Assessing Bilingual Children: Are Their Disfluencies Indicative of Stuttering or the By-product of Navigating Two Languages?

Courtney T. Byrd, Ph.D., CCC-SLP[1]

ABSTRACT

Clinicians commonly report difficulty determining whether the disfluencies produced by their clients are indicative of stuttering or suggestive of something else, such as cluttering, autism, language impairment, or second language learning. In our clinical decision-making process, we identify features unique to specific speech and/or language disorders. This identification enables differential diagnosis in most cases. But what happens when features appear to overlap and, as a result, compromise our clinical decision making? This article provides information to assist in the differential diagnosis of stuttering, particularly as it pertains to the assessment of children who speak more than one language. It explores similarities in the speech behaviors produced by these speakers, contrasting them with stuttering behaviors in monolingual English speakers.

KEYWORDS: Stuttering, fluency disorder, assessment, differential diagnosis, bilingualism

Learning Outcomes: As a result of this activity, the reader will be able to (1) identify the disfluent speech behaviors that overlap across typical speakers of more than one language; (2) describe the guidelines indicative of stuttering in monolingual English speakers; (3) explain how this overlap has contributed to the misperception of bilingualism as a risk factor for the onset and development of stuttering; (4) distinguish the speech behaviors that lead to false versus true positive identification of stuttering.

Researchers and clinicians alike have long debated cross-linguistic issues that may distinguish bilingual children who do and do not stutter from their monolingual fluent and disfluent peers.[1–3] The recurring theme continues to be the critical need for empirically based reports of the speech disfluencies produced by typically fluent bilinguals in each of their two

[1]Department of Communication Sciences and Disorders, The University of Texas at Austin, Austin, Texas.

Address for correspondence: Courtney T. Byrd, Ph.D., CCC-SLP, Department of Communication Sciences and Disorders, Michael and Tami Lang Stuttering Institute, The University of Texas at Austin, 1 University Station, A1100, Austin, TX 78712 (e-mail: courtney.byrd@austin.utexas.edu).

Stuttering through the Lifespan: Questions and Answers; Guest Editor, Vivian Sisskin, M.S., CCC-SLP, BCS-F.

Semin Speech Lang 2018;39:324–332.

DOI: https://doi.org/10.1055/s-0038-1667161.
ISSN 0734-0478.

languages.[4] At present, our knowledge of the manifestation of stuttering in bilingual children is limited to an alarmingly low number of single-subject case studies.[5,6] If the growth trends reported in the 2016 census continue, within the next 50 years, one in three U.S. residents will speak more than one language.[7] Thus, enhanced understanding of the manifestation of stuttering in bilinguals is of ever-increasing clinical relevance.

Of further relevance to the differential diagnosis of stuttering in this unique clinical population is that speakers of more than one language seem to produce mazes at higher rates than their monolingual peers.[8–13] Mazes have been defined as disruptions in the forward flow of speech that are characterized by the production of a string of words, initial parts, or unattached fragments of words that do not, in and of themselves, contribute to the message that the person is attempting to communicate.[14] Similarly, stuttering has been defined as a disruption in the forward flow of speech that includes repetitions of sounds and syllables as well as audible and inaudible sound prolongations.[15] Given the overlap in the speech behaviors characteristic of stuttering and those characteristic of speaking more than one language, we must increase our understanding of the typical speech disfluencies produced by bilingual speakers who stutter. This will help us in differentially diagnosing stuttering in speakers of more than one language.

To that end, Byrd et al[16] explored the types and frequencies of speech disfluencies that are produced by bilingual Spanish-English (SE)–speaking 5- to 6-year-old children who do not stutter ($N = 18$). Spanish and English narratives (a story retell and story generation in each language) were analyzed relative to the type and number of stuttering-like[17] dysfluencies typically produced in monolingual English speakers. The frequency of stuttering-like disfluencies markedly exceeded the monolingual standard of 3% per 100 syllables. In fact, if the 3% guideline had been employed, 100% of these bilingual children would have been classified as children who stutter even though there was no concern on the part of child, parents, teachers, or clinicians regarding their fluency. In addition, regardless of the child's dominant language, significantly more repetitions (sound, syllable, and monosyllabic word) were produced in Spanish than in English for all participants.

