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Assessing Speech Sound Disorders in School-Age Children from Diverse Language Backgrounds: A Tutorial with Three Case Studies

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Abstract

Purpose: Assessing speech sound disorders (SSD) in children from multilingual backgrounds requires synthesis of language- and dialect-specific information to arrive at a more accurate diagnosis. We present three case studies of school-age children with unique linguistic profiles to aid speech–language pathologists (SLPs) in assessing this diverse population. Our aim is to offer feasible strategies for SLPs who do not speak the student's language(s).

Method: Three multilingual school-age children with suspected SSD were assessed as part of an initial evaluation at a suburban school district. Children spoke Vietnamese–English, Japanese–Polish–English, and Tamil–English. Students' languages were considered in the entire assessment process (i.e., interview, test selection, data analysis, and clinical decision making), and appropriate measures and resources were chosen to understand word-level and spontaneous articulation, phonological awareness, and language skills. A contrastive analysis was used to determine the presence of an SSD.

Conclusions: Although all students presented with patterns attributable to transfer processes (e.g., nonmainstream vowel productions) and/or dialectal differences, only one of the three students presented with an SSD. Together, these cases underscore the importance of a comprehensive assessment for multilingual children.

A sizable number of students attending U.S. public schools are exposed to a language other than English at home (U.S. Department of Education, 2017). This is reflected in a greater number of students from linguistically diverse backgrounds on the school-based speech–language pathologist's (SLP) caseload. At the same time, only an estimated 6% of SLPs speak a language other than English (American Speech & Hearing Association, 2018), making SLP–client language mismatches a reality of clinical practice. This presents a particular challenge within the domain of phonology when interpreting assessment results to determine the presence of a speech sound disorder (SSD). Here, we adopt *multilingual* as an inclusive label for these speakers (in line with, among others, McLeod, Verdon, & Bowen, 2013); however, we also use *bilingual* for specific profiles and in our review of the literature to align with the original descriptions of these children. Other terms such as *English learners* and *dual language learners* are not used here.

The extant literature on SSD in multilingual populations has focused on preschoolers (e.g., Gildersleeve-Neumann, Kester, Davis, & Peña, 2008; Hasson, Camilleri, Jones, Smith, & Dodd, 2013) and Spanish–English bilingual children (e.g., Fabiano-Smith & Goldstein, 2010; Goldstein & Bunta, 2012; Gildersleeve-Neumann et al., 2008; Goldstein, Fabiano & Washington, 2005). While numerous studies have investigated school-age children who speak minority languages that have few speakers in their respective countries (e.g., Gaelic: Nance, 2019; Indo-Aryan languages: Holm, Dodd, Stow & Pert, 1999; Russian: Gildersleeve-Neumann & Wright, 2010), these are largely acquisition studies rather than clinical tutorials. We begin by providing a framework for assessing SSD and present three case studies of multilingual school-age children suspected of SSD who speak various minority languages in the U.S. The guidelines offered highlight best practices, while the case studies exemplify real-world scenarios of

assessments conducted in the public schools. Accurately diagnosing SSD in multilingual children requires leveraging all resources available, while acknowledging potential barriers such as greater complexity and time constraints.

In the U.S. multilingual students are more likely than their monolingual peers to be over- or under identified with a speech and language impairment (Artiles, Harry, Reschly, & Chinn, 2002; Sullivan, 2011). The direction of misidentification is moderated by age, with younger children tending to be under identified, and older children tending to be overidentified (Samson & Lesaux, 2009).

In this paper, we adopt a *disorder within diversity* framework (Oetting, Gregory, & Riviere, 2016; Oetting, 2018) instead of a traditional *difference vs. disorder* dichotomy. Such a reframing allows us to understand that a disorder manifests according to a specific language profile and emphasizes examining the child within the context of their specific linguistic community. For example, when assessing a Russian–English child with suspected SSD, it is necessary to disambiguate instances of transfer from true speech errors that manifest across languages while recognizing that both of these patterns are possible in a single speaker

Additionally, SLPs make evaluation decisions based on the child's language development. Unique to multilingual populations, they must also consider the effects of fluctuations in language dominance and dual language acquisition. These multilingual assessments are further complicated by the high individual variability in the speech–language abilities of multilingual children. The complexities of multilingual assessments contribute to SLPs feeling unprepared in this area, with school-based SLPs reporting only adequate preparation in working with the growing culturally and linguistically diverse population and minimal training in bilingual assessments (Arias & Friberg, 2017; ASHA Schools Survey, 2014).

In addition, there is a paucity of resources to aid in the identification of multilingual children with SSD who speak a minority language with few speakers. While clinical tools have been developed for Spanish–English bilingual children (e.g., Contextual Probes of Articulation Competence-Spanish [CPAC-S], Goldstein & Iglesias, 2009; Goldman-Fristoe Test of Articulation-Third Edition, Spanish [GFTA-3 Spanish], Goldman & Fristoe, 2017; Bilingual English-Spanish Assessment [BESA], Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2018), there is considerably less guidance for speakers of other minority languages. This tutorial addresses this need for guidance on clinical assessments of multilingual children for SSD. To begin, the sections that follow are intended to aid the clinician's understanding of multilingual speech acquisition and production.

Understanding Multilingual Speech Acquisition

Speech Acquisition and Production in Multilingual Children

Demystifying assessment of SSDs requires an understanding of speech acquisition and production from a multilingual perspective, so we review here literature that is most likely to inform clinical practice. Although bilingual children reach similar phonological milestones as monolingual children, rates of acquisition and production of segmental and/or suprasegmental features may be affected by cross-linguistic influences in bilingual children (Fabiano-Smith & Goldstein, 2010).

Acceleration and deceleration demonstrate the interaction of multiple phonological systems within a single speaker. Acceleration occurs when shared features are acquired earlier. For example, Spanish–German bilingual children acquire coda consonants at a higher rate than monolingual Spanish-speaking children (Lleó, Kuchenbrandt, Kehoe, & Tjujillo, 2003), suggesting a facilitation effect from German, which has a higher frequency of coda consonants.

In contrast, deceleration occurs when acquisition of sounds, particularly those with features not shared between the languages, are acquired more slowly than expected in a monolingual sample. Deceleration can manifest as lower overall accuracy, “atypical” patterns (for monolinguals), and lower accuracy on particular sound classes (Gildersleeve-Neumann et al., 2008). For example, bilingual children have shown reduced consonant accuracy compared to monolingual peers (Fabiano-Smith and Goldstein, 2010), though typical bilingual children will master both of their languages’ phonological systems.

