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Morphological Production Accuracy Patterns in Younger and Older Spanish-English Bilingual Children

Isabel Angelica Cano
University of Texas at El Paso

MORPHOLOGICAL PRODUCTION ACCURACY PATTERNS

IN YOUNGER AND OLDER SPANISH-ENGLISH

BILINGUAL CHILDREN

ISABEL ANGELICA CANO

Master's Program in Speech-Language Pathology

APPROVED:

_____
Patricia Lara, Ph.D., CCC-SLP, Chair

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

_____
Deena Peterson, M.S., CCC-SLP

_____
William Roberts, Ph.D., OTR

_____
Stephen L. Crites, Jr., Ph.D.
Dean of the Graduate School

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IN YOUNGER AND OLDER SPANISH-ENGLISH
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by

ISABEL ANGELICA CANO, B.A.

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Abstract

Clinicians require a model of typical bilingual language development. Morphological production accuracy patterns vary in Spanish-English (S-E) bilingual children considering differences in the exposure and use of their two languages compared to their monolingual peers. The purpose of the current study was to examine morphological production accuracy patterns in thirty younger (3- to 4-years old) and older (5- to 6-years old) S-E bilingual children utilizing English and Spanish Morphosyntax subtests from a bilingual language screener. Across development, older bilingual children were more accurate on all forms in both English and Spanish than younger bilingual children. Across languages, all S-E bilingual children were more accurate with their morphological productions overall in English than in Spanish. Researchers and clinicians should consider an individual bilingual child's morphological productions and expect differences in their accuracy patterns across development and across languages.

Table of Contents

List of Tables

Chapter 1: Literature Overview

The vast majority of the population in the world is bilingual or multilingual (Dockrell & Marshall, 2015; Jackson-Maldonado, 2012). According to the U.S. Census Bureau (2018), the Hispanic population has reached 58.9 million people constituting about 18.1% of the population. Among this fast growing population, about 25% speak English only, 38% speak Spanish only, and 36% are Spanish-English (S-E) bilinguals (Krogstad & Gonzalez-Barrera, 2015; Jackson-Maldonado, 2012). At school entry, children from bilingual backgrounds vary considerably in their proficiency of each of their languages due to differences in exposure to their languages and the contexts in which their languages are learned and used (Bedore, Cooperson, & Boerger, 2012). In effect, bilingual children may understand but not use one or both languages (Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010). In the U.S., the demand for learning English also increases as bilingual children enter the educational system between 3 and 6 years of age, which may impact their Spanish language development (Bedore & Peña, 2008). This culturally and linguistically diverse population has resulted in challenges for speech-language pathologists in accurately identifying S-E bilingual children with language impairment (LI; Dockrell & Marshall, 2015). In fact, S-E bilingual children can be both over- and under-identified for LI (Goldstein, 2012). This has been partly due to biased standardized language assessments as well as limited normative data on a typical range for language development patterns in S-E bilingual children (Bedore et al., 2012; Goldstein, 2012; Jackson-Maldonado, 2012).

Clinicians require a model of typical bilingual language development that may serve as a framework for determining expectations in assessment and intervention with S-E bilingual children. As more bilingual language development research is being conducted, a greater emphasis has been placed on morphology, as this domain is one of the most affected in English-speaking children with LI (Jackson-Maldonado, 2012). Researchers have recognized this need for more information on the rate and order of morpheme acquisition and use in S-E bilingual children (Bedore et al., 2012). This information is critical during diagnostic assessments, considering that

accurate identification and early intervention may mitigate future language difficulties (Baron, Bedore, Peña, Lovgren-Uribe, Lopez, & Villagran, 2018; Guiberson & Rodriguez, 2010; Fricke, Bowyer-Crane, Haley, Hulme & Snowling, 2013; Jackson-Maldonado, 2012).

The goal of the current study was to further examine patterns in typical morphological development in S-E bilingual children. A discussion of the three primary areas of research in the bilingual language development literature that have aimed to distinguish and document morphological development follows, including 1) age of morpheme acquisition patterns, 2) morpheme production accuracy patterns, as well as 3) patterns of grammatical errors with morphemes to indicate LI. Additional factors that influence the initiation and development of each of a bilingual's languages are also reviewed, including cross-linguistic differences and potential qualitative and quantitative differences in language experiences. Considering these factors will help clinicians work with bilingual children as they enter the educational system.

1.1 Morphological Age of Acquisition Patterns

First, with respect to documenting typical morphological development patterns in S-E bilinguals, numerous studies have focused on age of morpheme acquisition in accordance to a preestablished criterion. Such patterns have been documented by first recognizing ages when forms begin to emerge as children start to use their languages, followed by identifying ages when those forms are used consistently and considered fully acquired. Table 1 provides a summary of monolingual and bilingual morphological age of acquisition patterns documented from prior literature.

Table 1. *Monolingual and Bilingual Morphological Age of Acquisition (AoA) Patterns*

Monolingual Acquisition

	English		Spanish	
	Morphemes	AoA (years;months)	Morphemes	AoA (years;months)
Early Acquisition	Present progressive-*ing*	1;7 - 2;4	Articles	4;0
	Prepositions	2;2 - 2;9	Past-tense	4;0
	Plurals	2;2 - 2;9	Plurals	4;0 - 5;11
	Negatives	2;0 - 3;0	Direct Object Clitics	3;0 - 6;0
	Irregular Past-tense	2;1 - 3;10	Prepositions	4;0 - 5;9
	Possessive-*s*	2;1 - 3;10	Subjunctives	4;0 - 7;0
	Uncontractible/ Contractible Copulas	2;3 - 4;2		
	Uncontractible/ Contractible Auxiliaries	2;3 - 4;2		
	Articles	2;3 - 4;2		
	Regular Past-tense	2;3 - 4;2		
	3rd person singular- *s*	2;3 – 4;2		
Late Acquisition	Passives	4;0 - 5;0		

Bilingual Acquisition

	English		Spanish	
	Morphemes	AoA (years;months)	Morphemes	AoA (years;months)
Early Acquisition	Articles	5;0	Articles	5;0
	Past-tense	5;0	Past-tense	5;0
	Plurals	5;0	Plurals	5;0

