Top Lang Disorders
Vol. 38, No. 3, pp. 202–224

Guiding Principles and Essential Practices of Listening and Spoken Language Intervention in the School-Age Years

Uma Soman and Mary Ellen Nevins

Listening and spoken language (LSL) intervention and education have emerged as the preferred terms representing an intervention perspective that promotes "auditory oral" outcomes for many of today's children who are deaf or hard of hearing (D/HH), including those who are English learners. Practitioners (including speech–language pathologists, educational audiologists, and teachers) working with students who are D/HH require access to evidence-based principles of LSL. A deep understanding of general principles will inform practitioners' development of intervention to promote outcomes for school-aged students who are D/HH or D/HH and English learners. The purpose of this article is to identify principles and practices foundational to developing LSL. Knowledge, skills, and dispositions for practitioners are discussed; descriptions and examples of strategies and resources associated with LSL are included. **Key words:** *auditory oral*, *deaf*, *hard of hearing*, *hearing technologies*, *language intervention*, *listening and spoken language*, *school-aged children*, *speech–language pathologists*

OVER the last two decades, more children who are deaf or hard of hearing (D/HH) are using hearing technologies, such as hearing aids and cochlear implants, and receiving early intervention to develop listening and spoken language (LSL). When given a choice, a majority of families want their children to learn their home language(s) and use hearing aids or cochlear implants to develop auditory skills (Alberg, Wilson, & Roush, 2006). The cultural and linguistic diversity of the students who are D/HH is similar to that observed in the larger population, and for a growing number of families, the home language might be one other than English or one in addition to English.

There has also been a shift in educational placements such that students' time is maximized in general education settings instead of schools or programs specifically for children who are D/HH. Many of these students receive intervention from interprofessional teams that might include speech–language pathologists (SLPs), teachers of students who are D/HH, special education teachers, general education teachers, reading specialists, and English language teachers. A certified Listening and

Author Affiliations: *Carle Auditory Oral School, Carle Foundation Hospital, Urbana, Illinois (Dr Soman); and Audiology & Speech Pathology Department, University of Arkansas for Medical Sciences, Little Rock (Dr Nevins).*

The authors have indicated that they have no financial and no nonfinancial relationships to disclose.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.topicsinlanguagedisorders.com).

Corresponding Author: *Uma Soman, PhD, Carle Auditory Oral School, Carle Foundation Hospital, 611 W. Park St, Urbana, IL 61801 (uma.soman@carle.com).*

DOI: 10.1097/TLD.0000000000000158

Spoken Language Specialist[1] (LSLS) has experience and expertise in working with students who are D/HH and ought to be included on the interprofessional team; however, only a limited number of professionals are currently prepared and certified for this specialization (Alexander Graham Bell Association for the Deaf and Hard of Hearing, 2017).

Outcomes of students who are D/HH, especially those who are English learners (ELs), are influenced by a number of intrinsic factors, some of which are essentially immutable, as well as extrinsic factors, over many of which there is a degree of control. Importance of intervention in the first 3 years of life has received much attention at the levels of research, practice, and policy. As a result, children who are D/HH currently start their elementary years with varying levels of readiness to enter kindergarten. Readiness skills often reflect the quality and quantity of early intervention services children have received, but education and intervention across the school-age years continue to be critical for building language foundations for literacy development and for employment and social success in later life. Thus, it is critical to explore the LSL needs of students who are D/HH in the context of academic and social development that occurs during the elementary and middle school years.

In this article, we propose three *Profiles of Potential—Keep Up, Catch Up, Move Up.* These three profiles create a conceptual nomenclature that describes 5- to 14-year-old students based on their needs, growth trajectories, and the family's desired outcomes. It provides shared terminology for working in interprofessional teams and with families. In addition, this nomenclature can be applied to children who are D/HH and ELs. To date, little has been written on the needs of these students. This article is offered to contribute to the conversation regarding children who are D/HH and who are learning at least two spoken languages.

Practitioners working with students who are D/HH and who are ELs will benefit from an understanding of the impact of hearing loss on language and academic development considered in the context of dual language learning. There exists a body of knowledge and evidence-based strategies that can inform intervention for each student who is D/HH to achieve his or her personal best, including those who are ELs.

GUIDING PRINCIPLES OF LSL INTERVENTION

On the basis of a synthesis of knowledge from within the field, coupled with insights from our experience working with this population, we offer five principles for planning and implementing LSL intervention with school-aged children and adolescents who are D/HH and who come from culturally and linguistically diverse backgrounds. Before exploring these principles for adoption and implementation, impact of hearing loss and its prescribed management are reviewed.

The guiding principles and essential practices of LSL intervention for school-aged children are intended to extend knowledge and skills of practitioners who strive to meet the varied needs of students who are D/HH and to encourage sensitivity to cultural–linguistic variation. In our exploration of these principles, we share examples from our practice as well as composite vignettes of students that practitioners might encounter. The five principles are as follows:

1. Intervention maximizes learning *to* listen and learning *through* listening.
2. Language and literacy development is foundational to all interventions and targeted directly.
3. Intervention is individualized, systematic, and richly multidimensional.

[1]The Listening and Spoken Language Specialist certification is awarded by the Alexander Graham Bell Academy for Listening and Spoken Language to individuals with degrees in audiology, speech–language pathology, or deaf education upon the completion of advanced coursework, mentoring, and a passing score on the certification examination.

4. Effective intervention is driven by interprofessional practice (IPP).
5. Families are included and empowered to be partners in listening, spoken language, and literacy development.

Impact and management of hearing loss

Application of the five principles requires a deep understanding of the impact of hearing loss and the need to manage it effectively. Hearing loss limits auditory access to speech and language present in the child's environment. Prelingual hearing loss has a negative impact on development of spoken language(s) and can also have a cascading effect on social–emotional and academic development. Every state (and territory) in the United States has an established Early Hearing Detection and Intervention (EHDI) program. Hearing screening by 1 month (but preferably before a child leaves the birthing hospital), identification of hearing loss by 3 months, and enrollment in intervention by 6 months (called the *1-3-6 protocol*) is the gold standard recommended by the National Center for Hearing Assessment and Management and its EHDI programs (Joint Committee on Infant Hearing, 2007; Joint Committee on Infant Hearing and Muse et al., 2013). This aggressive protocol has been developed in response to an understanding of brain neuroplasticity (Dorman, Sharma, Gilley, Martin, & Roland, 2007; Kral & Sharma, 2012) and the importance of hearing for typical language acquisition (Fernald & Simon, 1984; Kuhl, 2004, 2010; Moon, Lagercrantz, & Kuhl, 2013).

A growing number of studies are demonstrating the effectiveness of timely identification and intervention for children who are D/HH (Geers, Moog, Biedenstein, Brenner, & Hayes, 2009; Moeller, Tomblin, Yoshinaga-Itano, Connor, & Jerger, 2007; Moog & Geers, 2010; Niparko et al., 2010; Yoshinaga-Itano, Sedey, Wiggin, & Chung, 2017). Yoshinaga-Itano et al. (2017) compared the effects of adherence to the 1-3-6 protocol on vocabulary development of children who are D/HH and discovered that "vocabulary quotients were significantly higher for children who met the EHDI guidelines" than for the outcomes of children who did not meet the recommended timetable (Yoshinaga-Itano, 2003; Yoshinaga-Itano et al., 2017). The EHDI bill was reauthorized in November 2017 and will continue to recommend and support 1-3-6 for infants who are D/HH.

Per the latest data available, 98.2% of all infants born in a hospital are screened for hearing loss. Unfortunately, approximately 30%–40% of children who are referred for additional assessments do not meet these recommended starting points and are lost to follow-up due to a variety of factors and mitigating circumstances (Centers for Disease Control and Prevention, 2015). This results in unmanaged hearing loss that can have a considerable negative impact on development of LSL. Here, *unmanaged* can refer to later identification of hearing levels, delayed fitting of hearing technologies, and/or no access to skilled professionals to guide family-centered intervention. Fortunately, early identification, early amplification, and early intervention can mitigate the negative impacts of hearing loss (Joint Committee on Infant Hearing, 2007; Joint Committee on Infant Hearing and Muse et al., 2013). Generally speaking, approximately 90% of infants who are D/HH are born to families with normal hearing (Mitchell & Karchmer, 2004) and, not surprisingly, a vast majority of families choose to communicate with their child in the spoken language of the home (Alberg et al., 2006).

Families who choose the spoken language(s) of the home as the desired outcome for their child naturally have a "communication match" between their language and the child's language. That said, they might be less knowledgeable regarding issues related to hearing loss, device management, and intentional auditory skills development. When coached by a highly qualified early interventionist specializing in working with families of children who are D/HH and are developing LSL, the opportunity to jump-start the learning journey and positively influence its trajectory is eminently possible. If the interventionist, although specialized in developing LSL is not

fluent in the family's spoken language, the child's language acquisition process may be impacted.

Without the linguistic skills and/or the cultural competence to coach families directly in the home language and understand the influence of the home language on learning spoken English not only are practitioners at a disadvantage but so too are children and families. One must consider the "double-challenge" effect on children who are *both* D/HH and ELs. Given the linguistic diversity of the families and children served, and the limited number of qualified LSL professionals overall, the challenge of providing excellent early intervention needs to be addressed on a case-by-case, location-by-location basis to design the best service delivery plan by an interprofessional team of practitioners. Regardless of the language in use, practitioners who commence intervention with dedicated knowledge, skills, and dispositions for working with children who are D/HH and their families are poised for the greatest success (Sass-Lehrer, Moeller, & Stredler-Brown, 2015).

