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**Developmental patterns of bilingual grammatical morphemes at various
levels of language use**

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levels of language use**

by

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Dedication

I would like to dedicate this thesis to my sister, Yevgenia. She always taught me to try my best, work hard, and pursue my dreams. She has supported me and motivated me every day and I hope she will forever know the impact that she has had on my life.

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Abstract

Developmental patterns of bilingual grammatical morphemes at various levels of language use

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The purpose of this analysis was to define norms for grammatical morpheme development in Spanish for Spanish-English bilingual children ages 4;0-7;6 relative to their use of Spanish. This study uses secondary data analysis based on two existing datasets. Participants included 334 Spanish-English bilingual children that were recruited from school districts in Texas, Utah, and Pennsylvania. Grammatical morpheme accuracy was determined by performance on the BESA (Bilingual English Spanish Assessment) (Peña, Gutiérrez-Clellen et al., in preparation). Percentage of current use of Spanish was estimated based on a parental interview in which parents estimated children language input and output. The average percent accuracy of grammatical morphemes was calculated and analyzed as a function of current use of Spanish and of chronological age. Results show that the percentage of accurately produced morphemes has a general upward trend as Spanish use and age increases. These findings will help define

expectations for bilingual children that in turn can inform the development of intervention goals.

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Chapter 1: Introduction

English and Spanish developmental language milestones have been defined for monolinguals (c.f. Brown, 1973 for English; c.f. Dale, 1980; Kernan & Blount, 1966; Merino, 1982; Perez-Pereira, 1989 for Spanish). However, for bilingual children relevant developmental language milestones have yet to be determined. Within the field of bilingualism, it has been recognized that the language skills of bilingual children need to be quantifiable and systematically explained (Fishman & Cooper, 1969; Grosjean, 1998). Both the type and amount of input available in a specific language influences language learning (Jorshchick et al., 2011; Li, 2009; Paradis, 2010). Due to the variable language input and output among bilinguals (defined as ‘current use’), it would be beneficial for assessment purposes to define norms by which bilingual children can be compared (Bohman, et al., 2010). Additionally these norms will help establish developmental targets for intervention. Approximately 11.8 million children speak a language other than English in the home, in the United States (Motel, 2012). The number of Spanish-English bilinguals is continuing to increase and over half speak Spanish (U.S. Census Bureau, 2012). Thus, Spanish-English language pair is the focus of this study.

THEORIES OF BILINGUAL LANGUAGE ACQUISITION

The theories of bilingualism typically discussed in the literature are universal grammar and critical period. Theories of universal grammar focuses on language exposure while critical period emphasizes age of first exposure (Ionin, Zubizarreta & Philippov, 2009; Serratrice, Sorace, Filiaci & Baldo, 2009; Montrul, 2009). These theories have been well established but neither theory takes current use into

consideration. More recent studies, however, have referred to usage-based theories that take note of type of input and output (Jorshchick et al., 2011; Li, 2009; Paradis, 2010). Within this approach, the amount of participation and interaction a child has with speakers of a given language leads to the development of vocabulary and eventually to more complex language structures. As a result, this study focuses on the development of grammatical morphemes in terms of levels of current use.

LANGUAGE HISTORY

Bilingual status can be determined in various ways and a detailed language history tends to be widely used among researchers to determine this status. Researchers use a variety of ways to document this history – whether they look at languages used at home, at school, or both (c.f. Pérez-Leroux, Pirvulescu & Roberge, 2009; Yan & Nicoladis, 2009; Kan & Kohnert, 2005, 2008; Oller & Eilers, 2002; Paradis et al., 2003; Simón-Cerejido & Gutiérrez-Clellen, 2009). Most researchers put more emphasis on cumulative exposure and age of first exposure. However, previous studies have shown that the growth rate of receptive language does not depend on age of exposure (e.g. Hammer et al., 2008). More recently, researchers have begun to utilize current use as a way to measure the status of participants' bilingualism. Language history questionnaires have been found to be a reliable source of information when asked about a child's current behavior (e.g., Marchman & Martinez-Sussman, 2002). Researchers are now including these types of measures in their questionnaires (Gutiérrez-Clellen & Kreiter, 2003; Restrepo, 1998). Parents and teachers are quite accurate when they give information on

the language that they use with the child and their reports correlate well with child performance (Bedore, Peña, Joyner & Macken, 2011; Gutiérrez-Clellen & Kreiter, 2003).

LANGUAGE DOMINANCE

Dominance is relative performance between two languages and has been calculated in a variety of ways. Some calculations of dominance are based on two versions (in each language) of the same language proficiency or language ability test. However, some tests are direct translations of English and are therefore not valid measures of the other language. For example, one grammatical morpheme may be very salient in one language, but may be acquired much later in the other language of a child's language pair. Therefore, the difficulty level of these items is different and a test with direct translation does not take this into consideration (e.g. Battelle Developmental Inventory, Second Edition (BDI-2)). Furthermore, some tests only provide monolingual English norms and cannot be used to accurately capture bilingual performance. Dominance shifts as children enter school and the shift in dominance is gradual and occurs at different time points in different domains (Kohnert & Bates, 2002; Kohnert, Bates & Hernández, 1999; Yip & Matthews, 2006).

Bedore et al., (2012) found that for approximately 1200 pre-kindergarten children, current use accounted for more of the variance in language screening scores compared to age of first exposure. Hence, current use is a good measure, which accounts for a majority of the variance in language dominance. Furthermore, at different levels of language exposure, children differed in their performance on semantic and morphosyntax tasks. They stated that current use would be a useful metric of bilingual development.

The amount of language input is important as children begin to use language and the amount of language output is important for adding knowledge to both languages (Bohman et al, 2010). Sixty percent of the variance was explained by current use patterns while only thirty-five percent of the variance was explained by age of first exposure. Semantic development is driven more by language input while morphosyntax development is driven by both input and output (Bohman, et al., 2010). By using a parent questionnaire, researchers are able to obtain an accurate picture of each child's language environment day to day. The questionnaire considers what language they hear and what language they speak. Hammer et al. (2012) conducted another study that further demonstrated the importance of language use on bilingual language development. In their study, more than 50% of the variance in vocabulary scores was explained by language exposure and use. Furthermore, children's outcomes are related to amount of use in each language (Bohman, et al., 2010; Hammer et al, 2012). These studies highlight the importance of documenting actual usage of each language in bilingual children. Thus, these factors need to be considered when explaining bilingual language development and are therefore highlighted in the present study.

Since language dominance changes over time, it is vital to consider current use since it is a good indicator at that specific time point. Hence, the current study includes a cross-sectional component as well as a longitudinal component to observe how children acquire grammatical morphemes based on their age, dominance, and/or current use.

VOCABULARY/GRAMMAR IN BILINGUALS

Monolingual children are often found to be significantly more advanced than the

bilingual children on measures of both vocabulary and grammar in single language comparisons, but comparable on a total vocabulary measure (e.g. Hoff et al., 2012). Bilingual children learn words at the same rate as monolingual children, but their vocabulary is distributed between two languages. Thus, it is important to assess in both languages because if assessment is only conducted in English, a bilingual child will often look impaired even if he/she is not.

For bilinguals, all measures of vocabulary and grammar are related to the amount of input in that particular language (Shintani, 2012). Although a large sample comparing bilingual to monolingual grammatical development does not exist, three groups of researchers demonstrated that vocabulary and grammatical development in young bilingual children are correlated within languages but such correlations are insignificant to very small across languages (Conboy & Thal, 2006; Marchman, Martinez- Sussmann & Dale, 2004; Parra, Hoff & Core, 2011). Therefore, it is likely that grammatical development is more protracted in early bilingual development. Increased usage of English slows the growth of Spanish vocabulary in Spanish-English bilinguals as seen in growth curve modeling (Hammer et al., 2009). However, mothers' use of Spanish actually maximizes Spanish vocabulary in bilingual children (Hammer et al., 2009). There is direct evidence of differences between school-aged monolingual and bilingual children on measures of grammatical development, and degree of difference between monolinguals and bilinguals on these grammatical measures is related to the amount of English exposure the children have (Gathercole, 2002a; 2002b; 2002c; Gathercole & Thomas, 2009; Pearson et al., 1997; Oller & Eilers, 2002). Thus, it is important to look at

both input and output throughout the day for each language. Both vocabulary and grammatical development, is affected by dual language input. Therefore by having these norms, we can look at both languages and see where the child falls compared to the normed population. Consequently, this study defines bilinguals as having at least 20% input in one language.

GRAMMATICAL MORPHEMES

A number of studies have been conducted evaluated the acquisition of grammatical forms in Spanish speaking children. As seen in Table 1 these studies have been conducted both in Spanish speaking countries where children are likely to be exposed only to Spanish as well as in Spanish speaking children who are growing up in in the US and likely to exposed to English as well. We divided the results of these studies into three groups. First we focus on grammatical acquisition in monolingual Spanish speakers (see Tables 2 and 3) and then we focus on US Spanish speakers.

Perez-Pereira (1989) documented grammatical morpheme production using an elicited production task. He found that plural /s/ was mastered by age 3 in Spanish-speaking monolinguals. When a noun ends with a consonant, it needs /es/ which is not mastered until age 4. Children continue to have trouble with plural /es/ on novel word inflection tasks through age 6 (Perez-Pereira 1989). In complex sentences, school age children sometimes still produce errors in number agreement.

Table 1. *Studies of Spanish Grammatical Morpheme (GM) Production*

Article	Blake (1980)	Brisk (1972)	Dale (1980)	Gonzalez (1970)	Kernan & Blount (1966)	Merino (1982)	Perez- Pereira (1989)
Country	Mexico City, Mexico	New Mexico, USA	Florida, USA	Texas, USA	Jalisco, Mexico	Oaxaca, Mexico	La Coruña, Spain
SES status	Mid/high SES	Low SES	Not reported	Mid SES	Low SES	Low/mid SES	High SES
Sample size	134, 4- 12 year olds	7, 5 year olds	122, 5;4-9;9 years old	27, 2-5 year olds	92, 4-12 year olds	50, 3;11- 8;5 year olds	109, 3-6 year olds

Table 2. *Accuracy of Grammatical Morphemes (GM) by Age and Author for Monolingual Spanish Speakers*

GM	Percent Accuracy by Age								
	Age 4		Age 5		Age 6		Age 7	Age 5-7	Age 8
	P	M	P	M	P	M	M	K & B	M
Plural	99	79	100	93	99	91	98	87.7	100
Preterite	75	85	73	92.5	76	100	97	32.33	100
Imperfect	98		98		100			46.7	
Direct object pronoun gender		50		80		65	95		100
Subjunctive		65		75		87.5	90		100

Note: P=Perez-Pereira (1989), M=Merino (1982), K & B = Kernan & Blount (1966)

Table 3. *Age of Acquisition of Grammatical Morphemes (GM) by Author in Spanish Speaking Countries*

GM	Blake (1980)	Cohen (1980)	Gudeman (1981)	Kernan & Blount (1966)	Merino (1982)	Perez- Pereira (1989)
Short plural			7;1-9	5-7	4;0	3;0
Long plural				11-12	4;0	4;0
Direct object pronoun gender					5-7	
Regular preterite		3;0	7;1-9	11-12	4;0	
Irregular preterite				11-12	4-5	
Present subjunctive	4;0				5;0	

In terms of past tense, monolingual Spanish speaking-children begin to produce the preterite past tense before 2;6. In 2 and 3 year old children, preterite is produced with state and change of state verbs (Jacobsen, 1986; Slobin & Bocaz, 1988). Between 2;6 and 3 the imperfect usually begins to emerge. Initially, both preterite and imperfect occur in 3rd person singular (Gonzalez, 1983). Between age 3 and 4, there is significant progress in the increase in use of tenses that have been acquired previously. Accuracy in person and number marking continues to increase in these forms. Additionally, dialectal differences become noticeable around this age. By age 5;6, errors in verbal inflection almost never occur in the speech of monolingual Spanish-speakers (Friedenberg, 1991).

The subjunctive mood is observed in children between 3;6 and 4;6 (Gonzalez 1983; Naharro, 1996). It is unclear as to when tense marking, person, and number agreement are used productively, but many tenses emerge quite early. On the whole these

studies indicate that monolingual children demonstrate high level of accuracy by 3 and 4 years of age.

Several researchers have considered grammatical acquisition in bilingual environments. Dale (1980; cited in Bland Stewart et al., (2001), hypothesized that experience with morphology in two languages may help a child form rules through an increased awareness of language. However, Dale (1980) found that morphological endings were not learned by the bilingual children at the same age as their monolingual English speaking counterparts. Dale's results indicate that bilingual Spanish- and English-speaking children acquired and mastered the plural /s/, the present progressive (-ing), and the third person singular /s/ (e.g. /s/ in He eats) by the time the children were in kindergarten. Possessives (e.g. Jane's) were acquired by first grade and the past tense (-ed) was acquired by the third grade. Per Dale's research, the bilingual participants were acquiring the morphemes appropriately but at a slower rate. However, he noted that the children in the study were typically on par with monolingual English speakers by the age of 9 years. Gonzalez (1970) documented the emergence of grammatical forms in spontaneous speech of US Spanish speaking children but did not calculate overall accuracy. Comparisons to monolingual suggest that some forms that are early emerging in monolingual acquisition are also observed in early bilingual acquisition. One example is past tense. Other forms seem to be delayed relative to monolingual development. Some delay may be because the form does not exist in English. For example, Guitart (1982) discusses the English-interference hypothesis and explained that the more a Spanish-English bilingual is influenced by English, the subjunctive will be used based on

the fact that there is no mood contrast in English. But, because these studies did not document language exposure patterns it is difficult to interpret these findings.

