Research Article

An Introductory Examination of Speech Disfluencies in Spanish–English Bilingual Children Who Do and Do Not Stutter During Narratives

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Purpose: The purpose of this study is to examine the frequency and type of speech disfluencies (stuttering-like and nonstuttering-like) in bilingual Spanish–English (SE) children who stutter (CWS) to SE children who do not stutter (CWNS) during narrative samples elicited in Spanish and English to provide further diagnostic information for this population and preliminary data toward an expansion of this study.
Method: Participants included six bilingual SE children (three CWS, three CWNS) ranging in age from 5 years to 7;5 (years;months) and recruited from the surrounding Houston, Texas area. Participants provided a narrative sample in English and Spanish. The frequency of speech disfluencies was tabulated, and mean length of utterance was measured for each sample.
Results: Results indicate that both talker groups exceed the diagnostic criteria typically used for developmental stuttering. Regardless of the language being spoken, CWS participants had a frequency of stuttering-like speech disfluencies that met or 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, with one of the three CWNS exceeding the criteria in both languages and one exceeding the criteria for percentage of stuttering-like speech disfluencies in one language.
Conclusion: Findings from this study contribute to the development of more appropriate diagnostic criteria for bilingual SE-speaking children to aid in the reduction of misdiagnoses of stuttering in this population.

Variability of speech disfluencies is a key feature of childhood stuttering (Ingham & Riley, 1998; Johnson, 1961; Sawyer & Yairi, 2006; Yaruss, 1997). Stuttering variation in monolingual children who stutter (CWS) has been examined across various conversational partners, locations, and contexts (Johnson et al., 2009). Although variability of frequency in stuttering has been found to be more evident across context for monolingual English-speaking children (i.e., dialogue vs. monologue; Johnson et al., 2009; Yaruss, 1997), stuttering variations across communicative partner, location, and context are not significant enough to impact a diagnosis of stuttering or normal speech fluency for most children (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 CWS and children who do not stutter (CWNS; Byrd, Bedore, et al., 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 speech disfluencies in this clinical population (Taliancich-Klinger et al., 2013).

Currently, the diagnosis of childhood stuttering is dependent upon stuttering frequency criteria based on monolingual English speakers (Ambrose & Yairi, 1999). Bilingual Spanish–English (SE) CWNS are reported to produce more speech disfluencies (stuttering-like and nonstuttering-like) than their monolingual English peers. The stuttering-like

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speech disfluencies (SLDs) surpass the 3% frequency classification (SLDs per 100 words) typically used to identify stuttering (Byrd, Bedore, et al., 2015; Byrd, Watson, et al., 2015). Thus, bilingual SE children are at risk of being falsely identified as CWS due to an undefined distinction between the profile of stuttering frequency presented by bilingual CWS and bilingual CWNS in comparison to monolingual English-speaking children (Byrd, Watson, et al., 2015).

In a study examining the accuracy of identification of stuttering in bilingual SE children by bilingual SE speech-language pathologists (SLPs), Byrd, Watson, et al. (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, Watson, 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 et al., 2006; Byrd, Bedore, 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 do not contribute meaning to the message attempted to communicate (Loban, 1976). Specific to speech disfluencies, studies report repetitions of words and parts of words as the most common type produced by bilingual SE CWNS (Bedore et al., 2006; Fiestas et al., 2005). Byrd, Bedore, et al. (2015) examined the disfluent speech of 18 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 monosyllabic whole words are often considered SLDs (Ambrose & Yairi, 1999). In considering nonstuttering-like disfluencies (nonSLDs) produced by bilingual SE CWNS, Byrd, Bedore, et al. (2015) found the following types of speech disfluencies that rank in order from most frequently occurring to least frequently occurring: revisions (REVs), interjections (INTs), phrase repetitions (PRs), and unfinished words.

The frequency at which bilingual SE CWNS exhibit sound/syllable repetitions (SSRs) or monosyllabic whole-word repetitions (WWRs), which are considered as SLDs, has been reported to range from 3% to 22% per 100 words, which is at or above the 3% frequency classification typically used to identify stuttering in monolingual speakers (Ambrose & Yairi, 1999; Byrd, Bedore, et al., 2015). Fiestas et al. (2005) suggested that the higher number of repetitions (i.e., sound/syllable, monosyllabic whole word, and phrase) produced by bilingual SE children results 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 et al., 2005). This evidence, taken together, implies that monolingual criteria are not appropriate for clinical decision making for SE children and can lead to overidentification of stuttering in this population (Byrd, Watson, 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 speech disfluencies and a higher frequency of disfluencies produced in their least proficient language. However, empirical findings on the influence of language dominance and fluency in bilingual SE children vary. Some studies report that bilingual SE CWNS have more SLDs in the dominant language (Byrd, Watson, et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005). However, Byrd, Bedore, et al. (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 SLDs, nonSLDs, or total speech disfluencies. They did report that all participants (bilingual SE CWNS), regardless of language dominance, presented with a 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 SLDs than is typically expected of monolingual English CWNS (Byrd, Bedore, et al., 2015; Byrd, Watson, et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005).