Profiles of potential

Given the variety of factors that influence a child's early intervention journey, children who transition from early intervention into the school environment might be starting at different levels of proficiency in their listening skills, home language(s), and social–emotional development. Practitioners should consider each student uniquely and identify strengths and areas of needs in each domain to plan intervention. However, we suggest that students who are D/HH might be characterized by one of three possible *profiles of potential* as they move into traditional educational settings from early intervention.

Conceptualizing these loosely organized profiles of potential might assist practitioners in developing and targeting objectives that are challenging but proximal and achievable for the students for whom they are written. Using terms that emphasize an active, general learning outcome desired for students in each group, these profiles of potential can guide families and practitioners to work together to help a student *Keep Up* with typically hearing classmates, *Catch Up* to same-aged classmates, or *Move Up* to attain the next appropriately targeted milestone in development. The following descriptions may clarify the differences between each of the suggested performance profiles.

Keep Up

Students who are challenged to *Keep Up* have experienced early identification and intervention resulting in "at or near" age-appropriate listening, speaking, and reading abilities. They must continue to develop skills in order to keep up with the ever-expanding linguistic and academic expectations of their grade level and typically hearing classmates.

Catch Up

Students who require support to help them *Catch Up* are those who have benefitted from LSL intervention but likely have had an idiosyncratic challenge (late identification, poorly fit device, limited intervention, etc.) as part of their early development. Most often these students have made steady progress over the years but do not yet have age-appropriate listening, speaking, and reading skills. Each child will likely need intense intervention (from an LSL practitioner) to develop age-appropriate LSL skills to catch up with his or her classmates.

Move Up

Students who are encouraged to *Move Up* are those who, in addition to being identified with hearing loss, have secondary diagnoses such as visual impairment, autism spectrum disorder, learning disability, etc. In these situations, the student might exhibit substantial delays in one or more areas of development and/or academic achievement. These children can still make progress with appropriately selected and functional listening and language intervention; in so doing, engagement with their family and their community is enhanced.

Principle 1: Intervention maximizes learning through listening

The first principle focuses on facilitating language and literacy development through systematic auditory skill development. This assumes access to the speech spectrum through well-fit and consistently worn hearing technology—hearing aids, cochlear implants, and/or bone-anchored hearing devices. Research suggests that even a mild degree of hearing loss is educationally significant and can disrupt the integrity of auditory input, leading to negative impact on development of auditory skills essential for language acquisition and language comprehension (Bess, Dodd-Murphy, & Parker, 1998; Tomblin et al., 2015).

Maximize audition

In typical development, hearing is a first-order event in the process of language acquisition (Cole & Flexer, 2015). However, speech perception is an audiovisual activity in which typically developing infants are attending to the sounds and rhythm of the language along with observing the lip movements of their caregivers (Kuhl & Meltzoff, 1982; Lewkowicz, 2010). Through a series of maturational processes combined with linguistic experiences infants learn to *detect* and *discriminate* the sounds of their native language (Kuhl, 2004; Maurer & Werker, 2014). Attuning to the sounds of one's native language begins in utero and is evident soon after birth. Newborn infants show a preference for listening to speech, particularly the language they heard in utero, compared with nonspeech stimuli (Vouloumanos & Werker, 2004, 2007) and compared with speech sounds from an unfamiliar language (Moon et al., 2013). Infants can discriminate between languages from different rhythm classes, for example, English from French by 3 months (Nazzi, Bertoncini, & Mehler, 1998).

At the segmental level, infants can discriminate between vowels from native and non-native languages (e.g., German vowels /U-Y/ and English vowels /i-a/) by 4 months (Polka & Werker, 1994) and demonstrate categorical perception of vowels in their native language by 6 months (Kuhl, 2004; Kuhl, Williams, Lacerda, Stevens, & Lindblom, 1992). By 12 months, infants with typical hearing can discriminate the consonants of their native language (see review by Kuhl, 2004). Furthermore, infants demonstrate familiarity and preference to the sounds of their native language versus non-native language (Cheour et al., 1998; Rivera-Gaxiola, Silva-Pereyra, & Kuhl, 2005; Tees & Werker, 1984).

This phenomenon of *perceptual narrowing* or *perceptual attunement* is fundamental to native language acquisition (Maurer & Werker, 2014). Infants in bilingual or multilingual home environments show some differences, including later demonstration of attunement to the phonemes in the home language (Byers-Heinlein & Fennell, 2014). However infants and toddlers who have meaningful exposure to the home languages demonstrate perceptual attunement to them (Bijeljac-Babic, Serres, Höhle, & Nazzi, 2012; Burns, Yoshida, Hill, & Werker, 2007; Garcia-Sierra et al., 2011; Weikum et al., 2007). It is important to note that this protracted timeline is not a delay caused by being in a bilingual environment but rather an alternative timeline of development of simultaneous bilingualism.

These findings suggest that babies who are born with congenital hearing loss (present at birth) will have lost valuable listening time before they take their first breath and will have much to decipher when they gain access to audible speech and language through their hearing technology. It has been proposed that even those who are using hearing technology experience some degree of auditory deprivation (Conway, Pisoni, & Kronenberger, 2009), which might impact neural development. Because auditory access through hearing technology does not exactly replace natural acoustic hearing, it might alter how the brain processes and lends weight to the meaning of auditory input in the context of other sensory experiences (Gilley, Sharma, & Dorman, 2008; Sharma, Gilley, Dorman, & Baldwin, 2007). The impact of early auditory deprivation and altered auditory input is

currently under investigation, so mindful practitioners should be alert for additional scientific evidence that will better inform their practices and expectations.

When providing LSL intervention to students who are D/HH, practitioners should note that, although hearing technology provides access to sound, it is not perfect. Students might not attend to their auditory environment all the time and might only tune in when they are directed. For beginning listeners (e.g., students who receive their hearing technology at a time coinciding with enrollment in school), the auditory stream might be overwhelming and indecipherable, necessitating need for direct instruction. It is important to gauge the audibility or auditory benefit derived from the hearing technology. Questions to ask include the following: Can the student hear all the speech sounds in his or her spoken language(s)? Does the student have adequate access to hear the difference between phonemes that vary by a single feature such as manner (e.g., /d/ vs. /n/), place (e.g., /k/ vs. /t/), or voicing (e.g., /b/ vs. /p/)? How well does the student hear in a noisy situation? Consultation and collaboration with a pediatric audiologist or an educational audiologist can lead to an appropriate audiological management plan that is attuned to the changing listening needs of students and maximizes auditory access in all learning environments.

Consider the following scenario of a third-grade student, Alex, who is on a *Catch Up* trajectory:

Alex was adopted at 18 months and identified as having severe hearing loss at 24 months. He wore bilateral hearing aids and received specialized instruction in an early childhood program for students who are D/HH. By the end of second grade, Alex had near age-appropriate language scores and entered third grade in his neighborhood school. He received support from a teacher for students who are D/HH, as well as from an SLP and an educational audiologist. Three months into the school year, Alex began complaining about the classroom being very noisy during group work. After observations and assessments, the educational audiologist recommended a change in hearing aid programming and upgraded assistive listening technology. This adjustment in Alex's access to the auditory signal subsequently maximized his learning through listening.

Targeting the hierarchy of listening skills

Upon receiving hearing technology, most children have to *learn* to listen to the auditory input to make sense of what they are hearing. This process typically involves learning to *detect*, *discriminate*, *identify*, and *comprehend* information presented in an auditory-only manner. This hierarchy of listening skills (Erber, 1982) provides a roadmap for developing these skills and maximizing learning through teaching children directly how to listen.

Erber's (1982) seminal work with children with all degrees of hearing loss led to conceptualization of four distinct stages of auditory skill acquisition, using terms that allow professionals to communicate precisely what a student is capable of doing using hearing alone—*detection*, *discrimination*, *identification*, and *comprehension*. When a task is auditory-only, no visual cues are available to the listener, thus truly ascertaining the contribution of the hearing technology to learning auditorally. Each of the four stages of the auditory skill hierarchy is elaborated as follows.

Detection

This is the most basic auditory skill where the listener simply indicates awareness that a sound is present (or absent) and is the foundation upon which more sophisticated auditory responses build. Because detection is required for all later stages of auditory skill development, early fitting of hearing devices is essential to jump-start auditory learning. Determining a child's unaided detection level is the entry point for choosing the hearing technology that will make spoken language input audible. For school-aged students who are D/HH, it is easy to confuse detection with higher levels of auditory skill; it is all too common for a teacher to report that a child is hearing when he or she responds to a passing

fire truck or a voice command that simply gets the child's attention that something is happening. For example, during quiet reading time, the teacher may indicate that it is "time for gym." The developing listener, however, may only hear the teacher's voice coming out of the quiet and look up to see what the rest of the students are doing and take a cue from their actions. These are examples of sound-only detection.

Discrimination

The ability to identify whether two stimuli are the same or different is *discrimination*. Generally speaking, this is not a skill that is targeted separately in instruction but rather as part of an intervention strategy on the road to fine-tuning the auditory skills required at the level of identification. Typically implemented after the student has misheard, this same–different judgment ability in more advanced authentic communication tasks will assist the young listener in knowing that *dog* and *frog* are not one and the same animal; the words *book* and *books* differentiate in number; and *in* and *on* represent varying spatial relationships. Discrimination tasks without an underlying language or literacy objective are not generally targeted for instruction. However, they might be useful as an intervention probe to determine what the student has heard. For example, in a phonological awareness task combining onsets and rimes, a student may incorrectly create the word *big* when */d/* and *ig* are presented. In this case, a quick check to determine whether the student can discriminate between /d/ and /b/ will drive the next step. If the student can discriminate between the two phonemes, saying *big* instead of *dig* might be related to articulation errors or even vocabulary limitations.

