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The Use Of Code-Switching In Bilingual Children With Autism Spectrum Disorder

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THE USE OF CODE-SWITCHING IN BILINGUAL CHILDREN WITH AUTISM SPECTRUM DISORDER

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Dedication

This thesis is dedicated to my family; my mom Yolanda Ponce, my husband Gabriel Lawler, and my children Angelique Elena Lawler and Noah Omar Lawler. Without their support, guidance, and love this would not have been possible, thank you.

In memory of my dad
Omar Ponce

Esta tesis está dedicada a mi familia; mi mamá Yolanda Ponce, mi esposo Gabriel Lawler y mis hijos Angelique Elena Lawler y Noah Omar Lawler. Sin su apoyo, dirección y amor esto no hubiera sido posible, gracias.

En memoria de mi papá
Omar Ponce
THE USE OF CODE-SWITCHING IN BILINGUAL CHILDREN WITH AUTISM SPECTRUM DISORDER

by

MONICA YOLANDA PONCE-LAWLER, B.A.

THESIS

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Abstract

Background: Code-switching may be seen as a weakness in the eyes of many who do not truly understand bilingualism. Several professionals consider code-switching to be a compensatory strategy, however other professionals perceive code-switching as a functionally motivating behavior (Chung, 2006). Whether is it consciously or subconsciously that a child code-switches, there is limited research on when bilingual children with Autism Spectrum Disorder (ASD) are likely to code-switch as well as what patterns they utilize when they code-switch.

Purpose: To grow the limited research on the use of code-switching in bilingual children with ASD. Introduce and compare two language treatments; a bilingual Spanish/English language intervention treatment and a monolingual English language intervention with two bilingual children with ASD. From the data gathered, examine their use of code-switching and during which treatment condition the children code-switched most. The data also helped identify the different patterns found in the code-switching used.

Methods: A time series design across 2 participants was utilized, which allowed measurements of the same variable to be taken at different points in time for two different participants. Descriptive statistics were then used to compare the use of code-switching between the two participants.

Results: The participants exhibited an increased production of code-switching in the Bilingual treatment condition. Though both participants showed greater production of code-switching between utterances as well as a higher percentage of code-switching in elicited responses, Participant A, who was older, showed fewer instances of code-switching than Participant B.

Conclusion: The results show that when a bilingual child with ASD comprehends that they are allowed to speak two languages, they will use all the resources they have in both languages in order to get their message across.
# Table of Contents

Acknowledgements...........................................................................................................v  
Abstract ............................................................................................................................. vi  
Table of Contents ............................................................................................................... vii  
List of Tables ...................................................................................................................... ix  
List of Figures ..................................................................................................................... x  
Chapter 1: Literature Review ............................................................................................ 1  
  1.1 Introduction ................................................................................................................. 1  
  1.2 Autism Spectrum Disorder .......................................................................................... 1  
  1.3 Bilingual Intervention in Bilingual Children with ASD .............................................. 4  
  1.4 Code-Switching ......................................................................................................... 5  
    1.4.1 Perceptions of code-switching ............................................................................. 7  
    1.4.2 Functions of code-switching ............................................................................. 8  
  1.5 Code-Switching in Children with Language Impairment .......................................... 8  
  1.6 Research Questions ................................................................................................... 9  
Chapter 2: Methods .......................................................................................................... 11  
  2.1 Participants ................................................................................................................. 11  
    2.1.1 Recruitment ......................................................................................................... 11  
    2.1.2 Informed consent ............................................................................................... 12  
    2.1.3 Participant profiles ............................................................................................. 12  
  2.2 Description of Sessions ............................................................................................. 15  
  2.3 Code-Switching ......................................................................................................... 17  
    2.3.1 Reliability ........................................................................................................... 18  
    2.3.2 Analysis ............................................................................................................. 19  
Chapter 3: Results ............................................................................................................. 20  
  3.1 Language Use ............................................................................................................ 20  
  3.2 Patterns of Code-Switching ....................................................................................... 22  
  3.3 Code-Switching by Examiners .................................................................................. 25  
Chapter 4: Discussion ....................................................................................................... 27  
  4.1 Variability in Code-Switching Use ............................................................................. 28
4.2 Limitations ..................................................................................................................31
4.3 Clinical Implications and Future Directions ...............................................................31

References..................................................................................................................................33

Vita .................................................................................................................................................38
List of Tables

Table 1: Results from the PLS-5, Spanish ................................................................. 14
Table 2: Output-input percentages of use of language based on the BESA-BIOS ............ 15
Table 3: Averages from ITALK- home and school ....................................................... 15
Table 4: Randomized interventions for participants .................................................... 16
Table 5: Coding systems used for transcriptions of language samples, participants ......... 18
Table 6: Coding systems used for transcriptions of language samples, examiners .......... 18
Table 7: Code-switching means and standard deviations, Participant A ......................... 23
Table 8: Code-switching means and standard deviations, Participant B ......................... 23
Table 9: Language production, Participant A .................................................................... 29
Table 10: Language production, Participant B .............................................................. 30
List of Figures

Figure 1: Use of language in each treatment condition for both participants ............................. 21
Figure 2: Total number of utterances for each treatment condition for both participants ............. 22
Figure 3: Types and number of code-switches for Participant A. .................................................. 24
Figure 4: Types and number of code-switches for Participant B................................................... 25
Figure 5: Mean use of code-switching by examiners. ................................................................. 26
Chapter 1: Literature Review

1.1 Introduction

Today’s society is a mosaic of many different cultures and languages. The majority of United States families speak a variety of languages. The U.S. is rapidly becoming home to people from many different countries who speak a diverse number of languages. According to the 2010 United States Census, 50.5 million people who reside in the U.S. are of Hispanic or of Latino origin, making up 16.3% of the total population (Ennis, Rios-Vargas, & Albert, 2011). This culturally and linguistically diverse population includes many children who will be diagnosed with some form of language impairment. Speech language pathologists (SLP’s) will be the ones who will screen, evaluate and treat the children from this population in order to establish if these children have a language disorder or a language difference. Many of the children they evaluate will be diagnosed with Autism Spectrum Disorder. Dealing with children in this population, particularly those who are bilingual can cause confusion and distress, and being informed may help alleviate that.