Although there is research that investigates the types and frequency of speech disfluencies in bilingual SE CWNS, limited evidence exists pertaining to the manifestation of stuttering in bilingual SE CWS. 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 man; however, information about his input and output in both languages and on the types of speech disfluencies (i.e., stuttering or nonstuttering like) were not provided. The authors only concluded that the adult produced more speech disfluencies in English than in Spanish. In another study, Howell et al. (2004) described the spontaneous speech of a male bilingual SE adolescent (aged 11;9 [years;months]) 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 SLDs) in Spanish than in English.

A study by Taliancich-Klinger et al. (2013) describes the disfluent speech of a bilingual SE girl aged 6;1 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 utterance (MLU), across both narrative and conversational samples. However, the disfluency types (SLDs: sound repetitions, syllable repetitions, monosyllabic word repetitions, audible sound prolongations [ASPs]; nonSLDs: REVs, unfinished

words, INTs, and PRs) 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 SSRs, in both Spanish and English. The least frequently produced SLDs were ASPs (only observed in English) and sound repetitions (noted in both Spanish and English). For nonSLDs, from most to least frequently occurring, unfinished words, REVs, PRs, and INTs were more frequently produced in English than in Spanish. Overall, the participant exhibited more nonSLDs than SLDs in both languages and used more overall disfluencies in both languages when she produced a longer MLU. Taliancich-Klinger et al. report the need for further research on bilingual SE CWS in order to establish a diagnostic guideline for this population since they theoretize that stuttering-specific and language-specific factors contribute to the fluency breakdowns in bilingual SE CWS.

Based on the 2010 U.S. 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. Census 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 analyze the connection of speech disfluencies for both talker groups to the MLU in words (MLU_w) 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 SLDs in the language eliciting the higher MLU. Findings from this study will provide support for the continued need to investigate and develop more appropriate diagnostic stuttering criteria for bilingual SE CWS.

Method

Participants

Participants consisted of six bilingual SE children ranging from 5 years to 7;5 from the surrounding Houston, Texas area. All participants were paid volunteers and were recruited from the Houston, Texas metropolitan area through SLPs, day care facilities, and community events and health clinics. 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 participants, parents signed an informed consent, and their children assented.

Inclusion and Exclusion Process

Thirteen 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 of at least 20% input and output in both languages required for participation in the study. The remaining 11 participants were classified as an SE CWS participant or an SE CWNS participant (criteria to be discussed). This resulted in three SE CWS and eight SE CWNS participants. Due to the small sample size of the current study, participants were unable to be exactly matched by age and gender across talker groups (CWS and CWNS). Thus, no statistical analyses were planned to occur across talker groups.

The authors did, however, take into consideration the gender, age, language skills, and English and Spanish use and input when selecting participants. With three participants identified as SE CWS, three SE CWNS participants were selected from the group of eight to ensure a representation of at least one older boy (since the CWS group included two boys ages 7;5 and 7;7) and at least one young girl (since the CWS group included one girl aged 5;0).

With the selection of three SE CWNS participants, the five remaining SE CWNS were excluded from this current study, and data were held for future expansions of this study. Of the excluded participants, four were female ranging in age from 5;9 to 7;7 and one was male (aged 6;9).

SE CWS Participants

Three of the six participants were classified as CWS based on having met the following criteria: (a) having a parental concern for stuttering, (b) listener perception of stuttering in both languages by the first author (a board-certified SLP with expertise in stuttering), and (c) blind listener perception of stuttering by a bilingual SE heritage speaker and speech-language pathology graduate student with formal course instruction in fluency disorders. Consideration was also given for having a current diagnosis of stuttering, although this was not required. The SE CWS group consisted of one girl (aged 7;5) and two boys (aged 5;0 and 7;7), and the SE CWNS group consisted of two girls and one boy.

SE CWNS Participants

Three of the six participants were classified as CWNS based on not having met the criteria detailed above and having no additional reported speech, language, or hearing concerns. The SE CWNS group consisted of one girl (aged 7;5) and two boys (aged 5;3 and 5;10).

Measures of Bilingualism

To participate in the study, participants were required to have at least 20% input and output in both languages; this criterion has been used in previous studies examining the speech disfluencies in bilingual SE children (Byrd, Bedore, et al., 2015). To measure input and output in both languages, parents of participants were administered the Bilingual Input–Output Survey (BIOS; Peña et al., 2014), which includes questions regarding the child's patterns of language input and output during weekdays and weekends. 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, et al., 2015; Taliancich-Klinger et al., 2013). 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, et al., 2015).