Practically speaking, the discrimination skills of a student who is D/HH are greatly influenced by the programming of the hearing technology, which should be fit to ensure adequate access to the speech spectrum. The audiologist should be conducting periodic speech perception testing at the sound, word, and sentence levels to ensure the appropriate fit and function of hearing technology. Speech perception is strongly linked to speech production (Eisenberg, 2007), so understanding a student's speech perception scores is essential to planning and implementing articulation therapy. Daily and routine listening checks are essential to ensure that a child's access and baseline functional performance is the starting point of every listening day and therapy session. The Ling Sound Check (Ling, 2006) is a quick and easy task that is used for this purpose; a child never outgrows the need for a check against his or her own standard performance. Deviation from expected performance may be an indicator of device malfunction or change in hearing status; teachers and SLPs are encouraged to learn more about why and how to perform the Ling Sound check. For more information about speech perception assessments, see Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

Identification

The skill in which a stimulus is recognized and acted upon is *identification*. The student's response, either motoric or linguistic, provides a window into the hearing brain. For the young listener, examples of identification include recognition of receptive vocabulary and responses to language that can be ascertained through an auditory-only presentation. When directed to pick one banana, two oranges, or five grapes, a preschooler who can select the ingredients of a fruit salad (given an auditory-only presentation of the item) is demonstrating auditory identification. For the older listener, responding correctly to an auditory-only prompt, spoken without visual/lipreading cues, for example, "point to Australia on the map," is also an example of the skill of auditory identification.

Additional tasks that require identification might include writing math problems in a listening-only condition or repeating core statements of fact from the science unit as presented with no visual cues. Often times, interventionists present closed sets of all possible responses as an instructional/interventional

strategy. Limiting the possible responses assists the student in being successful with auditory tasks. Closed sets support the development of increasingly sophisticated listening skills overlaid onto an ever-expanding language repertoire. However, if a student is unable to complete a task even with full access to auditory and visual cues, it is highly unlikely that the student will be able to do so in an auditory-only condition. This is especially noteworthy for students trying to *Catch Up* who rely on continued listening and language intervention/education because of their idiosyncratic needs. In essence, the practitioner guides the student through a sequential ratcheting of auditory competence in the context of an expanding linguistic skill set, particularly as the language of instruction becomes more complex and learning advances.

Comprehension

The most sophisticated level of auditory skill development is *comprehension*. It is considered by many to be the final outcome of LSL intervention and education. The interrelationship of listening and language continues to impact ability, but simply stated, auditory comprehension suggests the capacity to do more than just identify or name the linguistic stimulus. Instead, the listener is required to act upon or respond to the auditorally presented message. For example, when asked a question (through audition alone) "What are the stages of the water cycle?" the student who understands the question does not simply repeat back the stimulus. Instead, he or she responds with the answer to the inquiry by saying, "evaporation, condensation, and precipitation." Thus, the student demonstrates auditory comprehension, along with memory and retrieval of facts learned previously or available in the text.

In pursuing the development of the auditory skills of detection, discrimination, identification, and comprehension in parallel with the development of increasingly sophisticated spoken language ability and literacy skills, the practitioner is encouraged to utilize strategies that are part of LSL practice. Fickenscher and Gaffney (2015) describe these strategies in an open-source document for which a link is provided in Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

For children who are D/HH and EL, the same hierarchy of listening skills applies. If proficiency in the home language is a desired outcome, practitioners and families could work toward developing auditory comprehension of the home language as well as English. This will allow students to participate more fully in their cultural community as well as at school.

Maximize device wear time

Finally, the principle of maximizing (spoken language) learning through listening demands consistent use of hearing technology. *Wear time* is a factor that contributes to any student's improved performance with hearing technology. It is within control of the family, SLPs, and teachers, but it is not always easy to ensure. Internal data logging features in both hearing aids and cochlear implants can now help monitor wear time of the device. The cumulative effects of constant wear time contribute to better auditory performance with hearing devices (Walker et al., 2013, 2015). Another issue related to learning through listening is that of listening fatigue. Recent studies in students with hearing loss (Bess, Gustafson, & Hornsby, 2014) underscore the effort that is required to be an active auditory participant in classrooms. For more information about listening fatigue in students who are D/HH, see sources in Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

Principle 2: Language and literacy development is foundational to all intervention

After families have chosen spoken language as the primary mode of communication and learning for their child, all LSL interventions for school-age children should be guided by and focused upon the development of language and literacy skills essential for achieving

academic proficiency, social competence, and other desired outcomes. The construct of literacy encompasses the ability to listen, speak, read, and write using a literate style.

Childhood hearing loss can have a negative impact on development of the essentially interdependent skills of listening, speaking, reading, and writing. For example, a student using hearing aids might not clearly hear the regular past tense marker *-ed* and understand that it denotes an action that has happened. It is then likely that the student does not use *-ed* in his or her spontaneous spoken language and does not attend to this morpheme when presented in a text. It might follow that this absent morpheme will not appear in his or her written language. For students who are D/HH, deficits in oral vocabulary and morphosyntactic development can impact literacy development but can be addressed through intervention (Gross & Robertson 2017). Literacy instruction and intervention that take into account the unique impact of hearing loss are well within the scope of practice of the LSL professional, as well as the SLP (American Speech-Language-Hearing Association [ASHA], 2001). A collaborative approach for implementing intervention is recommended. Within discussion of this principle, we focus on the development of vocabulary and complex language while relating it to development of all aspects of literacy.

In typical development, spoken language acquisition relies on optimal perception of the language(s) in a child's environment, as provided through meaningful linguistic interactions with caregivers (Hirsh-Pasek & Golinkoff, 2012; Konishi, Kanero, Freeman, Golinkoff, & Hirsh-Pasek, 2014; Ramírez-Esparza, García-Sierra, & Kuhl, 2014). As stated previously, congenital hearing loss not only impacts the development of listening, language, and speech skills but also has an indirect effect on development of academic and social skills (Antia, 2011; Antia, Jones, Reed, & Kreimeyer, 2009; Dammeyer, 2010; Moeller, 2007; Moeller et al., 2007). Hearing technology can restore access to the auditory features of language and speech, but development of spoken language in early childhood years and literacy in the school years must be fostered through intentional intervention for these children.

Thus, it follows that the goal of LSL intervention is acquisition and maintenance of age-appropriate auditory, language, speech, academic, and social skills. Historically, students who are D/HH have demonstrated deficits in reading (Traxler, 2000) and other academic achievements. However, a review of more recent literature indicates that many preschool and school-aged students who are D/HH and receive timely and effective LSL intervention can develop age-appropriate vocabulary (Yoshinaga-Itano et al., 2017), spoken language and literacy (Geers et al., 2017; Mayer & Trezek, 2018), and academic skills (Antia et al., 2009).

In typical development, quality and quantity of language input, along with caregiver engagement, are factors that influence future language outcomes. Children who are in language-rich environments, engage in meaningful conversations, and participate in shared book reading with caregivers have a strong foundation for language and literacy. The same is true for children in bilingual home environments in which they are exposed to two or more languages and developing them simultaneously. For children who have a strong foundation in one language and then learn a second language, there might be a protracted learning period but the strong foundation in the first language likely assists in learning the second language.

Learning two languages that differ in modality such as American Sign Language and spoken English can be considered bilingual, and it can demonstrate certain features of spoken bilingualism such as code switching and inserting vocabulary from one language in the syntactic frame of the other. However, such instances are beyond the scope of this article, which focuses on developing two or more spoken languages, which often include scenarios in which the student is an English language learner.

Given the importance of having a strong language foundation in early childhood, recent research and public policy are focused on developing interventions such as Thirty Million Words Initiative (Leffel & Suskind, 2013; Suskind et al., 2016) and "Reach Out and Read" (Weitzman, Roy, Walls, & Tomlin, 2004; Zuckerman & Khandekar, 2010). These programs are being implemented to close the language gap for children in monolingual, bilingual, and/or low socioeconomic environments.

Researchers who work with students who are D/HH are developing similar interventions that take into account the impact of hearing loss in addition to the demographic factors. Cruz, Quittner, Marker, and DesJardin (2013), for example, identified *parallel talk*, *open-ended questions*, and *expansion* as high-level language facilitation strategies that contributed to growth in expressive language of students who are D/HH, irrespective of the family's socioeconomic status. Currently, research on the development of students who are D/HH and EL is sparse. That said, understanding the overlap between language intervention strategies for D/HH and EL can provide guidance when developing age- and stage-appropriate targets and is discussed as follows.

Vocabulary development and intervention

Learning the words of a language is fundamental to the comprehension and expression of thoughts and ideas. Whereas some words might be intentionally taught to young children by their families, a vast majority of words are learned incidentally by encountering them in meaningful natural contexts. For example, a typically developing preschooler might know the words *spoon*, *fork*, and *knife* through intentional instruction by families but might learn the word *chopsticks* in the context of eating Chinese food at a restaurant. In fact, a large majority of words acquired in early childhood are learned through incidental learning whereas only a small minority of words are learned from direct instruction (Bloom, 2002; Christ & Wang, 2010).

For many students who are D/HH, developing vocabulary can be challenging. The result is a vocabulary that is limited in size, breadth, and depth (Lund, 2016). For students who are D/HH and EL, learning words for the same object and concept across languages can present an additional challenge. A student who speaks Arabic at home might have a majority of food- and family-related vocabulary in Arabic but not in English, and vice versa for vocabulary related to academics. Deficits in vocabulary in one or more languages will likely impact performance in the classroom as well as social interactions at school and create confounding factors during assessments.