Transfer refers to the influence of one phonological system on the other. Even when sounds are shared between languages, allophonic differences may result in transfer. For example, while English and Arabic share a lateral approximant /l/, it is often realized as a dark [ɫ] in coda positions in American English (e.g., [pʰuːɫ]); conversely, in Arabic, this is a clear /l/. An Arabic–English bilingual speaker might have higher rates of light /l/ in English ([pʰuːl]). Other instances of transfer happen at the phonemic level, causing whole phoneme substitutions. For example, while interdental fricatives /θ ð/ are present in English and Greek phonemic systems, they are absent in many of the world’s languages (e.g., Vietnamese, Russian, Cantonese, and colloquial varieties of Arabic; Ball, 2012), so these might be replaced for existing sound classes with features matching in manner (e.g., /s z/) or place (e.g., /t d/). An extensive body of literature supports instances of transfer as a typical bilingual phenomenon that does not, on its own, implicate a disorder. Multilingual speakers exhibit cross-linguistic effects to varying degrees, and these must be discerned from true errors.

Speech Norms Across Languages

Another important parameter in assessing multilinguals is understanding the utility and limitations of speech acquisition data. Just as phonemic inventories vary across languages so do

developmental sequences and typical phonological processes of those phonemes. The developmental sequence of speech sounds in a language is largely a function of phonetic complexity, phonetic frequency, and functional load (Stokes & Surendran, 2005). For example, as Ingram (2012) notes, although both Greek and English have interdental fricatives, speakers of these two languages differ in their acquisition rates. Greek speakers, including those with SSD, acquire these sounds early, while in English, these sounds are part of the "late eight," acquired much later in development. Critically, applying an English norm to these shared sounds (i.e., /θ ð/) might lead to an incorrect interpretation of the results.

Because phonological processes and expected age of suppression are also language-specific, those processes considered atypical in monolingual English speakers, such as backing or initial consonant deletion, cannot be assumed to be atypical in other languages. Indeed, backing is a relatively common process in Japanese-speaking monolingual children (Li, Edwards, & Beckman, 2009), and a monolingual English reference standard would, again, lead to an incorrect diagnosis.

Accounting for Language Experience

In addition to cross-linguistic effects, it is important to consider the child's cumulative and current experience in each of their languages to determine expected proficiency. Documenting the amount and quality of language experience the child has in each language can help interpret findings. For example, a caregiver interview might reveal that a Vietnamese–English bilingual student currently hears and speaks Vietnamese and English 30% and 70% of the time, respectively, and began learning English at 4 years of age (age of acquisition [AoA] = 4;0), in a preschool setting; describing both current experience and length of exposure gives us a better picture of the child's specific language profile and determining the dominant language

(i.e., the one with the higher level of proficiency). This is particularly important given research showing the effects of language dominance on performance. For example, in speech perception, bilingual children's phonemic categorization depends partly on their language dominance (Borràs-Comes & Prieto, 2014). In speech production, bilingual children use similar voice onset time values in both of their languages when compared to monolingual speakers of each of their languages (Lee & Iverson, 2012).

Conducting a Comprehensive Assessment

In this section, we outline the components of a comprehensive speech assessment for multilingual students with suspected SSD. While we describe best-case scenarios, note that specific resources and procedures will depend on child-level factors (e.g., the student's language), as well as environmental factors such as school policies and the availability of interpreters. SLPs will need to work with their respective settings to ensure that they receive additional time, as assessments of multilingual children take longer than those with monolinguals. Ultimately we believe this saves time and yields better student outcomes over the long-term, as an accurate assessment ensures valid diagnosis and treatment planning. The following is a step-by-step procedure for conducting a comprehensive assessment, followed by additional considerations for collaborating with an interpreter.

Step 1: Collect Case History Information

Conducting a thorough case history requires gathering information about developmental milestones, caregiver concerns, and any familial history of speech–language disorders. For the multilingual student, this also includes cumulative language history (i.e., year-by-year from birth to present), collected through a caregiver interview (with an interpreter, as needed). Relevant

information includes age of acquisition, current language experience, communication partners, and language proficiency in each language.

Language Experience

Both measures of cumulative (e.g., AoA) and current experience are helpful for understanding the amount of input a child has received since birth, which can guide determination of language dominance and expectations of their skills in each language. *Language exposure* (*input)* is the relative amount of time spent hearing each language (e.g., 70% English exposure). L*anguage use* (*output)* refers to the relative amount of time spent speaking each language (e.g., 60% English use; Bedore et al., 2012). Clinical tools for reporting language experience have been developed for younger children (e.g., the Language Exposure Assessment Tool [LEAT], DeAnda, Bosch, Poulin-Dubois, Zesiger, & Friend, 2016). For school-age children, similar clinical measures are available, such as the Bilingual Input–Output Survey ([BIOS], Peña, Gutiérrez-Clellen, Iglesias, Goldstein, & Bedore, 2018) and the Alberta Language Development Questionnaire ([ALDeQ], Paradis, Emmerzael, & Sorenson Duncan, 2010).

Dialect Considerations

Also important for an informed clinical decision is dialect-specific information. To avoid basing information on a reference standard not used by the child, obtain information about the specific dialect to which the child is exposed (e.g., Taiwanese Mandarin, Northern Russian, Korat Thai). Research shows that applying different dialect standards impacts assessment results (Goldstein & Iglesias, 2001). Pronunciation in a particular dialect may explain differences between expected productions and a disorder.

Step 2: Conduct Preliminary Assessments

After obtaining case history, language history, and speech-specific information in the language/dialect in question, a comprehensive evaluation must also include other preliminary assessments. Typically done prior to the speech evaluation, a pure-tone hearing screening is used to determine whether loss of auditory functioning could be impacting speech development and production, possibly warranting a referral to an audiologist. An oral mechanism examination is completed to describe the structure and function of the oral mechanism for speech production and may rule out structural or neurological deficits.

Step 3: Gather (Dialect-Specific) Language Resources

Determining the nature of the specific phonemic productions observed requires gathering information and resources to conduct a contrastive analysis (e.g., McGregor, Williams, Hearst, & Johnson, 1997). Here, patterns that are consistent with the child's language history are separated from patterns that represent true errors. In this paper, we will consider nonmainstream productions those that would be unexpected for an adult monolingual speaker of a particular dialect. Developmental norms for age of acquisition across languages are not equivalent, especially if the languages have very different phonemic systems (e.g., McLeod, 2007, for speech acquisition data in 24 languages). Given that these norms are typically based on a monolingual population, information regarding the language experience and cross-linguistic transfer is crucial. Phonemic inventories will be gathered for both languages to determine whether particular sounds of interest are present in all languages spoken. ASHA's Phonemic Inventories and Cultural and Linguistic Information Across Languages website and Ethnologue includes phonemic inventories for several languages; see Appendix A).

When assessing a child who speaks a less common language for which norms or speech inventories are not readily available, a possible solution might be to record a native-speaking

caregiver or peer producing English and compare this sample to the client's speech. The Speech Accent Archive (see Appendix A), which provides audio examples of common English speech patterns of speakers of various languages, can be compared against the student's own speech once they have been assessed. These comparisons between speakers will then assist in determining if sound differences represent true errors.

