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A Comparison of Frequencies and Patterns of Codeswitching in Spanish-English Bilingual Children at High and Low Risk for Language Impairment

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A Comparison of Frequencies and Patterns of Codeswitching in Spanish-English Bilingual Children at High and Low Risk for Specific Language Impairment

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Dedication

To the Church.

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Abstract

A Comparison of Frequencies and Patterns of Codeswitching in Spanish-English Bilingual Children at High and Low Risk for Specific Language Impairment

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Theories of bilingual language production suggest that codeswitching is either a characteristic of limited language or a productive characteristic suggesting enhanced executive control and language proficiency. Since codeswitching patterns of typically developing and language impaired bilingual children are not thoroughly understood, utterances with codeswitches may be disregarded during language evaluations. Codeswitching frequency and types of codeswitches were analyzed in language samples of 12 bilingual children at high and 12 at low risk for specific language impairment (SLI). Results indicated that the frequency of codeswitching was similar for both risk groups in Spanish, but not in English. In English, the high risk group codeswitched significantly more than the typically developing group (18.76% vs 7.20%, $p<.05$). The types of codeswitches most often produced also differed by language and risk group. In Spanish,

single-word lexical codeswitches were preferred significantly more than syntactical or lexical-syntactical, but no differences were found between risk groups. In English, syntactical codeswitches were preferred significantly more than lexical or lexical-syntactical. That the children at high risk for SLI codeswitched more in their second language and that their patterns were similar to the typically developing group might suggest that codeswitching in bilingual children with SLI might be used as a productive strategy to fill in linguistic 'gaps' and that codeswitching should be recognized and given credit for in language evaluations.

Table of Contents

List of Tables

List of Figures

Introduction

Speakers of two languages may choose to use one language, or the other, or a combination of the two depending on the topic and goal of conversation, on their linguistic competencies, language background, social expectations of their communication context, and on their personal identification and value given to a certain language (Grosjean, 1994; Milroy & Wei, 1995; Myers-Scotton, 1993). This practice has come to be known as 'codeswitching.' One of the foremost experts in the field of codeswitching and bilingualism, Carol Myers-Scotton (2005), describes codeswitching as the use of two or more linguistic varieties in the same conversation or interaction. The most common form of codeswitching is when a person uses a word, phrase, or sentence from a non-target language in conversation. The codeswitch may be for one word or for several minutes of speech (Myers-Scotton & Ury, 1977).

Being an intricate practice that is not fully understood, codeswitching has sparked a debate of whether it results from high or from low language ability (Adele, Scheffner, & Rodriguez, 2009; Kroll & Tokowicz, 2005). Theories of bilingual language production suggest that codeswitching is potentially more easily produced by bilinguals with high language ability compared to those with low language ability because it is affected by the level of proficiency of the languages and it requires an ability to know and control the syntactic structures of two different languages (Myers-Scotton, 2005). For this reason, codeswitching may be thus seen at lower rates in bilinguals with low language ability such as those with Specific Language Impairment (SLI).

Other theories of bilingual language use suggest that codeswitching is the result of an inherent difficulty with separating two languages because it is affected by the processes of inhibition and competition of codes (Meuter, 2005). Children who are experiencing language loss have been reported to codeswitch more from their weaker language to their stronger language (Bolonyai, 2009; Zentella, 2007). In this view, codeswitching is seen as a strategy to compensate for limited language or access to language. In this view, children with SLI would be expected to codeswitch more than their typically developing peers with similar language proficiencies (Bolonyai, 2009). Research to disambiguate this question is needed. To date, studies examining codeswitching patterns in bilingual children who are typically developing versus those with SLI have not been conducted. To obtain a clearer insight into the reasons for codeswitching in bilingual children with and without SLI this study analyzed the codeswitching patterns and behaviors of a small sample of bilingual children in a narrative task. The following questions were explored: 1. Do bilingual children at high and low-risk for SLI differ in their frequencies of codeswitching depending on the language in a narrative task? 2. Are there cross-linguistic differences between the types of codeswitches that are produced by children in each language? 3. If so, are these patterns consistent in children at high and low-risk for SLI?

Codeswitching and Models of Bilingual Language Production

Different models of bilingual language production make different assumptions about the interaction of languages in bilinguals that have underlying implications for

codeswitching. One widely accepted model of bilingual language learning is the Unified Competition Model (MacWhinney, 2005). The model stresses competition between the different arenas of language including the lexical arena, the morphosyntactic arena, and the message formulation arena among others (MacWhinney, 2005). The model explains that bilinguals have to constantly inhibit competing activation in a certain arena from the non-target language (MacWhinney, 2005). However, inhibition of a language requires a higher degree of executive control than in monolingual speech production (Green, 1998). Based on this assumption, some believe that bilinguals develop higher-level cognitive skills and enhanced executive functioning when compared to monolinguals (Bialystok & Majumder, 1998). For example, one study of syntactic judgment ability in bilingual versus monolingual children found that bilingual children have increased control of attention to syntactic tasks and enhanced executive control for linguistic processing when compared to monolinguals (Bialystok & Majumder, 1998; Carlson & Meltzoff, 2008; Goetz, 2003; Moreno, Bialystok, Wodniecka, & Alain, 2010). Based on this particular model of bilingual speech production, codeswitching can be viewed as a complex and positive practice that requires higher cognitive skills than needed in monolingual speech production. Codeswitching in bilingual children thus could be seen as a productive language practice.

Models of bilingual language production also explain that bilinguals have one common conceptual store at the level of semantic representation that precedes lexical selection and is shared by the bilingual's two languages. Kroll and Tokowicz (2005) provide a model of lexical retrieval in which L1 and L2 have connections of different strengths to the conceptual store depending on the level of proficiency and use of each

language. In the model, L1 has stronger connections to the conceptual store than L2 under the assumption that L2 is still being learned (Kroll & Tokowicz, 2005). Under this assumption, codeswitching or interference from L1 during L2 production could be explained by stronger connections of L1 to the conceptual store. Studies looking at switching cost (i.e. response latency) have found that proficiency correlates negatively with the amount of lexical interferences in speech production (Costa & Santesteban, 2004). In other words, bilinguals that are balanced experience less interference in both of their languages than unbalanced bilinguals and unbalanced bilinguals experience more interference from their more dominant language (Costa & Santesteban, 2004). The implication of these findings is that bilinguals do experience interference and competition from their two lexicons. Furthermore, in this view codeswitching from L2 to L1, or from the weaker language to the stronger language, might be more regarded as evidence of language deficits or weak links of L2, or the weaker language, to the conceptual store and stronger links from L1, or stronger language, to the conceptual store. In this view, weaker language skills could give rise to codeswitching as a strategy to compensate for limited language or limited language storage and access.