1.2 Autism Spectrum Disorder

According to the Falco (2012), Autism Spectrum Disorder is a growing etiology in the United States, as there was an estimated 78% rise of ASD cases when the 2008 data was compared with the 2002 data. According to the website for the American Speech Language and Hearing Association (ASHA), the ASD prevalence among Hispanic children was 7.9 per 1,000. Having these children on caseloads can produce a dilemma for SLPs regarding an important treatment decision: should a bilingual child with ASD be treated in their home language, in their academic language, or should they treat the child in both languages, providing a bilingual intervention. This issue can cause a division among many professionals and parents. A number of experts believe that it is best to suppress the home language and only speak to the child in the
academic language (Kremer-Sadlik, 2005). It is also assumed that by continuing to speak the home language to the child, this will not allow them to fully acquire that second language and thus causing confusion and a mental overload (Ohashi et. al., 2012). There is also the belief that in order for a child to acquire a language they need to be fully immersed in that language and that another language should not be presented (Kremer-Sadlik, 2005).

Unfortunately, there are only a handful of studies pertaining to bilingual families of children with ASD (Yu, 2013; Kremer-Sadlik, 2005). In one such study, families were surveyed as to what language they were advised to speak to their child following the child’s diagnosis. All of the families were advised to stop speaking to their children in their home language and exclusively speak to their children only in English (Kremer-Sadlik, 2005). According to the ASHA Code of Ethics SLPs must show the highest levels of clinical competency when considering the client and the family’s cultural and linguistic preferences (ASHA, 2010). The ASHA policy states that SLPs should practice in a way that considers “the impact of culture and linguistic exposure/acquisition and uses the best available evidence for practice to ensure optimal outcomes for persons with communication and/or swallowing disorders or differences” (ASHA, 2007, p. 1).

When assessing and treating individuals from culturally and linguistically diverse populations, the SLP must consider the families and client’s culture, beliefs, values, and language preference. However, many times this policy is not followed simply because there are not enough bilingual SLPs to serve this population. Moreover, in most cases bilingual children with ASD receive therapy in the academic language and not in their home language. Doctors and clinicians believed that by exposing them to only one language they are exposing them to a simpler linguistic input, thus facilitating their language learning (Kremer-Sadlik, 2005). In many
cases, parents listen to the professionals’ advice and stop speaking to their child in their native language and only speak to them in the academic language (Yu, 2013; Ohasi, Mirenda, Marinova,-Todd, Hambly, Fombonne, Szatmari, Bryson, Roberts, Smith, Vaillancourt, Volden, Waddell, Zwaigenbaum, Georgiades, Duku, and Thompson, 2012). When this occurs, problems begin to amass. Parents want to listen to the professionals and only speak to their child in the academic language, though at the same time making an effort to prevent native language loss with their child. If they decide to listen to the professional and stop speaking to their child in the home language that family interaction will in many cases diminish (Kremer-Sadlik, 2005). Not only will quality family interaction dwindle or in some cases cease to exist, but without a strong grasp of the English language, these parents could potentially be inadequate English models for their children, as seen in the study conducted by Kremer-Sadlik (2005). If a child does not have a competent language model, they will not learn to properly speak the language themselves (Yu, 2013). Goldstein (2012) found that a child needs an intact cognitive system and a rich language environment to learn a language. In instances where bilingual children are only exposed to English, they may experience feelings of seclusion due to the lack of interaction with their family (Kremer-Sadlik, 2005). Additionally, the opportunity to be surrounded with rich learning experience may be lost. It is important to note that language is not only used for communication, but also for socializing, which is often times done more often in the home setting than the school setting (Bird, Cleave, Trudeau, Thordardottir, & Sutton, 2005). Therefore, depriving them of their native language is depriving the child from rich language models, as well as from socializing models.

Studies show that when a child fails to have a strong foundation in the first language the acquisition of a second language will be much more difficult (Kremer-Sadlik, 2005; Perozzi and
Sanchez, 1992). If a child is suddenly cut off from the native language and immersed into the second language without having fully acquired the former, proper acquisition of the second language will never be properly achieved (Paneque & Rodriguez, 2009). This support can be established by permitting the child to continue speaking their native language at home as well as at school. Children can be encouraged to speak about their culture and where they come from. Allowing them to learn and talk about their culture will better facilitate an awareness and education pertinent to their roots as well as help them make connections to the new language they are learning, making for a smooth transition. Granting them the ability to maintain their first language, additionally helps alleviate the stress on parents who can continue speaking the native language and therefore continue providing that strong language model (Seung et. al., 2006).

1.3 Bilingual Intervention in Bilingual Children with ASD

There are many arguments in favor of a bilingual approach to intervention. Bilingualism is considered a dynamic single system in which the first language (L1) and the second language (L2) are constantly interacting, rather than having two separate language systems for each (Gutierrez-Clellen, 1999). Fortunately for Spanish/English bilinguals English and Spanish have a very similar language system, meaning that these two languages share many of the same sounds. Another advantage in allowing bilingual children with ASD to continue speaking their native language is that “children benefit from input that is comprehensible” (Gutierrez-Clellen, 1999, p. 292). If a child is immersed into a language that they do not know, they may tune out the speaker, losing valuable instruction. An additional reason for the maintenance of the home language is that once they master the L1, they will have sufficient confidence to attempt to master a second language (Gutierrez-Clellen, 1999). Though this information does not answer the question as to what language to choose when selecting the language of intervention, this
evidence allows clinician to delve deeper into what ways these two languages interact and how they can be used in language intervention.

What may occur, due to the fact that the child is being exposed to two languages, is they may begin to use both languages together in an act called code-switching. Gawlitzek-Maiwald and Tracy (1996) state that code-switching can emerge since the two linguistic systems are interacting. Children will take what they know from each language and use it to communicate their wants and needs.

