

A COMPARISON OF VERBAL MORPHOLOGICAL ERRORS IN SPANISH-SPEAKING
ENGLISH LANGUAGE LEARNERS WITH AND WITHOUT DEVELOPMENTAL
LANGUAGE DISORDERS

by
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A thesis submitted to the Department of Communication Sciences and Disorders
College of Liberal Arts and Social Sciences
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

In Communication Sciences and Disorders

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May 2021

ABSTRACT

Purpose: The purpose of this study is to assess morphological markers in Spanish-speaking children, who are English language learners, with and without DLD, to determine the type of verb errors made by each group and the frequency of the verb errors.

Methods: The participants in this study included 76 Spanish-English bilingual children between 4;3 and 8;2 with (n=52) and without DLD (n=24). Spontaneous language samples were collected in Spanish and English for each participant and the recordings of the samples were transcribed and then coded. The coding process specifically analyzed errors of verb morphology that were categorized as an omission of an obligatory context, a substitution of a verb, auxiliary, or copula, an overregularization, or marked as a verb error.

Results: The proportion of accurate verbs and the number of obligatory contexts was significantly higher in bilingual children with TD in comparison with children with DLD when both languages were taken into account or when the best language was used. Verb errors were more frequent in English than in Spanish. In Spanish, substitution errors were the most frequent type of error, while in English, verb tense errors were most common. Lastly, a large percentage of children with DLD made verb omission errors in both languages.

Conclusion: Analysis of verb error type and frequency should be considered in the assessment of Spanish-English bilingual children to gather sufficient information about their language profile and determine accurate DLD diagnoses.

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A COMPARISON OF VERBAL MORPHOLOGICAL ERRORS IN SPANISH- SPEAKING ENGLISH LANGUAGE LEARNERS WITH AND WITHOUT DEVELOPMENTAL LANGUAGE DISORDERS

Bilingual children who speak Spanish and English make up a large portion of the United States (U.S.) population. According to the American Community Survey, Spanish is the most commonly spoken language in the U.S. besides English. In 2018, there were a total of 41.4 million people living in the U.S. who spoke Spanish at home. Of that population, 4.6 million were children between the ages of 5 and 17 (United States Census Bureau, 2018). Seven percent of these children (approximately 300,000 children) have a developmental language disorder (DLD) diagnosis, previously known as specific language impairment (SLI), in the U.S. in 2018 using the prevalence rate of DLD (Tomblin, 1997). It is important to better understand the language manifestations of bilingual children with DLD diagnosis to determine precise diagnostic procedures that will decrease misidentification of children with DLD. Based on previous literature, verb morphology is thought to be a strong diagnostic indicator for a DLD diagnosis, which is the specific analysis for this study.

The Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5) defines language disorder, which will now be referred to as DLD, as a neurodevelopmental condition that impairs the communication domain affecting receptive and expressive language. Children with DLD have difficulties acquiring and using language in their day-to-day life. These difficulties are due to deficits in comprehension or production of vocabulary, sentence structure, and discourse skills. Children with DLD have language abilities that are substantially below age expectations, which is reflected in their socialization skills, academic

achievements, occupational performance, and overall communication effectiveness (American Psychiatric Association, 2013). Specifically, the difficulties presented by children with DLD include vocabulary, memory and processing, syntax, pragmatics, and particularly morphology (Bedore & Leonard, 2001, 2005; Simon-Cereijido & Gutiérrez-Clellen, 2007).

CHALLENGES FOR THE ASSESSMENT OF BILINGUAL CHILDREN

Many language tests have been developed to assess the language development of Spanish and English-speaking children to help gather quantifiable data of a child's language skills. The Bilingual English-Spanish Assessment (BESA; Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2018) has demonstrated higher accuracy percentages towards identification of English-Spanish speaking children in the U.S. with DLD. However, commonly used language tests such as the Test of Language Development (Newcomer, & Hammill, 1997), the Test of Language Development- Intermediate 3rd Edition (Hammill & Newcomer, 1997), the Clinical Evaluation of Language Fundamental- Preschool (CELF-P; Wiig, Secord, & Semel, 1992), the Clinical Evaluation of Language Fundamentals 4th Edition (CELF-4; Semel, Wiig, & Secord, 2003), and the Preschool Language Scale-4 (PLS-4; Zimmerman, Steiner, & Pond, 2001), have raised many concerns regarding their validity to accurately identify bilingual speakers with DLD. These tests are designed to evaluate Spanish and English-speaking children's language yet have limited clinical accuracy. Speech-language pathologists (SLPs) are therefore not provided with the adequate tools to confidently distinguish a bilingual child between being a second language learner or a bilingual speaker with a DLD (Gutiérrez-Clellen & Simon-Cereijido, 2009).

Generating norming populations composed of Spanish and English-speaking children could be a beneficial factor in mitigating the issue at hand as bilingual children would be compared to individuals who speak the same languages. The commonly used language tests mentioned previously are examples of tests that include Latino children but do not provide separate norming tables for bilingual and monolingual children. Therefore, children who are assessed are compared to the language abilities of children who do not match their language profile as the norming tables include the language data of monolingual and bilingual children together. This indicates that these tests are not useful for the diagnosis of language disorders in bilingual children as they aren't solely being compared to the language abilities of bilingual speaking children (Gutiérrez-Clellen, & Simon-Cereijido, 2009).

Creating bilingual assessment strategies in Spanish and English that provide information about both languages could help decrease under and overidentification levels. The language information could then be compared to each other to determine the presence of a disorder because bilingual children must demonstrate impairments in both languages to receive a language disorder diagnosis (Kohnert, Ebert, & Pham, 2020). Comparing grammatical structures of two languages side by side could help SLP better distinguish a child with and without DLD. An effort has been placed to accomplish this idea as adaptations of English tests have been created to assess Spanish-speaking children. However, a study conducted by Restrepo and Silverman (2001) tested a Spanish adaptation of the Preschool Language Scale - 3 (Zimmerman, Steiner, & Pond, 1993) with Spanish-speaking children and they concluded that the use of the test leads to overidentification of TD (typically developing) children. The findings of this study also indicate that the adaptation of the English test failed to assess articles and clitic pronouns which are grammatical structures

sensitive to Spanish language development (Gutiérrez-Clellen, Restrepo, & Simón-Cereijido, 2006).

Bilingual language assessment strategies must be created that obtain accurate identification of DLD in Spanish-speaking children who are English-Language Learners as it could lead towards the development of appropriate intervention plans and prevention of academic delays (Gutiérrez-Clellen, Restrepo, & Simón-Cereijido, 2006). Tests that classify as reliable tools for the use of discrimination between typical and atypical language development are tests that demonstrate high sensitivity and specificity. It is because of these reasons that SLP has strived to develop language tests designed for Spanish and English-speaking children with high specificity (the ability for a test to correctly identify individuals without a language disorder) and high sensitivity (the ability for a test to correctly identify individuals with a language disorder). Sensitivities and specificities over 90% are considered good and will demonstrate a test's ability to accurately and reliably assess the language ability of children which will help SLP make accurate diagnoses of bilingual children with and without language disorders (Dollaghan, 2007).

SPONTANEOUS LANGUAGE SAMPLES

Spontaneous narrative language samples can be elicited through several methods, one of them being through wordless picture storybooks, which are particularly advantageous when assessing bilingual children especially if they are dual language learners. The use of books in the evaluation builds a functional communication context that decreases cultural bias. Also, books are objects that are familiar to children, which adds to the atmosphere of a functional context. This process is also very stable because of the control SLPs have in

choosing the story and knowing the relative length of time a child will take retelling the story. Another benefit of using narrative language samples is that the SLP can elicit a sample in Spanish and English using the same context. Therefore, language measures such as mean length of utterance, a measure of language complexity, can be calculated and compared in both languages. Lastly, narratives are academically relevant and narrative language samples can be used throughout the developmental school-age period. Therefore, the same technique can be used to measure a child's language abilities for several years as long as it is within the school-age period and it avoids task familiarity effects (Heilmann, Rojas, Iglesias, & Miller, 2016; Miller et al., 2015, Gusewski, & Rojas, 2017).

Additionally, various language measures can be formulated after gathering spontaneous narrative language samples, transcribing them, and coding them, such as mean length of utterance, the number of language errors, the number of different types of language errors, etc. Spontaneous language samples have been recommended, by several researchers, to be a part of the evaluation plan when assessing the bilingual population because they are a culturally and linguistically sensitive way to evaluate the language abilities of bilingual children (Gutiérrez-Clellen, Restrepo, Bedore, Peña, & Anderson, 2000; see Rojas & Iglesias, 2015, for a discussion; Tager-Flusberg & Cooper, 1999) (Gusewski, & Rojas, 2017). Spontaneous language samples are also an excellent source to gather data on a child's language abilities as they are given several opportunities to use complex grammatical structures in their natural linguistic repertoire (Gusewski, & Rojas, 2017).