Characteristics of Codeswitching

Throughout the years studies looking at the syntactic characteristics of codeswitching have identified several characteristics of codeswitching (Pfaff, 1978). Codeswitching can be intrasentential, occurring between sentences and across utterances as in (1) and intersentential, or within utterances, such as in (2) (Adele et al., 2008, p. 29).

(1). *Hurry! Esta frio*

(Hurry, it's cold).

(2). *Estaba cold*.

It was cold.

Codeswitching is also rule constrained within the syntactic structures of Experts in the field of codeswitching have proposed theories of grammar that would explain the rules that constrain intrasentential codeswitching within the grammatical framework of languages. The Equivalence Constraint and Free Morpheme Constraint theories suggested by Poplack (1981) said that codeswitches may occur at points where the surface structures of the languages map onto each other and as long as it does not disrupt any bound morphemes. However, this theory was contradicted through a number of exceptions and counter examples in studies of codeswitches in various languages and communities (Myers-Scotton, 1993). Alternatively, the framework that has been more widely used to explain codeswitching in Spanish-English bilingual adults is the Matrix Language Frame Model or MLF (Muñoz, Marquardt & Copeland, 1999). This framework proposed by Myers-Scotton, takes into consideration the grammatical relationships within the languages and roles that each language plays in the communication interaction (Myers-Scotton, 1993). In the model, the base language or the language that provides the morphosyntactic structure of the utterance is called the Matrix Language (ML). This is usually the base language that leads the conversation. The Embedded language, (EL), is the language that is inserted into the ML and from which the codeswitched items come from. The model defines four categories or types of

codeswitches, ML Islands, ML shift, EL islands, and ML + EL, that help explain multiple possibilities of intrasentential and intersentential codeswitching.

Three types of codeswitches that commonly occur in bilinguals can be explained by Myers-Scotton's MLF model. Lexical codeswitches are when a single lexeme from the EL is inserted into the syntactic structure of the ML, as in (3). In (3), Spanish is the ML while English is the EL. Syntactical codeswitches are the use of a syntactic structure for one language with the surface language of another, as in (4) (Swain & Wesche, 1975). Here the morphosyntactic structure of the embedded language is adopted while the surface language remains as the ML. Syntactical codeswitches in this regard do not have a specific name in the MLF, but fit well in the model. A codeswitch that is constituted of more than one lexeme or morpheme is an EL island such as in (5). EL islands, or 'lexical-syntactical' codeswitches in this study, consist of at least two EL morphemes showing the syntactic structure of the EL yet inserted into the ML.

(3). *Va a charter un camión*.

He's going to charter a bus

*In this example the lexical codeswitch is borrowed from English.

(4). *I went to the house little*.

I went to the little house.

*In this example the word order is borrowed from Spanish.

(5). *El perro chewed him up*.

The dog chewed him up.

*In this example 'chewed him up' is an EL Island where both the lexemes and the syntactic structure are borrowed from English in a Spanish phrase.

In one study looking at language samples of Spanish-English bilinguals with impaired language due to aphasia, Muñoz et al. (1999) used the MLF model to analyze codeswitching instances and compare them to bilinguals without language disorders. They coded intersentential codeswitches as ML islands and ML shifts, and intrasentential codeswitches as EL islands and ML + EL, plus 3 additional categories to account for atypical codeswitching patterns of neurologically impaired bilinguals. Muñoz et al., (1999) found the MLF model to be effective in coding for typical codeswitches. Studies like this one that explain the grammatical structures of codeswitched utterances have not been performed with young bilingual children and much less with those with language impairment or atypical language. Based on this effectiveness of MLF model in the Muñoz study, this study also uses the MLF model to analyzing the types of intrasentential and intersentential codeswitches that we see in young children's language samples.

Besides being rule-constrained within the languages, codeswitches are also subject to cross-linguistic differences (i.e. differences in the morphosyntactic and semantic domains) depending on the languages they derive from (Bolonyai, 2009). For example, in a study of codeswitches produced by adults, Poplack (1980) noticed more single noun and predicate adjective codeswitches in verb phrases, and in subordinate and prepositional clauses in English to Spanish. Unfortunately, Poplack (1980) did not compare these types of codeswitches to codeswitches in the Spanish to English mode. Studies like this one are not very common and up to date there are no studies that look at the structural differences of codeswitches across languages in young bilingual children. Studies in other areas of language have found cross-linguistic differences in bilinguals

and they predict that we might see cross-linguistic differences in codeswitching as well. For example, one study of mazes found that the same bilingual children produced more lexical revisions during a narrative task when speaking in English, but produced more grammatical revisions when speaking Spanish (Bedore et al., 2006). Because codeswitching patterns depend on deep structures of the languages (Myers-Scotton, 2005), it is probable that codeswitching patterns in bilingual children may reflect similar cross-linguistic differences between the languages as seen in Bedore et al.'s maze study (2006).

Codeswitching in Bilingual Children with SLI.

By definition, the diagnosis of Specific Language Impairment indicates the failure to develop age-appropriate language despite normal intelligence and in the absence of any other psychological, cognitive, or neurological disability (Bedore & Peña, 2008). Deficits are typically seen in the areas of phonology, morphology, syntax, and vocabulary (Hulit & Howard, 2006). Studies of monolingual English children with SLI have shown that the most common types of deficits in SLI are seen in grammar (i.e. marking verb tense and agreement) (Rice & Wexler, 1996). Based on these studies, experts support the theory that the cause of SLI is an inherent disruption in the module used for learning grammar (Rice & Wexler, 1996). In models of language production this would mean that only the module for grammatical encoding would be disrupted. A linguistic theory to explain the cause of SLI has not been proven, but grammatical difficulties have also been documented in speakers of other languages and in bilingual children further supporting

the theory (Gutierrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2008; Leonard, 1988). For example, one study found that young Spanish-English bilingual children with SLI ages 4-6 had the same degree of difficulty with verb finiteness as the monolingual children with SLI (Gutierrez-Clellen et al., 2008).