Similarly, Eggers and Van Eerdenbrugh (unpublished data) explored the types and frequencies of speech disfluencies that are produced by bilingual Dutch-Turkish–speaking 6- to 9-year-old children who do not stutter ($N = 5$). Dutch narratives (a retell and a tell) were analyzed relative to the type and number of dysfluencies produced. As with Byrd et al,[16] the frequency of those behaviors greatly exceeded the monolingual standard of 3% per 100 syllables. In this case as well, if the 3% guideline had been employed, 100% of these bilingual children would have been classified as children who stutter, in the absence of any concern on the part of the child, parents, teachers, or clinicians about fluency. Surprisingly, even among the case studies of stuttering in bilinguals for whom one of their languages is not English, researchers still refer to the monolingual English-speaking guidelines when making diagnostic determinations. As is clear from the two aformentioned studies, the use of the guidelines with bilingual speakers of any language dyad could lead to false-positive identification of stuttering.

ARE CHILDREN WHO SPEAK MORE THAN ONE LANGUAGE AT RISK FOR FALSE-POSITIVE IDENTIFICATION OF STUTTERING?

False-positive identification is not unique to stuttering. The following quote underscores the magnitude of this risk across communication disorders: as Gutiérrez-Clellen and Simon-Cereijido pointed out, "There are great individual differences within and between the two languages of bilingual children and current assessment instruments are not designed to differentiate differences from true disabilities in these children."[18] Data across most states suggest that culturally and linguistically diverse children appear to be either over- or underrepresented in the population of children who have learning disabilities.[19] Furthermore, it has also been reported that those children who are lacking proficiency in both their first and second

languages are the ones who appear to be overrepresented.[20]

A common assumption is that clinicians can easily identify stuttering in speakers of other languages even when they do not speak those languages; however, few studies have included samples of children (i.e., these studies have mainly focused on adults). Also, they have not included bilinguals, who are highly typically disfluent. Byrd et al[21] asked 14 bilingual SE speech–language pathologists (SLPs) to listen to narrative re-tells in English and in Spanish that were produced by two bilingual SE children matched for age, gender, and language ability. One of these was a confirmed child who stutters, and the other a confirmed typically fluent child. Twelve out of the 14 bilingual SLP participants falsely identified the bilingual child who was a confirmed typically fluent speaker as a child who stutters. Ten of the 14 correctly identified the bilingual child who stutters as such. Thus, these data demonstrate that, even when SLPs speak the language of the child, bilingual SE children may be vulnerable to misdiagnosis.

The false-positive identification of stuttering in the study of Byrd et al[21] was attributed to the atypically frequent sound, syllable, and monosyllabic word repetitions in the speech output of both the bilingual SE child who stuttered and also the child who was typically fluent. Indeed, repetitions of sounds, syllables, and monosyllabic words are harbingers of stuttering in monolingual English speakers when produced at rates that are considerably lower than what has been observed in the output of bilingual SE children in our studies.[16,22] Thus, the practicing clinician must take caution when listening to the speech of a child who speaks more than one language, as those children are likely to demonstrate both the disfluency types and the disfluency frequency that is indicative of stuttering in monolingual English speakers. However, they are not likely to produce dysrhythmic phonation or atypical tension; if either of these two factors is perceived in children's speech output, clinicians can feel more confident that the child is exhibiting stuttering, rather than typical disfluency associated with the linguistic uncertainty inherent in navigating two or more languages.

IS BILINGUALISM A RISK FACTOR FOR DEVELOPMENT OF STUTTERING?

An additional factor that may contribute to the increased likelihood of false-positive identification is that clinicians may be more likely to misperceive speaking more than one language as a risk factor for the onset and development of stuttering. There has been some disagreement within the literature as to how to address any potential *risk* of stuttering associated with second-language learning. For example, some researchers have suggested "if a child uses a language other than English in the home, deferring the time when they learn English reduces the chance of starting to stutter and aids the chances of recovery later in childhood."[23] However, others, including Packman et al,[24] have argued that the benefits of bilingualism far outweigh the merits of waiting to expose a child to a second language and that any recommendation to defer language exposure must be supported by sufficient data. At present, there are insufficient data to support that such a risk exists. Nevertheless, a significant number of practicing clinicians in fact do misperceive exposure to more than one language as a risk factor for the onset and development of stuttering.