Direct Object Clitics	7;0
Subjunctives	4;0 - 7;0

Late Acquisition

1.1.1 Monolingual morphological age of acquisition patterns. Age of acquisition patterns of language-specific morphemes have been extensively documented in monolingual environments (See Table 1). Brown (1973) reported on early emerging and acquired morphemes in monolingual English-speaking children. This developmental data is commonly known and utilized in both theory and practice today as "Brown's Fourteen Grammatical Morphemes" (Early Morphological Development, n.d.). According to this data, the earliest emerging and acquired morphemes in English include present progressive-*ing*, prepositions, and plurals between ages 1;7 and 2;9 (years;months). Other research has also included negation forms as early emerging and acquired between ages 2;0 and 3;0 (Sax & Weston, 2007). The next emerging forms noted by Brown (1973) include irregular past-tense and possessive-*s*, which are reported to be acquired between ages 2;1 and 3;10. Finally, the latest emerging forms in English reported by Brown (1973) include uncontractible and contractible copulas, uncontractible and contractible auxiliaries, articles, regular past-tense, and 3rd person singular-*s*, which are reported to be acquired between ages 2;3 and 4;2. With these forms, other work has also included the passive voice as one of the latest emerging and acquired forms in English between ages 4;0 and 5;0 (Sax & Weston, 2007).

Prior literature has also identified early emerging and acquired morphemes in monolingual Spanish-speaking children. The earliest emerging and acquired morphemes in Spanish include articles, past-tense (both preterite and imperfect), and plurals (Kernan & Blount, 1966; Pérez-Leroux, 1998; Pérez-Pereira, 1989). These forms begin to emerge around 1;8-2;6 years of age and are fully acquired between 4;0 years and 5;11 years of age (Bedore & Leonard, 2005; González, 1978; Vazquez & Alonso, 2007). Next, the noted later acquired morphemes in Spanish include direct object clitics, prepositions, and subjunctives (Baron et al., 2018). Although direct object

clitics and the subjunctive mood have been shown to emerge early around ages 2;0-2;7, consistent use of these forms appears to vary across Spanish monolingual development. As such, these forms are considered later acquired anywhere between 3;0-4;0 and 6;0-7;0 years of age (Baron et al., 2018; González, G, 1983; Pérez-Leroux, 1998). Prepositions, on the other hand, are noted as both a late emerging and later acquired form between ages 4;0 and 5;9 (Jackson-Maldonado & Maldonado, 2017).

1.1.2 Bilingual morphological age of acquisition patterns. To expand these language-specific development patterns, age of morpheme acquisition patterns in bilingual environments has also been considered (See Table 1). Similar to monolingual acquisition patterns, articles, past-tense, and plurals emerge early and are acquired early by age 5;0 in S-E bilingual children (Kvaal, Shipstead-Cox, Nevitt, Hodson, & Launer, 1988; Simón-Cereijido & Gutiérrez-Clellen, 2007). On the other hand, although direct object clitics have been noted to emerge early in both monolingual and bilingual speakers, they are reported to be produced more consistently earlier in Spanish monolinguals and not fully acquired until much later in bilinguals at 7;0 years of age (Jacobson, 2012; Simón-Cereijido & Gutiérrez-Clellen, 2007). Furthermore, though subjunctive forms were reported to be early emerging but later acquired between ages 4;0 and 7;0 in both monolingual and bilingual development, bilingual speakers demonstrate reduced-to-absent use of these forms until later ages (Castilla-Earls, Pérez-Leroux, Restrepo, Gaile, & Chen, 2018; Morgan, Restrepo, & Auza, 2013; Silva-Corvalán, 2014).

Overall, although interpretations of the age of morpheme acquisition data are limited to the relatively few forms that have been systematically documented in S-E bilingual children, this area of research has shown that bilingual patterns of English and Spanish morphological development are comparable to the patterns observed in monolingual children. Bilingual children may acquire forms in a similar order as their monolingual peers. However, morphemes in both English and Spanish have been noted to be acquired at later ages in bilingual children, indicating that bilingual children may not acquire the morphemes at the same rate as their monolingual peers. Rate of morpheme acquisition may be impacted by the differing demands of the two languages (Bedore

and Peña, 2008).

1.2 Morphological Production Accuracy Patterns

Another way to think about bilingual morphological development is through children's production difficulties with the forms in each of their languages. As children continue through development, they not only acquire the morphemes of their languages, they begin using them with increasing accuracy over time until they reach mastery. One method of examining mastery is to measure children's accuracy with their morpheme productions. More recent research with S-E bilinguals has focused on accuracy of morpheme use in specific tasks and contexts (e.g. language samples, cloze sentence tasks, and sentence repetition tasks) to further document patterns of typical morphological development (Baron et al., 2018; Taliancich-Klinger, Bedore, & Pena, 2018). Table 2 provides a summary of the bilingual morphological production accuracy patterns documented in the recent literature.

Table 2. *Bilingual Morphological Production Accuracy Patterns*

Accuracy	Morpheme Sets
Most Accurate	Imperfect Past-tense, Plurals, Singular articles, Conjunctions
↓	Plural Articles, Preterite Past-tense
Least Accurate	Prepositions, Subjunctives, Direct Object Clitics

Baron and colleagues (2018) sought to examine which morphemes were most accurate in 228 typically developing 4;0 to 7;6 year-old S-E bilingual children. This study expanded previous morphological acquisition research by investigating the difficulty of Spanish forms, as well as if the same forms were difficult in each of a bilingual child's languages (See Table 2). Results from this study indicated that the most accurate forms were imperfect past-tense, plurals, singular articles, and conjunctions. Although conjunctions have been less systematically investigated than other morphemes, the results from this study were largely consistent with the prior morphological age of acquisition literature that articles, plurals, and past-tense are the earliest emerging and acquired morphemes in both monolinguals and bilinguals (Brown, 1973; Kvaal, Shipstead-Cox,

Nevitt, Hodson, & Launer, 1988; Kernan & Blount, 1966; Pérez-Leroux, 1998; Pérez-Pereira, 1989; Simón-Cereijido & Gutiérrez-Clellen, 2007). Conjunctions were elicited in a sentence repetition task, and researchers suggested that the children's high accuracy reflected production ability in sentence constructions that the children have heard and been exposed to before (Baron et al., 2018). The second most accurate set of morphemes were plural articles and preterite past-tense, while the least accurate set of morphemes included prepositions, subjunctive forms, and direct object clitics. Lower accuracy with subjunctive forms and direct object clitics was also consistent with previous literature regarding later acquisition patterns in bilinguals (Castilla-Earls, Pérez-Leroux, Restrepo, Gaile, & Chen, 2018; Jacobson, 2012; Morgan, Restrepo, & Auza, 2013; Silva-Corvalán, 2014; Simón-Cereijido & Gutiérrez-Clellen, 2007).