Studies of lexical learning in monolingual English speaking children with SLI also demonstrate significantly more difficulties in language learning than their typically developing peers (Leonard, 1988). For example, children with SLI show a late onset of words, a restricted vocabulary when they enter school and difficulty with learning words presented at fast rates when compared to their typically developing peers (Leonard, 1988; Weismer & Hesketh, 1996). Studies looking at vocabulary in bilingual children with and without SLI suggest that bilingual children with SLI also have limited vocabularies and difficulties learning new words as monolingual children with SLI (Peña, Iglesias & Lidz, 2001; Restrepo & Kruth, 2000). Theories that are based on limited and reduced efficiency of lexical learning, conclude that the underlying cause for SLI is an impairment in cognitive processing and propose gaps in linguistic knowledge (Rice & Wexler, 1996). The theory proposes that language processing is less efficient in children with SLI (Leonard, 1988).

The characteristics of grammatical and vocabulary learning difficulties and the two contrasting theories of the causes of SLI have implications for codeswitching in bilingual children with SLI. A linguistic based theory would suggest that they may have more difficulties generating codeswitches than their typically developing peers since codeswitching requires a good knowledge and control of not one, but two morphosyntactic systems (Gutierrez-Clellen, Simon-Cereijido & Wagner, 2008). Under

this assumption, the frequency of codeswitching would be expected to be less in the language samples of bilingual children with SLI when compared to typically developing peers. Furthermore, syntactic and lexical-syntactic types of codeswitches would also be expected to occur less frequently than single-word lexical switches.

Similarly, a cognitive processing theory of SLI and the finding that bilingual children with SLI have limited vocabularies and difficulties acquiring words would imply that bilingual children with SLI could be more prone to codeswitch since the practice could be used as a strategy to fill any linguistic gaps. Codeswitching as a strategy to compensate for language deficits has been seen in typically developing bilinguals who are 'loosing' their first or weaker language (Paradis, 1995; Zentella, 1997). In one study of five Puerto Rican children ages 5-7, dysfluencies (fillers '*uh' and 'um',* pauses, and revisions) and explicit indications of language gaps ('*I don't know how to say it,' and 'I forgot'*) indicated that 14% of total codeswitches were 'crutches' used when the child did not know the word in the weaker language (Zentella, 1997). The study demonstrates that bilingual children who experience 'gaps' in their language codeswitch often as a strategy to fill in words or utilize syntactic structures that are permanently or temporarily inaccessible thus compensating for or avoiding further communication breakdowns (Zentella, 1997). If bilingual children with SLI also compensate for lexical gaps by codeswitching we would expect to see more lexical types of codeswitches in their language samples when compared to typical developing bilinguals.

Purpose of the Current Study

The number of bilingual children is growing in the United States and Speech and Language Pathologists are increasingly required to assess bilingual children (U.S. Census Bureau, 2008). The American Speech and Language Hearing Association now requires that Speech and Language Pathologists have basic competence for assessing children from diverse linguistic backgrounds (Hammer et al., 2003). In line with this need, experts and researchers in the area of bilingual speech and language have endeavored to outline and understand bilingual language development and to find valid and reliable ways to assess language disorders in bilinguals (Guitierrez-Clellen et al., 2000; Genesse, Paradis, & Crago, 2004; Bedore et al., 2008).

In the earliest stages of bilingual language assessment and research, when bilingualism was not well understood, standardized tests and methods used to assess monolinguals were being used to assess each of a bilingual's languages (Grosjean, 1994). Eventually, research endeavors led to the realization that bilinguals develop and use different communicative abilities than monolinguals speakers of their equivalent language backgrounds. In a study that compared monolingual Spanish and English children with bilingual Spanish-English children across semantic tasks, Peña, Bedore, and Rapazzo (2003) found significant task differences in the performance of the groups. Bilingual children performed differently in expressive tasks in each of their languages than their predominantly-Spanish and predominantly-English speaking peers (Peña et al., 2003). The finding illustrated that the performance of bilingual children in each of their languages does not mirror the performance of monolingual speakers of the same languages.

Bilinguals are now being studied and assessed in terms of their total language: their total conceptual vocabulary store, language input and output, and language experience in each of their languages (Bedore, Peña, García, & Cortez, 2005; Grosjean, 1994). Detailed efficacy data of valid and reliable measures in the following language areas has been obtained to date: phonology (Burrows & Goldstein, 2010; Fabiano-Smith & Goldstein, 2010), morphosyntax (Bedore et al., 2008), and semantics (Peña et al., 2003). However, strategies for looking at a bilingual's total language are still limited. Common practice is to look at each of the bilingual's languages separately. For example, a task will be given in one of the subject's languages then the other (i.e. L1 then L2) (Sheng, McGregor, & Marian, 2006). Although this method may be appropriate for many different areas of language, it does not capture codeswitching.

Up to date, none of the existing studies have analyzed the syntactic and grammatical characteristics of the mixing of two languages in young bilingual children with language impairment. Studies looking at bilingual Spanish-English language children exclude utterances that contain codeswitches or demonstrate language interference from the non-target language. Bedore, Peña, Gillam, & Ho (2010) excluded a cumulative total of 12.5% of utterances in Spanish and 11.0% of utterances in English in their study looking at valid measures of sentence productivity and organization in bilingual language. Not analyzing utterances of bilingual children who codeswitch is potentially detrimental for children who live in cultural-linguistic environments where codeswitching is the norm, as it is in some areas of the United States (Zentella, 1997).

