2019-01-01

The Role That Language Proficiency Variables Play On Grammaticality, Morphosyntax, And Semanitc Skills In Bilingual Children

Stephanie Escobar
University of Texas at El Paso, snescobar8@gmail.com

THE ROLE THAT LANGUAGE PROFICIENCY VARIABLES PLAY ON GRAMMATICALITY, MORPHOSYNTAX, AND SEMANITC SKILLS IN BILINGUAL CHILDREN

STEPHANIE ESCOBAR

Master's Program in Speech Language Pathology

APPROVED:

Connie Summers, CCC-SLP, Ph.D., Chair

Vanessa Smith, CCC-SLP

Mei-Ling Lin, Ph.D. OTR

Charles Ambler, Ph.D.
Dean of the Graduate School

DEDICATION

This thesis is dedicated to my parents, whose example of perseverance, sacrifice, patience, support and love have encouraged me to fulfill this research.

My sisters, whose endless support facilitated this accomplishment.

I love you.

THE ROLE THAT LANGUAGE PROFICIENCY VARIABLES PLAY ON GRAMMATICALITY, MORPHOSYNTAX, AND SEMANITC SKILLS IN BILINGUAL CHILDREN

by

STEPHANIE ESCOBAR, B.A

THESIS

Presented to the Faculty of the Graduate School of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF SCIENCE

Speech Language Pathology Program

THE UNIVERSITY OF TEXAS AT EL PASO

May 2019

ACKNOWLEDGEMENTS

Foremost, I would like to express my appreciation to Dr. Connie Summers whose mentorship, and endless guidance facilitated the competition of my thesis. I would also like to thank Mrs. Vanessa Smith for her dedication and time throughout this project. Lastly, I would like to extend my appreciation the individuals of the UTEP Research in Bilingual Language Learning lab, whose dedication aided the fulfillment of this project.

ABSTRACT

Purpose: A number of experiential factors contribute to bilingual development. Factors such as opportunities to hear and use language, age of first exposure, context of learning, social value of a language, education and others have been discussed in other studies. (Bedore et al 2016; Bedore et al 2012). Language questionnaires and self-reports have been used to quantify language variables and current usage of a language. The current study was part of a larger project examining diagnostic accuracy of various assessment tools for Spanish English bilingual children living in a US/Mexico border city (Curtis, Summers, Stubbemann, & Smith, 2017). The purpose of the study was to examine which language proficiency variables (age of English exposure and current input and output) would best predict language performance in young bilingual children.

Methods: Forty-four children aged 3-6 years old, participated in the study. Parent and teacher questionnaires were used to quantify age of English exposure (AoEE) and current language use. Children were administered the Bilingual English Spanish Oral Screener (BESOS) subtests and language samples to measure language performance in English and Spanish.

Results: Current input and output were correlated to more language performance variables and AoEE was only correlated to Spanish semantics and morphosyntax. None of the proficiency variables predicted grammaticality in language samples. Different levels of language input and exposure predicted performance in some morphosyntax and semantic tasks. AoEE did not predict any language performance tasks.

Discussion: Overall this study was consistent with previous findings. Current input and output are important variables as children begin to use their language and may be the best way to measure language proficiency in young children. Researchers and clinicians should always consider the way variables are determined when making recommendations.

TABLE OF CONTENTS

DEDICATION iii

ACKNOWLEDGEMENTS v

ABSTRACT vi

TABLE OF CONTENTS vii

LIST OF TABLES ix

CHAPTER 1: LITERATURE REVIEW 1

1.1 Documenting language history 2

1.2 Age of English exposure 4

1.3 Current input and output 6

1.4 Purpose of the Study 7

CHAPTER 2: METHODS AND PROCEDURES 9

2.1 Recruitment 9

2.1.1 Consent 9

2.1.2 Participants 9

2.2 Measures 10

2.2.1 Parent-Teacher Questionnaires. 10

2.2.2 Bilingual English Spanish Oral Screener 10

2.2.3 Language Sample Analysis 11

2.3 Procedures 12

2.3.1 Administration of Language Measures 13

2.4 Statistical Analysis 14

CHAPTER 3: RESULTS 15

3.1 Descriptive Statistics 15

3.2 Correlations 16

3.3 Multiple Linear Regressions 19

3.3.1 Percent Grammatical Utterances 19

3.3.2 Morphosyntax 19

3.3.3. Semantics 20

CHAPTER 4: DISCUSSION 21
4.1 Measures of proficiency and outcomes (Correlations) 21
4.2 Measures and proficiency (Regressions) 22
4.3 Within language patterns 23
4.4 Limitations 23
4.5 Conclusion 24
REFERENCES 26
VITA 29

LIST OF TABLES

Table 2.1 13
Table 3.1 16
Table 3.2 18
Table 3.3 20

CHAPTER 1: LITERATURE REVIEW

The quantity and quality of exposures to both languages of a bilingual individual impacts their language performance. Bilingualism emerges because a learner needs to learn more than one language to communicate (Grosjean, 2010). By the time bilingual children enter school, they vary considerably in their knowledge of each language (Boham, Bedore, Peña, Mendez-Perez, & Gillam, 2010). Children who have been exposed to two languages since birth may understand both languages but not necessarily use both languages. Bilingual children begin to develop their second language at different ages. Researchers must keep in mind that individuals learn language(s) at different rates, and some may even discontinue using the first language in everyday life (Bohman et al., 2010). For example, as some individuals learn a second language, they may lose skills in their primary language if the language is not reinforced and maintained.