To further investigate production difficulties with the forms in each a bilingual child's languages, another recent study by Taliancich-Klinger and colleagues (2018) examined accuracy of English preposition use in 148 typically developing older (7;0 to 9;11 year-old) S-E bilingual children utilizing a sentence repetition task on an experimental version of a morphosyntax test designed for older S-E bilinguals. The bilingual children exhibited a significantly higher mean production accuracy for Spanish prepositions than for English. Taliancich-Klinger et al. (2018) also explored other variables that may predict preposition accuracy in English. Results demonstrated that less English input and output accounted for most of the variance in the English prepositions scores. This finding highlights how preposition knowledge in older S-E bilinguals may be impacted by the experiences children have with each of their languages (input and output). Researchers also noted how the overall preposition scores in both languages were considered low, which was consistent with findings from Baron and colleagues (2018; See Table 2).

Overall, these two studies provided further insight into morphological production difficulties of forms in typical bilingual development. Results from this recent area of research highlighted accurate forms related to the prior literature documenting earlier and later bilingual morphological age of acquisition patterns, suggesting that bilingual children may acquire morphemes common to both languages with less difficulty and at a faster rate (Bedore and Peña,

2008). However, researchers only focused on accuracy patterns of specific morphemes common to both languages and of those unique to Spanish, but not morphemes unique to English. More work is needed to determine which forms are more or less difficult in each of a child's languages across development.

1.3 Patterns of Grammatical Errors with Morphemes

Beyond patterns of typical development, morphemes can be used as clinical markers as well. Other researchers have aimed to document typical morphological development patterns in S-E bilinguals by identifying morphological clinical markers in studies with children with LI. Clinical markers are language behaviors that reliably differentiate children with LI from those who are typically developing (Bedore & Peña, 2008). In English, tense marker errors, including 3rd person singular, regular past-tense-*ed*, and copula forms, have been identified as clinical markers for LI for English monolinguals (Eisenberg & Guo, 2013; Rice & Wexler, 1996). In Spanish, grammatical errors with articles, direct object clitics, and propositions have been identified to indicate LI (Bedore, & Leonard, 1998, 2001, 2005; Jackson-Maldonado & Maldonado, 2017).

Another assessment challenge for clinicians working with bilingual populations is that, although morphological clinical markers for LI have been documented, much of this area of research has been conducted with monolingual children. Data on clinical markers that function for S-E bilingual children is only beginning to emerge. Many grammatical errors with morphemes during assessments with bilinguals has been associated as a sign of LI when they actually may be a manifestation of typical bilingual developmental processes. Beginning work suggests that grammatical errors should be expected in bilingual children, and the frequency and type of the morpheme error is what should be considered (Bedore et al., 2012).

1.4 Potential Factors Influencing Bilingual Morphological Development

Taken together, these three primary areas of morphological development research in the bilingual language development literature have begun distinguishing typical bilingual morphological development patterns. However, part of the challenges in establishing a typical range for language development patterns in bilingual children also involve potential influences of

additional factors, including cross-linguistic differences and qualitative and quantitative differences in language experiences.

    1.4.1 Cross-linguistic differences. First, it is well known that cross-linguistic differences exist between English and Spanish. Examples include specific forms that exist in Spanish but not in English and grammatical functions of certain morphemes that differ across languages (Jackson-Maldonado & Maldonado, 2017). These differences in how morphemes are distributed across languages affect bilingual language development (Bedore et al., 2012; Goldstein, 2012; Jackson-Maldonado, 2012; Taliancich-Klinger et al., 2018). Morphological patterns vary in S-E bilinguals and some errors may be less or more frequent in bilinguals than what is observed in their monolingual peers (Bedore, Peña, Gillam, & Ho, 2010). For example, Restrepo and Gutierrez-Clellen (2012) suggest that S-E bilingual children may not exhibit the same difficulties with verb tense errors in English due to the rich morphology in the Spanish language. On the other hand, S-E bilingual children may demonstrate greater difficulty with other forms. For instance, articles in English are not marked for gender or number as they are in Spanish. Prepositions are also produced differently in English and Spanish and some Spanish prepositions have various prepositional meanings in English (Baron et al., 2018; Taliancich-Klinger et al., 2018). Spanish also has a notable amount of direct object clitics that serve a wide range of grammatical functions in addition to subjunctive forms that are commonly expressed with varying clause types (Baron et al., 2018; Pérez-Leroux, 1998). Therefore, omissions or substitutions of these morphemes may be expected in S-E bilingual language-learners (Jackson-Maldonado & Maldonado, 2017). These differences in error patterns are important to consider during diagnostic assessments with bilingual children, as grammatical errors in the accuracy of morpheme use may be a result of cross-linguistic differences and do not constitute LI.

    1.4.2 Qualitative differences in language experiences. Second, qualitive differences of language input (what they hear in their environment) may also play a role in the differences seen in S-E bilingual language development. Persson and Prins (2012) examined the quality of language input at home and school and its effect on semantic and morphosyntactic development in 178 4-

year-old Dutch-English-speaking children who were enrolled at 14 different early English (as the second language) schools. Parents and teachers completed questionnaires that established the quantity of language input at home and at school. The quality of each input amount was also determined through written reports of which English contexts the child was exposed to at home and through the teachers' English language proficiency at school. Interestingly, although the schools in the sample may have varied in the quantity and quality of English education, results indicated that only the quality of the input at school, and not the quantity, was statistically significant for the amount of variance that could be explained in the children's language performance after the school year. Though findings supported the quality of school language input as a significant predictor of bilingual morphological development, it is important to consider that language-learning contexts continue to vary as children progress through school.