Table 4. *Age of Acquisition of Grammatical Morphemes (GM) by Author for US Spanish speakers*

GM	Brisk (1972)	Dale (1980)	Gonzalez (1970)
Short plural		5;0	
Long plural		8;0	
Direct object pronoun gender	5;0		
Regular preterite		5;0	2-2;6
Irregular preterite			
Present subjunctive			4;0

MARKERS OF LANGUAGE IMPAIRMENT

Another way to gain insight into patterns of language acquisition is by evaluating the skills of children with language impairment. Cross language patterns suggest grammatical deficits are distinct (e.g., Leonard, 1998). There have been numerous studies on children with language impairment in Spanish that provide indicators of what is easy and hard for Spanish-speaking children. In English, for example, children with SLI show difficulties with finite verb morphology (Conti-Ramsden & Jones, 1997; Leonard & Eyer, 1997; Rice, Wexler, & Cleave, 1995; Rice & Oetting, 1993). On the other hand, Spanish-speaking children typically begin using accurate verb inflections with their first word combinations (Serra, Serrat, Sole, Bel, & Aparici, 2000). Although English children with SLI typically show difficulty marking verb tense, Bedore and Leonard (2001) show that this was not the case for Spanish-speaking children. When children did make verb errors, they were typically

for person and number. Additionally, Spanish-speaking children with LI present with deficits in morphology and verb agreement structure (Montrul, 2005; Sanz-Torrent, 2002). Spanish-speaking children sometimes mark mood incorrectly; however, article and clitic errors are much more frequent than verb morphology errors. Function words such as articles and clitics, third person plural verb inflections, and noun plural inflections are particularly difficult for Spanish-speaking children with SLI (Bosch & Serra, 1997; Leonard, 1998; Merino, 1983).

Restrepo and Gutiérrez-Clellen (2001), found that Spanish-speaking children with SLI exposed to bilingual environments presented with definite article production difficulties, especially in the singular masculine form (el). Bedore and Leonard (2001) and Bosch and Serra (1997) indicated that the most common error was omission of the definite article, Eng and O'Connor (2000) reported more substitutions for 'el', and Restrepo and Gutierrez-Clellen (2001) found both types of errors.

Other studies have shown that Spanish-speaking children with SLI present with decreased use of clitic pronouns and clitic gender agreement errors (Bedore & Leonard, 2001; Bosch & Serra, 1997; Jacobson & Schwartz, 2002). Similarly, Jacobson and Schwartz (2002) found that children who had SLI used clitic pronouns less frequently than their age-matched peers and were less accurate in their use of gender agreement for clitics. These deficits are typically more noticeable on elicited tasks since these children may choose not to include clitic pronouns in their

spontaneous language. Clitics are phonologically dependent morphemes and are syntactically independent (Zagona, 2002). Romance languages typically have a large repertoire of clitics. Clitic pronouns occur as indirect objects (le, les, lo/la), reflexives (me, se, te, nos), and direct objects (lo, la, los, las). Even though clitic pronouns appear early in development, their accuracy develops quite gradually. Although in English, verb use is a good discriminator for SLI (e.g., Redmond & Rice, 2001; Rice, Wexler, & Cleave, 1995; Watkins, Rice, & Moltz, 1993), the Spanish literature suggests that articles and clitic pronouns across gender and number inflections may have greater clinical sensitivity for Spanish-speakers. This is important to keep in mind because there are cross-linguistic differences in how SLI is differentiated from typically developing peers in different languages.

This referent becomes more complex when bilingual children are evaluated. Spanish-speaking children with SLI exposed to English tended to make gender agreement errors (Restrepo & Gutierrez-Clellen, 2001; Anderson, 2003). In a study by Jacobson and Schwartz (2005), the TD and LI bilingual Spanish-English children showed significant differences in the overall accuracy of past tense use in English according to verb type. Children with LI performed relatively better on irregular verbs while TD children were better at producing regular verbs. Children with LI performed poorest on novel verbs, and they exhibited more nonproductive errors (e.g., bare stem verbs) while TD children produced more productive errors (e.g., overregularization). Similarly, comparable errors would be expected in Spanish.

Gutiérrez-Clellen et al. (2006) conducted a study examining the discriminant accuracy of a grammatical structure to distinguish between typically developing bilingual Spanish-English children and children with language impairment. They used the morphosyntax portion of the Bilingual English Spanish Assessment (BESA), which was able to differentiate between children with and without SLI. This subtest focused on articles, clitics, subjunctive verbs, and complex syntax, which is similar to results found in previous studies (e.g., Bedore & Leonard, 2001; Gutiérrez-Clellen, 1998; Restrepo & Gutiérrez-Clellen, 2001). Previous studies have shown that children with LI demonstrate deficits with passives, which may be due to an overall difficulty with complex movement operations affecting the passive transformation (van der Lely, 1998), processing limitations that affect non-salient morphemes (ex. past participle inflection–ed), or strict reliance on subject–verb–object word order (Leonard, Wong, Deevy, Stokes, & Fletcher, 2006). Passives also help identify LI in nonmainstream English speakers with high sensitivity and specificity (Craig & Washington, 2000). A sentence repetition task targeting complex syntax was an effective indicator of English LI (Conti-Ramsden, Botting, & Faragher, 2001) and was also included in this BESA subtest. In this study, the authors found that a grammatical measure that includes verb morphology and other grammatical forms has good clinical value with English-speaking children, even if they are exposed to or use Spanish.

Simon-Cerejido and Gutierrez-Clellen (2007) examined grammatical measures including omissions of articles, prepositions, auxiliary verbs, and contractions, and incorrect usage of word order and negatives in Spanish-speaking children. By using a discriminant function analysis, the authors found that the combination of correct use of articles, verbs, and clitics had fair discrimination accuracy but may miss children who have limited syntactic complexity. Both action and direction are encoded in the Spanish verb, however in English, the action is encoded in the verb while the direction (preposition) is frequently encoded in a verb satellite. For example, one might say “Se bajó por la escalera” (“He went down the stairs”). As a result, bilingual children have been found to have much more difficulty with prepositions in Spanish than in English (Restrepo & Silverman, 2001). It would be informative to gather normative data on the forms evaluated in the speech of children with language impairment to better understand the extent and nature of difficulties as well as inform intervention efforts (Bedore & Peña, 2008).

PURPOSE

The purpose of this study is to identify the Spanish grammatical morphemes that are acquired depending on the amount of Spanish language use. Furthermore, this study will focus on the accuracy of the grammatical morphemes in reference to age and amount of Spanish language use. Data from 319 bilingual Spanish-English children with varied dominance served to look at the development of grammatical morphemes from four to eight year olds.

The following specific questions are addressed in this study:

1. When analyzing specific morphemes, how accurately do bilingual Spanish-English children perform as a function of Spanish language use?
2. How accurately do bilingual children perform as a function of age when divided into Spanish dominant (S), balanced bilingual (B) and English dominant (E) groups?
3. What grammatical morphemes are early emerging, emerging or mastered at varying levels of Spanish language use?

Chapter 2: Methods

This study is a secondary analysis of two existing data sets (Development of a Test for Hispanic Children in the US and Diagnostic Markers of Language Impairment in Bilinguals). This current analysis includes Spanish-English bilingual children who were recruited in the original studies from preschools in Texas, Utah, and Pennsylvania. All children were from Latino-American backgrounds and ranged from 4;0-7;6. Data were collected using the BESA (Bilingual English Spanish Assessment) (Peña, et al., in development) morphosyntax items, as well as language samples from a total of 319 children (this includes 146 children from central Texas and Utah under the Diagnostic Markers project). Since bilinguals have been defined as 20-80% Spanish use, 0-20% and 80-100% Spanish use have been eliminated from the following analyses since they are considered functionally monolingual children. Table 5 summarizes the demographic characteristics of the participant group.

To be selected for this analysis, children needed to have typically developing language skills and be considered bilingual. Children were considered to have typically developing language skills if there was no parent, teacher, or clinician concern regarding language development based on children's performance in their stronger language. Children were considered to be bilingual if they used English and Spanish at least 80% of the time based on parent report. Parent and teacher rating scales used to determine eligibility are discussed below.

Table 5. *Demographic summary of combined participants*

Age	
4;6-4;11	8
5;0-5;5	32
5;6-5;11	45
6;0-6;5	59
6;6-6;11	53
7;0-7;5	44
Sex	
Boys	123
Ethnicity	Latino
Disability Status	Recruited full range of children but eliminated children with language impairment
SES	
Regular	74
Free/reduced lunch	160
Did not report	4
Educational level	Prekindergarten through first grade
Language preference	
English dominant bilinguals	39
Balanced bilinguals	90
Spanish Dominant bilinguals	112
Spanish use (%)	
20-29.99	17
30-39.99	27
40-49.99	65
50-59.99	66
60-69.99	41
70-79.99	40
Geographical distribution	Austin, TX; Philadelphia, PA; Ogden, UT

SAMPLING PROCEDURES

All parents of the participants completed a questionnaire in their language of choice, which looks at the language characteristics of the participants, which has been validated, in previous research (Gutiérrez-Clellen & Kreiter, 2003). It included information about the child's language background (age of first exposure and

proficiency and current amount of input and output of each language). Current use is a stable estimate of a child's input and output in each language (Bedore, et al., 2012, Bohman, et al., 2010). Parents were asked to share their day-to-day schedule on an hourly basis so that a better understanding of amount of current use could be obtained. Income level was determined by a family's eligibility for free or reduced lunch based on federal guidelines. Family income level is considered to be a risk factor for language delays (Dollaghan, et al., 1999; Payne, Whitehurst, & Angell, 1994). Socio-economic status (SES) has been shown to impact language learning (Oller & Pearson, 2002). Consent forms were distributed and collected by the children's teachers. Recent research has shown that parents can be a reliable source of information on the bilingual language abilities of their children (Gutiérrez-Clellen & Kreiter, 2003). There have been several studies that have revealed that parent ratings of differential use and proficiency in both languages correlate with observed outcomes in each language (Bedore, et al., 2011; Gutiérrez-Clellen & Kreiter, 2003). Bedore et al. (2011) showed that there are significant and negative correlations between ratings of parent and teacher concern and bilingual Spanish-English children's performance on morphosyntactic tests.

Also, teacher interviews were conducted and included input and output data of each language. Teachers were also asked to quantify the language input and output hourly during school days. Both parents and teachers were asked about any concerns regarding the child's learning, cognitive, and social skills. Using these data,

the researchers examined amount of use in each language, as well as grammatical morphemes acquired at particular ages in order to determine the norms of language performance at varying levels of language dominance.

Only children who were determined to be bilingual were included in this study. Spanish input and output was averaged for all analyses. This variable was called English use and it was inversely related to Spanish use. There is a threshold of 20% of input required for language learning. The 20% threshold hypothesis originated in Pearson et al.'s (1997) observation that children who hear less than 20% of their input in one language are often reluctant to speak that language. The participants were classified as English or Spanish dominant if their use was between 60% and 79.99% in their dominant language and between 20% and 39.99% in their other language. Children were classified as balanced bilingual if they used English and Spanish 40% to 59.99%. If children used each language either 0-19.99% or 80-100%, they were considered functionally monolingual children and were excluded from the study.

BESA SCORES

The BESA is a standardized test that was used to assess Spanish language ability across various domains including semantics, pragmatics, phonology, and morphosyntax. This study focuses on morphosyntax only. In the Development of a Test for Hispanic Children in the US data set, the full set of BESA items are included and were collected during one time point. However, the Diagnostic Markers of Language Impairment in Bilinguals data set has a reduced number of items (52) and

these children were seen at two time points, kindergarten and first grade since this was part of a multiple longitudinal design study. The current analysis focuses on these 52 targets that were common to both datasets. All grammatical forms for which there were at least 3 exemplars were included in the analysis. The grammatical structures tested are shown in the table below:

Table 6. *Grammatical morphemes*

Item types	Number
Preterite past tense	3
Imperfect past tense	5
Noun agreement (singular)	14
Noun agreement (plural)	2
Prepositions	6
Direct object clitics	5
Conjunctions	6
Subjunctive	5
Articles (singular)	4
Articles (plural)	3

All sections of the morphosyntax test had at least one or two demonstration items for the children to understand what was required for each subsection. A majority of the items were elicited through cloze tasks however there were 10 sentence repetitions that contained multiple grammatical forms and the items scored are included in the table above.

All data were collected in a quiet place within each school and was administered by certified speech language pathologists or graduate students under the supervision of a certified speech language pathologist. The BESA was recorded

on site and was scored at a later time. All data were entered by one person and then another person checked at least 10% of the data set. Reliability for data entry was 89%.

ANALYSIS

All data were scored and entered into spreadsheets by undergraduate and graduate students in Communication Sciences and Disorders. Data included BESA scores, percent use in each language, gender, and free/reduced lunch. Reliability scoring was conducted by graduate students on 20% of the data and had over 90% reliability. Percent accuracy of each grammatical marker was calculated for each test item and then averaged. If a grammatical marker only had one test item, the marker was not included in the analysis.

The data were analyzed two ways. First, percent accuracy (0-100%) of each grammatical marker was graphed as a function of percent Spanish language use (20-79.99%). Each grammatical marker was then reviewed by mastery level (percent accuracy) at each level of Spanish language use. Ten to 49% is considered early emerging, 50-89% emerging, and 90-100% mastered.

Second, the percent accuracy of each grammatical marker was also graphed as a function of age (4;6-7;5). Since 4;0-4;5 and 7;11 had less than 2 participants per category, they were excluded from the analysis. Age was broken down by 6-month increments. The average accuracies were further broken down by dominance (English dominant bilinguals 20-39.99%, balanced bilinguals 40-59.99%, and Spanish dominant bilinguals 60-79.99%). Each grammatical marker was then reviewed by mastery level for each age

range. Afterwards, mastery level charts were created for each type of dominance separately.

Chapter 3: Results

To address the questions of interest a percentage score for each of the morphemes of interest was created. Table 7 summarizes the average value for the morphemes of interest as a group. Children demonstrated an upward trajectory associated with use for these morphemes as a group. First we explore performance on a form by form basis associated with current use and then we explore performance as a function of age. Performance was considered to increase significantly if there was a greater than 15% change in performance from one language experience group to the next. Performance was considered to be steady if performance was within a 0-15% range of change.