1.4 Code-Switching

The majority of bilingual children in the United States utilize English most often at school and other social venues, thus relegating Spanish to the home. Bilingual children make frequent decisions of which language to select and with whom it is appropriate to use each language. When making these language selections, the children may switch from one language to another. This act of switching between languages is referred to as code-switching. According to the Vu, Bailey, and Howes (2010), code-switching is, “the alternating and concurrent use of two languages” (p. 200). Two types of code-switching occur, intrasentential, within an utterance and intersentential, between utterances. There are several reasons why a child might code-switch according to Chung (2006). Bilingual speakers might code-switch when they are unable to select a correct word in one language, to increase comprehension and expression, to prevent miscommunication, or to identify with their community. Code-switching is a communicative strategy that is often unconsciously done by speakers particularly when there is a language barrier or a cultural difference between generations. Overall code-switching is a resource that many bilinguals use to assist in navigating through a conversation (Gawlitzek-Maiwald and Tracy, 1996). Children are more likely to code-switch when they are having a conversation,
rather than when they are involved in narration tasks (Gutiérrez-Clellen, Simon-Cereijido, and Leone, 2009). Typically developing children code-switch more from Spanish to English, than from English to Spanish. The reason for this could be that they prefer to speak English and feel most comfortable communicating in this language (Ribot & Hoff, 2014). Yow and Markman (2016) found that children who code-switched were more effectively able to use speakers nonverbal cues when they were asked to complete tasks in a foreign language. Overall, the research suggests that a child who practices code-switching may benefit more so than one who does not, because they are using all their linguistic abilities (Vu, Bailey, and Howes, 2010; Gutiérrez-Clellen, Simon-Cereijido, and Leone, 2009; Chung, 2006).

According to a study performed by Amorim (2012), code-switching is perceived as a “negative, undesirable behavior” (p. 179). Professionals, believe that when an individual code-switches, they do not have a firm grasp of either language. However, several studies (Amorim, 2012; Vu, Bailey, and Howes, 2010; Gutiérrez-Clellen, Simon-Cereijido, and Leone, 2009; Chung, 2006) demonstrate that children who code-switch are in actuality using all of their linguistic resources to communicate, which is what we want any child, particularly a child with ASD to accomplish. Code-switching typically occurs spontaneously, the speaker is not consciously trying to code-switch. When speakers of two languages communicate, their brain cannot activate one language and deactivate the other, both languages will be interacting simultaneously. Though code-switching is considered to be that the child is utilizing all their linguistic resources and should be embraced, children should not solely rely on code-switching to communicate. Code-switching should only be utilized when necessary by the speaker, such as when there is lexical uncertainty or when they are following the communication partner’s language lead. Ultimately, there is no right or wrong way to code-switch; however, it is seen as
having more control of the language when a child’s code-switches are elicited. The reason for this is because they are actively participating in the conversation and can “switch” languages to follow their communication partner.

Every child is unique, and will have different levels of input in each language. Factors that contribute to the varying levels of input include age of exposure to each language as well as how much the language is spoken with the child at home and outside of the home (Vu, Bailey & Howes, 2010). These factors influence the frequency and direction of code-switching. Code-switching does not indicate language confusion or language impairment, but should be viewed as a function of a child’s social and interactional skills.

1.4.1 Perceptions of code-switching. Code-switching has been viewed as an undesirable behavior. According to Amorim (2012), code-switching is perceived as “a sign of laziness or mental sloppiness and an inadequate command of the language” (p. 179). Under such a view, the motive of code-switching in children is because they do not care to properly learn a language or an indication that the child is not completely knowledgeable in either language. However, the evidence suggests that the more children code-switch, the greater the skill a child possesses in both languages (Amorim, 2012). It is even suggested that the ability to code-switch is a sign of giftedness (Gutierrez-Clellen, Simon-Cerejido, and Leone, 2009). Children must be confident when navigating grammatical structures as well as know when it is appropriate to code-switch in the sentence. Code-switching is not an easy task to accomplish. Code-switchers must be able to navigate through the different languages available to them in order to get their message across to the listener. Overall, code-switching does not occur because the child does not know a language or that they are confusing the two languages, but rather they are using what they know to increase their social and interactional function (Vu, Bailey & Howes, 2010).
1.4.2 Functions of code-switching. Though some professionals state that code-switching is not proper, there are a plethora of reasons as to why children might code-switch. Both languages of a child are active, so the two languages will influence each other. It is not possible for children to activate one language and deactivate the other; both languages are active at the same time. Another reason children code-switch is due to lexical uncertainty. Children resort to code-switching to “compensate for the lack of language competence” (Amorim, 2012, p. 179). Children also tend to code-switch to reiterate or restate valuable information (Gutierrez-Clellen, Simon-Cerejido, and Leone, 2009). According to Vu, Bailey and Howes (2010), bilingual children as young as 2 years of age classically code-switch. Their main form of code-switching is within utterances (intrasentential code-switching) and this continues until approximately 4 or 5 years of age.

There are four functions of code-switching for children; equivalence, floor-holding, reiteration, and conflict control. Equivalence is when a child “makes use of the native equivalent of a certain lexical item in target language and therefore code-switches to his/her native tongue” (Sert, 2005, p. 3). Floor holding is when a child cannot seem to remember a particular word and chooses to use their native language in order to avoid creating a gap in the flow of communication. Reiteration is when the student repeats what they said in their native language in order to restate what they said so that their message is clearly transmitted and understood by the listener. Conflict control is used by the child when they do not use a correct meaning when they are communicating their ideas and they code-switch to avoid confusion for the listener.

1.5 Code-Switching in Children with Language Impairment

Given that the Hispanic population is currently the largest and fastest-growing minority community in the United States and that many of these bilingual children are diagnosed with
some sort of language impairment, it is important to look at their code-switching patterns and if they differ from those of typically developing children (Gutierrez-Clellen, Simon-Cerejido, & Leone, 2009). According to research conducted by Iluz-Cohen and Walters (2012), children with language impairment produced more instances of code-switching than typically developing children. However, bilingual children with language impairment exhibited some of the same phenomena as those with typical language development, including difficulties with verb inflections, prepositions as well as articles, pronouns, gender marking and lexical retrieval (Iluz-Cohen and Walters, 2012). It is important to see how children with Autism Spectrum Disorder utilize code-switching and if it differs from those of typically developing children and children with other language impairments.