Research has been conducted examining the classification accuracy of spontaneous language samples in both Spanish-speaking children and English-speaking children. The research completed on Spanish-speaking children indicated that spontaneous language

samples had fair to good sensitivity and specificity at identifying children with and without DLD (Gutiérrez-Clellen, & Simon-Cereijido, 2009). However, 91.3% of the children with DLD were accurately identified when the number of errors per utterance in spontaneous language samples was paired with parental concern and 87.5% of the children with DLD were correctly identified in a confirmatory study (Restrepo, 1998). In English, verb morphology, such as the regular past-tense “-ed” inflection, third-person singular present “-s” inflection, and the copula and auxiliary “be” forms, have demonstrated good sensitivity and specificity. These measures were gathered through language sample analysis and 95% of affected children were accurately identified when grammatical accuracy of verb and mean length of utterance were paired to classify children. In essence, there is significant evidence supporting the use of spontaneous language samples to gather language-specific measures in both Spanish and English to ultimately obtain good clinical distinction between children with and without DLD (Gutiérrez-Clellen, & Simon-Cereijido, 2009).

RESEARCH IN VERB MORPHOLOGY

ENGLISH VERB MORPHOLOGY

In English, verbs are marked for tense and grammatical agreement, which is called finiteness marking. All main clauses have finiteness marking as main clauses require a finite verb to follow English grammar rules. A finite verb, which is inflections and function words, provides sentences with information regarding a person, number, and tense. The finite verbs in English include regular verb inflections (e.g. third-person singular -s, “She drives slow”), function words that classify as auxiliary (e.g. “the boy **is** jumping”) or copula (e.g. “the boy **is** happy”), and irregular verb forms (e.g. “He took leaves”). Regular verbs use an -ed ending

to mark past tense, however, irregular verbs do not follow the same inflectional pattern. For example, the past tense form of “take” is “took” rather than “taked” (Gusewski & Rojas, 2017).

SPANISH VERB MORPHOLOGY

Spanish is a Romance language that is relatively free of word order and is rich in verbal morphology. It is also classified as a “pro-drop” language, which indicates that Spanish allows pronouns to be omitted if they are pragmatically inferred. This is important to note as finite and nonfinite verbs are distinctively marked. Overall, in Spanish, verbs are marked for number and person to clarify the context and are conjugated for tense, aspect, and mood. Tense refers to whether the verb is in present, past, imperfect, future, or conditional, aspect indicates whether the verb is perfective or progressive, and mood denotes whether the verb is indicative or subjunctive. The verb endings in Spanish are *-er* (e.g. *comer*, “to eat”), *-ar* (e.g., *brincar*, “to jump”), and *-ir* (e.g., *vivir*, “to live”). There are also inflectional markers for these 3 verb classes that all differ except for some overlap between the *-er* and *-ir* endings (Bedore, & Leonard, 2001). It is important to note that verb marking is more salient in Spanish than in English, which indicates that verb marking is more noticeable in Spanish (Bedore, & Leonard, 2005).

VERB MORPHOLOGY AS A GRAMMATICAL MARKER IN DLD BILINGUALS CHILDREN

In general, morphology refers to the study of how the rules that govern morphemes, the smallest meaningful unit of language, are used in language. Children with language

impairments exhibit tremendous challenges in acquiring morphology. The acquisition of verb morphology, in specific, is a difficulty found in monolingual Spanish and English children with DLD (Castilla-Earls, Auza, Perez-Leroux, Fulcher-Rood & Barr, 2021; Gusewski, & Rojas, 2017) and bilingual Spanish-English speaking children with DLD (Bedore & Leonard, 2001, 2005; Simon-Cereijido & Gutiérrez-Clellen, 2007). Therefore, a common grammatical structure that is challenging to monolingual and bilingual-speaking children is verbs in Spanish and English. This is one of the main reasons in which this study is specifically analyzing verb errors in bilingual speakers. The analysis will provide additional information about verb morphology with insight towards verb errors produced and the frequency of the errors.

Typically developing Spanish-speaking children who are English learners also have difficulty with verbal morphology (Gutiérrez-Clellen, Simon-Cereijido, and Wagner, 2008). Verb morphology is the slowest linguistic subdomain to develop during the process of acquiring English as a second language (Gusewski, & Rojas, 2017). Paradis (2016) found that children who were learning English as a second language frequently omit morphological markers such as, the third-person singular -s, and the past tense of “be” and “do”. The omission of morphological markers is a pattern that is also found in monolingual children with DLD, who were age-matched peers, signaled an important confounding variable (Gusewski, & Rojas, 2017). This demonstrates that the grammatical difficulties produced by TD bilingual children can be related to limited proficiency in a language. However, similar grammar errors are produced by monolingual children with DLD, which indicates that bilingual children can be mistakenly diagnosed as having a language disorder. This again adds to the population of overidentified children with language disorders.

The common grammatical errors seen in the Spanish-speaking children with DLD include morphological and omission errors of articles, direct object pronouns, verb inflections, auxiliary verbs, adjective agreement, plural inflections, and the subjunctive mood (Bedore & Leonard, 2001, 2005). Bedore and Leonard (1998) found that a verb morpheme composite score based on the correct use of verb morphology excluding the auxiliary form of “do” helped identify English-speaking children with DLD between 3;7 and 6 years of age with a fair level of sensitivity and a good level of specificity. In Spanish, Bedore and Leonard (2001; 2005) found that Spanish-speaking children with DLD made significantly more errors in verb morphology when compared to age-matched peers. The results have also been replicated with other children, which further indicates tense markings might be an appropriate tool for identifying children with and without DLD.

In Spanish-speaking monolinguals, Grinstead et al. (2014) demonstrated that children with DLD are substantially less proficient than an age control group in producing finite verb forms through an elicited production task. The result from Grinstead et. al (2013) study revealed that Spanish-speaking children with DLD were significantly worse in both receptive and expressive tasks measuring verb finiteness than their typical developing age-matched peers (Grinstead, Baron, Vega-Mendoza, De la Mora, Cantú-Sánchez, & Flores, 2013). A number of other studies have demonstrated these similar findings (González Contreras & Soriano Ferrer, 2007; Grinstead et al., 2013; Jackson-Maldonado & Maldonado, 2017, Castilla-Earls, Auza, Pérez-Leroux, Fulcher-Rood, & Barr, 2020).

In Spanish-English Bilinguals, Gutiérrez-Clellen, Simon-Cerejido, and Wagner (2008) found that tense marking accuracy significantly discriminated Spanish-English bilingual speakers from typically developing peers with the same language profile. Castilla-

Earls et al (2021) replicated Simon-Cerijidos and Gutiérrez-Clellen's findings by demonstrating that a combination of articles, clitics, and verbs have high diagnostic accuracy in Spanish-speaking children and that no morphological structure was ideal in individually marking DLD. However, a combination of clitics and verbs improved the diagnostic accuracy by identifying children with and without DLD with acceptable sensitivity and specificity levels. The results in the findings are distinctive from other studies because the errors identified in the Spanish-speaking children with DLD were described in terms of verb phrase errors rather than noun-phase errors. Castilla-Earls (2021) study revealed that verbs and the subjunctive mood were morphological structures that resulted in adequate diagnostic accuracy when examined in isolation.

English-speaking children with DLD show the correct use of verb morphology between 32% to 63% of the time (Conti-Ramsden & Jones, 1997; Leonard, Bedore, & Grela, 1997; Rice et al., 1995, Simon-Cereijido, & Gutierrez-Clellen, 2007). In English, children optionally produce and judge verb finiteness until about 4;6 years of age (Rice, Wexler, & Hershberger, 1998; Rice, Wexler, & Redmond, 1999). Evidence also suggests that analysis of English verb morphology has high accuracy in identifying English-speaking children with DLD. 91.3% of the children with DLD were accurately identified when the number of errors per sentence in spontaneous language sample along with parental concern and 87.5% of the children with DLD were correctly identified in a confirmatory study (Gutiérrez-Clellen, & Simon-Cereijido, 2009). These studies found the specific difficulties in English-speaking children with DLD and have emphasized that the measure of verb morphology can differentiate and identify children with and without DLD with high reliability and validity.

Monolingual English-speaking children with DLD have been shown to have difficulty with several grammatical forms, however, as previously mentioned, the primary difficulty demonstrated is with tense marking affects regular and irregular verbs (Gutiérrez-Clellen, & Simon-Cereijido, 2009 & Gusewski, & Rojas, 2017). It has been found that they also exhibit more difficulty acquiring and using finite verb morphology than typically developing children (Conti-Ramsden & Jones, 1997; Leonard & Eyer, 1997; Rice, Wexler, & Cleave, 1995; Rice & Oetting, 1993) (Simon-Cereijido, & Gutierrez-Clellen, 2007). It is because of this evidence that researchers suggest that a focus on verb morphology can differentiate children with DLD from typically developing children with a high degree of accuracy (Gutiérrez-Clellen, & Simon-Cereijido, 2009). Some examples of morphemes that mark verb finiteness are the third-person singular -s, regular past tense -ed, the copula and auxiliary form of “be”, the auxiliary form of “do”, and the progressive -ing.

