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Identification of Stuttering in Bilingual Spanish–English-Speaking Children

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Researchers recently suggested that exposure to a second language before 5 years of age may make a child more vulnerable to the development and persistence of stuttering (Howell, Davis, & Williams, 2009). This suggestion is significantly compromised by the paucity of data regarding the development of normal fluency patterns *and* the lack of knowledge regarding the manifestation of stuttering in bilingual children. At present, our knowledge of the manifestation of stuttering in bilingual children is limited to an alarmingly low number of single-subject case studies (see Shenker,

ABSTRACT: **Purpose:** The purpose of this study was to complete a preliminary investigation of the accuracy of identification of stuttering in speech samples of bilingual Spanish–English (SE)-speaking children by bilingual SE-speaking speech-language pathologists (SLPs).
Method: Fourteen bilingual SE-speaking SLPs listened to narrative retells in English and in Spanish that had been produced by 2 bilingual SE children matched for age and gender (1 with a confirmed stuttering disorder and the other a confirmed typically developing speaker).
Results: Twelve of the 14 bilingual SLPs falsely or incorrectly identified the bilingual child who was confirmed as a typically developing speaker as a child who stutters. Ten of the SLPs correctly identified the bilingual child with a confirmed stuttering disorder as a child who stutters. The types of disfluencies that the SLPs used to identify stuttering were characteristic of what would be indicative of stuttering in monolingual English speakers. Within this pilot sample, additional years of experience, increased confidence in diagnosing stuttering in bilingual SE children, and number of classes/workshops in stuttering and/or bilingualism did not appear to improve the SLPs' identification accuracy.
Conclusion: These findings demonstrate the need for further data differentiating the disfluent speech of bilingual speakers who do and do not stutter. Further, the dissemination of such data to practicing SLPs is warranted as it appears that bilingual speakers may be at unique risk for false-positive identification of stuttering.

KEY WORDS: stuttering, mazes, bilingual, children, disfluent speech

2011, for review). If the growth trends reported in the 2010 census continue, within the next 50 years, one in three U.S. residents will be Hispanic, and more than 60% of the U.S. population will speak both Spanish and English (U.S. Census Bureau, 2010). Thus, the bilingual population that may be in immediate need of clinical understanding and also readily available in a number that would allow for meaningful exploration is bilingual Spanish–English (SE) persons who stutter. Of further relevance to the differential diagnosis of stuttering in this unique clinical population is that bilingual SE speakers seem to produce mazes at higher rates than their monolingual peers do (e.g., Bedore, Fiestas, Peña, & Nagy, 2006; Lennon, 1990; Lofranco, Peña, & Bedore, 2006; Poulisse, 1999; Rieger, 2003; Wiese, 1984).

Although the types of speech behaviors that are produced by monolingual English and monolingual Spanish children who stutter (CWS) appear to be somewhat similar (Watson & Anderson, 2001; Watson, Byrd, & Carlo, 2011), the speech behaviors that are characteristic of stuttering in monolingual children may differ in bilingual children. Thus, the application of monolingual guidelines to bilinguals may lead to a false-positive diagnosis of stuttering (Carias & Ingram, 2006; Fiestas, Bedore, Peña, & Nagy, 2005). Specifically, unlike their monolingual Spanish and monolingual English peers, bilingual SE children who do not stutter (CWDNS) often exhibit an atypically high rate of mazes, which include interjections, repetitions of beginning sounds, and strings of speech (including repetitions) that disrupt the forward flow of speech and do not contribute to the meaning of the message (Bedore et al., 2006; Byrd, Bedore, & Ramos, 2015; Carias & Ingram, 2006). Given that stuttering is also a disruption in the forward flow of speech and is characterized by sound and syllable repetitions and audible and inaudible speech prolongations (Ambrose & Yairi, 1999), there is a potential for misidentification of stuttering that may be unique to bilingual SE children.

We decided to explore the identification of stuttering in bilingual SE children by bilingual SE speech-language pathologists (SLPs). This preliminary evidence may reveal that even with listeners who speak both languages, SE children are indeed at risk for misidentification as CWS. If this is the case, completion of a larger scale nationwide study examining the clinical knowledge and ability of all SLPs regarding bilingual speakers would be supported.

Mazes in SE Speakers

A high level of maze use has traditionally been described as a red flag for a language disorder or impairment in bilingual SE children (Bedore et al., 2006). However, because maze production is also seen in bilingual SE children who have typically developing (TD) language skills, researchers have identified the production of mazes as the key characteristic that may compromise the diagnostic accuracy of language impairment in this population (Fiestas et al., 2005). As a result, these researchers have cautioned against using maze production alone to differentiate between bilingual SE children with and without language impairment (Fiestas et al., 2005). The high rate of maze use in bilingual SE children also may compromise the identification of stuttering in this population, particularly given that repetitions of words and parts of words have been reported as the most common types of mazes produced by bilingual SE children (Bedore et al., 2006; Fiestas et al., 2005).

Fiestas et al. (2005) examined narrative samples of bilingual SE children and monolingual English and monolingual Spanish children between the ages of 4 and 7 years to identify similarities and differences in their use of mazes. The bilingual SE children produced almost twice as many repetitions (sound, part word, whole word, and phrase) in both languages in comparison to the monolingual group. Fiestas et al. suggested that the linguistic uncertainty that is experienced by a bilingual child as he or she navigates phonological, lexical, and semantic decisions between two languages could account for the high use of repetitions.

Of particular relevance to the present study, these findings also suggest that bilingual SE children who do not stutter appear to produce to a clinically significant degree (i.e., high frequency) the same types of disfluencies that are characteristic of the speech production of monolingual English-speaking CWS. This apparent overlap in speech behaviors could put these bilingual children at risk for being falsely identified as CWS. In addition, these findings of high rates of disfluencies could further increase the vulnerability to misidentification of stuttering because most researchers have suggested that in order to be classified as a child who stutters, a bilingual (or multilingual) individual must exhibit stuttering-like behavior in both (or all) languages (Lim, Lincoln, Chan, & Onslow, 2008; Nwokah, 1988; Shenker, 2011; Van Borsel, Leahy, & Pereira, 2008; Van Borsel, Maes, & Foulon, 2001; Watson & Kayser, 1994).