1.4.3 Quantitative differences in language experiences. Lastly, given the divided language experience across two languages, S-E bilingual children differ in the quantity of language input (what they hear) and output (what they say) in each of their languages compared to their monolingual peers. Bohman and colleagues (2010) sought to explore if quantitative language experience factors contributed to Spanish and English language development in 757 Hispanic pre-kindergarten and kindergarten-age bilingual children, as measured by performance on semantics and morphosyntax subtests. Parents quantified the children's language experiences through detailed reports of initial exposure to both languages and weekly patterns of input and output in each language. Although it has been well documented that the amount of language experience predicts language proficiency skills in bilinguals, the results from this study distinctly detailed the importance of an increased amount of language input as bilingual children begin to learn a second language, and the importance of an increased amount of output as they progressively add knowledge to their languages. In other words, after starting to learn a second language through language exposure in their environments, bilingual children must practice using the language in order to increase the proficiency of their language skills. Performances in the semantics and morphosyntax domains were also differentially related to amount of input and output in each

language, where scores on the semantics subtest were more heavily dependent on increased input than output and morphosyntax scores relied on both input and output amount. These results highlight the important role of increased language input and output on morphological development in English and Spanish. However, it is unclear how the dynamic nature of these language experience factors influence bilingual morphological development across time.

1.5 Purpose of The Current Study

In summary, the literature has shown that S-E bilingual children appear to acquire morphological structures in a similar order as monolingual children (See Table 1). However, S-E bilingual children may not acquire morphological structures at the same rate as their monolingual peers, as certain morphemes have been noted to be acquired later in bilingual children compared to their monolingual peers. These previously documented morphological age of acquisition patterns coincide with more recent research that has investigated morphological production accuracy patterns to examine S-E bilingual children's production difficulties with the forms in each of their languages (See Table 2; Baron et al., 2018; Taliancich-Klinger et al., 2018). The documented early acquired forms were produced with the highest accuracy (articles, past-tense, and plurals), while forms that have been noted to be later acquired were produced with the lowest accuracy (direct object clitics, subjunctives, and prepositions). Although this recent work has provided further insight to the production difficulties with forms in typical bilingual development, data is limited to specific morphemes common to both languages and of those unique to Spanish. Therefore, it is not clear if S-E bilingual children have more or less difficulty with other forms in English. It is also unclear which forms in English and Spanish are more or less difficult for bilingual children across development.

Taken as a whole, it is apparent as to why assessment challenges exist for clinicians working with S-E bilingual populations, considering the limited normative data on a typical range for bilingual language development patterns in addition to potential effects of cross-linguistic differences and quantitative and qualitative differences in language experiences on bilingual morphological development. In assessment, many grammatical errors with morphemes has been

associated as an indicator of LI, when a bilingual child may only be beginning to practice sets of developing morphemes in their language(s). Information regarding which forms S-E bilingual children have more or less difficulty with in both Spanish and English, as well as which forms bilingual children are more accurate with as they continue through development would better inform clinical practice. As such, the current study aimed to further the recent knowledge-base of typical developmental trends of accurate morpheme use (Baron et al., 2018; Taliancich-Klinger et al., 2018) in younger and older S-E bilingual children. This study investigated production accuracy of forms common in both languages (Prepositions and Conjunctions), forms in Spanish (Articles, Direct Object Clitics, and the Subjunctive mood), and forms in English (3rd Person Singular-*s*, Negatives, and Passives; Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2014). To address gaps in the literature in production accuracy across development and across languages, the following questions were asked:

1. Do younger bilingual children demonstrate different morphological accuracy patterns in English compared to older bilingual children?

2. Do younger bilingual children demonstrate different morphological accuracy patterns in Spanish compared to older bilingual children?

3. What overall morphological accuracy patterns do bilingual children demonstrate across English and Spanish?

Chapter 2: Methodology

2.1 Participants

2.1.1 Recruitment. The current study was part of a larger project examining diagnostic accuracy of various assessment tools for S-E bilingual children living in a US/Mexico border city (Curtis, Summers, Stubbemann, & Smith, 2017). This study was approved in Fall of 2016 by the University of Texas at El Paso's Institutional Review Board (IRB) for human subjects' research. The participants were recruited from daycares, preschools, and Head Start programs at a university clinic around the local region by sending flyers in both English and Spanish. Each facility was also provided with a letter of purpose for the study. Families who agreed to participate in the study were compensated with a $40.00 gift card to a local grocery store upon the participants' completion of the study, which was funded by a University of Texas at El Paso Graduate School Award.

2.1.2 Consent forms. Consent forms approved by the IRB were issued to the children's parents/guardians in their preferred language (English or Spanish). The consent forms included information about the purpose of the study, the benefits of participating in the study, any potential risks such as participant confidentiality and discomforts such as fatigue. The consent form also included a disclosure statement that specified the participant may choose to withdraw from the study at any time without penalties, as well as an authorization statement followed by the participant's printed name and signature.

2.1.3 Inclusionary and exclusionary criteria. Forty-seven consent forms were received from participants, and 44 children completed the larger project. Three participants did not complete the study due to scheduling unavailability (n=1) and preexisting neurodevelopmental disorders reported by parents (n=2). Inclusionary criteria for this current study included participants who were (a) 3-to 6-years-old, (b) completed a language sample in at least one language, (c) had combined input/output of at least 10% in both languages, and (d) passed a hearing screening in accordance to the American-Speech-Language-Hearing Association (ASHA) standards at 25 dBHL for the frequencies 1000, 2000, and 4000 Hz. Exclusionary criteria included any known

neurological or cognitive concerns reported by parents. Thirty S-E bilingual participants met the inclusionary criteria for the current analysis (See Table 3). There were 15 males and 15 females with a mean age of 4;8 (ranged from 3;2 to 6;10). The participants were divided into two age groups, the younger 3- to 4-year-old bilingual age group (YB; N = 20) and the older 5- to 6-year-old bilingual age group (OB; N = 10).