1.6 Research Questions

The limited research on language of intervention for bilingual children with Autism Spectrum Disorder has fueled the formation of this study. The purpose of this study is to add to this limited research, by examining the use of code-switching in bilingual children with ASD. This particular research study will closely look at two bilingual children diagnosed with ASD and their use of code-switching in two languages, English and Spanish. Spanish is the second most spoken language in the United States, with 37.6 million persons ages 5 using Spanish in their homes (Gonzalez-Barrera, 2013). As a border city, El Paso is a heavily Hispanic community where much of the population speaks Spanish at home. This community provides an appropriate context in which to examine how these two languages are used by bilingual children with ASD. The prediction for this research study is that the children will increase their use of code-switching within the bilingual treatment condition, as opposed to a monolingual treatment condition. The following questions were answered in this research study:
1. What language, Spanish or English, do bilingual children with Autism Spectrum Disorder (ASD) use in the different treatment conditions?

2. Do bilingual children with Autism Spectrum Disorder (ASD) show different patterns of code-switching?
Chapter 2: Methods

The current study was part of larger study examining language of intervention in bilingual children with ASD (Muzza, 2017; Alexander, 2015). Two bilingual participants with ASD took part in an alternating treatment single subject design where treatment was alternated between two language conditions, the bilingual condition and the monolingual condition. The current study examined language use and code-switching patterns during the treatment sessions of the larger study. The design of this study was a time series design across 2 participants. This design allowed measurements of the same variable to be taken at different points in time for two different participants.

2.1 Participants

2.1.1 Recruitment. Recruitment of the two participants took place at community events for families of children with ASD. During the recruitment meetings, the audience was informed that a research study was being conducted at the University of Texas at El Paso Speech Language and Hearing Clinic, examining language of intervention choices for bilingual, (Spanish/English), children with Autism Spectrum Disorder. During these meetings, the audience was informed that the children would be part of a research study and would be receiving free intervention for approximately twelve weeks. The audience was made of the exclusionary criterion including; little to no articulation issues; no hearing problems, or any other neurological deficits. The inclusionary criteria, was that children had to be verbal. Flyers were distributed to the attendees in order to further explain the purpose of the study. The flyer contained contact information for graduate student clinicians, as well the contact information for the supervising university professor.
2.1.2 Informed consent. After the participants were recruited, a more in depth personal informational meeting was held with the participant’s parents. During these meetings, written consent forms detailing information about how the research study would be conducted were provided, and included the following sections; the purpose of the study, the evaluation procedure, the treatment procedure, the risks, the benefits, and confidentiality. Parents were told that there would be no risks associated with the study other than the risk of loss of confidentiality. They were also informed that there were no direct benefits for participating in the study other than the possible benefit from the language therapy. The potential parents of the bilingual children agreed to have their child participate in the study and signed the consent form.

2.1.3 Participant profiles. Participant A was a 5.7 year-old female diagnosed with ASD at the age of 3 by a developmental pediatrician. The participant received speech therapy from Early Childhood Intervention until the age of 3 and was receiving speech therapy in school when the study commenced. Participant B was a 3.8 year-old male diagnosed with ASD at the age of 3 by a developmental pediatrician. A diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) was also given to this participant by the developmental pediatrician. The participant attended Head Start at the time of the study. Both participants were exposed to Spanish and English at home and at school.

As part of the larger study, a language evaluation was conducted for each participant. All evaluations took place at the UTEP Speech Language and Hearing Clinic and were administered by bilingual graduate student clinicians, who were fluent in both Spanish and English. A summary of the participants’ language profiles follows.

Hearing screenings and oral mechanism examinations were performed. Two attempts at a hearing screening were made for Participant A but a conditioned response was never consistently
elicited to complete the screening. The participant’s mother did not express any concerns regarding the participant’s hearing. Participant B passed the hearing screening. No abnormalities were noted for participant A during the oral mechanism examination. A short lingual frenulum was noted for participant B.

Case histories with participant’s mothers revealed unremarkable prenatal and birth histories, as well as no delay in fine or gross motor skills. Participant A’s mother stated that the child’s language did not develop properly and that at approximately 18 months pediatrician referred them to ECI. Participant B’s mother stated that by age 1 the participant was producing 1 word utterances, but shortly after turning one, he went through a “silent period” and did not begin to speak until approximately 2 years of age, only being able to name simple objects.

The Preschool Language Scale – 5th Edition, Spanish (PLS-5, Spanish; Zimmerman, Steiner & Pond, 2012) was administered to each participant (See Table 1). A standard score in the range of 85 to 115 is considered average. Participant A obtained a total language standard score of 59. This score placed her -2.73 standard deviations below the mean, and demonstrated receptive and expressive language deficits across her two languages. Participant B scored a standard score of 96 in the Auditory Comprehension portion, which places the participant within the normal functioning limits a child his age. No results were calculated for the Expressive Communication portion, due to lack of participant’s participation.
Table 1

*Results from the PLS-5, Spanish*

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Participant A</th>
<th>Participant B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory Comprehension</td>
<td>62</td>
<td>96</td>
</tr>
<tr>
<td>Expressive Communication</td>
<td>61</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Language Score</td>
<td>59</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note. SS = Standard Score; CI = Confidence Interval; PR = Percentile Rank. SSs are distributed with a mean of 100 and a standard deviation (SD) of 15. A score within 1SD below or above the mean (SS of 85 -115) is considered to be within the average. Any score below 1 SD (SS of 84 or less) is considered to be below the average.

The *Childhood Autism Rating Scale, Second Edition, Standard Version*, (CARS2-ST; Schopler, Van Bourgondien, Wellman, & Love, 2010), which rates the child’s severity of Autism symptoms was completed by the mothers. Participant A scored a raw score of 31, which indicated mild to moderate symptoms of ASD. Participant B scored a raw score of 31.5, which indicated mild to moderate symptoms of ASD.