The critical overlap in what is defined as mazes and what is considered to be stuttering-like disfluencies was further highlighted in a study by Bedore et al. (2006). They explored maze production in terms of both type and amount in bilingual SE children (n = 22; M_{age} = 68.48 months) as compared to functionally monolingual children (n = 22 English speaking,

M_{age} = 69.86 months; n = 22 Spanish speaking, M_{age} = 69.18 months). The bilingual SE children produced repetitions more frequently than any other maze type; they also produced higher rates of repetitions than the monolinguals. These repetitions included repetitions of phrases and multisyllabic words, and, of particular note to stuttering, repetitions of sounds, syllables, and monosyllabic words. Although the repetition of phrases is considered to be nonstuttering like, and controversy exists regarding the stuttered nature of monosyllabic word repetitions (e.g., Wingate, 2001; cf. Ambrose & Yairi, 1999), repetitions of parts of words such as sounds and syllables are commonly considered to be indicative of stuttering (for review, see Yairi & Seery, 2011). Perhaps this atypically high rate of production of sound and syllable repetitions that appears to comprise the majority of the mazes produced by bilingual SE speakers contributes to this (potential mis-) perception of an increased risk of stuttering in this population.

Carias and Ingram (2006) examined the conversational speech of four bilingual SE CWDNS in an attempt to explore why disfluency appears to be more prevalent in bilingual speakers. They hypothesized that the use of multiple languages and/or limited language knowledge may overtax the children's language processing system and lead to the production of disfluent speech. Carias and Ingram found that when the children were speaking the language for which they had the highest level of proficiency, they produced the most instances of disfluency. Similar to Fiestas et al. (2005), the most common type of disfluency for the dominant language was repetitions; insertions and prolongations were more common in the less advanced language. These results suggest an interaction between language proficiency and disfluency, but Carias and Ingram made the distinction that *disfluency* did not mean *stuttering*. That is, none of the participants was classified as a child who stutters, yet all of the participants had disfluency rates of 37% or greater, which is a percentage that is again markedly higher than what would indicate stuttering when using monolingual standards (e.g., 3%; Ambrose & Yairi, 1999). There are anecdotal data, however, to suggest that a higher rate of repetitions does not always occur in the more dominant language (Mattes & Omark, 1991). Nevertheless, it is apparent that bilingual SE children have different levels of disfluencies than monolingual children, and the same classification criteria that are used to determine the presence of stuttering in monolinguals may not be appropriate for determining the presence of stuttering in bilinguals, particularly bilingual SE speakers.

More recently, Byrd et al. (2015) described the types and frequencies of speech disfluencies that were produced by 18 Mexican American bilingual SE CWDNS (9 males, 9 females; age = 5;6 [years;months]–6;7). Spanish and English narratives (a retell and a tell in each language) were elicited and analyzed relative to the type and amount of speech disfluencies produced that in monolingual English speakers are typically considered to be stuttering like versus those that are considered to be nonstuttering like. The mean frequency of stuttering-like speech behaviors in the bilingual SE children ranged from 3% to 22%, exceeding the monolingual English standard of 3% per 100 words. Thus, these findings suggest that the speech disfluency frequency guidelines for monolinguals appear to be too low for what might be indicative of stuttering in a bilingual SE speaker. Results further demonstrate our present position that if clinicians make diagnostic decisions based on the frequency of spech disfluencies alone, bilingual SE children may be at unique risk for a false-positive identification of stuttering.

Purpose of This Study

According to the U.S. Census Bureau report, Spanish was spoken at home by 23.4 million U.S. residents in 2007, representing a 211% increase since 1980 (U.S. Bureau of the Census, 2010). U.S. Census reports further revealed that 25% of the households in the south central Texas region (Kritikos, 2003) speak two or more languages. We designed the present preliminary investigation to determine the accuracy of identification of stuttering in bilingual SE children by bilingual SE SLPs who work and/or are currently being trained as bilingual SE SLPs in this south central Texas area. Based on research that suggests that bilingual SE children produce a higher number of syllable and/or word repetitions in their narratives in both English and Spanish (Bedore et al., 2006; Byrd et al., 2015; Carias & Ingram, 2006; Fiestas et al., 2005; Mattes & Omark, 1991), we hypothesized that bilingual SE SLPs may falsely identify a TD bilingual SE child as a child who stutters. Thus, our primary research question was:

- What is the accuracy with which bilingual SE SLPs are able to identify stuttering in bilingual SE children?

METHOD

To determine whether bilingual SE children may be at risk for false-positive identification of stuttering, bilingual SE SLPs with varying clinical experience analyzed the audio recordings of two children—one

who had a confirmed diagnosis as a child who stutters and one who had been confirmed as a TD child (confirmation criteria are reviewed in detail later in this section).

Participants

The first and fourth author e-mailed a total of 204 bilingual SE-speaking individuals living in Texas: (a) certified/licensed SLPs, (b) SLPs in their clinical fellowships (CFs), and (c) speech-language pathology graduate students. Potential participants were identified through a clinic that provides bilingual SE speech treatment to children in and around central Texas, professional contacts, alumnae from a Texas-based bilingual speech-language pathology program, Texas school districts, and the American Speech-Language-Hearing Association's (ASHA's) online professional locator tool for bilingual SE SLPs in central Texas.

Each participant's initial e-mail included an informed consent preamble that had been approved by the institutional review board of the University of Texas at Austin and a cover letter briefly describing the study. Recipients were instructed to respond to the first and fourth authors with a specific statement indicating their desire to participate in the study or to delete the e-mail if they were not interested. If recipients responded to the e-mail and confirmed their consent to participate, they were sent another e-mail with an attachment containing the survey with a unique tracking code and a link to the password-protected website where they could listen to the four audio samples they were required to analyze in order to complete the survey.

Twenty participants responded to our initial recruitment e-mail with a statement of consent to enroll in the study. However, two participants declined participation after having agreed to consent, citing the reason that their busy schedules did not allow them time to complete the tasks. Four participants who had agreed to participate did not respond to any e-mail reminders. Thus, the final number of participants who both agreed to participate and returned the analyzed survey was 14 (6.9%) of 204 bilingual SE SLPs who had been contacted by us.

Participants of the study were 13 females and one male, all residing in Texas. The certified/licensed SLPs and SLPs-in-training who identified themselves as bilingual SE speakers provided treatment to monolingual and bilingual children in a variety of settings, including outpatient medical settings, private practices, universities, and public schools. The following information was obtained for each participant: (a) if they were ASHA certified, and if so, when; (b) years of experience working as an SLP; (c) educational background regarding stuttering; (d) educational background regarding bilingualism; (e) reported confidence level when assessing monolingual and bilingual children; and (f) number of bilingual clients who they have assessed and treated thus far in their careers.