Table 7. *Average Percent Accuracy of all 10 Grammatical Morphemes for Each Range of Spanish Language Use*

% Span Use	20-29	30-39	40-49	50-59	60-69	70-79
Preterite	50.00	33.33	61.73	69.23	62.63	70.73
Imperfect	61.82	60.00	75.56	78.15	73.33	76.10
Sing Noun Agreement	65.26	60.92	71.43	77.80	78.90	78.05
Plural Noun Agreement	63.64	44.12	75.93	81.54	76.52	76.83
Preposition	46.97	38.24	51.23	55.9	55.05	56.10
Direct Object Clitic	37.27	27.06	51.11	52.92	51.82	56.10
Conjunction	59.85	52.94	64.81	73.33	72.47	76.02
Subjunctive	40.91	23.53	47.41	52.62	46.46	51.22
Singular Article	60.71	46.88	75.93	80.47	73.48	77.44
Plural Articles	53.03	39.22	59.26	70.77	70.20	70.73

LANGUAGE USE VS. ACCURACY

The preterite past tense shows an upward trend of accuracy as a function of Spanish language use as seen in Figure 1. There is a drop in accuracy when children are using Spanish 30-39.99% of the time, however, accuracy continues to improve as Spanish

language use increases. When reviewing the range of accuracy for each range of Spanish language use, all of the ranges have an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 27.08 (for 70-79.99%) and 39.51 (for 20-29.99%).

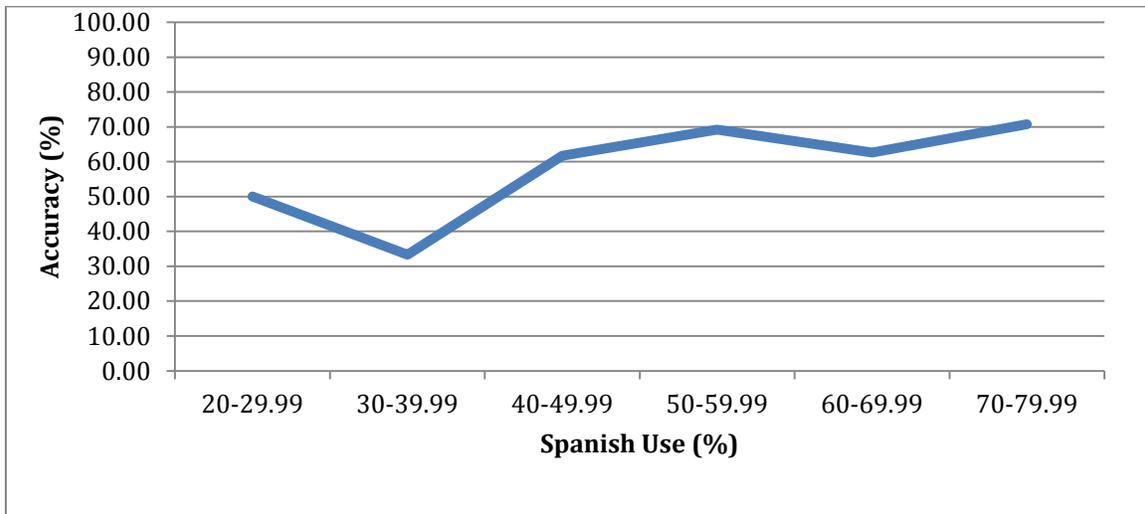


Figure 1. Preterite

As seen in Figure 2 the imperfect past tense shows an upward trend of accuracy as a function of Spanish language use. Accuracy has an upward trend that levels off around 40% Spanish language use and is quite stable as percent Spanish use increases. When reviewing the range of accuracy for each range of Spanish language use, all had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 24.58 (for 70-79.99%) and 36.99 (for 20-29.99%).

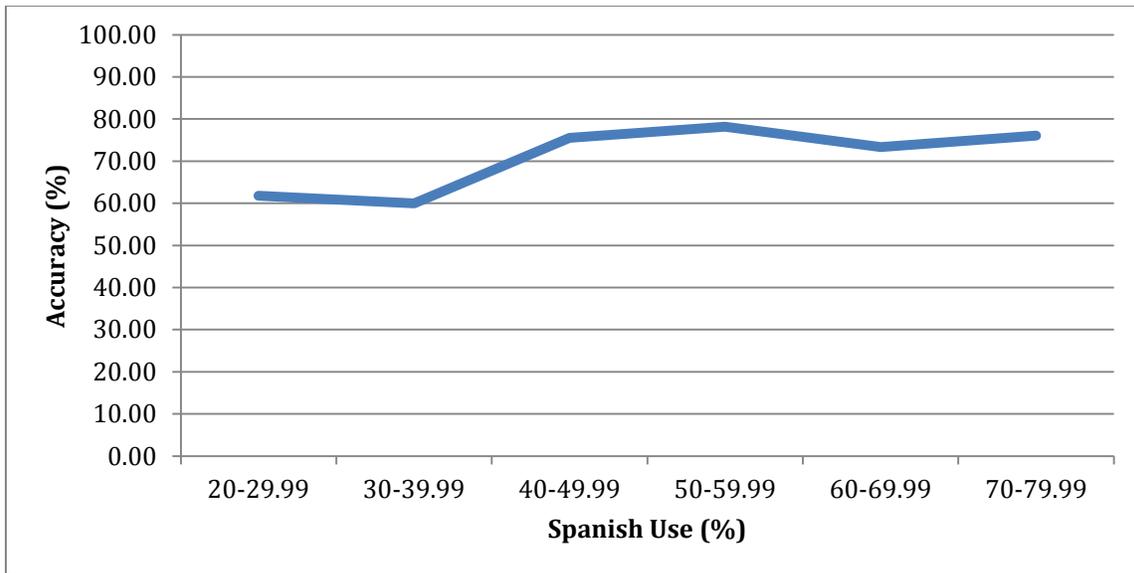


Figure 2. Imperfect past tense

The singular noun agreement morpheme shows a stable measure of accuracy as a function of Spanish language use (see Figure 3). Singular noun agreement accuracy levels off around 50% Spanish language use. When reviewing the range of accuracy for each range of Spanish language use, 20-59.99 and 70-79.99% had an accuracy range of 100 and 60-69.99 had a range of 92.86. The standard deviations for the ranges of Spanish language use are between 20.22 (for 60-69.99%) and 33.81(for 20-29.99%).

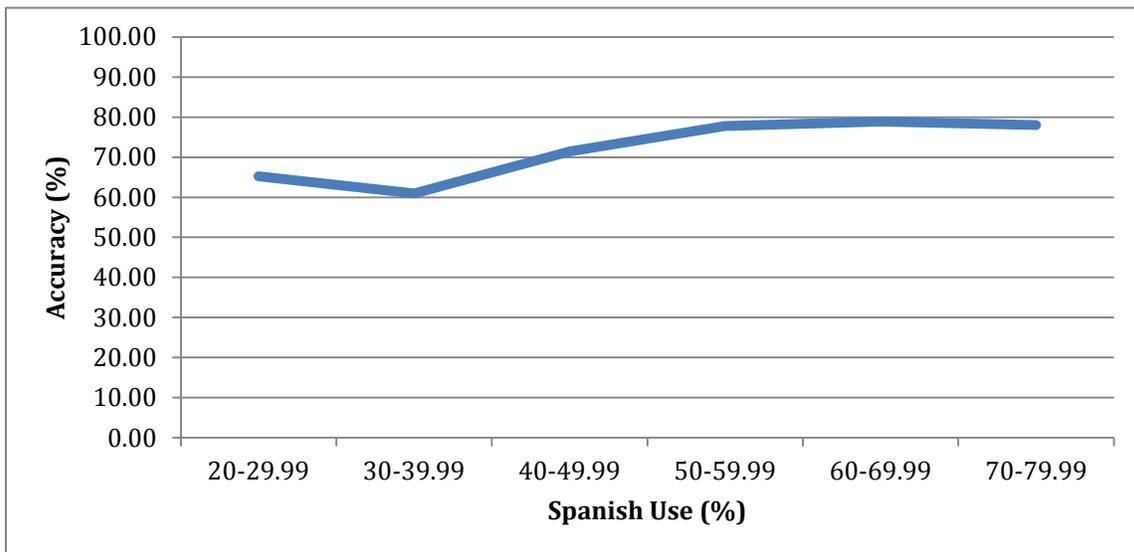


Figure 3. Singular Noun Agreement

The plural noun agreement morpheme shows an overall upward trend of accuracy as a function of Spanish language use as seen in Figure 4. There is a significant drop in accuracy between 20-29.99% and 30-39.99% Spanish language use, however, accuracy levels off at 40% and stays consistent through 79.99%. When reviewing the range of accuracy for each range of Spanish language use, there is accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 28.74 and 34.22 (for 40-79.99%) and 44.14 and 46.38 for 20-29.99% and 30-39.99% respectively. The standard deviation for plural noun agreement at 20-29.99% and 30-39.99% Spanish language use are higher than most other standard deviations within this specific morpheme as well as when compared to other morphemes.

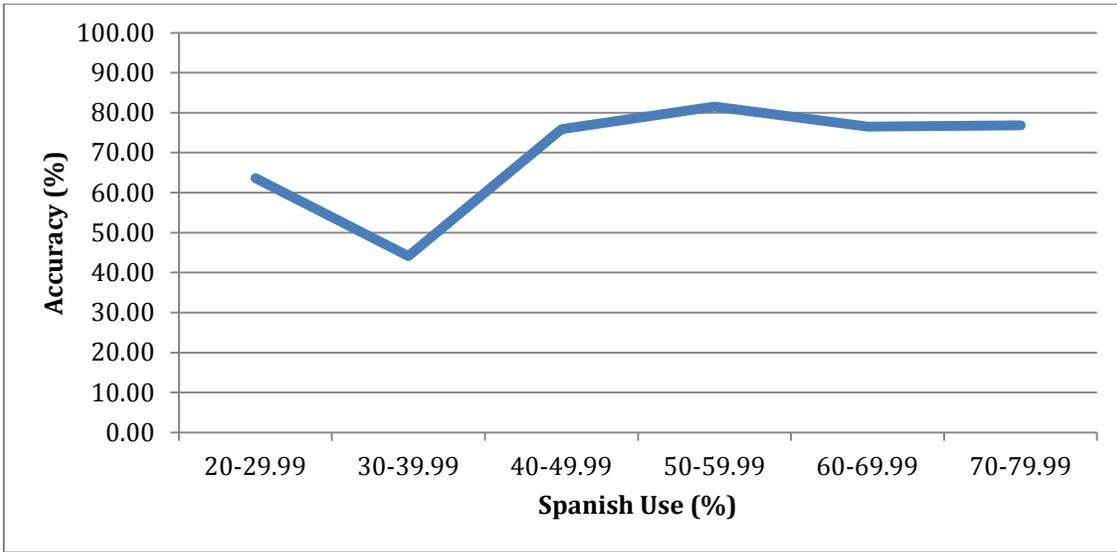


Figure 4. Plural Noun Agreement

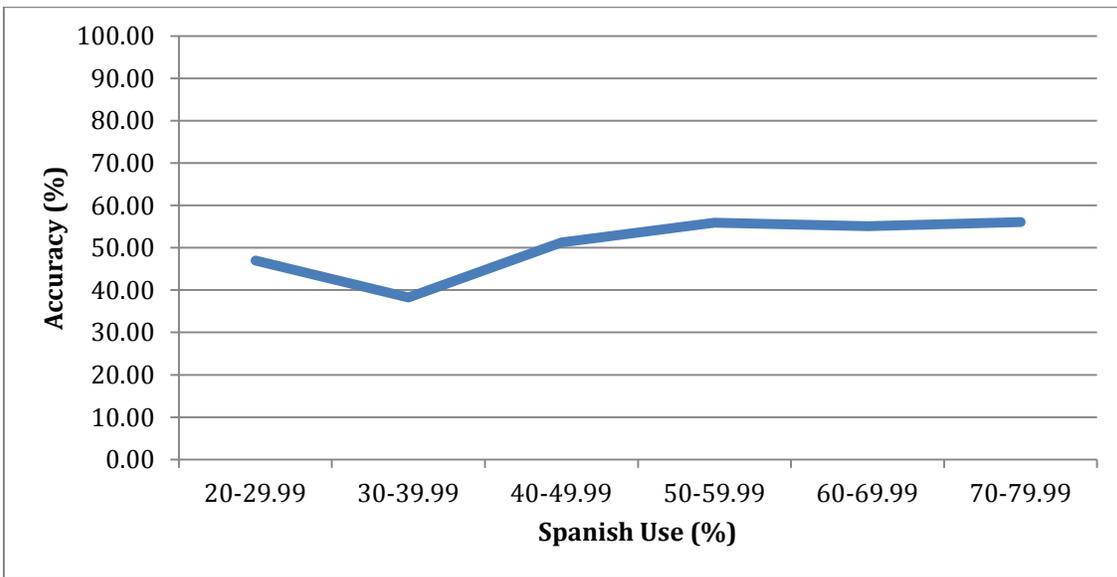


Figure 5. Prepositions

As seen in Figure 5 prepositions show an upward trend of accuracy as a function of Spanish language use. Although there is a slight decrease in accuracy at 30-39.99%

Spanish use, there is a continued upward trend thereafter that levels off around 50% Spanish use. When reviewing the range of accuracy for each range of Spanish language use, 30-39.99% had a range of 83.33, while the rest of the Spanish language use had an accuracy range of 100. The standard deviations were between 23.47 (for 50-59.99%) and 29.93 (for 40-49.99%).

