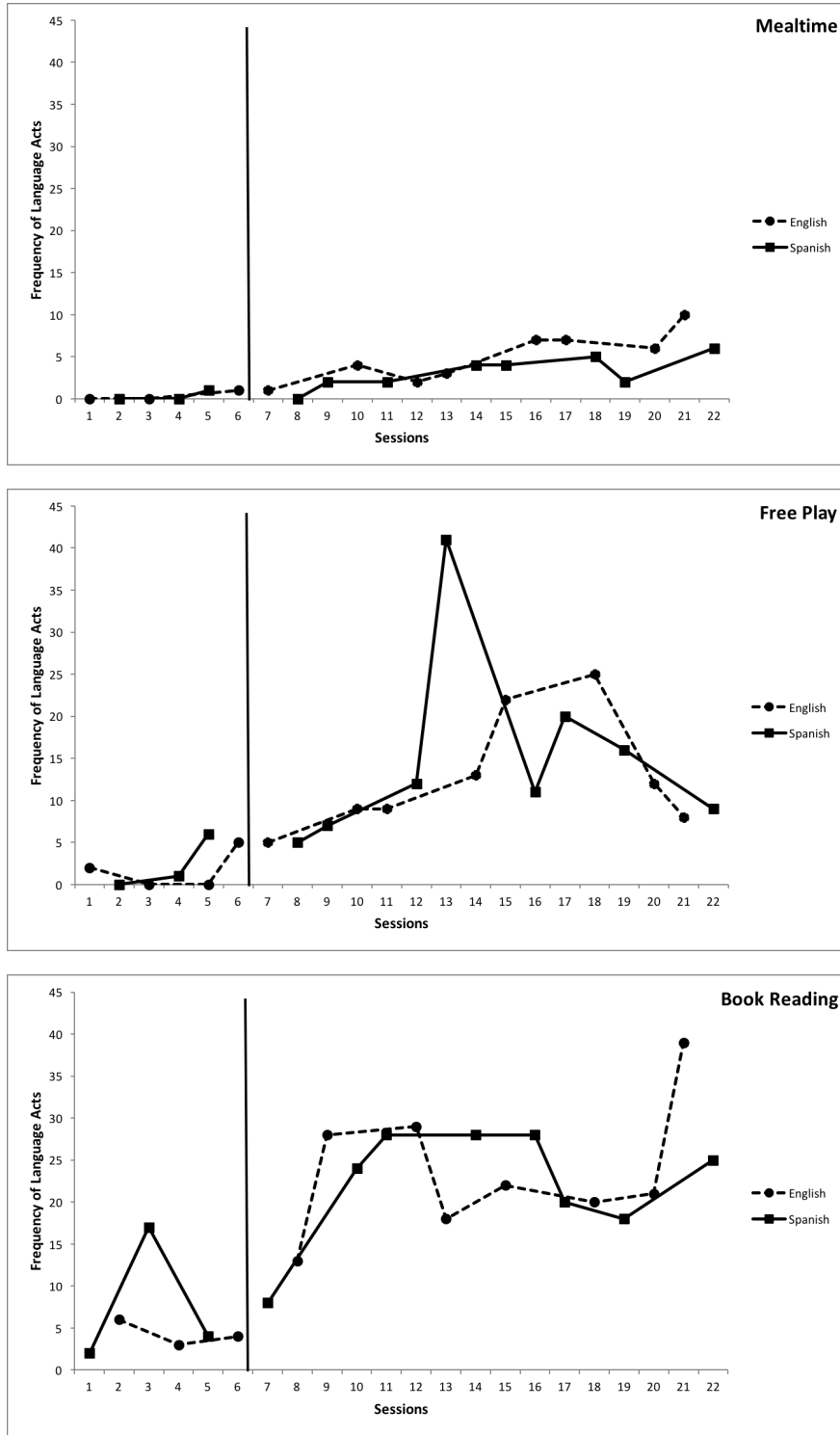


Figure 1 Total language acts across both languages during mealtime, free play, and shared book reading activities, in both baseline and intervention phases

Mealtime. The baseline data for total language acts during mealtime demonstrate no difference in Bruno's rate of communication across language conditions. In intervention, there is an increasing trend toward a higher rate of communication in the English-language condition as compared to the Spanish-language condition, which remains consistent across the time of intervention. Bruno exhibited an average rate of 5 language acts in English-condition sessions, and 3.86 in Spanish-condition sessions. From session to session, Bruno demonstrated a higher range of variability in the English condition than in the Spanish condition. In English-condition sessions, he produced 1 to 10 language acts. In Spanish-condition sessions, he produced 0 to 6 language acts. Given that there is an overall upward trend in both languages, the last three sessions are highlighted to examine potential differences in language acts across conditions after initial learning increases may have occurred. In the last three sessions, Bruno produced a higher rate of language when provided responsive intervention in English ($M = 7.6$) than in Spanish ($M = 4.3$).