Elementary school students are expected to acquire at least 8–10 new words per week (Biemiller, 2003; Biemiller & Slonim, 2001; Nagy & Anderson, 1984) through interactions with individuals, engagement with texts, and incidental learning. All students need to expand the size, breadth, and depth of their vocabulary to meet the demands of academic instruction. Many education and language professionals are aware of the work of Beck, McKewon, and Kucan (2013), who classify vocabulary into three tiers. Tier 1 vocabulary represents basic words or the first words for concepts, for example, *baby*, *mommy*, *big*, *happy*, *like*. Tier 2 vocabulary represents words frequently used in mature language, for example, *infant*, *parent*, *enormous*, *joyful*, *adore*, and are encountered in a variety of contexts, especially in grade-level reading materials. Tier 3 vocabulary represents words that are rarely used and mostly in specific contexts, for example, *sedimentary*, *entomology*, *excavate*. Tier 1 vocabulary might be sufficient to have a basic conversation in order to meet needs and wants, but Tier 2 vocabulary is essential for learning and engaging in an exchange of ideas as students and adults.

Limited vocabulary, especially Tier 2 vocabulary, can impact learning of concepts and new vocabulary for all students but especially for those who are D/HH. Consider an elementary school scenario in which the teacher

states, "Texts that are make-believe are fiction, and those that are real are nonfiction." The key words in this sentence are *texts*, *make-believe*, *real*, *fiction*, and *nonfiction*. Typically developing students might be familiar with the words *make-believe*, and *real*, making it possible for them to deduce what *fiction* and *nonfiction* mean. However, the student who is D/HH might not fully understand what *make-believe* and *real* mean. If not, this student will not be able to grasp the meaning of these terms as quickly as classmates. Many state curricula expect students to master these concepts by the end of first grade. One can imagine how difficulty with these seemingly simple vocabulary and concepts can impact future learning of concepts, such as *genre* and *realistic fiction*, putting the student even further behind.

To advance vocabulary development, practitioners must be proactive in identifying contextualized vocabulary and concepts (in addition to those identified by the Teacher's Guide) that are not only important for understanding a particular text but also applicable in other contexts. For example, learning the words *destination*, *breathtaking*, and *towering*, in preparation for an unit on national parks and landmarks, will not only facilitate learning of the target content but could also lead to more precise word choice when sharing commentary about story settings or even family travel.

Previewing a classroom lesson during an intervention session and emphasizing the vocabulary and concepts within the unit can level the playing field for learning and prepare the student to engage in academic conversations with his or her classmates. Experiencing the information a second time during classroom instruction might allow the student to use the target vocabulary when participating in the lesson. For many students who are D/HH, previewing target vocabulary can be incorporated as an objective in the Individualized Education Plan (IEP) and addressed by teachers and SLPs.

Unfortunately, simply encountering new words is not sufficient to create the vocabulary infrastructure that assists in later access to previously learned words. Whether new words are learned through direct instruction or incidentally, incorporating them into the existing semantic organization is essential for efficient retrieval. Consider the following scenario of a fictionalized middle school student, a bilateral hearing aid user, who is on a *Keep Up* trajectory.

Jayla knows the words *electricity* from a lesson on Benjamin Franklin and *electrician* from a vocabulary list related to occupations. As Jayla prepares for a science unit on modern technologies and engineering, she learns the words *electric* and *electronic*. It is important to consider how she incorporates and organizes these words in the context of her existing vocabulary. Does she have adequate word study skills to understand that all of these words have a common origin and then extend it to the word *electron* but not *election*? How do deficits in understanding prefixes, suffixes, and grammatical morphemes impact listening, speaking, reading, and writing?

Students who are D/HH are often catching up to what their classmates might know and then trying to learn additional new words. Thus, efficiency in teaching vocabulary and helping situate it in an existing semantic map is necessary on the practitioner's part. Consider teaching the word *habitat*. It can be taught by pairing an unknown word with a known word and creating a "vocabulary sandwich" and acoustically highlight the target word during instruction. "**Habitat** is the house or environment that people or animals live in. **Habitat.** The camel lives in a desert **habitat**." In this brief interaction, the practitioner repeats the target word three times within a meaningful context and provides clues to situate it in an expanding semantic map.

A general rule of thumb is that typically developing children need to hear a word 15–20 times in order to learn it. It has been proposed that students who are D/HH might need up more repetitions for learning the same word. Practitioners should consider creating multiple opportunities for exposure to relevant words. For example, repeated

exposure to the word *camouflage* in response to a child's saying "I have soldier pants and soldier backpack" could support meaningful learning of age-appropriate language. Taking the opportunity to understand and learn these precise words can lead to more sophisticated language, avoiding the perception of the students as being childish or immature by adults and/or peers.

Complex language development and intervention

Vocabulary intervention can propel a student's understanding and use of age-appropriate vocabulary in academic domains, but it is incomplete without adequate attention to mastery of complex syntax. Stringing together a few words or using simple sentences with a single verb phrase may be sufficient to communicate basic needs and wants, but complex syntax (i.e., sentences with one or more clauses, each with its own verb phrase) provides an efficient way to communicate multiple ideas and relationships among them. For example, a routine direction such as "Before you go to recess, complete the word problems on page 65" can be challenging if the student does not understand the meaning and function of the conjunction *before* or if the student applies the order-of-mention strategy when interpreting the given direction and starts to leave for recess. If the student does not follow the direction, it might be perceived as "misbehavior" or inability to follow directions when, in fact, it might be neither. A teacher's redirection (or perhaps even chastisement) for failure to complete the task as assigned could be confusing, disappointing, or even embarrassing to the student.

Research studies demonstrate that some students who are D/HH have difficulty acquiring age-appropriate syntactic skills (Cannon & Kirby, 2013; Ganek, McConkey Robbins, & Niparko, 2012; Moeller et al., 2007). Morphological markers such as plural *-s* or tense markers such as *-ed* and *-ing* consist of high-frequency consonants and rely on adequate auditory access and auditory skills. As a result, syntactic development could be an area in which students might require intervention for a longer duration than they might in vocabulary or pragmatics (Ganek et al., 2012; Moeller et al., 2007). Difficulty with comprehension or expression of complex syntax in spoken language can translate into difficulty in reading or writing texts containing sophisticated language. Consider the following prompt to write an alternate ending to the story, for example, "What else could Cade have done to solve the problem of the missing birthday present?" Student responses require the understanding of highly complex language, including the modal of possibility (*could*) and perfect tense (*have done*) to communicate something that did not happen but could possibly have happened in a new ending. One resource that can assist the practitioner in implementing intervention for syntactic development in a systematic manner is the Cottage Acquisition Scales for Listening, Language, and Speech (CASLLS). For more information about this resource, see Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

Literacy development and intervention

In addition to developing vocabulary and complex language, students who are D/HH need direct instruction in phonological awareness, phonics, morphological awareness, sight word reading, and related concepts. Instruction and intervention related to reading and writing are a broad topic, which is beyond the scope of this article focusing on principles of LSL intervention. Gross and Robertson (2017) provide a detailed overview of literacy development of students who are D/HH. A thorough discussion of literacy interventions for students who are D/HH can be found in Robertson (2014). In addition, in this special issue, Alfano and Douglas (2018) discuss language and literacy development for children who are bilingual.

Special considerations for students who are D/HH and EL

A recent review of guidelines for accommodating to the needs of ELs in the

elementary classroom yields a list of tips that, not surprisingly, parallels many of the same strategies recommended for students who are D/HH in the mainstream. These recommendations include general instructional principles, specific linguistic guidelines addressing vocabulary, syntax, and nonliteral language, as well as delivery of instruction.

Whether students are D/HH, ELs, or both, one important suggestion is to consider the interplay between the content and language used to convey important subject matter concepts. During classroom instruction, inability to derive the correct meaning from a complex sentence can limit comprehension. For example, consider the following sentence that might be found in a science text describing erosional effects and the comprehension skills necessary for understanding the language: "Repeated swings in temperature can also weaken and eventually fragment rock, which expands when hot and shrinks when cold." Although concepts included in this sentence may be within the cognitive capacity of the student, unfamiliar vocabulary and the grammatical structure may mask its comprehensibility. It stands to reason, then, that when subject matter is newly presented, preteaching of the vocabulary and simplification of the grammatical frame may assist a student in grasping the essence of the core content.

One recommendation for practitioners working with students in classroom who are D/HH is to follow the EL guidelines offered in Teacher's Guide for a particular academic subject. In addition to the precise content vocabulary specified by the topic under study, there are many Tier 2 vocabulary words that appear in text with the assumption that they are already present in the lexicon of the typical student. Seemingly innocent words such as *individual*, *regularly*, *separate*, and *constant* may be found as modifiers to subject matter words but may be virtually meaningless to an EL student who is D/HH who then overlooks the important information such words contribute to understanding the text. The high utility of knowing such words makes them worthy targets for intervention; thus, the practitioner may wish to consider the role of words such as these as part of a total language plan. Similarities between recommendations for students who are D/HH and are ELs are apparent in Table 1.

In summary, hearing loss influences how a child learns to listen, speak, read, and write. Facilitating the development of age- and grade-appropriate language and literacy skills begins with early intervention but continues throughout the school years so that the student will be college or career ready. Thus, *all* interventions provided to students who are D/HH or D/HH and EL by any member of the interprofessional team are rooted in and foster the growth of listening, language, and literacy.