Procedure

The stimulus materials for this investigation were audio recordings of the narrative productions (in English and Spanish) of a bilingual SE child who had been diagnosed with a stuttering disorder and a TD bilingual SE child matched for age, gender, language dominance, and language abilities. All of the samples were recorded using a digital audio recorder (Sony MS-515 or ICD-P320) with an external microphone (ECM 115) and were then transcribed using Sony Digital Voice Editor version 2.4.04. The recorders were placed next to the child during the narrative production, with the external microphone also placed on the table next to the child, approximately 18 in from the child's mouth, for optimal recording.

Although the recording procedure was the same, the sample selection process differed for the child who stutters from that of the child who does not stutter.

Child who stutters. The bilingual SE child with a confirmed stuttering disorder was a female age 6;1. A certified/licensed bilingual SE SLP who was a doctoral student specializing in bilingualism and stuttering and was working at an area outpatient clinic confirmed the diagnosis of stuttering (in the absence of any concomitant speech and/or language disorder) after three individual sessions of observation and related analyses of the child's speech. Throughout each of these sessions, the child consistently produced a significant amount (≥35%) of disfluencies that were considered by the bilingual SE SLP to be stuttering like in nature. In addition, there was documentation of both parent and teacher concern that the child was a child who stutters and that within the past year, there had been a diagnosis of stuttering from a school-based bilingual SE SLP in the state where the participant lived before moving to central Texas.

To provide further validation that this particular child was indeed a child who stutters, the first, second, and fourth author, who have specialized academic and clinical training and experience in both bilingualism and stuttering, analyzed the three sessions and also confirmed the stuttering diagnosis. In addition, a stuttering severity rating was assigned by the first and the fourth author using a 9-point stuttering severity rating scale (1 = n*o stuttering,* 2 = *very mild stuttering*…9 = *extremely severe stuttering*)

described by Logan, Byrd, Mazzocchi, and Gillam (2011). This scale was modified from a stuttering severity scale that had previously been developed by O'Brian, Packman, Onslow, and O'Brian (2004). The average fluency severity rating given for the child was 4 in the English sample and 6 in the Spanish sample. Thus, the overall mean rating for this child was 5, which would correspond to a moderate stuttering severity rating.

In addition to the confirmation of stuttering, analyses were completed to confirm that the child did not present with a concomitant speech and/or language disorder. Specifically, the child's speech and language skills were evaluated through informal observation and parent and teacher report as well as administration of the Bilingual English Spanish Assessment (BESA; Peña, Gutierrez-Clellen, Iglesias, Goldstein, & Bedore, 2014). The BESA is a standardized measure of speech and language ability for bilingual SE children.

Further, given the potential impact that language dominance might have on the child's speech fluency (Lim et al., 2008), we calculated her language dominance using a questionnaire that was in development by the third author. This questionnaire requires parents to report the Spanish and English input and output that their child receives and produces in various settings during each hour of the day, along with a description of the specific activity and the other persons present. The value of the percentage is a weighted value that is calculated using five times the weekday English and Spanish input/output and two times the weekend percentage English and Spanish input and output. Results from this analysis indicated that the child who stutters was 66% English dominant.

Child who does not stutter. The database of bilingual SE child narrative tell and retell language samples that has been developed by the third author, a senior researcher at the Human Abilities in Bilingual Language Acquisition (HABLA) Lab, was used to search for a control who—with the exception of stuttering—matched the age, gender, language dominance, and language abilities of the child who stutters. In sum, the following criteria were used to identify the TD control in the HABLA database: (a) female, (b) within ±3 months of age of the child who stutters, (c) had recorded narrative retells in both English and Spanish, (d) demonstrated English-language dominance within 10% of the child who stutters (based on the same language questionnaire), and (e) had typical language skills as determined by informal observation and parent and teacher report as well as performance of 1 *SD* above the mean on the BESA (Peña et al., 2014).

Based on these criteria, out of a database containing narrative samples from more than 600 children, nine possible controls were identified. From these nine eligible children, a third party who was blind to the purpose and content of the study randomly selected the final control: a female who was 5;11 at the time that the audio recordings were collected and who (like the child who stutters) was also classified as being 66% English dominant and who also scored 1 *SD* above the mean on the BESA.

This child was determined to be a TD child for the following key reasons: (a) She had no present or prior history of parent or teacher concern with regard to her speech fluency, (b) all four authors listened to the recordings of the narrative samples and confirmed that the child produced speech that was characteristic of a TD bilingual SE child, and (c) the first and fourth author who rated the severity levels for the child who stutters also rated this child with the rating *no stutter* for both samples, further supporting that this child was not a child who stutters.

Sample recording. Although the audio samples from each child were obtained in two different locations by two different bilingual SE SLPs, the same protocol was followed for all of the recordings. To collect the narrative retell sample, the clinician first read a scripted story while looking at each page of a (wordless) book with the child, and then the child was required to retell the story while using the pictures in the book as a guideline. The book used for the experimental English recording was *One Frog Too Many* (Mayer, 1975), and the book used for the Spanish recording was *Frog on His Own* (Mayer, 1973). Thus, we had a sample in English from each child using the same book and a sample in Spanish from each child using the same book. To avoid repetition of the same sample in one language that was produced in the other, the books were used in tandem to allow for similar language samples in terms of length and complexity but differing contexts. All of the samples were recorded using a digital audio recorder (Sony MS-515 or ICD-P320) with an external microphone (ECM 115) and then were transcribed using Sony Digital Voice Editor version 2.4.04.

Sample transcription and coding. Trained research assistants transcribed and coded the narratives. The narratives were transcribed using guidelines from the Systematic Analysis of Language Transcription (SALT; Miller & Iglesias, 2008). Following the guidelines for spoken narrative production outlined by Loban (1976), utterances were segmented into communication units. Words and morphemes were coded according to the SALT guidelines for the analysis of English and Spanish transcripts. The samples were then coded for disfluencies (as described later).

The fourth author, a second-year graduate bilingual speech-language pathology student, transcribed the samples for the bilingual child who stutters; a bilingual doctoral student (who is also a certified/licensed SLP) transcribed the samples for the bilingual child who does not stutter. An additional bilingual doctoral student (certified/licensed SLP) reviewed all of the samples from each child to confirm accuracy; any discrepancies were resolved through review and discussion among the first, second, and fourth author.