Step 4: Conduct a Thorough Speech Evaluation

Speech evaluations should be conducted in all the languages spoken by the child, allowing for a relational analysis, which determines the sounds that are being produced correctly based on the standard of the child's linguistic community. Since phonological knowledge is distributed across a child's languages (Goldstein, 2006), errors are expected to be present across languages, though, crucially, not necessarily the *same* set of errors. Theories of bilingual language acquisition and processing posit that multilingual children have independent and separate phonological inventories for each language (Paradis & Genesee, 1996). Thus, they may be producing a phoneme correctly in one language, but not in the other when the segment is slightly different in the two phonological systems. Audio/video recording of these sessions will allow for more reliable documentation of patterns and, when possible, phonetic (vs. phonemic) transcription in IPA by multiple listeners.

Single-word Testing for Phonetic/Phonemic Inventories

Speech evaluations often consist of single-word elicitations, and Fabiano-Smith (2019) reports that many SLPs assess multilingual children using English-only standardized articulation tests based on Mainstream American English norm (e.g., Goldman-Fristoe Test of Articulation-3 [GFTA-3], Goldman & Fristoe, 2015). To avoid overidentification, standard scores must not be calculated or reported on standardized assessments. They can, however, be used informally as

word lists. To probe speech production in the minority language, many published tests and word lists exist (See a compiled list from The Charles Sturt University's website in Appendix A), such as the Japanese Single-Word Elicitation Tool for Phonology (Bernhardt, Stemberger, Hara, Takai, & Yamane, 2011). While single-word tests elicit phonemes in at least one phonotactically permissible context, they are limited in the number of items and contexts within which specific sounds are elicited. Thus, it is important that additional elicitations be conducted to increase the number of trials and contexts.

Stimulability

Stimulability testing—the child's ability to imitate an adult model—has clinical utility, as with assessing monolingual students. The student's ability to repeat productions at different levels (i.e., in isolation, syllables, and words) and in different (i.e., more/less facilitating) phonetic contexts (e.g., /k/ before a front vowel /i/ versus a back rounded vowel /u/) can help determine production consistency, which will lead to more accurate determination of severity and prognosis (Rvachew, Rafaat, & Martin, 1999).

Spontaneous Speech Samples

The speech evaluation will also include a connected speech sample in all languages, with an interpreter as needed. This should provide ample opportunities to assess the child's phonemic inventory. This can be completed with an informal conversation or a narrative sample with known context, such as the School-Age Language Assessment Measures (SLAM; see Appendix A) or the Mercer Mayer frog story books. The phonemes that raised concern during the single-word assessment may be compared to productions in the speech sample; in addition, other segmental or suprasegmental problems, all of which may negatively impact intelligibility, may

be revealed. The speech sample also offers the opportunity to compare the consistency of possible errors across multiple contexts and judge intelligibility subjectively.

Speech Intelligibility

Speech intelligibility, the extent to which the acoustic signal generated by the child can be correctly recovered by the listener (e.g., Kent, Weismer, Kent, & Rosenbek, 1989), is often the presenting concern and may ultimately become a treatment goal. Intelligibility metrics may be critical for several reasons, including determining the presence of a disorder, providing baseline data to document progress, and indicating severity across the child's languages. Further, speech intelligibility is a measure with high social validity that allows for information regarding the impact of the disorder across communication partners. As with other parts of the speech evaluation, the clinician will consider cross-linguistic effects when measuring intelligibility of the multilingual child's speech.

In clinical practice, intelligibility is often measured subjectively, with the clinician estimating the percentage of speech that is understood. We offer two measures that are more systematic and perhaps offer greater comparability. The Systematic Analysis of Language Transcripts software (SALT, Miller & Iglesias, 2012) uses orthographically transcribed samples and intelligibility codes, determined by the SLP, to calculate percent intelligibility (the words understood divided by total words). The Intelligibility in Context Scale (ICS; McLeod, Harrison, & McCormack, 2012) uses a parent/caregiver questionnaire to determine the child's speech intelligibility across communication partners. An advantage of the ICS is that it is available in 60 languages and is accessible online (see Appendix A).

Step 5: Assess Phonological Awareness

Phonological awareness testing taps into the child's phonological system on a meta-linguistic level and may be a domain that becomes targeted clinically (e.g., Gillon, 2005) in monolingual and multilingual children. It is crucial to understand the impact of the child's phonological skills in the context of reading, given that literacy abilities are highly predictive of academic achievement, and children with SSD often experience lags in their development of phonological awareness. Thus, it is important to monitor literacy skills especially in school-age children. Ideally, PA will be assessed in all languages spoken by the child to best understand the child's strengths and needs (Preston & Seki, 2011). Since phonological awareness often aligns with reading, it may have already been measured by the teacher or school psychologist in the school's majority language. Several standardized and non-standardized measures can be used by the clinician. In our case studies, phonological awareness was measured (non-standardized) with the Comprehensive Test of Phonological Processing–Second Edition (CTOPP-2, Wagner, Torgesen, Rashotte, & Pearson, 1999).

Step 6: Conduct a Contrastive Analysis

After collecting assessment data from multiple sources and gathering developmental norms and phonological inventories for the minority language, we must begin to synthesize this information. Interpreting assessment results in a systematic way requires identifying the phonological inventories (i.e., all consonant and vowel phonemes) separately for each language spoken by the child. To aid in conducting a phonological pattern analysis, we recommend categorizing consonant accuracy by manner and place.

When documenting the type and frequency of phonological error pattern to determine the nature of nonmainstream productions, the shared/unshared elements between the languages should be considered, as well as the phonotactic contexts in which specific sounds occur. For

example, a Russian(L1)–English(L2) might exhibit many shared sounds (unshared sounds include English /θ ð/ and Russian /x r/); however, shared sounds do not correspond perfectly and may differ in terms of their phonotactically legal contexts: /s t v/, which exist in both languages, can form an onset cluster in Russian /stvoł/, but not in English.

Also important to consider in the error pattern analysis are language exposure, possible transfer processes, which may occur bidirectionally, and dialect features. Actively consulting the phonological inventories of the languages and/or an interpreter will be required to best understand all of the potential factors contributing to the child's speech production. Recall that typical phonological processes will differ among languages and that neither cross-linguistic nor dialectal features are errors.

As you apply a contrastive analysis to relevant productions, comparing shared/unshared features in the languages spoken, additional resources may be needed to make a more informed decision regarding the nature of the production. Determine if those sounds are represented in their specific dialect and consider getting example words containing target sounds from caregivers, or look online for words in the standard variety and ask how caregivers or the interpreter say them.

Step 7: Assess for Comorbid Communication Disorders

SSD has an estimated prevalence of 3.6–3.8% in school-age children (Shriberg, Tomblin, & McSweeny, 1999; Wren, Miller, Peters, Emond, & Roulstone, 2016). Further, there is a high comorbidity with other communication disorders. SSD with co-occurring language disorder is especially high, with estimates of almost 50% of school-age children with SSD (Eadie et al. 2015). In our view, this warrants at minimum a language screening. Again, all languages spoken must be assessed and if a monolingually, standardized assessment tool is used, it must be used

informally (i.e., without calculating scores). Often SLPs use parts of standardized assessments keeping in mind that there may be many unfamiliar examples due to cultural exposure. Extra trial items and repetition of prompts may be warranted to ensure that the child understand the directions. A language evaluation may be completed with the already-obtained connected speech sample for language sample analysis. To ensure a more holistic picture of the child is captured for both diagnosis and meaningful treatment, Krueger (2019) recommends the use of social impact questionnaires. These questionnaires, which are completed by the caregiver, teacher, SLP, and/or child, evaluate the social impact of SSD on the child. Thus, it is important to observe the child's communication skills in multiple settings, especially when they are interacting with peers to help determine if there is a social impact of the SSD (Krueger, 2019). Since there may be comorbidity of SSD with stuttering and/or voice disorders, these can be informally assessed during the connected speech sample.