2.2 Measures

2.2.1 Parent-teacher questionnaires. The participant's parents and teachers completed the *Bilingual Input-Output Survey* (BIOS) questionnaire from the *Bilingual English Spanish Assessment* (BESA; Peña et al., 2014) to determine their combined input/output in English and Spanish. Parent questionnaires were either completed in-person or via telephone with a trained bilingual research assistant in the parent's dominant language. Teacher questionnaires were completed in-person. On this questionnaire, information was gathered regarding the children's history of language exposure from birth to their current amounts of language exposure and use. Parents and teachers provided hour by hour indications of input (what they hear) and output (what they say) in each language, after which the home and school hours were combined to reflect the children's daily schedule. Reported hours were averaged across weekdays and weekends to calculate percentages of language input and language output for both age groups. This procedure for calculating language input and output has been utilized in other studies with S-E bilinguals and has been found to be a reliable and valid tool to record how much of each language a child hears (input) and uses (output) consistently, and has also been correlated with performance on semantic and morphosyntax measures (Bedore, Peña, Griffin, & Hixon, 2016; Bohman et al., 2010; Taliancich-Klinger et al., 2018). As per the inclusionary criteria, children were required to exhibit a combined input/output of at least 10% in both languages to confirm their bilingual experiences (See Table 3).

Table 3. *Younger and Older S-E Bilingual Participant Characteristics*

Age Group	N	Mean Age (years;months)	English		Spanish	
			Input % (SD)	Output % (SD)	Input % (SD)	Output % (SD)
YB	20	4;2	49.60 (20.76)	61.44 (34.16)	50.40 (20.76)	38.56 (34.16)
OB	10	5;8	55.24 (18.05)	71.15 (27.54)	44.76 (18.05)	28.85 (27.54)

Note. YB = Younger 3-4 year-old bilingual age group; OB = Older 5-6 year-old bilingual age group. Combined Input/Output percentages in English and Spanish were obtained from the BIOS.

2.2.2 Morphological task. The *Bilingual English Spanish Oral Screener* (BESOS) is a language screener that is also part of the BESA (Peña et al., 2014) and is used to identify children who are at risk for LI with morphosyntax and semantics test items. The BESOS has two versions; a version for younger children that can be used with 3- and 4-year-olds and a version for older children that can be used with 5- and 6-year-olds. The BESOS consists of four subtests, including a Semantics subtest in English and Spanish, and a Morphosyntax subtest in English and Spanish. The Morphosyntax subtests were utilized for the current study, which included cloze sentence items and sentence repetition items to elicit morphemes (See Table 4). The English Morphosyntax subtest includes 11 cloze sentence items and 6 sentence repetition items for younger children and 10 cloze sentence items and 7 sentence repetition items for older children. Cloze items in English target 3rd Person Singular-*s*, Negatives, Passives, Past-tense (regular and irregular), Present Progressive-*ing* (Present Prog-*ING*), and Copula forms. The Spanish Morphosyntax subtest consists of 11 cloze sentence items and 5 sentence repetition items for younger children and 12 cloze sentence items with 4 sentence repetition items for older children. Cloze items in Spanish target Articles, Direct Object Clitics, and Subjunctive forms. The sentence repetition items in both English and Spanish target various morphosyntactic forms, including Prepositions and Conjunctions.

Table 4. *BESOS Sample Items*

Morpheme	Example	YB	OB
English			
3rd Person Singular-*s*	E: Everyday these dogs drink water. And here this dog does it too. What does he do everyday? Everyday the dog…**T: drinks**	3	2
Negatives	E: These men have mustaches. And these men? **T: don't**	5	3
Passives	E: The baby is carried by the mother. What happened to the baby here? **T: is/was/got/being/getting carried**	3	1
Past-tense	E: Today, he is walking his dog. And yesterday, he did it too. What did he do yesterday? Yesterday he… **T: walked**	-	2
Present Prog-*ING*	E: Maria and Juan want to watch T.V. They are doing it now. What are they doing here? They… **T: are watching**	-	1
Copula	E: Maria and Juan went to the zoo yesterday. At the zoo this elephant was big. And these elephants… **T: were/are**	-	1
Sentence Repetition	The children had to do their homework **before they watched TV.**	6	7
	Total Score	17	17
Spanish			
Articles	E: María se lava la cara. Y aquí, ¿qué se lava María? **T: las manos/ sus manos**	2	4
Direct Object Clitics	E: Juan va a pintar la mesita. Y aquí, ¿Qué hace Juan con la mesita? **T: la pinta**	8	6
Subjunctive	E: La mama quiere que pongan la mesa. Y aquí, ¿qué quiere la mama? La mama… **T: coman/ tomen**	1	2
Sentence Repetition	**El gato** no quiería comer **aunque** tenia hambre.	5	4
	Total Score	16	16

Note. YB = Younger 3-4 year-old bilingual age group; OB = Older 5-6 year-old bilingual age group; T = Target response; -Forms not tested at that age on the BESOS.

2.3 Procedures

    2.3.1 Research design and data collection. Participants were individually tested in both English and Spanish following a randomized block research design. Participants in the larger study were first placed in a monolingual (English or Spanish) or bilingual (English and Spanish) test administration sequence depending on the participants' combined input/output levels as determined by the BIOS. Participants were then randomly assigned to a predetermined testing sequence in order to reduce test order bias. After completing the hearing screening, participants followed their assigned test order sequence and were administered the BESOS, the *Preschool Language Scales – Fifth Edition* (PLS-5), and a picture description task developed by Eisenberg and Guo (2013) to collect language samples. Regardless of the monolingual or bilingual testing sequence placement, all participants were administered the BESOS in both languages. All tests were administered by trained undergraduate and graduate speech-language pathology students and certified speech-language pathologists. Testing location was dependent on the site of participant recruitment. Test administration ranged from 1 to 4 sessions (average of 3 sessions) and data collection ranged from 1 day to 5 weeks (average of 2 weeks) due to the participants' attendances at the different facilities.

