A COMPARISON OF SPEECH DISFLUENCIES IN BILINGUAL SPANISH-ENGLISH CHILDREN WHO DO AND DO NOT STUTTER: A PRELIMINARY INVESTIGATION

A Master's Thesis

Presented to

The Faculty of the Department

Of Communication Sciences and Disorders

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

By

Cristina Rincon

May 2017

A COMPARISON OF SPEECH DISFLUENCIES IN BILINGUAL SPANISH-ENGLISH CHILDREN WHO DO AND DO NOT STUTTER: A PRELIMINARY INVESTIGATION

An Abstract of a Master's Thesis

Presented to

The Faculty of the Department

Of Communication Sciences and Disorders

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

By

Cristina Rincon

May 2017

ABSTRACT

Bilingual Spanish-English (SE) children who do not stutter (CWNS) are known to exceed the diagnostic criteria for developmental stuttering based on monolingual English speakers. Therefore, this population is at risk of being misdiagnosed as children who stutter (CWS). The purpose of this study is to examine the speech disfluency frequency and type of bilingual SE CWS to SE CWNS during narrative samples elicited in Spanish and English to provide further diagnostic information for this population. Participants included 5 bilingual Spanish-English children (2 CWS, 3 CWNS) ranging in age from 5 years to 7 years and 5 months and recruited from the surrounding Houston, Texas area. Findings indicate that the current diagnostic criteria for developmental stuttering, based on monolingual English speakers, are not appropriate for bilingual Spanish-English children who do not stutter because it is too low for this population. Regardless of the language being spoken, CWS participants had a frequency of stuttering-like disfluencies that exceeded the diagnostic criteria for developmental stuttering that is based on monolingual English speakers. The CWNS participants varied in meeting the criteria depending on the language being spoken. Findings from this study may contribute to the stuttering frequency criteria specific to bilingual SE children to reduce misdiagnoses of stuttering in this population.

Acknowledgments

I would like to thank the committee chair, Dr. Kia Johnson, for her guidance, support, and mentorship throughout this research study. Thank you for believing in me, encouraging me to strive for more, and for giving me this opportunity. I would not have accomplished this without you and I am extremely grateful.

Thank you also to the committee members, Dr. Anny Castilla-Earls and Dr. Courtney Byrd, for your time and collaboration throughout this process. Your expertise has been invaluable and I appreciate all you have done for this project.

A special thank you to the University of Houston Stuttering Research Laboratory research assistants – both graduate and undergraduate – for running participant visits with and without me, for coding and transcribing data, and for completing various tasks related to the study. Your time and effort are greatly appreciated.

Thank you to all my wonderful friends within the program. Your support, patience, and the laughs we shared along the way helped me get through this process.

TABLE OF CONTENTS

LIST OF TABLES

Dedication

This thesis is dedicated to my parents, Rodolfo Rincón and Sandra Cantú Rincón, for their love, patience, and support. I also dedicate this thesis to my sister, Alexandra Rincón, the Mary-Kate to my Ashley and my number one fan. Lastly, I dedicate this thesis to Carlos A. Rodriguez Jr. for his endless support and encouragement. I am so grateful for all of you.

A Comparison of Speech Disfluencies in Bilingual Spanish-English Children Who Do and Do Not Stutter: a Preliminary Investigation

Introduction

Variability of speech disfluencies is known to be a key feature of childhood stuttering (Ingham & Riley, 1998; Johnson, 1961; Sawyer & Yairi, 2006; Yaruss, 1997). Stuttering variation in monolingual children who stutter has been examined across various conversational partners, locations and contexts (Johnson, Karrass, Conture, & Walden, 2009). Although variability of frequency in stuttering has been found to be more evident across context (i.e. dialogue vs. monologue; Johnson, Karrass, Conture, & Walden, 2009; Yaruss, 1997), stuttering variations across communicative partner, location, and context are not significant enough to impact a child's diagnosis as a child who stutters (CWS) or as a child who does not stutter (CWNS; Johnson et al., 2009). Despite what is known about variability within monolingual English-speaking CWS, little is known about the variability of speech disfluencies in bilingual children who do and do not stutter (Byrd, Bedore, & Ramos, 2015). It is suspected, however, that language complexity, language dominance, conversational type, or some combination of the three may play a major role in variability of disfluencies in this clinical population (Taliancich-Klinger, Byrd, & Bedore 2013).

Currently, the diagnosis of childhood stuttering is dependent upon a stuttering frequency criteria based on monolingual English-speakers (Ambrose & Yairi, 1999). Bilingual Spanish-English (SE) children who do not stutter (CWNS) are reported to produce more disfluencies than their monolingual English peers. These disfluencies surpass the 3% frequency classification (stuttering-like disfluencies per 100 words) typically used to identify stuttering (Byrd, Watson, Bedore, & Mullis, 2015; Byrd, Bedore, & Ramos, 2015). Thus, bilingual SE children are at risk of being falsely identified as CWS due to an undefined distinction between the profile of stuttering

presented by bilingual children who stutter and bilingual children who do not stutter in comparison to monolingual English-speaking children (Byrd, Watson, Bedore, & Mullis, 2015).

In a study examining the accuracy of identification of stuttering in bilingual SE children by bilingual SE speech-language pathologists (SLPs), Byrd and colleagues (2015) found that the majority of the SLPs falsely identified a bilingual SE child who does not stutter as a child who stutters. No relationship was found between the years of clinical experience or number of fluency clients the SLP had and their accuracy of the identification (Byrd et al., 2015).