Although not experimentally controlled, the level of the intervention phase is notably higher than the level in the baseline phase, with respective means of 4.06 and 0.33. The baseline data for total communication acts during mealtime are initially low and stable with a slight increase in the session per condition. In the intervention phase, there was variability in each condition with an overall increasing trend. Although the level was higher in the English-language condition, the trends were similar across conditions.

Free Play. During the free play activity, similar patterns of communication were noted in each language condition. Communication rate in both language conditions was low in the baseline phase and no meaningful difference is noted between the communication rate across language conditions. Across the intervention phase, without including the outlying data point,

there is little variability in communication rates across languages. Bruno's average rate of communication in the English-language condition was 12.88 while it was 15.13 in the Spanish condition. Over the course of the sessions during the intervention period, he produced a range of 5 to 25 language acts during the English intervention condition and from 5 to 20 language acts in the Spanish-language condition (without considering the outlying point).

Even though the rate of communication across languages was not experimentally controlled, there is an increase in the number of language acts noted from the baseline to the intervention phase with only one point of overlap across the two phases. The data demonstrate a mean of 2.33 acts across both languages in the baseline phase, and a mean of 14 during the intervention phase. While there is no evidence of a consistent trend represented in the free play data across the intervention period, the communication rate during the English-language intervention condition' demonstrates an increasing trend up through the eighteenth of the 22 sessions as compared to the more unstable upward trend in communication rate during the Spanish-language condition.

Book Reading. Data from the book reading activities also demonstrate no significant differences in communication rate across language conditions from baseline to intervention, despite an outlier point in the baseline phase. During the intervention phase, the communication rate demonstrates variability across both language conditions, but there is a slight upward trend in the Spanish-language condition ($M = 23.2$) through the seventeenth session, as compared to the less stable trend in the English-language condition ($M = 22$). Over the course of intervention, Bruno exhibited a higher range of variability in the English-language condition, with a range of 13 to 39 language acts. Meanwhile, Bruno produced a range of 8 to 28 language acts during intervention in the Spanish-language condition.

Excepting the outlying point in the baseline phase that overlaps with data points in the intervention phase, there is a notable change in level from baseline to intervention phase that, despite lack of experimental control, might be contributed to incidental learning on Bruno's part. The intervention phase has a mean frequency of 23 language acts, as compared to six in the baseline, indicating a baseline-to-intervention change in level. However, there are a number of points that nearly overlap during the intervention phase, and a similar level is noted across languages. His average rate of communication in the Spanish-language condition was 22.38 while it was 23.75 in the English-language condition.

These results across all three activities indicate that language use during intervention did not have a large impact on the child's rate of communication. The slight differences in level between languages, the lack of graphic trend, and variability across phases demonstrated in all three activities in both language conditions indicate a weak relationship between communication rates and language of intervention. However, further analyses, of lexical diversity for example, may render significant differences in examining communication rates.

Language Complexity

Table 2 shows average total communication acts across activities weighted according to complexity (single word = 1, 2-3 words = 2, and a complete sentence = 3). As illustrated in the table below, mealtime intervention across language conditions led to the lowest number of language acts, shared book reading had the greatest number. Although not attributable to the experimental design, there is a clear pattern of increasing level in language acts across both language conditions from baseline to intervention across all activities. Despite differences in weighted language acts across activities from baseline to intervention, Bruno demonstrated consistent increases in language acts in all activities.

Table 2 Weighted average total language acts for each activity in both languages

Activity	Weighted Language Acts in Baseline	Weighted Language Acts in Treatment
Meal	0.33	5.56
Play	3.17	18.69
Book	10.83	32.63

Language Acts Across Activities

The average number of language acts in all activity phases and within language conditions are listed in Table 3. Although book reading demonstrates the highest rates of communication out of the three activity phases, there is no meaningful difference in average number of language acts across language conditions for this activity. The results from free play, which shows the second highest rate of communication, exhibit a small difference in communication rate between the English-language condition and Spanish-language condition, with a higher average of language acts during Spanish-language intervention than during English-language intervention. No meaningful difference is noted in mealtime across language conditions. However, the communication rate within English-language intervention is higher than the rate within Spanish-language intervention. Despite identical rates of communication in both language conditions during mealtime and free play during the baseline phase, Bruno exhibited greater gains in the English-language condition during mealtime and in the Spanish-language condition during free play.

Table 3 Average frequency of language acts for each activity in both language conditions

Activity	Baseline - English	Baseline - Spanish	Treatment - English	Treatment- Spanish
Meal	0.33	0.33	5	3.16
Play	2.33	2.33	12.86	15.13
Book	4.33	7.67	23.75	22.36