    2.3.2 Task administration and scoring. Participants were administered the BESOS in both English and Spanish according to their age. The YB group completed the Morphosyntax subtest for younger children and the OB group completed the Morphosyntax subtest for older children. All test items were presented via an iPad and responses were audio recorded to ensure accurate dictation. Responses on the BESOS were scored using a binary scoring system, with each item scored as either a "1" for correct or "0" for incorrect. If participants were unable to provide responses in the targeted language or if they scored five consecutive "0s," the task was discontinued. Responses were also scored as incorrect if the child did not respond and "NR" was recorded. Twenty-eight participants completed the task in English, 27 completed the task in Spanish, and 25 completed the task in both languages.

2.3.3 Variables for analysis. A percent accuracy was calculated for each morpheme type specific to English and Spanish, as well as for the items that were common in both languages. For example, if a 3-year-old correctly produced 3 out of 5 of the Negative form items in English, percent accuracy for that morpheme was 60%. However, unlike the English Morphosyntax subtest for older children, the subtest for younger children does not assess Past-tense, Present Prog-*ING*, or Copula forms (See Table 4; Peña et al., 2014). Thus, to compare morphemes across development, the dependent variables calculated for English included: 3rd Person Singular-*s*, Negatives, and Passives. In Spanish, the dependent variables calculated included: Articles, Direct Object Clitics, and Subjunctives. To compare overall performance across development and across languages, dependent variables included the sentence repetition scores and total scores of the Morphosyntax subtests in English and Spanish.

Chapter 3: Statistical Analysis and Results

3.1 Younger and Older Bilingual Children's Production Accuracies with English Morphemes and Spanish Morphemes

To answer the first and second research questions regarding the bilingual participants' accurate productions of the morphemes in each of their languages across development, one-way ANOVAS were completed in English (See Table 5) and Spanish (See Table 6). The dependent variables included the morpheme accuracy scores calculated for each morpheme type on the BESOS specific to each language, and the independent variable was age group (YB or OB).

3.1.1 English morphemes. The YB group and OB group produced the 3rd person singular-*s* form with similar accuracy, 42.59% and 45% respectively, [$F(1,26) = 0.021$, $p = 0.885$]. The YB group produced the Negative forms with 51.11% accuracy and the OB group produced this form with 76.67% accuracy, although not a statistically significant difference [$F(1,26) = 3.213$, $p = 0.085$]. The YB group only produced Passives with 25.93% accuracy while the OB group demonstrated more accurate productions at 40%, again not a statistically significant difference [$F(1,26) = 0.812$, $p = 0.376$].

Table 5. *Bilingual Morphological Production Accuracies in English (n = 28)*

Morpheme	YB n = 18 M (%)	SD	OB n = 10 M (%)	SD	*p*-value
3rd Person Singular-*s*	42.59	40.91	45.00	43.78	0.885
Negatives	51.11	38.33	76.67	31.62	0.085
Passives	25.93	31.43	40.00	51.64	0.376
Past-tense	-	-	45.50	41.56	-
Present Prog-*ING*	-	-	82.00	40.50	-
Copula	-	-	64.00	50.50	-
Sentence Repetition	41.67	38.88	61.43	37.53	0.204
Total Score	41.51	28.85	60.00	29.58	0.119

Note. YB = Younger 3-4 year-old bilingual age group; OB = Older 5-6 year-old bilingual age group; -Forms not tested at that age on the BESOS.

3.1.2 Spanish morphemes. There were no significant differences between the YB and OB groups for Articles [$F(1,25) = 3.361$, $p = 0.079$] or Subjunctive forms [$F(1,25) = 3.157$, $p = 0.088$],

although the YB group was less accurate than the OB group for both (Articles: YB = 22.22%, OB = 52.78%; Subjunctives: YB = 11.11%, OB = 38.90%). There was a statistically significant difference for Direct Object Clitics, [$F(1,25) = 4.793$, $p = 0.038$]. The YB group was significantly less accurate at 9.72% with Direct Object Clitics compared to the OB group who demonstrated 37.04% accuracy.

Table 6. *Bilingual Morphological Production Accuracies in Spanish (n = 27)*

| | YB n = 18 | | OB n = 9 | | |
Morpheme	M (%)	SD	M (%)	SD	*p*-value
Articles	22.22	35.24	52.78	50.69	0.079
Direct Object Clitics	9.72	20.81	37.04	44.70	0.038*
Subjunctive	11.11	32.34	38.90	48.59	0.088
Sentence Repetition	22.78	27.82	38.89	35.60	0.208
Total Score	15.63	20.81	41.67	41.58	0.038*

Note. YB = Younger 3-4 year-old bilingual age group; OB = Older 5-6 year-old bilingual age group; **p* is less than .05.

3.2 Bilingual Children's Overall Morphological Production Accuracy in English and Spanish

To answer the third research question regarding the bilingual participants' overall production accuracies across languages, one-way ANOVAS were first completed in English (See Table 5) and Spanish (See Table 6). Then, paired *t*-tests were conducted with the younger and older participants together in order to provide a direct comparison of bilingual morphological production accuracy patterns across languages (See Table 7). Dependent variables included the sentence repetition scores and total scores, and the independent variable was age group (YB or OB) in the first analysis (ANOVAS) and language (English and Spanish) in the second analysis (paired *t*-tests).

3.2.1 Sentence repetition scores in English and Spanish. In English, the YB group was less accurate (41.67%) than the OB group (61.43%) on the sentence repetition items, although not a statistically significant difference [$F(1,26) = 1.701$, $p = 0.204$]. In Spanish, the YB group was also less accurate (22.78%) on the sentence repetition items while the OB group was more accurate

(38.89%), again not a statistically significant difference [$F(1,25) = 1.671$, $p = 0.208$]. However, eliminating the age group factor revealed that S-E bilingual children's accuracy in sentence repetition between languages was approaching a statistically significant difference between their performance in English and Spanish [$t(1.984) = 24$, $p = 0.059$] with scores for English sentence repetition higher (49.52%) than in Spanish (29.61%).