The child who stutters and the child who does not stutter produced narrative samples in English and Spanish with varying lengths and word counts. Because reducing the samples to match exactly for length would have compromised the amount of disfluent speech production allowed for analysis, and children do not typically produce samples of equal length to other children in narrative tasks, the full production of their samples using the same books and same protocol was deemed to be the most ecologically valid choice. The child who stutters provided a 7 min, 16 s audio sample in English consisting of 1,055 words; the Spanish sample contained 502 words and was 4 min, 9 s in duration. The child who does not stutter produced a 4 min, 3 s English sample with 297 words and a Spanish sample of 231 words that was 4 min, 51 s in duration.

Each transcript was also analyzed for mean length of utterance (MLU). These values were then compared to the mean equivalents from a database compilation of similar narrative retells that had been produced by bilingual children who matched the participants in gender, grade, and age (within 2 months). The MLU values for the English and Spanish experimental audio samples provided by the child who stutters were 5.88 and 6.50, respectively. These values were within typical limits in comparison to those from the matched database. The MLU value for the English sample produced by the child who does not stutter was 7.29, which was 1 *SD* above the database mean. The MLU value for her Spanish sample was 4.76, which was 1 *SD* below the expected range. Variation in MLU across Spanish and English output is typical for bilingual children (Rojas & Iglesias, 2013).

The following disfluencies were coded in each child's English and Spanish sample: whole-word repetitions, sound and syllable repetitions, revisions, phrase repetitions, interjections, inaudible sound prolongations, and audible sound prolongations. For the Spanish and English samples from each child, we calculated percentages for each type of disfluency based on how many times they occurred over the total number of words in the sample (see Table 1). Disfluency rates, as indicated by the total percentages of disfluent words, were comparable across the Spanish and English sample for the child who does and the child who does not stutter (i.e., ranging from 16.7% to 17.82%).

Table 1. Percentages of disfluency types and total disfluencies in the English and Spanish narrative samples of the child who stutters (CWS) and the child who does not stutter (CWDNS).

	CWS		*CWDNS*	
Disfluency type	*English*	*Spanish*	*English*	*Spanish*
WWR	7.10	6.10	7.96	4.80
SSR	0.67	3.90	3.22	13.00
REV	5.19	2.60	2.08	2.00
PR	2.40	20.87	2.56	5.98
INJ	1.00	2.60	0.66	—
ISP	0.34	0.43	0.28	—
ASP	—	—	0.18	0.02
% Total disfluencies	16.7	16.7	16.67	17.82

Note. For ease of understanding, in the tables, CWS will be used to refer to a child who stutters and CWDNS will be used to refer to a child who does not stutter. WWR = whole-word repetition, SSR = single syllable repetition, REV = revision, PR = phrase repetition, INJ = interjection, ISP = inaudible sound prolongation, ASP = audible sound prolongation.

Listening and survey tasks. We uploaded both samples from each child to a password-protected Wordpress (http://wordpress.com/) blog page so that the study participants could easily access, once provided the password, the recordings in any location that had Internet access. In order to present the recordings in a Wordpress blog page, they were converted into MP3 audio format and were uploaded to a private Internet storage space that was only available to the first and fourth author through a Soundcloud (http://soundcloud.com/) page. Once these samples were uploaded to the Soundcloud account, they were selected and embedded in the Wordpress blog using a unique Internet embedding code. The samples were labeled as C1 Audio Clip English, C1 Audio Clip Spanish, C2 Audio Clip English, and C2 Audio Clip Spanish.

In order to counterbalance the order of listening, half of the participants were instructed to listen to the C1 samples first, and the other half were instructed to listen to the C2 samples first. The languages of the speakers were also counterbalanced. For example, half of the participants who were assigned to listen to the C1 samples first were also assigned to listen to C1's Spanish sample first and then her English sample, and the other half were instructed to listen

to C1's English sample first and then her Spanish sample.

After listening to their first assigned two samples and before moving on to their next assigned two samples, the participants were asked to indicate whether or not they thought the child was a stutterer, and to rate each child on a 6-point scale ranging from *no stutter* to *severe stutter*. In addition, we asked the SLPs to provide a list of any speech characteristics that influenced their decision about the child's level of fluency. After completing the initial questions pertaining to speech characteristics of the first two audio samples, the participants listened to their next assigned two samples and answered the same three questions about the other child.

Following completion of the listening tasks and the related questions regarding the samples, the participants completed a questionnaire wherein they were required to provide their certification status as an SLP, education background in stuttering and in bilingualism, the number of bilingual SE clients they had diagnosed with stuttering, and the number of bilingual SE CWS they had treated during their careers. Each participant was also asked to provide a self-rating of his or her confidence in his or her ability to accurately diagnose stuttering in English-speaking, Spanish-speaking, and bilingual SE children.

RESULTS

The purpose of the present study was to investigate the accuracy of identification of stuttering among bilingual SE SLPs when evaluating audio samples of a bilingual SE child who may or may not stutter. Along with fluency ratings, the participants reported speech characteristics that influenced their decisions. Finally, factors such as years of experience and education and confidence levels in assessing stuttering and bilingual children were examined.

Accuracy of Bilingual SE SLPs to Identify Stuttering in Bilingual SE Children

Given the small sample size ($N = 14$), we selected a nonparametric independent-samples Mann–Whitney *U* test to analyze the differences in participant accuracy ratings for the bilingual SE child who stutters as compared to the bilingual SE child who does not stutter. Results from this analysis indicated that the null hypothesis that the accuracy ratings would be equally distributed for both the child who stutters and the child who does not stutter should be rejected because the participants were significantly less accurate identifying the child who does not stutter than they were the child who stutters, $p = .003$. In fact, only two of the 14 participants accurately identified the SE child who does not stutter as a child who does not stutter, which is a true-negative rating. Twelve of the participants gave the SE child who does not stutter a false-positive rating of stuttering. By comparison, 10 of the 14 participants accurately identified the SE child who stutters as a child who stutters, which is a true-positive label. Four of the participants gave the child who stutters a false-negative rating, or inaccurately identified her as a child who does not stutter. Only one participant out of 14 in the study correctly identified both children.

Post Hoc Considerations

The sample size ($N = 14$) was too low to allow for meaningful analysis of any additional variables that may predict the accuracy of identification. Thus, following a similar survey study examining the knowledge of SLPs regarding the diagnosis and treatment of autism (i.e., Schwartz & Drager, 2008), we provided a descriptive review of the factors that may have influenced the SLPs' identification accuracy for the bilingual SE child who stutters and/or the bilingual SE child who does not stutter.