For the SE CWS, based on BIOS scores, two participants were considered Spanish dominant and one participant was considered a balanced bilingual speaker. For the SE CWNS, one participant was considered English dominant and two participants were considered balanced bilingual speakers.

Speech and Language

To establish the participants' level of language skills and development, the Bilingual English–Spanish Assessment (BESA; Peña et al., 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 six participants received a BESA Language Index that was within normal limits (85–115), with the exception of one SE child who does not stutter who received a BESA Language Index of 119. All six participants passed a binaural pure-tone hearing screening and had no other speech, language, and related problem other than stuttering (see Table 1 for participant demographic information, BIOS scores, and BESA scores).

Procedure

During a 2-hr 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 one undergraduate student clinician—were heritage Spanish speakers who were also bilingual in English. The monolingual English-speaking undergraduate student clinician administered the BESA in English only.

Speech Samples

The following two speech samples were obtained: (a) a narrative sample with one clinician in English and (b) a narrative sample with a different clinician in Spanish. The same clinician who administered the BESA in Spanish obtained the Spanish speech sample, and the clinician who 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 with the clinician in their preferred language.

For the narrative samples, two wordless picture books from the *Frog Where Are You?* book series were used. For each participant, one wordless picture book was used to elicit the English narrative sample, and a different picture book from this book series was used to elicit the Spanish narrative sample. To elicit each sample, participants were asked to look at the pictures from the storybook while an examiner told a story in English (for the English narrative sample) and Spanish (for the Spanish narrative sample). The participants were then asked to retell the same story while reviewing the pictures from the same storybook. Each of the two narrative samples was approximately 15–20 min in length to allow for a complete 300-word sample. The experimenter kept an online tally of words, and after 300 words were obtained, the narrative speech sample was

Table 1. Participants' demographic information, Bilingual Input–Output Survey (BIOS) scores, and Bilingual English–Spanish Assessment (BESA) scores.

Participant	Age (years;months)	Gender	BIOS	BESA Semantics standard score	BESA Syntax standard score	BESA Language Index
SE-CWS 1	5;0	M	E: 50% S: 50%	E: 118 S: 113	E: 110 S: 83	114
SE-CWS 2	7;5	F	E: 36% S: 64%	E: 115 S: 113	E:115 S: 98	115
SE-CWS 3	7;7	M	E: 39% S: 61%	E: 95 S: 110	E: 100 S: 80	105
SE-CWNS 1	5;3	M	E: 80% S: 20%	E: 128 S: 118	E: 110 S: 110	119
SE-CWNS 2	5;10	M	E: 47% S: 53%	E: 108 S: 115	E: 95 S: 105	110
SE-CWNS 3	7;5	F	E: 41% S: 59%	E: 120 S: 113	E: 110 S: 103	110

Note. SE = Spanish–English; CWS = children who stutter; M = male; E = English; S = Spanish; F = female; CWNS = children who do not stutter.

finished. Speech samples were transcribed using Systematic Analysis of Language Transcripts (SALT) software.

Dependent Measures

Speech Disfluencies

The following dependent measures were used for data analyses: (a) total speech disfluencies (SLDs + nonSLDs) / number of words spoken (TDs), (b) stuttering-like disfluencies / number of words spoken (SLDs), and (c) ratio of stuttering-like disfluencies to total disfluencies (SLDs/TDs).

MLU_w

The MLU_w was determined for each speech sample through use of SALT.

Reliability

Reliability of speech disfluency identification was conducted similar to the processes published in Byrd, Bedore, et al. (2015). For the current study, given the low number of samples to code, all speech samples were coded by the first author and another graduate student research assistant. Each coded sample was reviewed by the second coder, with discussion occurring between the two coders to resolve any discrepancies yielding 100% agreement on all speech disfluency types. Both coders were second-year graduate students with previous formal education and training on fluency disorders and speech disfluency coding as part of their graduate program curriculum.

All samples were initially transcribed via SALT by one of two undergraduate research assistants. After the initial transcribing, each SALT transcription was reviewed by the second transcriber, with discussion occurring between the two transcribers to resolve any discrepancies. Both coders were undergraduate students majoring in communication sciences and disorders with formal education and training on SALT transcribing as part of their undergraduate program curriculum.

Data Analysis

Pre-analysis: Data Preparation

Transcription of Speech Samples

Video-recorded narrative samples were transcribed by undergraduate student research assistants using SALT. Utterances in the narrative samples were segmented by communication units. With the use of SALT, the MLU_w 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 MLU_w (Ardila et al., 2011; Byrd, Bedore, et al., 2015; Carias & Ingram, 2006). Furthermore, Gutiérez-Clellen et al. (2010) recommend using MLU_w when analyzing Spanish narrative samples.