Byrd et al[25] explored whether SLPs inaccurately classify bilingualism as a risk factor for the onset and persistence of stuttering and examined the factors that influenced their perception of bilingualism as a risk factor. Participants included 207 SLPs recruited through the American Speech-Language Hearing Association Membership Directory. Participants completed web-based surveys addressing their knowledge of perceived risk factors associated with stuttering, including bilingualism. Preliminary results indicated that some, but not all, SLPs view bilingualism as a risk factor. Results further indicate that clinical experiences and personal perspectives significantly contribute to this misperception. The crucial point from this and other work in this area is that there are not sufficient data to support bilingualism as a significant risk factor, and that deferring exposure to another language until "the critical period" (as argued by some) for second-language learning has passed may

compromise the child's ability to acquire that language.[26]

IS IT BEST TO COLLECT SAMPLES IN THE DOMINANT LANGUAGE OF SPEAKERS OF MORE THAN ONE LANGUAGE?

Regardless of whether they have limited or exceptional knowledge of both languages, the language knowledge of bilinguals/multilinguals is not limited to one language; rather, it is spread across two or, in the case of multilinguals, across three or more. Speakers of more than one language may know some of the same words in all languages, but there is not a one-to-one correspondence between what they know in one language and what they know in the other language.[27] Therefore, completing disfluent speech analyses in only one language will not account for the variations in maze production across those languages the typically fluent bilingual child speaks. To date, there have been conflicting data regarding the production of stuttering-like speech disfluencies relative to the language dominance of the speaker. The fact that study findings conflict in this area is understandable, given the differences across studies. For example, some participants are adults, whereas others are still developing language skills as adolescents; this is important because it is expected that language proficiency will change over time. Given differences across studies, a summary of this literature is provided with caution.[28] It is also critical to acknowledge that the linguistic output of these participants may have been mitigated by negative social emotional consequences of persistent stuttering.[29] Nevertheless, these data at least provide a starting point for understanding the role of dominance in the manifestation of stuttering in bilinguals.

In short, the evidence is mixed on whether it is the more dominant or the less dominant language in which greater stuttering is produced. On one hand, Jankelowitz and Bortz[30] reported that the English–Afrikaans bilingual man in their study (age = 63 years) produced more stuttering-like speech disfluencies in his less dominant language of Afrikaans. Similarly, Lim et al[31] (total $N = 30$; age range = 12–44 years) reported increased stuttering in the less dominant language for the Mandarin–English bilinguals ($n = 4$) and also for the English–Mandarin bilinguals ($n = 15$), with similar amounts of stuttering reported between the Mandarin and English output for the balanced bilinguals ($n = 11$). In contrast, Jayaram[32] examined the speech output of Kannada–English bilinguals ($n = 10$; age range = 19–32 years) who were considered to be more proficient in Kannada. Jayaram reported that these bilingual speakers produced significantly more stuttering-like speech disfluencies in Kannada than in English.

Several additional studies focused on language dominance and stuttering frequency in bilingual speakers of Spanish and English, in particular. Dale[33] analyzed the speech disfluency of four bilingual SE adolescents (mean age = 13 years) who were reportedly equally proficient in both English and Spanish. He stated that all four participants stuttered in Spanish only; no stuttering was observed in English. In contrast, Bernstein Ratner and Benitez[34] reported that the SE bilingual man (age = 50 years) they observed (who was similar to Dale's[33] participants in that he was considered to be a balanced bilingual) stuttered more severely in English. More recently, Ardila et al[35] reported that the English-dominant adult bilingual SE speaker (age = 27 years) whom they observed stuttered more in Spanish than in English.

In my own work,[16] findings have differed somewhat in that we observed no differences relative to language dominance. Regardless of language dominance, all speakers were significantly more disfluent in Spanish as compared with English. This lends further support to the notion that stuttering varies depending on the grammatical structure of the language being spoken.[30–32,36] These findings provide an interesting link to Bernstein Ratner and Benitez's[34] earlier case study, in which the participant's stuttering occurred more frequently on verbs than on nouns in his Spanish output compared with verbs versus nouns in his English output. Likewise, Ardila et al[35] reported significantly more stuttering in Spanish than in English on adjectives, adverbs, and conjunctions. This difference in stuttering loci between languages has

been attributed to the pro-drop form that is characteristic of Spanish. The pronouns are often omitted because the context of the sentence and the inflected verb form provide enough information to allow for identification of the subject.[37] These findings suggest collection of comparable data across the languages is key to understanding whether the language being spoken and/or the dominance uniquely impacts stuttered speech.