Types of Disfluencies (and Associated Fluency Ratings) SLPs Consider When Making Clinical Decisions About Stuttering

Different disfluency types were presented as choices of speech characteristics that may have affected the participants' decisions about whether or not the child stuttered. The participants were allowed to choose as many characteristics as necessary. In addition, the participants were asked to identify any additional speech characteristics that affected their decisions. The participants were also given the opportunity to write any comments pertaining to their choice. Table 2 presents the types of disfluencies that were identified relative to the accuracy of the identification of each participant.

Of the disfluencies that were identified by the 12 participants who falsely identified the child who does not stutter as a child who stutters (i.e., false positive), sound/syllable repetition was the disfluency type most commonly cited as influencing their judgment. Whole-word and phrase repetitions were the second-most frequently occurring disfluencies reported by the participants, followed by revisions, inaudible sound prolongations, audible sound prolongations, and interjections. The two participants who provided a true-negative identification of stuttering for the child who does not stutter indicated that

Table 2. The number of participants who identified each disfluency type as influencing their decisions according to stuttering identification.

Disfluency type	*CWDNS identified as CWS*	*CWDNS identified as CWDNS*	*CWS identified as CWDNS*	*CWS identified as CWS*
SSR	9 (22.5%)	—	—	6 (15.38%)
WWR	8 (20.0%)	—	—	5 (12.82%)
PR	8 (20.0%)	1 (50.0%)	—	7 (17.95%)
REV	6 (15.0%)	1 (50.0%)	—	4 (10.26%)
ISP	4 (10.0%)	—	—	6 (15.38%)
ASP	3 (7.5%)	—	—	7 (17.95%)
INJ	2 (5.0%)	—	—	4 (10.26%)

phrase repetitions and revisions were the disfluency types that influenced their decision.

Of the disfluencies that were identified by the 10 participants who correctly identified the child who stutters as a child who stutters (i.e., true positive), the most commonly identified disfluency types were audible sound prolongations and phrase repetitions, followed by inaudible sound prolongations, sound/syllable repetitions, whole-word repetitions, revisions, and interjections. The four participants who provided a false-negative identification of not stuttering for the child who stutters did not provide information about the types of speech disfluencies that influenced their decision.

In addition to identifying disfluency types, the participants were required to rate each child's fluency on a 6-point scale ranging from no stutter to severe stutter (see Table 3). For the child who does not stutter, six of the 14 participants rated her as having a moderate severity rating, with the second most common rating being mild, followed by no stutter and mild-moderate stutter. Similarly, for the child who does not stutter, six of the participants rater her as having a moderate severity rating, with the second most common rating being no stutter, followed by mild, moderate-severe, and severe stutter.

Characteristics That May Influence Stuttering Identification Accuracy

Table 4 presents a detailed review of the participant characteristics that might have significantly influenced the accuracy of their stuttering identification.

Table 3. Fluency ratings of the two children.

Fluency rating	*CWDNS*	*CWS*
No stutter	2 (14.29%)	4 (28.57%)
Mild stutter	5 (35.71%)	2 (14.29%)
Mild-moderate stutter	1 (7.14%)	—
Moderate stutter	6 (42.86%)	6 (42.86%)
Moderate-severe stutter	—	1 (7.14%)
Severe stutter	—	1 (7.14%)

Individuals who completed the surveys were either (a) licensed SLPs (n = 10), (b) completing their CF (n = 2), or (c) in a university graduate program working to earn a master's degree in speech-language pathology (n = 2). The licensed SLPs had received their certification within a range of years, from 1980 to 2009. The CF was coming to an end for each participant who was working to earn an ASHA Certificate of Clinical Competency in speech-language pathology. Both individuals who were attending graduate school when they completed the survey were in their first year of study.

The range of years that the participants had been working as certified bilingual SE SLPs spanned from less than 1 year of employment to 37 years (M = 9.40, including graduate students; M = 10.96, excluding graduate students). The majority of participants (71.43%) had more than 3 years of experience as a bilingual SE SLP.

Of the 14 participants, two had not taken any academic courses related to stuttering. The practicing SLPs reported having taken at least one academic course, and some also reported having taken multiple continuing education classes (i.e., seminars, workshops) in addition to their academic coursework. All of the participants reported that they had completed an academic course that focused on bilingualism, with some reporting that they had completed several additional continuing education workshops and seminars with respect to this topic.

The number of clients in this population that the participants had diagnosed with stuttering ranged from 0 to 50 (M = 12.93 with graduate student values; 15.08 without graduate student values). The participants had treated between 0 and 50+ bilingual SE CWS (M = 11.43 with graduate student values; 13.33 without graduate student values). The overall mean among the participants for the assessment and treatment of bilingual SE CWS was 12.18 (with graduate student values); 14.21 (without graduate student values).

Table 4. Participant characteristics and accuracy of stuttering identification.

Participant	*CCC year*	*Years of experience as bilingual SLP*	*# of stuttering courses*	*# of bilingual courses*	*# of bilingual CWS assessed*	*# of bilingual CWS treated*	*Accurately identified CWS*	*Accurately identified CWDNS*
1	2005	10	4	1	~5	~10	N	Y
2	1980	37	5	26	>50	>50	N	N
3	2011	<1	1	3	0	1	Y	Y
4	1998	13	3	5	10	10	Y	N
5	2003	9	3	11	4	~8	Y	N
6	2000	12	>5	>5	30–40	8–10	Y	N
7	2003	9	1	8	7–8	4–5	N	N
8	Grad student	—	0	1	0	0	Y	N
9	1997	14	NR	NR	>30	>30	Y	N
10	1999	15	>10	>10	16	16	Y	N
11	2011	1	3	2	0	1	Y	N
12	Grad student	—	0	1	0	0	N	N
13	2009	3	1	7	<5	<5	Y	N
14	2004	8	2	8	15–18	12–15	Y	N

Note. CCC = Certificate of Clinical Competency, SLP = speech-language pathologist, Y = yes; N = no, NR = no rating provided.

As stated earlier, the sample size is preliminary in nature. However, a review of these participant characteristics in relation to the accuracy of the SLPs' stuttering identification revealed that increased experience and/or educational history on the topics of stuttering and/or bilingualism did not appear to improve the bilingual SE SLPs' identification accuracy (see Table 4).

To explore whether confidence influenced the SLPs' identification accuracy, we asked the SLPs to provide their confidence level diagnosing a monolingual English-speaking, monolingual Spanish-speaking, and bilingual SE-speaking child with stuttering on a 1- to 4-point scale with 1 = *not confident,* 2 = *sort of confident,* 3 = *generally confident,* and 4 = *very confident*. The values for the self-reported confidence levels for evaluating monolingual English-speaking CWS ranged from 2 to 4 (M = 3.14). The values for the self-reported confidence levels for evaluating monolingual Spanish-speaking CWS included the same range (2 to 4, M = 3.14). The majority of participants (n = 11) with English-speaking children and (n = 12) with Spanish-speaking children reported that they felt generally confident to very confident accurately diagnosing a child with stuttering.