A number of experimental factors contribute to bilingual development. Factors such as opportunities to hear and use language, age of first exposure, context of learning, social value of a language, education and others have been discussed in other studies (Bedore, Peña, Griffin, & Hixon 2016; Bedore et al., 2012). These factors have been useful in helping to understand a child's language abilities. Studies that have focused on one or more of these factors have noted a number of different outcomes. The relationship between the amount of language experience defined by these factors may vary and depend on the domain and even the specific target that is being measured (Jia & Fuse 2007).

When describing these different factors, language questionnaires and self-reports have been used to quantify language history and current language use of a participant (Li, Sepanski, & Zhao, 2006). In many cases, parent reports have been found to be effective in accurately reporting the child's language skills. In a study by Gutierrez-Clellen and Kreiter (2003), parent and teacher

ratings were both correlated significantly with semantics and morphosytnax development in children. Parent questionnaires can be used to quantify language experience and performance depending on what variables are documented and what is used to quantify language proficiency.

1.1 Documenting language history

Proficiency has been defined as the extent to which a bilingual individual's language skills in one or more languages meets expectations of a monolingual speaker within their age (Bedore et al., 2012). Proficiency can be described in terms of vocabulary size and/or grammatical skills that reflect a monolingual speaker's performance (Bedore et al., 2012). Bilingualism is a multidimensional construct meaning there are multiple determinants to bilingual language acquisition. For these reasons, it is important to consider how language proficiency is documented.

There is limited research regarding levels of proficiency and what assessment procedures should be conducted to determine bilingual children's language skills (Gutierrez-Cellen, & Kreiter, 2003). In the past, questionnaires have been used with various ages and language groups to obtain specific language histories from culturally diverse families (Gutierrez-Cellen, & Kreiter, 2003). Researchers have documented language history by obtaining information regarding language(s) spoken at the home/school, current input and output, age of first exposure, opportunities to use each language, context of learning, social value of a language, and other variables (Bedore et al., 2012). Although described in multiple ways, most have classified children as bilinguals by focusing on age of first exposure and/or the current patterns of use in their languages.

Li, Sepanski, & Zhao (2006) reviewed various factors used by researchers for language history questionnaires. They analyzed a total of 41 studies to develop their own language

questionnaire (Li Sepanski, & Zhao, 2006). Their questionnaire consisted of three main components. The first part consisted of general information questions related to language history and participant's proficiency in each language in terms of different domains (i.e reading, writing, listening, and speaking). The second part specifically targeted the language environment and language usage of the bilingual learner. Lastly, the researcher/ clinician can customize the online questionnaire by adding their own questions for the specific needs. This study validated the importance of generating a questionnaire that includes crucial components when collecting information that targets language usage, and history of each language. By having a general questionnaire, it will decrease overlap between different versions and focus on what is important when thinking of cultural and linguistic diversity.

A study by Gutierrez-Cellen, & Kreiter (2003) developed parent questionnaires to describe language proficiency in children. They asked about years of exposure to languages with regard to how long they had been in the country, the languages they spoke at home and in other settings such as school and day care, and obtained information about language input at home. Parents reported the different speakers that the child interacted with and what language they normally used with them. The number of hours of exposed to each language was converted into percentages. Using this system, results indicated that the impact of the language exposure variables really did depend on the language that was being investigated. For example, the amount of Spanish used at home impacted the child's grammatical performance in that language.

Based on results from previous studies, it is evident that language history questionnaires are useful and valid tools to determine language proficiency. There remains a need to obtain research on what type of variables should be considered in questionnaires for the bilingual population. Knowing which variables to use would assist in assessing bilingual population and help

understand bilingual children's speech and language development. Age of English exposure and current input and output are variables that have been used in a number of studies to validate their use in questionnaires.

1.2 Age of English exposure

Age of acquisition and Age of English exposure are terms often used interchangeably to describe when an individual is exposed to English for the first time. For this study, the term Age of English Exposure (AoEE) will be used. AoEE also helps clinicians, educators, and researchers understand a child's bilingual experience and how their experiences potentially influence the language skills needed for academic achievement (Bedore et al., 2016). The role of age of exposure differs in younger and older bilinguals. Many researchers have theorized and analyzed how AoEE impacts language acquisition. There may be differences in grammatical elements between children who have and do not have an AoEE before entering preschool. A study by Unsworth et al. (2012) found that children with an AoEE before age of 3-years-old make grammatical errors similar to monolingual speakers of their same age. Children that acquire a second language prior to entering preschool are more are likely to master English grammatical forms by first grade than children who did not start learning English prior to entering school (Bedore et al., 2016). There are qualitative differences in acquisition patterns observed between groups of bilingual children associated with AoEE (Bedore et al., 2016).

When a child has a AoEE after age four differences in grammatical acquisition become evident between younger and older bilinguals (Bedore et al., 2016). Herschensohn (2007) reported up until age four the languages compete minimally and there is a greater likelihood of transfer between the languages. After age four, a child may learn new strategies and not acquire a second language the same way. AoEE influences how bilingual children acquire their languages as evidenced by the different patterns exhibited in younger and older bilinguals.