IS IT OK TO SIMPLY STATE THE CLIENT IS BILINGUAL OR DO I NEED TO GATHER MORE INFORMATION?

Yet another factor that is important to consider when assessing speakers of more than one language is that bilingualism is measured on a continuum.[38] In other words, bilingualism is not a categorical measurement; rather, there are degrees of bilingualism. The vast majority of investigations of bilinguals in the stuttering literature have been far too general in the manner in which bilingualism is defined.[5] Labeling all children who speak two languages as "bilingual" does not allow for consideration of the continuous nature of bilingualism and how performance on language tasks fluctuates depending on language dominance and proficiency.[28,39] In addition, although there is no one standard measure of bilingualism, both the child's exposure to the language and the child's actual use of that language have been documented as critical factors to consider when determining his or her level of bilingualism.[40]

As noted by Coalson et al,[5] this information either has not been reported or has not been defined in a consistent manner. Coalson and colleagues provided a framework for description of language profiles that is based on Grosjean's[39] recommendations within the broader multilingual literature. This framework emphasizes the importance of including three primary factors in describing a language profile: language history, language function, and language proficiency. *Language history* is defined as the age and conditions in which the speaker was exposed to the second/nonnative language (L2, first/native language: L1). *Language function* is defined as the amount or frequency that each language is currently used across specific settings and interlocutors. *Language proficiency* is defined as the speaker's overall ability to speak and understand each language in verbal or written form. Clinicians are encouraged to administer questionnaires that provide valuable insight into these three factors. See Coalson et al[5] for a comprehensive list of available questionnaires.

Use of a basic framework for language profile description would improve our understanding of fundamental questions within the multilingual stuttering literature. For example, Van Borsel[41] suggested that the role of language dominance and stuttering remains uncertain due, in part, to the heterogeneity of the multilingual population. In the broader multilingual literature, individual factors used to determine dominance, such as history, proficiency, and function, have been found to uniquely interact with specific language abilities. By including each of these factors in the evaluation of a child who may present with stuttering, the relative contribution of each to the manifestation of stuttering can be more carefully considered. Additionally, consistent use of a framework allows the findings of these and other critical research questions (e.g., treatment generalization across languages, language-specific interactions with stuttering) to be validly interpreted by accounting for potential sources of variability unique to the multilingual population.

ARE THERE OTHER CLINICAL POPULATIONS AT RISK FOR FALSE-POSITIVE IDENTIFICATION OF STUTTERING IF THE MONOLINGUAL ENGLISH GUIDELINES FOR STUTTERING ARE USED AS A REFERENCE?

Breakdowns in speech fluency are more likely when children are attempting to produce utterances at the leading edge of their linguistic capacity.[42] Thus, there are other clinical populations for whom the application of the guidelines established with monolingual English speakers may yield false-positive identification of stuttering. For example, late talkers, children with specific language impairment,

and children with autism spectrum disorder produce frequencies and types of disfluencies considered to be stuttering in monolingual English speakers. Upon review of the literature, what we have found in speakers of more than one language also appears to hold true in other clinical populations. Specifically, overlap in type and frequency of stutter-like behaviors in monolingual English speakers is observed, but no description of atypical tension is reported in the repetitions produced.

Interestingly, the use of disfluency categories has not been without debate in the monolingual stuttering literature,[43] and the validity of including monosyllabic word repetitions in our categorization of stuttering-like disfluencies has been questioned.[43–46] Thus, when completing disfluency count analyses of children who speak more than one language, this type of disfluency (unless produced with atypical tension) should not be considered as an indicator for stuttering. Across the preliminary data gathered to date, it appears that the presence of audible sound prolongations, cluster production, and the presence of atypical tension and/or atypical rhythm in the iterations may prove to be more discriminating than frequency within this population; however, additional normative data are needed to support this assumption.

WHAT IS KEY TO DIFFERENTIAL DIAGNOSIS OF STUTTERING IN SPEAKERS OF MORE THAN ONE LANGUAGE?

