

Assessment and Intervention for Bilingual Children with Phonological Disorders

Monitoring phonological change across the two languages of bilingual children is important because it is possible that intervention provided in one language will generalize to the other language given the interdependence between the two languages.

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An estimated 5.2 million bilingual children are enrolled in schools in the United States, a 61% increase since 1994 (National Center for English Language Acquisition and Language Instruction Education Programs, 2005). The increasing number of bilingual children has resulted in significant challenges to the provision of assessment and intervention services to bilingual children with phonological disorders (a term used here to apply to both segment- and pattern-based errors).

Providing assessment and intervention to children with such disorders is complicated given the lack of understanding of theories of bilingual phonological representation and the lack of knowledge of current best practices related to the assessment of and intervention for these children. The discussion below highlights theories of bilingual phonological representation and links those theories to models of assessment and intervention.

Theories of Bilingual Phonological Representation

Historically, researchers have posited two models of language representation for bilingual children. According to the Unitary System Model (e.g., Bhatia & Ritchie, 1999), bilingual children begin with a single phonological system that separates into two autonomous systems over time. In contrast, the Dual Systems Model maintains that bilingual children develop separate phonological systems for each language from birth that do not interact (e.g., Keshavarz & Ingram, 2002).

A third model, a variation of the Dual Systems Model known as the Interactional Dual Systems Model of phonological representation (Paradis, 2001), suggests that bilingual children

possess two separate phonological systems with mutual influence. Various case and group studies have found support for the Interactional Dual Systems Model in that bilinguals use resources from both of their languages for efficiency in production while maintaining separation for language-specific elements (e.g., Brulard & Carr, 2003; Fabiano, 2006; Goldstein, Fabiano, & Iglesias, 2003; Johnson & Lancaster, 1998; Paradis, 2001).

Knowledge of phonological representation in bilinguals is helpful because it allows speech-language pathologists to distinguish a phonological *difference* from a *disorder*. Evidence-based assessment of phonological disorders in bilingual children should consider recent theories of bilingual phonological representation. By assessing the languages and determining how they interact, clinicians can make a valid diagnosis, determine the child's strengths and weaknesses, and plan for intervention.

Assessment of Bilingual Children

The following protocol for bilingual phonological assessment was developed based on the theoretical rationale that bilingual children maintain separation for some phonological elements while demonstrating interaction on others.

Step 1: Perform a Detailed Case History

In addition to what is normally obtained in a parent interview for a monolingual child, ask parents what a typical day is like for their child. In every situation mentioned, ask what language

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is typically spoken and what language the child uses during that task, or if both languages are heard/used. In addition, obtain the following information for bilingual children each time an assessment occurs: language history (when the child was exposed to and began to use each language); percent input in each language (hours per week the child *hears* each language); and percent output in each language (hours per week the child *uses* each language). It is important to remember that percent input and output are not static measures in that language environments shift over time (Pease-Alvarez, 2002).

Step 2: Obtain Speech Samples

Single-word and connected speech (conversation or narrative) samples should be obtained in both of the bilingual child's languages. It is important to collect speech samples in both languages because phonological acquisition will not be parallel across the bilingual child's two languages (Goldstein, Fabiano, & Washington, 2005). Developmental trajectories and structure of the two languages may be different for each language. As a result, the order of acquisition and phonological patterns will differ. Thus, phonological development in bilinguals is similar, but not identical, to monolinguals (e.g., Goldstein et al., 2005).

Step 3: Perform an Independent Analysis

Determine the phonetic inventory of the child in both languages using single-word and connected speech samples. Organize the inventory by place of articulation (e.g., bilabial, alveolar, etc.) and manner of articulation (e.g., stops, nasals, etc.). Obtaining a phonetic inventory in each language will aid in clinical decision-making and help to determine whether to take a phonetic or phonological approach to intervention.

Step 4: Perform a Relational Analysis

Relational analyses should be performed to examine overall consonant and vowel accuracy in each language, and accuracy of shared elements (i.e., common to both languages, such as /p/ between Spanish and English) and unshared elements (i.e., unique to each language, such as the Spanish trill). Analysis of shared and unshared elements should be examined because studies examining bilingual phonological representation have found, for example, significantly higher accuracy on shared elements compared with unshared elements, demonstrating interaction between the two languages (Fabiano, 2006; Fabiano & Goldstein 2004a, 2004b).

A phonological pattern analysis also should be included. The phonological pattern analysis should take into consideration that the type and frequency of phonological patterns vary across languages (Goldstein & Washington, 2001). For example, English allows three-member onset clusters and Spanish allows only two-member onset clusters. Because of this difference, cluster reduction is a phonological pattern that, at a given chronological age, would be developmental in English but "delayed" in Spanish.