As seen in Figure 6 Direct object clitics show an upward trend of accuracy as a function of Spanish language use. There is a slight decrease in accuracy when children are using Spanish 30-39.99% of the time. Afterwards, there is an increase in accuracy that levels off around 40% Spanish language use. When reviewing the range of accuracy for each range of Spanish language use, all of them had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 33.83 (for 70-79.99%) and 40.89 (for 40-49.99%). The standard deviation for direct object clitics at 40-49.99% Spanish language use is higher than most other standard deviations within this specific morpheme as well as when compared to other morphemes.

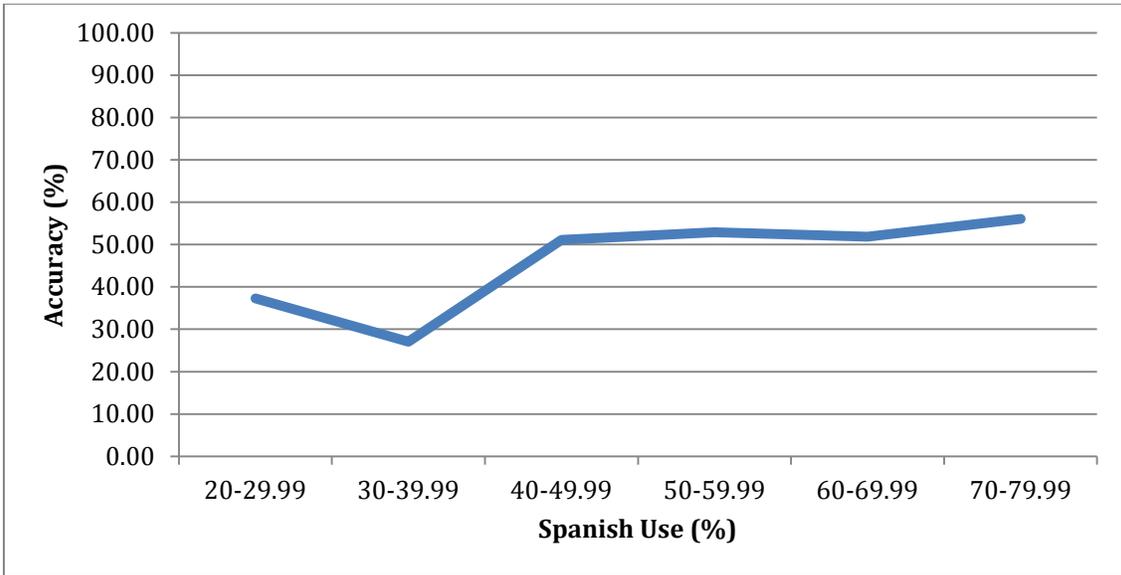


Figure 6. Direct object clitics

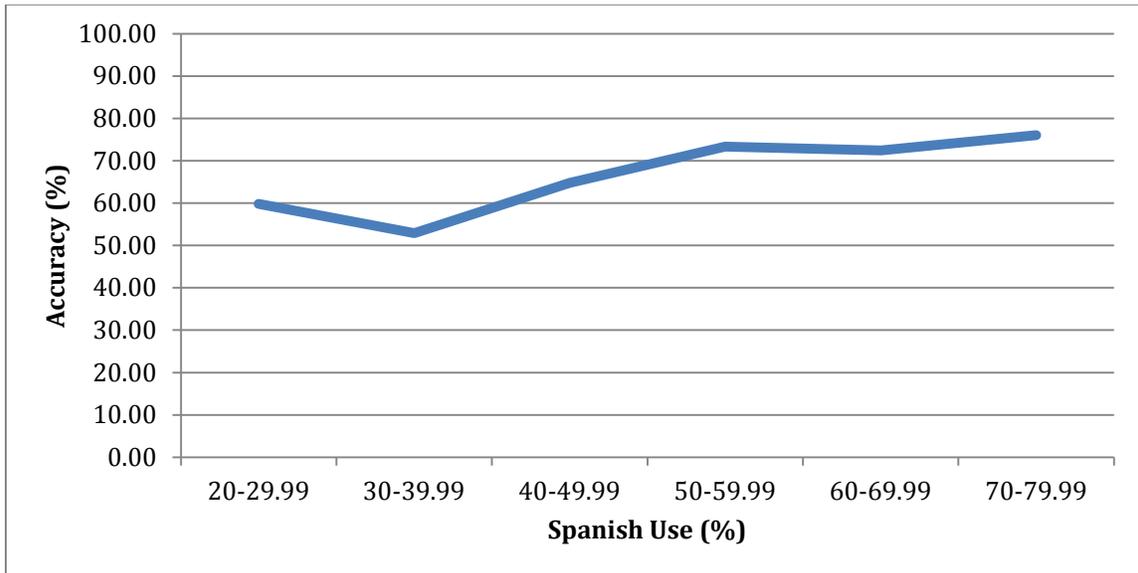


Figure 7. Conjunctions

Conjunctions show a steady upward trend of accuracy as a function of Spanish language use (see Figure 7). The accuracy increases gradually as Spanish language use

increases. When reviewing the range of accuracy for each range of Spanish language use, all had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 24.17 (for 70-79.99%) and 37.68 (for 20-29.99%).

The subjunctive mood shows an upward trend of accuracy as a function of Spanish language use (see Figure 8). There is a drop in accuracy at 30-39.99% Spanish language use. Around 40% Spanish language use, accuracy increases and then levels off as Spanish language use increases. When reviewing the range of accuracy for each range of Spanish language use, 30-39.99% had a range of 80 while the rest of the Spanish language use had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 25.72 (for 30-39.99%) and 35.58 (for 40-49.99%).

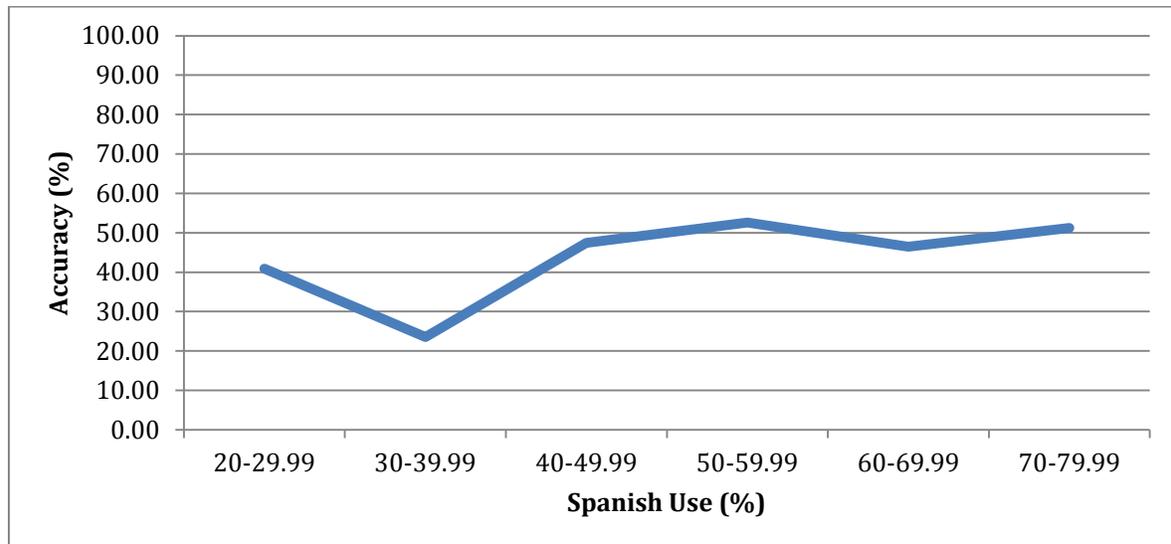


Figure 8. Subjunctive mood

Singular articles show an upward trend of accuracy as a function of Spanish language use (see Figure 9). There is a decrease in accuracy when participants use Spanish 30-39.99% of the time, however, the accuracy continues to increase and levels off around 40% Spanish language use. When reviewing the range of accuracy for each range of Spanish language use, 50-59.99% had a range of 75 while the rest of the Spanish language use had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 25.38 (for 50-59.99%) and 35.32 (for 60-69.99%).

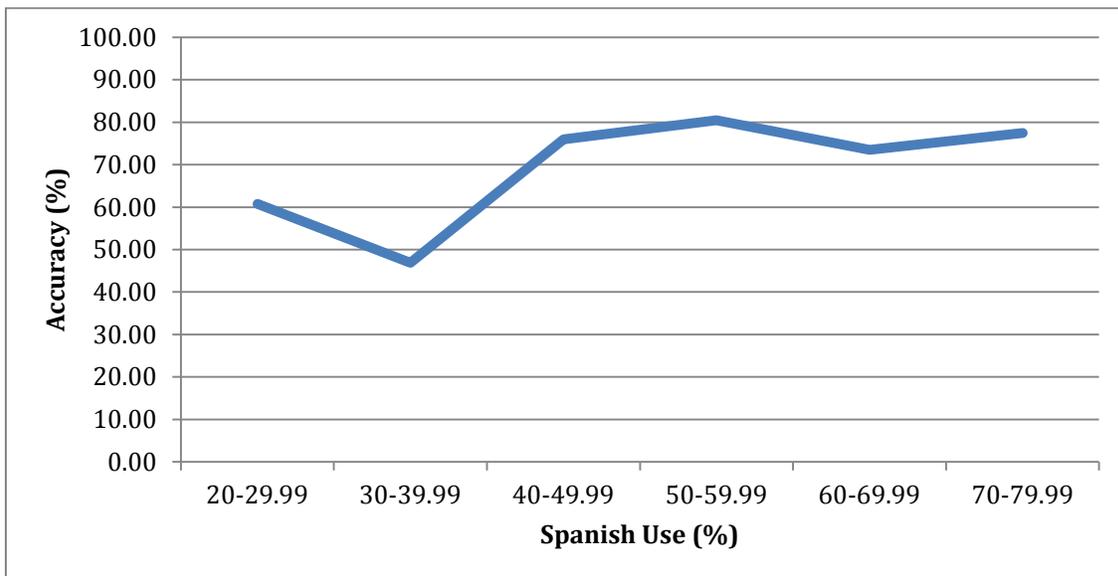


Figure 9. Singular Articles

Plural articles show an upward trend of accuracy as a function of Spanish language use as seen in Figure 10. There is a decrease in accuracy when participants use Spanish 30-39.99% of the time, however, the accuracy continues to increase and levels off around 50% Spanish language use. When reviewing the range of accuracy for each

range of Spanish language use, all had an accuracy range of 100. The standard deviations for the ranges of Spanish language use are between 24.94 (for 70-79.99%) and 39.58 (for 40-49.99%).

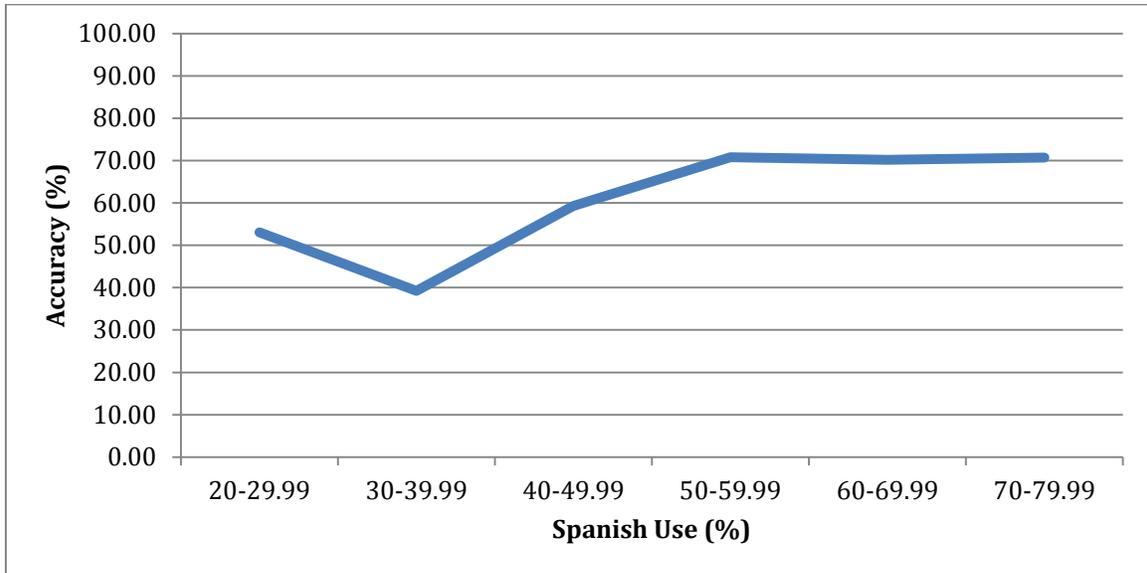


Figure 10. Plural Articles

Figure 11 summarizes the patterns of use of the ten morphemes studied. As percent Spanish language use increases, so does percent accuracy for each grammatical morpheme. Most grammatical morphemes show a decrease from 30-39% Spanish language use, but then accuracy increases with Spanish use and then typically levels off around 40% or 50%. There are 17 children in this group which is comparable to the adjacent groups.