The participants’ mothers completed the Bilingual Input-Output Survey (BIOS) and Instrument to Assess Language Knowledge (ITALK) from the Bilingual English Spanish Assessment’s (BESA; Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2014) to obtain information regarding the participant’s language exposure and developmental history (see Table 2). Participant A was exposed to more Spanish than English, and used more Spanish than English. She interacted with her mother and sister, and spoke more Spanish to her mother and both Spanish and English with her sister. At school, participant A was exposed to more Spanish. Participant B was exposed to more Spanish than English at home, and used both Spanish and English at school.
Parents rated the child’s language use and proficiency in Spanish and English for both home and school on the ITALK. An average score higher than or equal to 4.18 indicates no concerns. ITALK scores, from home and school, are found on Table 3. Participant A scored below a 4.18 in both languages for both home and school. For participant B, the questionnaire for home was completed by the participant’s mother, but the school information was never obtained. Participant B scored below a 4.18 in both languages for home.

Table 3

\textit{Averages from ITALK-home and school.}

\begin{tabular}{llll}
\hline
 & Participant A & & Participant B \\
 & Spanish & English & Spanish & English \\
\hline
Home & 3.4 & 2.8 & 3.2 & 2.2 \\
School & 3.0 & 2.6 & N/A & N/A \\
\hline
\end{tabular}

2.2 Description of Sessions

For the larger study, 14 treatment sessions were conducted with the order of the treatment condition (bilingual or monolingual) were determined by an online randomizer (see Table 4). For the purpose of the current study, 5-minute language samples in each condition for each session were transcribed for a total of 28 samples (14 bilingual and 14 monolingual) for both participants. These language samples served as the basis for the current study.
Table 4

Randomized interventions for participants

<table>
<thead>
<tr>
<th>Session</th>
<th>Participant A</th>
<th>Participant B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block 1</td>
<td>Block 2</td>
</tr>
<tr>
<td>1</td>
<td>Bilingual</td>
<td>English</td>
</tr>
<tr>
<td>2</td>
<td>Bilingual</td>
<td>English</td>
</tr>
<tr>
<td>3</td>
<td>English</td>
<td>Bilingual</td>
</tr>
<tr>
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<td>English</td>
</tr>
<tr>
<td>9</td>
<td>Bilingual</td>
<td>English</td>
</tr>
<tr>
<td>10</td>
<td>Bilingual</td>
<td>English</td>
</tr>
<tr>
<td>11</td>
<td>English</td>
<td>Bilingual</td>
</tr>
<tr>
<td>12</td>
<td>Bilingual</td>
<td>English</td>
</tr>
<tr>
<td>13</td>
<td>English</td>
<td>Bilingual</td>
</tr>
<tr>
<td>14</td>
<td>Bilingual</td>
<td>English</td>
</tr>
</tbody>
</table>

Note. Block 1=first 30 minutes Block 2=last 30 minutes

Sessions were conducted at the University of Texas El Paso by graduate student clinicians, who were assisted by undergraduate speech language pathology students. Every session was recorded by either video camera, voice recorder, or both. Sessions were divided into two 30 minute blocks. In between the first and second 30 minute block, the graduate clinician and the participant took a 5 minute break and completed an activity. After the break, the language of intervention was rotated.

During the Bilingual Condition, graduate clinicians spoke to the participants in both Spanish and English. If the participants did not respond in the language spoken, the clinicians would change and repeat the same information in the other language. During the Monolingual Condition, the clinicians only spoke English regardless of the participant’s language use.
2.3 Code-Switching.

In order to analyze the participants’ use of code-switching, 5-minute language samples, from both treatment conditions were randomly selected. Each 5-minute language sample was transcribed by a graduate student clinician utilizing SALT (Miller et al., 2011). The use of code-switching was coded in the transcripts. Eleven different codes were used to label both the participant and the examiner’s use of language. Table 5 and 6 display the participants and examiner’s codes with descriptions and examples respectively.

Each utterance was coded for the language used: Spanish or English, exclamations, and code-switching. First, the languages were examined and coded with the following codes; [S] when the participant only spoke Spanish and [E] when the participant only spoke English. Then, exclamations were coded with [X]. An exclamation would be a word that could be used interchangeably in either language, such as the words “wow”, “ok”, or a person’s name. Finally, the utterances were coded for code-switching. The following were the code-switching codes utilized; [CWE], participant code-switched within a single utterance, code-switch was elicited (following the clinician’s lead), [CWS], participant code-switched within a single utterance, code-switch was spontaneous (on their own, without any guidance from the examiner), [CUE] was utilized when the participant code-switched between utterances, elicited (following the clinician’s lead), [CUS] was used when the participant code-switched between utterances, spontaneous (on their own, without any guidance from the examiner).

The examiner’s language codes were also observed, the codes were as follows; [EE] was used when the examiner spoke only in English, [ES] was utilized when the examiner spoke only in Spanish, [ECS] was used when the examiner code-switched either between utterances or within utterances, and [EX] was utilized when the examiner used an exclamation.
**Table 5**

*Coding systems used for transcription of language samples, participants.*

<table>
<thead>
<tr>
<th>Codes</th>
<th>Descriptions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>[S]</td>
<td>When the child speaks the entire utterance in Spanish.</td>
<td>C: Dame la pelota por favor.</td>
</tr>
<tr>
<td>[E]</td>
<td>When the child speaks the entire utterance in English.</td>
<td>C: Give me the ball please.</td>
</tr>
<tr>
<td>[CWE]</td>
<td>Elicited. Code-switching one or more words within an utterance due to the clinician’s use of language. Based on the utterance before.</td>
<td>E: ¿Cuál pelota quieres? C: Dame rojo please.</td>
</tr>
<tr>
<td>[CWS]</td>
<td>Spontaneous. Code-switching one or more words within an utterance. It is not based on the clinician’s use of language.</td>
<td>E: ¿Cuál pelota quieres? C: Give me red por favor.</td>
</tr>
<tr>
<td>[X]</td>
<td>Words that can be used in either language.</td>
<td>C: Wow! C: OK.</td>
</tr>
</tbody>
</table>