Collaborating with Interpreters and Cultural Brokers

Given the language mismatch between SLPs and their clients, most multilingual assessments require collaborating with interpreters, so here we consider their specific role during the entire assessment process (i.e., Steps 1 through 7). ASHA provides information on collaborating with an interpreter (see Appendix A); a few points are highlighted here. For interpreter characteristics, it is important to consider their level of professional expertise (years of training), proficiency/familiarity in the languages (and specific dialects) they are performing their work, and level of experience working in the clinical setting. While it is best practice to collaborate with a trained and qualified interpreter, this is not always possible, and bilingual staff may be recruited. As a last resort, working with an adult family member may be the only available option to obtain information about the language or to act as a cultural broker. Prior to

conducting the assessment, the interpreter should be trained to the assessment procedures and briefed by the SLP (as described in Langdon & Cheng, 2002). This process involves familiarizing the interpreter with testing procedures, including understanding test administration, prompting, and how to assist with eliciting a representative speech sample.

Interpreters may play a key role in collecting assessment data by leveraging knowledge of the language and culture to report on student–caregiver interactions or elicit a connected speech sample from the student. Following the direct assessment is a debriefing session with the interpreter, which will include providing the raw data to the SLP. The interpreter could give input regarding intelligibility (*How understandable was their speech to you?*) and, in cases where they are familiar with the specific cultural/linguistic population, how the child's speech compares to that of their peers (*Did they sound like a typical 5-year-old of that language*?).

Case Studies

We apply the decision-making framework outlined above to three real-world scenarios. Assessments were carried out by the first author to determine eligibility for speech–language services in a suburban school district in Northern California with high enrollment of children speaking a minority language. As with most public schools in the U.S., the language of instruction was English; the school district had no bilingual language programs. All three students participated in the general education classroom and had no other academic or behavioral concerns. The students came from homes where at least one non-majority language/dialect was spoken. Parental consent to use assessment data for educational and scholarly purposes was obtained, and an informal review by the first author's research institution determined that IRB oversite was not required. Relational analyses used IPA transcription of single word elicitations, allowing narrow phonetic details of both consonant and vowel productions to be captured. The

case studies follow a similar structure: the reason for referral and case history information; assessment information from multiple sources; and a contrastive analysis to determine results/eligibility.

Case 1: "Chloe"

Chloe was a first-grade student (age = 7;5) referred for a speech–language evaluation due to teacher concerns of "baby talk" that made her "hard to understand" compared to her peers. She was born in the U.S., the youngest of three children, and was primarily exposed to Vietnamese at home. Her mother described Chloe as a bright, caring student who enjoyed talking.

Teacher input was gathered, and a classroom observation was conducted. Both teacher data and student observation showed active participation in all classroom activities with a few communication breakdowns (presumably due to unintelligible segments) with the teacher and peers. Throughout the assessment, the SLP collaborated with a Vietnamese-speaking school district interpreter with whom the SLP had previously collaborated. Briefing consisted of training the interpreter on appropriate dialectal variation, given the interpreter–parent dialect mismatch and sociolinguistically marked productions that differed from prestige Vietnamese dialects.

Language History

Language history information was collected through a parent interview that was conducted in conjunction with the interpreter. Chloe was a Vietnamese (L1)–English (L2) sequential bilingual who had begun acquiring English upon entering kindergarten (i.e., English AoA = 5;0). Chloe preferred English in home and school contexts and would often respond in English even when spoken to in Vietnamese. The mother's primary—and strongly preferred—

language was Vietnamese. Specifically, she spoke a Northern Vietnamese dialect but had been exposed to Southern Vietnamese dialects before and after emigrating to the U.S. No speech–language or hearing concerns were reported by the family. Information about the interpreter's dialect(s) was also collected to identify potential mismatches (e.g., significant dialectal differences). She spoke a Southern Vietnamese dialect natively but had experience in various Vietnamese dialects. As a preliminary assessment, pure-tone audiometry, conducted at typical thresholds, indicated that Chloe had average hearing, and no structural abnormalities were observed.

Once language history and dialect-specific information were collected, information regarding Vietnamese phonology was researched to anticipate possible L1-influenced processes. Given Chloe's strong preference for English, her current exposure and use being primarily in English, and the practical reality of school-based services, the influence of English on Vietnamese was not investigated further. Two relevant peer-reviewed resources were found—Hwa-Froelich, Hodson, and Edwards (2002) and Kirby (2011)—which provided a linguistic sketch of phonemic (consonant/vowel) inventory, suprasegmental features (tone), and phonotactics (restricted consonant clusters, only plosive/nasal stops in coda position). Vietnamese was a relatively large minority language in the community, so Vietnamese staff and resources were available, and the SLP had previously assessed and treated Vietnamese-speaking students on his caseload.

English Articulation

The GFTA-3 was used informally to probe Chloe's single-word articulation of English phonemes. Single-word productions were transcribed using IPA conventions. Observed nonmainstream patterns were /l/ gliding in initial (*leaf* [jif]) and medial (*color* [ˈkʰʌ.jɚ])

positions, as well as *th*-fronting for /θ/ (*thumb* [t̪ʌm]) and /ð/ (*that* [d̪æt]). Further, articulation in connected speech was examined through a speech–language sample (also used to analyze language performance). At the utterance level, several unexpected productions were identified: final consonant deletion (*was* [wʌʔ]; *let's do* [lɛʔ.duː]) and cluster reduction, particularly for triconsonantal clusters (*splash* [plæʃ]). Percent intelligibility, analyzed in SALT (Miller & Iglesias, 2012), was 85%.

Vietnamese Articulation

To gain more information regarding Vietnamese articulation, a follow-up interview was conducted with Chloe's mother, in collaborating with the interpreter. When asked to indicate her intelligibility (*What percent of the time do you understand Chloe when she speaks to you in Vietnamese?*), Chloe's mother rated her to be 100% intelligible; however, she rated Chloe as being considerably less intelligible to her siblings and also indicated that she often used context to understand what Chloe was saying.

Following a 10-minute pre-briefing session with instruction on eliciting a conversation sample using open-ended questions, the interpreter engaged in a short unstructured conversation in Vietnamese. During the conversation, Chloe responded in single words and phrases rather than whole sentences, likely due to her strong preference for English. The interpreter provided the SLP with a list of productions that did not seem "correct" to her.