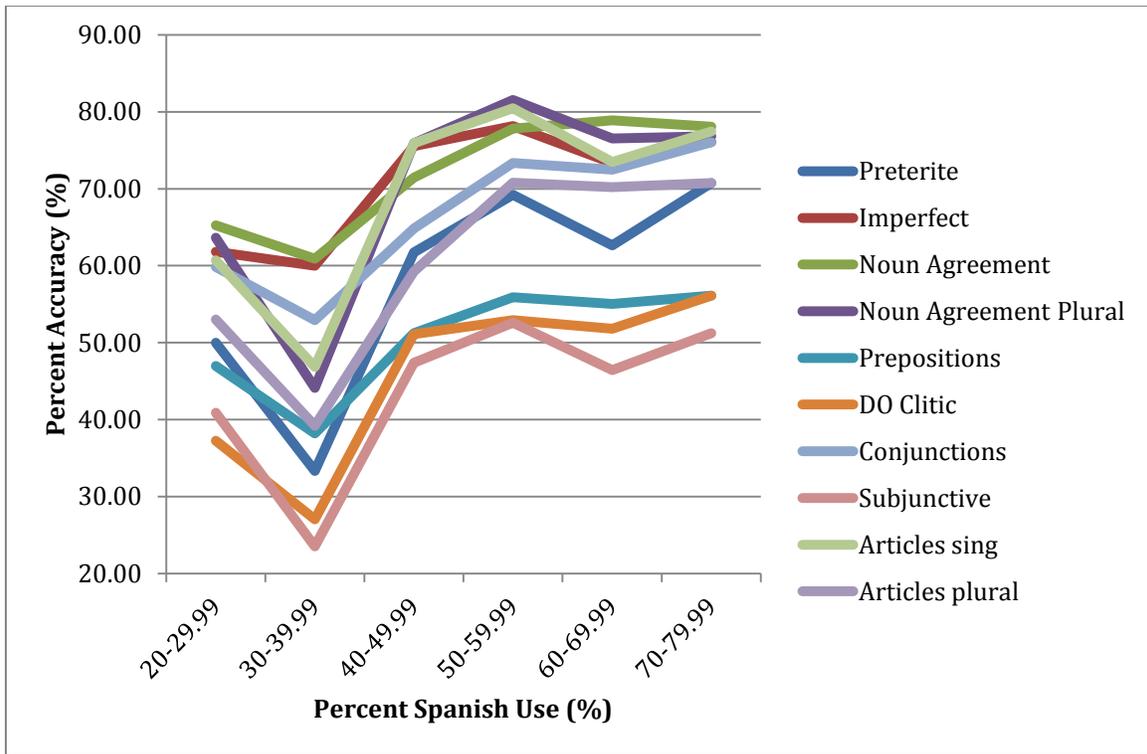


Figure 11. Percentage of accuracy of all morphemes studied

LANGUAGE USE (BY DOMINANCE) VS. ACCURACY

The second set of graphs below show percent accuracy as a function of age and are split up into English dominant (E): 20-39.99% Spanish language use, balanced bilingual (B): 40-59.99%, and Spanish dominant (S): 60-79.99%. Most of the participants start as Spanish dominant and therefore, balanced bilinguals and English dominant participants do not begin to appear until 4;6 or 5;0 respectively. Since the 4;0-4;5 and 7;6-7;11 age range had three or fewer participants respectively, these ages were not included in the analyses below.

Table 8. *Number of Participants at Each Age and Dominance (E=English Dominant Bilinguals, B=Balanced Bilinguals, S=Spanish Dominant Bilinguals)*

Age	E	B	S
4;0-4;5			1
4;6-4;11		3	5
5;0-5;5	7	12	13
5;6-5;11	7	12	26
6;0-6;5	6	22	31
6;6-6;11	10	24	19
7;0-7;5	9	17	18
7;6-7;11		2	1

Both Spanish dominant and balanced bilinguals show variability in percent accuracy of the preterite past tense as seen in Figure 12, but they have a general upward trend as age increases. Balanced bilinguals surpass the Spanish dominant bilinguals by age 7;0 on percent accuracy of preterite past tense use. English dominant bilinguals, however, have a steady increase and then decrease significantly between 6;6 and 7;5. Across all of the ages, English dominant bilinguals have significantly lower accuracy than both Spanish dominant and balanced bilinguals.

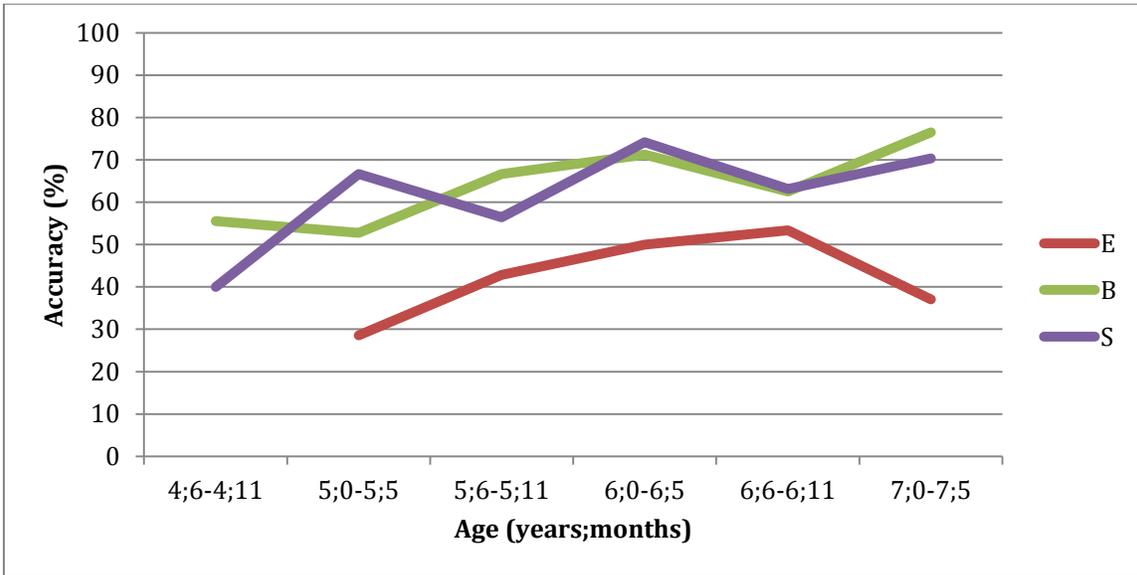


Figure 12. Preterite past tense

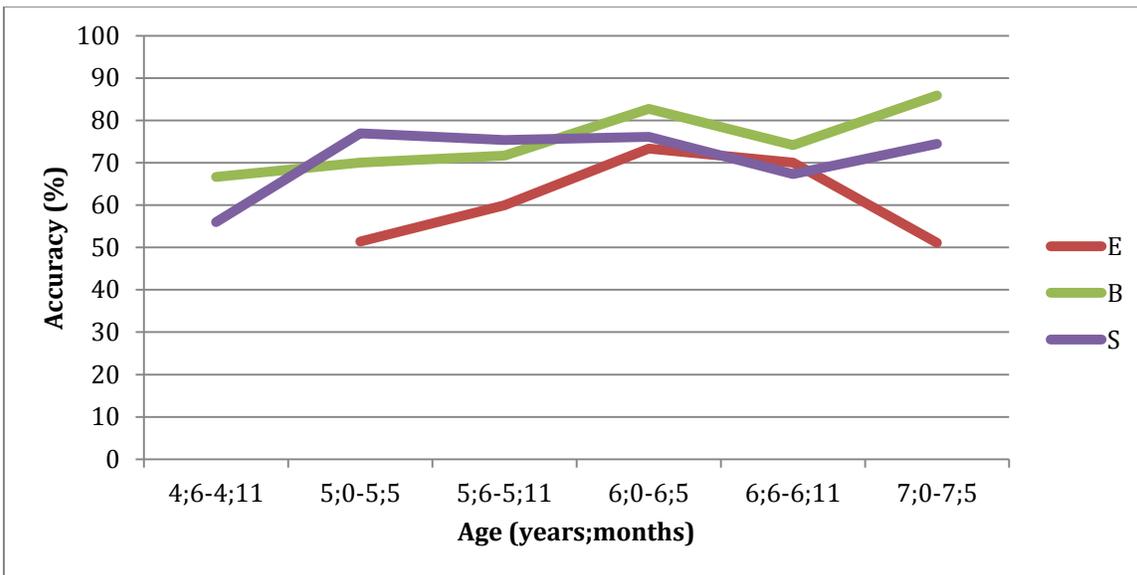


Figure 13. Imperfect past tense

Spanish dominant bilinguals have an initial increase in accuracy for imperfect but then quickly levels off around 5;0 and slightly fluctuates for older participants (see Figure

13). Balanced bilinguals have a steady upward trend while English dominant bilinguals steadily increase their accuracy and then decrease between 6;6 and 7;5. Although English dominant bilinguals have a lower accuracy than the other bilinguals from 5;0 to 6;0, from 6;0-6;11 their accuracy is very similar to Spanish dominant bilinguals. Balanced bilinguals surpass the Spanish dominant bilinguals by age 6;0 on accuracy of imperfect past tense use.

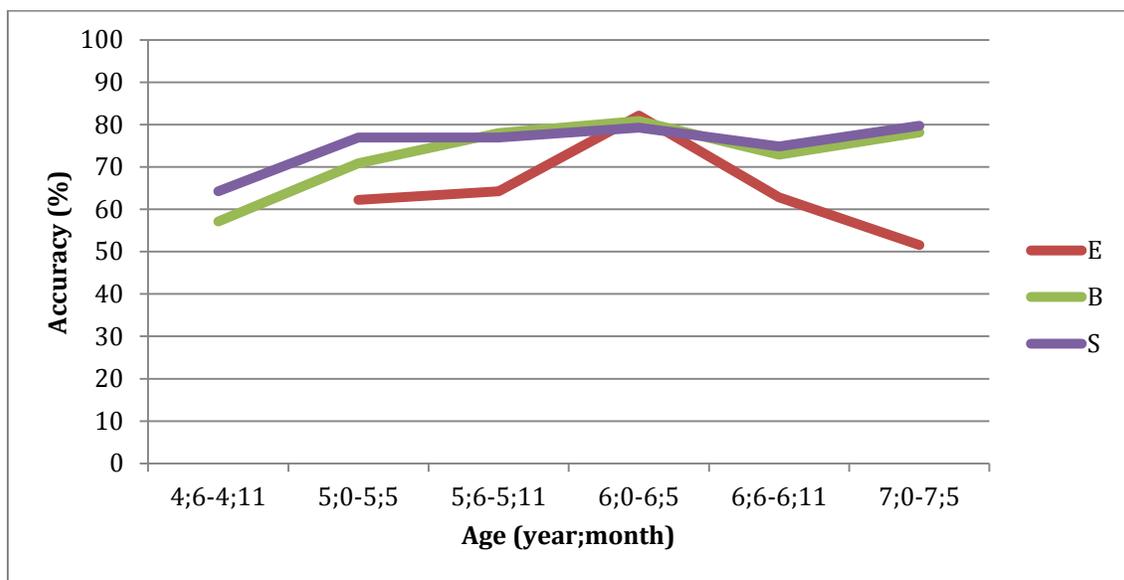


Figure 14. Singular noun agreement

Spanish dominant and balanced bilinguals have an initial increase in accuracy for singular noun agreement in Figure 14 and then level off. Spanish dominant and balanced bilinguals are nearly identical in their accuracy of singular noun agreement accept for the youngest ages. English dominant bilinguals steadily increase their accuracy and peak at 6;0 before decreasing their accuracy thereafter.

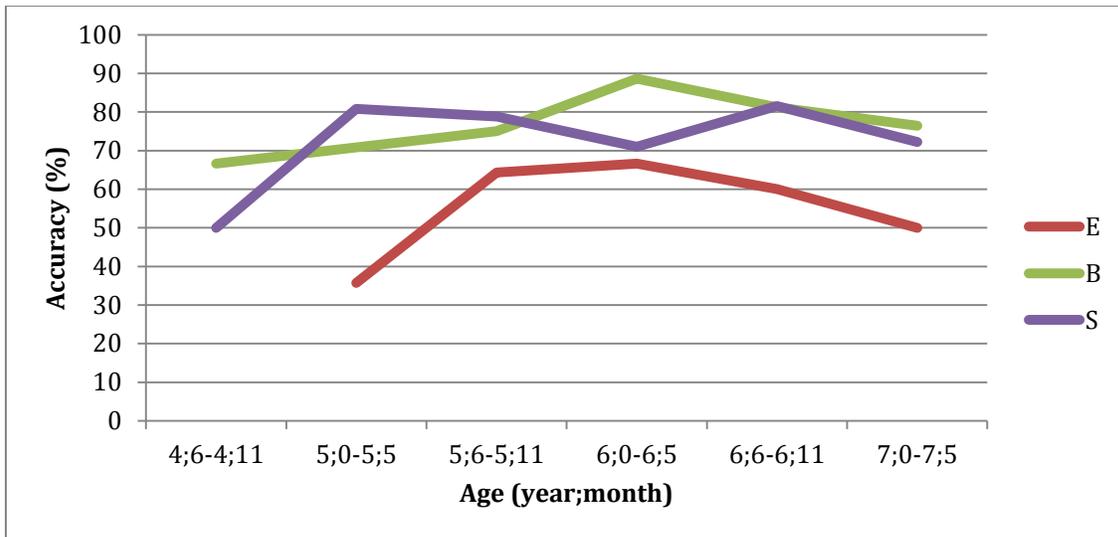


Figure 15. Plural Noun agreement

In Figure 15 it is evident that Spanish dominant bilinguals have a significant increase initially for plural noun agreement and then have some variability throughout the ages. Balanced bilinguals' accuracy gradually increases until 6;0 and then decreases slightly from 6;0 to 7;5. However, balanced bilinguals do slightly better Spanish dominant bilinguals in the older age ranges. English dominant bilinguals however, have a slight yet steady increase and then decrease from 6;0 to 7;5. Across all of the ages, English dominant bilinguals have significantly lower accuracy than both Spanish dominant and balanced bilinguals.