AoEE has been found to be a significant predictor variable for some language but this is not the case for all languages. AoEE has been investigated to understand the impact it plays in different languages and early and late sequential learners. A sequential leaner is defined as a bilingual individual who acquires a second language at a later age. Unsworth and colleges (2012), found that AoEE played little to no role in the acquisition of gender marking and early sequential learners did not differ from later sequential learners. In different language AoEE might make a difference but this is not the case for all. It is important to note these differences in order to consider AoEE a significant variable to measure proficiency.

Exposure to the language(s) is required for a learner to access their innate ability to acquire a language (Bedore et al., 2012). With so many questions about factors that impact a child's level of bilingual proficiency, Bedore et al. (2012) explored the relationship between experience and the measures of their language ability in semantics and morphosyntax in pre-and kindergarten children. Experience was measured using AoEE and the current input and output in each language. Participants reportedly performed better on a grammaticality judgment task when they were exposed to English earlier, but these results were not reflected across all language ability tasks. Bedore et al. (2012) found that AoEE had less predictive value than current input or output. AoEE accounted for 35% of the variance alone in English and Spanish performance in kinder children and about 60% of variance was explained by current use patterns. Based on the results of this study AoEE may be important in some cases but should be interpreted with caution.

A very important reason to study AoEE is to understand the differences of early exposure to a second language for bilingual children. Many studies have proposed that AoEE is a significant predictor in determining the language proficiency in bilingual children. It is important to continue

to try and identify how much of a role AoEE plays in language outcomes in children of different grade levels compared to other variables such as current input and output.

1.3 Current input and output

Current input is defined as how much language exposure the individual is receiving in their first and second language (L1 and L2). Current output is defined as the amount of L1 and L2 the individual is using to communicate. Questionnaires have been used to elicit information about current patters of input and output because current input and output reliably predict language performance (Bedore et al., 2016; Ukrainetz 2015). Current input and output have estimated up to 60% of the variance in children's language scores in early school age years (Bedore, Peña, Griffin, & Hixon, 2016). Vocabulary, semantic, and grammatical development have been correlated to patterns of current use and steady exposure of a language. A study by Pearson, Fernandez, Lewedeg, & Oller, (1997) confirms these results. They followed a total of 25 simultaneous Spanish-English speakers from a Spanish speaking community in Miami. Vocabulary size in Spanish and English was directly proportional to input of the corresponding languages.

Bedore et al. (2016) explored the influences of AoEE and Current English and Spanish Input and Output in 1st and 3rd grade children, performance was based on a brief test in English and Spanish morphosyntax, and semantic knowledge. The children in both grades scored higher if they were exposed to English at an earlier age. These results were reflected in the first grade more than they affected the third graders. The results from this study reflect that as the length of exposure increases, AoEE decreases in importance. Sheng, Bedore, Peña, and Fiestas (2013), explored the impact of age and language experience defined by current input and output, in 7 and 9 year olds. Language experience had a greater impact in forming semantic connections than age. Semantic development dramatically increased as children had more exposure.

The findings in all these studies demonstrate that both AoEE and current input and output play an important role in the bilingual knowledge of children. The importance of quality input based on the opportunities children get to hear and use each language may impact a bilingual child language performance (Bedore et al., 2016). As clinicians and researchers, it is important to consider the child's opportunities to hear and use the language. AoEE and current input and output are important predictors.

1.4 Purpose of the Study

This research study will examine children from the El Paso border area where 70.5% of the Hispanic population mostly speaks Spanish at home ("El Paso, TXl USA", 2014). The need for continued research in bilingual children is extremely important considering the United States bilingual population is growing. According to Camarota and Zeigler (2014), an estimated one in five people in the U.S speak a foreign language at home. In the year 2013 this reached an all-time high of 61.8 million people speaking a different language at home other than English, with a 2.2 million increase since 2010. It is particularly important to know what impacts language development in bilingual children. The following questions were asked in this study:

1. What measures of language proficiency (age of first exposure, and current input and output) best predict bilingual children's overall grammaticality in language samples?
2. Does age of first exposure and current input and output best predict bilingual children's morphosyntactic and semantic skills?

The results from this study will help determine which language proficiency measure predicts language performance in young bilingual children. Knowing which language proficiency variables to use would assist in assessing and treating the bilingual population. If AoEE has a greater effect than current input and output, this will highlight the advantages or disadvantages of earlier

exposure for bilingual children. If the current input and output is a greater predictor, the findings would confirm previous studies.

CHAPTER 2: METHODS AND PROCEDURES

2.1 Recruitment

The current study was part of a larger project examining diagnostic accuracy of various assessment tools for Spanish English bilingual children living in a US/Mexico border city (Curtis, Summers, Stubbemann, & Smith, 2017). The university's Institutional Review Board (IRB) for human subjects approved this study in Fall 2016. The participants were recruited by sending flyers in both English and Spanish to different head starts, daycares, and pre-schools. Participants were recruited from various sites in different areas of the region to ensure that the sample provided an accurate demographic representation of children in the region. Each facility was provided with a letter of purpose. If the facility agreed to participate, an educational workshop about typical language development and early markers of language impairments was offered to the employees upon completion of the study at their site. Lastly, families who participated in the study were compensated with a $40.00 gift card to a local grocery store upon completion of the study funded by a University of Texas at El Paso Graduate School Dodson Award.

2.1.1 Consent. Consent forms were distributed to the parents/guardians in their preferred language (English or Spanish). The consent forms included information about the study, potential risks, withdrawal information, confidentiality, and the benefits of participating in the study. Parents received information regarding the child's language performance on assessments following their child's participation in the study with information about how to interpret scores from tests used in this research project.