In light of the predominance of codeswitching in bilinguals and the need to assess bilingual children who codeswitch, this study was designed to get a preliminary view of

codeswitching in young bilingual children and to see if there is any diagnostic value in analyzing the frequency and type of their codeswitches. Initially, we wanted to explore how frequently bilingual children codeswitch in each of their languages and if there was a difference between how frequently children who are at high risk for SLI codeswitch when compared to children at low-risk for SLI. We also wanted to see what types of codeswitches (lexical, syntactical, or lexical-syntactical) were most common in each language and if there were differences within the risk groups in the frequencies of these types of codeswitches. We expected the findings would be beneficial in resolving the debate of whether codeswitching might arise in bilingual children due to low or high language ability.

Methods

Participants

Participants were part of an ongoing, large-scale longitudinal study of early markers of language impairment in bilingual children. The participants were recruited from public schools in central Texas and Utah that serve large percentages of Spanish-English bilingual children from Hispanic backgrounds (Bedore et al., 2010). These schools are located in primarily-low income city areas. Overall, the participants included were between the ages of 60 months (5 years) and 82 months (6;10 years) with a mean age of 67.9 months. Twenty-four children of 90 available children were included in the study, 13 males and 11 females. These were selected from the larger dataset based on high and low risk pairs matched according to age, grade, and language proficiency. Approximately half of the bilingual children participating in this study were sequential bilinguals. They first learned Spanish in their homes and began learning English when they entered grade school.

Parent interview was conducted through the phone to obtain detailed language background and history of acquisition of each language. Parents described what language their children use and hear throughout weekdays and weekends on an hour by hour basis during their child's waking hours. Teachers also provided information about each child's language proficiencies. The information from the language use questionnaire, parent interview, and teacher interview, was used to determine language use percentage. In order to qualify for the study, children needed to have at least 20%

input and output in each language (Bedore et al., 2010). The children were classified as either bilingual Spanish dominant (used Spanish 60-80% of the time), bilingual English dominant (used English 60-80% of the time), or balanced bilingual (used each language 40-60% of the time) depending on their percentage of input and output of each language.

Collection of Language Samples

Participants were given language tests consistent with the purposes of the longitudinal study. Testing was done in the schools in an area designated for this purpose. Testing was conducted in 20 to 60 minute sessions depending on the child's ability to attend to the tasks at hand. They completed the Spanish and English versions of the Bilingual English Spanish Assessment (BESA; Peña, Gutierrez –Clellen, Iglesia, Goldstein, and Bedore, in development) and told stories from wordless picture books. The BESA is a test being developed to identify bilingual children with and without language impairment.

To elicit language samples, participants told stories from wordless picture books in each language while examiners recorded the stories. The books used were from Mercer Mayer's Frog series (1969), *Frog on his Own*, *Frog Goes to Dinner, A Boy, a Dog, and a Frog*, and *One Frog Too Many*. These were counterbalanced so that the children got different books in Spanish and English. The examiners showed the books page by page and modeled a story from a script set forth by Berman and Slobin (1994). After reading the script examiners prompted with 'Tell the story back to me exactly as you heard it.' Following the retell, participants were given a second book. They were

instructed to look at the book and create a story similar to the one they just heard. Examiners prompted with 'Here I have another book. I want you to tell me a story' and 'Acá tengo otro libro. Quiero que tu me lo cuentes también.' Participants then looked through the book and were given time to make up a story. Examiners used prompts to help the children begin their stories, 'You can start when you are ready' and 'Puedes empezar cuando estes listo/lista.'

Minimal open-ended prompts were used when eliciting the language samples. They encouraged the child to keep going. Prompts were used if the child was not speaking, if the child said 'I don't know,' 'no sé,' 'how do you say…..?,' or 'cómo se dice?,' or when the child started a list of objects or characters in the book (i.e. 'boy,' 'dog,' 'jar,'…etc.). Prompts included in English were 'Tell me more,' 'You're doing great', 'what else?,' and 'Dime más,' 'Dime also sobre eso,' 'Hazlo lo mejor que puedas,' and 'Estás haciendolo bien' in Spanish.

To be consistent with larger purposes of the longitudinal study, caution was taken to elicit only the target language during the sessions (i.e. instructions and prompts were given in Spanish during Spanish sessions and in English only during English sessions). Prompts were given if the child began their story in the non-target language or if the child codeswitched. This instructed or reminded the child to use the target language. Prompts included 'Tell me in English' and 'Remember to use English 'or 'Dime en español' and 'Vamos a decir la historia en español.' That these language specific prompts were used in the elicitation tasks should be kept in mind when interpreting the results of this study. This is further addressed in the discussion section.

After collection, language samples were transcribed using the *Systematic Analysis of Language Transcripts* (SALT) (Miller & Iglesias, 1998). Rules for transcription for research purposes specified by Miller and Iglesias were followed (1998). Transcribers were monolingual English or bilingual Spanish-English trained research assistants who were undergraduate speech-language pathology students. After transcription, language samples were coded for grammatical or ungrammatical following a pre-established list of errors (see Bedore, et al. 2010 for further discussion).

The Current Study

To be included in this study, children had to be classified as low risk (failed 2 or fewer subtests of the BESOS) or high risk (failed 4 subtests of the BESOS) and produce a minimum of two codeswitched utterances in each language. The samples from ninety children, forty-five at high risk for SLI and forty-five at low-risk for SLI were examined for this purpose. The children from the two groups were matched according to age, grade, and language-proficiency so that we had 45 high- and low-risk pairs. From this set we included those who codeswitched in both languages.

To find the children that produced the minimum requirement of codeswitched utterances, a rectangular data analysis was conducted in SALT for each language. A total of 25 children had two or more codeswitched utterances in both languages. One bilingual English-dominant participant was an outlier as she codeswitched or used full English utterances during her Spanish sample for 100% of utterances and was excluded from the

study as well as her match. Overall, twelve participants with high risk and twelve with low-risk for language impairment were included in the study for a total of 24 participants.

Coding and Analysis

Frequency of Codeswitching

To find the frequency of codeswitching by utterance a Rectangular Data File Analysis was conducted using SALT. All code-switched utterances, coded as [i], were totaled for each sample. The frequency of codeswitching by utterance was calculated for each sample by dividing the total number of influenced utterances in the sample by total number of utterances analyzed. A percentage of codeswitched utterances was obtained for each language sample in both languages. Percentages of all 24 samples were totaled and averaged to obtain an overall average frequency of codeswitched utterances in each language. Percentages of frequency were also calculated for each risk type and compared to one another.