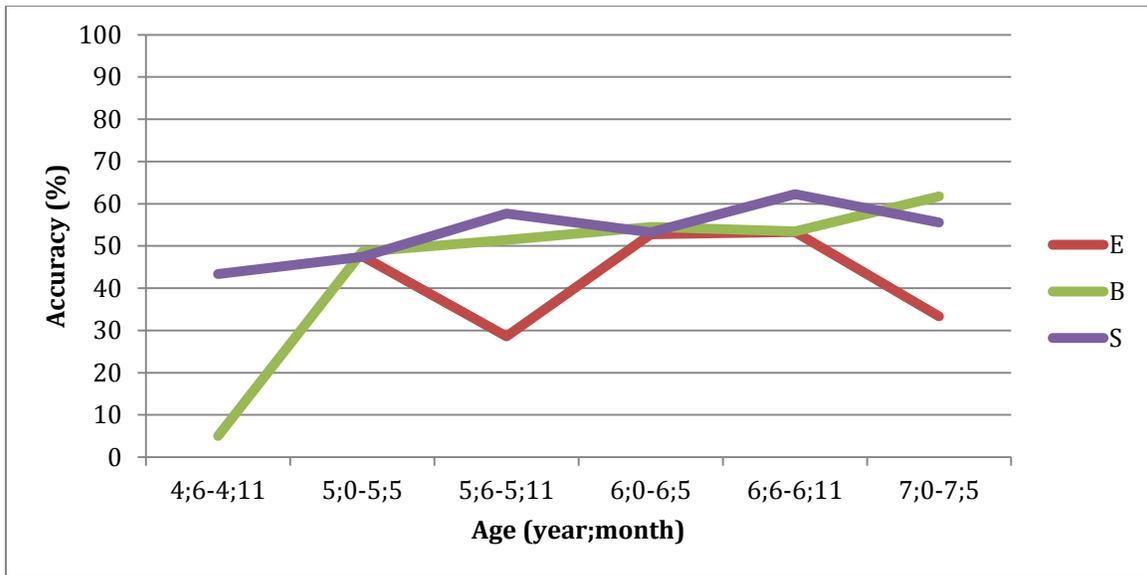


Figure 16. Prepositions

In Figure 16 Spanish dominant bilinguals have a slow and slightly variable increase in accuracy of prepositions as age increases. Balanced bilinguals' accuracy gradually increases as well and eventually surpass the Spanish dominant bilinguals. English dominant bilinguals show significant variability in accuracy as age increases. Interestingly, their accuracy is on par with balanced bilinguals at 5;0 and 6;6 and with Spanish dominant bilinguals at 5;0. English dominant bilinguals also show a significant decline in accuracy from 6;6 to 7;5.

The accuracy of direct object clitics is variable for Spanish dominant bilinguals as seen in Figure 17. There is an initial high accuracy of direct object clitics and then a significant decrease at 5;0 before gradually increasing as age increases. Balanced bilinguals show some variability in accuracy and as age increase. Similar to Spanish dominant bilinguals, they too have an initial high accuracy for direct object clitics but

gradually decrease before increasing their accuracy as age increases. Balanced bilinguals surpass Spanish dominant bilinguals in percent accuracy by 7;0. English dominant bilinguals show a gradual increase in accuracy until 6;6 before decreasing significantly. Across all of the ages, English dominant bilinguals have significantly lower accuracy than both Spanish dominant and balanced bilinguals.

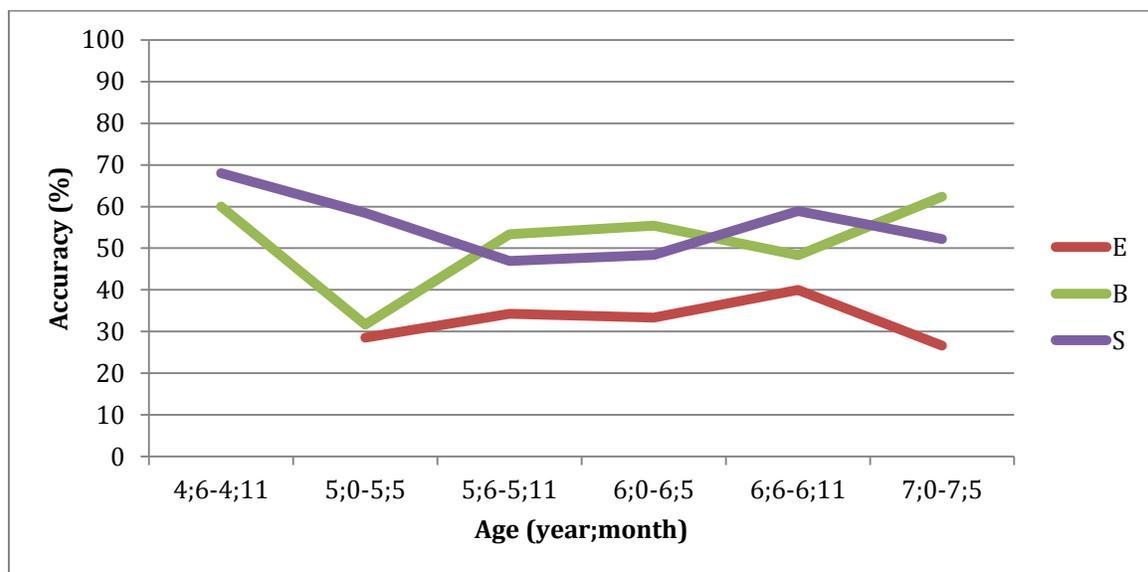


Figure 17. Direct object (DO) clitics

Spanish dominant bilinguals have an initial increase in accuracy for conjunctions and then levels off around 5;0 as seen in Figure 18. Balanced bilinguals have a varied accuracy but steadily increases as age increases. English bilinguals have a similar accuracy as balanced bilinguals from 5;0 to 5;6, slowly increases, and then significantly decreases from 6;6 to 7;5.

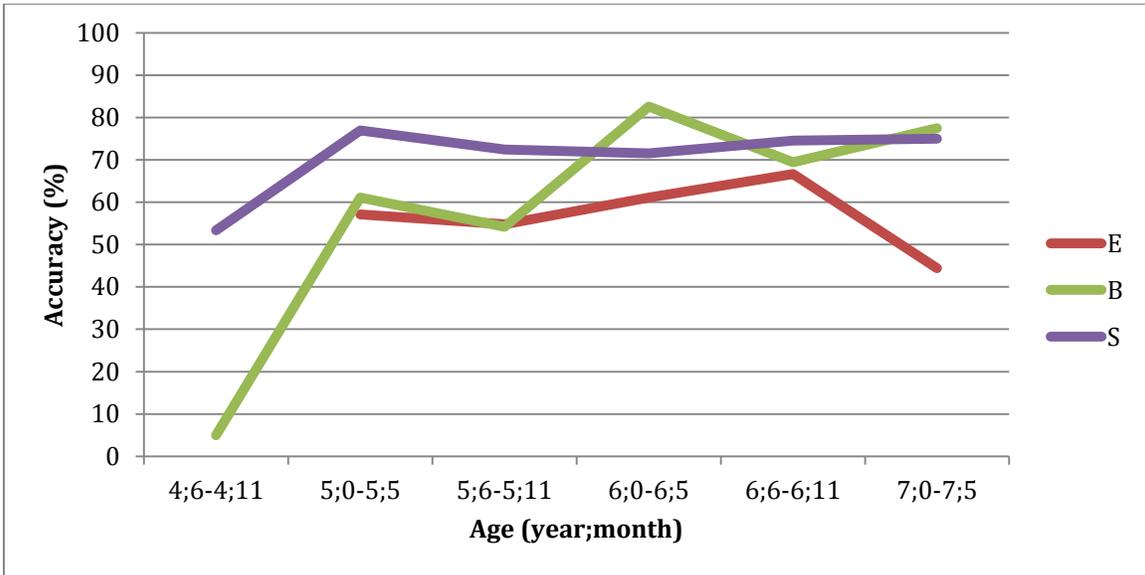


Figure 18. Conjunctions

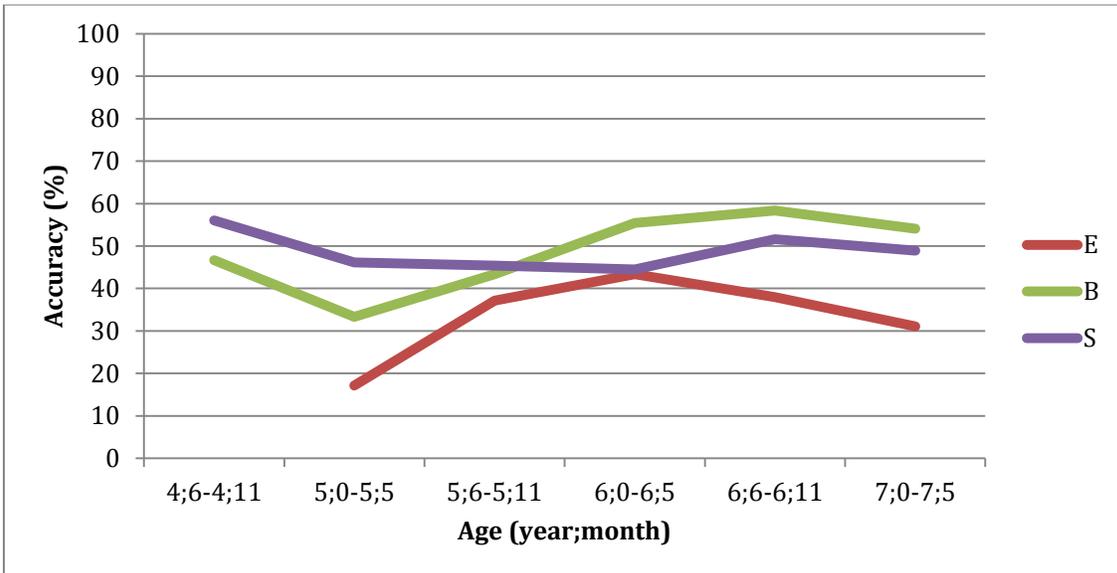


Figure 19. Subjunctive

In Figure 19 we see that Spanish dominant bilinguals had a high accuracy of subjunctive initially, slightly decrease and then slightly increase their accuracy as age

increases. Balanced bilinguals also have a higher accuracy initially but then have a gradual increase in accuracy that eventually surpasses the accuracy of Spanish dominant bilinguals. English dominant bilinguals increase from 5;0 to 6;0 and decrease from 6;0 to 7;5. At 6;0, English and Spanish dominant bilinguals have the same accuracy of subjunctive mood use. Overall, English dominant bilinguals still have a lower accuracy than Spanish dominant and balanced bilinguals.

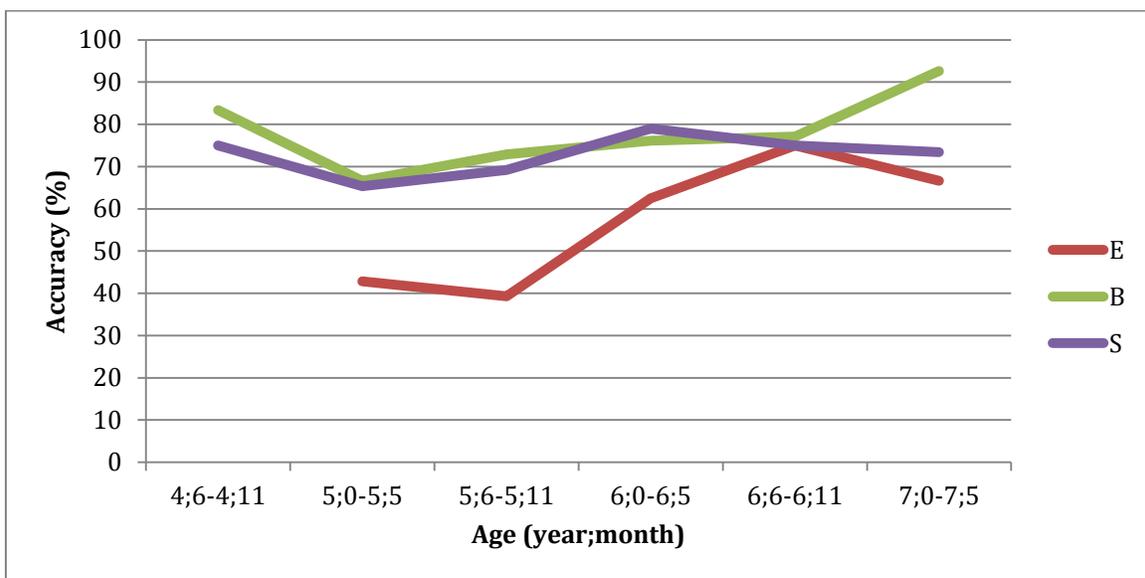


Figure 20. Singular articles

Spanish dominant bilinguals had a higher accuracy initially for singular articles as shown in Figure 20. However, accuracy stays relatively constant across the age groups. Balanced bilinguals also have a slight decrease after an initially high accuracy and continue to increase as age increases and surpasses Spanish dominant accuracy of singular articles. Between 5;0 and 6;11, Spanish dominant and balanced bilinguals have very similar accuracies. English dominant bilinguals have an initial low accuracy and

their accuracy increases rapidly and slightly decrease their accuracy of singular articles between 6;6 and 7;5. At 6;6 English and Spanish dominant bilinguals have a very similar accuracy of singular articles.