As previously discussed, there is a considerable number of research studies examining monolingual and bilingual children's acquisition of verb morphology. However, a study analyzing Spanish verbs and English verbs in bilingual Spanish-English speaking children with and without DLD has not been conducted to date. This study will fill this gap and give clinicians an indication of verb error frequency in spontaneous language samples as well as the language that demonstrates to be more difficult in verb morphology.

CURRENT STUDY

The purpose of this study was to assess verbs in Spanish-speaking children who are English language learners, now referred to as bilingual children. In this study, we compared bilingual children with typical development (TD) and children with DLD to determine the

type of verb errors made by each group and the frequency of the verb errors. We analyzed spontaneous language samples to examine the differences between the two groups and ultimately determine whether the production of specific errors can indicate the presence of a DLD.

The research questions and hypotheses that guided the current study were:

1. Are there differences in the accuracy of Spanish and English verbs produced by bilingual children with and without DLD during a story retell?

Hypothesis: Bilingual children with TD will produce fewer verb errors than bilingual children with DLD in a story retell.

2. Which verb error is produced most frequently by bilingual children with and without DLD during a story retell?

Hypothesis: A bilingual child with DLD will have more omission errors of tense markers, such as the past tense -ed, present progressive -ing, and third-person singular -s, than other types of verb errors in English and more verb tense errors than other types of verb errors in Spanish.

METHOD

PARTICIPANTS

The participants in this study included a total of 76 bilingual children living in and around Houston, Texas. They were recruited through school district and city events. There were a total of 43 males and 33 females between the ages of four and eight (children with DLD: $M= 65.3$, $SD= 9.6$; children with TD: $M=75.7$, $SD= 11.1$). The data used in this study was initially gathered through a longitudinal study analyzing several aspects of language in

2018 and 2019. The criteria used to identify the participants with DLD was the morphosyntax subtest data collected from the BESA and BESAME standardized tests (Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2018). Using the BESA/BESAME, 24 children were identified as having DLD (14 males, 10 females); these children's ages ranged from four to seven years of age, as shown in Table 1. All children passed an otoacoustic emission test and obtained a score of 70 or higher on the Non-Verbal Scale of the Kaufman Brief Intelligence Test 2 (KBIT-2; Kaufman & Kaufman, 2014).

The data analyzed only included participants who produced 8 intelligible utterances, had an obligatory context greater than 0, and produced both English and Spanish language samples. Participants who only spoke English during the Spanish language sample or spoke only Spanish during the English language sample were excluded from the study.

MEASURES

DIAGNOSTIC CLASSIFICATION

Children who were ages 4;6-11 (years; months) were tested using the BESA and children between 7 and 8;11 years of age were tested using the BESAME. The morphosyntax subtest includes a cloze task, and a sentence repetition task. All children were evaluated with the BESA or BESAME in the Spanish and English morphosyntax subtest. The English cloze task measures the use of the plural -s, possessive -s, past and present tense, progressives, copulas, passives, auxiliary “be” and “do” and negatives. The sentence repetition task in English measures complex verb forms, conjunctions, embedded prepositions, and noun phrases. The cloze task in Spanish measures articles, progressives, clitics, and subjunctives, and the sentence repetition task measures preterite, complex verb forms, and conjunctions.

To follow diagnostic indications written in the manual, the highest score obtained on the subtest was used to determine DLD qualification. The qualifying scores on the morphosyntax subtest were based on the cut-off scores corresponding to the child's age. The cutoff score for 4-year-olds is 84, for 5-year-olds is 85, and for 6-year-olds is 81. For 7-year-olds the cutoff score is 78 in Spanish and 88 in English, and for 8-year-olds it is 80 in Spanish and 87 in English. These scores have sensitivity of 90% and specificity over 80% for children between 4 and 6 years of age (Peña et al., 2018). And again, to follow best practices in the interpretation of the standardized scores, a 95% confidence interval was used to identify participants with DLD. Children who obtained a standardized score above their corresponding cut-off score were considered to have typical language development and were accounted for in the TD group.

LANGUAGE SAMPLE MEASURES

Spontaneous language samples were elicited in Spanish and English through four different wordless picture books. Two books, "Frog on His Own" and "Frog Goes to Dinner," were designated to the Spanish sessions, and two other books, "One Frog, Too Many" and "A boy, a Dog and a Frog," were appointed to the English session (Mayer, 1973, 1974, 1975, 1967). Each book had a pre-written script following the pictures and storyline and the books used for the Spanish and English samples were selected in random order. The RAs audio recorded the samples and then transcribed them through the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2018) software. Standard measures (number of utterances, MLUw, NDW, NTW, verbs per utterance) were derived by using SALT transcription conventions. The children with DLD demonstrated language skills

significantly below the expected level for their age in spontaneous language sample (See Table 5).

VERB ERROR CODING

For each language, we coded errors in main verbs, auxiliaries, and copulas. The codes followed a key (see Table 2) to categorize the type of error as an omission of an obligatory context ([-]), a substitution of a verb, auxiliary, or copula that was used but did not match the tense, or person ([EW]), or an overregularization, which means that the tense was marked morphologically instead of lexically on an irregular verb ([EO]).

ERRORS OF OMISSION. A verb is a word that expresses or shows action, such as eating, drinking, sleeping, laughing, jumping, etc. When an utterance did not contain a verb, the utterance was marked with the code for the omission of a verb, [-V]. Verbs, auxiliaries, and copulas were thoroughly analyzed to determine the presence of an error and the type. In English, an omission was marked with codes containing a dash (-) or an asterisk sign (*). The 3 obligatory bound morphemes that were marked for omission were the third person singular -s (/ *3s), the past tense -ed (/ *ed), and the progressive verb form -ing (/ *ing). These morphemes were coded with a slash, an asterisk, and the “3s”, “ing” or “ed”. In Spanish, the omission was only marked for auxiliaries, copulas, and verbs with codes containing a dash (-) because there is a distinct inflectional system in Spanish that does not follow attachment of bound morphemes other than the use of plurals, which is not of importance in this study. Three examples of each code are provided in Table 3, which are the English codes, and Table 4, which are the Spanish codes.

The [-AUX], [-COP], and [-V] codes were used to mark the omission of a verb, an auxiliary, and a copula. The infinitive of auxiliary and copula verbs is “to be,” which

includes, “is, was, are, were, am, be, been, and being”. In Spanish, the auxiliary and copula verbs include, “ser” and “estar”. The difference between an auxiliary and a copula verb is that an auxiliary verb “helps” other verbs and a copula verb “links ideas” between a person or thing to a state of being. For example, in the utterance, “the frog was eating,” the auxiliary “was” is helping the listener determine that it happened in the past. Another example is “the frog is hungry,” the word “hungry” is being connected to the frog because of the copula verb, “is,” rather than helping determine the state of time. The auxiliary “do,” which includes did and does were also coded if they were omitted. When an utterance did not contain an auxiliary, the utterance was marked with, [-AUX], and when an utterance did not contain a copula, the utterance was marked with, [-COP]. A verb is a word that expresses or shows action, such as eating, drinking, sleeping, laughing, jumping, etc. When an utterance did not contain a verb, the utterance was marked with the code for the omission of a verb, [-V].

SUBSTITUTION ERRORS. Substitution errors were also coded to account for errors that were made for when an auxiliary, copula, or verb was used but still lacked other concepts, such as, tense agreement or number agreement. As previously explained, auxiliary and copulas include the different forms of the verb *to be* in English (e.g., is, was, are, were, am). When a participant used an auxiliary that did not match the person, the auxiliary was marked with, [EW:AUX]. When a participant used a copula verb that did not match the person the copula was marked with, [EW:COP]. A person error refers to a mismatch between the number of people or things spoken about and the auxiliary or copula verb. In Spanish, person mistakes were also accounted for but used a different code, [V:EW:P].

Semantic substitutions were coded with [V:EW], in Spanish and English, which signifies that a verb was used that does not follow the rest of the utterance. For example, the

utterance, “the frog saw a noise,” contains a verb that uses the appropriate tense but does not match the rest of the utterance because noise cannot be seen.

Tense was another aspect analyzed in English and Spanish verbs. An error in tense occurred when the participant changed tense throughout an utterance or within 3 utterances. The reason we looked at 3 utterances to analyze tense was that children change tense while narrating a story. However, it is typical to speak in the same tense throughout an entire story, as seen in adults. Therefore, when a change in verb tense was observed the coder analyzed the previous two utterances to see if the tense the child was speaking had changed. If the verb tense changed then the verb was marked with the verb tense code, [V:EW:VT].