Types of Codeswitching

Codeswitched instances were analyzed. Three different types of codeswitches were chosen that could be explained by the conditions from Myers-Scotton's MLF model. These were coded: lexical, [lex], syntactical [isyn], and lexical-syntactical [lexsyn]. Table 1 shows the coding scheme.

Lexical codeswitches were coded when a word was borrowed from the non-target language while the morphosyntactic structure remained the same as the target language.

For example in '*La frog [Lex] se fue brincando'* the noun was borrowed from English during a Spanish retell of the story. A syntactical codeswitch was coded when the structure of the utterance followed the syntactical rules of the non-target language. Or in other words, the word order was influenced by the non-target language such as in the utterance: *He did it, the boy [iSyn]*. A lexical-syntactical codeswitch was coded when a clause or phrase used a lexical item and the syntactic structure of the non-target language but still fit the matrix language requirements for the overall class structure (Myers-Scotton, 2005). For example, in *El niño buscó under the tree [Lexsyn]*, the prepositional phrase '*under the three'* was in the embedded language but still fit the matrix language.

Table 1: Code Types and Examples

Code	Purpose	Example
[I]	Utterance contains a codeswitch or is influenced by the non-target language.	*And [Lex] él sacó su tongue [Lex][I].*
[Lex]	Lexical Codeswitch. When a single word of the Embedded Language is inserted into while the morphosyntactic structure of the Matrix Language remains the same.	*La frog [Lex] se fue brincando [I].*
[iSyn]	Syntactic Codeswitch. When structure of the phrase follows the Embedded Language while the surface Matrix Language remains.	*He did it, the boy [iSyn] [I].*
[LexSyn]	Lexical-syntactical Codeswitch-EL Islands and ML shifts. When the embedded Language provides both the structure and content. This includes utterances that fully shifted to the EL.	*El niño buscó under the tree [LexSyn] [I].* *The boy looked for the frog [LexSyn][I]* -in a Spanish narrative.

Reliability

In order to ensure consistency of coding, 10% of the transcripts were re-corded by a bilingual graduate student according to the steps outlined before. Coding reliability was measured at 88%.

Results

Several questions were explored in this study. First, do bilingual children at high and low-risk for SLI differ in their frequencies of codeswitching depending on the language in a narrative task? Secondly, are there cross-linguistic differences between the types of codeswitches that are produced by children in each language? If so, are these patterns consistent in children at high and low-risk for SLI?

Frequency of Codeswitching

To calculate the frequency of codeswitching per utterance, the utterances that were coded as 'influenced,' [i], were tabulated per child for each language. Table 2 shows each subjects' frequency of codeswitching by language and a summary of frequency totals by group and language.

Table 2: Percentage of Codeswitched Utterances

		English			Spanish		
Child	Risk: *High or Low*	Total utterances in the sample.	Total utterances codeswitched	Percentage of CS	Total utterances in sample.	Total utterances codeswitched	Percentage of CS
1	High	64	5	8%	59	2	3%
2	High	81	2	2%	34	2	6%
3	High	71	25	35%	92	4	4%
4	High	112	4	4%	73	3	41%
5	High	60	23	38%	59	6	10%

Table 2 (continued)

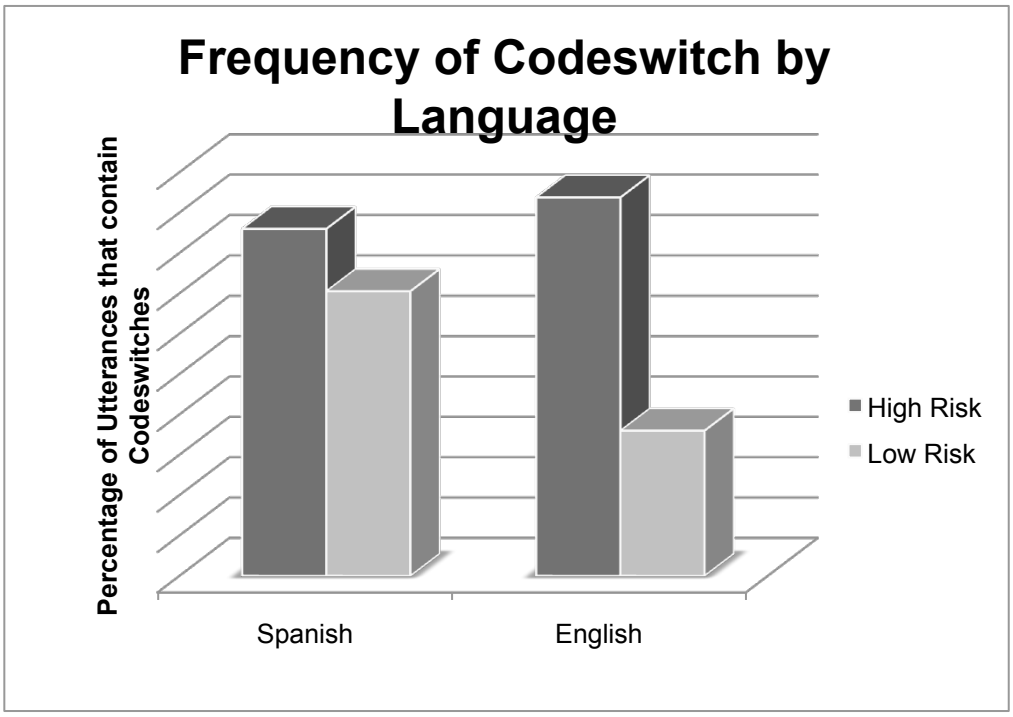
6	High	69	13	19%	119	14	18%
7	High	89	32	36%	47	19	40%
8	High	79	67	85%	87	7	8%
9	High	75	3	4%	60	15	25%
10	High	80	4	5%	87	13	15%
11	High	52	5	10%	72	18	25%
12	High	77	4	5%	76	33	43%
13	Low	86	5	6%	67	12	18%
14	Low	77	16	21%	59	7	12%
15	Low	71	2	3%	57	2	4%
16	Low	63	3	5%	71	2	3%
17	Low	65	19	30%	67	16	24%
18	Low	87	11	13%	119	12	10%
19	Low	99	16	16%	105	8	8%
20	Low	98	19	19%	85	5	6%
21	Low	134	3	2%	58	6	10%
22	Low	54	28	52%	67	3	4%
23	Low	91	5	5%	87	14	16%
24	Low	50	16	32%	77	6	8%