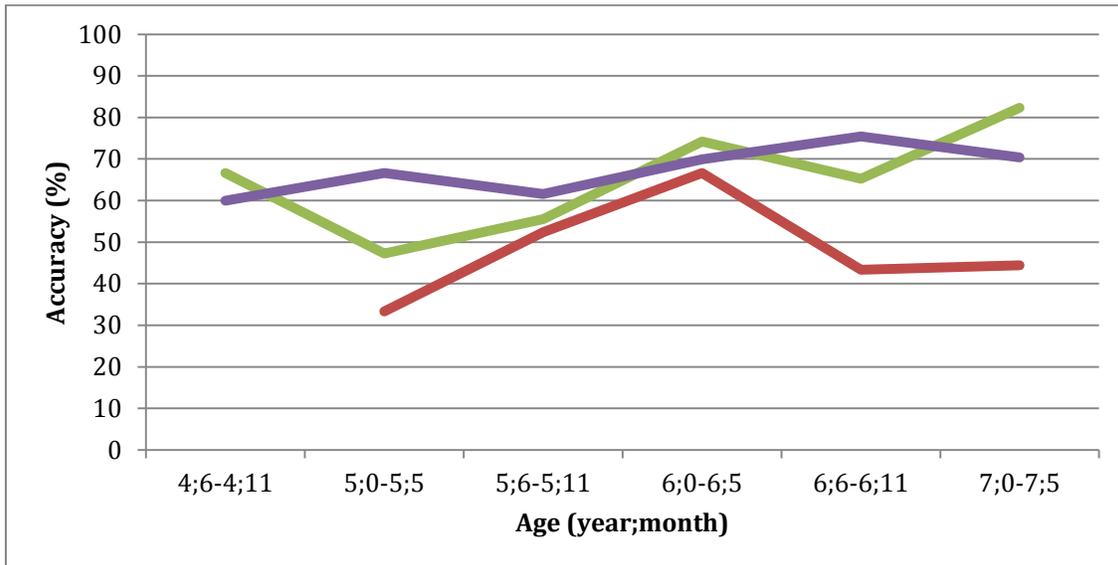


Figure 21. Plural articles

Spanish dominant bilinguals progressively increase their accuracy of plural articles as age increases. Although balanced bilinguals have a higher accuracy initially, there is a significant decrease at 5;0-5;5 before the accuracy increases and eventually surpasses the accuracy of plural articles in Spanish dominant bilinguals. English dominant bilinguals have a rapid increase in accuracy until 6;0 and then has a steady decline in accuracy before leveling off at 6;6. At 6;0, English dominant bilinguals almost reached the accuracy of Spanish dominant and balanced bilinguals.

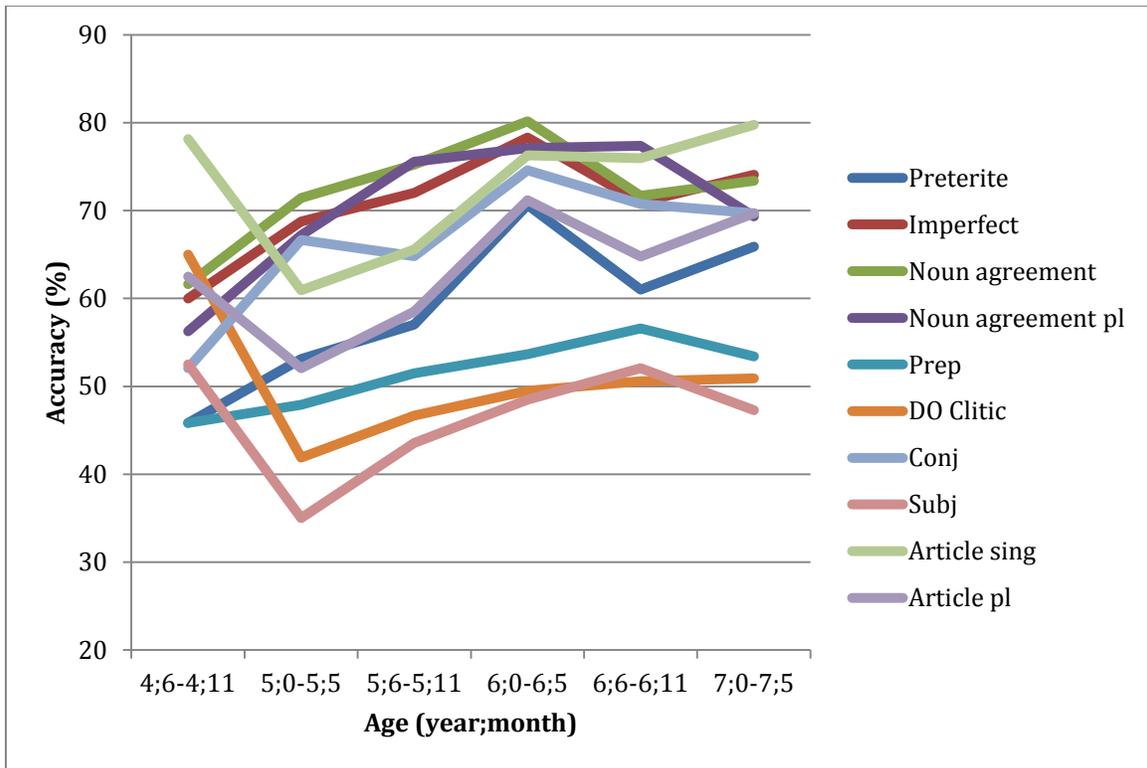


Figure 22. All 10 grammatical morphemes

Figure 22 summarizes the pattern of performance by age for the group as whole. Four of the grammatical markers (singular articles, plural articles, subjunctive, and direct object clitics) have a high accuracy at 4;6 but then decrease at 5;0 before showing a steady increase in accuracy as age increases. The other grammatical markers show a steady increase in accuracy as age increases, but there is still some variability in the older age ranges.

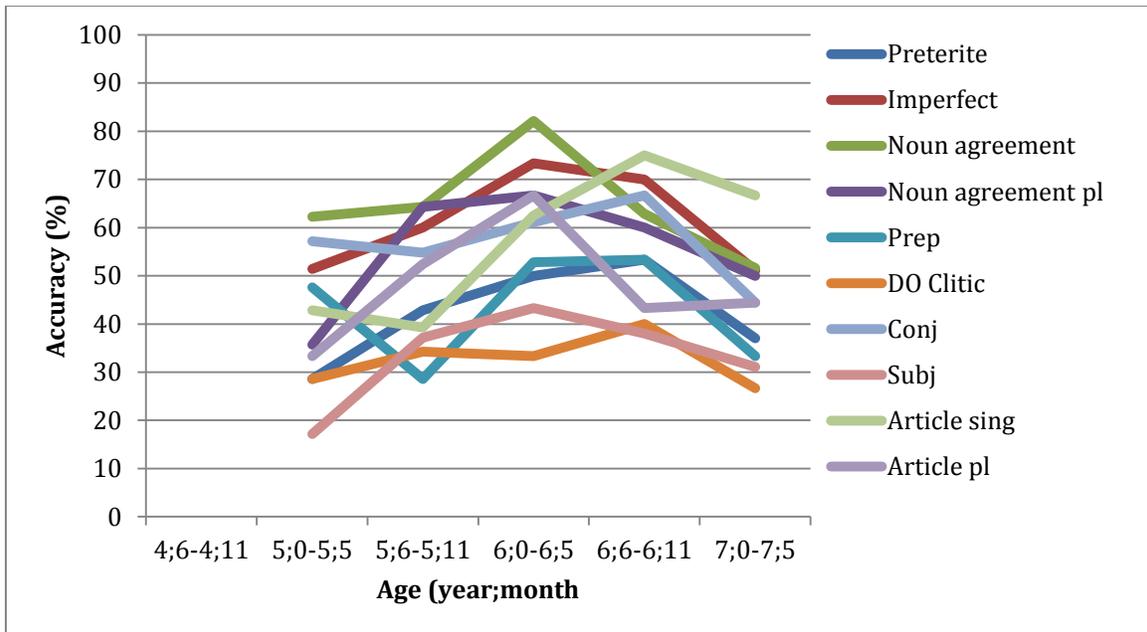


Figure 23. English dominant bilinguals

Figures 23, 24, and 25 shows the break down of forms each type of bilingual group is analyzed individually by percent accuracy in relation to increasing age, the graph above is generated for English dominant bilinguals (Figure 23). In general, morpheme accuracy steadily increases until age 6;0-6;5 and then decreases significantly as age increases. For balanced bilinguals (Figure 24), the general trend of all them morphemes is a gradual increase in accuracy as age increases although some grammatical markers show more variability in percent accuracy than others. For Spanish dominant bilinguals, there is high variability as seen in Figure 25. For some of the morphemes, the graph is “U” shaped while other grammatical markers show a steady upward trend.

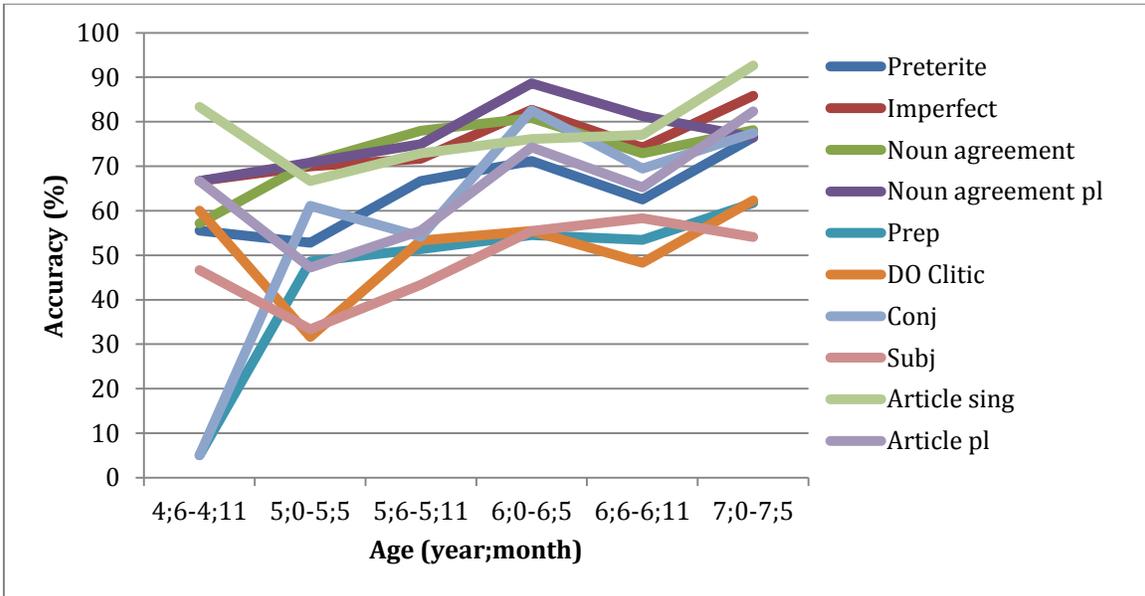


Figure 24. Balanced bilinguals

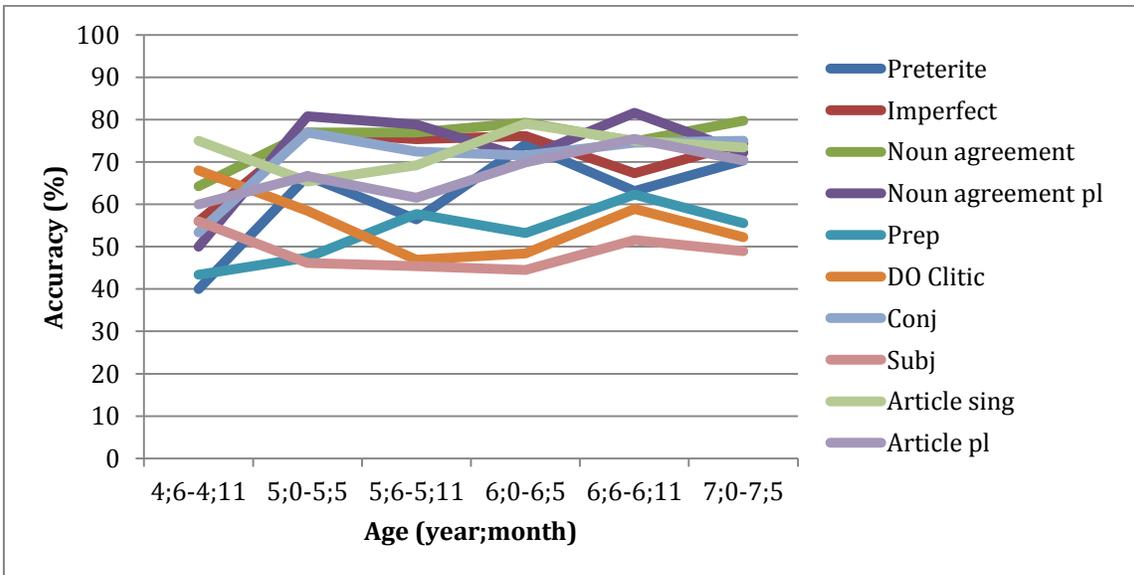


Figure 25. Spanish dominant bilinguals

Finally Figures 26 through 30 classify children’s performance by morphemes as regards to their status as emerging or mastered. Looking across the figures it is apparent that relatively few forms are fully acquired. Most forms fall into the emerging range of 50-89%. Figure 26 represents the performance of the children divided by amount of use. Across use groups subjunctive and clitics forms were among of the least accurately produced forms. The most accurate forms were singular and plural articles and nouns. While overall accuracy varies as a function of group ease of acquisition follows some general trends that are comparable regardless of amount of use. When children’s performance is grouped by age and groups are combined in Figure 27 the patterns of performance are highly similar.

Spanish Use <10%	Early Emerging (10-49%)							Emerging 50-89							Mastery (90+)
	DOC	Subj	Prep					Pret	PLA	Conj	SA	Imp	PLN	SN	
20-29.99	37.27	40.91	46.97					50.00	53.03	59.85	60.71	61.82	63.64	65.26	
30-39.99	23.53	27.06	33.33	38.24	39.22	44.12	46.88	52.94	60.00	60.92					
40-49.99	47.41							51.11	51.23	59.26	61.73	64.81	71.43	75.56	
50-59.99								52.62	52.92	55.90	69.23	70.77	73.33	77.80	
60-69.99	46.46							51.82	55.05	62.63	70.20	72.47	73.33	73.48	
70-79.99								51.22	56.10	56.10	70.73	70.73	76.02	76.10	

Figure 26. Mastery of grammatical morphemes by percent Spanish use

In Figures 28-30 children’s performance is grouped by age and dominance group. Comparing across the figures there appears to be differences in accuracy of use for the different dominance groups. While the easiest and hard forms (e.g., subjunctive and clitics versus singular and plural nouns) remain similar there is much more spread in the

performance on prepositions for the bilingual English and Spanish dominant groups than for the bilingual balanced children. A closer look at the factors that facilitate transfer will be needed to understand how knowledge of English could support or compete with knowledge of Spanish.