Step 5: Perform an Error Analysis

In a substitution error analysis, one should examine targets (including phonemes that the child does not attempt to produce) and substitutes (phones the child is using in place of those target phonemes). In this analysis, one should account for cross-linguistic effects (using a phonological element specific to one language in the production of the other; for example, the Spanish trill /r/ found in an English production) and dialect features (Goldstein & Iglesias, 2001). Neither cross-linguistic effects nor dialect features should be scored as errors.

Intervention for Bilingual Children

Providing intervention to bilingual children with phonological disorders is challenging because there are relatively few research studies in this area. However, speech-language pathologists can use evidence that is known about phonological development in bilingual children, universal characteristics of phonological development, and the translation of theory into practice to guide decision-making about appropriate intervention services to bilingual children with phonological disorders. Consistent with the tenets of evidence-based practice, the process should begin with the clinical question (e.g., Justice & Fey, 2004).

Knowledge of phonological representation in bilinguals is helpful because it allows speech-language pathologists to distinguish a phonological *difference* from a *disorder*.

In treating bilingual children with phonological disorders, SLPs typically ask the question, "In which language do I treat?" That question, however, is not the appropriate one, because it mistakenly assumes that phonological development in bilingual children proceeds similarly in the child's two languages. Because the structure of each language is different (e.g., different phonemes, syllable types, word shapes, etc.) and development is not the same in each language (e.g., Goldstein, 2004), intervention will need to be tailored to the construct and development of each constituent language. A more precise question is, "When do I treat in each of the two languages?" (Goldstein, 2006).

To account for the nature of bilingual language development, Kohnert and Derr (2004) and Kohnert, Yim, Nett, Fong Kan, & Duran (2005) proposed two main approaches to providing intervention to bilingual children. It should be noted that these approaches are models based on underlying research on language (including phonological) development in bilingual children, although they have yet to be tested empirically. First, the Bilingual Approach proposes that SLPs should increase language skills common to both languages. In terms of phonology, this approach would mean that clinicians would begin

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intervention with constructs common to both languages (e.g., CV syllables, the phoneme /s/, initial consonant clusters). Thus, the initial treatment determination is the goal and not the language of intervention.

The Bilingual Approach would support beginning with goals in which one would treat constructs common to both languages or errors or error patterns exhibited with relatively equal frequency in both languages (Yavas & Goldstein, 1998). For example, this might mean that if unstressed syllable deletion were exhibited frequently in both languages, then that pattern might be an appropriate initial intervention target. Similarly, if /s/ was frequently in error in both languages, treatment might begin targeting that phoneme.

Second, the Cross-Linguistic Approach proposes that clinicians should focus on the linguistic skills unique to each language. This approach also will be necessary (likely in conjunction with the Bilingual Approach) because of the differences in the linguistic (in this case, phonological) structures of the two languages. For example, aspirated affricates exist in Hmong, but not in English, and can only be remediated in the one language. Additionally, SLPs might use a cross-linguistic framework based on types of errors and/or error rates (Yavas & Goldstein, 1998). For example, final consonant deletion is more common in the English of Spanish-English bilingual children than in their Spanish (Goldstein et al., 2005). Thus, intervention to decrease the use of that pattern will likely occur in English but not in Spanish. Finally, errors occurring in only one language would be targets for phonological intervention (e.g., backing in Language B but not in Language A).

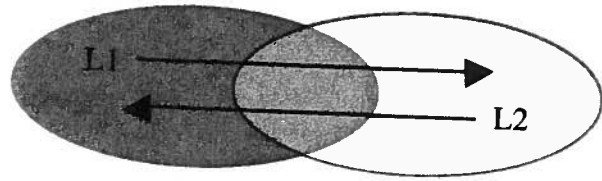
Language of Intervention

Once the general approach is selected, then the initial language of intervention can be determined. The initial language of intervention will depend on a variety of factors such as language history (relative experience with each language), use in each language (how frequently the child utilizes each of the languages), proficiency in each language (how well the child understands and produces each language), environment (where and with whom the child uses each language), and family considerations (the family's goals) (Goldstein, 2006).

The child's phonological skills and errors/error patterns in each of the two languages will be a factor as well. That analysis might show that the child exhibits lower accuracy, more errors, and a higher frequency-of-occurrence on phonological patterns (e.g., cluster reduction) in Language A than in Language B. Thus, intervention would begin with Language A (all other factors being relatively equal).