In considering normal fluency, bilingual SE children are known to produce more mazes in their speech than monolingual English-speaking children (Bedore, Fiestas, Peña, & Naggy, 2006; Byrd et al., 2015). Mazes are defined as disruptions in the forward flow of speech identified by the production of initial parts of words, a string of words, or unattached fragments of words that that do not contribute meaning to the message attempted to communicate (Loban, 1976). Specific to disfluencies, studies report repetitions of words and parts of words as the most common type of disfluencies produced by bilingual SE CWNS (Bedore et al., 2006; Fiestas et al., 2005). Byrd, Bedore, and Ramos (2015) examined the disfluent speech of eighteen bilingual SE CWNS and found that 16 of the participants produced monosyllabic word repetitions in both Spanish and English, 12 participants produced sound repetitions in either Spanish or English, and five participants did not produce sound repetitions in either language. Traditionally, repetitions of sounds/syllables and words are often considered stuttering-like disfluencies (SLDs). In considering non-stuttering like disfluencies (nonSLDs) produced by bilingual SE CWNS, Byrd, Bedore, and Ramos (2015) found the following types of disfluencies that rank in order from most frequently occurring to least frequently occurring: revisions, interjections, phrase repetitions, and unfinished words.

The frequency at which bilingual SE CWNS exhibit sound/syllable or word repetitions, which are considered as SLDs, have been reported to range from 3-22% per 100 words which is at or above the 3% frequency classification typically used to identify stuttering in monolingual speakers (Ambrose & Yariri, 1999; Byrd et al., 2015; Byrd, Bedore, & Ramos, 2015). Fiestas and colleagues (2005) suggested that the higher number of repetitions (i.e. sound/syllable, whole word, and phrase) produced by bilingual SE children result from the linguistic uncertainty experienced by bilinguals compared to monolinguals. Linguistic uncertainty experienced by bilingual children is characterized by the lexical, semantic, and phonological decisions made as the speaker navigates both languages (Fiestas, Bedore, Peña, Nagy, 2005). This evidence, taken together, implies that monolingual criteria are not appropriate for clinical decision-making for SE children and can lead to over-identification of stuttering in this population (Byrd, et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005).

If linguistic uncertainty is found to play a significant role in an increase in the amount of repetitions, one could speculate that, for a bilingual SE child, there may be more variability of disfluencies as well as a higher frequency of disfluencies produced in their least proficient language. However, empirical findings on the influence of language dominance and speech disfluency frequency in bilingual SE children vary. Some studies report that bilingual SE CWNS have more stuttering-like disfluencies in the dominant language (Byrd et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005). However, Byrd, Bedore, and Ramos (2015) found no significant difference between balanced bilinguals (using Spanish and English 40-69% of the time), English dominant bilinguals (using English 61-80% of the time), and Spanish dominant bilinguals (using Spanish 61-80% of the time) in their frequency of stuttering-like, non-stuttering like, or total speech disfluencies. They did report that all participants (bilingual SE CWNS), regardless of language dominance, presented with higher overall frequency of speech

disfluencies in Spanish than in English. Language dominance aside, the most important factor to consider is that bilingual SE CWNS exhibit a higher frequency of stuttering-like speech disfluencies than is typically expected of monolingual English CWNS (Byrd, Bedore, & Ramos, 2015; Byrd et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005).

Although there is research that investigates the types and frequency of disfluencies in bilingual SE children who do not stutter, limited evidence exists pertaining to the manifestation of stuttering in bilingual SE children who do stutter. In these limited studies, pertinent information about language use, input, and proficiency is lacking. Albeit not an examination of stuttering in children, Bernstein Ratner and Benitez (1985) explored the speech of a 50-year-old bilingual SE male; however, information about his input and output in both languages and on the types of speech disfluencies (i.e. stuttering or non-stuttering like) were not provided. The authors only concluded that the adult produced more speech disfluencies in English than in Spanish. In another study, Howell and colleagues (2004), described the spontaneous speech of an adolescent (11 years and 9 months old) bilingual SE male who stutters. Information regarding the participant's proficiency in either language was limited to the observation that he was more proficient in Spanish than in English and his stuttering was reported as more severe (i.e. more stuttering-like disfluencies) in Spanish than in English.

A recent study by Taliancich-Klinger, Byrd, and Bedore (2013) describes the disfluent speech of a 6 year and 1 month old bilingual SE female with confirmed stuttering. Through a parent report on language input and output as well as speech and language assessments to examine language skills in both English and Spanish, the participant demonstrated mixed language dominance. The participant was more disfluent in English, the language in which she produced a longer mean length of utterances (MLU), across both narrative and conversational samples, however the disfluency types and their occurrence from most to least frequent were

determined to be comparable across both languages. Specific to SLDs, monosyllabic word repetitions produced with atypical tension and rhythm were the most frequently produced SLDs followed by syllable repetitions in both Spanish and English. The least frequently produced SLDs were audible sound prolongations (only observed in English) and sound repetitions (noted in both Spanish and English). In regards to nonSLDs in order from most to least frequently occurring, unfinished words, revisions, phrase repetitions, and interjections were more frequently produced in English than in Spanish. Overall, the participant exhibited more nonSLDs than SLDs in both languages and was more disfluent in both languages when she produced a longer mean length of utterance (MLU). Because the authors believe that stuttering-specific and language-specific factors contribute to the fluency breakdowns in bilingual SE CWS, they report the need for further research on bilingual SE CWS in order to establish a diagnostic guideline for this population (Taliancich-Klinger, Byrd, & Bedore, 2013).