Summary of Variables:							
		Total	SD	Range	Total	SD	Range
	High	17.20%	25.15	2-85%	18.76%	16.15	3-43%
	Low	14.11%	16.66	2-52%	7.20%	7.32	3-24%
	Total	15.66%	20.48	2-85%	12.98%	13.33	3-43%

Percentage calculated by dividing number of utterances containing a codeswitch over total utterances produced in the sample.

To see if the difference between the percentages of codeswitching of the risk groups in Spanish versus English was significant, an independent sample 2-tailed t-test was conducted using the Statistical Program for the Social Sciences (SPSS). There was not a significant codeswitching difference between the high and low-risk groups in Spanish ($t(22)=0.355$, $p=.726$). In the Spanish mode the high risk group codeswitched at a mean rate of 17.20%. This was similar to the low-risk group which codeswitched at a rate of 14.11%. However, a significant difference was found in codeswitching between risk groups in the English mode ($t(15.343)=2.259$, $p<.05$). In English, the high-risk group codeswitched at a rate of 18.76%, while the low-risk group codeswitched at a rate of 7.20%. Figure 1 shows the pattern of codeswitching within language by high and low risk children.

Figure 1: Percentage of Codeswitches by Language.



Percentage was calculated by dividing influenced utterances by total utterances produced in each sample.

Types of Codeswitches

The total number of lexical, syntactical, and lexical-syntactical codeswitches were inventoried for each language. Table 3 shows the total number of codeswitches by type and language. In Spanish, lexical codeswitches were produced 266 times, lexical-syntactical were the second most common produced 74 times, and syntactical were produced only 3 times. In English syntactical codeswitches were produced the most, 151 times, followed by lexical codeswitches produced 43 times, and lexical-syntactical were produced 41 times.

Table 3: Total Number of Codeswitches by Type and Language.

	Spanish		English	
	Mean	SD	Mean	SD
Lexical	266	12.20	43	3.58
Syntactical	3	.44	151	7.191
Lexical-Syntactical	74	3.95	41	2.95

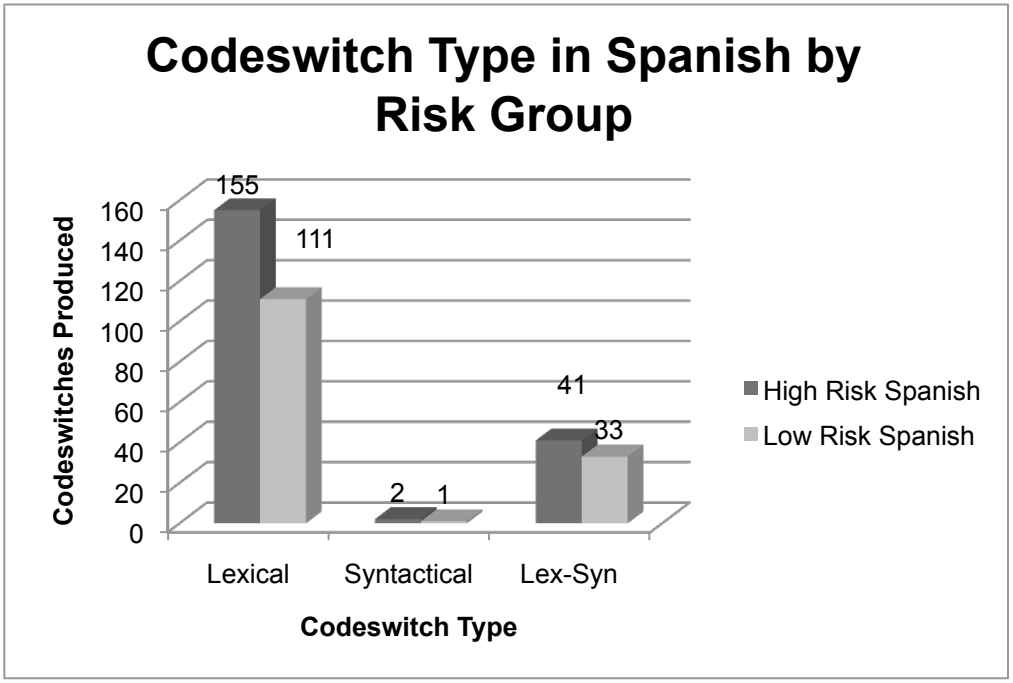
To see if a particular type of codeswitch was preferred more or less in each language, a Chi-square Goodness of Fit test was conducted using SPSS. The test compared the number of occurrences of three types of codeswitches, lexical, syntactical, and lexical-syntactical, within each language and across languages. Results indicated that in Spanish, lexical codeswitches were preferred significantly above syntactical and lexical-syntactical codeswitches ($x^2(2)=1.77$, $p<.05$). Overall, 86.1% of all lexical codeswitches were produced in Spanish while only 13.9% were produced in English. However, in English, syntactical codeswitches were preferred above lexical and lexical-syntactical codeswitches ($x^2(2)=1.18$, $p<.05$). The analysis revealed that 98% of all syntactical codeswitches were produced in English and 1.9% in Spanish.

The number of codeswitches by type were further analyzed within risk groups. Table 4 shows the total number of codeswitches by type for each group. A Chi-Squared Test of Independence was also conducted to see if there were any significant differences between the types of codeswitches produced by the risk groups in each language.