As previously explained, verb morphology is different in English and Spanish. Therefore, there were some code errors unique to each language. For example, an error observed in Spanish was an error in mood, which indicates whether a verb is indicative or subjunctive. When a participant used an indicative verb when it was supposed to be subjunctive the error was marked with, [V:EW:IND] and when the verb was subjunctive but was supposed to be indicative the error was marked with, [V:EW:SUB].

OVERREGULARIZATION. In English, there were two codes used to mark overregularization of verbs, [V:EO:R] and [V:EO:I] and in Spanish, overregularization was marked with [V:EO]. The difference between the codes in English is the tense of the verb. The [V:EO:R] code was used to mark the overregularization of a verb that is in the present tense with the past tense -ed, such as caught and eaten. The [V:EO:I] code was used to mark overregularization of an irregular verb, which are in the past tense, with the past tense -ed, such as caught and ated. In Spanish, verbs that were changed to end with “io” to signify past tense but end differently in past tense were marked as overregularized. For example, “el

niño pensio” is supposed to be “el niño pensó” or “la señora ponio” is supposed to be “la señora puso”.

OTHER VERB ERRORS. In Spanish, the code [V:I] was used to mark infinitive verbs that were supposed to be used in a different tense. This code wasn’t used in English because verbs were marked with the omission of a bound morpheme when they were used as infinitive verbs. To mark the influence of the Spanish language on English verbs or the influence of the English language on Spanish verbs, the [V:BI] code was developed. In English transcripts, this code marked Spanish verbs that were semantically changed to sound like English words but are not English verbs. An example of this is the use of the word “salt” to refer to the word “jump” because the Spanish-influenced word for jump is “saltar”. In Spanish transcripts, this code marked English verbs that were semantically changed to sound like Spanish words but are not Spanish verbs. For example, the word “cacho” which refers to the English verb “catch” is not a Spanish verb but rather a made-up verb that was influenced by the English language. To mark an unnecessary additional verb, the code [DTM] was used which stands for, double tense marking. This code was used in English and Spanish transcripts to mark when an utterance had two verbs and one was unnecessary, or when a verb was used with a copula or auxiliary that was unnecessary. There were also other verbs errors found that didn’t fit into any of the above-stated errors, which were marked with the [V:EW:O] code.

Utterances that used an appropriate verb, were abandoned (e.g. the participant did not complete their thought), interrupted (e.g. the examiner interrupted or environmental factor interrupted), contained an unintelligible word, did not contain a noun, or had the verb code-switched, the participant spoke in another language, were not coded in this study. Abandoned

utterances left too much ambiguity towards the ending of the participants' utterances, to determine with certainty if a verb was used appropriately. The same reasoning lies towards an utterance containing one or more unintelligible words. Equally, when the participant omitted a noun it was also too ambiguous to determine what the appropriate auxiliary, copula, or verb markings matched the participant's thoughts. Utterances that contained words that were code-switched were coded if there was an error present, however, when the verb was code-switched it was not coded. The reason behind this was to keep the consistency of the codes used in the transcripts because the codes were created for a specific language. Also, it is unfair to mark code-switched verbs as an error for not matching tense or person when the true reason could be that the participant did not know the word in the other language.

The total number of obligatory contexts in English was calculated by adding the number of verbs, auxiliaries, and copulas used with the number of verbs, auxiliaries, and copulas omitted in the English transcripts. The total number of obligatory contexts in Spanish was calculated by adding the total number of verbs, auxiliaries, and copulas used with the number of verbs, auxiliaries, and copulas omitted in the Spanish transcripts. Lastly, the total number of obligatory contexts for the bilingual group was calculated by adding the total number of obligatory contexts calculated from the Spanish and English transcripts.

Additionally, a ratio of the total number of verb errors divided by obligatory contexts was computed in four groups, English, Spanish, bilingual, and best language. The best language group refers to an analysis used to compare participants' performance using the data from the language in which each participant demonstrated the least amount of errors. These measures were developed to assess differences in the accuracy of Spanish and English verbs produced by bilingual children with and without DLD during story retell.

PROCEDURES

Each participant was evaluated throughout two sessions to collect data in each language, Spanish and English. For example, Spanish was evaluated in the first session and then English was evaluated in the second session. However, the order of the language assessment was random. Research assistants (RAs) received extensive training to prepare them for evaluations. To minimize subjective bias, all RAs were blind to the language status of the participants and only evaluated one session for each child. RAs evaluated the participants' who were recruited in school district events at their school during class time. Children who were recruited through other means were evaluated at their homes. In addition to the morphosyntax subtest scores and other standardized language tests, spontaneous language samples were collected in Spanish and English.

Four different wordless picture books were used in total and each had a pre-written script following the pictures and storyline. Two books, "Frog on His Own" and "Frog Goes to Dinner," were designated to the Spanish sessions, and two other books, "One Frog, Too Many" and "A boy, a Dog and a Frog," were appointed to the English session (Mayer, 1973, 1974, 1975, 1967). The books were used to elicit a story retell (SR) sample. The pre-written scripts were used with the book and the books were selected in random order. The RAs read the pre-written script with the book to the participant, for the SR sample. After the RA read the story, they asked the participant to retell them the story using the book's pictures as their storyline guide. The RAs audio recorded the samples and then transcribed them through the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2018) software. The initial transcription followed basic SALT conventions, such as adding a slash to bound morphemes, using the vertical bar to identify root words, separating mazes with parenthesis,

etc. The transcripts then underwent a coding process that specifically analyzed verb morphology in the SR samples only.

RELIABILITY

It is important to establish reliability in the data so that researchers reduce the probability of personal biases and to be able to replicate the data in future studies. Therefore, inter-rater reliability was completed to calculate coding accuracy for 20% of the samples. This process was completed following two steps. First, a trained RA coded the transcripts by marking the verb error type for ungrammatical utterance and a second trained RA coded 20% of the original transcripts completed by the first RA. The transcripts coded by the second RA were selected through randomized order. The English transcripts had inter-reliability of 90% and the Spanish transcripts had 92% inter-reliability. All disagreements between the RAs were solved.

DATA ANALYSIS

A *t*-test is a statistical test that is used to compare the mean of two groups to determine whether the groups are different from each other. This study used *t*-tests to compare children with TD and children with DLD with several aspects of demographics, the standard language measures from the norm-referenced assessments, BESA, BESAME, and K-BIT, and the verb error results from the codification process. Additionally, we reported effect sizes using Cohen's *d*.

The first research question, were there differences in the accuracy of Spanish and English verbs between children with and without DLD, was answered by analyzing the

differences in the groups concerning the differences in verb errors with an independent sample *t-test*. This was completed for the total number of verb errors made by each group, looking at the most common errors observed and analyzing the difference in ratio, concerning obligatory context. These factors generated results to determine whether verb errors differentiate groups of children with DLD versus a group of children with TD.

For the second research question, which verb errors are the most frequent in bilingual children with and without DLD, the most common verb errors were analyzed by adding the frequency of verb errors in groups and dividing it by the obligatory context. A ratio was created that contained the type of verb error along with the total number of obligatory contexts to determine the most frequent verb error in each language. For this analysis, we continued to compare the verb errors of the TD children versus children with DLD in both languages separately.

RESULTS

Independent t-tests were used to analyze participant's age in months, and scores in the various norm-referenced test that measured non-verbal intelligence (KBIT-2), receptive vocabulary in Spanish (TVIP), and English (PPVT), and their language skills in Spanish and English (BESA and BESAME). The results demonstrated that age in months was significant between the group of children with TD ($M = 75.73$, $SD = 11.1$) and the group of children with DLD ($M = 65.29$, $SD = 9.6$), $t(74) = 3.968$, $p < .001$, $d = .979$. On average, children with TD ($M = 102.3$, $SD = 13.9$) and children with DLD ($M = 104.5$, $SD = 12.5$) demonstrated similar scores on the KBIT-2, a test that measures non-verbal intelligence. The difference, $-.69$, was

not significant $t(74) = -.694, p < .490, d = -.171$. The measures of receptive vocabulary and language skills were all significantly different between the groups (See Table 5).

LANGUAGE SAMPLE STANDARD MEASURES

In English, the number of utterances produced by children with TD ($M = 31.87, SD = 9.0$) and children with DLD ($M = 28.7, SD = 12.7$) was about the same. In Spanish, the number of utterances produced by children with TD ($M = 37.6, SD = 8.7$) and children with DLD ($M = 42.2, SD = 11.9$) was also about the same. Therefore, the number of utterances was not significant in English, $t(34.2) = 1.096, p < .281$, or in Spanish, $t(74) = -1.882, p < .064$. The measures of mean length of utterance in words (MLUw), number of total words (NTW), number of different words (NDW), and number of verbs per utterance (VPU) were all measures obtained through the SALT analysis software. All of these measures were significantly different for the TD and DLD groups except for the number of verbs per utterance in Spanish. The data for these measures can be seen in Table 5.