**Table 6**

*Coding systems used for transcription of language samples, examiners.*

<table>
<thead>
<tr>
<th>Codes</th>
<th>Descriptions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ES]</td>
<td>The examiner speaks the entire utterance in Spanish.</td>
<td>E: ¿Dónde ponemos la boca?</td>
</tr>
<tr>
<td>[EE]</td>
<td>The examiner speaks the entire utterance in English.</td>
<td>E: Where do we put the mouth?</td>
</tr>
<tr>
<td>[ECS]</td>
<td>The examiner code-switches within or between the utterances.</td>
<td>E: Dame el azul, the blue one. E: Which one do you want? C: Huh? E: ¿Cuál quieres?</td>
</tr>
<tr>
<td>[EX]</td>
<td>Words that can be used in either language.</td>
<td>E: Wow Lisa! E: Oh, oh.</td>
</tr>
</tbody>
</table>

**2.3.1 Reliability.** To obtain reliability for the language sample transcription for both participants, two graduate students listened to the audio from the video recordings and
transcribed the same 5-minute language sample. They compared the two transcriptions obtained from the structured-play activities, and marked areas where they heard differences. This was done for both the bilingual treatment condition as well as for the monolingual treatment condition. The reliability was at 90% accuracy. Reliability was calculated by obtaining the total number of agreements between the two student clinicians, then the number of agreements and the disagreements were divided, and multiplied by 100.

To obtain reliability for the coding of both participants language use, one graduate student clinician and one undergraduate student coded the language samples on their own. They then compared the coded language samples and marked the differences. This was done for both the bilingual and monolingual conditions. The reliability was at 90% accuracy. Reliability was calculated by obtaining the total number of agreements between the two student clinicians, then the number of agreements and the disagreements were divided, and multiplied by 100.

2.3.2 Analysis. After the transcriptions were coded, they were analyzed using SALT to compare the number of instances of code-switching and the type of code-switching in each session. Lastly, the standard deviations and the means were calculated.
Chapter 3: Results

The purpose of the study was to observe the languages spoken as well as the patterns of code-switching utilized by bilingual children with Autism Spectrum Disorder (ASD). Descriptive statistics were utilized to look at the language(s) used across sessions for each participant. Statistical significance was determined with Paired t-tests. Results were considered to be statistically significant at the $p = <0.05$ level. The languages used by the participants were Spanish and English.

3.1 Language Use

The first research question: What language, Spanish or English, do bilingual children with Autism Spectrum Disorder (ASD) use in the different treatment conditions (Bilingual Condition: B Condition and Monolingual Condition: M Condition), was answered by observing the language produced in each condition. Paired t-tests compared the use of language in the Bilingual and Monolingual treatment conditions. Participant A produced significantly more Spanish utterances than English in the B Condition ($t(13) = -11.587, p = .000$; Spanish = 31.86, English = 1.85); see Figure 1. She also produced significantly more English utterances in the M Condition ($t(13) = 12.887, p = .000$; Spanish = 0, English = 31.64). Similarly, Participant B (see Figure 1) produced significantly more Spanish utterances in the B Condition ($t(13) = 6.379, p = .000$; Spanish = 26.21, English = 2.35). He did not produce significantly more English utterances in the M Condition ($t(13) = -0.882, p = .394$; Spanish = 8.93, English = 11), however he did verbalize more English utterances than Spanish utterances.
To determine if one of the treatment conditions results in more utterances produced by the participants the total number of utterances in each condition were compared. No significant differences were found for the total number of utterances produced by Participant A ($t(13)=1.103, p = .290$; B Condition=44.6, M Condition= 44.7) and Participant B ($t(13)=-1.579, p = .138$; B Condition=40.3, M Condition= 46). The participants spoke approximately the same number of utterances in both treatment conditions. See Figure 2.

*Figure 1. Use of language in each treatment condition for both participants.*
3.2 Patterns of Code-Switching

The second research question was: Do bilingual children with Autism Spectrum Disorder (ASD) show different patterns of code-switching? Descriptive Statistics were calculated for each type of code-switch and are displayed in Tables 7 and 8.

Paired t-tests were used to compare the code-switching in the Bilingual and Monolingual treatment conditions. Participant A’s code-switching was not significant for code-switching within utterances, elicited [CWE] \((t(13)= 2.121, p=.054; \text{bilingual}= 0.43, \text{monolingual}= 0)\) and for spontaneous [CWS] \((t(13)= .763, p=.459; \text{bilingual}= 0.57, \text{monolingual}= 0.36)\). However, she produced significantly more code-switches between utterances when elicited [CUE] by the clinician in the B Condition \((t(13)=3.330, p = .012; \text{bilingual}=2, \text{monolingual}= 0.29)\) than the M Condition. The difference between utterances when spontaneous [CUS] was not statistically significant \((t(13)= 2.121, p=.054; \text{bilingual}= 0.5, \text{monolingual} = 0.07)\). Figure 3 shows the types of code-switches and number of code-switches that Participant A produced in each condition.
Table 7

*Code-switching means and standard deviations, Participant A*

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>[CWE]</th>
<th>[CWS]</th>
<th>[CUE]</th>
<th>[CUS]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilingual Spanish-English</td>
<td>0.43</td>
<td>0.57</td>
<td>2.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Mean</td>
<td>0.75</td>
<td>0.85</td>
<td>2.04</td>
<td>0.76</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monolingual English</td>
<td>0.00</td>
<td>0.36</td>
<td>0.29</td>
<td>0.07</td>
</tr>
<tr>
<td>Mean</td>
<td>0.00</td>
<td>0.74</td>
<td>0.61</td>
<td>0.27</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. SD = standard deviation, CWE = code-switching within an utterance elicited, CWS=code-switching spontaneous CUE= code-switching between utterances elicited, CUS=code-switching spontaneous.