Results

As previously stated, the participants of this study were not matched across talker group. Therefore, results are organized by profile to provide data for each participant. See Table 2 for frequency data yielded from the SE CWS participants and Table 3 for frequency data yielded from the SE CWNS participants. Speech disfluency data by type for the CWS are detailed in Figure 1 (English) and Figure 2 (Spanish); data by type for the CWNS are detailed in Figure 3 (English) and Figure 4 (Spanish).

Participant: SE CWS-1 (Aged 5;0, Male)

Frequency of Speech Disfluencies

During a narrative sample in English, SE CWS-1 produced the following disfluency data: 17.00% of TDs, 7.00% of SLDs, and 41.17% of SLDs/TDs. During the narrative sample in Spanish, SE CWS-1 presented with 17.00% of TDs, 10.00% of SLDs, and 58.82% of SLDs/TDs. The percentages of TDs and SLDs in both languages exceed the diagnostic stuttering criteria typically used to identify developmental stuttering (Ambrose & Yairi, 1999). Based on visual inspection, SE CWS-1 presented with comparable frequencies of speech disfluencies across both languages.

Types of Speech Disfluencies

During the narrative sample in English, SE CWS-1 presented with the following SLDs listed in order from most frequent to least frequent: monosyllabic WWRs (12), SSRs (6), and ASPs (3). Nonstuttering-like speech disfluencies in English in order from most frequent to least frequent consisted of INTs (14), PRs (11), and REVs (5).

During the narrative sample in Spanish, SE CWS-1 presented with the following SLDs listed in order from most frequent to least frequent: WWRs, 21; SSRs, 7; ASP, 1; and inaudible sound prolongations (ISPs; 1). The participant presented with the following nonstuttering-like speech disfluencies in Spanish in order from most frequent to least frequent: INTs, 12; PRs, 5; and REVs, 4. The types of speech disfluencies exhibited by SE CWS-1 did not vary by language.

MLU_w

From the narrative sample, SE CWS-1 presented with an MLU_w of 5.78 in English and 4.26 in Spanish. For SE CWS-1, there was a higher percentage of SLDs in the language in which he also presented with a lower MLU_w (Spanish).

Participant: SE CWS-2 (Aged 7;5, Female)

Frequency of Speech Disfluencies

During a narrative sample in English, SE CWS-2 produced the following disfluency data: 11.67% TDs, 3.00% SLDs, and 25.71% SLDs/TDs. During the narrative sample in Spanish, SE CWS-2 presented with 15.33% TDs, 3.33% SLDs, and 21.74% SLDs/TDs. The percentages of TDs and SLDs in both languages meet and exceed the diagnostic stuttering criteria based on monolingual English children.

Table 2. Children who stutter (CWS): speech disfluency data and mean length of utterance (MLU) for participants by language.

Participant	Language	TD per words spoken	SLD per words spoken	SLD per TD	MLU
SE-CWS 1	English	17.00%	7.00%	41.17%	5.76
	Spanish	17.00%	10.00%	58.82%	4.26
SE-CWS 2	English	11.67%	3.00%	25.71%	9.43
	Spanish	15.33%	3.33%	21.74%	8.83
SE-CWS 3	English	5.00%	3.67%	73.33%	6.64
	Spanish	14.60%	6.21%	42.55%	8.71

Note. TD = total disfluency; SLD = stuttering-like speech disfluency; SE = Spanish–English.

Based on visual inspection, SE CWS-2 presented with comparable frequencies of speech disfluencies across both languages.

Types of Speech Disfluencies

During the narrative sample in English, SE CWS-2 presented with the following SLDs listed in order from most frequent to least frequent: ASPs, 5; WWRs, 2; SSR, 1; and ISP, 1. The participant presented with the following nonSLDs presented in order from most frequent to least: INTs, 17; REVs, 7; and PRs, 3.

In Spanish, SE CWS-2 presented with the following SLDs listed in order from most frequent to least frequent: WWRs, 5; SSRs, 4; and ASP, 1. Nonstuttering-like speech disfluencies produced by SE CWS-2 in Spanish in order from most frequent to least frequent are as follows: INTs, 25; REVs, 6; and PRs, 5. The types of speech disfluencies exhibited by SE CWS-2 did not vary by language.

MLU_w

From the narrative sample, SE CWS-2 presented with an MLU_w of 9.43 in English and 8.83 in Spanish. SE CWS-2 produced more TDs and SLDs in the language with the lower MLU_w (Spanish). For SE CWS-2, there was a higher percentage of SLDs in the language in which she also presented with a lower MLU_w (Spanish).