Taken together, present data suggest that when clinicians are assessing speakers of more than one language, they need to take into account at least a few critical considerations. First, there are insufficient data to suggest stuttering is more prevalent in bilingual/multilingual speakers. If stuttering were more prevalent in these groups, countries that were highly populated by speakers of more than one language would yield rates of stuttering significantly higher than countries where the majority of the population is monolingual. Second, there have been conflicting perspectives published in the literature that may have contributed (and could continue to contribute) to some clinicians inaccurately assuming that learning another language could increase the risk for onset and/or development of stuttering. One could argue stuttering may be likely to increase when the child who stutters is initially exposed to a second language, but this argument would apply only to sequential learners and would only be conjecture as there are again insufficient data to support this perspective.

To facilitate differential diagnosis, clinicians should take caution when analyzing the speech of the child who speaks more than one language, as these children will likely produce all the types of disfluencies considered to be stuttering-like in monolingual English speakers, with the exception of blocks, audible sound prolongations, and non–stuttering-like disfluencies produced with atypical tension (e.g., the production of an interjection that is unusually tense and, thus, becomes stuttering-like in quality). As stated previously, the following points are critical to consider:

1. Monosyllabic word repetitions are produced to an unusually high degree in typically fluent children who speak more than one language, and these speakers also produce sound and syllable repetitions at higher rates than monolingual English speakers.
2. Audible sound prolongations, cluster production, and the presence of atypical tension and/or atypical rhythm in the iterations may prove to be more discriminating than frequency.

An additional consideration for differential diagnosis is that of parent concern. Parent concern has been demonstrated to be a reliable indicator of need for further evaluation.[47] The frequency of stuttering needed to elicit parental concern may be significantly higher (than that of parents of monolingual children), as parents of bilingual children may be more accustomed to hearing mazes in their children's speech. It is also possible that the presence of timing and tension differences is the main contributor to parental concern specific to stuttering. Some preliminary data from my work in this area, currently in review, suggest that tense, arrhythmic speech is more concerning than is a high frequency of disfluent speech for the parents of

bilingual children as well as the parents of monolingual children.

Finally, the stuttering of the child who speaks more than one language will likely differ significantly from the stuttering observed in a bilingual adult. That is, the timing of gains and potentially losses in proficiency in one or more of the languages the child speaks[28,39] may yield marked differences in disfluency and language profiles over time. Furthermore, these differences in gains and losses in children's languages over time may be coupled with the development of affective and cognitive correlates that are characteristic of persistent stuttering.[29] Thus, any future guidelines for differential diagnosis established for children who speak more than one language cannot be applied to the adult bilingual/multilingual who stutters.

CONCLUDING REMARKS

Speech disfluencies provide valuable insight into the linguistic and motoric effort required for spoken communication. Breakdowns in speech fluency are more likely when children attempt to produce utterances at the leading edge of their linguistic capacity.[42,48] Thus, it is not surprising that bilingual children experience *elevated levels of disfluency* as, unlike monolingual children, they have to navigate more than one language system.[16]

Preliminary data demonstrate that clinicians have significant difficulty discriminating typical from clinical speech disfluency in Spanish–English bilingual children who do and do not stutter.[21] Recent findings also suggest that SLPs inaccurately perceive bilingualism as a risk factor for the development and/or persistence of stuttering.[25] This misperception is not surprising given the *lack of normative data* in bilingual speakers.[5]

Interestingly, there appears to be a *behavioral overlap* between what is considered typical versus atypical in the disfluent speech among monolingual and bilingual speakers. Moreover, there is overlap between speakers of one or more languages who present with either a language or a fluency disorder. This overlap raises the question as to whether there are distinctive disfluent speech behaviors that differentiate bilingual and monolingual children with typically developing language skills from matched peers with either impaired language or stuttering.

Taken together, recent research shows that parent concern coupled with the rhythm and tension of the disfluencies produced, as opposed to the types and frequency of disfluency, may best support differential diagnosis. However, these suggestions are preliminary and warrant further investigation. In particular, study is needed of the *distinctive, qualitative, and/or quantitative disfluent behaviors that differentiate bilingual individuals with typical language from monolingual English speakers who stutter.*

From a theoretical perspective, additional research exploring overlapping and distinguishing behaviors could serve to demonstrate the relative contribution of linguistic planning and speech motor control to disfluent speech (both stuttered and typical). From a clinical perspective, identification of behaviors that differentiate typical disfluency from the disfluency associated with stuttering and even language impairment in monolingual and bilingual speakers will enhance differential diagnosis across these distinct disorders and speakers. At the very least, the information in this article has provided readers with an evidence-based starting point with regard to the key differentiating characteristics and areas of overlap. In addition, it has highlighted other critical assessment considerations to enhance clinician's knowledge and confidence in the evaluation of bilingual speakers for whom there may be an increased risk for misidentification of stuttering.