DIFFERENCES IN VERB ERRORS FOR BILINGUAL CHILDREN WITH AND WITHOUT DLD

OBLIGATORY CONTEXT

To answer our first research question, we assessed the data for each group's percentage of accuracy per language based on obligatory context. The measures developed to assess the obligatory context of Spanish and English verbs, auxiliaries, and copulas in bilingual children with and without DLD during story retell were assessed using independent sample t-tests. Three different approaches were applied to the independent sample t-tests to

account for accuracy percentages of the obligatory context in Spanish, English, and a combination of the totals in Spanish and English, which is referred to as the bilingual group. The independent-sample *t*-test was used to test the hypothesis that bilingual children with TD would produce fewer errors than bilingual children with DLD in story retell. Therefore, they were used to detect if there was a significant difference between children with TD and children with DLD concerning obligatory context.

For children with TD the number of obligatory contexts ranged from 10 to 87 in English ($M= 45.02$, $SD= 15.5$), 1 to 103 in Spanish ($M= 47.33$, $SD= 18.1$) and 44 to 165 for the bilingual calculation ($M= 92.35$, $SD= 28.0$). For children with DLD, the number of obligatory contexts ranged from 7 to 73 in English ($M= 33.33$, $SD= 18.9$), 4 to 75 in Spanish ($M= 35.92$, $SD= 18.8$) and 11 to 133 in the bilingual group ($M= 69.25$, $SD= 29.1$). Because several *t* tests were completed the alpha was adjusted to be less than or equal to .016. In English, children with TD ($M= 45.02$, $SD= 15.5$) and children with DLD ($M= 33.33$, $SD= 18.9$) demonstrated, $t(74)= 2.856$, $p<.006$. In Spanish, children with TD ($M= 47.33$, $SD= 18.1$) and children with DLD ($M= 35.92$, $SD= 18.8$) demonstrated, $t(74)= 2.522$, $p<.014$. In bilingual, children with TD ($M= 92.35$, $SD= 3.89$) and children with DLD ($M= 69.25$, $SD= 29.1$) demonstrated, $t(74)= 3.301$, $p<.001$. Therefore, a significant difference was found between the number of obligatory contexts created by children with TD compared to children with DLD based on the English, Spanish, and the bilingual group results.

VERB ERROR RATIO

Based on the independent sample *t*-tests results children with DLD underperformed compared to children with TD in English, Spanish, bilingual, and best language groups. In

English, children with TD ($M = .3$, $SD = .2$) demonstrated less verb errors per obligatory context than children with DLD ($M = .4$, $SD = .2$). In Spanish, the same was observed, children with TD ($M = .1$, $SD = .1$) continued to have a smaller verb error ratio than children with DLD ($M = .2$, $SD = .1$). Similarly, in the bilingual comparison the verb error ratio continued to demonstrate a lower ratio for children with TD ($M = .2$, $SD = .1$) than children with DLD ($M = .3$, $SD = .1$). Lastly, in the best language comparison the verb error ratio mirrored the same results, children with TD ($M = .0835$, $SD = .0085$) demonstrated a lower ratio than children with DLD ($M = .1453$, $SD = .0212$).

However, the only two analyses that were statistically significant were the bilingual and best language comparisons. Again, several *t-tests* were completed, therefore, the alpha was adjusted to be less than or equal to .0125. The bilingual comparison demonstrated, $t(74) = -3.570$, $p < .001$, $d = -.881$, and the best language comparison demonstrates, $t(30.651) = -2.694$, $p < .011$, with a Hedge's correction of $-.790$. Therefore, the hypothesis to the first research question is partially supported, because only two of the four approaches used to find a difference in the accuracy of Spanish and English verbs were statistically significant. The two approaches were statistically significant when both languages were taken into account or when the best language was taken into account. Differences were not found when each language was analyzed individually.

VERB ERROR FREQUENCY

The first step taken into answering the second research question, to determine the most common verb error produced in each language, was by calculating the verb error data

that was separated into groups by obligatory context. The groups were separated based on the type of error named, tense omission, verb omission, substitution errors, verb tense errors, overregularization errors, and other errors. The errors within the groups were then divided by the total number of obligatory contexts per language, English and Spanish, and group, children with TD and children with DLD. Tables 6 and 7 demonstrate the allocation of verb errors into all of the groups of errors produced by the participants. It is important to note that the obligatory context of children with TD was more than twice the number of obligatory contexts for children with TD in both languages. With this information taken into account, the frequency of the verb errors was examined based on the total obligatory context.

In English, verb tense errors were the most common errors produced by children with TD and children with DLD. Verb tense errors in English include the omission of past tense -ed, and third-person singular -s as well as the verb tense error. 16.4% of the verbs produced by children with TD and 18% of the verbs produced by children with DLD had verb tense errors. Not to mention, 90.4% of children with TD and 91.7% of children with DLD produced at least one verb tense error. Although there was a similar percentage of children making verb tense errors the quantity of verb tense errors produced is greater in children with DLD. The second most frequent error produced by children with TD and children with DLD was the substitution errors, followed by the tense omission, which can be reviewed in Table 6.

In Spanish, substitution errors were the most common errors produced by children with TD and children with DLD. The substitution errors included substitution of the auxiliary, copula, verb, verb tense, and other substitution errors. 6.8% of the verbs produced by children with TD and 7.6% of verbs produced by children with DLD carried a substitution

error. 92.3% of children with TD and 70.8% of children with DLD made at least one substitution error. Although more children with TD produced substitution errors, on average children with DLD produced more substitution errors. However, the order from most frequent to least frequent verb error groups are substitution, verb tense errors, verb omission, other errors, and overregularization errors. This information can also be found in Table 7.

As shown above, our hypothesis that errors of tense omission would be the most frequent verb error by children with DLD is not supported, because the tense omission was not the most frequent error produced by the children in English and verb tense was not the most frequent error generated by the children in Spanish. However, the additional information gathered through the analysis of the data demonstrated that more verb errors were produced in English than in Spanish by the bilingual children with TD and DLD. In English, 76% of the verbs used by children with TD and 67.2% of the verbs used by children with DLD were correctly produced during the SR narration. However, in Spanish, both groups of children demonstrated higher accuracies; children with TD used 90.2% of verbs accurately and children with DLD used 82.6% of verbs accurately. Despite a high level of verb accuracy the majority of the participants produced at least one verb error which was found by analyzing the number of children who did not make any verb errors. In English, only one child with TD accurately produced all verbs and in Spanish, two children with TD and one child with DLD accurately produced all verbs.

DISCUSSION

The purpose of this study was to examine the type of verb errors and their frequency in bilingual children with TD and DLD. The results suggested that the proportion of accurate

verbs was significantly higher in children with TD in comparison with children with DLD when both languages were taken into account or when the best language was used.

Importantly, there were no differences between the groups when Spanish or English were analyzed separately. Differences in the type of errors between the languages were observed. In general, verb errors were more frequent in English than in Spanish. In Spanish, substitution errors were the most frequent type of error, while verb tense errors were most common in English. Additionally, a large percentage of children with DLD made verb omission errors in both languages.

To better interpret these results, it is important to consider that children with TD had a higher number of obligatory contexts compared to children with DLD. There was no significant difference in the total number of utterances between children with TD and DLD. However, all other language sample standard measures, except for verb per utterance in Spanish, demonstrated significant differences between the groups. Although the number of total utterances used on average was around the same between children with TD (English 45, Spanish 47) and children with DLD (English 33, Spanish 36), the obligatory context mean was higher in both languages for children with TD. This indicates that children with DLD produced utterances that either didn't include a verb or only required one verb, compared to children with TD. These findings are in disagreement with Bedore and Leonard's (2001) study's results examining grammatical morphology, through structured elicitation tasks, produced by bilingual children with DLD in comparison to an MLU control group and the age control group. Their study demonstrated that the mean number of obligatory contexts per grammatical morpheme type were similar in the DLD group (range= 13-15), and the MLU control group (range= 12 and 15). Although the age control group demonstrated larger means

for obligatory context per grammatical morpheme type (range= 14-15), the difference was not statistically significant (Bedore & Leonard, 2001). The differences seen in these results could be due to using structured elicitation tasks rather than spontaneous language samples or a difference in the analysis method. Bedore and Leonard (2001) analyzed obligatory context per grammatical morpheme type rather than comparing the children based on an obligatory context total.

On average children with DLD were 10 months younger than children with TD. This is important to note because previous literature has found that older children with DLD have higher levels of grammatical skill than younger children with DLD (Jacobson & Schwartz, 2005; Gutierrez-Clellen, Restrepo, & Simon-Cerijido 2006; Paradis, 2015). Therefore, implicating that children with DLD become more accurate with age rather than through further exposure to the language. This suggests that perhaps the verb error percentages would have been lower had there been similar age ranges of children with DLD and TD. Therefore, the age difference found may have had an impact on the obtained results. However, children with TD and children with DLD demonstrated similar dominance of the languages based on the BESA differential results. Therefore, the results should not differ in either language due to language dominance within the groups.