Table 4: Codeswitches by Type and Language for Each Risk Group

	CS type	Spanish	English
High	Lexical	155	22
	Syntactical	2	99
	Lexical-Syntactical	41	19
Low	Lexical	111	21
	Syntactical	1	52
	Lexical-Syntactical	33	22

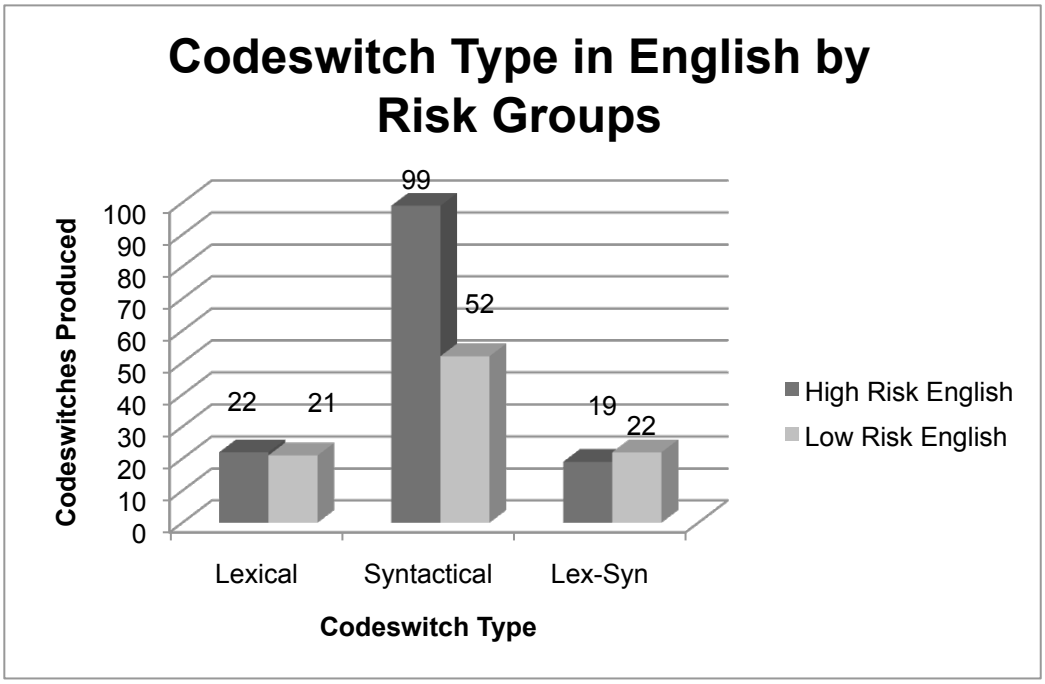
Figure 2: Codeswitch Types in Spanish by Risk Group



Results indicated a non-significant non-independent difference between risk and type of codeswitch in Spanish ($x^2(2)=.29$, $p<.86$). Figure 2 shows the number of codeswitches by type and risk group. Analysis revealed a significant non-independent difference between risk level and type of codeswitch only in English. There was a higher than expected percentage of syntactical codeswitches in the high-risk children (99) when

compared to the low-risk children (52) in English ($x^2(2)=6.49$, $p<.05$). Figure 3 shows the difference by codeswitch type. Syntactical codeswitches in the high-risk group constituted a total of 79.7% of all codeswitches while in the low-risk group syntactical codeswitches constituted 54.7%. Significant differences were not found between the high and low-risk groups in their use of lexical or lexical-syntactical codeswitches.

Figure 3: Codeswitch Type in English by Risk Group



Discussion

Frequency of Codeswitches

The purpose of this study was to evaluate the frequency and the type of codeswitches that bilingual children at high and low-risk for SLI produced in a narrative task. We first wanted to see if the groups codeswitched at different rates in each language and if there were any significant differences. Then, we analyzed the types of codeswitches the children produced (lexical, syntactical, and lexical-syntactical) to see if there were any differences between the languages and within risk groups.

Based on the theories of codeswitching in bilinguals, we hypothesized that the bilingual children at high-risk for SLI would codeswitch at higher or lower frequencies than those at low-risk. If they codeswitched less than the typically developing group, we hypothesized this would support the idea that children with SLI do not have the linguistic knowledge or abilities to control two morphosyntactic systems and or the required processes of inhibition to switch back and forth between them effectively. Alternatively, if the high-risk group presented higher codeswitching frequencies, it would support the theory that children with SLI have limited executive control and have difficulty inhibiting the non-target language or that they use codeswitching as a compensating strategy to supplement for linguistic 'gaps' such as for limited vocabulary.

The findings were not as clear-cut as we expected. Overall, the high-risk group codeswitched significantly more in English, but not in Spanish. The finding supports the hypothesis that the children at high-risk for SLI might codeswitch to supplement their linguistic 'gaps' in English, their L2. This is consistent with observations of frequent or

involuntary codeswitching in first language attrition and incomplete acquisition where bilingual children demonstrated signs of language loss along their codeswitches (Bolonyai, 2009; Zentella, 1997). Further research is needed to see what percentage of codeswitches in bilingual children at risk for SLI also have signs of linguistic breakdown.

The finding does not support the theory that the SLI group may have reduced ability to inhibit the non-target language or reduced executive functions to do so since they codeswitched at comparable rates to the typically developing children in their L1, the language in which young Spanish-English bilingual children are usually more proficient in. Thus, the rate of codeswitching in the SLI group was more related to language proficiency. This supports the theories in models of bilingual development that, especially in the early stages of language acquisition, bilinguals have connections to each module that differ in strength according to age of acquisition, proficiency, and use of a language (as in Kroll and Stewart's Revised Hierarchical Model, Kroll & Tokowicz, 2005).

The finding that bilingual children at low-risk for language impairment codeswitched less is evidence to support that typically developing bilingual children can gain competence in their second language and a degree of automaticity to their L2. Studies have shown that children develop competence in their second language after 5-7 years of exposure that is comparable to monolinguals (Oller & Eillers, 2002). Other studies have also found that bilingual children can develop conversational competence and productive morphosyntactic skills within one or two years of being exposed to a second language in an educational setting (Collier, 1989; Hakuta, Goto Butler and Witt, 2000; Jacobsen and Schwartz, 2005).