Table 8

*Code-switching means and standard deviations, Participant B*

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>[CWE]</th>
<th>[CWS]</th>
<th>[CUE]</th>
<th>[CUS]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilingual Spanish-English</td>
<td>2.71</td>
<td>2.36</td>
<td>3.43</td>
<td>2.14</td>
</tr>
<tr>
<td>Mean</td>
<td>2.26</td>
<td>2.50</td>
<td>2.82</td>
<td>2.11</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monolingual English</td>
<td>1.00</td>
<td>7.79</td>
<td>7.21</td>
<td>7.07</td>
</tr>
<tr>
<td>Mean</td>
<td>1.41</td>
<td>6.09</td>
<td>2.86</td>
<td>3.50</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. SD = standard deviation, CWE = code-switching within an utterance elicited, CWS=code-switching spontaneous CUE= code-switching between utterances elicited, CUS=code-switching spontaneous.
Participant B’s productions (see Figure 4) between conditions for elicited code-switching within an utterance [CWE] was not significant ($t(13)= 2.139, p=.052$; bilingual= 2.71, monolingual= 1.00). He produced significantly fewer code-switches within utterances spontaneously [CWS] in the B Condition ($t(13)= -3.153, p = 0.008$; bilingual=2.36, monolingual= 7.79) than the M Condition. Participant B produced significantly fewer code-switches between utterances when elicited [CUE] by the clinician in the B Condition ($t(13)= -4.033, p = 0.001$; bilingual=3.43, monolingual= 7.21) than the M Condition. He also produced significantly less code-switches between utterances spontaneously [CUS] in the B Condition ($t(13)= -5.116, p = 0.0001$; bilingual=2.14, monolingual= 7.07) than the M Condition.
3.3 Code-Switching by Examiners

To verify if the use of code-switching by the examiner influenced the participants, the examiners’ code-switching was also explored. Results are shown in Figure 5, and revealed that although Participant B’s examiner did code-switch more than Participant A’s examiner, the numbers were only statistically significant in the B Condition. Participant A produced significantly fewer instances of code-switching in the B Condition ($t(13)= 5.664, p = .000$; Participant A Examiner= 3.8, Participant B Examiner= 14). She also produced fewer English utterances in the M Condition ($t(13)= 1.325, p = .208$; Participant A Examiner= 0.07, Participant B Examiner= 0.43), however they were not statistically significant. Therefore, there was a possibility that Participant B’s examiner influenced him to code-switch in the B Condition.

Figure 4. Types and number of code-switches for Participant B.
Figure 5. Mean use of code-switching by Examiners. Note. The numbers are the mean average of examiner’s use of code-switching.
Chapter 4: Discussion

Little research has been conducted on bilingual children with ASD, let alone on their use of code-switching. Understanding the language use of these children would be extremely valuable to discover if they present with patterns that are similar to typically developing children. This information could help individuals who work with this particular population know more about language development in bilingual children with ASD. When looking at the languages used by both participants, it was interesting to note that both participants were able to follow the clinician’s lead and speak in the language that the clinician was using. One of the deficits that children with ASD are affected with, are pragmatic deficits. For example, children with ASD have difficulty with social skills and have trouble maintaining a conversation and staying on topic. Even though, the participants in this study had pragmatic difficulties, they were able to listen to the examiners and pick up on the language(s) being used and speak in that language(s) for the majority of the interaction. They were able to navigate through conversational events when code-switching was utilized.

According to research conducted by Iluz-Cohen and Walters (2012), children with language impairment, produced more instances of code-switching than typically developing children. One participant in the current study produced greater amounts of code-switching than the other. Participant A demonstrated abilities of code-switching that typically developing children exhibit. She had an ease about her use of code-switching, mainly using it when following the clinician’s lead. She mostly spoke only in the language that the clinician was speaking, and only code-switched when the examiner changed the language. Though instances of code-switching were seen by both participants, Participant B produced more code-switching than Participant A, just as a child with language impairment would demonstrate. Participant B
demonstrated lexical uncertainty in his code-switches when he was compensating for the lack of language competence (Amorin, 2012). Participant B also presented with floor holding (Sert, 2005), when he could not remember a particular word and chose to use his native language or a word that he was familiar with in order to prevent creating an interruption in the flow of communication. The two participants followed many of the same patterns as typically developing children, considering that children with ASD have difficulty with pragmatics.

4.1 Variability in Code-Switching Use

The two participants exhibited no variation in code-switching within an utterance when comparing the two treatment conditions. The participants presented with greater instances of code-switching between utterances in the B Condition than in the M Condition. Participant A’s use of code-switching between utterances seemed to be influenced by the clinician’s language use. The higher rate of this type of code-switching indicates that the participant was following the clinician’s lead. For participant B, much of the code-switching occurred when the participant seemed to only have knowledge of the word in one language. The code-switching in the M Condition suggests that the participant was using it as a strategy to fill in the gap of an unknown word.

These findings show that bilingual children with ASD follow similar patterns as typically developing children when it comes to code-switching (Iluz-Cohen and Walters, 2012). Chung (2006) states that code-switching is “triggered when a switcher cannot find a corresponding word or expression in one language or when the language being used does not have the appropriate lexical item, set phrase, or sentence” (p. 305). Examples of code-switching by both participants can be seen in Tables 9 and 10. Participant A (see Table 9) was able to code-switch by following
the lead of the communication partner just as a typically developing child would. This was surprising given she was diagnosed with ASD.

Participant B exhibited different patterns of code-switching (see Table 10), resembling those of a child with language impairment (Gutierrez-Clellen, Simon-Cerejido, and Leone, 2009). When he was unsure of a word in the language that was being spoken to him, he selected a word that he knew even if it was in the other language. Participant B was not able to switch languages when the clinician switched languages as easily as Participant A. This participant produced instances of code-switching which were executed more impulsively. After reviewing his code-switching patterns, it was observed that he would code-switch according to the words that he knew and were part of his lexical inventory as demonstrated in Table 10. He was very familiar with words such as “ball”, “please”, “dame”, and “si”. Therefore, when he needed to use those words, even when the clinician used the words in the contrasting language, he still used the word that he knew and was familiar with.