Based on the 2010 US census, growth trends suggest that one in three U.S. residents will be Hispanic and more than 60% of the population will speak both English and Spanish within the next 50 years (U.S. Consensus Bureau, 2010). Therefore, it is imperative to understand the manifestation of speech disfluencies in this growing clinical population.

Thus, the purpose of this study is to examine the speech disfluencies of bilingual SE CWS in comparison to bilingual SE CWNS based on changes in language (English vs. Spanish) during a narrative task. Secondarily, this study will examine the connection of speech disfluencies for both talker groups to the mean length of utterance in words (MLUw) in both languages. It is hypothesized that, between talker groups, the bilingual SE CWS will present with more SLDs than the SE CWNS regardless of the language. It is also hypothesized that participants within talker groups will exhibit more stuttering in the language eliciting the higher MLU. Findings

from this study will provide clinical support to the continued need for diagnostic stuttering data specific to bilingual SE children who stutter.

Methods

Participants

Participants consist of five bilingual SE children ranging in age from 5 years to 7 years and 5 months from the surrounding Houston, Texas area. All participants were paid volunteers and were recruited throughout the Houston, Texas metropolitan area through speech-language pathologists, daycare facilities, and community events and health clinics. Of the five participants, the two SE CWS participants had previously received formal intervention for stuttering. Other than stuttering, participants had no known or reported speech, language, or hearing problems. This study was approved by the University of Houston Committee for Protection of Human Subjects. For each of the twelve participants, parents signed an informed consent, and their children assented.

The SE CWS group consists of 1 female and 1 male, and the SE CWNS group consists of 2 females and 1 males. Due to the small sample size of the current study, participants were not all matched by age across talker groups (CWS and CWNS). However, the author did take into consideration the gender, age, language skills, and English and Spanish use and input when selecting participants. Only participants SE CWS-2 and SE CWNS-3 matched in age, gender, and English and Spanish language skills.

Twelve total participants were seen for the study, however, two bilingual SE CWNS participants were excluded from data analyses due to their inability to complete testing in Spanish and meet the Spanish input and output percentages criteria required for participation in the study. Five additional participants (5 SE CWNS) were excluded from the study due to not having a participant match in the contrasting talker group.

Bilingualism

To establish the participants' exposure and use of Spanish and English, parents of participants were administered the Bilingual Input-Output Survey (BIOS) which includes questions regarding the child's patterns of language input and output during weekdays and weekends (Peña, Gutierrez-Clellen, Iglesias, Goldstein, & Bedore, 2014). The questionnaire provides a language dominance percentage for both English and Spanish and has been used in previous studies to determine participants' levels of language exposure and use (Byrd, Bedore, & Ramos, 2015; Taliancich-Klinger & Byrd, 2013). To be eligible for the study, participants required at least 20% input and output in both languages; this criterion has been used in previous studies examining the disfluencies in bilingual SE children (Byrd, Bedore, & Ramos, 2015). Participants with a Spanish-use percentage of 61%-80% are considered Spanish-dominant. Participants with an English-use percentage of 61%-80% are considered English dominant. Participants with English and Spanish use percentage of 40%-60% are considered balanced bilinguals (Byrd, Bedore, & Ramos, 2015).

Based on the participant's input and output percentages in both English and Spanish gathered from the BIOS questionnaire, participants SE CWS-1, SE CWNS-2, and SE CWNS-3 are considered to be balanced bilinguals. Participant SE CWS-2 is considered to be an English dominant bilingual and participant SE CWNS-1 is considered to be a Spanish dominant bilingual based on their BIOS percentages (see Table 1 for participant BIOS percentages).

Speech and Language

To establish the participants' level of language skills and development, the Bilingual English Spanish Assessment (BESA; Peña, Gutierrez-Clellen, Iglesias, Goldstein, & Bedore, 2014) was administered to each participant. The BESA is a standardized measure of language ability for bilingual SE children that includes semantic, morphosyntactic, and phonology subtests

in both English and Spanish. All five participants performed within normal limits, a standard score of 85-115, on all subtests of the BESA except for the SE CWS-1 who received a standard score of 83 on the Spanish Morphosyntax subtest. All five participants passed a binaural pure tone hearing screening and had no other speech, language, and related problem other than stuttering.

Talker Group Classification

Participants with confirmed diagnoses of stuttering by a board certified speech-language pathologist were classified as CWS. Participants were classified as CWNS if they (a) exhibited nonstuttering-like disfluencies (i.e., interjections, phrase repetitions, revisions) and whole-word or part-word repetitions (Byrd et al., 2015) and (b) were perceived by bilingual SE graduate students and the thesis committee chair, a monolingual English-speaking speech-language pathologist with experience in fluency disorders, as being typically disfluent.

Procedures

During a two-hour visit, two student clinicians (i.e. one graduate student clinician and one undergraduate student clinician) administered the BESA to each participant prior to obtaining a series of speech samples. One student clinician administered the BESA in Spanish and the other student clinician administered the BESA in English. The graduate student clinician administered the BIOS to a parent of the participant. All student clinicians – with the exception of 1 undergraduate student clinician – were bilingual in Spanish and English. The monolingual English-speaking undergraduate student clinician administered the BESA in English only.