VERB ERROR PERCENTAGES

The percentage of verbs used correctly was higher in children with TD than children with DLD in both languages. In Spanish, 82.6% of children with DLD and 90.2% of children with TD accurately produced the verbs used. In English, children with DLD accurately produced 67.2% of verbs used and children with TD accurately produced 76% of verbs used.

These results demonstrated that children with TD have higher grammatical accuracy in verbs than children with DLD, which indicates that children with DLD have more difficulty applying language rules, such as tense and number agreement, to verbs. The data also demonstrated that more verbs were produced accurately in Spanish than in English for both children with DLD and TD. This indicates that the data results are in line with the participants' language development; Spanish language speakers learning English as a second language. Therefore, the results suggest that both groups are more grammatically accurate in their first language. This is in agreement with Castilla-Earls, Perez Leroux, Fulcher-Rood, and Barr (2020) who studied bilingual children with and without DLD and found statistical significance between the groups for several grammatical structures, one of them being verbs, which resulted in large effect size, $d = 2.09$. Their results demonstrated that 25.5% of verbs were produced correctly by children with DLD and 65.3% of verbs were produced correctly by children with TD. These results correlate with the finding that children with TD are more accurate in verb production than children with DLD. This could be due to the comprehensive deficits affecting children with DLD's ability to understand language rules which in turn affects their expressive language abilities including a lack of verbal morphology.

An important factor to consider that differentiates this study from previous literature was the approach taken to analyze verb morphology in the procedures and statistical analysis. Some studies assessing verb morphology differ in the participant's language, monolingual Spanish-speaking, monolingual English-speaking or bilingual, the stimuli used to gather data, elicited tasks or spontaneous, and the approach used to analyze the data, children with and without DLD, verb type and language (bilingual studies). These are all factors that affect the data of a study therefore an explanation of how this study differs from previous literature is

essential to outline the differences that could impact results. Grinstead et al. (2014) assessed monolingual Spanish-speaking with and without DLD by gathering spontaneous language samples and analyzed data based on the group and the type of verb errors. Another study completed on monolingual Spanish-speaking children with and without DLD is Castilla et al. (2020) who also used elicitation tasks and analyzed the groups and the type of verb errors. Monolingual English-speaking children Bedore and Leonard (2001, 2005) analyzed Spanish-English bilingual children by comparing 3 groups, 15 children with DLD and 30 children with TD (15 age control group, 15 MLU control group), assessed them using elicited probe tasks and analyzed data by implementing the 3 groups and different verb inflection accuracy. Castilla-Earls, Perez Leroux, Fulcher-Rood, and Barr's (2020) study evaluated bilingual children with and without DLD using elicited probe tasks and analyzed the data based on the type of grammatical structure. However, this study analyzed bilingual children using spontaneous language samples and analyzed the data based on group (children with and without DLD), type of error (omission, substitution, overregularization, and other), and language used (Spanish, English, best-performed language, and a combination of both Spanish and English). This method allowed the participants to be compared and analyzed through various factors and helped determine that one language was not sufficient in demonstrating differences in bilingual children with and without DLD when assessing verbs in spontaneous language samples.

FREQUENCY OF VERB ERRORS

The most common error type produced by children with DLD and TD were verb tense errors followed by substitution errors, tense omission, and verb omission, in English. In

Spanish, substitution errors were the most common error type produced by children with DLD and TD followed by verb omission and verb tense errors. This finding suggests that the verb errors in both languages are different which could be due to the different verb systems between Spanish and English. The different rules in the languages lead to a different manifestation of verbal morphology. This finding is in agreement with the results of Jacobson and Livert (2010) who found that bare stems, verbs missing tense markings, were the most common error produced by younger and older bilingual children with DLD compared to younger bilingual children with TD. The researchers concluded that these errors are due to the reduced perceptual saliency of inflections (Jacobson & Livert, 2010). However, this is not in agreement with Castilla-Earls, Perez Leroux, Fulcher-Rood, and Barr (2020) who studied bilingual children with and without DLD and found that both groups make more substitution errors in verbs and reported no omission errors in either group. This might be due to differences within the studies. The researchers used elicitation tasks to induce verb production rather than spontaneous language samples and assessed the Spanish and English data combined rather than separately. The use of elicitation tasks affected the frequency of omission errors as the data showed many substitution errors and unscorable errors yet no omission errors in either of the groups.

OMISSION ERROR

Although verb omission errors were not the most frequent errors seen in either Spanish or English there was a high percentage of children with DLD and TD that omitted verbs. In English, 88% of children with DLD and 44% of children with TD produced a type of verb omission. In Spanish, 88% of children with DLD and 48% of children with TD

produced a type of verb omission. This suggests that verb omission errors are seen in both children with DLD and TD with low frequency compared to other verb errors, however, more children with DLD omit verbs compared to children with TD. Similarly, Gutierrez-Clellen, Restrepo, and Simon-Cereijido's (2006) study on Spanish-speaking children with DLD found that the majority of the errors the children produced were on verb inflection, and a small percentage of the errors involved verb omissions. The total number of verb inflection errors was 20% and 4.18% of the errors were omission of verbs (Gutierrez-Clellen, Restrepo, & Simon-Cereijido, 2006). This study demonstrated similar percentages, children with DLD produced errors in 33% of verbs and 10% of them were omissions of verbs, in English and, 17% of verbs produced in Spanish contained errors and 6% of them were omission of verbs.

INFINITIVE ERROR

A particular finding of this study is that children with TD and DLD made infinitive verb errors when speaking Spanish which is not common in Spanish. Examples of infinitive errors are, "El niño *ver* la rana" (the boy see the frog), "El niño se *comer* un pan" (The boy is eat a bread), and "El señor se *sentar*" (The man is sit). Although there were not many infinitive verb errors made by either TD or DLD groups in Spanish, the error was interesting because infinitive verbs were not meant to be used in those contexts. Therefore, the error was unexpected in Spanish, however bare stems do exist in English, and English bare stems were marked with the omission of tense errors. These results suggest that bilingual children with TD and DLD omit some inflections and tense markings as they learn the rules of Spanish and English. Bedore and Leonard (2001) also found that infinitives occasionally replaced other verb inflections in Spanish-speaking children with DLD, children in their MLU control

group, and children in their age control group when speaking English. They suggested that it is part of the extended optional infinitive stage, explained by Rice and Wexler (1998), in which tense and agreement are optional factors treated by children acquiring other languages.

OVERREGULARIZATION ERROR

Overregularization errors emerge as an interesting finding in this study because the percentages of children with TD who produced overregularization errors were significantly higher than the percentages of children with DLD in both languages. In English, 19.2% of children with TD and 4.2% of children with DLD produced overregularization errors. In Spanish, 17.3% of children with TD and 4.2% of children with DLD produced overregularization errors. An example of an overregularization error in English is “the frog *eated* his food” and an example in Spanish is “El niño *decio* adios” (The boy *sayed* bye). These results suggest that children with TD demonstrate knowledge of tense marking systems as compared to children with DLD and that the emerging skill did not have enough practice to be fully mastered. These findings correlate with the results of Jacobson and Livert’s (2010) study on bilingual children with DLD. Their results demonstrated that 26% of bilingual children with TD and 1% of bilingual children with DLD produced overregularization errors. The researchers concluded that the findings indicated that bilingual children with TD exhibit difficulties with irregular past tense (Jacobson & Livert, 2010).

CLINICAL IMPLICATIONS

This study provides some insight into the expectation of verbal morphology error types and frequencies produced by bilingual children with TD and DLD. Although verb errors in isolation do not distinguish children with and without DLD, they can contribute to clinical judgment by supplementing speech-language pathologists with further information about verb errors children with and without DLD produce. Examples of important information they can extract from this study are that bilingual children with DLD frequently omit morphological endings when speaking English and that bilingual children with TD have a higher percentage of overregularization errors in both Spanish and English compared to bilingual children with DLD.

Furthermore, this study suggests that clinicians should obtain a language sample in each language for bilingual children suspected of having DLD to develop appropriate diagnostic decisions. As indicated by this study's finding, bilingual children with DLD and TD only demonstrated significant differences when both languages were taken into account or when the best language was considered. However, neither method can be completed without obtaining two language samples. Moreover, bilingual children with DLD should demonstrate limited performance in both languages.

LIMITATIONS

One limitation that might have impacted the findings is that the language samples analyzed only considered story retell. There were two types of spontaneous language samples obtained in each language, story retell and story generation, as explained previously. However, only one of the language samples was used which raised the question, "Was there

enough information to detect differences in each language”? However, based on the data gathered, all participants produced at least 8 utterances. The exclusion criteria developed for the participants included having a minimum of 8 utterances, therefore, it is safe to say that there was enough data to make accurate conclusions about the findings.