2.1.2 Participants. A total of 47 consent forms from participants were received for this research study. There was a total of 23 boys and 24 girls with a mean age of 56.47 months (standard deviation = 10.52). The inclusionary criteria for the larger study required the participants to pass a hearing screening at 25dB for the frequencies 1000, 2000, and 4000Hz. Additionally, the

participants had to be verbal and between the ages of 3 to 6 years old with exposure to English, Spanish, or both. Lastly, participants could not have any known neurological or cognitive concerns reported by parents. For the current study, only 44 participants completed the battery of tests. One of the participants dropped out of the study due to scheduling unavailability, and two dropped out due to existing neurodevelopmental disorders reported by parents.

2.2 Measures

2.2.1 Parent-Teacher Questionnaires. The Bilingual Input Output Survey (BIOS: Pena et al., 2014) and the Inventory to Assess Language Knowledge (ITALK: Pena et al., 2014) questionnaires adapted from the Bilingual English-Spanish Assessment (BESA) were used to derive the language proficiency measures. These questionnaires were administered to parents and teachers to determine language proficiency and overall dominance. Parent questionnaires were administered in Spanish or English via telephone or in-person in the parents' dominant language. Teacher questionnaires were administered in-person. On the BIOS, parents and teachers provided information on the child's history of language exposure from birth to current use and language(s) used in any daycare or preschool in the child's life. They also provided language input and output information in an hour by hour report of language and context.

2.2.2 Bilingual English Spanish Oral Screener. The Bilingual English Spanish Oral Screener (BESOS) (Peña, Bedore, Iglesias, Gutiérrez-Clellen, & Goldstein, n.d.) was administered to each participant in Spanish and English. The BESOS is a language screener used to identify children who are at risk for language impairment (LI) with morphosyntax and semantics items. Each item is scored as correct or incorrect. The higher the score on the BESOS, the more indicative of language ability in the target language (Bedore et al., 2012).

The BESOS consists of two subtests; morphosyntax, and semantics. The morphosyntax subtest is comprised of cloze and sentence repetition items. The Spanish morphosyntax subtest

consists of 11 cloze and 5 sentence repetition tasks for 3 and 4-year-olds and 12 cloze with 4 sentence repetition items for 5-year-olds. Cloze items target articles, direct object clitics, and subjunctive forms in Spanish. The English morphosyntax subtest includes 11 cloze and 6 sentence repetition items for 4-year-olds and 10 cloze and 7 sentence repetition items for 5 and 6-year-olds. The cloze items in English assessed for past tense, third person singular, negations, passives, and copulas.

The semantics subtest measures knowledge of different words, categories of words, and concepts. The Spanish semantics subtest contains 12 items with questions such as "what do you do with a knife" or asking the child to point to the correct answer. The English semantics subtest contained a total of 10 items for the 4-year-old version and 11 items for the 5-year-olds. Participants were asked to put items in a category and name different items in a category. The participants could answer in English or Spanish on the semantics subtest and received credit for their answer as long as it was conceptually correct. All children were administered the BESOS in both English and Spanish, but if the child failed to respond to five consecutive items, the subtests were discontinued to minimize frustration.

2.2.3 Language Sample Analysis. Language samples were collected by asking the participants to describe seven pictures using procedures adapted from Eisenberg and Guo (2013). They were collected in English, Spanish, or both depending on the expected language proficiency of the participants. Participants selected pictures at random and were asked to describe the picture using a series of four prompts. Two of the four prompts were the same for all pictures and the last two prompts were specific to each picture. A secondary prompt was given if the participant did not respond to any of the initial four prompts. If the child did not provide a

response in the targeted language during the first or second prompt, the task was discontinued for that language.

2.3 Procedures

Children were placed in a monolingual (English or Spanish) or bilingual (Spanish and English) administration sequence depending on the parent/teacher interviews. The Preschool Language Scale-5 (PLS-5) was administered as part of the larger study. The monolingual administration sequence consisted of two different orders. Table 2.1 displays the monolingual and bilingual administration sequences. Four different administration sequences were followed for the bilingual participants based on the participants' output levels determined by the BIOS and the ITALK. Participants were randomly assigned to one of the testing sequences. These sequences helped reduce order bias. Test administration lasted between 1 to 4 sessions. Testing took place in different facilities; daycare, preschool, or the university clinic. Data collection ranged from 1 day to 5 weeks due to participant's attendance. If the participant looked fatigued testing was concluded for that day and rescheduled.

Participants were individually tested following a testing sequence that was predetermined to reduce bias. Each participant completed the BIOS, ITALK, BESOS, PLS-5, and a language sample. If the participant was bilingual, each test was completed in both English and Spanish. All tests were administered by trained graduate students majoring in Speech Language Pathology (SLP), and certified SLPs.