DISCLOSURES

C.T.B. has a nonfinancial relationship in her role as the founding director of the Michael and Tami Lang Stuttering Institute. She has no financial relationships to disclose.

REFERENCES

1. Finn P, Cordes AK. Multicultural identification and treatment of stuttering: a continuing need for research. J Fluency Disord 1997;22:219–236
2. Roberts PM, Shenker RC. Assessment and treatment of stuttering in bilingual speakers. In: Conture EG, Curlee RF, eds. Stuttering and

Related Disorders of Fluency. 3rd ed. New York: Thieme Medical Publishers; 2007
3. Van Borsel J, Maes E, Foulon S. Stuttering and bilingualism: a review. J Fluency Disord 2001; 26:179–205
4. Tetnowski J, Richels C, Shenker R, Sisskin V, Wolk L. When the diagnosis is dual. ASHA Lead 2012;17:10–13
5. Coalson GA, Peña ED, Byrd CT. Description of multilingual participants who stutter. J Fluency Disord 2013;38(02):141–156
6. Shenker RC. Multilingual children who stutter: clinical issues. J Fluency Disord 2011;36(03):186–193
7. U.S. Census Bureau. 2016, https://www.census.gov/. Accessed June 20, 2018
8. Bedore LM, Fiestas CE, Peña ED, Nagy VJ. Cross-language comparisons of maze use in Spanish and English in functionally monolingual and bilingual children. Biling Lang Cogn 2006;9(03): 233–247
9. Lennon P. Investigating fluency in EFL: a quantitative approach. Lang Learn 1990;40(03):387–417
10. Lofranco L, Peña ED, Bedore LM. English language narratives of Filipino children. Lang Speech Hear Serv Sch 2006;37(01):28–38
11. Poulisse N. Slips of the Tongue: Speech Errors in First and Second Language Production. Amsterdam, The Netherlands: John Benjamins; 1999
12. Rieger CL. Repetitions as self-repair in English and German conversations. J Pragmatics 2003;35 (01):47–69
13. Wiese R. Language production in foreign and native languages: same or different? In: Dechert H, Möhle D, Raupach M, eds. Second Language Production. Tübingen, Germany: Narr; 1984: 11–25
14. Loban W. Language development: kindergarten through grade twelve. Urbana, IL: National Council of Teachers of English; 1976
15. Conture E. Stuttering: Its Nature, Diagnosis, and Treatment. Boston, MA: Allyn and Bacon; 2001
16. Byrd CT, Bedore LM, Ramos D. The disfluent speech of bilingual Spanish-English children: considerations for differential diagnosis of stuttering. Lang Speech Hear Serv Sch 2015;46(01):30–43
17. Yairi E, Seery CH. Stuttering: Foundations and Clinical Applications. Upper Saddle River, NJ: Pearson Education; 2011
18. Gutiérrez-Clellen VF, Simon-Cereijido G. Using nonword repetition tasks for the identification of language impairment in Spanish-English-speaking children: does the language of assessment matter? Learn Disabil Res Pract 2010;25(01):48–58
19. Klingner J, Artiles AJ. English language learners struggling to learn to read: emergent scholarship on linguistic differences and learning disabilities. J Learn Disabil 2006;39(05):386–389
20. Artiles AJ, Rueda R, Salazar J, Higareda I. Within-group diversity in minority disproportionate representation: English language learners in urban school districts. Except Child 2005;71:283–300
21. Byrd CT, Watson J, Bedore L, Mullis A. Identification of stuttering in bilingual Spanish-English speaking children. Contemp Issues Commun Sci Disord 2015;42:72–87
22. Taliancich-Klinger CL, Byrd CT, Bedore LM. The disfluent speech of a Spanish-English bilingual child who stutters. Clin Linguist Phon 2013;27 (12):888–904
23. Howell P, Davis S, Williams R. The effects of bilingualism on stuttering during late childhood. Arch Dis Child 2009;94(01):42–46
24. Packman A, Onslow M, Reilly S, Attanasio J, Shenker R. Stuttering and bilingualism. Arch Dis Child 2009;94(03):248
25. Byrd CT, Hague A, Johnson K. Speech-language pathologists' perception of bilingualism as a risk factor for stuttering. J Commun Disord Deaf Stud Hear Aids 2016;4:1–6
26. Johnson JS, Newport EL. Critical period effects in second language learning: the influence of maturational state on the acquisition of English as a second language. Cognit Psychol 1989;21(01):60–99
27. Peña ED, Bedore LM, Zlatic-Giunta R. Category-generation performance of bilingual children: the influence of condition, category, and language. J Speech Lang Hear Res 2002;45(05):938–947
28. Grosjean F. Studying bilinguals: methodological and conceptual issues. Biling Lang Cogn 1998; 1:131–149
29. Craig A, Blumgart E, Tran Y. The impact of stuttering on the quality of life in adults who stutter. J Fluency Disord 2009;34(02):61–71
30. Jankelowitz DL, Bortz MA. The interaction of bilingualism and stuttering in an adult. J Commun Disord 1996;29(03):223–234
31. Lim VPC, Lincoln M, Chan YH, Onslow M. Stuttering in English-Mandarin bilingual speakers: the influence of language dominance on stuttering severity. J Speech Lang Hear Res 2008;51(06):1522–1537
32. Jayaram M. Phonetic influences on stuttering in monolingual and bilingual stutterers. J Commun Disord 1983;16(04):287–297
33. Dale P. Factors related to dysfluent speech in bilingual Cuban-American adolescents. J Fluency Disord 1977;2:311–314
34. Bernstein Ratner N, Benitez M. Linguistic analysis of a bilingual stutterer. J Fluency Disord 1985; 10:211–219
35. Ardila A, Ramos E, Barrocas R. Patterns of stuttering in a Spanish/English bilingual: a case report. Clin Linguist Phon 2011;25(01):23–36
36. Nwokah E. The imbalance of stuttering behavior in bilingual speakers. J Fluency Disord 1988; 13:357–373