Participant: SE CWS-3 (Aged 7;7, Female)

Frequency of Speech Disfluencies

During a narrative sample in English, SE CWS-3 produced the following disfluency data: 5% TDs, 3.67% SLDs, and 73.33% SLDs/TDs. During the narrative sample in Spanish, SE CWS-3 presented with 14.60% TDs, 6.21% SLDs, and 42.55% SLDs/TDs. The percentage of TDs meets the diagnostic criteria in Spanish, but not in English. The percentages of SLDs exceed the diagnostic criteria in both languages. Based on visual inspection, SE CWS-3 presented with a higher frequency of speech disfluencies in Spanish than in English.

Types of Speech Disfluencies

During the narrative sample in English, SE CWS-3 presented with the following SLDs listed in order from most frequent to least frequent: WWRs, 4; ISPs, 4; ASPs, 2; and SSR, 1. The participant presented with the following nonSLDs presented in order from most frequent to least frequent: PRs, 3; and REV, 1.

In Spanish, SE CWS-3 presented with the following SLDs listed in order from most frequent to least frequent: WWRs, 17; and ASP, 1. Nonstuttering-like speech disfluencies produced by SE CWS-2 in Spanish in order from most frequent to least frequent are as follows: REVs, 14; PRs, 11; and INT, 1. The types of speech disfluencies exhibited by SE CWS-3 did vary by language.

MLU_w

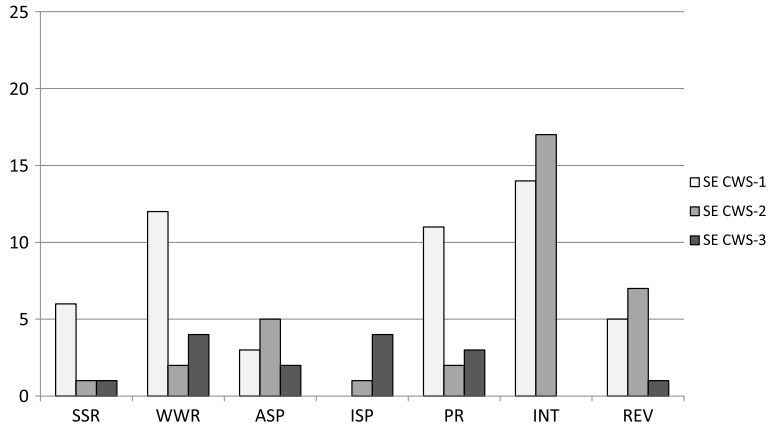
From the narrative sample, SE CWS-3 presented with an MLU_w of 6.64 in English and 8.71 in Spanish. SE CWS-3 produced more TDs and SLDs in the language with the lower MLU_w (Spanish). For SE CWS-3, unlike SE CWS-1 and SE CWS-2, there was a higher percentage

Table 3. Children who do not stutter (CWNS): speech disfluency data and mean length of utterance (MLU) for participants by language.

Participant	Language	TD per words spoken	SLD per words spoken	SLD per TD	MLU
SE-CWNS 1	English	6.33%	2.00%	31.58%	6.29
	Spanish	7.33%	2.67%	36.36%	4.33
SE-CWNS 2	English	7.33%	4.00%	54.55%	5.90
	Spanish	5.33%	2.00%	37.50%	5.84
SE-CWNS 3	English	14.33%	4.33%	30.23%	8.07
	Spanish	21.00%	3.33%	15.87%	6.06

Note. TD = total disfluency; SLD = stuttering-like speech disfluency; SE = Spanish–English.

Figure 1. CWS: speech disfluency data from English narratives by type. ASP = audible sound prolongation; CWS = children who stutter; INT = interjection; ISP = inaudible sound prolongation; PR = phrase repetition; REV = revision; SE = Spanish–English; SSR = sound/syllable repetition; WWR = whole-word repetition.



of SLDs in the language in which she also presented with a higher MLU_w (Spanish).

Participant: SE CWNS-1 (Aged 5;3, Male)

Frequency of Speech Disfluencies

During the 300-word narrative sample in English, SE CWNS-1 produced the following disfluency data: 6.33% TDs, 2.00% SLDs, and 31.58% SLDs/TDs. During the 300-word narrative sample in Spanish, the following was presented: 7.33% TDs, 2.67% SLDs, and 36.36% SLDs/TDs. The percentage of TDs and SLDs did not meet the stuttering diagnostic criteria typically used to identify stuttering in either language. Based on visual inspection, SE CWNS-1 presented with comparable frequencies of speech disfluencies across both languages.

Types of Speech Disfluencies

SE CWNS-1 produced the following SLDs in the English narrative in order from most frequent to least frequent: WWRs, 5; and SSR, 1. The following nonSLDs were produced in English: INTs, 8; REVs, 4; and PR, 1.