Principle 3: Intervention is individualized, systematic, and richly multidimensional

Teachers and therapists who are creating learning objectives for IEPs and providing intervention to students who are D/HH in a school setting take into account the child's hearing history, auditory access, and home language and present levels of performance in language, literacy, and other academic areas. Whereas the first two principles focus on the *what* and *why* of LSL intervention, this third principle focuses on the *how*. That is, intervention should be ***individualized*** to the student's unique learning profile and desired outcomes, utilizing a ***systematic*** approach that takes into account a hierarchy of skill development in language, literacy, and academic areas, and is ***richly multidimensional*** so as to target objectives from multiple domains within the same activity or lesson.

Individualized intervention

When working with a student who might be on a *Keep Up*, *Catch Up*, or *Move Up* trajectory, practitioners are charged to identify challenging but achievable goals across all domains of knowledge and skill building. Goals and activities that take into consideration child-specific factors of hearing and learning create the desirable difficulties that make

Table 1. Comparison of teacher recommendations for students who are D/HH and students who are ELs

Domain	Students Who Are D/HH	Students Who Are ELs
General instruction	Weigh cognitive load against linguistic density	Balance content and language
Teacher–student instructional turns	Provide wait time for processing of teacher question	Offer opportunities for spoken language practice
Assessing comprehension	Ask student to repeat or summarize the lesson with random checks of all students so as not to target the student who is D/HH	Check for understanding by asking the student to tell how he or she will approach an assignment
Vocabulary	Consider lesson preview highlighting unfamiliar words	Encourage word learning, especially in context
Language structure/syntax	Build receptive language understanding and transfer to expressive output	Provide a language model and recast for syntactic complexity
Nonliteral language	Be on the lookout for idiomatic language and probe for the student's understanding	Make figurative language explicit
Speed and prosody of speech	Speak slowly and clearly; use acoustic highlighting	Don't speak too fast; emphasize important concepts

Note. D/HH = deaf or hard of hearing, EL = English learner. Recommendations for students who are D/HH can be found at https://successforkidswithhearingloss.com/for-professionals/teacher-tips/. Recommendations for students who are ELs can be found at http://www.scilearn.com/blog/top-10-tips-for-working-with-ell-students.

true accomplishment motivating for the student. In so doing, any child has the opportunity to develop what Dweck referred to as a *growth mind-set* as opposed to a fixed mindset (Dweck, 2007). In the former, children adopt a "can do" attitude and celebrate effort and the achievement that come from thoughtful strategy selection and steady progress toward a goal. Without question, this is an important disposition to learning for all children, especially those who are D/HH. When goals of intervention are targeted for students who are D/HH as individuals, following the milestones of development in a systematic manner, and customized to place learning well within the zone of proximal development (Vygotsky, 1978), it is more likely to ensure the success that serves as the motivation for continuing to "do hard things."

Typically, students who are receiving LSL intervention have deficits in some but not all domains. Consider the following scenario of a 5-year-old kindergartener, Ruby, who is on a *Move Up* trajectory.

Ruby has only recently begun using bilateral cochlear implants and has substantial needs in the domains of audition, speech, and language. She demonstrates age-appropriate cognitive and motor skills. As her classmates learn about various animal habitats, Ruby is learning the names of animals. As detailed by Rosenzweig (2011), when there is a big difference in chronological age and hearing age, providers must consider age-appropriate learning activities, even though the targeted auditory and/or language goals may be rudimentary. Ruby might benefit from learning names of animals (a stage-appropriate skill) through dramatic play (an age-appropriate activity) facilitated by the provider within the general education setting during a "push-in" session. Similarly, in an individual intervention session, Ruby could continue to learn animal names through reading a book such as *Dear Zoo* or singing *Old McDonald Had a Farm*.

Given the reality of scheduling constraints in a school setting, it is often incumbent upon the providers to deliver intervention in small group settings. We propose that it is possible to provide individualized LSL intervention even when working with children who are at different ages and stages in development. For example, Ruby could be paired with her classmate Ishan, who is on a *Catch Up* trajectory. Ishan's language goals include expanding vocabulary and increasing syntactic complexity. In keeping with the animal habitat theme, while looking through a picture book, the provider could ask Ruby, "Where is the pig?" and then ask Ishan, "Where does it live?" with the expected response of "the pig lives in the *sty*." In this scenario, both students are receiving targeted intervention, even though they have different language goals. In addition, there is an opportunity to work on social skills as well as literacy skills through dialogic reading (DesJardin & Ambrose, 2010; DesJardin, Ambrose, & Eisenberg, 2009; DesJardin et al., 2017).

Systematic intervention

In addition to developing individualized intervention, it is important to contextualize selected targets within a hierarchy of development. For example, 6-year-old Vincent has progressed from "want apple" to "I want an apple" to "May I have the big, red apple?" The next step in his syntactic development could be the use of relative clauses and prepositional phrases, for example, "May I have the big, red apple that is on the counter?" Note that in addition to development of complex syntax, the provider has to work on developing a variety of syntactic elements, for example, prepositions to be used in prepositional phrases, starting from early emerging prepositions, *in* or *on*, to the next level of *beside* or *above*. Attention to systematic progression of skills is also relevant for audition, vocabulary, literacy, cognition, and even social skills development. For more information on resources, see Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

Richly multidimensional intervention

For most students who are D/HH, practitioners must keep up with academic content while backfilling the idiosyncratic holes in linguistic, auditory, and critical thinking skills. With the focus on closing the language gap, it is not feasible to target only one objective in one lesson. There is an economy of essential function when each of the student's needs is considered in a rich interventional plan that targets many objectives in a single, well-designed session.

For example, it is possible to include auditory, receptive, and expressive language (including form, content, and use) targets in several activities within a session. For example, as a companion to a classroom unit on the environment, a student who is D/HH may be asked to categorize items as being *recyclable* or not when given an auditory-only presentation of a list, recall the sequence of events outlined in a trade book about one town's efforts to recycle, and create a television commercial that promotes recycling. Each of these activities targets listening, language, and vocabulary objectives as well as writing and pragmatic goals that are embedded into this content-related and theme-based LSL intervention. For the practitioner who is classroom-based, there are resources within the Teacher's Guide of most curricula that can be consulted to assist in planning functional intervention that meets the needs of students who are D/HH and who also are ELs.

Principle 4: Effective intervention is driven by interprofessional practice

Recall that only a limited number of teachers and SLPs have specialized training in working with students who are D/HH and use LSL, perhaps related to the fact that students who are D/HH are part of a low-incidence population. Within the last decade, more practitioners have been able to obtain a postgraduate certificate as a Listening and Spoken Language Specialist Certified Auditory Verbal Therapist or Educator (LSLS Cert AVT or Cert AVEd) through the Alexander Graham Bell

Academy for Listening and Spoken Language (www.agbell.org/teach).

Currently, there are approximately 800 certified LSLSs worldwide. A majority of these practitioners reside in the United States and provide intervention in English (Guignard, 2017). Of these practitioners, 43% are teachers of students who are D/HH and 39% are SLPs. Most are intersecting with students who are D/HH and/or ELs in public schools, private special education programs, or private practices. The LSLS designations indicate that the individuals who have earned them have experience and expertise in developing LSL skills in students who are D/HH. They have completed a rigorous certification process that includes 900 hr of practice, continuing education, mentoring with an established LSLS, and knowledge and skills examination.

In the absence of this specially certified individual, it is well within the scope of practice for SLPs to address the needs of the school-aged population of students who are D/HH. Given a strong base in language acquisition, an understanding of the importance of auditory access, and a keen awareness of the linguistic challenges and hazards that face students who are D/HH, SLPs who are knowledgeable, skilled, and inquisitive can and do support the established trajectory of learning of these students.

Building the team

Interprofessional teams are formed and reformed depending on the abilities and needs of the individual students for whom they are assembled. It might be suggested, then, that the makeup of any particular interprofessional team is driven by the specific profile of the student who is D/HH. Students presenting with a *Keep Up* profile might need a small team, for example, an audiologist, a classroom teacher, and an SLP (bilingual or monolingual if thresholds for qualifications for services are met). In some cases, however, even a student with age-appropriate language and literacy skills might need a team with additional personnel, such as an itinerant teacher of students who are D/HH, a captioner, a notetaker, or perhaps even an educational (sign) interpreter to assist in providing access to higher level curricular instruction. *Catch Up* students might require these same personnel, but the team could also include a reading specialist and a bilingual education specialist to meet the student's individual learning needs. As another example, students presenting with a *Move Up* profile may require a team that goes well beyond the core members indicated earlier. For such students, additional team members might include a neurologist, a special education teacher, an occupational therapist, a school psychologist, and perhaps a vision specialist to help meet the student's multiple learning challenges.

Working as a team

Today's interprofessional collaborative practice guidelines state explicitly that providers and families/caregivers work together to improve outcomes and quality of care and education of their students. According to ASHA (2017), IPP occurs when multiple service providers from different professional backgrounds provide comprehensive educational services by working with individuals and their families, caregivers, and communities to deliver the highest quality of intervention across settings. The tenets of IPP would suggest that each team member has a designated contribution to make with regard to the needs of students who are D/HH and might also be ELs. This means that attitudes of professional centrism are discouraged to avoid scenarios in which one team member assumes greater importance than the others (Pecukonis, Doyle, & Bliss, 2008). Interprofessional practice calls for a more conscious and focused effort as a team member in which each individual is responsible for bringing integrity, commitment, engagement, and effort to the team. Blaiser and Nevins (2017) acknowledged the self-work that is needed to become a contributing team member and offered practical suggestions for the IPP team members who work with students who are D/HH. They cautioned against waiting for scheduled IEP meetings to be the impetus for communicating,

suggesting that these formal meeting were essentially insensitive to a need for discussions regarding hearing fluctuation or variable language performance as a function of various listening environments at school (classroom, cafeteria, gymnasium, therapy room). They urged the use of both formal and informal communication strategies (e.g., checklists, forms, e-mail, or notebooks) to keep team members apprised of student progress. Unique situations may also call for a recast of more traditional team members.