While no lexical tone errors were observed (lexical tone is indicated in the IPA transcription), phonemic deviations were noted: *lên* (*up*) /len˧˧/ produced as [jen˧˧], *ngủ* (*sleep*) /ŋu˧˩/ produced as [ju˧˩], *nhà* (*house*) /ɲaː˨˩/ as [jaː˨˩], and đánh răng (*brush teeth*) /ʔɗajŋ̟˧˥ zaŋ˧˧/ as [ʔɗajŋ̟˧˥ jaŋ˧˧]. What is important to note here is that in all cases, a voiced phoneme—more

specifically, a sonorant—was produced as the palatal glide [j]. Next, a contrastive analysis was conducted to understand the nature of these differences.

Contrastive Analysis

Using the Vietnamese references gathered, English and Vietnamese productions were classified as either linguistically/dialectally appropriate or speech sound errors through a contrastive analysis (McGregor et al., 1997). We review here a few characteristics of Vietnamese phonology: Vietnamese has 5–6 contrastive tones (depending on dialect); a large vowel inventory; and few onset consonant clusters. Phonemes with dialectal variation include /r/, /z/, and, to a lesser extent, /l/ (Hwa-Froelich et al., 2002; Kirby, 2011). We focused largely on the North Vietnamese dialect since that was the dialect Chloe was exposed to at home.

English Productions. Of the English sounds in question, devoicing, *th*-stopping, final consonant deletion, and cluster reduction were determined to be linguistically appropriate, as they are not present in Vietnamese. In contrast, /l/ gliding did not appear to be a transfer process, as a near-equivalent /l/ phoneme exists in Vietnamese. This /l/ gliding was categorized as a true error.

Vietnamese Productions. All sonorant productions observed in Chloe's Vietnamese were produced as [j], resulting in a four-way phonemic merger. Though dialectal variation exists for both /z/ and /l/ phonemes, none of Chloe's productions were consistent with any of those variants. Thus, as in English, these productions were labelled as speech sound errors.

Phonological Awareness (English)

Chloe's current English PA skills were informally evaluated using the Phonological Awareness and Phonological Memory subtests from the CTOPP-2. PA in Vietnamese was not measured given her lack of current use of Vietnamese in both oral and written modalities. Chloe

elided phonemes in syllables (*cup* without /k/, *tiger* without /g/); blended onset–rime pairs (s– and *un*) and some 3- to 4-phoneme words (j-u-m-p); and identified phonemes in onset (/l/ in *flat*). For phonological memory, Chloe repeated 5-digit numbers and a subset of 5- to 6-syllable nonwords presented (e.g., teebudieshawlt).

Receptive–Expressive Language

A frog story retell (Mayer, 1969) was used to evaluate English language performance. Measures of language productivity (e.g., MLU, number of different words) and grammaticality (e.g., word-level errors) were generated in SALT. Following the retell, Chloe answered comprehension questions and demonstrated understanding of main story grammar elements. Morphosyntactic performance was compared to same-age English–Spanish bilingual peers, as no Vietnamese–English bilingual comparison was available through SALT. Observed L1-influenced productions included variable use of plural marking. Overall, her utterances in English contained age-appropriate inflectional morphology and were of appropriate length.

For Vietnamese language performance, according to her mother, Chloe spoke in short sentences consisting of high frequency nouns and verbs, as well as frequent English code-switches; overall this was consistent with a decreased use of Vietnamese upon school entry, as had been reported by Chloe's mother. This language screening, along with teacher data, did not warrant further language evaluation.

Clinical Decision

Chloe exhibited a number of dialectally appropriate, unexpected productions (i.e., L1-influenced productions). However, there were also true speech sound errors (i.e., sonorant gliding) identified in both Vietnamese and English. Chloe presented with an SSD, and speech services were warranted to address gliding processes.

Case 2: "Randy"

Randy was a first-grade student (age = 6;8) who was trilingually exposed to English, Japanese, and Polish. A referral from his classroom teacher described "difficulty speaking and producing sounds" in English. A record review and classroom observation were followed by structured and spontaneous assessment techniques and parent interviews to assess Randy's articulation skills in his three languages. His older brother had been previously assessed due to similar concerns, but he did not qualify for speech services. A parent-completed case history revealed no remarkable medical history. In addition, Randy passed an audiometric hearing screening, and no oral structural or functional deviations were noted.

Language History

An initial interview with both parents guided the choice for language(s) of assessment. Japanese and Polish were acquired at birth, while English was acquired later, upon school entry. In terms of input/output and communication partners, Japanese was the home language, which Randy most frequently used to communicate with his mother, older brother, and family friends. In stark contrast, Polish was used exclusively at Polish school, which he had been attending twice a month since kindergarten. Due to his minimal exposure to Polish (i.e., less than 20%), the decision was made to exclude it from further consideration, in line with other studies (e.g., Bedore et al., 2012).

Because Japanese was not well represented in the community or school district, the clinician greatly relied on outside sources. Specifically, a peer-reviewed reference was found detailing Japanese phonology (Preston & Seki, 2011), and an articulation test was identified through the Charles Sturt University's website (Bernhardt et al., 2011). Multiple attempts were made by the school district to obtain a Japanese-speaking interpreter but were unsuccessful

within the required timeline; instead, native Japanese informants within the clinician's network were contacted. Parents' conversational fluency in English made possible interviewing without an interpreter.

English Articulation

Articulation skills in English were assessed at the word level using the GFTA-3 and spontaneously using a speech sample. GFTA-3 standardized scores were not derived, but word-level performance identified five nonmainstream consonant productions: /f/ (*fork* [ɸɔɹk]) /v/ (*violin* [ˌbaɪ.ə.ˈlɪn], *shovel* [ˈʃa.βo]), vocalized coda /l/ (*fell* [few]), as well as *th*-stopping of /θ/ (*thumb* [t̪am]) and /ð/ (*that* [d̪æt]). Nonmainstream vowel productions included substitutions (*cup* [kʰap]) and monophthongized diphthongs (*go* [go:]). A recorded speech sample of Randy's speech was rated as 99% intelligible using SALT. A contrastive analysis, described below, was used to interpret the nature of these productions.

Japanese Articulation

A follow-up interview with Randy's mother indicated no parental concern regarding his articulation skills in Japanese, rating him 100% intelligible across contexts and listeners. To explore this further, The Japanese Single-Word Elicitation Tool for Phonology (Bernhardt et al., 2011) was used to probe single-word articulation through a picture elicitation task. Randy's productions were audio recorded and independently rated off-line by three native Japanese speakers. There were no observed nonmainstream productions in single words, with over 95% interrater agreement; a follow-up inquiry showed dialectally appropriate forms.

Contrastive Analysis

To contextualize the results of the articulation probes, a Japanese linguistics and speech–language pathology reference (Preston & Seki, 2011) was used, which outlined Japanese

consonant/vowel inventories and phonotactics. Some relevant characteristics are reproduced here: Japanese syllables are usually CV, V, or syllabic C, with no consonant clusters and no coda consonants except /n/. There is a five-vowel system and a meaningful consonant/vowel length contrast (i.e., long and short) (Preston & Seki, 2011). Because no nonmainstream patterns were noted in Japanese, only English sound productions needed to be disambiguated.