Table 2.1

Test Administration Sequence

	Bilingual Sequences				***Monolingual Sequences***	
	I	***II***	***III***	***IV***	***I***	***II***
Testing Sequence	BESOS (S) LSA (S) BESOS (E) LSA (E) PLS-5 (Dual)	BESOS (E) LSA (E) BESOS (S) LSA (S) PLS-5 (Dual)	PLS-5 (Dual) BESOS (S) LSA (S) BESOS (E) LSA (E)	PLS-5 (Dual) BESOS (E) LSA (E) BESOS (S) LSA (S)	BESOS LSA PLS-5	PLS-5 BESOS LSA

Note: BESOS= Bilingual English Spanish Oral Screener, (S)= Spanish, (E)= English LSA= Language Sample Analysis, PLS-5= Preschool Language

2.3.1 Administration of Language Measures. Prior to the administration of language measures, bilateral pure tone hearing screenings were conducted at 25 db for frequencies 1000, 2000, and 4000 Hz recommended by the American Speech-Language Hearing Association (ASHA) to each participant (American Speech-Language-Hearing Association. 1997). Participants were instructed to raise their hand whenever a tone was heard. However, if a child did not comprehend instructions, play audiometry was implemented by the test administrator.

Children were administered the appropriate test for their age. All test items were presented via an iPad. Responses were scored using a binary system (1-correct, 0-incorrect). However, if the child did not respond, "NR" was recorded and if the child used another language "OL" was used. Trained graduate students majoring in Speech Language Pathology (SLP), and certified SLPs scored the tests. All tests were audio recorded.

All language samples were audio recorded, transcribed, and coded for grammaticality using Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2012). Each utterance was coded as grammatical or ungrammatical. Percent grammatical utterances (PGU) was calculated by dividing the total number of grammatical utterances by the total number of utterances. Two trained research assistants obtained inter-rater reliability for coding in both English and Spanish language samples. A total of 28.5% of English samples coded for reliability with 95.3% accuracy, and 40% of Spanish transcripts coded for reliability with 91.3% accuracy.

2.4 Statistical Analysis

All samples were analyzed using simultaneous multiple linear regression to determine the extent of the influence of one or more variables on the same outcome (Keith, T. Z., 2006). Simultaneous regression is also useful for determining the relative influence of each of the variables studied. It allows for an estimation of the direct effects of each independent variable on the dependent variables. Most importantly, the regression determined the extent to which a set of variables predicts an outcome and the relative importance of the various predictors.

CHAPTER 3: RESULTS

For the purposes of this study, the results were aimed to determine which language proficiency variable, AoEE or current input and output, would best predict language performance on grammaticality, morphosyntax, and semantic skills. To control for the effects of age, the age in months was entered into the regression. Descriptive statistics for these variables will first be presented followed by the multiple linear regressions.

3.1 Descriptive Statistics

Descriptive statistics for the participant's language proficiency (AoEE, current input, current output, and age) and language performance (BESOS, and PGU) are summarized in Table 3.1. For the purposes of this study age was controlled for and used as a continuous variable. The participants had an average age of 56 months. Participants had a mean AoEE of 1.40 (SD= 1.14) years. At the time of testing, the participants used slightly more English than Spanish. They had a mean current English input of 62% (SD= 25.72), and a mean current English output of 73% (SD=36.60). Participants current Spanish input was 38% (SD= 18.90) and current Spanish output was 27.0 (SD=35.30). PGU was obtained using the language samples, the average PGU score in English was 62% (SD=21), and PGU in Spanish was 54%(SD=21). Participants had a higher amount of grammatical utterances in English than Spanish. The same results are reflected in the BESOS morphosyntax and semantic scores. Participants obtained an average z-score of -.07 (SD=1.18) on the BESOS English morphosyntax, -1.70 (SD=1.12) on the BESOS Spanish morphosyntax, -.038 (SD=1.52) on the BESOS English semantics, and -1.53 (SD=1.32) on the BESOS Spanish semantics. The higher scores in English may have been influenced by the amount of English exposure participants were being exposed to during the time of testing.

Table 3.1
Descriptive Statistics

	English		Spanish	
	Mean	SD	Mean	SD
Age in months*	56 months	10.52		
AoEE*	1.40	1.14		
Current Input*	61.7	25.02	38.30	18.90
Current Output*	72.30	35.30	27.0	35.30
PGU	62	21	54	21
BESOS	-0.07	1.18	-1.70	1.12
Morphosyntax				
BESOS Semantics	-.038	1.52	-1.53	1.32

Note: *Age in months, AoEE, and Current input and output does not reflect Spanish/English difference, AoEE= Age of English Exposure, PGU=percent grammatical utterances; BESOS= Bilingual English Spanish Oral Screener

3.2 Correlations

Pearson product-moment correlations were computed to assess the relationship between the independent (Age, AoEE, Current input, and current output) and dependent (English and Spanish PGU, English and Spanish morphosyntax, English and Spanish semantics) variables. The Pearson product-moment correlation coefficients are presented in Table 3.2. Overall the relationships ranged from small to large correlations between the independent and dependent variables. There were no cross linguistic correlations but there were significant correlations within the languages. Current input and output were correlated to more language performance variables and AoEE was only correlated to Spanish semantics and morphosyntax. There were weak to moderate significant correlations between age and English semantics (r=.393, p= .010), English morphosyntax (r=.378, p=.0140), current input (r=.464, p=.004), and current output (r= .489, p=.002). English Semantics had moderate significant correlations with English morphosyntax (r=.690, p=.001), and current output (r=.513, p=.002). Spanish semantics had

moderate to strong significant correlations with Spanish morphosyntax (r= .717, p=.001) and Spanish PGU (r=.512, p=.003). There were moderate significant correlations for Spanish semantics and multiple variables: AoEE (r= .456, p=.007), current input (r=.450, p=.019), and current output (r=.529, p=.005). English morphosyntax had a strong significant correlation to English PGU (r= .762, p=.001). There were moderate correlations between English morphosyntax current input (r= .439 p=.009), and current output (r=.572, p=.001). Spanish morphosyntax had moderate significant correlations to Spanish PGU (r= .686, p= .007), AoEE (r= .470, p= .005), and current output (r= .457, p=.019). AoEE had a medium significant correlation to current output (r=.435, p= .008). Lastly current input had a large significant correlation to current output (r=.871, p= .008).