3.2.2 Total scores in English and Spanish. In English, the YB group demonstrated a total score percent accuracy of 41.51% on the BESOS and the OB group demonstrated 60% accuracy, although not a statistically significant difference [$F(1,26) = 2.596$, $p = 0.119$]. In Spanish, the YB group demonstrated a statistically significant lower total score percent accuracy of 15.63% compared to the OB group at 41.67% accuracy [$F(1,25) = 4.800$, $p = 0.038$]. Again, eliminating the age group factor revealed that S-E bilingual children's total score percent accuracy was significantly higher in English at 48.24% than in Spanish at 25.51% accuracy [$t(2.392) = 24$, $p = 0.025$].

Table 7. *Bilingual Morphological Production Accuracies in English and Spanish for all*
participants (n = 25)

Morpheme	t	df	p-value
Sentence Repetition	1.99	24	**0.059**
Total Score	2.39	24	0.025*

Note. Bolded p-value approached significance; *p is less than .05.

Chapter 4: Discussion

The current study aimed to further the knowledge-base of typical bilingual language development by investigating morphological accuracy patterns in younger and older S-E bilingual children to highlight developmental trends of accurate morpheme use in both English and Spanish. The older bilingual children were generally more accurate in their morphological productions than the younger bilingual children in both English and Spanish, demonstrating a consistent upward developmental trend. Across languages, all S-E bilingual children in both age groups were more accurate with their overall morphological productions in English than in Spanish.

4.1 Bilingual Morphological Production Accuracy Patterns across Development

4.1.1 Bilingual morphological production accuracy patterns in English. First, although no differences were statistically significant, descriptive results highlighted bilingual production accuracy patterns with English forms that were consistent with previously documented morphological age of acquisition patterns in the English monolingual development literature (Brown, 1973; Sax & Weston, 2007). Of the analyzed morphemes in English, all participants produced the 3rd Person Singular-*s* and Negative forms with the highest accuracy overall.

Between groups, the OB group exhibited higher production accuracy percentages with Negatives than the YB group, 76.67% and 51.11% respectively, suggesting early grammatical errors with these forms until later ages. On the other hand, both the younger and older bilingual children produced the 3rd Person Singular-*s* with similar accuracy (YB = 42.59%, OB = 45%), indicating that this English morpheme may be expected to be used accurately early in bilingual development but not mastered even into older ages.

The older bilinguals also produced Passives with higher accuracy (40%) than the younger bilingual children (25.93%). However, the OB groups' production accuracy with the Passive forms was considered low overall for both age groups in comparison to accuracy percentages of the other analyzed English morphemes. Similar to monolinguals, Passives may be more difficult for S-E bilingual children and a high amount of grammatical errors with this form may continue into later

ages as well (Sax & Weston, 2007).

4.1.2 Bilingual morphological production accuracy patterns in Spanish. Next, descriptive results also demonstrated bilingual production accuracy patterns with Spanish forms that corresponded to both the Spanish monolingual and bilingual age of morpheme acquisition literature (Bedore & Leonard, 2005; Kernan & Blount, 1966; Pérez-Leroux, 1998; Pérez-Pereira, 1989; Simón-Cereijido & Gutiérrez-Clellen, 2007). Of the analyzed forms in Spanish, all participants produced Article forms with the highest accuracy overall.

Between groups, the OB group produced Articles with a higher accuracy than the YB group. However, the percent accuracies with this morpheme for both age groups (OB = 52.78%, YB = 22.22%) was still surprising considering that this form was noted as one of the most accurately produced morphemes in other recent research investigating morphological production accuracy patterns with other S-E bilinguals (Baron et al., 2018). Although prior age of acquisition literature has also documented Articles as one of the earliest emerging and acquired Spanish morphemes, mastery of use may not be obtained until later ages in S-E bilingual children.

Moreover, the OB group also was more accurate with Subjunctive forms and significantly more accurate with Direct Object Clitics than the YB group. Younger bilingual language-learners may demonstrate more grammatical errors with these forms in Spanish. However, production accuracies of the Subjunctive and Direct Object Clitic forms were considered low overall for both age groups compared to the accuracy percentages of the other analyzed Spanish form (Articles). These results coincided with the findings from the recent study conducted Baron et al. (2018) which noted Subjunctives and Direct Object Clitics as two of the most difficult Spanish morpheme structures. Despite early emergence, errors with these forms may persist in S-E bilingual children across development, and therefore, not fully develop until much later ages (Castilla-Earls, Pérez-Leroux, Restrepo, Gaile, & Chen, 2018; Jacobson, 2012; Morgan, Restrepo, & Auza, 2013; Silva-Corvalán, 2014; Simón-Cereijido & Gutiérrez-Clellen, 2007).

4.2 Bilingual Morphological Production Accuracy Patterns across Development and across Languages

Descriptively, all participants produced sentence repetition items, which targeted various morphosyntactic structures common to both languages including Prepositions and Conjunctions, with comparable accuracies to the production percentages of the most accurate English forms (3rd Person Singular-*s* and Negative forms) and the most accurate Spanish form (Articles). These patterns were partially consistent with prior literature, which has noted Conjunctions as one of the most accurately produced common forms in S-E bilinguals but Prepositions as one of the least accurate forms (See Table 2; Baron et al., 2018) with continued production difficulties noted in children even up to 7;0 to 9;11 years of age (Taliancich-Klinger et al., 2018). As such, although bilingual children may use some morphemes common to both languages with higher accuracy, they may also continue to demonstrate production difficulties with other common forms. Between age groups, the older bilinguals were more accurate overall with sentence repetition items in both English (OB = 61.43%; YB = 41.67%) and Spanish (OB = 38.89%; YB = 22.78%) than the younger bilinguals. Although the sentence repetition scores did not statistically differ for either age group in English or in Spanish, an examination of all the participants as one group revealed sentence repetition accuracy between languages was approaching a statistically significant difference between their two languages with a higher accuracy in English.