Consider the following scenario of a middle school student, Estuardo, who is on a *Keep Up* trajectory:

Estuardo is a bilateral hearing aid user whose parents are migrant workers and speak Kekchi at home. In elementary school, Estuardo demonstrated the profile of a *Keep Up* learner. Now in middle school, he is struggling with wear time of his devices and social acceptance in his classroom. Issues of school avoidance are beginning to appear and general withdrawal behaviors are becoming an increasing concern. No one member of his current team is capable of addressing the multiplicity of his needs. Inviting a school counselor, school psychologist, or an EL teacher to join the team and collaborate to identify child- and family-focused solutions seem to be the most direct path to redirect him to his previously promising learning trajectory.

Principle 5: Families are included and empowered to be partners in listening, spoken language, and literacy development

Given the fact that Universal Newborn Hearing Screening makes it possible to screen for hearing loss in children, identification of hearing loss in the first few weeks and months of life has become imminently achievable. In turn, early identification opens the door for families to play an integral role in their child's LSL development. Families are nurtured in focused intervention in which they play a prominent role and develop a disposition to inclusion and active participation as their child's first teachers. To continue this early relationship with families through the preschool, elementary, and high school years makes good sense for all involved, especially the student who is D/HH.

That said, families who might not have had access to practitioners who speak their preferred language face an additional challenge of understanding the information supporting early LSL development of their child in order to enhance their knowledge and skills. Cultural differences that are not understood by practitioners may pose an additional barrier. If this has been the case, it would not be surprising to discover idiosyncratic gaps in families' understanding of hearing loss, its effect on language learning, and familiarity and comfort with the strategies and techniques for LSL development. Furthermore, if congenital hearing loss is not identified until after the early intervention years, there will be a loss of not only critical learning time for the child but also dedicated time for family learning. As a factor in long-term outcomes, effects of missing the early intervention period are compounded over the years and influence achievement of a personal best that might never be realized with a different timeline.

When appropriately enacted, family-centered intervention engages the adult family members and facilitates and coaches *their* development of the knowledge and skills that foster language learning for their child. All too often, once the child begins to attend school, the focus shifts to teachers taking on the responsibility of teaching and providing intervention, with families functioning on the periphery and making sure that the student completes his or her homework. Studies that have examined the contribution of family involvement in the preschool and school years for students who are D/HH have concluded that it is a strong predictor of language proficiency and academic achievement (Boons et al., 2012; Reed, Antia, & Kreimeyer, 2008).

Role of family

Many families of students who are D/HH have been coached during the early intervention years to create a language-rich environment and engage in meaningful

interactions with their child. In that period, efforts are focused on establishing consistent use of hearing technology, acquiring first words and sentences, and enjoying shared book reading. Families require similar support and coaching if students begin to question the value of their hearing technology or struggle with mastery of higher level auditory skills, Tier 2 and academic vocabulary, increasingly complex syntax, or challenging reading and subject matter assignments. When families understand the strategies that practitioners are using, they can support the child's learning beyond the classroom environment and into real-world experiential learning. Talking aloud about nuances in conversations, explaining social conventions, and the linguistic choices that are made in exchanges in the larger community can be quite instructional. This explicit instruction provided by the family can build confidence in conversation initiation and participation within the community.

When the language of instruction in school is provided only in English or mostly in English, the responsibility for the development of increasing sophistication in the home or heritage language becomes the purview of the family. Because culture and heritage language are inextricably linked, families can be encouraged to develop advanced home language capacity that will allow their student who is D/HH to appreciate stories associated with familial and cultural heritage and to be a full participant in family life. Especially important are the language and vocabulary that identify and describe the kinship relationships the students have beyond the nuclear family. As a counterpart to advancing English language skills, understanding of and appreciation for idiomatic expressions that have meaning in the context of the home language can support participation in communicative exchanges at home.

As students move through the elementary years, families also may choose to revisit goals they set while their child was still in the early phase of intervention and reconsider whether those goals continue to be applicable/reachable as the student ages. Are the *Keep Up* students still keeping up? Is college or university attendance on the horizon? If so, what is the transition plan to make that goal a reality? How can families assist their student to continue to reach personal best? Other types of postsecondary education might be considered for the *Catch Up* student, who despite his or her best efforts still struggles with the rigors of an academic track. With socially competent linguistic skills, there are many options for postsecondary endeavors for the students who demonstrate this profile of potential and families may need support as they make appropriate adjustments to their previous desired outcomes for their child. For families of students who continue to progress on a *Move Up* trajectory in their later years of schooling, realistic, potentially difficult choices may need to be made to prepare the student for adult life. Success for students in the later years of their educational journey becomes increasingly idiosyncratically defined. Practitioners who work with these students (and their families) must be sensitive to the emotional ramifications of reaching the end of the traditional K-12 period and be prepared to have frank conversations that will drive IEP/transition plans.

Finally, families who have long advocated for their children who are D/HH to get needed services and supports may find it difficult to relinquish this important role to their children. But the long-term benefits for building self-advocacy dictates that it must become part of the IEP for students who are D/HH. With self-advocacy as an explicitly stated IEP goal, students can develop the confidence, as well as the language, to advocate for themselves. Nevins and Chute (2018) have suggested that students must be able to make requests that help getting their access needs met. For example, one request might be for other students in the classroom to pass around a microphone that transmits directly to the student's hearing device during discussions so that the student who is D/HH has an opportunity to hear every student's contribution firsthand. Asking a teacher to repeat a question, a spelling word, or

homework assignment may be necessary more than once per day; knowing how to pose these requests in a manner the teacher can accept is an important ancillary to the academic curriculum and successful participation in the mainstream classroom. Self-advocacy statements that are communicated in a clear and nonconfrontational manner can have greater pragmatic acceptance than a first salvo that is demanding or complaining. Command of the language, vocabulary, and social signals required to be clear in communicating advocacy needs is crucial and may be included as important intervention goals for any student who is D/HH. For more information about resources for self-advocacy development, see Supplemental Digital Content A (available at: http://links.lww.com/TLD/A59).

CONCLUSIONS

The five principles of LSL intervention that are presented in this article are meant to inform the practitioner in the development of listening, language, and literacy skills in a systematic manner that meets the individual needs of each student who is D/HH or D/HH and EL. An interprofessional team working in collaboration with the families can help students achieve their personal best. Resources such as those presented in this article (including the Supplemental Digital Content A, available at: http://links.lww.com/TLD/A59) and associated articles in this issue of *Topics in Language Disorders* are offered to practitioners to guide intervention and sustain advances made in a child's early language journey.

As indicated previously, outcomes of students who are D/HH or D/HH and EL are influenced by a number of extrinsic factors over which there is a degree of control. Ensuring quality service provision to address the highest priority needs of these students is well within the reach of teachers and SLPs committed to mindful practice. These principles and practices are based on the current state of knowledge in the field. We expect that advances in hearing technology, early intervention, and new findings from language and brain research, especially those related to bilingual acquisition, will lead to an expanded set of principles and practices in the near future. We urge practitioners to stay fully engaged in the field and expand their knowledge related to the development of LSL. Through ongoing professional learning, practitioners can continue to refine the skills needed to assist students who are D/HH or D/HH and EL in keeping up, catching up, or moving up.

REFERENCES

Alberg, J., Wilson, K., & Roush, J. (2006). Statewide collaboration in the delivery of EHDI services. *The Volta Review*, *106*(3), 259–274.

Alexander Graham Bell Association for the Deaf and Hard of Hearing. (2017). *Delivery of services by listening and spoken language specialists*. Retrieved February 25, 2018, from http://www.agbell.org/Speak/Delivery-of-Services-by-Listening-and-Spoken-Language-Specialists

Alfano, A., & Douglas, M. (2018). Facilitating pre-literacy skills in children with hearing loss when the home language is not English. *Topics in Language Disorders*, *38*(3), 194–201.

American Speech-Language-Hearing Association (ASHA). (2001). *Roles and responsibilities of speech-language pathologists with respect to reading and writing in children and adolescents* [Position statement]. Retrieved May 20, 2018, from www.asha.org/policy

American Speech-Language-Hearing Association (ASHA). (2017). *Interprofessional education/interprofessional practice (IPE/IPP)*. Retrieved February 25, 2018, from https://www.asha.org/practice/interprofessional-education-practice

Antia, S. D. (2011). Social outcomes of students who are deaf and hard of hearing in general education classrooms. *Exceptional Children*, *77*(4), 489. doi:10.1177/001440291107700407

Antia, S. D., Jones, P. B., Reed, S., & Kreimeyer, K. H. (2009). Academic status and progress of deaf and hard-of-hearing students in general education classrooms. *Journal of Deaf Studies and Deaf Education*, *14*(3), 293–311. doi:10.1093/deafed/enp009

Beck, I., McKewon, M., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction* (2nd ed.). New York: Guilford Press.

Bess, F., Dodd-Murphy, J., & Parker, R. (1998). Children with minimal sensorineural hearing loss: Prevalence, education performance, and functional status. *Ear and Hearing*, *19*(5), 339–354.