Table 3.2
Correlations

	Age	English Semantic	Spanish Semantics	English Morphosyntax	Spanish Morphosyntax	English PGU	Spanish PGU	AoEE	Current Input	Current Output
Age	1									
English Semantics	.393**	1								
Spanish semantics	-.087	.151	1							
English Morphosyntax	.378*	.690**	-.028	1						
Spanish Morphosyntax	.151	-.005	.717**	-.066	1					
English PGU	.151	.333	-.034	.762**	-.172	1				
Spanish PGU	.236	.387	.572*	.177	.686**	-.505	1			
AoEE	-.138	-.093	.456**	-.145	.470**	-.136	.275	1		
Current Input	.464**	.295	-.450*	.439**	-.322	.034	.223	-.453	1	
Current output	.489**	.513**	-.529**	.572**	-.457*	.203	.176	-.435**	.871**	1

Note: AoEE= Age of English Exposure, PGU=percent grammatical utterances, *$p < .05$

3.3 Multiple Linear Regressions

This research was designed to determine which language proficiency variables would best predict language performance on grammaticality, morphosyntax, and semantic skills. Multiple linear regression models were used to analyze scores from the language samples and the BESOS. The independent variables were AoEE, age, current input, and current output. Six different regression models were run for each dependent variable: English PGU, Spanish PGU, English MS, Spanish MS, English SEM, and Spanish SEM.

3.3.1 Percent Grammatical Utterances. The first and second multiple linear regressions were performed on English and Spanish PGU. The four predictor variables: Age, current input, current output, and age of first exposure were entered into the regression. The English PGU multiple linear regression model with all four predictor variables produced R2= .227, F (4,25) = 1.840, p>.153. The predictor variables were not significant. The Spanish multiple linear regression model testing all 4 predictor variables produced R2= .455, F (4,7) = 1.459, p>.310. The predictor variables were not significant. The regression coefficients are found in Table 3.3 but were not interpreted as they were not statistically significant.

3.3.2 Morphosyntax. The third multiple linear regression performed was on English morphosyntax using the same procedures. The multiple linear regression models testing all four predictor variables produced R2= .568, F (4,29) = 9.548, p<.0001. Age (b= .072, p= .001) and Current output (b= .018, p= .058) significantly predicted English morphosyntax. Current input and age of first exposure did not significantly predict English morphosyntax for this sample (p > .05).

The fourth multiple linear regression was performed on Spanish morphosyntax. The multiple linear regression model testing all 4 predictor variables produced R^2= .271, F (4,21) =

1.955, $p>.139$. The predictor variables were not significant. The regression coefficients are found in Table 3.3 but were not interpreted for this model as it was not statistically significant.

3.3.3. Semantics. The fifth multiple linear regression was performed on English semantics. The multiple linear regressions testing all four predictor variables produced $R^2= .496$, $F(4,29) = 7.147$, $p<.001$. Age (b= .079, $p= .006$), current output (b=.039, $p=.006$), and current input (b=.-041, p=.022) significantly predicted English semantics. Age of first exposure did not predict English semantics for this sample ($p > .05$).

Lastly, the sixth multiple linear regression was performed on Spanish semantics. The same procedures for the analysis above were followed. The multiple linear regression model testing all 4 predictor variables produced $R^2= .287$, $F(4,22) = 2.218$, $p>.100$. The predictor variables were not significant. The regression coefficients are found in Table 3.3 but were not interpreted for this model as it was not statistically significant.

Table 3.3
Predictor variables with b value

	PGU		**Semantics**		**Morphosyntax**	
	English	Spanish	English	Spanish	English	Spanish
Age	.007	.024	**.079***	-.007	**.072***	.025
Current Input	-.006	.006	**-.041***	.001	-.016	.009
Current Output	.006	-.007	**.039***	-.017	**.018***	-.021
Age of first exposure	-.049	-.093	.043	.087	-.096	.123

Note: PGU= Percent grammatical utterance, *$p < .05$

CHAPTER 4: DISCUSSION

A variety of variables have been used to quantify language proficiency to measure language performance in young bilingual children. For the purpose of this study, language proficiency was measured using AoEE, current input, and current output. Age was also controlled for in the analysis. Language performance was measured through PGU obtained from language samples, morphosyntax, and semantics subtests from the BESOS. A total of 44 participants were included in the study, ranging from 3- to 6-year-olds with various patterns of AoEE, current input, and current output in both languages. The goal of this study was to explore which language proficiency measures would best predict overall language performance.

4.1 Measures of proficiency and outcomes (Correlations)

Age was the most informative indicator of language performance in this study, which was entered into the correlation and regression models along with the language proficiency variables to control for maturation effects. Age was significantly correlated to English semantics and morphosyntax subtests. These findings suggest that, at least for children who are starting to make use of a second language, age is an important predictor of morphosyntax and semantic performance. As children get older they start to gain more traction of English meaning children's dominance patters shift as they move from the home language setting to using the school language (Bedore et al., 2016).