Age	<10%	Early Emerging (10-49)					Emerging (50-89)					Mastery (90+)		
4;6-4;11		Pret	Prep				Conj	Subj	PLN	Imp	SN	PLA	DOC	SA
		45.83	45.83				52.08	52.50	56.25	60.00	61.61	62.50	65.00	78.13
5;0-5;5		Subj	DOC	Prep	PLA	Pret	SA	Conj	PLN	Imp	SN			
		35.00	41.88	47.92	52.08	53.13	60.94	66.67	67.19	68.75	71.43			
5;6-5;11		Subj	DOC		Prep	Pret	PLA	Conj	SA	Imp	SN	PLN		
		43.56	46.67		51.48	57.04	58.52	64.81	65.56	72.00	75.24	75.56		
6;0-6;5		Subj	DOC		Prep	Pret	PLA	Conj	SA	PLN	Imp	SN		
		48.47	49.49		53.67	70.62	71.19	74.58	76.27	77.12	78.31	80.15		
6;6-6;11					DOC	Subj	Prep	Pret	PLA	Conj	Imp	SN	SA	PLN
					50.57	52.08	56.60	61.01	64.78	70.75	70.94	71.70	75.94	77.36
7;0-7;5		Subj			DOC	Prep	Pret	PLN	Conj	PLA	SN	Imp	SA	
		47.27			50.91	53.41	65.91	69.32	69.70	69.70	73.38	74.09	79.76	

Figure 27. Mastery of grammatical morphemes by age

Age	<10%	Early Emerging (10-49)					Emerging (50-89)					Mastery (90+)				
5;0-5;5		Subj	Pret	DOC	PLA	PLN	SA	Prep	Imp	Conj	SN					
		17.14	28.57	28.57	33.33	35.71	42.86	47.62	51.43	57.14	62.24					
5;6-5;11		Prep	DOC	Subj	SA	Pret			PLA	Conj	Imp	SN	PLN			
		28.57	34.29	37.14	39.29	42.86			52.38	54.76	60.00	64.29	64.29			
6;0-6;5		DOC	Subj						Pret	Prep	Conj	SA	PLA	PLN	Imp	SN
		33.33	43.33						50.00	52.78	61.11	62.50	66.67	66.67	73.33	82.14
6;6-6;11		Subj	DOC	PLA					Pret	Prep	PLN	SN	Conj	Imp	SA	
		38.00	40.00	43.33					53.33	53.33	60.00	62.86	66.67	70.00	75.00	
7;0-7;5		DOC	Subj	Prep	Pret	PLA	Conj		PLN	Imp	SN	SA				
		26.67	31.11	33.33	37.04	44.44	44.44		50.00	51.11	51.59	66.67				

Figure 28. Mastery of grammatical morphemes by English dominant bilinguals

Age	<10%	Early Emerging (10-49)				Emerging (50-89)								Mastery (90+)	
4;6-4;11		Subj				Prep	Conj	Pret	SN	DOC	PLA	Imp	PLN	SA	
		46.67				50.00	50.00	55.56	57.14	60.00	66.67	66.67	66.67	83.33	
5;0-5;5		DOC	Subj	PLA	Prep	Pret	Conj	SA	Imp	PLN	SN				
		31.67	33.33	47.22	48.61	52.78	61.11	66.67	70.00	70.83	70.83				
5;6-5;11		Subj				Prep	DOC	Conj	PLA	Pret	Imp	SA	PLN	SN	
		43.33				51.39	53.33	54.17	55.56	66.67	71.67	72.92	75.00	77.98	
6;0-6;5						Prep	DOC	Subj	Pret	PLA	SA	SN	Conj	Imp	PLN
						54.55	55.45	55.45	71.21	74.24	76.14	80.84	82.58	82.73	88.64
6;6-6;11		DOC				Prep	Subj	Pret	PLA	Conj	SN	Imp	SA	PLN	
		48.33				53.47	58.33	62.50	65.28	69.44	72.92	74.17	77.08	81.25	
7;0-7;5						Subj	Prep	DOC	Pret	PLN	Conj	SN	PLN	Imp	SA
						54.12	61.76	62.35	76.47	76.47	77.45	78.15	82.35	85.88	92.65

Figure 29. Mastery of grammatical morphemes by balanced bilinguals

Age	<10%	Early Emerging (10-49%)		Emerging 50-89								Mastery (90+)			
4;6-4;11		Pret	Prep												
		40.00	43.33												
5;0-5;5		Subj	Prep												
		46.15	47.44												
5;6-5;11		Subj	DOC												
		45.38	46.92												
6;0-6;5		Subj	DOC												
		44.52	48.39												
6;6-6;11															
7;0-7;5		Subj													
		48.89													

Figure 30. Mastery of grammatical morphemes by Spanish dominant bilinguals

Chapter 4: Discussion

The purpose of this study was to determine how accurately bilinguals perform as a function of Spanish language use and as a function of age when divided by dominance. Furthermore, we wanted to explore which grammatical markers emerge or are mastered at varying levels of Spanish language use and age.

When accuracy is reviewed as a function of Spanish language use, plural nouns are emerging when Spanish is used 20-79.99% of the time (except for 30-39.99% where plural nouns are still in the early emerging stage). The highest percent accuracy (81.54%) was for participants who use Spanish 50-59.99% of the time. If all participants are combined and are separated by age, plural nouns are in the emerging stage from 4;6 to 7;5. If divided by dominance, plural nouns are early emerging from 5;0-5;5 and emerging from 5;6-7;5 for English dominant bilinguals. For Spanish dominant and balanced bilinguals, plural nouns are emerging at all ages (4;6-7;5). In the monolingual Spanish literature, all plural nouns are mastered by age 4 (Perez-Pereira, 1989). Therefore, bilinguals seem to acquire plural nouns several years later than monolinguals. However, Perez-Pereira (1989) that children may have trouble up to age 6 and this may lead plural nouns to stay in the 'emerging stage' rather than becoming mastered. It is important to note that there is significant variability within the monolingual literature as well. Kernan and Blount (1966) found that the monolinguals did not acquire plural /s/ until 5 to 7 years old and /es/ until 11 to 12 years old. Since our analysis did not divide /s/ and /es/ bilinguals may still be considered within the normal monolingual range of acquiring plural nouns.

When accuracy is reviewed as a function of Spanish language use, preterite past tense is emerging when Spanish is used 20-79.99% of the time (except for 30-39.99% where preterite is still in the early emerging stage). The highest percent accuracy (70.73%) was for participants who use Spanish 70-79.99% of the time. If all participants are combined and are separated by age, preterite is in the early emerging stage at 4;6-4;11 but in the emerging stage from 4;6 to 7;5. If divided by dominance, preterite is early emerging from 5;0-5;11, emerging from 6;0-6;11 and then early emerging again from 7;0-7;5. For balanced bilinguals, preterite is emerging at all ages (4;6-7;5). Lastly, for the Spanish dominant bilinguals, preterite is early emerging at 4;6-4;11 and emerging from 5;0-7;5. There is significant variability in monolingual literature and the acquisition of preterite ranges from 2 to 12 years old for regular preterite and 4 to 12 years old for irregular preterite. Since our analysis did not divide regular and irregular preterite past tense, bilinguals may still be considered within the normal monolingual range of acquiring plural nouns.

When accuracy is reviewed as a function of Spanish language use, imperfect past tense is emerging when Spanish is used 20-79.99% of the time. The highest percent accuracy (78.15%) was for participants who use Spanish 50-59.99% of the time. If all participants are combined and are separated by age, imperfect is emerging from 4;6 to 7;5 and accuracy increases as age increases (60% at 4;6-4;11 to 74.09% at 7;0-7;5). If divided by dominance, imperfect is emerging for all ages, at all dominance levels. Within the monolingual literature, the accuracy of imperfect use is 98% at age 4 and is thus

considered mastered (Perez-Periera, 1989). Therefore, bilinguals are several years behind the monolingual Spanish norms for imperfect past tense.

When accuracy is reviewed as a function of Spanish language use, the subjunctive mood is early emerging when Spanish is used 20-79.99% of the time (except for 50-59.99% Spanish language use in which it is emerging). The highest percent accuracy (52.62%) was for participants who use Spanish 50-59.99% of the time. If all participants are combined and are separated by age, subjunctive is emerging from 4;6-4;11 and 6;6-6;11 and early emerging from 5;0-6;5 and 7;0-7;5. There is a significant amount of variability here. If divided by dominance, subjunctive is early emerging for all ages for English dominant bilinguals. This aligns with Guitart's (1982) English-interference hypothesis since these participants are English dominant (and English does not have a mood contrast) and their Spanish is more influenced by English since it is the weaker language. For balanced bilinguals, subjunctive is early emerging from 4;6-5;5 and emerging from 5;6-7;5. Lastly, subjunctive is early emerging from 5;0-5;11 and 7;0-7;5 and emerging for 4;6-4;11 and 5;5-5;11 for Spanish dominant bilinguals. When compared to monolingual Spanish literature, subjunctive mood is observed between 3;6 and 4;6 (Gonzalez 1983; Naharro, 1996). The term 'observed' is not defined and Merino (1982) showed that monolingual children master the subjunctive mood by age 7 and present subjunctive by age 5. Since the bilingual data only goes up to 7;5, it is not yet acquired. However, the subjunctive mood may or not be acquired much later in bilinguals than monolinguals.

When accuracy is reviewed as a function of Spanish language use, direct object clitics are early emerging when Spanish is used 20-39.99% of the time and emerging from 40-79.9% Spanish language use. The highest percent accuracy (52.92%) was for participants who use Spanish 50-59.99% of the time. If all participants are combined and are separated by age, subjunctive is emerging from 4;6-4;11 and 6;6-6;11 and early emerging from 5;0-6;5 and 7;0-7;5. There is a significant amount of variability here. If divided by dominance, direct object clitics are early emerging for all ages for English dominant bilinguals. For balanced bilinguals, direct object clitics are early emerging from 5;0-5;5 and 6;6-6;11 and emerging from 4;6-4;11 and 5;6-6;5 and 7;0-7;5. Lastly, direct object clitics are early emerging from 5;6-6;5 and emerging for all of the rest for Spanish dominant bilinguals. When compared to monolingual Spanish literature, direct object pronouns are mastered by age 5 (Brisk, 1972) or age 7 (Merino, 1982). Since the bilingual data only goes up to 7;5, it is not yet acquired. However, direct object clitics may or not be acquired much later in bilinguals than monolinguals.

The majority of the monolingual Spanish literature focused on plural nouns, preterite past tense, imperfect past tense, direct object clitics, and subjunctive as explained above. However, prepositions, conjunctions, articles (singular and plural), and singular nouns have not been discussed. Therefore, there are no monolingual norms to compare them too. It is important to remember that there is no sample comparing development of bilinguals and monolinguals in Spanish. Within language correlations are stronger than cross-language correlations for vocabulary and grammatical development and may therefore support our findings that grammatical development is slower in

bilingual language development (Conboy & Thal, 2006; Marchman, Martinez-Sussman, & Dale, 2004; Parra, Hoff & Core, 2011).

It is interesting to note that when participants speak Spanish 50-59.99% of the time (considered balanced bilinguals), they have the highest accuracy for all grammatical markers except for preterite (70-79.99% Spanish language use) and singular noun agreement (60-69.99%).

Overall, English dominant bilinguals had significantly lower accuracies for the grammatical morphemes than Spanish dominant and balanced bilinguals. This parallels Hammer et al. (2009) study where the increased usage of English slowed the growth of Spanish.

Furthermore, it is important to note that each of the studies conducted in the monolingual Spanish literature had a significant amount of variability between them. Some of the participants from these studies came from Spain while others in Latin America. Similarly, groups of participants come from a variety of SES backgrounds. Research shows a significant disparity in language due to SES when all else is equal.

LIMITATIONS

The standard deviation of a majority of the analyses discussed above was large and the range of percent accuracy for a majority of the percent Spanish language use ranges (20-29.99, 30-39.99, etc.). This may be due to the small number of item or small groups of participants when divided by language use. Additionally, bilinguals are an extremely diverse group by nature, which leads to some expected variability.

Additionally, previous monolingual Spanish literature divided plurals (short and long) into two categories and preterite (regular and irregular) into two categories. In the future, the analysis could divide these two grammatical morphemes to see if there is a difference in age of acquisition for each specific type within each morpheme.

Some of the monolingual Spanish literature shows mastery around age 7 or even 11-12. Therefore in the future it would be important to graph the trajectory of the grammatical morphemes up to 12 years of age to see if bilinguals acquire certain morphemes earlier or later than their monolingual age-matched peers. Some of the data in this study could not be used because of too few participants in a certain age group. If there are not enough participants, the data may be unreliable and may not reflect the true ability of the general population. Therefore, future studies should have at least 5-10 participants per age group in order for the data to be included in the analysis.

FUTURE DIRECTIONS

This analysis specifically focused on the Spanish language of Spanish-English bilinguals. In the future it would be beneficial to combine the results of Spanish and English together to see what bilingual children do in each language. There may be some similarities and differences between languages that may be interesting to discuss. Furthermore, this analysis looked at percent accuracy of certain grammatical markers as a function of percent language use. Another way to analyze this data is to focus on percent accuracy of the same grammatical markers, but as a function of MLU instead of percent language use. Afterwards, these analyses (language use vs. MLU) could be compared in order to see which analysis is a better indicator of what bilinguals do.

Furthermore, it would be beneficial to do a regression analysis to see which variable (language use or MLU) correlates more strongly with percent accuracy. Age could be considered a covariate and taken out of the analysis. An analysis of variance (ANOVA) could also be conducted to see how much variance is explained by each variable. For each type of bilingual – English dominant, balanced, and Spanish dominant, the amount of variance explained by each variable may be different. Therefore, depending on a bilingual’s amount of language use, one of the variables may be a better indicator of their current language and predict future language trends.

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