Similar to the monolingual responses, the SLPs' confidence level for diagnosing a bilingual SE child with stuttering ranged from 2 to 4 (M = 2.86). However, in contrast, five of the 14 participants (35.71%) reported lower levels of confidence (i.e., sort of confident) for assessing bilingual SE children for stuttering than they did for monolinguals (see Table 5).

As with the other SLP characteristics, confidence ratings did not, at least within these preliminary data, appear to uniquely influence the accuracy of identification of the children who did and did not stutter. In fact, the one participant who accurately identified both the child who does and the child who does not stutter reported being sort of confident in the diagnosis of stuttering of bilingual SE children, whereas the participants who reported that they were very confident were inaccurate in their identification of stuttering in the two children.

DISCUSSION

The purpose of the present study was to determine the accuracy of identification of stuttering in bilingual SE children by bilingual SE SLPs who work and/or are currently being trained as bilingual SE SLPs in the south central Texas area. The accuracy of such identifications, along with the higher rates of disfluencies that are characteristic of this population (Bedore et al., 2006; Byrd et al., 2015; Carias & Ingram, 2006; Fiestas et al. 2005), may indicate whether bilingual children are at risk for misdiagnosis as CWS. Preliminary data from the present study do in fact support the notion that SLPs have a markedly increased tendency to identify the bilingual child who does not stutter as a child who stutters.

Table 5. Participant confidence in diagnostic accuracy and accuracy of stuttering identification.

Participant	*English CWS*	*Spanish CWS*	*Bilingual SE CWS*	*Accurately identified CWS*	*Accurately identified CWDNS*
1	3	3	3	N	Y
2	4	4	4	N	N
3	3	3	2	Y	Y
4	3	3	3	Y	N
5	3	3	3	Y	N
6	4	4	3	Y	N
7	3	3	3	N	N
8	2	2	2	Y	N
9	4	NR	4	Y	N
10	4	4	4	Y	N
11	3	3	2	Y	N
12	2	3	2	N	N
13	3	3	2	Y	N
14	3	3	3	Y	N

Note. 1- to 4-point scale with 1 = *not confident,* 2 = *sort of confident,* 3 = *generally confident,* 4 = *very confident*.

Accuracy of Bilingual SE SLPs to Identify Stuttering in Bilingual SE Children

As expected, the majority of participants (n = 12) gave false-positive ratings of stuttering to the bilingual SE child who does not stutter. An unexpected finding, however, was that four of the 14 participants did not accurately identify the confirmed bilingual SE child who stutters. Further, what was perhaps the most surprising finding was that only one of the 14 participants accurately identified both the bilingual child who does not stutter and the bilingual child who stutters.

At the very least, these findings support the notion that in bilingual children in particular, one cannot make an accurate identification of stuttering based on the frequency of specific types of disfluency alone without risking overidentification. At most, these findings lend support to the assertion that there is a critical need for information about typical and atypical speech characteristics of bilingual SE children to support a differential diagnosis of stuttering. Although the sample size was small, the factors that may have contributed to this identification inaccuracy will be discussed descriptively as in previous similar studies (Schwartz & Drager, 2008), along with suggestions for future research and variables that may have compromised the findings from the present study.

Types of Disfluencies (and Associated Fluency Ratings) SLPs Consider When Making Clinical Decisions About Stuttering

For the participants who rated the confirmed child who stutters as being a child who does not stutter (false negative), no information was provided about the types of speech disfluencies that influenced their decision. This is unfortunate because such information would have provided additional valuable insight into what speech characteristics influence clinical decision making when evaluating and ruling out an SE child for stuttering. Future research efforts should make the provision of this information a requirement for participation in the study.

The 12 participants who provided a false-positive identification of stuttering behavior in the confirmed bilingual SE child who does not stutter did specify the types of disfluencies that influenced their decision. Sound syllable repetitions and whole-word repetitions were the most commonly cited disfluencies produced. The sole participant who accurately identified both children stated that the production of revisions suggested that this child was a child who does not stutter, and commented that, "C1 [the child who does not stutter] seemed less fluent in ENG but appeared as typical behaviors for a non-balanced bilingual. I did not notice much stuttering in SPN." This may indicate that this participant has knowledge about typical disfluent speech characteristics in bilingual SE children who do not stutter. One could argue that perhaps this person accurately identified both children as stutterer versus nonstutterer solely by chance. This is plausible, but it would seem that if that were the case, the participant would have expressed uncertainty about what influenced his or her decision. Nevertheless, a participant who gave a false-positive rating to the child who does not stutter stated with certainty, "tension heard and avoidance behavior that occurred possibly due to [types of disfluencies identified]." Thus, again, the precise

reasons why each individual participant made his or her decision is difficult to determine. Yet, the fact remains that the large majority of SLPs were able to identify the child who stutters as a stutterer, but they also identified the child who does not stutter as a stutterer, emphasizing our position that the TD bilingual child is at unique risk for the misidentification of stuttering.

Research has described the speech characteristics of sound syllable repetitions and whole-word repetitions as being typical in bilingual SE children (Bedore et al., 2006; Byrd et al., 2015; Fiestas et al., 2005). However, these disfluency types have been included in assessment protocols as stuttering-like disfluencies (e.g., Ambrose & Yairi, 1999). The production of these behaviors did appear to uniquely impact the identification accuracy of the SLPs because the majority of the disfluencies that resulted in a false-positive identification of stuttering in the child who does not stutter were stuttering like in nature (i.e., sound syllable repetitions and whole-word repetitions). By comparison, the participants who provided a true-negative identification of stuttering for the child who does not stutter indicated that phrase repetitions and revisions were the disfluency types that influenced their decision.

Based on the relatively ambiguous nature of the survey questions related to these factors (e.g., "Please identify and/or describe the specific speech and/or language characteristics that influenced your decision"), there is no precise way of knowing how accurate the participants were in their interpretation of the disfluencies they heard. That is, without each participant providing individual analyses of the disfluent speech in each sample, the accuracy of the participants' interpretations of the types of disfluency they identified in the samples cannot be firmly established. Future study of the accuracy of identifying and interpreting specific speech disfluencies in SE children who do and do not stutter would yield important insights as to how such factors influence diagnostic decision making.