Frequency of Language Form Across Activities

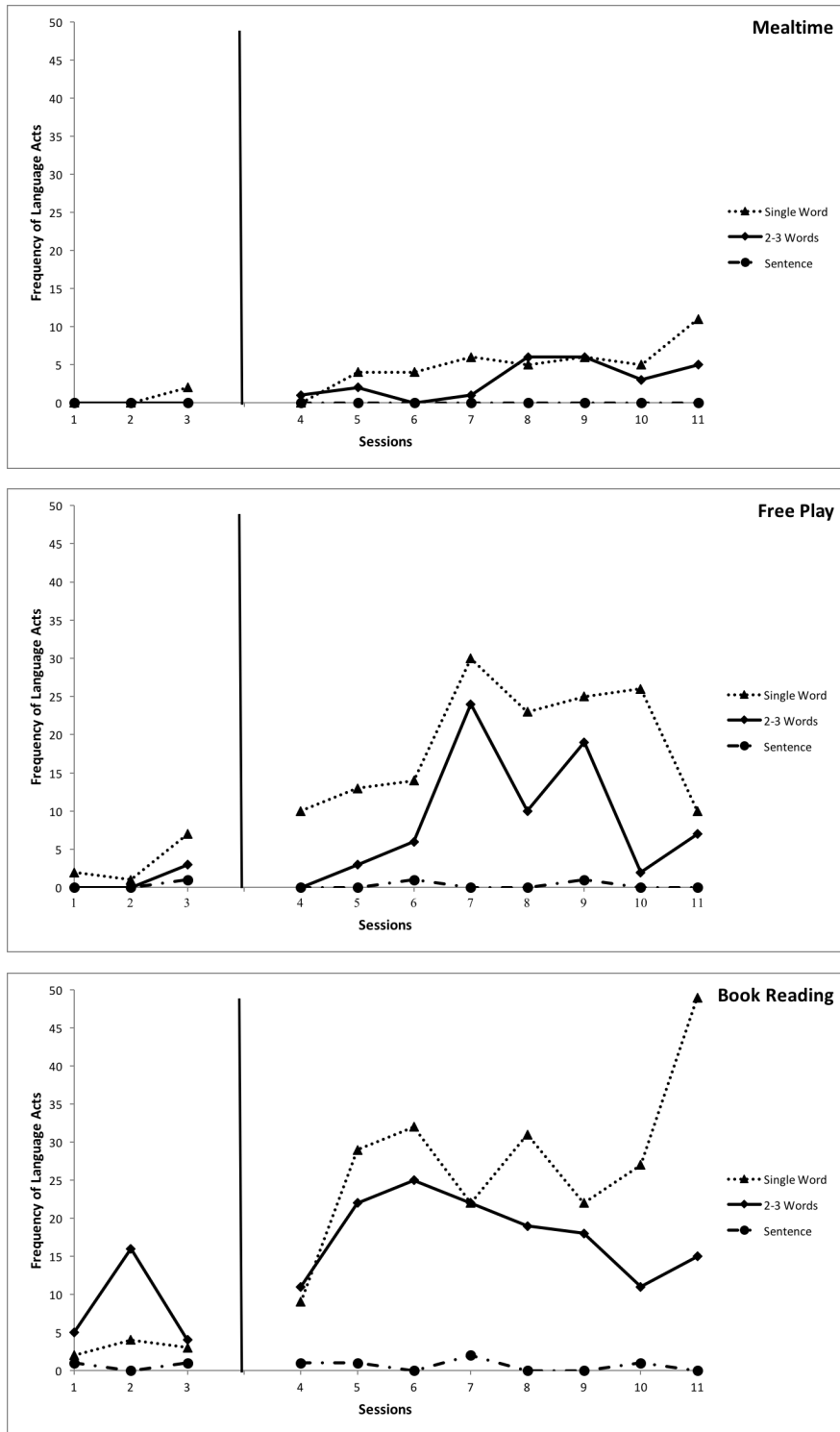


Figure 2 Language acts according to form across both language conditions during mealtime, free play, and shared book reading, in both baseline and intervention phases

Mealtime. Communication rates differed more intensely according to language form across activities, and within and across language conditions. In both language conditions, the mealtime data show that communication rates during mealtime activities demonstrated an increase from baseline to intervention phases. Single words show a somewhat increasing trend as compared to 2-3 words, which experienced a more variable rate of use. There is an increase in the level of the intervention phase in comparison to that of the baseline, as noted in the increase in use of 2-3 words and in the mean of single-word use from 0.33 to 2.75 per session. The use of complete sentences did not change in communication rate from baseline to intervention.

Free Play. As noted the free play data, there was great variability across rates of communication in single word and 2-3 word forms in free play. Across the baseline phase, there is less variability as demonstrated in the range of all language acts between 0-4. There was greater variability in the intervention phase with a range of 20 single-word language acts and 24 2-3 word acts. Complete sentences remained the same in range from baseline to intervention, from 0-1. While there were similar increases and decreases in frequency of single word and 2-3 word use over time, there is no evidence of trend within the data. From baseline to intervention, there was an increase in level with some overlap in sentence frequency, one overlapping point of 2-3 word use, and no overlap in the use of single words. Single word use experienced the most change in level from baseline to intervention.