In Spanish, SLDs produced by SE CWNS-1 were as follows: WWRs, 7. Nonstuttering-like speech disfluencies produced in Spanish were as follows: INTs, 9; REVs, 4; and PR, 1. Across both languages, SE CWNS-1 presented with monosyllabic word repetitions, PRs, INTs, and REVs.

Figure 2. CWS: speech disfluency data from Spanish narratives by type. ASP = audible sound prolongation; CWS = children who stutter; INT = interjection; ISP = inaudible sound prolongation; PR = phrase repetition; REV = revision; SE = Spanish–English; SSR = sound/syllable repetition; WWR = whole-word repetition.

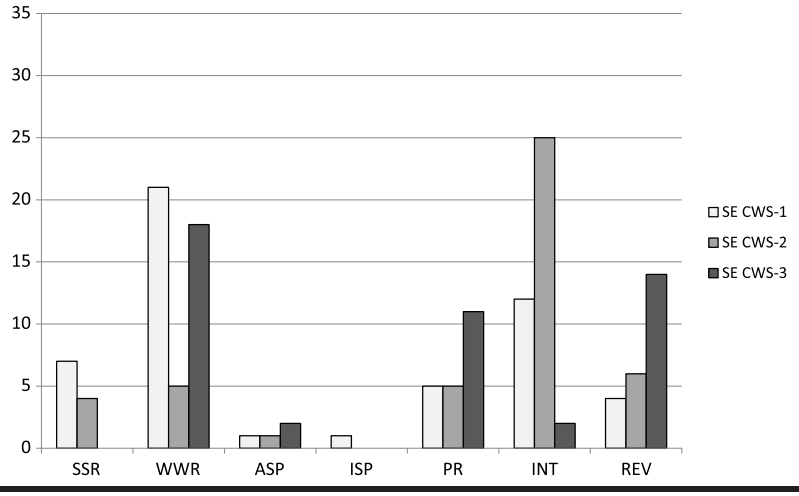
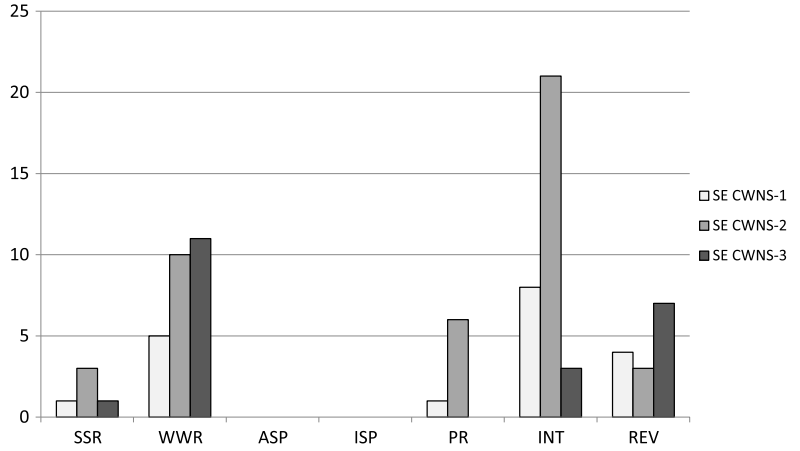


Figure 3. CWNS: speech disfluency data from English narratives by type. ASP = audible sound prolongation; CWNS = children who do not stutter; INT = interjection; ISP = inaudible sound prolongation; PR = phrase repetition; REV = revision; SE = Spanish–English; SSR = sound/syllable repetition; WWR = whole-word repetition.



MLU_w

SE CWNS-1 produced an MLU_w of 6.29 in English and 4.33 in Spanish. Although this participant produced a higher MLU_w in Spanish, there was no noticeable difference in speech disfluencies.

Participant: SE CWNS-2 (Aged 5;10, Male)