Nonmainstream vowel and consonant patterns from both single-word productions and spontaneous speech were analyzed; they are discussed here by frequency of occurrence in Randy's speech. Vowel substitutions and diphthong patterns—both commonly observed patterns—appeared to reflect the Japanese vowel system, which does not have central vowel /ʌ/ and has long monophthong vowels instead of diphthongs. Turning to consonant productions, the consistent stopping and/or fronting of interdental /θ ð/ and labiodental fricatives /f v/ appeared to be linguistically appropriate, as these do not exist in Japanese. Lastly, there were occasional /ɹ/ cluster substitutions (*frog* [flɑg]); again, these were considered instances of transfer because neither clusters nor segmental /ɹ/ are present in Japanese. Of all the sound patterns observed in English, all of them were consistent with a transfer process from a Japanese L1.

Phonological Awareness

Randy performed at or above age-expected levels on an unstandardized administration of the CTOPP-2 Phonological Awareness and Phonological Memory subtests. PA skills did not appear to be a deficit.

Receptive–Expressive Language

On a frog retell, Randy answered age-appropriate comprehension questions, and his narrative language features included appropriate macrostructure (transitions, sequencing) and

microstructure (e.g., inflectional morphology and multi-clausal sentences). Given these appropriate language measures, his language performance was not evaluated further.

Clinical Decision

In Randy's L2 (English), all nonmainstream productions were judged to be the result of cross-linguistic transfer. At the same time, no segmental deviations were observed in his L1 (Japanese). Therefore, Randy was determined not to be eligible for speech services. Parents and teacher were provided information regarding second language acquisition.

Case 3: "Maya"

Maya is a third-grade student (age = 8;8) referred for speech–language services due to teacher concerns regarding her articulation. Maya's parents did not have concerns regarding her articulation but were concerned about her shyness. She was born and lived in India until her family moved to the U.S. when she was in kindergarten.

Language History

Maya was exposed to multiple languages/dialects before and after arriving in the U.S. Prior to her arrival, she was exposed to the following: Tamil and Indian English, both community languages in southern India. Parents also spoke Kannada, a language related to Tamil. Upon arriving to the United States three years prior to the evaluation, Maya was exposed to the following: North American English (70%, in the community and at home), Tamil (30%, as a home language). Maya reported that she preferred English. A hearing evaluation and oral mechanism examination were unremarkable.

A Tamil phonology reference—Keane (2004)—was consulted, which reported the following general phonological features: syllables with few consonant clusters and no initial clusters, a large number of retroflex consonants (not present in English), lack of phonemic

voicing (i.e., voiced/voiceless depends on the context) or aspiration, no postalveolar consonants /ʃ t͡ʃ d͡ʒ/, two lateral approximants, two rhotic consonants (an alveolar tap /ɾ/ and a retroflex approximant /ɻ/), and a labiodental approximant (a sound not present in English). In terms of vowels, Tamil has five short vowels, five long vowels, and two diphthongs (Keane, 2004).

English Articulation

On an informal administration of the GFTA-3, Maya misarticulated /ɹ/ in initial position (*red* [lɛd]), in clusters (*frog* [flɑg]), and post-vocalically (*color* [ˈkʰʌ.lə]). A speech sample was used to examine English articulation in connected speech and rate speech intelligibility. Patterns involving place of articulation were observed: clear /l/ production (never American English dark /ɫ/), postalveolar consonants produced as palatal, and interdental fricatives produced as dental stops. Devoicing was also observed (*zebra* [si.blə]). Lastly, there were vowel differences, particularly monophthongized diphthongs (*soap* [so:p]). These speech patterns were highly consistent and pervasive. Overall intelligibility was judged to be 90% by the SLP (an unfamiliar listener) in known and unknown contexts.

Tamil Articulation

Given the lack of resources for Tamil articulation, as well as the lack of available interpreters or cultural brokers, a focused parent interview was conducted to identify Maya's intelligibility in Tamil. Per parental report, Maya is 100% intelligible in Tamil, with occasional "mispronunciations" that are easily corrected given a model. Parents did not express concerns about her articulation in her home language.

Contrastive Analysis

All unexpected place/voicing patterns, as well as vowel substitutions, were categorized as transfer patterns. The rest of the analysis focused on /ɹ/ productions. Given the lack of available

Tamil-speaking bilingual SLPs or interpreters, a follow-up interview was conducted with her parents in English. Although Tamil reportedly has a retroflex approximant (Keane, 2004), when shown words with this target sound (e.g., /vaɻi/ *way*), Maya's parents reported this was not present in their specific dialect. This drove the decision, then, to label this, too, as a transfer pattern. Overall, none of these productions indicated errors due to a SSD.

Phonological Awareness

On an informal administration of the CTOPP-2 Phonological Awareness subtest, Maya elided phonemes (*split* without /p/), blended syllables (*hamm–* and *–er*), onset–rime pairs (*s–* and *un*), and some 6- to 8-phoneme words; and identified onset phonemes (/n/ in *net*) and phonemes in clusters (/l/ in *flat*). On the phoneme isolation task, she appeared to use orthographic knowledge (identified /h/ as the second sound in *three*). On the Phonological Memory subtest, Maya repeated up to 6-digit numbers and 6- and 7-syllable nonwords (e.g., *dookershatupietazawm*). Overall, no obvious difficulty with manipulating segmental information was observed.

Receptive–Expressive Language

A personal narrative in English was audio recorded, transcribed, and analyzed qualitatively. Because Maya was particularly shy and reluctant to engage in limited conversation; therefore, the choice was made to use a personal narrative, as this format seemed to elicit more representative language. The personal narrative—about a recent trip to Lake Tahoe—contained age-appropriate macrostructure/microstructure elements. In conjunction with parent report, teacher data, and a profile assessment of Maya's classroom work, no further language assessment was deemed necessary.

Clinical Decision

Due to the L1-influenced nature of Maya's unexpected sound patterns and her relatively short exposure to American English, a speech disorder was not indicated in English. Similarly, Tamil articulation did not appear to be delayed based on intelligibility ratings and a lack of parental concern. Given her speech profile, speech services were not warranted, and the teacher was provided classroom recommendations for increasing intelligibility.

Discussion

Assessing SDD in multilingual students requires taking into account each child's specific linguistic profile and the interplay (over time) between their languages. This can be done by collecting a case history that includes information about language history and dialect; referencing the phonological systems of the language(s) of interest; and measuring intelligibility and consonant/vowel accuracy in all languages with tools appropriate for the cultural/linguistic group. Arriving at a clinical decision requires synthesizing information about the languages (e.g., phonemic inventories and developmental norms) with assessment data on student performance (e.g., elicitation tasks, observations, and caregiver/teacher ratings).