Speech Samples

The following two speech samples were obtained: A narrative sample with (1) one clinician in English and (2) a narrative sample with a different clinician in Spanish. The same clinician that administered the BESA in Spanish obtained the Spanish speech sample and the

clinician that administered the BESA in English obtained the English speech sample. This was done so that the child believed each clinician only spoke English or Spanish, thus reducing the chances of the child speaking to the clinician in their preferred language.

Participants were asked to look at pictures in a picture book while the clinician told a story. The participants were then asked to re-tell the same story while flipping through the picture book. The wordless picture book used for the English narrative was different than the story and picture book used for the Spanish narrative. Each of the two narrative samples was approximately 15-20 minutes in length to allow for a complete 300-word sample. For each participant, one wordless picture book was used for each narrative sample in English and Spanish. The experimenter kept an online tally of words and after 300 words were obtained, the narrative speech sample was finished. Speech samples were transcribed using Systematic Analysis of Language Transcription (SALT) software.

Dependent Measures

Speech disfluencies. The following dependent measures were used for preliminary data analyses: (1) total disfluencies (stuttering-like + nonstuttering-like disfluencies)/number of words spoken (TDs), (2) stuttering-like disfluencies/number of words spoken (SLDs), and (3) ratio of stuttering-like disfluencies to total disfluencies (SLDs/TDs).

Mean length of utterance in words (MLUw). The MLUw was measured for each speech sample based on a SALT analysis.

Reliability. Intra- and interjudge measurement reliability was obtained for total disfluencies (stuttering-like + nonstuttering-like disfluencies), stuttering-like disfluencies, and the SALT transcriptions. Research assistants reviewed each other's SALT transcriptions and disfluency coding. Discrepancies were discussed between clinicians and resolutions of coding and transcription differences were agreed upon.

Data Analysis

Pre-analysis - Data Preparation

Transcription of speech samples. Video recorded narrative samples were transcribed using the Software Analysis of Language Transcripts (SALT) by undergraduate student research assistants formally trained on SALT. Utterances in the narrative samples were segmented by communication units. With the use of SALT, the mean length of utterance in words (MLUw) was calculated for each of the two speech samples per participant for data analysis. Previous studies that have explored speech disfluencies of bilingual SE individuals have also measured MLUw, thus allowing for comparison with these studies (Ardila, Ramos, & Barrocas, 2011; Carias & Ingram, 2006; Byrd, Bedore, & Ramos, 2015). Further, Gutiérez-Clellen and Simon-Cereijido (2010) recommend using MLUw when analyzing Spanish narrative samples.

Results

As previously stated, the participants of this preliminary study were not matched. Therefore, results are organized to provide a profile of data for each participant.

SE Child Who Stutters-1 (SE CWS-1)

The SE CWS-1 is a 5 year old male.

Frequency of disfluencies. During a narrative sample in English, the SE CWS-1 presented with the following disfluency data (see Table 2): 17% of TDs, 7% of SLDs, 10% of nonSLDs, and 41.17% of SLDs/TDs. During the narrative sample in Spanish, the SE CWS-1 presented with (see Table 2): 17% of TDs, 10% of SLDs, 7% nonSLDs, and 58.82% of SLDs/TDs. The percentages of SLDs in both languages exceed the diagnostic stuttering criteria (3% of SLDs per 100 words) based on monolingual English-speakers typically used to identify developmental stuttering (Ambrose & Yairi, 1999).

Types of disfluencies. During the narrative sample in English, the SE CWS-1 presented with the following SLDs listed in order from most frequent to least frequent (see Table 3): whole word repetitions (WWR; 12), sound/syllable repetitions (SSR; 6), and audible sound prolongations (ASP; 3). Nonstuttering-like disfluencies in English in order from most frequent to least frequent consisted of: interjections (INT; 14), phrase repetitions (PR; 11), and revisions (REV; 5).

During the narrative sample in Spanish, the SE CWS-1 presented with the following SLDs listed in order from most frequent to least frequent (see Table 3): WWR (21), SSR (7), and an ASP (1) and inaudible sound prolongation (ISP; 1). Nonstuttering-like disfluencies in Spanish in order from most frequent to least frequent consisted of: INT (12), PR (5), and REV (4) (see Table 3). The types of disfluencies exhibited by the SE CWS-1 did not vary by language.

MLUw. From the narrative sample in English, the SE CWS-1 presented with a MLUw of 5.78 and was in the 54% percentile for monolingual English-speaking children of the same age. In Spanish, the SE CWS-1 had an MLUw of 4.26 and was in the 12% percentile for same-aged monolingual English-speaking children (see Table 1). The SE CWS-1 presented with a higher percentage of SLDs in the language in which he also presented with a lower MLUw (Spanish).

SE Child Who Stutters-2 (SE CWS-2)

The SE CWS-2 is a 7 year and 5 month old female.

Frequency of disfluencies. During a narrative sample in English, the SE CWS-2 produced the following disfluency data (see Table 4): 12% TDs, 3% SLDs, 9% nonSLDs, and 25% SLDs/TDs. During the Spanish narrative, the SE CWS-2 produced (see Table 4): 15.33% TDs, 3.33% SLDs, 12.6% nonSLDs, and 21.7% SLDs/TDs. The percentages of SLDs in both

languages meet and exceed the diagnostic stuttering criteria based on monolingual English children.