Frequency of Speech Disfluencies

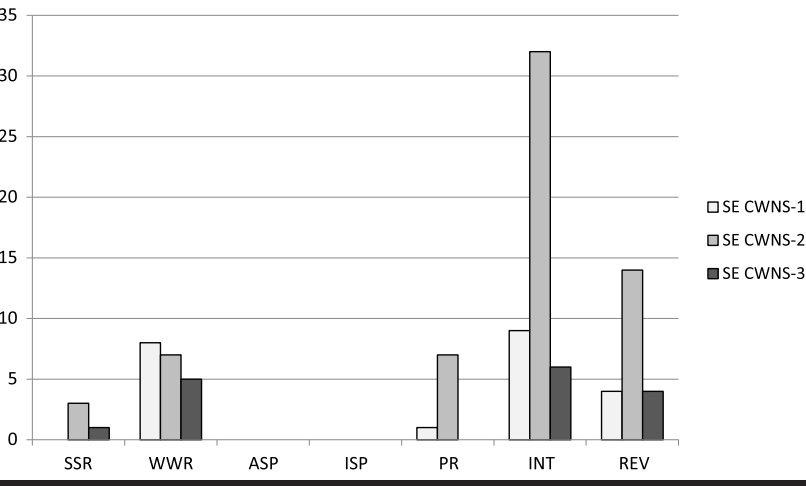
In English, SE CWNS-2 produced the following disfluency data in a 300-word narrative sample: 7.33% TDs, 4.00% SLDs, and 54.55% SLDs/TDs. In Spanish, SE CWNS-2 produced the following disfluency data: 5.33% TDs, 2.00% SLDs, and 37.50% SLDs/TDs. The percentage of SLDs exceeds the stuttering diagnostic criteria based on monolingual English children in English, but not in Spanish. The percentage of TDs did not meet the diagnostic criteria. Based on visual inspection, SE CWNS-2 presented with higher frequencies of speech disfluencies in English than in Spanish.

Types of Speech Disfluencies

SE CWNS-2 presented with the following SLDs in English in order from most frequent to least frequently occurring: WWRs, 11; and SSR, 1. Nonstuttering-like speech disfluencies in English consisted of the following in order from most frequent to least frequent: REVs, 7; and INTs, 3.

In Spanish, SE CWNS-2 produced the following SLDs in order from most frequent to least frequent: WWRs, 5; and SSR, 1. The nonSLDs produced by SE CWNS-2 in

Figure 4. CWNS: speech disfluency data from Spanish narratives by type. ASP = audible sound prolongation; CWNS = children who do not stutter; INT = interjection; ISP = inaudible sound prolongation; PR = phrase repetition; REV = revision; SE = Spanish–English; SSR = sound/syllable repetition; WWR = whole-word repetition.



Spanish in order from most frequent to least frequent included the following: INTs, 6; and REVs, 4. Across both languages, SE CWNS-2 presented with monosyllabic WWRs, SSRs, INTs, and REVs.

MLU_w

SE CWNS-2 produced an MLU_w of 5.90 in English and 5.84 in Spanish. These comparable MLU_w values occurred despite having more SLDs in English.

Participant: SE CWNS-3 (Aged 7;5, Male)

Frequency of Speech Disfluencies

The following disfluency data were presented by SE CWNS-3 in English: 14.33% TDs, 4.33% SLDs, and 30.23% SLDs/TDs. In Spanish, the following disfluency data were produced by SE CWNS-3: 21.00% TDs, 3.33% SLDs, and 15.87% SLDs/TDs. The percentages of TDs and SLDs in both languages exceeded the diagnostic stuttering criteria based on monolingual English children. Based on visual inspection, SE CWNS-3 presented with a higher frequency of SLDs in English than in Spanish.

Types of Speech Disfluencies

The following SLDs were produced by SE CWNS-3 in English in order from most to least frequently occurring: WWRs, 10; and SSRs, 3. For nonSLDs, SE CWNS-3 produced the following from most to least frequently occurring: INTs, 21; PRs, 6; and REVs, 3.

In Spanish, the following SLDs were produced by SE CWNS-3 from most to least frequently occurring: WWRs, 10; and SSRs, 3. The following nonSLDs were produced in Spanish from most to least frequently occurring: INTs, 22; PRs, 6; and REVs, 3.

MLU_w

SE CWNS-3 produced an MLU_w of 8.07 in English and 6.06 in Spanish. Participant SE CWNS-3 produced more SLDs in English; however, he produced more TDs in Spanish (the language with the lower MLU_w).

Discussion

This preliminary study resulted in two main findings. First, as expected, for the bilingual children diagnosed with stuttering, their frequency of SLDs met or exceeded the diagnostic criteria in both languages, regardless of language. However, for the bilingual SE-speaking CWNS, meeting or exceeding these criteria varied, with one participant meeting the criteria entirely, one meeting it partially, and one not meeting any of the criteria in either language.

The second main finding indicates a difference in the types of speech disfluencies presented by the stuttering group versus the nonstuttering group. While all children in this exploratory study presented with nonstuttering-like speech disfluencies (i.e., REVs, PRs, INTs) and a noticeable amount of monosyllabic WWRs and SSRs, only the children who were identified as stuttering also presented with ASPs and inaudible sound prolongations or blocks. Both main findings are discussed below.

Frequency of Speech Disfluencies as an Indicator of Stuttering

As previous findings suggest, relying on the frequency of speech disfluencies as a primary indicator of stuttering is problematic for bilingual SE-speaking children (e.g., Byrd, Bedore, et al., 2015; Byrd, Watson, et al., 2015). Findings from this exploratory study indicate that, while the frequency of speech disfluencies for the participants identified as stuttering—with the exception of the percentage of total disfluencies elicited from one sample—met or exceeded the diagnostic criteria for stuttering, this was not the case for the nonstuttering participants who varied in meeting all, one, or neither criteria of producing 10% total speech disfluencies per spoken words and 3% SLDs per spoken words in one or both languages.