This brings light to the next limitation which comes with using spontaneous language samples. In spontaneous language samples, children select the lexical items used in their utterances. In this case, children selected vocabulary that went along with wordless picture books. However, the ability to create their utterance enables them to select words that they are familiar with. This raises the likelihood that the participants will use vocabulary with inflected forms that have been highly practiced. Therefore, there is a possibility that a child’s language, vocabulary, and morphological skills are not captured through the use of spontaneous language samples. However, there are many advantages to using spontaneous language samples, as previously acknowledged, so this is not to discourage future studies from using this method to gather data.

Lastly, the obligatory context of each verb type used correctly was not coded differently. Therefore, a ratio could not be completed to obtain a percentage of the number of verb errors according to the number of opportunities the participant had for each verb type. For example, auxiliaries, copulas, and verbs were not differentiated in the calculation for obligatory context because the coding system did not include codes to differentiate auxiliaries, copulas, and verbs that were used correctly. Therefore, we were unable to compare the number of opportunities each participant had with the number of errors made, according to each verb type, auxiliaries, copulas, verbs. Overall, the results are valid for answering the two research questions because the coding system allowed for appropriate data

generation to answer specific questions given two different groups and two different languages.

CONCLUSION

Overall, children with DLD produced more verb errors than children with TD, and children with DLD created a lower number of obligatory contexts than children with TD. However, the results only demonstrated a statistical significance when both languages were taken into account or when the best language was used in the analysis of verb accuracy of the two groups. The groups did not demonstrate differences when the data were compared in Spanish and English separately. Verb tense errors were the most frequent error type in English and substitution errors were the most frequent error type in Spanish for both children with DLD and TD. However, children with TD demonstrated the errors at lower percentages. The results suggest that verb error type should be analyzed and considered in the assessment of Spanish-English bilingual children to gather sufficient information about their language profile and determine an accurate DLD diagnosis. Future research can build on the findings of this study by analyzing detailed measures through the codification and calculation of specific obligatory contexts.

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TABLE 1. CHILD AND FAMILY DEMOGRAPHICS (*N*=74).

	DLD (<i>N</i> =24) <i>n</i> (%)	TD (<i>N</i> =52) <i>n</i> (%)
Child Gender		
Female	14 (58.3%)	23 (44.2%)
Male	10 (41.7%)	29 (55.8%)
Receiving Speech-Language Services Now		
Yes	19 (79.2%)	10 (19.2%)
No	5 (11.3%)	42 (80.8%)
No response	0 (0%)	0 (0%)
Maternal Education		
Elementary	8 (33.3%)	11 (21.2%)
Highschool	7 (29.2%)	15 (28.8%)
Some College	4 (16.6%)	3 (5.8%)
Associate degree	2 (8.3%)	4 (7.7%)
Bachelor's degree	1 (4.2%)	6 (11.5%)
Graduate degree	1 (4.2%)	11 (21.2%)
No Response	1 (4.2%)	2 (3.8%)
Receiving Free / Reduced Lunch		
Yes	22 (91.7%)	33 (63.5%)
No	2 (8.3%)	16 (30.8%)
No response	0 (0%)	3 (5.7%)

Note: DLD = Developmental language disorder; TD = Typically developing language skills

TABLE 2. KEY FOR CODES

Codes Key	
[V]	Verbs
[-] (dash)	Omission
[EW]	Substitution
[EO]	Overregularization

TABLE 3. ENGLISH VERB ERRORS

	Type of Error	Category	Codes	Example
English Verb Errors	Omission	Third-person singular -s	/*3s	The frog jump/*3s. Correct: The frog jump/3s. He eat/*3s on the couch. Correct: He eat/3s on the couch. The girl grab/*3s the frog. Correct: The girl grab/3s the frog.
		Omission of Past tense -ed	/*ed	The frog jump/*ed yesterday. Correct: The frog jump/ed yesterday. He climb/*ed on the log. Correct: He climb/ed on the log The dog bark/*ed at him. Correct: The dog bark/ed at him.
		Present Progressive -ing	/*ing	The frog is jump/*ing. Correct: The frog is jump/ing. He is climb/*ing on the log. Correct: He is climb/ing on the log. She is cry/*ing on the bed. Correct: She is cry/ing on the bed.
		Auxiliary “be” and “do” (Always ending with -ing)	[-AUX]	The frog[-AUX] jumping. Correct: The frog is jumping. They[-AUX] trying to catch him. Correct: They are trying to catch him. She[-AUX] looking over there. Correct: She is looking over there
		Copula “be”	[-COP]	The frog[-COP] happy. Correct: The frog is happy. He[-COP] in the middle. Correct: He was in the middle They[-COP] best friends. Correct: They are best friends.
		Regular or irregular verb	[-V]	The frog[-V] his food. Correct: The frog ate his food. The boy and the dog[-V] footprints. Correct: The boy and the dog left footprints. He[-V] into the house. Correct: He went into the house.
	Substitution	Auxiliary	[EW:AUX]	They was[EW:AUX] jumping. Correct: They were jumping. The boy were[EW:AUX] walking. Correct: The boy was walking. The boy and the dog was[EW:AUX] crying. Correct: The boy and the dog were crying.
		Copula	[EW:COP]	The frog are[EW:COP] happy. Correct: The frog is happy. They was[EW:COP] all mad at him.

				Correct: They were all mad at him. The frog and the boy is[EW:COP] sad. Correct: The frog and the boy were sad.
		Semantic Errors	[V:EW]	The frog saw[V:EW] a noise. Correct: The frog heard a noise. They come[V:EW] friends. Correct: They became friends. He said[V:EW] to the dog to the dog to go over there. CorrectL He told the dog to go over there.
		Verb Tense	[V:EW:VT]	The frog think[V:EW:VT] they were looking. Correct: The frog thought they were looking. He brake[V:EW:VT] the tree. Correct: He broke the tree. The big frog go[V:EW:VT] on the turtles shell. Correct: The big frog went on the turtles shell.
	Overregularization	Regular Verbs	[V:EO:R]	The frog eated[V:EO:R] his food. Correct: The frog ate his food. He bited[V:EO:R] the little frog. Correct: He bit the little frog. The boy catched[V:EO:R] the dog. Correct: The boy caught the dog.
		Irregular Verbs	[V:EO:I]	The frog ated[V:EO:I] his food Correct: The frog ate his food. He stucked[V:EO:I] his tongue out at him. Correct: He stuck his tongue out at him. The boy haded[V:EO:I] three pets. Correct: The boy had three pets.
	Other	Bilingual Influenced Verb	[V:BI]	He salt[V:BI] in the bathtub. Correct: He jumped in the bathtub.
		Double tense marking (Additional verb, copula, or auxiliary)	[DTM]	The turtle faced were[DTM] the frog. Correct: The turtle faced the frog. The boy got is[DTM] the dog. Correct: The boy got the dog. The boy wanted couldn't[DTM] to see that. Correct: The boy wanted to see that.
		Other Verb Error	[V:EW:O]	The frog be[V:EW:O] mad. Correct: The frog was mad. They went[go[V:EW:O] to the woods. Correct: They went to the woods. The dog is saded[V:EW:O]. Correct: The dog is sad.

TABLE 4. SPANISH VERB ERRORS

	Type of error	Category	Codes	Example
Spanish Verb Errors	Omission	Auxiliary	[-AUX]	El niño[-AUX] yendo a la casa. Correct: El niño está yendo a la casa. Un niño[-AUX] caminando. Correct: Un niño esta caminando La señora[-AUX] cantando. Correct: La señora esta cantando
		Copula	[-COP]	Ella[-COP] enojada. Correct: Ella esta enojada. La rana[-COP] aquí. Correct: La rana esta aquí. Una señora[-COP] con su bebe. Correct: Una señora esta con su bebe.
		Verb	[-V]	La niña y el perro[-V]. Correct: La niña y el perro llegaron. El niño[-V] “esa es mi rana”. Correct: El niño dijo “esa es mi rana”. La rana[-V] en la casa. Correct: La rana brinco en la casa.
	Substitution	Number of Person Error	[V:EW:P]	Los niños comemos[V:EW:P] Correct: Los niños comen. Ellos quería[V:EW:P] ir a su cuarto Correct: Ellos querían ir a su cuarto. La rana ya se van[V:EW:P] con él. Correct: La rana ya se va con él.
		Semantic Verb Error	[V:EW]	La rana hizo[V:EW] adiós. Correct: La rana dijo adiós. Ellos salieron[V:EW] lo que pasaba. Correct: Ellos sabían lo que pasaba. Hizo un beso en la nariz. Correct: Dio un beso en la nariz.
		Verb Tense Error	[V:EW:VT]	La rana saltaría[V:EW:VT]. Correct: La rana salto. La niña se pone poner[V:EW:VT] enojada. Correct: La niña se puso enojada. Ellos leen[V:EW:VT] el menú. Correct: Ellos leyeron el menú.
		Mood: Indicative	[V:EW:IND]	La mama quiere que viene[V:IND]. Correct: La mama quiere que venga (SUB).
		Mood: Subjuntive	[V:EW:SUB]	El niño no vea[V:EW:SUB] los animales. Correct: El niño no veía(IND) los animales. La señora vaya[V:EW:SUB] con él. Correct: La señora fue(IND) con él. El perro corrio lo mas rapido que pueda[V:EW:SUB].