Next, descriptive results also demonstrated that the OB group produced a higher total score percent accuracy on the English Morphosyntax subtest compared to the YB group (OB = 60%; YB = 41.51%), although not statistically significant. On the other hand, the OB group was significantly more accurate than the YB group on the Spanish subtest (OB = 41.67%; YB= 15.63%). Another examination of total scores for all bilingual participants together revealed that, across languages, S-E bilingual children's total percent accuracy was significantly higher in English than in Spanish. Interestingly, although all bilingual children in both age groups exhibited a significantly higher total percent accuracy on the Morphosyntax subtest in English than in Spanish, differences in morpheme production accuracies were only demonstrated when analyzed

by age group. The YB group may have exhibited more errors in Spanish due to difficulties managing cross-linguistic differences across their two languages (Baron et al., 2018; Bedore et al., 2012; Bedore, Peña, Gillam, & Ho, 2010; Goldstein, 2012; Jackson-Maldonado, 2012; Jackson-Maldonado & Maldonado, 2017; Restrepo & Gutierrez-Clellen, 2012; Taliancich-Klinger, Bedore, & Pena, 2018). Alternatively, despite similar reported input quantity to English and Spanish at home and at school (See Table 3), qualitative differences of language input at school may have also impacted the younger bilingual children's performances in Spanish (Persson and Prins, 2012).

4.3 Clinical Implications and Conclusions

The school curriculum systematically increases in difficulty and language required for success as children get older. Understanding English and Spanish morpheme use across development is important for bilingual children's continuous success in school, as accurate use and understanding of forms have the potential to impact reading, writing, and language used in the classroom (Taliancich-Klinger et al., 2018). In addition, information on the order and rate of morphological development is imperative to inform speech-language pathologists in selecting appropriate language-learning goals and structure intervention efficiently for younger and older bilingual children (Bedore et al., 2012).

Developmental trends highlighted from this study support the bilingual age of morpheme acquisition literature, in that S-E bilingual children appear to acquire the morphemes of each of their languages in a similar order as monolingual children. All bilingual children in this study produced early acquired morphemes in both English and Spanish with the highest accuracy (3rd Person Singular-s, Articles, and Negative forms), and produced the later acquired forms in each language with the least accuracy (Passives, Direct Object Clitics, and Subjunctives). As such, use of early forms in English and Spanish should be expected at both younger and older ages in S-E bilingual children. However, accuracy percentage patterns between age groups highlighted from this study also support the notion that bilingual children may not acquire morphological structures at the same rate as their monolingual peers (Bedore and Peña, 2008). Although bilingual children may produce morphemes in both of their languages with increasing accuracy as they continue

through development, they also appear to demonstrate persistent difficulties with both early and later acquired forms in each of their languages even into older ages (Baron et al., 2018; Bedore and Peña, 2008; Taliancich-Klinger et al., 2018). For bilingual children, more complex forms in English (Passives) and more abstract forms in Spanish (Direct Object Clitics and Subjunctives) may be more difficult, resulting in more frequent errors of these forms at both younger and older ages (Bedore et al., 2010). In addition, although bilingual children may have less difficulty with some morphemes common to both languages, such as Conjunctions, errors should be expected with other forms, such as Prepositions, that serve differing grammatical functions between languages (Bedore and Peña, 2008; Jackson-Maldonado & Maldonado, 2017).

Moreover, although all bilingual children in both age groups exhibited a significantly higher overall accuracy with morphosyntax structures in English than in Spanish, differences in accuracy of performance were only demonstrated when analyzed by age group. The younger bilingual children may have been less accurate in their morphological performance in Spanish only and not in English as a result of the increased demand of English-language learning for bilingual children as they begin their formal education (Bedore & Peña, 2008; Bohman et al., 2010). In effect, S-E bilingual children may progress with their morphological development in English at a faster rate than Spanish as they enter the school system. Therefore, as children with a variety of bilingual language proficiencies enter the educational system, their language development profiles may differ compared to their monolingual peers. Although assessments like the BESOS (Peña et al., 2014) are developed for bilingual children, bilingual children's performance in each of their languages may vary considering cross-linguistic differences between their two languages, in addition to the dynamic nature of quantitative and qualitative differences in language experiences. Because bilingual children produce different grammatical errors in morpheme production accuracies across development and across languages (Baron et al., 2018; Bedore et al., 2010; Bedore et al., 2012; Jackson-Maldonado & Maldonado, 2017; Restrepo & Gutierrez-Clellen, 2012), researchers and clinicians should consider an individual child's morphological productions and expect differences in their accuracy patterns.

4.4 Limitations and Future Directions

A limitation of this study was the small sample size. In addition, as a screening measure, the BESOS has a relatively small number of items on each morphosyntax subtest in English and Spanish. Replicating the findings of this study with a larger sample size and with a comprehensive language assessment would strengthen the generalizability of findings. Furthermore, although not examined in this study, performance may have been impacted by potential cross-linguistic differences, as well as quantitative and qualitative differences in the children's language experiences. Further exploration into these factors and how they may impact aspects of bilingual language development is warranted to learn more about how bilingual children learn to master two languages successfully.

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Vita

Isabel Angelica Cano was born and raised in the borderland city of El Paso, TX. She attended the University of Texas at El Paso (UTEP), where she earned her Bachelor of Arts degree with a concentration in Pre-Speech-Language Pathology, with Highest Honors, in August of 2018. She continued her graduate education at UTEP to obtain her Master of Science degree in Speech-Language Pathology in May of 2020.

Isabel began conducting research with bilinguals as an undergraduate in 2016. During the following years, she was employed as an undergraduate research assistant and again as a graduate research assistant for the Research in Bilingual Language Learning Laboratory. Isabel received numerous travel awards to present her research at both state and national levels. In 2018, she was selected as 1 of 40 students nationwide to participate in the American Speech-Language-Hearing Association's 2018 Minority Student Leadership Program. During her time at UTEP, Isabel also served as the Community Service Officer, External Vice President, and President for her university chapter of the National Student Speech-Language-Hearing Association. As of 2020, she has co-authored two different research articles for publication regarding language development in bilingual children, one which is in final preparations and the other that has accepted with minor revisions.

Contact Information: isabelAngelica03@gmail.com

This thesis was typed by Isabel A. Cano, B.A.