Conclusion

The purpose of this clinical tutorial was to present SLPs working with school-age children a framework to strengthen confidence in conducting assessments in multilingual populations. The worked examples provided demonstrate the application of such a framework in a public school setting. Using the framework in conjunction with resources provided in Appendix A, may aid SLPs in feeling better prepared to collect information, collaborate with interpreters, and make appropriate recommendations based on the available data, including caregiver/professional education on typical multilingual speech acquisition.

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References

American Speech-Language-Hearing Association (2014). *2014 Schools survey: SLP Caseload Characteristics Report.* Available from www.asha.org.

American Speech-Language-Hearing Association (2019). *Demographic profile of ASHA members providing bilingual services, year-end 2018*. Available from www.asha.org.

Arias, G., & Friberg, J. (2017). Bilingual language assessment: Contemporary versus recommended practice in American schools. *Language, Speech, and Hearing Services in Schools*, *48*(1), 1–15. https://doi.org/10.1044/2016_LSHSS-15-0090

Artiles, A. J., Harry, B., Reschly, D. J., & Chinn, P. C. (2002). Over-identification of students of color in special education: A critical overview. *Multicultural Perspectives*, 4(1), 3-10. https://doi.org/10.1207/S15327892MCP0401_2

Ball, M. J. (2012). Vowels and consonants of the world's languages. In *Multilingual aspects of speech sound disorders in children* (pp. 32–41). Multilingual Matters.

Bedore, L. M., Peña, E. D., Summers, C. L., Boerger, K. M., Resendiz, M. D., Greene, K., … Gillam, R. B. (2012). The measure matters: Language dominance profiles across measures in Spanish–English bilingual children. *Bilingualism: Language and Cognition*, *15*(3), 616–629. https://doi.org/10.1017/S1366728912000090

Bernhardt, B. M., Stemberger, J. P., Hara, A., Takai, O., & Yamane, N. (2011). *Japanese Single-Word Elicitation Tool for Phonology*. Vancouver, Canada: University of Columbia.

Borràs-Comes, J., & Prieto, P. (2014). The acquisition of coda consonants by Catalan and Spanish children: Effects of prominence and frequency of exposure. *Probus*, 26(1), 59–82. https://doi.org/10.1515/probus-2013-0001

DeAnda, S., Bosch, L., Poulin-Dubois, D., Zesiger, P., & Friend, M. (2016). The language exposure assessment tool: Quantifying language exposure in infants and children. *Journal of Speech, Language, and Hearing Research*, *59*(6), 1346–1356. https://doi.org/10.1044/2016_JSLHR-L-15-0234

Fabiano-Smith, L. (2019). Standardized tests and the diagnosis of speech sound disorders. *Perspectives of the ASHA Special Interest Groups*, *4*(1), 58–66. https://doi.org/10.1044/2018_PERS-SIG1-2018-0018

Fabiano-Smith, L., & Goldstein, B. A. (2010). Phonological acquisition in bilingual Spanish–English speaking children. *Journal of Speech, Language, and Hearing Research*, *53*(1), 160–178. https://doi.org/10.1044/1092-4388(2009/07-0064)

Gildersleeve-Neumann, C. E., Kester, E. S., Davis, B. L., & Peña, E. D. (2008). English speech sound development in preschool-aged children from bilingual English–Spanish environments. *Language, Speech, and Hearing Services in Schools*, *39*(3), 314–328. https://doi.org/10.1044/0161-1461(2008/030)

Gildersleeve-Neumann, C. E., & Wright, K. L. (2010). English speech acquisition in 3- to 5-year-old children learning Russian and English. *Language, Speech, and Hearing Services in Schools*, *41*(4), 429–444. https://doi.org/10.1044/0161-1461(2009/09-0059)

Gillon, G. T. (2005). Facilitating phoneme awareness development in 3- and 4-year-old children with speech impairment. *Language, Speech, and Hearing Services in Schools*, *36*(4), 308–324. https://doi.org/10.1044/0161-1461(2005/031)

Goldman, R., & Fristoe, M. (2015). *Goldman-Fristoe Test of Articulation-Third Edition*. New York, NY: Pearson Assessments.

Goldman, R., & Fristoe, M. (2017). *Goldman-Fristoe Test of Articulation-Third Edition, Spanish*. New York, NY: Pearson Assessments.

Goldstein, B. A. (2006). Clinical implications of research on language development and disorders in bilingual children. *Topics in Language Disorders*, *26*(4), 305–321.

Goldstein, B. A., & Bunta, F. (2012). Positive and negative transfer in the phonological systems of bilingual speakers. *International Journal of Bilingualism*, *16*(4), 388–401. https://doi.org/10.1177/1367006911425817

Goldstein, B. A., Fabiano, L., & Washington, P. S. (2005). Phonological skills in predominantly English-speaking, predominantly Spanish-speaking, and Spanish-English bilingual children. *Language, Speech, and Hearing Services in Schools*, *36*(3), 201–218. https://doi.org/10.1044/0161-1461(2005/021)

Goldstein, B. A., & Iglesias, A. (2009). *Contextual Probes of Articulation Competence-Spanish*. Greenville, SC: Super Duper Publications.

Goldstein, B. A., & Iglesias, A. (2001). The effect of dialect on phonological analysis. *American Journal of Speech-Language Pathology, 10*(4), 394–406. https://doi.org/10.1044/1058-0360(2001/034)

Hasson, N., Camilleri, B., Jones, C., Smith, J., & Dodd, B. (2013). Discriminating disorder from difference using dynamic assessment with bilingual children. *Child Language Teaching and Therapy*, *29*(1), 57–75. https://doi.org/10.1177/0265659012459526

Holm, A., Dodd, B., Stow, C., & Pert, S. (1999). Identification and differential diagnosis of phonological disorder in bilingual children. *Language Testing*, *16*(3), 271–292. https://doi.org/10.1177/026553229901600303

Hwa-Froelich, D., Hodson, B. W., & Edwards, H. T. (2002). Characteristics of Vietnamese phonology. *American Journal of Speech-Language Pathology, 11*(3), 264–273. https://doi.org/10.1044/1058-0360(2002/031)

Ingram, D. (2012). Prologue: Cross-linguistic and multilingual aspects of speech sound disorders in children. In S. McLeod & B.A. Goldstein (Eds.), *Multilingual aspects of speech sound disorders in children* (pp. 3–12). Multilingual Matters.

Keane, E. (2004). Tamil. *Journal of the International Phonetic Association*, 34(1), 111–116. https://doi.org/10.1017/S0025100304001549

Kent, R., Weismer, G., Kent, J., & Rosenbek, J. (1989). Toward phonetic intelligibility testing in dysarthria. *Journal of Speech and Hearing Disorders*, *54*, 482–499. https://doi.org/10.1044/jshd.5404.482

Kirby, J. P. (2011). Vietnamese (Hanoi Vietnamese). *Journal of the International Phonetic Association*, 41(3), 381–392. https://doi.org/10.1017/S0025100311000181

Krueger, B. I. (2019). Eligibility and speech sound disorders: Assessment of social impact. *Perspectives of the ASHA Special Interest Groups*, *4*(1), 85–90. https://doi.org/10.1044/2018_PERS-SIG1-2018-0016

Langdon, H., & Cheng, L. (2002). *Interpreting and translating in speech-language pathology and audiology*. Eau Claire, WI: Thinking Publications.