Book Reading. The results for book reading show the use of language forms across languages during the shared book reading activity. The data demonstrate variability across forms with single words displaying a somewhat increasing trend over time from baseline to intervention. The level of language acts from baseline to intervention increases from a mean of 1.33 to 13.86 for single words and 2.33 to 9.25 for 2-3 words. The mean of complete sentence

use from baseline to intervention decreases slightly, from 0.67 to 0.63. No significant increase in communication rate is noted in complete sentence use; its range from baseline to intervention remains the same. Without considering the one outlying point for single word use at the end of the intervention period, single words appear at a slightly higher rate than 2-3 words during the intervention phase. The opposite effect is demonstrated in the baseline period.

These results across all three activities show that language form differed across activity phases and during intervention, in particular. Bruno's rate of communication using single words and 2-3 words language forms specifically showed the most similar rates of communication in mealtime and book reading activities. Free play data demonstrated the most variability in communication rate according to language form. He did not communicate at the same rate in complete sentences in any of the three activities. The overall differences in rate of communication across language forms in all activities indicate that mealtime and book reading intervention led to increased communication rates as compared to free play intervention.

Frequency of Language Form Within Each Language

Results displayed in Tables 4 and 5 show the rate of communication within each language form according to language condition. While the baseline across all activities and language conditions is low, there is an increase in frequency and level of language acts from baseline to intervention phase within each activity and across language conditions. While complete sentences demonstrate similar rates in both conditions and activities, single words show great variability in communication rate across activities with highest rate of use exhibited during book reading in the English-language condition. Although not a large difference, the higher rate of single word use in the Spanish-language condition during play activities as compared to the English-language condition serves as the only example of a rate of

communication in the Spanish condition exceeding the rate in the English condition. The rate of 2-3 words demonstrates an overall higher rate of use in the English-language condition activities in comparison to the rate in the Spanish-language condition, except in play activities where Spanish-language intervention produced a slightly higher rate of communication. However, the differences in communication rate of 2-3 words are not meaningful. The communication rate of complete sentences is greater in the English-language intervention across all activities. No complete sentences were evidenced in any activities during Spanish-language intervention.

Table 4 Average frequency of language form for each activity in the English-language condition

Activity - English	Baseline			Treatment		
	Single Word	2-3 Words	Complete Sentence	Single Word	2-3 Words	Complete Sentence
Meal	0.33	0	0	2.75	2.25	0
Play	1.67	0.33	0.33	8.38	4.25	0.25
Book	1.33	2.33	0.67	13.88	9.25	0.63

Table 5 Average frequency of language form for each activity in the Spanish-language condition

Activity - Spanish	Baseline			Treatment		
	Single Word	2-3 Words	Complete Sentence	Single Word	2-3 Words	Complete Sentence
Meal	0.33	0	0	2.38	0.75	0
Play	1.67	0.67	0	10.5	4.63	0
Book	1.67	6	0	13.75	8.63	0

CHAPTER 4

DISCUSSION

The main focus of this preliminary study was to examine the combined effect of dual language intervention and responsive language intervention on the communication of a bilingual child with ASD who is minimally verbal. The intervention's impact was replicated across three familiar activities and provided in alternating fashion in English and Spanish in the child's school environment. While the responsive intervention techniques implemented have been shown to increase language in school-age children (Kasari et al., 2014), their impact in dual language intervention had previously not been explored. The current study's focus on the implementation of dual language responsive intervention adds to the literature specifically in the area of bilingual language disorders as well as intervention for social communication impairments in ASD.

Communication as a Function of Intervention Language Context

With respect to the study's first purpose to compare communication rates as a function of the language of intervention, the results indicate that there were no significant differences in providing language intervention in either English or Spanish. Given Bruno's expressive and receptive language level in English and Spanish, it was hypothesized that he would demonstrate a higher rate of communication in his more dominant language, which, in this case, is English. However, given his exposure to Spanish at home, it was also thought that he might possibly respond at a higher rate to the Spanish-language condition. The resulting similar rate of communication across language conditions is in line with the body of research literature; it

supports the importance of providing bilingual language instruction to children, with typical language or with language disorders (Nedler & Sebera, 1971; Legarreta, 1979; Perozzi & Sanchez, 1992; Gutierrez-Clellen, 1999; Kohnert et al., 2005; Tysbina & Eriks-Brophy, 2010). In Bruno's case, bilingual language intervention had an impact on communication rates in both languages.

Despite the study's focus on analyzing communication rates across language conditions, secondary incidental learning and subsequent increases in language appear to have occurred over the course of the language intervention. The study's results demonstrate increases in language output from the baseline to intervention phases. However, it is important to emphasize that this language increase was not experimentally controlled. Thus, it is unknown whether Bruno's increased language production is due to other external factors, such as maturation, classroom instruction, home and community experiences, or access to speech therapy services at his school.

In regard to the study's second purpose to compare these rates as well as language forms across activities, the data revealed that there were differences in communication rates in different activities, regardless of language condition. This finding is consistent with the literature on dual language intervention (e.g., Gutierrez-Clellen, Simon-Cerejido, & Sweet, 2012) and intervention for children with ASD (e.g., Lane, Shepley, & Lieberman-Betz, 2016). Research studies in the area of ASD in bilingual children should further examine the impact of activities on child communication.