Types of Codeswitching

In our hypothesis of the frequency of codeswitching within risk groups, we also hypothesized that if the high-risk group codeswitched more then, lexical types of codeswitches would be more frequent overall. However, we found distinct patterns of codeswitches in each language but not an association with risk group. In English, syntactical codeswitches were the most common and of all syntactical codeswitches, the majority occurred in English. In Spanish, the majority of codeswitches were lexical. This meant that the bilingual children at high risk for SLI produced patterns of codeswitching that were 'typical' or the same as produced by the typically developing bilingual children.

The finding also illustrates how codeswitching is rule-constrained within the languages. This is similar to the finding by Bedore et al. (2008) in which they analyzed maze use in young bilingual children and found that specific types of grammatical revisions were language specific. Revisions of article and subject pronoun (the → she), pronoun gender (him → her), noun plurals (frog → frogs), word-order (can he → he can) only occurred in the English mode. No evidence was found that these occurred in Spanish in this study. We found more grammatical revision in Spanish but of course the patterns are different. In another study where language samples of 8 to 11 year old bilingual children living in the United States were collected, Spanish-English bilinguals had more revisions at the lexical level when speaking Spanish (Fatham, 1980). The children tended to revise their word use in Spanish especially when they began the word in English (Fatham, 1980).

The results found in this study further highlight that cross-linguistic differences always play a role in the language of bilinguals and remind SLPs that language differences must be considered when evaluating language in bilingual children. By virtue of speaking and growing up with two languages, bilinguals demonstrate verbal characteristics that sound different and even 'disordered' to an untrained person when compared to monolinguals. For example, studies have shown that bilingual children have similar vocabulary sizes as monolingual children yet spread over two languages with only about 30% overlapping words that result in smaller vocabularies in each language (Peña, Bedore, & Zlatic-Guinta, 2002). However, in another study, Bedore et al., (2005) showed that the overall semantic skills in bilingual children can potentially be accurately classified by giving credit for accurate concepts regardless of the language of response. In the same way, children who codeswitch might do so as a productive strategy to fill in any 'gaps' in their languages and should be given credit in assessments of language for doing so.

Methodological Considerations

The fact we were eliciting stories in a way that was consistent with the purposes of the longitudinal study to understand development of each language might have limited the frequency of codeswitching that we observed. Therefore, overall low frequency of codeswitched utterances might reflect how effective prompts were. However, if the goal were to study codeswitching then the way of prompting the languages sample would be different. In future studies of codeswitching specific prompts to elicit more codeswitched

language should be used. Example prompts could, 'Tell me a story however you want to tell me. You can use whichever language you want. I can understand English or Spanish' and 'Puedes decirme el cuento en cualquier idioma que quieras. Yo hablo ingles y español.' In the current study the examiners were either bilingual English-Spanish speakers or monolingual English speakers. Using bilingual speakers for the tasks might also help bilingual children produce more codeswitched utterances.

One variable that should also be considered when interpreting these results is the language and nature of the task used in this study. The analysis used narrative samples elicited through wordless picture books. Although, narrative samples are a good diagnostic tool in the evaluation of language, it should be noted that culturally and linguistically diverse children might not be used to narrating stories from picture books in their native languages (Kayser & Restrepo, 1995). However, bilingual children receiving instruction in English would be more familiar narrating stories in English. In considering this, one logical reason why the low percentage of codeswitching in the low-risk group in English, could be that that these children perhaps have learned from their experiences at school, (listening to stories being read aloud, retelling stories, speaking with English-speaking peers) how to better narrate a story in English. This could have contributed to why this particular group of children had less need to codeswitch when telling a story in English than in Spanish. Also data collection was taking place in the school.

The way that the children who codeswitched were selected to be in this study, those who had 2 or more codeswitches in each language, may have affected the results. A significant number of children in the original database of 45 risk pairs codeswitched from English to Spanish or only from Spanish to English, but not in both directions. It

would be interesting to see if these children show the same patterns in the frequency and types of codeswitching. It is likely that this group would show differences in the frequency of codeswitching since frequency of codeswitching was variable in this study. However, they might demonstrate similar patterns of the types of codeswitching in each language given that codeswitching patterns were found to be language-specific in this study.

Future Directions

One area that this study did not address was whether the codeswitches in the high-risk group were as grammatical or less grammatical when compared to the low-risk group. This would shed light on the question of whether codeswitching was a successful strategy for the high-risk children. A follow-up project could compare the efficiency of the use of codeswitching in the high-risk children to that of the low-risk children. If codeswitching in bilingual children with SLI can improve their grammatical scores, strategies to using codeswitching could potentially be developed when teaching syntactic structures to bilingual children with SLI.

Summary

In summary, these findings suggest that there's a complex relationship between languages, language abilities, and strategies of codeswitching used by bilingual children. The types of codeswitches that bilingual children produced were relatively specific within each language. In Spanish single word, lexical codeswitches were produced more

often, while in English, syntactical codeswitches were produced more. Furthermore, the bilingual children with SLI codeswitched more in their second language than their typically developing peers, yet they did not differ in the types of codeswitches they produced. This might indicate that bilingual children with SLI might use codeswitching in their second language as a strategy to fill in linguistic 'gaps'. Codeswitching could thus be viewed as a productive language practice during language evaluations with bilingual children with SLI.

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Vita

Bertha Alicia 'Anaiz' Silva was born in Monterrey, Mexico in 1986. She moved to Chicago, Illinois at a young age and shortly after to Houston, Texas. In a town outside of Houston named Pasadena she spent most of her childhood. She attended Pasadena High School where she was a recognized student leader and graduated in 2004. She began her undergraduate studies at the University of Texas in the fall of 2004. In the fall of 2008 Anaiz finished a Bachelor of Science degree in Communication Sciences and Disorders with a concentration in Speech-Language Pathology and a Bachelor of Arts degree in French Language with a minor in Government. It was in her undergraduate career that Anaiz began collecting language samples and testing bilingual children in Austin area elementary schools. This sparked her interest in bilingual language development and an interest to continue to graduate school. In the fall of 2009 Anaiz began the Masters program in Communication Sciences and Disorders with a bilingual concentration at the University of Texas at Austin. She graduated from the program in May 2011.

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