Types of disfluencies. In English, the SE CWS-2 presented with the following SLDs listed in order from most frequent to least frequent (see Table 5): ASP (5), WWR (2), SSR (1) and ISP (1). The following are the nonSLDs presented by the SE CWS-2 in English in order from most frequent to least: INT (17), REV (7), and PR (3).

In Spanish, the SE CWS2 presented with the following SLDs listed in order from most frequent to least frequent (see Table 5): WWR (5), SSR (4), and an ASP (1). Nonstuttering-like disfluencies produced by the SE CWS-2 in Spanish in order from most to least frequent are: INT (25), REV (6), and PR (5). The types of disfluencies exhibited by the SE CWS-2 did not vary by language.

MLUw. In English, the SE CWS-2 produced an MLUw of 9.43% and was in the 68% percentile in English for same-age monolingual English-speaking children. In Spanish, she produced an MLUw of 8.83 percent and was in the 55% percentile for monolingual-English speaking children of the same age (see Table 1). The SE CWS-2 produced more TDs and SLDs in the language with the lower MLUw (Spanish). Similar to the SE CWS-1, the SE CWS-2 presented with a slightly higher percentage of SLDs in the language in which she also presented with a lower MLUw (Spanish).

SE Child Who Does Not Stutter-1 (SE CWNS-1)

The SE CWNS-1 is a 5 year and 3 month old male.

Frequency of disfluencies. During the 300-word narrative sample in English, the SE CWNS-1 produced the following disfluency data (see Table 6): 6.33% TDs, 2% SLDs, 4.33% nonSLDs, and 31.57% SLDs/TDs. During the 300-word narrative sample in Spanish, the following was presented (see Table 6): 6.66% TDs, 2.33% SLDs, 4.33% nonSLDs, and 35%

SLDs/TDs. The monolingual English diagnostic criteria of 3% SLDs typically used to identify stuttering was not met by the SE CWNS-1 in either language.

Types of disfluencies. The SE CWNS-1 produced the following SLDs in the English narrative in order from most to least frequent (see Table 7): WWR (5) and SSR (1). The following nonSLDs were produced in English: INT (8), REV (4), and PR (1).

In Spanish, SLDs produced by the SE CWNS-1 were 7 WWRs (see Table 7). Nonstuttering-like disfluencies produced in Spanish were: INT (9), REV (3), and PR (1). Across both languages, the SE CWNS-1 presented with whole-word repetitions, phrase repetitions, interjections, and revisions.

MLUw. In English, the SE CWNS-1 produced an MLUw of 6.29 and was in the 61% percentile of monolingual English speaking children of the same age. In Spanish, the SE CWNS-1 presented with an MLUw of 4.33 and was in the 10% percentile of same-age monolingual English children (see Table 1). More disfluencies were noted in Spanish, the language with the lower than expected MLUw.

SE Child Who Does Not Stutter-2 (SE CWNS-2)

The SE CWNS-2 is a 5 year and 10 month old male.

Frequency of disfluencies. In English, the SE CWNS produced the following disfluency data in a 300-word narrative sample (see Table 8): 7.33% of TDs, 4% of SLDs, 3.33% of nonSLDs, and 54.54% of SLDs/TDs. In Spanish, the SE CWNS produced the following disfluency data (see Table 8): 5.33% of TDs, 2% of SLDs, 3.33% of nonSLDs, and 37.5% of SLDs/TDs. The percentage of SLDs exceeds the stuttering diagnostic criteria based on monolingual English children in English, but not in Spanish. The percentages also indicate a greater presence of disfluent speech in English versus Spanish.

Types of disfluencies. The SE CWNS presented with the following SLDs in English in order from most frequent to least frequently occurring (see Table 9): WWR (11), and SSR (1). Nonstuttering-like disfluencies in English consisted of the following in order from most frequent to least frequent: REV (7), and INT (3).

In Spanish, the SE CWNS produced the following SLDs in order from most frequent to least frequent (see Table 9): WWR (5), and SSR (1). The nonSLDs produced by the SE CWNS in Spanish in order from most frequent to least included the following: INT (6), and REV (4). Across both languages, the SE CWNS presented with whole-word repetitions, sound/syllable repetitions, interjections, and revisions.

MLUw. In English, the SE CWNS-2 produced a MLUw of 5.90 and was in the 29% percentile of same-aged monolingual English-speaking children. In Spanish, the SE CWNS-2 presented with a MLUw of 5.84 and was in the 28% percentile of monolingual English-speaking children of the same age (see Table 1). Although equal nonSLDs were noted across both languages, the SE CWNS-2 produced more SLDs in Spanish, the language with a lower reported MLUw, than in English.

SE Child Who Does Not Stutter-3 (SE CWNS-3)

The SE CWNS-3 is a 7 year and 5 month old female.

Frequency of disfluencies. The following disfluency data was presented by the SE CWNS-3 in English (see Table 10): 14.33% TDs, 4.33% SLDs, 10% nonSLDs, and 30.23% SLDs/TDs. In Spanish, the following disfluency data was produced by the SE CWNS-3 (see Table 10): 21% TDs, 3.33% SLDs, 17.66% nonSLDs, and 15.87% SLDs/TDs. The SE CWNS-3 exceeds the diagnostic criteria based on monolingual children typically used to identify stuttering (3% SLDs per 100 words) in both languages. This participant has more TDs and

nonSLDs in Spanish than in English, however they produced more SLDs in English than in Spanish.