In working with all children (bilingual and monolingual) with phonological disorders, SLPs need to determine how their goals will be implemented. The way in which goals are implemented may conform to a number of goal attack strategies: vertical, horizontal, and cyclical approaches (Fey, 1992). A "vertical approach" is one in which one goal is taught at a time until criterion is reached. A vertical-approach analogue for bilingual children might be implemented in one of two ways.

- separate but non-autonomous systems (Keshavarz & Ingram, 2002; Paradis, 2001)
- moderate interaction between the two languages



Interactional Dual Systems Model

Paradis J. *International Journal of Bilingualism*, Vol.5, no.1, March 2001, pp.19-38. Copyright © Kingston Press Ltd.

It might be used to focus on a goal that is specific to one language (e.g., trill in Spanish). Additionally, the SLP might consider how a target generalizes from one language to the other. So, remediation for /s/ occurs in English but is monitored but not targeted in Cantonese.

In a "horizontal approach," more than one goal is addressed in each session. A horizontal-approach analogue for bilingual children might be targeting one goal in Language A and one goal in Language B within the same session, although the targets would be divergent. For example, final consonants would be targeted in English, and aspirated affricates would be targeted in Hmong.

Finally, a "cyclical approach" is one in which a number of goals are addressed in a cyclical fashion, but only one goal is incorporated at a time within a session. A cyclical-approach analogue for bilingual children would be to rotate not only targets but also languages. For example, in Weeks 1-4, /s/ would be targeted in Language A and initial consonant clusters would be targeted in Language B. In Weeks 5-8, initial consonant clusters would be targeted in Language A with /s/ being the goal in Language B. (This example assumes, of course, that /s/ and clusters occur in both languages.)

Regardless of which goal attack strategy is used, patterns of phonological change should be monitored within and across the two languages (Grunwell, 1992). Monitoring these patterns serves to determine how the child's phonological system is changing during the course of intervention.

Monitoring phonological change across the two languages of bilingual children is important because it is possible that intervention provided in one language will generalize to the other language given the interdependence between the two languages (Paradis, 2001). There are a few studies that have examined this issue (Holm & Dodd, 1999; Holm, Dodd, & Ozanne, 1997; Holm, Dodd, Stow & Pert, 1998 in Holm & Dodd, 2001; Ray, 2002). Results from these studies indicate that intervention in English generally influences phonological skills in the other language. For example, Holm, Dodd, and Ozanne (1997) found that treatment of /s/ increased accuracy of that sound in both English and Cantonese. There were cases, however, in which phonological treatment in English did not affect skills in the

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other language. Holm, Dodd, Stow and Pert (1998 in Holm & Dodd, 2001) found that treatment of gliding did not generalize from English to Cantonese.

Unfortunately, for all these studies, intervention was provided in English only, and generalization to the other language was not always measured systematically. As a result, it is unclear if and/or how intervention in one language will generalize to the other language. It is likely, although untested, that intervention in one language will influence skills in the other language in a bi-directional manner (i.e., from Language A to Language B and vice versa). The interaction effect of providing intervention in more than one language is relatively unknown, but research on phonological development in bilingual children portends that such interaction is likely to occur.

A final consideration is the order in which goals are selected. For example, consider the targets for a monolingual English-speaking child with a severe phonological disorder. For that child, the SLP might begin intervention focusing on the inclusion of final consonants (i.e., decreasing final consonant deletion). That target would be appropriate given that, in English, final consonants are common, sounds occurring in word final position come from a large variety of sound classes, and sounds in word final position are critical for morphology.

Now consider the targets for a bilingual Spanish-English speaking child. In the child's English, focusing on final consonants still would be appropriate just as it was for the monolingual child. In Spanish, however, it would not be the most appropriate initial treatment target given that there are only five consonants

in the language that occur at the end of a word (Hammond, 2001). In Spanish, a pattern such as unstressed syllable deletion would be a more fitting initial treatment target because the majority of words in Spanish are multisyllabic (Hammond, 2001). Thus, the order in which targets are remediated will be determined, in part, by the languages spoken by the child.

Assessing and treating bilingual children with phonological disorders is neither quick nor easy. However, understanding how the phonological system is represented in bilingual children leads to a comprehensive, least-biased assessment. Information from that broad and deep assessment then can be translated into appropriate intervention goals. Those goals likely will be different at different points in time for each of the child's two languages. Thus, it is not a matter of if, but when, both languages will be used during the intervention process. Doing so will allow bilingual children with phonological disorders to attain age-appropriate phonological skills in both languages.

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