AoEE was significantly correlated to Spanish morphosyntax and semantic subtests. Children exposed to English at a later age scored higher in Spanish subtests, which may be due to having more language exposure to Spanish and no significant language model in English. These findings are consistent with previous research; children perform better in the languages they have had the most experience in (Bedore et al., 2012). Children exposed to English at an earlier age consistently scored higher in both subtest. Consistent results were found in Bedore et

al. (2012) and Bedore et. Al (2016), as performance in Spanish decreases English performance increases children perform poorly in English when exposed at a later age.

Current output was significantly correlated to English semantics, English morphosyntax, Spanish semantics, and Spanish morphosyntax. These findings may be associated to the amount of English they are using to communicate per parent and teacher report. Current input was correlated to Spanish semantics, and English morphosyntax. It is important that a child not just hear a language, but use it so they can demonstrate continued development in each of the languages. Current input and output were highly correlated as expected because children often respond in the language they are spoken too (Bedore et al, 2012).

4.2 Measures and proficiency (Regressions)

Current input and output significantly predicted English semantics, current output also significantly predicted English morphosyntax. These predictive values are important because children need to use the language in order to add knowledge in that language (Bedore et al 2016). After learning a language, the need for consistent exposure is important to continue to add language knowledge. Output was a significant predictor in determining semantic knowledge and grammatical structure in the language. These results may conclude that language semantic and morphosyntactic development may require exposure and practice. Age of first exposure did not have any predictive value for Spanish morphosyntax, and semantic, English morphosyntax, and semantics, and PGU. This study is consistent with usage based theories. The more a language a child is exposed to, the language influence for learning and knowing increases (Jorshchick, Quick, Glsser, Lieven & Tomasello, 2011).

The results of the different analyses suggest that the variables selected for language proficiency predicted morphosyntax, and semantics performance but not for PGU. These findings may be associated with the low number of participants for Spanish PGU. Participants

discontinued the task because they did not respond, or did not speak Spanish. The more input and output the children received, the higher they scored in Spanish and English BESOS subtests. BESOS English morphosyntax, Spanish morphosyntax, and Spanish semantics were significantly correlated with current input and output. There were no significant findings for English or Spanish PGU. PGU may have more variability that cannot be explained just by proficiency variables. These findings are similar to Gutierrez-Clellen and Kreiter (2003), the amount of input and output did not play a role in English grammatical skills but did play a significant role in Spanish grammatical skills. The results will always depend on the language that is being investigated. The findings from the current study and Gutierrez-Clellen and Kreiter (2003) provide compelling evidence that bilingual children who have no English input at home can still reach appropriate English grammatical skills in a bilingual context at school since input or output may not be directly predict grammatical development. Overall, researchers and clinicians should always consider the way proficiency was determined.

4.3 Within language patterns

Overall, there were many correlations within language but no significant cross language correlations. English semantics was significantly correlated to English morphosyntax, and English PGU was significantly correlated to English morphosyntax. The same patterns were exhibited for the Spanish language performance variables including Spanish PGU with Spanish semantics. Children who scored high in one domain were likely to score high in another domain within the same language. The results were not replicated when comparing scores from different domains. These findings indicate that children at these ages are not generalizing behaviors from one language domain to the other, different results may be presented in older children.

4.4 Limitations

This study reported on findings based on a sample size of 44 participants. Proficiency variables were based on only three variables. Variables such as parent education, socio economic status (SES), and social value of a language could have provided a better understanding of bilingual performance. Participants were selected from areas of El Paso that are generally known to be of varied SES, however it is unknown if this strategy was successful. Some participants were in dual language programs; these participants were exposed to English half of the school day and Spanish the other half of the day. It could be suggested that participants from this study were unevenly distributed bilinguals. Lastly, a monetary incentive was offered to individuals who completed this study.

4.5 Conclusion

The purpose of this study was to investigate which language proficiency variables would best predict language performance in bilingual children. The results of this study point to the importance of exposure through current input and output. Language input and output may be differentially important as children progress in their acquisition of semantics and syntax in their languages (Bohman et al. 2010). AoEE was not a predictor variable for any of the language performance tasks but was correlated to Spanish semantics and morphosyntax subtests. AoEE correlations may be associated with having more exposure to Spanish. Language proficiency variables should be carefully considered when assessing a child in order to avoid misidentification of a child. Typically, a child gets tested in English yet this may not be the child's strongest language given the correlations between AoEE and semantic and morphosyntax as well as current input and output predicting BESOS subtests. These findings suggest children's language performance varies as a function of what languages are in their environment. Clinicians and researchers should always obtain a case history to fully understand the bilingual child's language experience to better serve them. Future studies should focus on implementing different

proficiency variables to see if it accounts for variables such as PGU. It is important that these issues are explored with older children to get a better understanding of how bilingualism unfolds.

REFERENCES

American Speech Language- Hearing Association (n.d.a). *Bilingual service delivery*. Retrieved from https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935225&section=Key_Issues

American Speech-Language-Hearing Association. (1997). *Childhood hearing screening*. Retrieved from http://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935406&section=Key_Issues

Bedore, L. M., Peña, E., Summers, C. L., Boerger, K. M., Resendiz, M. D., Greene, K., Gillman, R. (2012). The Measure Matters: Language dominance profiles across measures in Spanish-English bilingual children. *Bilingual Cambrige English*, *15*(3), 616-629.