Types of disfluencies. The following SLDs were produced by the SE CWNS-3 in English in order from most to least frequently occurring (see Table 11): WWR (10), and SSR (3). For nonSLDs, the SE CWNS-3 produced the following from most to least frequently occurring: INT (21), PR (6), and REV (3).

In Spanish, the following SLDs were produced by the SE CWNS-3 from most to least frequently occurring (see Table 11): WWR (7) and SSR (3). The following nonSLDs were produced in Spanish from most to least frequently occurring: INT (32), REV (14), and PR (7).

MLUw. The SE CWNS-3 produced an MLUw of 8.07 in English and was in the 38% percentile of same-age monolingual English children. In Spanish, the SE CWNS-3 produced an MLUw of 6.06% and was in the 7% percentile of same-age monolingual English children (see Table 1). The SE CWNS-3 produced more SLDs in English, however he produced more TDs in Spanish (the language with the lower MLUw).

Discussion

This preliminary study resulted in two main findings. First, for the bilingual children diagnosed with stuttering, their frequency of stuttering-like disfluencies exceeded the diagnostic criteria that are based on monolingual English speakers, regardless of language and MLUw. For the children who do not stutter, meeting these criteria varied depending on the language being spoken. Secondly, for this study, the children diagnosed with stuttering exhibited a wider variety of types of stuttering-like disfluencies than the non-stuttering participants. Both main findings are discussed by talker groups.

CWS Participants

Regardless of language and difference in MLUw, both the SE CWS-1 and the SE CWS-2 demonstrated stuttering frequencies that exceed the diagnostic criteria of 3% SLDs (Ambrose & Yairi, 1999) that is based on monolingual English-speakers and typically used to identify developmental stuttering. Both bilingual children who stutter presented with a wider range of stuttering-like disfluencies than the children who did not stutter, these include audible and inaudible sound prolongations. The types of disfluencies exhibited by the SE CWS participants did not vary by language.

CWNS Participants

For the CWNS participants, they vary across languages in meeting the diagnostic criteria of 3% SLDs. The SE CWNS-1 did not meet the diagnostic criteria in either language and the SE CWNS-3 exceeded the criteria in both languages. Based on disfluencies presented by the SE CWNS-2, he met the stuttering diagnostic criteria only in English, and not Spanish. For the SE CWNS-2, uneducated listeners may perceive stuttering in English and not in Spanish based on the disfluency types and frequency in either language. This suggests that it may be important to assess bilingual SE children in both English and Spanish when evaluating fluency.

MLUw and Disfluencies

Monolingual English-speaking children are reported to produce a higher percentage of SLDs (for monolingual CWS) or nonSLDs (for monolingual CWNS) on utterances with a higher than expected MLU for their age (Zackheim & Conture, 2003). Contrary to what is reported about speech disfluencies in monolingual English-speaking children and MLU, both the SE CWS-1 and SE CWS-2 had a higher percentage of SLDs in the language with a lower than expected MLU (Spanish).

Two of the three SE CWNS participants produced more total disfluencies in Spanish, the language in which they had a lower MLUw. Only the SE CWNS-2 (5 year and 10 month old male) produced more total disfluencies and stuttering-like disfluencies in English, the language in which he had a higher MLUw, than in Spanish. All SE CWNS participants except for the SE CWNS-3 had equal amounts of nonSLDs in both languages; the SE CWNS-3 had more nonSLDs in Spanish than in English.

The higher frequency of SLDs produced by the participants in their language with a lower MLUw (Spanish) may be due to the linguistic uncertainty that Fiestas and colleagues (2005) suggested that bilingual SE children experience which results in a higher number of whole-word and sound/syllable repetitions. This information may indicate that the participants are more fluent, or produce less disfluencies, in the language that they are more proficient in. However, in a study examining the disfluent speech of 18 SE CWNS, Byrd and colleagues (2015) found that all participants had significantly more stuttering-like disfluencies in Spanish than in English. Although all participants produced a lower MLUw in Spanish than in English, there were no significant differences between the MLUw and the language produced or the language dominance for all participants. The authors further explain that the difference seen in the manifestation of stuttering across languages in bilingual SE speakers may be due to the grammatical differences of Spanish and English (Byrd, Bedore, & Ramos, 2015), which can also explain the lower MLUw in Spanish than in English. Further, a study by Bedore and colleagues (2006) reported that the SE CWNS participants produced more grammatical revisions in Spanish than they did in English. Thus, it would be inappropriate to assume that a lower MLUw in Spanish than in English is the result of proficiency in a language and rather is the result of the grammatical and morphological differences between the Spanish and English language.

Types of Disfluencies

The most frequently occurring SLD for participants SE CWS-1, SE CWNS-1, SE CWNS-2, and SE CWNS-3 were whole-word repetitions, followed by sound/syllable repetitions in both languages; however, SE CWNS-1 did not produce any SSRs in Spanish. These SLDs (whole-word and sound/syllable repetitions) are the most frequently occurring SLDs reported in bilingual SE CWNS (Bedore et al., 2006; Fiestas et al., 2005). This suggests that whole-word and sound/syllable repetitions may be specific to the disfluency types produced by bilingual SE CWNS and SE CWNS. But, based on the presentation of SLDs in the SE children who do not stutter, it could be that audible sound prolongations and inaudible sound prolongations are more specific to bilingual SE children who actually do stutter.