Bess, F., Gustafson, S. J., & Hornsby, B. W. (2014). How hard can it be to listen? Fatigue in school-age children with hearing loss. *Journal of Educational Audiology*, *20*, 34–47.

Biemiller, A. (2003). Vocabulary: Needed if more children are to read well. *Reading Psychology*, *24*, 323–335. doi:10.1080/02702710390227297

Biemiller, A., & Slonim, N. (2001). Estimating root word vocabulary growth in normative and advantaged populations: Evidence for a common sequence of vocabulary acquisition. *Journal of Educational Psychology*, *93*(3), 498–520. doi:10.1037/0022-0663.93.3.498

Bijeljac-Babic, R., Serres, J., Höhle, B., & Nazzi, T. (2012). Effect of bilingualism on lexical stress pattern discrimination in French-learning infants. *PLoS One*, *7*(2), e30843. doi:10.1371/journal.pone.0030843

Blaiser, K. M., & Nevins, M. E. (2017). Practitioner reflection that enhances interprofessional collaborative practices for serving children who are deaf/hard-of-hearing. *Perspectives of the ASHA Special Interest Groups*, *2*(9), 3–9. doi:10.1044/persp2.SIG9.3

Bloom, P. (2002). *How children learn the meanings of words*. Cambridge, MA: MIT Press.

Boons, T., Brokx, J. P., Dhooge, I., Frijns, J. H., Peeraer, L., Vermeulen, A., et al. (2012). Predictors of spoken language development following pediatric cochlear implantation. *Ear and Hearing*, *33*(5), 617–639. doi:10.1097/AUD.0b013e3182503e47

Burns, T. C., Yoshida, K. A., Hill, K., & Werker, J. F. (2007). The development of phonetic representation in bilingual and monolingual infants. *Applied Psycholinguistics*, *28*(3), 455–474. doi:10.1017/S0142716407070257

Byers-Heinlein, K., & Fennell, C. T. (2014). Perceptual narrowing in the context of increased variation: Insights from bilingual infants. *Developmental Psychobiology*, *56*(2), 274–291. doi:10.1002/dev.21167

Cannon, J. E., & Kirby, S. (2013). Grammar structures and deaf and hard of hearing students: A review of past performance and a report of new findings. *American Annals of the Deaf*, *158*(3), 292–310. doi:10.1353/aad.2013.0027

Centers for Disease Control and Prevention, National Center on Birth Defects and Developmental Disabilities. (2015). 2015 CDC EHDI Hearing Screening & Follow-up Survey. Retrieved from https://www.cdc.gov/ncbddd/hearingloss/2015-data/01-data-summary.html

Cheour, M., Ceponiene, R., Lehtokoski, A., Luuk, A., Allik, J., Alho, K., et al. (1998). Development of language-specific phoneme representations in the infant brain. *Nature Neuroscience*, *1*(5), 351–353. doi:10.1038/1561

Christ, T., & Wang, X. C. (2010). Bridging the vocabulary gap: What the research tells us about vocabulary instruction in early childhood. *Young Children*, *65*(4), 84–91.

Cole, E., & Flexer, C. (2015). *Children with hearing loss developing listening and talking birth to six*. San Diego, CA: Plural Publishing.

Conway, C. M., Pisoni, D. B., & Kronenberger, W. G. (2009). The importance of sound for cognitive sequencing abilities. *Current Directions in Psychological Science*, *18*(5), 275–279. doi:10.1111/j.1467-8721.2009.01651.x

Cruz, I., Quittner, A. L., Marker, C., & DesJardin, J. L. (2013). Identification of effective strategies to promote language in deaf children with cochlear implants. *Child Development*, *84*(2), 543–559. doi:10.1111/j.1467-8624.2012.01863.x

Dammeyer, J. (2010). Psychosocial development in a Danish population of children with cochlear implants and deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education*, *15*(1), 50–58. doi:10.1093/deafed/enp024

DesJardin, J. L., & Ambrose, S. E. (2010). The importance of the home literacy environment for developing literacy skills in young children who are deaf or hard of hearing. *Young Exceptional Children*, *13*(5), 28–44.

DesJardin, J. L., Ambrose, S. E., & Eisenberg, L. S. (2009). Literacy skills in children with cochlear implants: The importance of early oral language and joint storybook reading. *Journal of Deaf Studies and Deaf Education*, *14*(1), 22–43. doi:10.1093/deafed/enn011

DesJardin, J. L., Stika, C. J., Eisenberg, L. S., Johnson, K. C., Hammes Ganguly, D. M., Henning, S. C., et al. (2017). A longitudinal investigation of the home literacy environment and shared book reading in young children with hearing loss. *Ear and Hearing*, *38*(4), 441–454. doi:10.1097/AUD.0000000000000414

Dorman, M. F., Sharma, A., Gilley, P., Martin, K., & Roland, P. (2007). Central auditory development: Evidence from CAEP measurements in children fit with cochlear implants. *Journal of Communication Disorders*, *40*(4), 284–294. doi:10.1016/j.jcomdis.2007.03.007

Dweck, C. S. (2007). *Mindset: The new psychology of success*. New York: Ballantine Books.

Eisenberg, L. S. (2007). Current state of knowledge: Speech recognition and production in children with hearing impairment. *Ear and Hearing*, *28*(6), 766–772. doi:10.1097/AUD.0b013e318157f01f

Erber, N. P. (1982). *Auditory training*. Washington, DC: Alexander Graham Bell Association for the Deaf and Hard of Hearing.

Fernald, A., & Simon, T. (1984). Expanded intonation contours in mothers' speech to newborns. *Developmental Psychology*, *20*(1), 104–113. doi:10.1037/0012-1649.20.1.104

Fickenscher, S., Gaffney, E., & Dickson, C. (Ed.) (2015). *Auditory verbal strategies to build listening and spoken language skills*. Retrieved from http://www.mcesc.org/docs/building/3/av%20strategies%20to%20build%20listening%20and%20spoken%20language%20skills%20(1).pdf?id=1107

Ganek, H., McConkey Robbins, A., & Niparko, J. K. (2012). Language outcomes after cochlear implantation. *Otolaryngologic Clinics of North America*, *45*(1), 173–185. doi:10.1016/j.otc.2011.08.024

Garcia-Sierra, A., Rivera-Gaxiola, M., Percaccio, C. R., Conboy, B. T., Romo, H., Klarman, L., et al. (2011). Bilingual language learning: An ERP study relating early brain responses to speech, language input, and later word production. *Journal of Phonetics*, *39*(4), 546–557. doi:10.1016/j.wocn.2011.07.002

Geers, A. E., Mitchell, C. M., Warner-Czyz, A., Wang, N. Y., Eisenberg, L. S., & the CDaCI Investigative Team. (2017). Early sign language exposure and cochlear implantation benefits. *Pediatrics*, *140*(1), e20163489. doi:10.1542/peds.2016-3489

Geers, A. E., Moog, J. S., Biedenstein, J., Brenner, C., & Hayes, H. (2009). Spoken language scores of children using cochlear implants compared to hearing age-mates at school entry. *Journal of Deaf Studies and Deaf Education*, *14*(3), 371–385. doi:/10.1093/deafed/enn046

Gilley, P. M., Sharma, A., & Dorman, M. F. (2008). Cortical reorganization in children with cochlear implants. *Brain Research*, *1239*, 56–65. doi:10.1016/j.brainres.2008.08.026

Gross, P., & Robertson, L. (2017). Literacy growth and development. In S. Lenihan (Ed.), *Preparing to teach, committing to learn: An introduction to educating children who are deaf/hard of hearing* (pp. 13–1–13–20). Retrieved from https://www.infanthearing.org/ebook-educating-children-dhh/

Guignard, G. (2017, October). *Listening and spoken language in low resource communities: Data and resources*. Poster session presented at the 8th Annual Coalition for Global Hearing Health, Miami, FL.

Hirsh-Pasek, K., & Golinkoff, R. M. (2012). How babies talk: Six principles of early language development. In S. Odom, E. Pungello, & N. Gardner-Neblett (Eds.), *Revisioning the beginning: Developmental and health science contributions to infant/toddler programs for children and families living in poverty* (pp. 77–101). New York: Guilford Press.

Joint Committee on Infant Hearing. (2007). Year 2007 position statement: Principles and guidelines for early hearing detection and intervention programs. *Pediatrics*, *120*(4), 898–921. doi:10.1542/peds.2007-2333

Joint Committee on Infant Hearing, and Muse, C., Harrison, J., Yoshinaga-Itano, C., Grimes, A., Brookhouser, P. E., et al. (2013). Supplement to the JCIH 2007 position statement: Principles and guidelines for early intervention after confirmation that a child is deaf or hard of hearing. *Pediatrics, 131*(4), e1324–e1349. doi:10.1542/peds.2013-0008

Konishi, H., Kanero, J., Freeman, M. R., Golinkoff, R. M., & Hirsh-Pasek, K. (2014). Six principles of language development: Implications for second language learners. *Developmental Neuropsychology*, *39*(5), 404–420. doi:10.1080/87565641.2014.931961

Kral, A., & Sharma, A. (2012). Developmental neuroplasticity after cochlear implantation. *Trends in Neurosciences*, *35*(2), 111–122. doi:10.1016/j.tins.2011.09.004

Kuhl, P. K. (2004). Early language acquisition: Cracking the speech code. *Nature Reviews Neuroscience*, *5*(11), 831–843. doi:10.1038/nrn1533

Kuhl, P. K. (2010). Brain mechanisms in early language acquisition. *Neuron*, *67*(5), 713–727. doi:10.1016/j.neuron.2010.08.038

Kuhl, P. K., & Meltzoff, A. N. (1982). The bimodal perception of speech in infancy. *Science*, *218*(4577), 1138–1141. doi:10.1126/science.7146899

Kuhl, P. K., Williams, K. A., Lacerda, F., Stevens, K. N., & Lindblom, B. (1992). Linguistic experience alters phonetic perception in infants by 6 months of age. *Science*, *255*(5044), 606–608. doi:10.1126/science.1736364

Leffel, K. R., & Suskind, D. L. (2013). Parent-directed approaches to enrich the early language environments of children living in poverty. *Seminars in Speech and Language*, *34*(4), 267–277.