Fluency ratings were also interesting in that both the child who does and who does not stutter were assigned a comparable number of ratings of moderate severity (n = 6 for each child). Further, twice as many participants (n = 4) rated the child who stutters with a no stutter rating than the child who does not stutter (n = 2). This finding further highlights the difficulty in differentiating stuttering from typical disfluencies in this population. This finding also suggests that the frequency of these types of speech behaviors that are considered to be characteristic of stuttering in monolingual English speakers can result in the bilingual SE population being misidentified as more than simply being highly disfluent but as being moderate stutterers.

Characteristics That May Influence Stuttering Identification Accuracy

One might assume that factors such as certification, years of experience, number of clients, and so forth would yield increased accuracy in the identification of children who do and do not stutter. However, within the limited sample of participants, there did not appear to be any distinct relationship between identification accuracy and years of experience and/or number of clients. In fact, the participant who had been a practicing SLP longer than any of the other participants and who had diagnosed and treated more than 50 of these types of clients did not accurately identify the confirmed child who stutters or the child who does not stutter. In contrast, the participant who provided the only accurate identification of both the child who stutters and the child who does not stutter was in the process of completing his or her CF, had treated only one bilingual SE child who stutters, and had not diagnosed any bilingual SE child with stuttering.

Further, one might assume that a higher number of professional development courses completed on stuttering and bilingualism, whether in graduate school or beyond, would increase the SLPs' identification accuracy. However, a distinct relationship between educational background and identification accuracy was not apparent in the participants in the present study. For example, the participant who reported writing papers in the area of bilingualism and also completing the highest number of courses in bilingualism failed to accurately identify both the child who stutters and the child who does not stutter.

This finding, however, does not necessarily suggest that increased experience and education specific to stuttering and bilingual populations would not lead to enhanced differential diagnosis of stuttering in SE children. Rather, it may support the need for *current* and *relevant* information specific to stuttering and bilingual speakers. The nature of the bilingual coursework completed and when such coursework was completed was not identified in the current study. The currency of information may be a factor in improving identification, as the sole participant in the present study who accurately identified both the child who stutters and the child who does not stutter had completed bilingualism and fluency coursework within the last 2 years. This particular finding also highlights the critical need for student training because the quality of training can be the difference maker in identification accuracy.

Yet another consideration is that current experience with stuttering *and* bilingualism is only critical when the bilingual child is TD. All but two of the participants accurately identified the child who stutters, suggesting that speech output data can be reliably used to accurately identify a bilingual child who is a stutterer regardless of the SLP's experience. On the other hand, nearly all of the participants also misidentified the TD child as a child who stutters. This suggests that additional information (namely, parent concern or rather lack thereof) is needed with respect to the identification accuracy of the speech output of the bilingual child who is not a stutterer. To that end, we had a significant advantage because we had access not only to the child's speech fluency data but also to the child's speech-language history and parent perspectives on the child's speech-language development.

Parent concern has been demonstrated to be a reliable resource when considering the need for further evaluation (Glascoe, 1997). Specific to concern regarding stuttering, Byrd et al. (2015) recently suggested that the frequency percentage to elicit parent concern may be significantly higher because parents of bilingual children may be more accustomed to hearing mazes in their child's speech. It is also possible that the presence of timing and tension differences is the main contributor to parent concern.

In the study by Byrd et al. (2015), the TD bilingual children produced high rates of speech disfluencies, but all without atypical tension or rhythm. Similarly, in our analysis of the speech samples of the two children in the present study, a critical distinction arose. Although the overall frequency of speech disfluencies was comparable between the two children, the timing and tension of the repetitions were uniquely different: The child who stutters demonstrated atypical rhythm and tension in his disfluent speech. Thus, as Byrd et al. recently argued, the timing and tense nature of the repetitions, along with parent concern, may be the more clinically relevant discriminators in the bilingual population.

We also requested confidence-level ratings in the diagnosis of stuttering SE speakers of the participants because we thought confidence in their selection might be related to their accuracy of identification, with perceived increased confidence resulting in increased accuracy. However, this relationship did not appear to be present, at least not within our small sample size, as the majority of the participants reported that they felt generally confident in their ability to accurately diagnose this population, yet these same respondents were not accurate in their identification. The only participants who indicated that they were sort of confident were the two graduate students. Interestingly, one of these students was the only participant who accurately identified the confirmed child who stutters and the confirmed child who does not stutter.

Future studies with larger sample sizes are warranted to better understand the potential strength of the relationship between confidence and identification accuracy. Nevertheless, a particularly relevant finding regarding SLPs' confidence level is not that those who were the least experienced were the least confident, but instead, it is that the majority of participants stated that they were confident in their assessment abilities of monolingual and bilingual children, yet the majority was inaccurate in their identification. This finding suggests that the participants were not aware that they lacked critical knowledge that would compromise their ability to reliably differentiate a bilingual child who stutters from one who does not.

Additional Considerations

Van Borsel and Pereira reported in 2005 (citing Holliday, 2001) that less than 1% of clinically certified SLPs in the United States speaks more than one language fluently. This number is significantly below the clinical demand as more than 20% of households in the United States are bilingual. Given this information, future research investigating the evaluation of bilingual SE children who may stutter should perhaps include monolingual SLPs as well. Although the preferred method of evaluation with second language–learning children should incorporate the expert opinion of a bilingual SE SLP, the prevalence of bilingual children in need of SLP services exceeds the number of available bilingual SE SLPs. Whether an SLP is bilingual or not, it is important for all clinicians to have contemporary knowledge about children who are culturally and linguistically diverse, especially given the inevitability that monolingual SLPs will likely have a bilingual child on their caseload at some point.

Further, because there appears to be a similar frequency of speech disfluencies in bilingual SE children who do and do not stutter, future research should attempt to identify what constitutes a stuttering-like disfluency in bilingual SE children, as well as standard percentages for stuttering-like, nonstuttering-like, total disfluencies, and stuttering-like over nonstuttering-like for this population. Expecting a unique pattern in one language versus the other as a determinant factor of stuttering may also be misleading. Based on research that suggests that there are higher rates of speech disfluencies in the less dominant language for a bilingual individual who stutters, one would expect the confirmed child who does not stutter in the present study to have produced

more disfluencies in Spanish than English because she was 66% English dominant. Interestingly, the opposite was true across all disfluency types, with the exception of phrase repetitions. Thus, future research should focus on the analysis of stuttering in bilingual SE CWS who vary relative to proficiency in order to determine if in fact this variable has a significant influence on disfluent speech.