Caveats

The preliminary nature of this study resulted in a small sample size (n=5) and unmatched participants. Future implications to the study include the need to further analyze the complexity and grammaticality beyond MLUw between the participants' samples in English and Spanish. Also, analyzing the quality of the speech disfluencies in both languages, such as noted tension and iterations, as well as the quantity may lead to a more detailed disfluency data profile of bilingual Spanish-English children who do and do not stutter.

Conclusion

Preliminary findings indicate that the diagnostic frequency criteria based on monolingual English-speaking children is not appropriate for bilingual SE CWNS because it is too low to indicate stuttering in this population. Findings also suggest the importance of considering the types of disfluencies presented by bilingual SE children as important diagnostic criteria. Further, findings indicate that it is important to consider the differences in manifestation of speech disfluencies between English and Spanish. This data may play a role in how we assess bilingual

SE children and can impact how this population is assessed and diagnosed for stuttering. Future findings of this study have the potential to contribute to the diagnostic stuttering frequency criteria specific to bilingual SE children and therefore reduce the rate of misdiagnoses of stuttering in bilingual SE CWNS. This pathway of research could lead to a more thorough understanding of stuttering across bilingual children of other languages as well.

Tables

Table 1. Participants' Demographic Information

ID	Age	Gender	BIOS	BESA-Semantics	BESA-Morpho-syntax	BESA-Language Index	MLUw Narrative
CWS1	5,0	M	Eng 50% Spa 50%	Eng 118 Spa 113	Eng 110 Spa 83	114	Eng 5.79 (54%) Spa 4.26 (12%)
CWS2	7,5	F	Eng 64.29% Spa 35.71%	Eng 115 Spa 113	Eng 115 Spa 98	115	Eng 9.43 (68%) Spa 8.83 (55%)
CWNS1	5,3	M	Eng 20.4% Spa 79.6%	Eng 128 Spa 118	Eng 110 Spa 110	119	Eng 6.29 (61%) Spa 4.33 (10%)
CWNS2	5,10	M	Eng 46.59% Spa 53.40%	Eng 108 Spa 105	Eng 95 Spa 105	110	Eng 5.90 (29%) Spa 5.84 (28%)
CWNS3	7,5	F	Eng 59.09% Spa 40.90%	Eng 120 Spa 113	Eng 110 Spa 103	110	Eng 8.07 (38%) Spa 6.06 (7%)

Table 1: ID= participant identification, BIOS= Bilingual Input Output Survey, BESA=Bilingual English Spanish Assessment, MLUw= Mean length of utterances in words (out of a 300-word narrative sample) and MLUw percentiles based on normative data from monolingual English-speaking children.

Table 2. SE CWS-1 Disfluency Data Profile

	English Narrative	Spanish Narrative
%TDs	17%	17%
%SLDs	7%	10%
%nSLDs	10%	7%
%SLD/TD	41.17%	58.82%

Table 2: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 3. SE CWS-1 Disfluency Type and Frequency

Disfluency type	English Narrative	Spanish Narrative
SSR	6	7
WWR	12	21
ASP/ISP	3	2
PR	11	5
INT	14	12
REV	5	4

Table 3: SSR= sound/syllable repetition, WWR= whole word repetition, ASP= audible sound prolongation, ISP= inaudible sound prolongation, PR= phrase repetition, INT= interjection, REV= revision.

Table 4. SE CWS-2 Disfluency Data Profile

	English Narrative	Spanish Narrative
%TDs	12%	15.33%
%SLDs	3%	3.33%
%nSLDs	9%	12.6%
%SLD/TD	25%	21.7%

Table 4: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 5. SE CWS-2 Disfluency Type and Frequency

Disfluency type	English Narrative	Spanish Narrative
SSR	1	4
WWR	2	5
ASP/ISP	6	1
PR	3	5
INT	17	25
REV	7	6

Table 5: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 6. SE CWNS-1 Disfluency Data Profile

	English Narrative	Spanish Narrative
%TDs	6.33%	6.66%
%SLDs	2%	2.33%
%nSLDs	4.33%	4.33%
%SLD/TD	31.57%	35%

Table 6: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 7. SE CWNS-1 Disfluency Type and Frequency

Disfluency type	English Narrative	Spanish Narrative
SSR	1	0
WWR	5	7
ASP/ISP	0	0
PR	1	1
INT	8	9
REV	4	3

Table 7: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 8. SE CWNS-2 Disfluency Data Profile

	English Narrative	Spanish Narrative
%TDs	7.33%	5.33%
%SLDs	4%	2%
%nSLDs	3.33%	3.33%
%SLD/TD	54.54%	37.5%

Table 8: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 9. SE CWNS-2 Disfluency Type and Frequency

Disfluency type	English Narrative	Spanish Narrative
SSR	1	1
WWR	11	5
ASP/ISP	0	0
PR	0	0
INT	3	6
REV	7	4

Table 9: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 10. SE CWNS-3 Disfluency Data Profile

	English Narrative	Spanish Narrative
%TDs	14.33%	21%
%SLDs	4.33%	3.33%
%nSLDs	10%	17.66%
%SLD/TD	30.23%	15.87%

Table 10: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

Table 11. SE CWNS-3 Disfluency Type and Frequency

Disfluency type	English Narrative	Spanish Narrative
SSR	3	3
WWR	10	7
ASP/ISP	0	0
PR	6	7
INT	21	32
REV	3	14

Table 11: %TDs= % of total disfluencies in words, %SLDs= % of stuttering-like disfluencies in words, %nonSLDs= % of nonstuttering-like disfluencies in words, %SLD/TD= % of stuttering-like disfluencies per total disfluencies in words.