Lewkowicz, D. J. (2010). Infant perception of audiovisual speech synchrony. *Developmental Psychology*, *46*(1), 66–77. doi:10.1037/a0015579

Ling, D. (2006). The Six-Sound Test. In W. Estabrooks (Ed.), *Auditory-verbal therapy and practice* (pp. 307–310). Washington, DC: Alexander Graham Bell Association for the Deaf and Hard of Hearing.

Lund, E. (2016). Vocabulary knowledge of children with cochlear implants: A meta-analysis. *Journal of Deaf Studies and Deaf Education*, *21*(2), 107–121. doi:10.1093/deafed/env060

Maurer, D., & Werker, J. F. (2014). Perceptual narrowing during infancy: A comparison of language and faces. *Developmental Psychobiology*, *56*(2), 154–178. doi:10.1002/dev.21177

Mayer, C., & Trezek, B. J. (2018). Literacy outcomes in deaf students with cochlear implants: Current state of the knowledge. *Journal of Deaf Studies and Deaf Education*, *23*(1), 1–16. doi:10.1093/deafed/enx043

Mitchell, R. E., & Karchmer, M. A. (2004). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies*, *4*(2), 138–163. doi:10.1353/sls.2004.0005

Moeller, M. P. (2007). Current state of knowledge: Psychosocial development in children with hearing impairment. *Ear and Hearing*, *28*(6), 729–739. doi:10.1097/AUD.0b013e318157f033

Moeller, M. P., Tomblin, J. B., Yoshinaga-Itano, C., Connor, C. M., & Jerger, S. (2007). Current state of knowledge: Language and literacy of children with

hearing impairment. *Ear and Hearing*, *28*(6), 740–753. doi:10.1097/AUD.0b013e318157f07f

Moog, J. S., & Geers, A. E. (2010). Early educational placement and later language outcomes for children with cochlear implants. *Otology & Neurotology*, *31*(8), 1315–1319. doi:10.1097/MAO.0b013e3181eb3226

Moon, C., Lagercrantz, H., & Kuhl, P. K. (2013). Language experienced in utero affects vowel perception after birth: A two-country study. *Acta Paediatrica*, *102*(2), 156–160. doi:10.1111/apa.12098

Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, *19*(3), 304–330. doi:10.2307/747823

Nazzi, T., Bertoncini, J., & Mehler, J. (1998). Language discrimination by newborns: Toward an understanding of the role of rhythm. *Journal of Experimental Psychology*, *24*(3), 756–766. doi:10.1037/0096-1523.24.3.756

Nevins, M. E., & Chute, P. M. (2018). Listening, language and literacy for children with auditory devices: From hearing aids to cochlear implants. In N. Capone & B. Shulman (Eds.), *Language development: Foundations, processes, and clinical applications* (3rd ed.). Burlington, MA: Jones & Bartlett Learning.

Niparko, J. K., Tobey, E. A., Thal, D. J., Eisenberg, L. S., Wang, N. Y., Quittner, A. L., et al. (2010). Spoken language development in children following cochlear implantation. *JAMA*, *303*(15), 1498–1506. doi:10.1001/jama.2010.451

Pecukonis, E., Doyle, O., & Bliss, D. L. (2008). Reducing barriers to interprofessional training: Promoting interprofessional cultural competence. *Journal of Interprofessional Care*, *22*(4), 417–428. doi:10.1080/13561820802190442

Polka, L., & Werker, J. F. (1994). Developmental changes in perception of nonnative vowel contrasts. *Journal of Experimental Psychology: Human Perception and Performance*, *20*(2), 421–435. doi:10.1037/0096-1523.20.2.421

Ramírez-Esparza, N., García-Sierra, A., & Kuhl, P. K. (2014). Look who's talking: Speech style and social context in language input to infants are linked to concurrent and future speech development. *Developmental Science*, *17*(6), 880–891. doi:10.1111/desc.12172

Reed, S., Antia, S. D., & Kreimeyer, K. H. (2008). Academic status of deaf and hard-of-hearing students in public schools: Student, home, and service facilitators and detractors. *Journal of Deaf Studies and Deaf Education*, *13*(4), 485–502. doi:10.1093/deafed/enn006

Rivera-Gaxiola, M., Silva-Pereyra, J., & Kuhl, P. K. (2005). Brain potentials to native and non-native speech contrasts in 7- and 11-month-old American infants. *Developmental Science*, *8*(2), 162–172. doi:10.1111/j.1467-7687.2005.00403.x

Robertson, L. (2014). *Literacy and deafness listening and spoken language*. San Diego, CA: Plural Publishing.

Rosenzweig. (2011, August 17). *The catch up game: Children who receive cochlear implants "late"* [Web blog post]. Retrieved from https://auditoryverbaltherapy.net/2011/08/17/the-catch-up-game-children-who-receive-cochlear-implants-late

Sass-Lehrer, M., Moeller, M. P., & Stredler-Brown, A. (2015). What every early intervention professional should know. In M. Sass-Lehrer (Ed.), *Early intervention for deaf and hard-of-hearing infants, toddlers, and their families* (pp. 3–36). New York: Oxford University Press.

Sharma, A., Gilley, P. M., Dorman, M. F., & Baldwin, R. (2007). Deprivation-induced cortical reorganization in children with cochlear implants. *International Journal of Audiology*, *46*(9), 494–499. doi:10.1080/14992020701524836

Suskind, D. L., Leffel, K. R., Graf, E., Hernandez, M. W., Gunderson, E. A., Sapolich, S. G., et al. (2016). A parent-directed language intervention for children of low socioeconomic status: A randomized controlled pilot study. *Journal of Child Language*, *43*(2), 366–406. doi:10.1017/S0305000915000033

Tees, R. C., & Werker, J. F. (1984). Perceptual flexibility: Maintenance or recovery of the ability to discriminate non-native speech sounds. *Canadian Journal of Psychology/Revue Canadienne de Psychologie*, *38*(4), 579–590. doi:10.1037/h0080868

Tomblin, J. B., Harrison, M., Ambrose, S. E., Walker, E. A., Oleson, J. J., & Moeller, M. P. (2015). Language outcomes in young children with mild to severe hearing loss. *Ear and Hearing*, *36*, 76S–91S. doi:10.1097/AUD.0000000000000219

Traxler, C. B. (2000). The Stanford Achievement Test, 9th edition: National norming and performance standards for deaf and hard-of-hearing students. *Journal of Deaf Studies and Deaf Education*, *5*(4), 337–348. doi:10.1093/deafed/5.4.337

Vouloumanos, A., & Werker, J. F. (2004). Tuned to the signal: The privileged status of speech for young infants. *Developmental Science*, *7*(3), 270–276. doi:10.1111/j.1467-7687.2004.00345.x

Vouloumanos, A., & Werker, J. F. (2007). Listening to language at birth: Evidence for a bias for speech in neonates. *Developmental Science*, *10*(2), 159–164. doi:10.1111/j.1467-7687.2007.00549.x

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Walker, E. A., Holte, L., McCreery, R. W., Spratford, M., Page, T., & Moeller, M. P. (2015). The influence of hearing aid use on outcomes of children with mild hearing loss. *Journal of Speech, Language, and Hearing Research*, *58*(5), 1611–1625. doi:10.1044/2015_JSLHR-H-15-0043

Walker, E. A., Spratford, M., Moeller, M. P., Oleson, J., Ou, H., Roush, P., et al. (2013). Predictors of hearing aid use time in children with mild-to-severe hearing loss. *Language, Speech & Hearing Services in*

Schools, *44*(1), 73–88. doi:10.1044/0161-1461(2012/12-0005)

Weikum, W. M., Vouloumanos, A., Navarra, J., Soto-Faraco, S., Sebastián-Gallés, N., & Werker, J. F. (2007). Visual language discrimination in infancy. *Science*, *316*(5828), 1159. doi:10.1126/science.1137686

Weitzman, C., Roy, L., Walls, T., & Tomlin, R. (2004). More evidence for reach out and read: A home-based study. *Pediatrics*, *113*(5), 1248–1253. doi:10.1542/peds.113.5.1248

Yoshinaga-Itano, C. (2003). From screening to early identification and intervention: Discovering predictors to successful outcomes for children with significant hearing loss. *Journal of Deaf Studies and Deaf Education*, *8*(1), 11–30. doi:10.1093/deafed/8.1.11

Yoshinaga-Itano, C., Sedey, A. L., Wiggin, M., & Chung, W. (2017). Early hearing detection and vocabulary of children with hearing loss. *Pediatrics*, *140*(2), e20162964. doi:10.1542/peds.2016-2964

Zuckerman, B., & Khandekar, A. (2010). Reach Out and Read: Evidence based approach to promoting early child development. *Current Opinion in Pediatrics*, *22*(4), 539–544. doi:10.1097/MOP.0b013e32833a4673