Last but not least, future research should also include a monolingual English and also Spanish child who stutters as well as a monolingual English and Spanish child who does not stutter in addition to bilingual SE children who do and do not stutter. Exploring identification accuracy across these talker groups would further enhance our understanding of whether the risk of false-positive identification is in fact unique to bilingual speakers or perhaps is also applicable to monolingual speakers of languages other than English.

Study Limitations

Van Borsel et al. (2001, 2008) stressed that stuttering must be observed and reported in both languages before a bilingual individual can be diagnosed as a child who stutters. These researchers also identified other clinical markers of stuttering that need to be considered, such as a family history of stuttering, negative self-perception, and accurate self-identification. Similarly, Roberts and Shenker (2007) reported that there are three crucial components/elements to assessing stuttering in a bilingual speaker: (a) a complete language history, (b) speech samples from a variety of contexts in each language, and (c) reliable analyses in which the SLP examines the speech samples with regard to rate of speech and typical speech disfluencies. Finally, Watson and Kayser (1994) stressed that secondary behaviors are also important to consider when assessing a bilingual individual for a stuttering disorder (e.g., noticeable tension, eye blinks, body movement).

Additionally, for the present study, the participants were limited to the audio samples alone. That being said, there are data to suggest comparable accuracy in auditory versus visual analysis of stuttering (see Bloodstein & Bernstein Ratner, 2008; Panico, Healey, Brouwer, & Susca, 2005, for review), but it is still likely that the accuracy would have differed had the participants had access to the aforementioned critical information. In fact, one participant returned her completed survey with the comment that analyzing the samples in this way "made [her] appreciate the need for a visual and a thorough background history."

Multiple participants noted that their decision regarding stuttering was influenced by the occurrence of speech disfluencies in both languages, indicating that they were familiar to some extent with the clinical marker that stuttering must occur in both languages in order for a bilingual individual to be classified as someone who stutters. Although these individuals were still inaccurate in their identification of stuttering, they demonstrated awareness of some of the additional important considerations aside from an auditory analysis of speech disfluency when evaluating CWS, including one that is unique to bilingual SE CWS (i.e., analysis of stuttering in both languages the person speaks).

Another factor that may have compromised the SLPs' identification accuracy is the rater's proficiency in that language. Van Borsel et al. (2008) examined native English speakers' (trained in assessing fluency in their own language) ability to listen to and judge stuttering in Dutch speakers. Their findings suggested that the more different an unfamiliar language is, the greater the possibility for a false-positive identification of stuttering. This information indicates that a native English speaker may have greater success evaluating a sample in Spanish than in a language such as Russian, given the similarities such as frequency of cognates (words that sound the same; e.g., *guitar* and *la guitarra*) and a similar orthographic system. However, the data also suggest that a lack of familiarity of a language compromises SLPs' ability to make an accurate identification of stuttering. Although all of the SLPs reported themselves as fluent in both English and Spanish, it is a possibility that perhaps the proficiency level of the participants in our study was lower than indicated. Future studies should measure the proficiency levels of SLPs before having them evaluate the child in that language sample in order to examine the potential relationship between the proficiency of the SLP in each language and the accuracy of diagnosis of stuttering.

An additional potential study limitation is the unequal listening sample lengths. The child who stutters produced a longer sample size in English than in Spanish, and the English sample of this child was also significantly longer than that of the English sample of the child who does not stutter. By comparison, the English and Spanish samples of the child who does not stutter were comparable in length. It is possible that had all of the samples been equal in length across and within both children, the results may have differed. However, no participant reported any concerns regarding length differences when discussing any challenges regarding identification accuracy within or across the listening samples. Additionally, the ratio of disfluencies to word output as indicated by the percentages of total disfluencies across all samples was equivalent.

Finally, the recruitment process for this study was challenging and likely reflects both the limited number of SLPs with bilingual specialization and the limited time that those SLPs have because they may be overextended in their current positions (Katz, Maag, Fallon, Blenkarn, & Smith, 2010). In both scenarios, ways to incentivize and recruit knowledgeable and willing participants for the study of stuttering in bilingual speakers need to be identified and implemented if we are to expand our understanding of the need for and completion of further study in this area.

Conclusion

Results confirm the notion that TD bilingual SE children may be misidentified as CWS. Although our sample size was small, correct identification among our 14 participants did not appear to be related to years working as a bilingual SE SLP, confidence level for diagnosis of this population, experience treating and diagnosing bilingual SE CWS, or educational background. Recall that one of the participants who provided a false-positive identification for the child who does not stutter and a false-negative identification for the child who stutters had been practicing for more than three decades, with a history of both treating and diagnosing more than 50 clients who were bilingual CWS. She also taught roughly seven courses on bilingualism and had attended at least five workshops on stuttering throughout her career. By comparison, the individual who provided a true-negative and true-positive rating of both children was completing her CF and had limited experience treating and diagnosing children in this population. However, she did graduate from a university that offered a bilingual tract hosting a variety of classes on bilingualism as well as a fluency class with the most current evidence-based research. This demonstrates that even with a broad range of experiences and a high degree of confidence, someone may not be able to accurately identify stuttering in speech samples of bilingual SE children. This also suggests that *current* and *relevant* information regarding stuttering and bilingualism may be critical to identification accuracy. On the other hand, findings also indicate that identification accuracy in bilingual children who do not stutter may not be possible when SLPs are provided speech output only and that additional information such as parent concern may be the key discriminating factor.

In closing, given the previously described nature of stuttering and the clinical markers that are used to identify it in monolingual children, the speech characteristics of bilingual SE children could be mistaken for stuttering-like behavior when their disfluent speech may actually be resulting from a manifestation of second-language learning and the interaction of two or more languages in their processing system. Further, although these preliminary data support the hypothesis that bilingualism may be a risk factor for the misidentification of stuttering in SE children, a broader range of participants must be surveyed in order to truly examine the ability of bilingual SE SLPs to assess SE children who may or may not stutter. This particular study focused on recruiting participants who were living in a specific region of the United States.

The findings that suggest that bilingual children could indeed be at risk for false-positive identification as CWS warrant further nationwide investigation, with specific immediate focus on states that have a particularly high prevalence of bilingual children. Perhaps of greater clinical relevance, the data presented here demonstrate that their disfluent output is not comparable to that of monolingual English speakers. Thus, any clinical use of monolingual English guidelines to determine factors such as diagnosis, prevalence, risk, and so forth are strongly cautioned against until we have additional evidence to support the reliability and validity of such application.

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