Additionally, a full picture of Bruno's communication was not fully examined in this study. According to teacher reports and interventionist observation during the implementation of the study, Bruno demonstrated high rates of jargon use. While he expressed himself mostly in English, the jargon perceptually followed pattern of Spanish-language inflection. Future studies

might explore the role of quantity and quality of jargon in bilingual children with ASD. It is also important to note that while the interventionist remained consistent in language use in implementation of intervention sessions, Bruno used a mix of English and Spanish within sessions in the Spanish-language condition. However, during the sessions in the English-language conditions, he spoke English only. Further analyses would need to be completed in order to interpret if there was a specific pattern of use for one language or the other.

Limitations

In terms of total language impact, the study's findings are limited to certain language aspects. Currently, the results only reflect an analysis of rate of communication (i.e., frequency of language acts), language complexity (i.e., the combined effect of communication rate and language form), and language form (i.e., length of utterance). To fully address all aspects of communicative competence, the study would have benefitted from further analysis of language function and rate of responses and initiations. To expand the study's scope, a more nuanced exploration of language intervention impact would need to include other components of language, such as semantics and pragmatics. For example, sessions in which Bruno repeated a specific word, such as "no," only the frequency rather than the content of his communication was considered.

Given the study's design, its findings are limited to its one participant. Even though variables that typically limit adapted alternating treatment studies were controlled (i.e., order of conditions, varying conditions at different time points, consistency of responsive intervention techniques), it is challenging to control for the possibility of generalization across conditions and activity phases (Byiers, Reichle, & Symons, 2012). Thus, this experiment specifically cannot control for internal validity factors relating to maturation or generalization that may have taken

place over the course of the intervention. External factors, mainly those relating to the school environment, distractors, and disruptive behavior, were also not controlled in this experiment. Additionally, a series of follow-up sessions could have strengthened the experiment's findings.

Future Directions

Given the limited scope of research on dual language intervention for children with ASD, there is a great need for future studies to continue to examine the impact of dual language intervention on bilingual children with ASD. While a handful of studies have set out to analyze differences in communication across languages in bilingual children with ASD (Valicenti-McDermott, 2012; Hambly & Fombonne, 2012) and differences between monolingually and bilingually-exposed children with ASD (Ohashi et al., 2012), further research is required to increase understanding of the effect of language conditions specifically. Research designs that compare specific language interventions (i.e., English only, Spanish only, both) across children with language disorders will contribute to the limited evidence base surrounding the effectiveness of dual language interventions.

There is a specific need to add to the available literature surrounding dual language intervention for bilingual children with ASD. Currently, broad guidelines exist for guiding clinical decision-making around bilingual communication intervention in children with language disorders. This study demonstrates that increased rates of communication across both languages occur with bilingual responsive language intervention, and thus suggests that increased language learning across languages is possible. It also lays the groundwork for continued research endeavors to explore the social communication impact of responsive language intervention in school-age children.

References

- Brown, J. A., & Woods, J. J. (2016) Parent-implemented communication intervention: Sequential analysis of triadic relationships. *Topics in Early Childhood Special Education, 36*(2), 115-124.
- Byiers, B.J., Reichle, J., & Symons, F.J. (2012). Single-subject experimental design for evidence-based practice. *American Journal of Speech-Language Pathology, 21*(4), 397-414.
- Carter, A.S., Messinger, D.S., Stone, W.L., Celimli, S., Nahmias, A.S., & Yoder, P. (2011). A randomized controlled trial of Hanen's 'More Than Words' in toddlers with early autism symptoms. *Journal of Child Psychology and Psychiatry, 52*(7), 741-52.
- Chaidez, V., Hansen, R. L., & Hertz-Picciotto, I. (2012). Autism spectrum disorders in Hispanics and non-Hispanics. *Autism: The International Journal of Research and Practice, 16*(4), 381–97.
- Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., ...Varley, J. (2010). Randomized, controlled trial of an intervention for toddlers with autism: The Early Start Denver Model. *Pediatrics, 125*, 17–23.
- Estrada, L., & Deris, A.R. (2014). A phenomenological examination of the influence of culture on treating and caring for Hispanic children with Autism. *International Journal of Special Education, 29*(3), 4-15.
- García, E. (1983). *Early child bilingualism with special reference to the Mexican-American child*. Albuquerque, NM: University of New Mexico Press.