Lee, S. A. S., & Iverson, G. K. (2012). Stop consonant productions of Korean–English bilingual children. *Bilingualism: Language and Cognition, 15*(2), 275–287. https://doi.org/10.1017/S1366728911000083

Li, F., Edwards, J., & Beckman, M. E. (2009). Contrast and covert contrast: The phonetic development of voiceless sibilant fricatives in English and Japanese toddlers. *Journal of Phonetics*, *37*(1), 111–124. https://doi.org/10.1016/j.wocn.2008.10.001

Lleó, C., Kuchenbrandt, I., Kehoe, M., & Trujillo, C. (2003). Syllable final consonants in Spanish and German monolingual and bilingual acquisition. In N. Müller (Ed.), *(In)vulnerable domains in multilingualism* (pp. 191–220). John Benjamins Publishing Company. https://doi.org/10.1075/hsm.1

McGregor, K. K., Williams, D., Hearst, S., & Johnson, A. C. (1997). The use of contrastive analysis in distinguishing difference from disorder: A tutorial. *American Journal of Speech-Language Pathology*, *6*(3), 45–56. https://doi.org/10.1044/1058-0360.0603.45

McLeod, S. (Ed.). (2007). *The international guide to speech acquisition*. Clifton Park, NY: Thomson Delmar Learning.

McLeod, S., Harrison, L. J., & McCormack, J. (2012). *Intelligibility in Context Scale*. Bathurst, NSW, Australia: Charles Sturt University.

McLeod, S., Verdon, S., & Bowen, C. (2013). International aspirations for speech-language pathologists' practice with multilingual children with speech sound disorders: Development of a position paper. *Journal of Communication Disorders*, *46*(4), 375–387. https://doi.org/10.1016/j.jcomdis.2013.04.003

Mayer, M. (1969). *Frog, where are you?*. New York: Dial Press.

Miller, J., & Iglesias, A. (2012). *Systematic Analysis of Language Transcripts (SALT), Clinical Version 2012*. Middleton, WI: SALT Software, LLC.

Nance, C. (2019). Bilingual language exposure and the peer group: Acquiring phonetics and phonology in Gaelic Medium Education. *International Journal of Bilingualism,* 1–16. https://doi.org/10.1177/1367006919826872

Oetting, J. B. (2018). Prologue: Toward accurate identification of developmental language disorder within linguistically diverse schools. *Language, Speech, and Hearing Services in Schools*, *49*(2), 213–217. https://doi.org/10.1044/2018_LSHSS-CLSLD-17-0156

Oetting, J. B., Gregory, K. D., & Rivière, A. M. (2016). Changing how speech-language pathologists think and talk about dialect variation. *Perspectives of the ASHA Special Interest Groups*, *1*(16), 28–37. https://doi.org/10.1044/persp1.SIG16.28

Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent?. *Studies in Second Language Acquisition, 18*(1), 1–25. https://doi.org/10.1017/S0272263100014662

Paradis, J., Emmerzael, K., & Sorenson Duncan, T. (2010). Assessment of English language learners: Using parent report on first language development. *Journal of Communication Disorders*, *43(6)*, 474–497. https://doi.org/10.1016/j.jcomdis.2010.01.002

Peña, E. D., Gutiérrez-Clellen, V. F., Iglesias, A., Goldstein, B. A., & Bedore, L. M. (2018). *Bilingual Input-Output Survey (BIOS)*. Baltimore, MD: Paul H. Brookes Publishing Co.

Peña, E. D., Gutiérrez-Clellen, V. F., Iglesias, A., Goldstein, B. A., & Bedore, L. M. (2018). *Bilingual English-Spanish Assessment*. Baltimore, MD: Paul H. Brookes Publishing Co.

Preston, J. L., & Seki, A. (2011). Identifying residual speech sound disorders in bilingual children: A Japanese-English case study. *American Journal of Speech-Language Pathology*, *20*(2), 73–85. https://doi.org/10.1044/1058-0360(2011/10-0057)

Rvachew, S., Rafaat, S., & Martin, M. (1999). Stimulability, speech perception skills, and the treatment of phonological disorders. *American Journal of Speech-Language Pathology*, *8*(1), 33–43. https://doi.org/10.1044/1058-0360.0801.33

Samson, J. F., & Lesaux, N. K. (2009). Language-minority learners in special education: Rates and predictors of identification for services. *Journal of Learning Disabilities*, *42*(2), 148–162. https://doi.org/10.1177/0022219408326221

Shriberg, L. D., Tomblin, J. B., & McSweeny, J. L. (1999). Prevalence of speech delay in 6-year-old children and comorbidity with language impairment. *Journal of speech, language, and hearing research, 42*(6), 1461–1481. https://doi.org/10.1044/jslhr.4206.1461

Stokes, S. F., & Surendran, D. (2005). Articulatory complexity, ambient frequency, and functional load as predictors of consonant development in children. *Journal of Speech, Language, and Hearing Research, 48*(3), 577–591. https://doi.org/10.1044/1092-4388(2005/040)

Sullivan, A. L. (2011). Disproportionality in special education identification and placement of English language learners. *Exceptional Children*, *77*(3), 317–334. https://doi.org/10.1177/001440291107700304

U.S. Department of Education. (2017). *EDFacts data warehouse, 2014-15: LEP Enrolled.* Washington, DC: Author. Retrieved from https://www2.ed.gov/about/inits/ed/edfacts/data-files/school-status-data.html

Wagner, R., Torgesen, J., Rashotte, C., & Pearson, N. A. (1999). *CTOPP-2: Comprehensive Test of Phonological Processing–Second Edition*. Austin, TX: Pro-ed.

Wren, Y., Miller, L. L., Peters, T. J., Emond, A., & Roulstone, S. (2016). Prevalence and predictors of persistent speech sound disorder at eight years old: Findings from a

population cohort study. *Journal of Speech, Language, and Hearing Research, 59*(4), 647-673. https://doi.org/10.1044/2015_JSLHR-S-14-0282

Appendix A

Helpful Resources

- ASHA's Phonemic Inventories and Cultural and Linguistic Information Across Languages: http://www.asha.org/practice/multicultural/Phono/
- ASHA's site on Collaborating with Interpreters: https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935334&section=Key_Issues
- Charles Sturt University, Multilingual Children's Speech: http://www.csu.edu.au/research/multilingual-speech/languages
- Ethnologue Languages of the World by SIL International: https://www.ethnologue.com/
- Intelligibility in Context Scale (ICS): http://www.csu.edu.au/research/multilingual-speech/ics
- Portland State University Multicultural Topics in Communications Sciences and Disorders language bank: https://www.pdx.edu/multicultural-topics-communication-sciences-disorders/languages
- School-age Language Assessment Measures (SLAM) materials: https://www.leadersproject.org/disability-evaluation/school-age-language-assessment-measures-slam/
- Speech Accent Archive: http://accent.gmu.edu/browse.php