Table 9

<table>
<thead>
<tr>
<th>Examples</th>
<th>Language Production</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P: Morado.</td>
<td>P: Purple.</td>
</tr>
<tr>
<td></td>
<td>C: What are you going to make?</td>
<td>C: What are you going to make?</td>
</tr>
<tr>
<td>2</td>
<td>P: Yellow sun.</td>
<td>P: Yellow sun.</td>
</tr>
<tr>
<td></td>
<td>C: ¿Quieres pintar el sol amarillo?</td>
<td>C: Do you want to color the sun yellow?</td>
</tr>
<tr>
<td></td>
<td>P: Si, pintar sol amarillo.</td>
<td>P: Yes, color sun yellow.</td>
</tr>
<tr>
<td>3</td>
<td>P: Esta llorando.</td>
<td>P: She’s crying.</td>
</tr>
<tr>
<td></td>
<td>C: Who’s crying?</td>
<td>C: Who’s crying?</td>
</tr>
<tr>
<td></td>
<td>P: The girl.</td>
<td>P: The girl.</td>
</tr>
<tr>
<td>4</td>
<td>P: All done.</td>
<td>P: All done.</td>
</tr>
<tr>
<td></td>
<td>C: ¿Ya acabamos?</td>
<td>C: Did we finish?</td>
</tr>
<tr>
<td></td>
<td>P: Si, ya acabamos.</td>
<td>P: Yes, we finished.</td>
</tr>
</tbody>
</table>

*Note. P=participant and C=clinician.*
Table 10

*Language production: Participant B*

<table>
<thead>
<tr>
<th>Examples</th>
<th>Language Production</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C: ¿Quieres jugar con la pelota?</td>
<td>C: Do you want to play with the ball?</td>
</tr>
<tr>
<td></td>
<td>P: Dame ball please.</td>
<td>P: Give me ball please.</td>
</tr>
<tr>
<td>2</td>
<td>C: I pass it to Alezandra?</td>
<td>C: I pass it to Alezandra?</td>
</tr>
<tr>
<td></td>
<td>P: Si, to Alezandra.</td>
<td>P: Yes, to Alezandra.</td>
</tr>
<tr>
<td>3</td>
<td>C: ¿Cómo quieres ponerlo?</td>
<td>C: How do you want to put it?</td>
</tr>
<tr>
<td></td>
<td>P: Mira así please.</td>
<td>P: Look like this please.</td>
</tr>
<tr>
<td>4</td>
<td>C: Can you ask for the nail?</td>
<td>C: Can you ask for the nail?</td>
</tr>
<tr>
<td></td>
<td>P: Dame nail please.</td>
<td>P: Give me nail please.</td>
</tr>
</tbody>
</table>

*Note. P=participant and C=clinician.*

There are several reasons as to why these two participants might exhibit different code-switching patterns. First, Participant A was approximately 1 ½ years older than Participant B. A study by Vu, Bailey, & Howes, 2010, found that typically developing children decrease the amount of code-switching by the age of 4 or 5 years which is consistent with what is demonstrated by Participant A. Furthermore, being older gave her more language experience overall. She had been part of many more conversations and therefore might have known how to navigate them with more ease. Participant A had also received more schooling and was attending Pre-K at the time of the study. Participant B on the other hand, had only just recently been enrolled in school. Being older, having more life experience, as well as additional schooling gave Participant A extra time to develop her pragmatic skills, which are skills necessary in order to engage and maintain conversations. Participant A was also a girl as opposed to Participant B who was a boy. What has been typically known is that girls mature faster than boys (Sifferlin, 2013). Therefore, maturity from the part of Participant A could have also been a reason as to why she had fewer instances of code-switching and was able to follow the clinician’s lead with greater ease.
4.2 Limitations

There were limitations in this research study. The first limitation was sample size. Only two participants were part of this study, which makes it more difficult to generalize findings to all bilingual children with ASD. Children of different ages, severities, and spoken languages should be used for future studies. Another limitation was that the participants were not the same age. Thus, they were at different stages in their language development and production. The difference in ages may also have contributed to differences in social experience, maturity, and schooling. As older and more experienced, Participant A, may have acquired better pragmatic skills which could have led to fewer code-switches and allowed her to follow the clinician’s lead effortlessly. Finally, Participant B’s language use questionnaires could not be completed by the participant’s teacher. It would have beneficial to obtain direct information from Participant B’s teacher thus giving the research more accurate data.

4.3 Clinical Implications and Future Directions

The findings from this research study provide evidence that when a child is allowed to use both of their languages; they are actually not being confused but are using all of their cognitive and linguistic resources. Many researchers and professionals throughout the years have seen code-switching as a negative indicator of limited language proficiency in either one or both languages. The findings support the study by Hughes, Shaunessy, Brice, Ratliff, and McHatton, (2006), who wrote that children who utilize code-switching are able to navigate and incorporate both languages into their world, “When bilingual children can alternate between their two languages with ease and can maintain grammaticality of both languages, then this appears to be evidence of advanced language and higher order thinking skills” (p.21). The findings confirm that code-switching is not a language deficit or communicative deficiency, but rather that it is an
additional resource that bilingual children can utilize to communicate their messages. It is essential to remember that bilingual children, particularly those with ASD, are not only coping with a disability, but they are also living in a world where two languages are spoken to them. Code-switching serves as a tool, that will not only help them communicate, but also aid them as they steer through the different relationships they will have with people both at home and in the community.

Future studies can focus on replicating and expanding the findings of this study with other participants, with different levels of severities as well as different levels of bilingualism. It would also be interesting to return to evaluate Participant B once he is 5 years old, to see if he shows code-switching patterns that mirror Participant A’s patterns.
References


Vita

Monica Yolanda Ponce-Lawler was born in El Paso, TX. She is the first born child of Omar Ponce and Yolanda Ponce. She is married to Gabriel Lawler and has two children, Angelique Elena Lawler and Noah Omar Lawler. She received a Bachelor’s Degree in Education from Our Lady of the Lake University (OLLU) in 2000. She taught for 13 years for both the Ysleta Independent School District and Socorro Independent School District. In the fall of 2015, she entered the University of Texas at El Paso (UTEP) to obtain her Masters of Science in Speech-Language Pathology, with a Bilingual Certification. She was awarded the Preparing Bilingually Certified Speech Language Pathologists’ grant for the 2015-2016. While pursuing her Master’s Degree, she was part of the Research in Bilingual Language Learning Laboratory under the supervision of Dr. Connie Summers. She participated in presenting her research at the ARMADILLO, The Southwest Cognition Conference. Her research was presented at the 2016 UTEP Graduate Student Expo, where she received Honorable Mention for her work. She served as the historian officer for the National Student Speech Language Hearing Association for the 2015-2016 school year.

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This thesis was typed by Monica Yolanda Ponce-Lawler.