- Gutiérrez-Clellen, V., Simon-Cereijido, G., & Sweet, M. (2012). Predictors of second language acquisition in Latino children with Specific Language Impairment. *American Journal of Speech-Language Pathology, 21*(1), 64–77.
- Gutiérrez-Clellen, V. (1999). Language choice in intervention with bilingual children. *American Journal of Speech-Language Pathology, 8*(4), 291–302.
- Hambly, C., & Fombonne, E. (2012). The impact of bilingual environments on language development in children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 42*(7), 1342–1352.
- Hampton, L.H., & Kaiser, A.P. (2016). Intervention effects on spoken-language outcomes for children with autism: a systematic review and meta-analysis. *Journal of Intellectual Disability Research, 60*(5), 444-463.
- Hancock, P., & Kaiser, A.P. (2012). Implementing Enhanced Milieu Teaching with Children Who Have Autism Spectrum Disorders. In P.A. Prelock & R.J. McCauley (Eds.), *Treatment of Autism Spectrum Disorders: Evidence-Based Intervention Strategies for Communication and Social Interactions* (pp. 163-188). Baltimore, MD: Paul Brookes.
- Hart, B. M., & Risley, T. R. (1975). Incidental teaching of language in the preschool. *Journal of Applied Behavior Analysis, 8*, 411-420.
- Ingersoll, B., & Schreibman, L. (2006). Teaching reciprocal imitation skills to young children with Autism using a naturalistic behavioral approach: Effects on language, pretend play, and joint attention. *Journal of Autism and Developmental Disorders, 36*(4), 487–505.
- Julien, H., & Reichle, J. (2016). A comparison of high and low dosages of a component of milieu teaching strategies for two preschool-age learners with Autism Spectrum Disorder. *Language, Speech, and Hearing Services in Schools, 47*(1), 87–98.

- Kaiser, A., & Hester, P. (1994). Generalized effects of Enhanced Milieu Teaching. *Journal of Speech, Language, and Hearing Research*, 37(6), 1320–1340.
- Kasari, C., Kaiser, A., Goods, K., Nietfeld, J., Mathy, P., Landa, R., ... Almirall, D. (2014). Communication interventions for minimally verbal children with Autism: A sequential multiple assignment randomized trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, 53(6), 635–646.
- Kasari, C., Paparella, T., Freeman, S., & Jahromi, L.B. (2008). Language outcome in Autism: Randomized comparison of joint attention and play interventions. *Journal of Consulting and Clinical Psychology*. 76(1), 125–137.
- Koegel, R.L., & Koegel, L.K. (2006) *Pivotal Response Treatments for Autism: Communication, social and academic development*. Baltimore: Paul H. Brookes Publishing Co.
- Kohnert, K., & Derr, A. (2004). Language intervention with bilingual children. In B.A. Goldstein (Ed.), *Bilingual Language Development & Disorders in Spanish-English Speakers*. (pp. 311-338). Baltimore: Paul H. Brookes Publishing Co.
- Kohnert, K. (2013). *Language Disorders in Bilingual Children and Adults* (2nd Ed.). San Diego: Plural Publishing.
- Kohnert, K., Yim, D., Nett, N., Kan P.F., & Duran, L. (2005). Intervention with linguistically diverse preschool children: A focus on developing home language(s). *Language, Speech, and Hearing Services in Schools*, 36, 251-263.
- Kong, N.Y., & Carta, J.J. (2011). Responsive interaction interventions for children with or at risk for developmental delays: A research synthesis. *Topics in Early Childhood Special Education*, 33(1), 4–17.

- Lane, J.D., & Brown, J.A. (2016). Promoting communication development in young children with or at-risk for disabilities. In B. Reichow, B.A. Boyd, E.E. Barton, & S.L. Odom (Eds.), *Handbook of Early Childhood Special Education*. New York: Springer.
- Lane, J. D., Lieberman-Betz, R., & Gast, D. L. (2016). An analysis of naturalistic interventions for increasing spontaneous expressive language in children with autism spectrum disorder. *Journal of Special Education, 50*(1), 49-61.
- Lane, J.D., Shepley, C., & Lieberman-Betz, R. (2016). Promoting expressive language in young children at-risk for Autism Spectrum Disorder in a preschool classroom. *Journal of Autism and Developmental Disorders, 46*(10), 3216-3231.
- Legarreta, D. (1979). The effects of program models on language acquisition by Spanish-speaking children. *TESOL Quarterly, 13*, 521–534.
- Lopez, K. (2014). Sociocultural perspectives of Latino children with Autism Spectrum Disorder. *Best Practices in Mental Health, 10*(2), 15-31.
- Magaña, S., Lopez, K., Aguinaga, A., & Morton, H. (2013). Access to diagnosis and treatment services among Latino children with Autism Spectrum Disorders. *Intellectual and Developmental Disabilities, 51*(3), 141–53.
- Nedler, S., & Sebera, P. (1971). Intervention strategies for Spanish-speaking preschool children. *Child Development, 42*, 259-267.
- Odom, S., Boyd, B., Hall, L., & Hume, K. (2010). Evaluation of comprehensive treatment models for individuals with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 40*(4), 425–436.