Bedore, L. M., Peña, E. D., Griffin, Z. M., & Hixon, J. G. (2016). Effects of Age of English Exposure, Current Input/Output, and grade on bilingual language performance. *Journal of Child Language*, *43*(3), 687-706.

Bohman, T., Bedore, L. M., Peña, E. D., Mendez, A., & Gillam, R. B. (2010). What you hear and what you say: Language performance in Spanish-English Bilinguals. *International Journal of Bilingual Education*, *13*(3), 325-344.

Camarota, S. A., & Zeigler, K. (2014, October 3). *One in Five U.S. Residents Speaks Foreign Language at Home, Record 61.8 million* [Fact sheet]. Retrieved November 23, 2017, from Center for Immigration Studies website: https://cis.org/One-Five-US-Residents-Speaks-Foreign-Language-Home-Record-618-million.

Curtis, C., Summers, C., Stubbemann, R., & Smith, V. (2017). *The validation of screening practices for bilingual preschool-aged children in a border community*. Poster presentation at the Symposium on Research in Child Language, Madison, Wisconsin.

Eisenberg, S. L., & Guo, L.-Y. (2015). Sample size for measuring grammaticality in preschool children from picture-elicited language samples. *Language, Speech, and Hearing Services in Schools*, *46*(2), 81–93. http://doi.org/10.1044/2015_LSHSS-14-0049.

Eisenberg, S.L. & Guo, L. (2013). Differentiating children with and without language impairment based on grammaticality. *Language, Speech, and Hearing Services in Schools, 44*, 20-31.

El Paso, TX| Data USA [Fact sheet]. (2014, January). Retrieved March 27, 2019, from https://datausa.io/profile/geo/el-paso-tx/

Grosjean, F. (2010). *Bilingual life and reality*. Cambridge, MA: Harvard University Press.

Gutierrez-Cellen, V. F., & Kreiter, J. (2003). Understanding child bilingual acquisition using parent and teacher reports. *Applied Psycholinguistics*, *24*, 267-288.

Herschensohn, J. (2007). Language development and age. Cambridge: Cambridge University Press.

Jia, G., Aaroson, D. & Wu, Y. H. (2002). Long term Language attainment of bilingual immigrants: predictive factors and language differences. *Applied Psycholinguistics, 23*, 599-621.

Jia G., Fuse A. (2007). Acquisition of English grammatical morphology by native Mandarin speaking children and adolescents: age-related differences. *Journal of Speech, Language, and Hearing Researc*h, *50*,120-140.

Keith, T. Z. (2006). *Multiple regressions and beyond*. Massachusetts, Boston: Pearson Education Incorporated.

Li, P., Sepanski, S., & Zhao, X. (2006). Language history questionnaire: A web-based interface for bilingual research. *Behavior Research Methods*, *38*(2), 202-210.

Miller, J. & Iglesias, A. (2012). Systematic Analysis of Language Transcripts (SALT), Research Version 2012 [Computer Software]. Middleton, WI: SALT Software, LLC.

Pearson, B. Z.,& Fernandez, S. C. Lewedge, V., & Oller, D.K. (1997). The relation of input factors to lexical learning by bilingual infants. *Applied Psycholingusitics, 18*, 41-58.

Peña, E. D., Bedore, L. M., Iglesias, A., Gutiérrez-Clellen, V. F., & Goldstein, B. A. *Bilingual English Spanish Oral Screener– Experimental Version (BESOS)*. Unpublished instrument.

Peña E. D., Gutiérrez-Clellen V. F., Iglesias A., Goldstein B. A., & Bedore L. M. (2014). *Bilingual English Spanish Assessment* (BESA). San Rafael, CA: AR Clinical Publications.

Sheng, L., Bedore, L. M., & Fiestas, C. (2013). Semantic Development in Spanish-English bilingual children effect of age and language experience. *Child Development*, *84*(3),1034-1045.

Unsworth, S., Argyri, F., Cornips, L., Hulk, A., Sorace, A., & Tsimpli, I. (2012). The role of age of onset and input in early child bilingualism in Greek and Dutch. *Applied Psycholinguistics*,1-41.

Ukrainetz, T. A. (Ed.). (2015). *School-Age Language Intervention: Evidence Based Practices*. Austin, TX: An International Publisher.

VITA

Stephanie Escobar was born and raised in El Paso, Texas, USA. She graduated from Riverside High School in 2012. She completed pre-speech language pathology undergraduate coursework at the University of Texas at El Paso (UTEP). While completing her undergraduate coursework, Stephanie was a member of the Research in Bilingual Language Learning Lab (ReBLL). She presented her research in various conferences at the Campus office of Undergraduate Research Initiative Symposium (COURI), the Southwest Cognition Conference, and the American Speech-Language Hearing Association conference. She completed her bachelors at The University of Texas at El Paso (UTEP) in Spring 2017. In the fall semester of 2017, she entered the UTEP Speech-Language Pathology program to obtain her Master of Science degree. As a graduate student, she continued her involvement in ReBLL. As a member, she presented at the UTEP Graduate Student Expo, and the American Speech-Language Hearing Association conference. Stephanie has been awarded numerous awards including, the Lydia Stark Memorial Endowed Scholarship, Pan America Round Table El Paso Scholarship, and Preparing Bilingually Certified Speech Language Pathologist Grant.

Contact Information: snescobar@miners.utep.edu