References

Ambrose, N. G., & Yairi, E. (1999). Normative disfluency data for early childhood stuttering. *Journal of Speech, Language, and Hearing Research, 42*, 895-909. doi: 1092 4388/99/4204-0895.

Ardila, A., Ramos, E., & Barrocas, R. (2011). Patterns of stuttering in a spanish/english bilingual: A case report. *Clinical Linguistics & Phonetics, 25,* 23-36. doi: 10.3109/02699206.2010.510918.

Bedore, L. M., Fiestas, C. E., Peña, E. D., & Nagy, V. J. (2006). Cross-language comparisons of maze use in spanish and english in functionally monolingual and bilingual children. *Bilingualism: Language and Cognition, 9*(3), 233-247. doi: 10.1017/S1366728906002604.

Bernstein Ratner, N., & Benitez, M. (1985) Linguistic analysis of a bilingual stutterer. *Journal of Fluency Disorders, 10,* 211-219. doi: 10.1016/0094-730X(85)90011-7

Byrd, C. T., Bedore, L. M., & Ramos, D. (2015). The disfluent speech of bilingual spanish-english children: Considerations for differential diagnosis of stuttering. *Langauge, Speech, and Hearing Services in Schools, 46,* 30-43. doi: 10.1044/2014_LSHSS-14-0010.

Byrd, C. T., Watson, J., Bedore, L. M., & Mullis, A. (2015). Identification of stuttering in bilingual spanish-english-speaking children. *Contemporary Issues In Communication Sciences and Disorders, 42,* 72-87. doi: 1092-5171/15/4201-0072

Carias, S., & Ingram, D. (2006). Language and disfluency: Four case studies on spanish-english bilingual children. *Journal of Multilingual Communication Disorders, 4,* 149-157. doi: 10.1080/14769670601092663.

Fiestas, C. E., Bedore, L. M., Peña, E. D., & Nagy, V. J. (2005). Use of mazes in the narrative language samples of bilingual and monolingual 4- to 7-year-old children. In *Proceedings of*

the 4th International Symposium on Bilingualism (pp. 730-740). Somerville, MA: Casaedilla Press.

Goldstein, B., & Iglesias, A. (2009). *Contextual probes of articulation competence-Spanish.* Greenville: Super Duper.

Howell, P., Ruffle, L., Fernández-Zúñiga, A., Gutiérrez, R., Fernández, A. H., O'Brien, M. L., Tarasco, M., Vallejo-Gomez, I. & Au-Yueng, J. (2004). Comparison of exchange patterns of stuttering in Spanish and English monolingual speakers and a bilingual Spanish-English speaker. In A. Packman, A. Meltzer, & H. F. M. Peters (Eds.), *Theory, research and therapy in fluency disorders* (pp. 415-422). Nijmegen: Nijmegen University Press.

Ingham, J., & Riley, G. (1998). Guidelines for documentation of treatment efficacy for young children who stutter. *Journal of Speech, Language, and Hearing Research, 41*(4), 753-770. doi: 1092-4388/98/4104-0753.

Johnson, K. N., Karrass, J., Conture, E. G., & Walden, T. (2009). Influence of stuttering variation on talker group classification in preschool children: preliminary findings. *Journal of Communication Disorders, 42,* 195-210. doi: 10.1016/j.jcomdis.2008.12.001

Johnson, W. (1961). Measurements of oral reading and speaking rate and disfluency of adult male and female stutterers and nonstutterers. *Journal of Speech and Hearing Disorders, Monograph Supplement, 7,* 1-20. doi: 10.1016/j.jcomdis.2008.12.001.

Loban, W. (1976). Language development: Kindergarten through grade twelve. Urbana, IL: National Council of Teachers of English.

Peña, E. D., Gutierrez-Clellen, V. F., Iglesias, A., Goldstein, B. and Bedore, L. M., 2014, *Bilingual English Spanish Assessment* (San Rafael, CA: A-R Clinical Publ.).

Sawyer, J., & Yairi, E. (2006). The effect of sample size on the assessment of stuttering severity. *American Journal of Speech Language Pathology, 15*(1), 36-44. doi: 1058-0360/06/1501-0036.

Taliancich-Klinger, C. L., Byrd, C. T., & Bedore, L. M. (2013). The disfluent speech of a spanish-english bilingual child who stutters. *Language, Speech, and Hearing Services in Schools, 46,* 30-43. doi: 10.3109/02699206.2013.81376

United States Census Bureau**.** (2010). *Place of birth by language spoken at home and ability to speak English in the United States.* Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_B06007&prodType=table

Yairi, E., & Ambrose, N. (1992). A longitudinal study of stuttering in children: A preliminary report. *Journal of Speech and Hearing Research, 36,* 771-778. doi: 10.1044/jshr.3504.755

Yaruss, J. S. (1997). Clinical implications of situational variability in preschool children who stutter. *Journal of Fluency Disorders, 22*(3), 187-203. doi: 10.1016/S0094-730X(97)00009-0.

Zackheim, C. T., & Conture, E. G. (2003). Childhood stuttering and speech disfluencies in relation to children's mean length of utterance: a preliminary study. *Journal of Fluency Disorders, 28(2),* 115-41. doi: 10.1016/S0094-730X(03)00007-X.