37. Anderson RT, Centeno JG. Contrastive analysis between Spanish and English. In: Centeno JG, Anderson RT, Obler LK, eds. Communication Disorders in Spanish Speakers: Theoretical, Research and Clinical Aspects. Clevedon, England: Multilingual Matters; 2007:11–33
38. Valdés G, Figueroa RA. Bilingualism and Testing: A Special Case of Bias. Norwood, NJ: Ablex; 1994
39. Grosjean F. Studying bilinguals: methodological and conceptual issues. In: Bhatia T, Ritchie W, eds. The Handbook on Bilingualism. Oxford, UK: Blackwell Publishing Company; 2004:32–63
40. Gutiérrez-Clellen VF, Kreiter J. Understanding child bilingual acquisition using parent and teacher reports. Appl Psycholinguist 2003;24(02):267–288
41. Van Borsel J. Review of research on the relationship between bilingualism and stuttering. In: Howell P, Van Borsel J, eds. Multilingual Aspects of Fluency Disorders Tonawanda. NY: Multilingual Matters; 2011:247–270
42. Rispoli M, Hadley P. The leading-edge: the significance of sentence disruptions in the development of grammar. J Speech Lang Hear Res 2001;44(05): 1131–1143
43. Einarsdóttir J, Ingham RJ. Have disfluency-type measures contributed to the understanding and treatment of developmental stuttering? Am J Speech Lang Pathol 2005;14(04):260–273
44. Brocklehurst PH. Stuttering prevalence, incidence and recovery rates depend on how we define it: comment on Yairi & Ambrose' article Epidemiology of stuttering: 21st century advances. J Fluency Disord 2013;38(03):290–293
45. Wingate ME. SLD is not stuttering. J Speech Lang Hear Res 2001;44(02):381–383
46. Howell P. Screening school-aged children for risk of stuttering. J Fluency Disord 2013;38(02):102–123
47. Glascoe FP. Parents' concerns about children's development: prescreening technique or screening test? Pediatrics 1997;99(04):522–528
48. Zackheim CT, Conture EG. Childhood stuttering and speech disfluencies in relation to children's mean length of utterance: a preliminary study. J Fluency Disord 2003;28(02):115–141, quiz 141–142