- Odom, S., Brown, W., Frey, T., Karasu, N., Smith-Canter, L., & Strain, P. (2003). Evidence-based practices for young children with Autism: Contributions for single-subject design research. *Focus on Autism and Other Developmental Disabilities, 18*(3), 166–175.
- Ohashi, J., Mirenda, P., Marinova-Todd, S., Hambly, C., Fombonne, E., Szatmari, P., ... Thompson, A. (2012). Comparing early language development in monolingual- and bilingual- exposed young children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 6*(2), 890–897.
- Paul, R., & Norbury, C.F. (2012) *Language Disorders from Infancy through Adolescence: Listening, Speaking, Reading, Writing, and Communicating* (4th Ed.). St. Louis: Elsevier.
- Perozzi, J., & Sanchez, M. (1992). The effect of instruction in L1 on receptive acquisition of L2 for bilingual children with language delay. *Language, Speech and Hearing Services in Schools, 23*, 348–352.
- Roberts, M., & Kaiser, A. (2012). Assessing the effects of a parent-implemented language intervention for children with language impairments using empirical benchmarks: A pilot study. *Journal of Speech, Language, and Hearing Research, 55*, 1-16.
- Sandoval-Martínez, S. (1982). Findings from the Head Start bilingual curriculum development and evaluation effort. *National Association for Bilingual Education Journal, 7*, 1–12.
- Schoenbrodt, L., Kerins, M., & Gesell, J. (2010). Using narrative language intervention as a tool to increase communicative competence in Spanish-speaking children. *Language, Culture and Curriculum, 16*(1), 48–59.
- Schreibman, L., Dawson, G., Stahmer, A., Landa, R., Rogers, S., McGee, G., ... Halladay, A. (2015). Naturalistic developmental behavioral interventions: Empirically validated treatments for Autism Spectrum Disorder. *Journal of Autism and Developmental*

Disorders, 45(8), 2411–2428.

Sussman, F. (2012). *More Than Words: A parent's guide to building interaction and language skills for children with autism spectrum disorder or social communication difficulties*.

Toronto, ON: The Hanen Centre.

Tager-Flusberg, H., Rogers, S., Cooper, J., Landa, R., Lord, C., Paul, R., ... & Yoder, P. (2009).

Defining spoken language benchmarks and selecting measures of expressive language development for young children with autism spectrum disorders. *Journal of Speech, Language, and Hearing Research*, 52(3), 643-652.

Thordardottir, E. (2010). Towards evidence-based practice in language intervention for bilingual children. *Journal of Communication Disorders*, 43(6), 523–537.

Tincani, M., Travers, J., & Boutot, A. (2009). Race, culture, and Autism Spectrum Disorder:

Understanding the role of diversity in successful educational interventions. *Research and Practice for Persons with Severe Disabilities*, 34(3), 81–90.

Tsybina, I., & Eriks-Brophy, A. (2010). Bilingual dialogic book reading intervention for

preschool children with slow expressive vocabulary development. *Journal of Communication Disorders*, 43(6), 538-56.

Valicenti-McDermott, M., Tarshis, N., Schouls, M., Galdston, M., Hottinger, K., Seijo, R., ...

Shinnar, S. (2012). Language differences between monolingual English and bilingual English-Spanish young children with Autism Spectrum Disorders. *Journal of child neurology*, 28(7), 945–8.

Wetherby, A. M., Guthrie, W., Woods, J., Schatschneider, C., Holland, R. D., Morgan, L., &

Lord, C. (2014). Parent-implemented social intervention for toddlers with Autism: An RCT. *Pediatrics*, 134(6), 1084-1093.

- Wolery, M., Gast, D. L., & Ledford, J. R. (2014). Comparison designs. In D. L. Gast & J. R. Ledford (Eds.), *Single case research methodology: Applications in special education and behavioral sciences* (pp. 297- 345). New York, NY: Routledge.
- Wong, C., Odom, S., Hume, K., Cox, A., Fettig, A., Kucharczyk, S., ... Schultz, T. (2015). Evidence-based practices for children, youth, and young adults with Autism Spectrum Disorder: A comprehensive review. *Journal of Autism and Developmental Disorders, 45*(7), 1951–1966.
- Woods, J., Kashinath, S., & Goldstein, H. (2004). Effects of embedding caregiver-implemented teaching strategies in daily routines on children's communication outcomes. *Journal of Early Intervention, 26*(3), 175-193.
- Yoder, P. J., & Warren, S. F. (2002). Effects of prelinguistic milieu teaching and parent responsivity education on dyads involving children with intellectual disabilities. *Journal of Speech, Language, and Hearing Research, 45*, 1158–1174.

Appendix A: Overview of Implemented Responsive Intervention Strategies

Strategy	Definition	Example
Environmental arrangement	Setting up the environment to provide a communicative context; could include communication temptations	Putting preferred object in a clear container on shelf
Following the child's attentional focus	Paying attention to the child's interests, noticing child's signals, and providing activities of interest	Interventionist notices that the child is looking at the milk cup and focuses actions and verbal input to the milk cup
Modeling	Setting a language or play example	Interventionist says, "that's a big ball" while reaching for a ball
Imitating actions	Imitating the child's non-verbal behaviors	Child stirs food; interventionist stirs food
Imitating communication	Imitating the child's verbal behaviors	Child says, "whoa"; interventionist says, "whoa"
Linguistic mapping	Adding language to non-verbal behaviors	Interventionist says, "reading a book" while the child holds a book
Expansions	Expanding on a child's communication to extend the length of utterance and make it grammatical	Child says "sleep" and interventionist says "I'm going to sleep."
Balanced turn-taking	Responding to each of the child's communicative acts and then pausing to give the child a chance to make a verbal or non-verbal turn	Child picks up toy dinosaur; interventionist picks up toy dinosaur, says "roar", and pauses; Child moves dinosaur under tables; Interventionist moves dinosaur under table and pauses