	Overregularization			Correct: El perro corrió lo más que podía(IND).
		Overregularization	[V:EO]	La señora ponio[V:EO] la lechuga. Correct: La señora puso la lechuga. El pensio[V:EO] que no veían. Correct: El penso que no veían. El niño decio[V:EO] “adios”. Correct: El niño dijo “adios”.
	Other	Infinitive verb	[V:I]	El niño ver[V:I] la rana. Correct: El niño vio la rana. El niño se comer[V:I] un pan. Correct: El niño se comió un pan. El señor se sentar[V:I]. Correct: El señor se sentó.
		Bilingual Influence Verb	[V:BI]	Ella cachó[V:BI] la rana. Correct: Ella pescó la rana. El niño estaba lafando[V:BI]. Correct: El niño estaba riéndose. El perro estaba barkiando[V:BI]. Correct: El perro estaba ladrando.
		Double Tense Marking	[DTM]	Después estuvo ella fue[DTM] muy enojada. Correct: Después estuvo muy enojada. Luego le dio daría[DTM] un beso. Correct: Luego le dio un beso. La rana metió estaba[DTM] su pata. Correct: La rana metió su pata.
		Other Verb Error	[V:EW:O]	Ellos lloron[V:EW:O]. Correct: Ellos lloraron. Mi tambor esta rompido[V:EW:O] Correct: Mi tambor está roto. Ella dijo “no regresas[V:EW:O]”. Correct: Ella dijo “no regreses”.

Table 5. DESCRIPTIVE STATISTICS AND RESULTS OF INDEPENDENT SAMPLE *T* TESTS (*N*=74)

	DLD (<i>n</i> =24)				TD (<i>n</i> =52)				<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>				
Child Age (mths)	65.3	9.6	51	87	75.7	11.1	49	98	3.968	74	<.001	.979
Normed-referenced results												
KBIT-II	104.5	12.5	70	130	102.3	13.9	83	130	-.694	74	.490	-.171
BESA Spanish	71.7	7.8	52	118	92.5	17.4	52	83	7.172 ^a	73.9	<.001	1.376
BESA English	68.4	7.9	58	116.5	91.6	16.4	55	85	8.265 ^a	72.4	<.001	1.595
BESA Best Lang	73.4	6.8	83	118	101.9	9.6	58	85	13.12	74	<.001	3.238
BESA Differential	3.0	7.5	-61	48	.9	124.8	-8	18	-.560	67.6	.577	-.099
Language sample measures												
English												
No. of utterances	28.7	12.7	10	57	31.9	9.0	8	50	1.096 ^a	34.2	.281	.303
MLU _w	4.4	1.3	2.76	9.67	7.0	1.5	2	7.5	7.473	74	<.001	1.844
NTW	132.7	79.8	39	492	225.9	79.6	16	300	4.738	74	<.001	1.169
NDW	47.2	21.3	25	109	71.1	19.5	10	84	4.812	74	<.001	1.188
Verbs per utterance	.9	.2	.43	1.62	1.2	.3	.47	1.29	5.182	74	<.001	1.122
Spanish												
No. of utterances	42.2	11.9	18	68	37.6	8.7	12	66	-1.681 ^a	34.9	.102	-.460
MLU _w	4.4	1.2	1.27	9.85	6.5	1.5	2.32	7.8	6.128	74	<.001	1.512
NTW	146.9	81.8	19	484	226.38	91.1	14	398	3.644	74	<.001	.899
NDW	55.4	22.2	13	145	80.2	24.0	10	103	4.274	74	<.001	.971
Verbs per utterance	-.8	.4	-1	.07	-.7	.5	-1	.17	1.476 ^a	52.9	.146	.341
Total Obligatory Context												
English	33.3	18.9	10	87	45.0	15.5	7	73	2.856	74	.006	.705
Spanish	35.9	18.8	1	103	47.3	18.1	4	75	2.522	74	.014	.622
Bilingual	69.3	29.1	44	165	92.3	28.0	11	133	3.301	74	.001	.814
Verb Error Ratio												
English	.4	.2	.0	.67	.3	.2	.19	.89	-2.370	74	.020	-.585
Spanish	.2	.1	.0	1	.1	.1	.0	.51	-1.280	74	.205	-.316
Bilingual	.3	.1	.02	.4	.2	.1	.08	.5	-3.570	74	.001	-.881
Best Language	.1	.1	.0	.54	.1	.1	.0	.35	-2.694 ^a	30.7	.011	

Note: The table reports group means and standard deviations for each variable as well as results of independent sample *t*-tests comparing the group means. Cohen's *d* is reported as the effect size for the comparison. Child Age and Length of English exposure are measured in months. ^a indicates that Levene's test for equality of variances was significant, so equal variances were not assumed in the independent sample *t*-test calculations. DLD = Developmental language disorder; TD = Typically developing language skills; KBIT-II = Non-verbal subtest of the Kaufman Brief Intelligence Test, Second Edition; BESA = Bilingual English-Spanish Assessment; MLU_w = Mean length of utterance in words; NTW = Number of total words; NDW = Number of different words.

TABLE 6. VERB ERROR FREQUENCY IN ENGLISH (*N*=74).

	DLD (<i>N</i> =24) <i>n</i> (%)	# of participants	TD (<i>N</i> =52) <i>n</i> (%)	# of participants
Tense Omission	96 (11.1%)	23 (95.8%)	229 (9.3%)	44 (84.6%)
Third Person Singular -s	23	11	13	6
Past Tense -ed	55	17	200	42
Present Progressive -ing	168	12	16	12
Verb Omission	82 (9.5%)	21 (87.5%)	57 (2.3%)	23 (44.2%)
Auxiliary	38	16	32	17
Copula	32	15	17	12
Verb	12	9	8	8
Substitution	102 (11.8%)	21 (87.5%)	271 (11%)	46 (88.5%)
Auxiliary	4	3	20	14
Copula	5	3	32	13
Verb	9	7	25	19
Verb Tense	77	19	190	44
Other	7	4	4	3
Overregularization	1 (0.1%)	1 (4.2%)	24 (1%)	12 (23.1%)
Irregular Verb	0	0	3	3
Regular	1	1	21	11
Present Progressive -s	0	0	0	0
Other Verb Errors	2 (0.4%)	2 (8.3%)	10 (0.4%)	10 (19.2%)
Bilingual Influence	0	0	1	1
Double Tense Marking	2	2	9	9
Verb Tense	155 (18%)	22 (91.6%)	403 (16.4%)	47 (90.4%)
Third Person Singular -s	23	11	13	6
Past Tense -ed	55	17	200	42
Verb Tense	77	19	190	44
No Verb Errors	-	0 (0%)	-	1 (2%)
Obligatory Context	862	-	2461	-
# of Verbs used correctly	579 (67.2%)	-	1870 (76%)	-

Note: DLD = Developmental language disorder; TD = Typically developing language skills.

TABLE 7. VERB ERROR FREQUENCY IN SPANISH ($N=74$).

	DLD ($N=24$)	# of Participants	TD ($N=52$)	# of Participants
	n (%)		n (%)	
Verb Omission	50 (6.3%)	21 (87.5%)	36 (1.5%)	25 (48.1%)
Auxiliary	7	16	5	5
Copula	22	15	10	9
Verb	21	9	21	17
Substitution	61 (7.6%)	17 (70.8%)	159 (6.8%)	48 (92.3%)
Verb	19	9	38	23
Indicative	0	0	3	3
Subjunctive	1	1	4	4
Person	8	4	50	27
Verb Tense	31	13	52	29
Other	2	2	12	10
Over Regularization	1 (0.1%)	1 (4.2%)	14 (0.6%)	9 (17.3%)
Other Verb Errors	9 (3.4%)	6 (25%)	25 (0.9%)	9 (17.3%)
Bilingual Influence	4	4	11	8
Infinitive	20	4	9	8
Double Tense Marking	3	2	1	1
Verb Tense Errors	51 (6.4%)	14 (58.3%)	61 (2.6%)	32 (61.5%)
Infinitive	20	4	9	8
Verb Tense	31	13	52	29
No Verb Errors	-	1 (4.2%)	-	2 (3.8%)
Obligatory Context	800	-	2341	-
# of Verbs used correctly	661 (82.6%)	-	2111 (90.2%)	-

Note: DLD = Developmental language disorder; TD = Typically developing language skills.