Although based on a small sample of three, it is not surprising that the children in the study who are perceived by the listener as stuttering would present with a frequency of speech disfluencies indicative of stuttering. This finding provides some incentive to fine-tune the diagnostic criteria of stuttering in bilingual children place more emphasis on listener perception and less on the frequency of speech disfluencies.

In a clinical setting, SLPs who evaluate bilingual SE-speaking children for stuttering must use criteria that are reliable and consistent in determining the presence of stuttering. These results provide additional support to the notion that normal speech disfluency occurs at a higher frequency for bilingual SE CWNS when compared to monolingual English-speaking CWNS. However, for bilingual SE CWS, these results suggest greater similarity to monolingual English-speaking CWS since they consistently met or exceeded the diagnostic criteria. Additionally, given that participants in this study varied in meeting the criteria across languages (e.g., meeting the criteria in English, but not in Spanish), findings also lend support to the importance of assessing speech disfluencies in both languages.

Type of Speech Disfluencies as an Indicator of Stuttering

Findings from this exploratory study indicate a difference in the types of SLDs presented in the talker groups. Both groups presented with a variety of nonstuttering-like speech disfluencies as expected. Relative to SLDs, both groups presented with monosyllabic WWRs and SSRs. However, only the participants who stutter also presented with ASPs and ISPs. Although based on a small sample size, the current findings suggest that the type of speech disfluency, specifically the type of SLDs, may be a distinguishing factor denoting the presence or absence of stuttering regardless of language. The present findings are consistent with previous studies reporting a strong presence of monosyllabic WWRs and SSRs as a part of normal disfluency in bilingual

SE CWNS. Taken together, it can be expected that bilingual SE children will present with a high frequency of repetitions. However, those who actually warrant a diagnosis of stuttering will also present with additional types of SLDs (i.e., ASPs and ISPs).

MLU and Speech 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 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 speech disfluencies in Spanish, the language in which they had a lower MLU_w. Only SE CWNS-2 (aged 5;10, male) produced more total speech disfluencies and SLDs in English, the language in which he had a higher MLU_w, than in Spanish. All SE CWNS participants except for SE CWNS-3 had equal amounts of nonSLDs in both languages; 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 MLU_w (Spanish) may be due to the linguistic uncertainty that Fiestas et al. (2005) suggested that bilingual SE children experience, which results in a higher number of monosyllabic WWRs and SSRs. This information may indicate that the participants are more fluent, or produce less speech disfluencies, in the language that they are more proficient in.

However, in a study examining the disfluent speech of 18 SE CWNS, Byrd, Watson, et al. (2015) found that all participants had significantly more SLDs in Spanish than in English. Although all participants produced a lower MLU_w in Spanish than in English, there were no significant differences between the MLU_w 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, et al., 2015), which can also explain the lower MLU_w in Spanish than in English. Furthermore, a study by Bedore et al. (2006) reported that the SE CWNS participants produced more grammatical REVs in Spanish than they did in English. Thus, it would be inappropriate to assume that a lower MLU_w 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.

Caveats

The small sample size ($n = 6$) of this preliminary investigation is a clear caveat to this study. However, findings from this study provide motivation to expand the sample to include more participants as well as attempt to match participants across groups.

Another caveat to the current study is the absence of variables that investigate the affective and cognitive aspects of stuttering in addition to the core behavior of speech disfluencies. It is a widely accepted fact that stuttering can be presented with affective and cognitive components. Examining the affective and cognitive aspects of stuttering will aid in the knowledge we have about the presentation of stuttering in children.

Additionally, the low amount of data and the exploratory nature of this study lead the authors to use an unconventional method to determine reliability, similar to that reported by Byrd, Bedore, et al. (2015). However, as interest in empirical investigation of this research area grows, considerable thought should be given to using a more traditional approach to determining reliability of speech disfluency coding and language transcribing.

Additionally, this study—and others—has focused on examining speech disfluencies in bilingual SE children, but it is unknown whether these findings are applicable to other bilingual populations. Future studies may consider investigating these same factors in other bilingual populations in the United States.

Conclusion

Preliminary findings indicate that the diagnostic frequency criteria based on monolingual English-speaking children are not appropriate for bilingual SE-speaking children because it is too low to indicate stuttering in this population. The findings from this study are in agreement with current knowledge on the consideration of types of disfluencies in differentially diagnosing stuttering. Furthermore, findings indicate that it is important to consider the differences in manifestation of speech disfluencies between English and Spanish. These 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.

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