Appendix B: Coding Manual

Implementing responsive interactions strategies with bilingual school-age children with Autism Spectrum Disorder Coding Manual

A. Purpose

This manual is meant to serve as a guide for coders that will allow them to collect data on child communication across activities in the school environment. This document includes information on how to code various communication forms and functions with definitions and examples provided for each. The continued use and reference to the manual will help coders remain reliable in their data collection.

B. Overview

The observer's task is to view and report the frequency of the child's communication behaviors across forms (i.e., single word, 2-3 words).

You will be coding verbal communication behaviors. All behaviors will be coded using Noldus Observer. Coders will tally communication behaviors for each five-minute session.

C. General Coding Procedure:

Watch the video and tally the child's verbal communicative behavior within each 5-minute session according to social communication form, purpose, function, and use.

- Social communication forms:
 - Single word
 - 2-3 words
 - Complete sentence
 - Jargon-like

D. Coding Definitions of Child Communication

I. Communicative forms

A. Single words - A single true word uttered as a complete message.

<p><i>Can:</i></p> <ul style="list-style-type: none"> ○ Consist of two-word learned expressions like "all gone," "oh no," or "high five" 	<p><i>Cannot:</i></p> <ul style="list-style-type: none"> ○ A series of single words counted only once as one utterance
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B. 2-3 words – A combination of two or three words that are uttered together as a complete message.

<p><i>Can:</i></p> <ul style="list-style-type: none"> ○ Be any combination of two or three words ○ Consist of a command, such as “put here” 	<p><i>Cannot:</i></p> <ul style="list-style-type: none"> ○ Consist of common expressions that are learned as chunks, such as “all done” and “no more”
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C. Complete sentences – A complete utterance consisting of a subject, verb, and an object or a subject and a predicate.

<p><i>Can:</i></p> <ul style="list-style-type: none"> ○ Include subject-verb-object combinations without function words (i.e., articles, demonstratives) 	<p><i>Cannot:</i></p> <ul style="list-style-type: none"> ○ Consist of a phrase without a clear subject, verb, and object (e.g., “[unintelligible] eat ice cream”)
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D. Jargon-like language – An utterance that might have the inflection pattern heard in normal language, but has no decipherable words.

<p><i>Can:</i></p> <ul style="list-style-type: none"> ○ Consist of any utterance of any length that is not understood in either language 	<p><i>Cannot:</i></p> <ul style="list-style-type: none"> ○ Be utterances that the interventionist acknowledges directly and responds to specifically
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Additional Helpful Coding Guidelines

1. Code only if the child is directing communication towards the interventionist.
2. Code each word/sentence the child says individually, unless it is the same word repeated over and over again. Count these as single words. *For example, if the child says “no, no, no,” those would be coded once under the corresponding purpose, function, and use categories.*
3. Code common two-word learned expressions like “all gone,” “oh no,” or “high five” as single words.
4. Sentences are considered complete when they contain a subject, verb, and object. *For example, “I don’t like” would be coded as a 2-3 words, but “dog ate food” would count as a sentence.*
5. A complete messages or utterances are separated by pauses or breaths.
6. Any utterance that includes jargon should be coded as both jargon and according to the utterance that was clear. *For example, “open coca [unintelligible],” this would count as a two-word phrase and the jargon wouldn’t be coded.*
7. To distinguish between a vocalization and jargon, listen for language- and word-like inflection patterns.
8. Grunting and vocalizing “ooo,” “ah,” “ow,” and “uh oh” don’t count as jargon or language, so they don’t get coded.

Appendix C: Fidelity checklist

Fidelity Checklist

Date: _____ Observer: _____
 Language Intervention Condition: _____
 Activity: _____

<i>Did the interventionist:</i>	Yes		No
1. Provide all verbal input directed to the targeted child in the specified language? (No more than two interjections in non-specified language)			
2. Interact with the child for 5 continuous minutes?			
3. Interact with child within specified activity?			
4. Use 3 or fewer directive statements (except for safety)? Tally directive statements here:			
5. Use 5 or fewer yes/no or “test” (e.g., “what’s this?”) questions? Tally yes/no and “test” questions here:			
6. Use 1 or fewer direct mand-model prompts (e.g., “say_____”)			
<u>Responsive Intervention Strategies (refer to strategy definitions)?</u> <i>Did the interventionist:</i>	Consistently	Occasionally	
7. Use environmental arrangement strategies?			
8. Follow the child’s attentional focus?			
9. Model language?			
10. Imitate actions?			
11. Imitate communication?			
12. Use linguistic mapping?			
13. Expand child’s language?			
14. Balance turns with the child?			
Subtotal			
Total			

Comments: