Providing Interventions That Support Literacy Acquisition in Children With Hearing Loss What Professionals Need to Know

K. Todd Houston, Lyn Robertson, and Denise Wray

Today, children with hearing loss are often identified at birth, fitted with advanced hearing technology, and enrolled in family-centered early intervention. Most of these children have the opportunity to enter kindergarten or first grade with language competencies that rival their hearing peers. For these children to be successful communicators ready to learn, professionals serving them and their families—such as early interventionists, speech-language pathologists, and early childhood educators—must understand the developmental, communicative, and educational challenges inherent to childhood hearing loss. Likewise, these professionals also must be competent practitioners in the provision of evidence-based interventions that establish the critical foundations for literacy acquisition. **Key words:** *children*, *hearing loss*, *literacy*, *reading*, *speech-language pathologists*, *teachers*

E VEN though dramatic improvements in have led to significant reductions in the age at which children with hearing loss (HL) are identified, many continue to face significant social-emotional, communicative, and educational challenges. Professional preparedness is a major contributor to helping all children with HL reach their communicative and academic potential. At the same time, teacher preparation programs for children who are deaf and hard of hearing (D/HH), many of which historically have embraced visual communication methodologies, have been closing

DOI: 10.1097/TLD.0000000000000161 242 at dramatic rates, as have educational settings designed decades ago as specialized classrooms for children with HL.

Increasingly, parents are choosing for their children to use hearing technology, acquire spoken language, and enroll in the least restrictive environment in their neighborhood schools. With this paradigm shift, many professionals lack the unique training, knowledge, and skills required to work with this new generation of children with HL, and in particular, children who come from culturally and linguistically diverse homes (Rosa-Lugo, 2016). Specifically, early interventionists, speech-language pathologists (SLPs), early childhood educators, and even educational audiologists lack this preparation; thus, their proficiency and capabilities are limited in this important educational and clinical area (Cosby, 2009; Marlatt, 2014; Miller, 2014). Similarly, growing evidence (Houston, Munoz, & Bradham, 2011; Houston & Perigoe, 2010; Joint Committee on Infant Hearing, 2007; Moeller, White, & Shisler, 2006; Shulman, Besculides, Saltzman, Irevs, & White, 2010; White, 2008) suggests that a critical shortage exists of professionals who

Author Affiliations: School of Speech-Language Pathology and Audiology, The University of Akron, Obio (Drs Houston and Wray); and Denison University, Granville, Obio (Dr Robertson).

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

Corresponding Author: K. Todd Houston, PhD, CCC-SLP, LSLS Cert. AVT, School of Speech-Language Pathology and Audiology, The University of Akron, Akron, OH 44325 (bouston@uakron.edu).

possess the necessary background, knowledge, and skills to deliver appropriate, evidence-based medical, clinical, and early intervention services. A particular need exists for professionals with specialized preparation for helping young children with HL learn to listen and develop spoken language, especially when many of these children may come from homes where English is not the primary language.

LISTENING HIERARCHY

Listening and spoken language (LSL) is a term that has been used by the Alexander Graham Bell Academy for Listening and Spoken Language, which provides certification tracks as Listening and Spoken Language Specialists (LSLS). Professionals serving young children with HL may choose to obtain certification as an LSLS Certified Auditory-Verbal Therapist or as an LSLS Certified Auditory-Verbal Therapist or as an LSLS Certified Auditory-Verbal Educator. In this section, we introduce the listening hierarchy that serves as a foundation on which spoken language outcomes are built.

Auditory first

In LSL pedagogy, a child's auditory access to the speech spectrum is paramount. It is a mindset perhaps best expressed by Flexer (1994), who wrote, "We speak because we hear, and we speak what we hear" (p. 5). Acknowledging hearing as a "first order event" (Flexer & Rhoades, 2016, p. 24) in the progression to becoming a literate adult has long been recognized as essential to achieving that ultimate outcome, making it possible for children with HL, first, to learn to listen and speak.

The philosophical tenet that enables children with HL to use spoken communication to function as independent and literate adults has served as one of the basic premises of auditory-verbal practice (Goldberg, 1993; Pollack, 1970). The term *auditory-verbal therapy* (AVT) captures the importance of audition because it relates to verbal communication and auditory brain development (Flexer & Rhoades, 2016; Ling, 1993). Hearing loss blocks acoustic input to the brain and precludes adequate neural growth, thereby hindering speech-language and auditory development; however, utilizing today's advanced hearing technology, the child's brain can be stimulated to the point whereby the biological structure of the brain may act in synchrony with the child's development when intervention occurs as close as possible to the critical time periods (Robbins, Koch, Osberger, Zimmerman-Philips, & Kishon-Rabin, 2004). Cole and Flexer (2008) further emphasized the subsequent need to engage in cumulative practice during intervention to achieve substantial speech-language and auditory brain growth.

In light of this mindset, professionals who receive additional training and certification from the A. G. Bell Academy for Listening and Spoken Language to become LSLS learn to approach intervention for the child with HL in an "auditory first" manner. That is to say, a child's neural access to audition plays a crucial role in the intervention plan. In turn, that intervention plan includes goals not only targeting speech and language, but audition as well. For children to be successful, they need optimal access to audition through early fitting of hearing aids. Pediatric and educational audiologists as well as other professionals serving the child and/or family should ensure that the hearing technology is appropriately fit and that the child is wearing the hearing aids or cochlear implants throughout all waking hours. We recommend establishing such goals to target the developmental hierarchy that Estabrooks (1994) and Edwards and Estabrooks (2006) outlined. This hierarchy can be adapted and individualized for the child with HL by the SLP or other instructors who may not have completed LSLS training, and it also can be adapted for children in homes where languages other than English are the primary form of communication.

Listening, localizing, and learning

Every hierarchy has a beginning, and in the realm of listening, it is detection. Simply put, it is the awareness of the presence or the absence of sound. Initially, this awareness may be indicated by an infant through changes in behavior such as decreased or increased sucking, eye widening, furrowed brows, or head movements. Later, it can be evidenced through conditioned play by placing a raised block or ring positioned at the child's ear and dropping the toy upon the presentation of the auditory stimulus. It is critical to note that a child cannot progress through the auditory hierarchy if detection cannot be established by the SLP, audiologist, related professional, or parent.

The second component in the hierarchy involves discrimination of words that may require some remediation if a child cannot indicate whether words sound the same or different. For a child who may not recognize whether words sound identical acoustically or not, direct practice with word pairs identified by the child as "same" or "different" for pairs such as "run-run" or "cat-cats" may be necessary.

The third component in the auditory hierarchy is identification. The child learns to identify both the prosody of speech, known as the suprasegmental aspects of speech, and to identify the vowels and consonants of speech, also known as the phonemes or segmentals. Adding the cues of pitch, stress, intensity, and duration to speech stimuli facilitates children's ability to identify or recognize what they hear. In other words, the task goes beyond simply identifying whether or not the stimulus is detected, but the identification of the sound. The child can actually associate a sound with a meaningful counterpart (e.g., "I not only HEAR the /s/, but I can identify that it is the snake sound"). Identification skills begin with individual sounds with prosodic features (i.e., suprasegmental characteristics) and progress to words that can be identified lacking any prosodic cueing. The child may identify the stimulus via pointing or by verbally repeating the stimulus presented through audition alone.

The final piece in the auditory hierarchy puzzle is comprehension. It is where professionals and family members ultimately want to be in terms of listening. In practical application, comprehension of language is continually taking place in the child's environment, and in some cases, in more than one language. In fact, identification and comprehension tasks are not linear in development; rather they often occur simultaneously, as the child begins to listen and hear.

Some professionals may function as if listening begins at this point (i.e., word identification) in the auditory hierarchy of listening development, but in fact, mastery of the previous three steps is a prerequisite. Upon close inspection of tasks that comprise comprehension, one might view the tasks involving common phrases, single- and multiple-step directions, sequencing, and answering questions as typical receptive language tasks. It is not new vocabulary and concepts being assessed, however; rather, it is auditory perception and comprehension of familiar vocabulary through the auditory modality using the natural prosodic pattern that characterizes connected speech.

For a more detailed explanation of the listening hierarchy, see Edwards and Estabrooks (2006) or a commercially available auditory curriculum published by the Central Institute for the Deaf (www.cid.edu), entitled *Speech Perception Instructional Curriculum and Evaluation* (Manley, 2016).

Key speech frequencies and the audiogram

Most SLPs and other professionals who are prepared to work with children with HL recognize that speech must be audible to the child with HL and that it is critical to see that the child has properly fitted hearing technology and uses that technology consistently. However, as represented in the listening hierarchy, it is the intelligibility of speech perceived by the child that is crucial and not just detection. Cole and Flexer (2016) explained that sound being audible simply reveals that the individual can detect the signal. Intelligibility requires more acoustic information, such as information that can enable a child to perceive the high-pitched energy carried by the consonants that reveals the acoustic differences among sounds. Such distinctions enable intelligibility, which is essential for listeners to comprehend language.

The critical case for intelligibility explains why Ling (2002) and Flexer (1999) have long underscored the concept of key speech frequencies and the speech information carried by these key frequencies. For example, nasality and voicing cues are primarily carried by the low frequencies of 250 and 500 Hz. The mid-frequency of 1000 Hz enables one to perceive cues that differentiate manner of articulation as well as the ability to perceive unstressed morphemes important for comprehension and expression of verb tense, plurality, possessives, and several other phoneme features. The ability to perceive information relating to place of articulation so one might hear the difference between a nonvisible velar /k/ and a more front alveolar /t/ is primarily carried by 2000 Hz. This is cited as the key frequency for speech intelligibility. Acoustic information for later-developing phonemes, such as liquids /l/ and /r/, as well as affricate and fricative bursts, occurs at this pitch. Lastly, the highest speech frequency range of 4000-6000 Hz permits a child to perceive the differences between /s/ and /z/, thereby imposing a significant impact on morphological inflections that convey crucial language meaning such as plurals, possessives, auxiliary verb endings, third person verb forms, and other components of language. Similar acoustic analyses might be conducted, in collaboration with audiologists, for languages other than English the child may be hearing at home to ensure that the parameters of the hearing technology is a good match for the languages the child is hearing and learning at home.

Knowledge of this acoustic information range and sensitivity is available via access to a child's audiogram, which reports thresholds at each of the key speech frequencies while using their hearing technology (e.g., hearing aids and cochlear implants). This requires a consistent and fluid communication stream between the SLP and the child's managing audiologist. Given the vast array of media options in today's world, communication between these professionals should be viable (e.g., electronic medical records, texting, phone, voicemail, and e-mail). It is paramount that the child's hearing technology is being maximized and routinely managed if spoken language for the child is the family's desired outcome. It takes a team to do so.

Furthermore, access to the speech spectrum must be determined on a daily basis at school using a functional listening test such as the Ling Six-Sound Test (Ling, 2002). Six speech sounds (/m/, /u/, /a/, /i/, "sh," and /s/) that cover the speech range for English are presented to the child at a normal conversational level, and the child is required to either detect or identify the sounds presented at various distances. This is an auditory goal that must be a part of the child's individualized educational plan and conducted daily at the school by the educational staff. The teacher and/or SLP should know how well the child's technology is functioning. Any differences or concerns regarding hearing should be reported to the audiologist.

TARGETING LISTENING AND SPOKEN LANGUAGE TO PREPARE CHILDREN FOR SCHOOL AND LITERACY LEARNING

Children with HL, whatever the cause of the loss, need not be limited and need not learn in different ways from children with typical hearing. In terms of formal education, the goal for this child is the same as the goal for the child with typical hearing, which is to complete high school and be prepared for postsecondary education. Preparation to meet this goal must start early. That is, parents and teachers must keep in mind the advantages children have when they are prepared to enter preschool, kindergarten, and first grade ready to listen, speak, and participate in all learning activities. The child with HL, especially one whose loss has been identified late (even 12 months is late to begin hearing), may be delayed in some linguistic and social aspects upon beginning school. If listening has been emphasized, however, the child will have a foundation for adding to his or her listening

and speaking repertoire in the company of other children who listen and speak. Such learning can be facilitated and ongoing if their general education teachers can be supported to understand the relationship between listening, speaking, reading, writing, and thinking and to foster their integration for children with HL.

The LSL approach (also called AVT) is designed to pave the way for the development of all aspects of language, from sounds to the construction of meaning, so that young children learn syntax, pronunciation, intonation, pragmatics, semantics, and content, upon which they can build knowledge of the world, including ways to interpret and represent such knowledge in print, throughout life. Most children with typical hearing arrive at school in the early years, with a basic foundation of the ways that language works, and then build the ability to read and write upon that knowledge. Children who do not have a basic facility with spoken language, or who have facility with a spoken language, but not the language used academically, are not ready to learn to read and write that language. Therefore, the primary task of the LSLS is to guide, coach, and mentor the child's parents to immerse the child in all the uses of spoken language in preparation for the child beginning formal schooling (Robbins, 2007).

For children with HL who are exposed to more than one language in the home, research continues to demonstrate that these children can learn and be proficient in both languages (Guiberson, 2013; McConkey Robbins, Green, & Waltzman, 2004). When working with linguistically and culturally diverse families, professionals should not counsel families to use "English only" in the home. For many of these families, English is most likely their second language, and they may not have sufficient fluency to express a range of language models. These families should be supported in the use of their first language while they also expose their children with HL to English.

Many researchers make the point that reading and writing are logical extensions of listening and speaking (see Adams, 1990; Goodman, 1994; Smith, 2004) and that many children make the leap on their own from being read with to reading by themselves (e.g., Fox, 2008; Trelease, 2013). Reading and writing processes develop rather easily in most children with typical hearing and strong oral language skills. They also can develop on time in children with HL, if their hearing and listening are attended to regularly and in meaningful settings. There are no "special" ways to work with such children, although presenting all aspects of spoken language to children with HL, including multiple languages if present, must be more intentional to avoid gaps in their spoken and written language acquisition.

Expectations to drive intervention and instruction

Unfortunately, there is a critical shortage of well-trained practitioners with the professional preparation to provide appropriate services to children with HL (Houston et al., 2011; Houston & Perigoe, 2010; Joint Committee on Infant Hearing, 2007). Similarly, there is a paucity of professionals with the skills, knowledge, and competences to work with children with HL, and specifically children and adolescents who are learning English as another spoken language (Rosa-Lugo, 2016; Rosa-Lugo & Allen, 2011). In regard to SLPs, Luckhurst (2008) and Compton, Tucker, and Flynn (2009) surveyed SLPs serving children with HL and found considerable deficiencies in their knowledge and skills, with only a few respondents reporting any exposure to children with HL prior to completing their university training. To fill these gaps in knowledge and skills, Ying (2008) recommended, "the academic preparation of an SLP should prepare clinicians to conduct the evaluation and treatment programs for pediatric patients with hearing loss" (p. 308). Although their background and training in speech and language acquisition are vital areas of knowledge, most SLPs have limited or no experience delivering direct speech and language services to young children with HL. Even without meeting the standards of LSLS certification, SLPs should receive preservice preparation in the skills that will prepare them to target the listening and spoken language skills, as well as the literate language skills, of children with HL.

Research (Compton, Tucker, & Flynn, 2009; Luckhurst, 2008) shows, however, that many SLPs have only cursory knowledge of current trends now shaping services to young children with HL and their families, such as universal newborn hearing screening, early fitting of amplification, immediate enrollment in early intervention services, and the use of cochlear implants in children with bilateral severe and profound sensorineural hearing losses. Furthermore, SLPs may not be aware of or have specific training in approaches such as AVT, which is the essence of LSL service delivery. It uses a family-centered approach that focuses on the acquisition of listening and spoken language for children who may not have been hearing since birth.

AVT is a developmental approach that is often employed from the time the child is identified with HL as a newborn. In this scenario, once the child has been fit with amplification and gained access to audition, typical neurodevelopment can be facilitated. The goal of AVT is to help the child achieve age-appropriate auditory, speech, and language milestones (Cole & Flexer, 2008). Unfortunately, prior to widespread implementation of newborn hearing screening programs, parents and caregivers could suspect the presence of an HL in their child for 12 months or more before receiving a diagnosis (Thompson & Thompson, 1991). For a majority of children, this meant an average age of diagnosis of 2.5 years (White, 2007). Children diagnosed at such a late age often faced considerable challenges acquiring spoken language, even when amplification was fitted and intervention services were initiated in a relatively timely manner. Because the initial diagnosis occurred midway or later during the critical period for language learning, many of these children experienced language delays. And, without access to welltrained practitioners with the knowledge and skills to close the language gap, a significant number of these children failed to acquire age-appropriate language abilities.

Today, universal newborn hearing screening has changed the landscape for nearly all children born with HL, and early identification has become the new standard of care. Some children, however, may be identified with HL later due to a range of issues, or they may receive inadequate audiological management or be provided inappropriate early intervention services. This can result in delayed acquisition of listening and spoken language developmental targets. That is, their performance age may be significantly delayed when compared with their chronological age.

For these children, the first priority is to rectify any issues with audiological management to ensure that the child is using hearing technology (e.g., digital hearing aids and/or cochlear implants) that is appropriately fitted and programmed. Weekly AVT sessions then are scheduled with the parents or caregivers to model strategies and coach techniques that can be used to close the language gap. An individualized and aggressive intervention plan would be needed, with specific emphasis on maximizing speech perception, speech and language development, and a rapid expansion of receptive and expressive vocabulary. As Caraway and Elder (2009) found through a controlled outcomes-based study, children enrolled in an AVT program can often make more than 1 year of progress in their language development during a 12-month period of intervention. To achieve this level of progress, Caraway and Elder observed that children, regardless of cultural background, benefitted from the services provided by a highly skilled LSLS, the availability of appropriate audiological management, and motivated parents and caregivers who reinforce listening and language targets daily in the home.

Listening, language development, and literacy

Acquisition of the spoken language to be read is known to be the best predictor of learning to read that language (Snow, Burns, & Griffin, 1998). The child with typical hearing has an advantage over the child with HL in that acquisition of spoken language begins in utero (DeCasper & Fifer, 1980; DeCasper & Spence, 1986). The child learning the language of schooling (i.e., English in the United States) at home also has an advantage. Such a child progresses on a daily basis after birth through constant and consistent interactions between caregivers and the infant. The child continues to grow through all stages of development, with each stage emerging from the one before it. Historically, children with typical hearing have been able to acquire the language spoken in their environment far more easily than have children with HL, and that has been one explanation for reading problems in children with HL. But new technologies, from newborn hearing screening to sophisticated hearing aids and cochlear implants, mean that HL need no longer be an insurmountable problem (Madell, 2015). Hearing can now be established as soon as the HL is diagnosed. The critical matter, though, for reading acquisition is to make possible the development of listening and the bringing of a child's attention to ever-finer-grained listening, whether the child has typical hearing or HL.

Being able to listen and converse in a spoken language does not necessarily mean that a child will learn to read proficiently, however, as can be seen in the rather large number of individuals with typical hearing who do not learn to read well (National Center for Education Statistics, n.d., NAEP, 2009 to present). Difficulties with phonological awareness and phonemic discrimination are associated with some reading problems seen in individuals with typical hearing (Snow, Burns, & Griffin, 1998), suggesting that hearing alone does not ensure sufficient listening and phonological skills to support skilled reading. Explicit instruction is required, even for typically hearing children.

Meaningful reading also involves knowledge of content expressible in vocabulary, using variations of syntax that align with the language used by the author of the text being read. Being able to converse must be built on being able to listen to a text being read. Building such capacities is an interactive process, such that knowledge of one part assists in building knowledge of another. Scarborough (2002) employed the metaphor of strands being woven together over time, as in a rope, to produce strategic and automatic facility with literacy. She showed how one strand, language comprehension, is woven from components such as background knowledge, vocabulary, language structures, verbal reasoning, and concepts of print, which are dependent on listening to and learning spoken language. The comprehension strand gradually becomes completely interwoven with a second strand that starts out separate, word recognition. This strand comprises smaller strands made up of phonological awareness, decoding, and sight recognition, in an ever-growing and intertwined rope leading toward the skilled reading needed for dealing with complex ideas.

To facilitate such growth, the LSLS needs to have a thorough knowledge of how all aspects of language are acquired by the child with typical hearing, to include the development of a second language (Paradis, Genesee, & Cragom, 2011). This makes it possible to have realistic expectations for the child with HL who is learning to listen and converse using the spoken language(s) in his or her environment. Such expectations for the child with HL need not differ from the typical hearing and learning child in quality or quantity, although more time and attention may be needed for the child with HL, particularly in children who have not had the advantage of early identification and use of appropriate hearing technologies and children from culturally and linguistically diverse backgrounds.

LSL Domains: Supporting literacy

The domains established for the certification of professionals as LSLS culminate in *Domain 9, Emergent Literacy*, which is the focus of the remainder of this article. Earlier domains, such as Domain 6, target listening and spoken language, signifying the central role played by learning to listen and use language in meaningful, interactive conversation, making it possible for children with HL to arrive at kindergarten and elementary school ready to learn to read.

According to the principles of LSL treatment, hearing, listening, reading, writing, and thinking scaffold one another, with each playing a continuous role in literacy development and its advancement throughout a person's life. Reading involves an interaction between the reader's knowledge of language, content, expectations, purposes for reading, and the text itself, and can be understood as a problem-solving, meaning-making activity. As a child progresses in reading, she or he can use reading to learn new words and the ideas they represent, but at the beginning, reading depends upon already knowing the spoken form of the words found in the text. The elements of Domain 9 are summarized in Table 1.

The focus of this domain is on the development of the auditory and language skills that underlie and support the acquisition and advancement of literacy. We have grouped these components into sets and provided examples of each in the table and have added rationale and commentary in the sections next.

Rbyme and rbythm

Reciting finger plays and nursery rhymes is a ubiquitous part of most children's early years for a variety of reasons, including providing the child with cultural knowledge and an opportunity to memorize, perform, get positive attention from adults, and speak with intonation and patterns. The language used in them is silly, fun, and often nonsensical, but they may be culture-specific. For LSL purposes, finger plays and nursery rhymes provide extensive practice that introduces and builds phonological awareness. Such awareness extends from making general comparisons between words that rhyme (itsy bitsy and bickory dickory) and making finer comparisons between initial sounds in words (little lamb). Children who can attend to such comparisons in their vocalizations are ready to learn to tease out subtle differences between the ways words are represented in print (Goswami, 2002). To make these activities more culturally sensitive, professionals should be aware of finger plays and nursery rhymes that are common in the diverse families they serve.

Narration

Telling and/or retelling stories and sequencing events can help children build memory for stories and can introduce them to elements of their home culture that may differ from what they encounter in school. Building memory for stories is important for using words to sequence events and ideas and to establish reasoning involving cause/effect and comparing/contrasting. Such stories need to come from the child's life and home culture, as well as from storybooks that may reflect more of the mainstream culture. All children need practice and assistance in listening to, reciting, and acting out stories in their conventional order. Knowledge of sequence and generalized conventional content enables a child to read for comprehension and to make sense of the words and ideas involved. Being able to predict what comes next in a story is an important part of comprehending it. When too much is surprising or unfamiliar, the child's thinking can collapse into confusion. Research has shown that children with HL taught in an LSL environment are as adept as children with typical hearing at remembering stories read with them by a caring adult (Robertson, Dow, & Hainzinger, 2006).

Songs and music

Songs and related activities provide scaffolding for remembering related words, including their sounds and meanings, in sequence. Music is an integral part of every culture. Pitch, rhythm, intonation, and kinesthetic movement are powerful tools for forming and maintaining memory and learning about syllabication, and all of these are available to the child with HL who is learning through LSL (Anvari, Trainor, Woodside, & Levy, 2002; Yennari, 2010). Parents and grandparents should be engaged to broaden **Table 1.** Summary of the learning sequence and pedagogy for emergent literacy, Domain 9, in

 criteria for certifying Listening and Spoken Language Specialists, expanded by the authors

Emergent Literacy Skills	Rationale/Cluster	Examples Showing Sensitivity to Cultural-Linguistic Diversity
a. Reciting finger plays and nursery rhymes	Rhyme and rhythm	Introduce mainstream culture through nursery rhymes such as the <i>Itsy Bitsy Spider</i> , <i>Hickory</i> <i>Dickory Dock</i> , and <i>Mary Had a</i> <i>Little Lamb</i> . Encourage parents to add rhymes and
		finger plays from the child's home
b. Telling and/or retelling stories c. Activity and story sequencing	Narration	Provide practice and assistance in listening to, reciting, and acting out stories (both from storybooks and the child's life) in their conventional order. Recognize that not all cultures use
		the same narrative discourse structure. Ask parents or grandparents to tell some classical stories from their heritage.
d. Singing songs and engaging in musical activities	Music and song	Provide opportunities to sing and dance in the rhythms of the child's home culture as well as in the shared mainstream culture
 e. Creating experience stories/experience books f. Organization of books (e.g., cover, back, title, and author page) g. Directionality and orientation of print h. Distinguishing letters words 	Books and print	Language Experience Books, in which children's own experiences are chronicled in a book format can help them learn about the left-to-right orientation of print and that spoken words can be represented in print.
sentences, spaces, and		
punctuation that mark text i. Phonics (e.g., sound-symbol correspondences and letter-sound correspondences) j. Phonemic awareness (e.g., sound matching, isolating, substituting, adding, blending, segmenting, and deleting) k. Sight word recognition	Phonics, decoding, and spelling	Children need direct instruction in how to connect the phonological and morphological structure of words to print. A solid foundation of word decoding and encoding (spelling) skills is critical to fluent sight reading and spelling.
a organ word recognition		(continues)

Table 1. Summary of the learning sequence and pedagogy for emergent literacy, Domain 9, in criteria for certifying Listening and Spoken Language Specialists, expanded by the authors *(Continued)*

Emergent Literacy Skills	Rationale/Cluster	Examples Showing Sensitivity to Cultural-Linguistic Diversity
 Strategies for the development of listening, speaking, reading, and writing vocabulary Contextual clues to decode meaning Oral reading fluency development Text comprehension strategies (e.g., direct explanation, modeling, guided practice, and application) Abstract and figurative language (e.g., similes and metaphors) Divergent question comprehension (e.g., inferential questions and predictions) 	Text comprehension and construction	Higher level language comprehension and construction of original texts requires a deep understanding of literate language and all of its components. Children with hearing loss need experience in reading grade-level textbooks, and in writing a variety of text genres to become academically proficient, just as children with typical hearing do.

Note. Column 1 is from the Alexander Graham Bell Association for the Deaf and Hard of Hearing, the Academy for Listening and Spoken Language. Retrieved October 11, 2017, from http://www.agbellacademy.org/CoreCompetencies. pdf

the cultural experience for children and to keep them grounded in their home cultures, languages, and rhythms.

Books and print

An important aspect of learning to read is coming to understand how text works within the context of books. Domain 9 of the LSL protocol specifies that children be introduced to what is involved in creating stories and informational accounts by being drawn into making and reading homemade books that document their own experiences. This provides information about language content, but also form. When children observe an adult drawing a picture or providing something else from the child's experience on the page of a notebook, along with writing an account of what the picture or object represents, the child sees that written language is recorded from left to right and from the top to the bottom of the page.

Participation in creating a Language Experience Book (Robertson, 2014) proceeds from the parent providing the subject, the words and the way to represent them, and the related picture or artifact. This can enhance culturallinguistic connections between school and home (Caesar & Nelson, 2014). The end goal of frequently using a Language Experience Book and other related activities is to ensure that the child grows into a literate reader and writer (Robertson, 2014). Along the way, the conventions of syntax, spelling, and mode of expression are incorporated by the child through having progressive experience with all aspects of language. The advantage of the Language Experience Book is that the story and explanation are relevant to the child's life, making the point repeatedly that writing and

reading refer to real experiences of a real person (e.g., "This is MY book about ME!"). When an adult writes about the child, the result is an accessible and predictable reading book for the child that uses words already in his or her vocabulary. Matching up the written and spoken words is easier when they are all within the child's experience. The Language Experience Book can be used to add to vocabulary and to syntactic expressions new to the child, as long as the new is incorporated into what the child already knows. The child with whom Language Experience Books are used can become the young adult who keeps a journal and writes clear academic papers, as well as operating as an avid reader who expects text to make sense.

Simultaneously with learning about books "from the inside," adults need to help children identify book parts and strategies "from the outside" by reading with the child daily and talking about the parts of the book: the front cover, the author, proceeding from the left to the right and from the top to the bottom down the page, the relationships between the pictures, and the text, the back cover, letters, words, sentences, punctuation, spaces between words, and so on. Clay (1993) emphasized the importance of learning about print concepts by interacting with an adult in the use of books on a regular basis. Focusing on these aspects of Domain 9 of the LSL curriculum ensures a familiarity with text, pictures, and books built from a consistency of experience. Knowing what to do with a book reduces anxiety about learning to read independently.

Phonics, decoding, and spelling

Reading involves processes of word identification at its core. Some words are distinguished by relating their letters in the order they are represented to the sounds the letters represent, commonly called the "sounding out" of words. Others are best identified as whole words or through hybrid methods, because they so not follow the rules of pronunciation at the phoneme level, although they might include recognizable orthographic chunks. Phonological awareness and its subprocess, phonemic awareness, are necessary in both processes. Sight and sound interact as the reader looks for meaning, or, more accurately, as the reader brings meaning to print. The prerequisite for these word identification processes to take place is the development of the ability to pay attention to the sounds of language, commonly known as phonemic awareness. In order for instruction in word identification to be successful, the emerging reader must be able to isolate individual sounds in words (Adams, 1990, 2002), which is an important emphasis of the LSL approach that underlies fluent sight reading. They also must learn to recognize regularly spelled morphemes, such as -ing and -ed, or dis- and pre-.

Text comprehension and construction

The last six parts of Domain 9 emphasize the outcomes of literacy processes, because reading and writing are the written counterparts of listening and speaking. Ultimately, the goal is for children with HL to be able to listen, use spoken language, and become independent consumers of print. They also should be able to formulate language well, both when speaking and writing. Through these processes, children become literate, not only using reading to gain information but to develop a deep enjoyment of reading and writing.

Vocabulary building is often identified as the main stumbling block for children with HL; therefore, professionals need to understand how words relate to one another so as to provide experience for the child with synonyms, antonyms, and shades of meaning. Knowledge of schema theory is helpful in this regard (see Anderson, 2004). The term schema stands for a memory structure or category, and schemas (or schemata) are collections of memory structures. To learn a new word, a person needs to find or be shown a way to connect its meaning and structure to a word or words she or he already knows; therefore, teaching and therapy need to be done with a sensitivity to what the child knows and has experienced, sometimes in more than one language and culture. This is the basis for working with contextual clues and of asking children questions that help them make connections between what they already know and the words or circumstances in a story.

Oral fluency and fluency in reading aloud both depend on automatic application of pronunciation rules based on implicit knowledge of the sounds of spoken language. Even more importantly, reading aloud depends on the moment-to-moment construction of the meaning of the text. Achieving fluency without comprehension misses the point that reading is ultimately a thinking process. Text comprehension strategies begin with spoken language comprehension strategies, and the LSLS or other professional needs to monitor the child's participation in conversations and decide sensitively where to explain, model, and guide the child in making appropriate meaning. When the child can do this during conversations, the child can be coached to apply such strategies while reading. Professionals also need to attend to cultural differences in timing and other aspects of social interactions.

Deciphering abstract and figurative language can be difficult for children with limited vocabulary and experience with such language. The LSLS needs to introduce children to similes and metaphors and explain how they show something important about a word. For example, understanding "... its fleece was white as snow" involves knowing something about sheep, color names, and snow; otherwise it is just an exercise in articulation. Actual experience with sheep, colors, and snow is best, but experience can be gained from picture books and conversation about them. Divergent questions are important in order to help the child move from the literal level of comprehension to more complex levels of thinking. Even in an ordinary conversation, young children can be asked why something happened, what they think will happen next, and what they think about a story's outcome.

Challenges children may experience: Syntax, semantics, content, and vocabulary

Twenty-first century advancements in newborn hearing screening, access to the frequency spectrum for speech via advanced hearing technologies, and intense early intervention have created a seismic shift in intervention paradigms for children who are D/HH, necessitating a transfer in focus from early childhood to infancy, from visual teaching to auditory skill development, and from educational management in segregated classrooms to collaborative models and placement in mainstream settings (Cole & Flexer, 2008). Evidence continues to mount indicating that, for infants with HL identified early and who receive appropriate technologies and intense early intervention, age-appropriate speechlanguage and literacy outcomes are a possibility (Dornan, Hickson, Murdoch, Houston, & Constantinescu, 2010; Geers, 2006; Niparko et al., 2010).

Further, following cochlear implantation, the vast and growing literature on the achievements of children who are severely or profoundly deaf indicates a dramatic shift toward spoken language outcomes that can closely approximate or be equal to those of hearing peers (Dornan et al., 2010; Geers, 2006; Nicholas & Geers, 2007; Niparko et al., 2010). Further, Hayes, Geers, Treiman, and Moog (2009) concluded that children implanted by the age of 2 years can achieve receptive vocabulary skills within the average range when compared with hearing peers. In addition, they observed a steeper growth rate in those children experiencing earlier implantation. As stated, the landscape of deafness has changed dramatically because of evidence-based research involving technology, cortical research featuring neuroplasticity of the brain, and early identification. As a result, this is a new and different generation of children who are D/HH.

Long-term studies are beginning to reflect a new landscape in speech-language expectations for children with HL. Geers and Hayes (2010) reported results of a longitudinal study that chronicled the performance of language-related skills in 184 students who had severe-to-profound HL and who received cochlear implants prior to age 5. They had followed these students throughout primary school and they reassessed the reading, writing, and phonological processing skills of 112 of those original subjects in high school. Results revealed that 47%-66% of the original subjects performed within the average range for reading in comparison to hearing peers. Indeed, this is a promising outcome in view of previous research findings. However, two areas that continued to present serious challenges for the subjects are phonological processing and written expression. This is particularly concerning because phonological processing skills have been identified as crucial predictors of high school literacy skills (Pogorzelski & Wheldall, 2006). For children with typical hearing, research has revealed a direct connection between insufficient phonological skills, specifically phonemic awareness, and an increased risk of reading difficulties (Catts, Fey, Zhang, & Tomblin, 2001; Schuele & Boudreau, 2008; Yopp, 1997). The National Reading Panel (National Institute of Child Health and Human Development, 2000) also identified phonemic awareness as a key building block in reading acquisition.

The audition necessary for phonological awareness assumes full access to the speech spectrum. In the past, this requisite skill underlying literacy development posed obstacles for children with HL because of the obvious difficulty of accessing adequate speech sound perception. Now, however, advanced hearing technologies and national Early Hearing Detection and Identification laws have made it possible to identify HL at birth followed by fitting of amplification shortly thereafter. The combination of early identification, amplification, and intervention has ameliorated the debilitating factors that HL poses, thereby opening the door to age-appropriate speaking, listening, reading, and writing skills that define literacy achievement.

Now that children with HL have early access to hearing the full speech spectrum, the suggestion that phonological process training as part of the foundation for literacy begins in preschool has become an essential part of the intervention plan. In fact, Johnson and Goswami (2010) examined communication outcomes of children with HL, and concluded that earlier cochlear implantation was associated with improved phonological processing skills as well as improved oral language and auditory memory. Studies have revealed that the sequential acquisition of these skills is similar for both children with and without typical hearing, but students with HL may be expected to evidence delays (Geers & Hayes, 2010). It is, indeed, a promising future for speech-language and literacy outcomes for children with severe-to-profound HL; however, the role of early identification, amplification, and implantation and intervention cannot be overemphasized.

Practical listening, language, and literacy suggestions for the child with hearing loss

Cole and Flexer (2008) offered a practical list of suggestions to share with families that target growth of the auditory brain. One suggestion was for the family to use a personal FM (frequency modulated) transmission system at home as soon as possible, and most definitely, when the child enters preschool. Such technology will enhance distance hearing and incidental learning because the speaker can speak directly into a microphone, making it easier to distinguish the person's speech from background noise, and the system can transmit a wireless FM signal directly to the receiver of the child's personal device. It will require a recommendation from the educational audiologist, but FM usage has become standard protocol for noisy environments such as home, classrooms, and field trips.

Another strategy for the child with HL is early implementation of a Language Experience Book (Robertson, 2014), which is used to visually chronicle a child's daily life, using personally meaningful vocabulary, as well as to promote the synergistic connection between speaking and writing. The clinician, teacher, and child can share events that occurred throughout the week in a note pad, spiral notebook, or any diary-type notebook. Writing about daily events with assistance from an adult promotes literacy and can be implemented with the child as an early shared book experience, in which the child is featured as the main character.

Reading aloud to children has long been recognized as a way to improve not only language skills, but attention span, while creating an excellent signal-to-noise ratio because the reader is close to the child (Trelease, 2006). As Trelease suggests, reading aloud to children is an emotionally satisfying experience long before it is an intellectual one, and both tremendously benefit the child with HL. Specific questions that assist the child in predicting, describing, and identifying story grammar and plot can be found in the *Guided Reading Coaching Tool* (Byrd & Westfall, 2015).

As previously mentioned, one of the most difficult foundation skills for children with HL involves phonological awareness. The challenging characteristic of phonological awareness operations is that the tasks are presented primarily through audition. Hearing the stimulus words or phrases intelligibly is requisite to successfully completing the tasks. This can be an arduous task for the child with HL; however, adding the qualities of the three Rsrhyme, rhythm, and redundancy-can enhance the tasks for the child. Table 2 summarizes examples from authors (e.g., Fitzpatrick, 1997; Yopp & Yopp, 2000) who have emphasized the use of rhyme and rhythm to inspire children to listen as they gain crucial skills that will lay the foundation for successful reading.

Guiding and coaching parents to mentor their children

A final recommendation in growing the child's auditory brain is to coach family members about how to use narration of family life to expand auditory comprehension. This can start with identifying objects and events in the environment, as they are encountered in daily living and extend to complex stories reminiscing about important family occasions. This recommendation applies to children with HL because it is not safe to assume that the child has learned vocabulary and concepts incidentally; it applies to dual language learners because it is not safe to assume that the vocabulary and cultural concepts learned at home will be a close match to vocabulary and cultural concepts learned at school. For the child with HL, particularly if the family uses a different home language, it is important for parents actively to teach adjectives, nouns, verbs, with extensive repetition of association with the new concepts (Alfano & Douglas, 2018; Douglas, 2011). Parents also can compare and contrast object characteristics and make comparisons as meaningful as possible by relating them to everyday experiences. Above all, parents should make language learning fun, purposeful, and relevant (Cole & Flexer, 2008).

To accomplish this, professionals need to keep in mind key principles of family-centered practice. This means that, in working with a child, they must simultaneously work with the parent(s) of the child. The task is that of mentoring parents to mentor their children. This is almost always an emotional matter for the parents. They are usually new at having a child with "special needs" and are often also new at being parents. Some may be stuck in grief, wondering why the HL happened or blaming themselves for it. Guiding them to support success for the child is a good way to help them move beyond such feelings. Parents may need to learn step by step how to nurture their child's progress. This includes helping parents learn how to talk, read, and write with their child in their own spoken language, which may be something other than English.

Part of LSLS certification involves demonstrating the ability to introduce an activity or strategy by performing it with the child while the parent observes. Then the parent can try to do the activity with the child, ideally while the LSLS observes, or outside of the school or therapy setting. Then the LSLS gives sensitive, constructive, supportive feedback that helps

uble 2. Examples o Level	of intervention activi Title	ties for building phonologic Operation	al skills through rhyme, rhythr Objectives	n, and redundancy Directions/Examples
evel 1: Rhythm and rhyme	Time to rhyme	Sound matching	Child will hear and identify word patterns using alliteration and rhyme	Read sentences to children. Have them say missing rhyming word; may provide picture choices. I like to have fun & play in the (sun). Would you rather eat a bone or an ice cream(cone)? Around the hive, what do you see? A black & yellow bumble
	The name game	Segment sentences into words Segment words into syllables and phonemes	Child will count words in a sentence Child will count syllables in a sentence	Sing the name chant, inserting each child's name. Segment each child's name into syllables. Clap, Clap, Clap your name. (Sar-ah, Sar-ah) Tap, Tap your name. Snap, Snap, Somp your name. Stomp, Stomp, Stomp your name.
evel 2: Parts of a word	Parts of a word	Blending (onsets and rimes)	Child will blend onsets and rimes to form words	Sing the chant, inserting words of choice. First you have a(/k/), Then comes the(/at/), Smush'em together And then you have(/kat/). (continues)

Level	Title	Operation	Objectives	Directions/Examples
Level 3: Sequencing of sounds	Sequencing of sounds	Isolating phonemes Syllable identification followed by phonemes	Child will identify the initial/final syllable of a word. Child will identify the I/M/F phoneme of a word	Sing the song and have the children identify initial, medial, or final phonemes of words. Song: What sound do you hcar? (to "Farmer in the Dell") What sound is first, What sound is first, When you hcar (dog), What sound is first? Response: /d/ is first, /d/ is first, When I hear dog,
Level 4: Separation of sounds	Separation of sounds	Segmentation (by the child) words to phonemes	Child will count individual phonemes in a word Child will identify individual phonemes in a word	(4) 15 IIISU. Give each child approximately 20 goldfish snacks. Say words containing 2-4+ phonemes (use words from current classroom theme or literature). Have the children make a line of fish, one for each phonema in the word
Level 5: Manipulation of sounds	Manipulation of sounds	Substitution of phonemes	Child will substitute I/M/F phoneme of a word	Sing the song "Zippity Bippity" substituting various sounds. (Tippity-to-tah, Pippity-po-pah) Song: (to "Zippity-do-dah") Bippity-bo-bah, bippity-bay, My, oh my, what a wonderful day. Plenty of sunshine coming my way, Bippity-bo-bah, bippity-bay

Table 2. Examples of intervention activities for building phonological skills through rhyme, rhythm, and redundancy

257

the parent build skills in working with the child. The parent needs a durable connection with the LSLS or other professional as a mentor and needs to feel the safety of working together on behalf of the child's best future.

CONCLUSION

A new day has dawned for children with HL. Today, newborn hearing screening and early diagnosis of HL have led to earlier fitting and use of hearing technology at younger ages, often within a few weeks of life. Children with significant HL now can access auditory information almost from birth, and they can receive intervention from wellprepared LSLS practitioners who are versed in facilitating listening and spoken language outcomes, while receiving consistent parent guidance and coaching. Rather than being delayed in their development, children with HL are arriving in kindergarten and first grade ready to learn. In turn, professionals who have received specialized preparation, such as to become a certified LSLS, and who know how to work with children who come from homes where English is not the primary language, have higher expectations for academic success. Emerging research reviewed in this article supports an expectation that these children can obtain levels of literacy that are equal to or exceed accomplishments of many of their hearing peers.

REFERENCES

- Adams, M. (1990). *Beginning to read*. Cambridge, MA: MIT Press.
- Adams, M. (2002). Alphabetic anxiety and explicit, systematic phonics instruction: A cognitive science perspective. In S. Neuman & D. Dickinson (Eds.), *Handbook of early literacy research* (pp. 66-80). New York: Guilford Press.
- 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.
- Anderson, R. (2004). Role of the reader's schema in comprehension, learning, and memory. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (5th ed., pp. 594–606). Newark, DE: International Reading Association.
- Anvari, S., Trainor, L., Woodside, J., & Levy, B. (2002). Relations among musical skills, phonological processing, and early reading ability in preschool children. *Journal of Experimental child Psychology*, 83, 111– 130.
- Byrd, D., & Westfall, P. (2015). *Guided reading coaching tool.* Jacksonville Beach, FL: Professional Development Resources.
- Caesar, L. G., & Nelson, N. W. (2014). Parental involvement in language and literacy acquisition: A bilingual journaling approach. *Child Language Teaching and Therapy*, 30(3), 317–336. doi:10.1177/0265 659013513028
- Caraway, T. H., & Elder, T. H. (2009). Doing what it takes: Advancing outcomes for children with hearing loss. *Perspectives on Hearing and Hearing Disorders in Childbood*, 18(2), 69-73.
- Catts, H. W., Fey, M. E., Zhang, X., & Tomblin, J. B. (2001). Estimating the risk of future read-

ing difficulties in kindergarten children: A researchbased model and its clinical implementation. *Language Speech and Hearing Services in Schools*, *32*, 38-50.

- Clay, M. (1993). An observational survey of early literacy achievement. Portsmouth, NH: Heinemann.
- Cole, E. B., & Flexer, C. (2008). *Children with hearing loss: Developing listening and talking birth to six* (2nd Ed.). San Diego, CA: Plural Publishing.
- Cole, E. B., & Flexer, C. A. (2016). *Children with bearing loss: Developing listening and talking birth to six* (3rd ed.). San Diego, CA: Plural Publishing.
- Compton, M. V., Tucker, D. A., & Flynn, P. F. (2009). Preparation and perceptions of speech-language pathologists working with children with cochlear implants. *Communication Disorders Quarterly*, 30(3), 142-154.
- Cosby, J. (2009). Pediatric cochlear implants: Knowledge and skills of speech-language pathologists. *The ASHA Leader*, *14*(2), 6-18. doi:10.1044/leader .FTR1.14022009.6
- DeCasper, A., & Fifer, W. (1980). Of human bonding: Newborns prefer their mothers' voices. *Science*, 208(4448), 1174-1176.
- DeCasper, A., & Spence, M. (1986). Infant Behavior and Development, 9(2), 133-150.
- Dornan, D., Hickson, L., Murdoch, B., Houston, K. T., & Constantinescu, G. (2010). Is auditory-verbal therapy effective for children with hearing loss. *The Volta Review*, *110*(3), 361–387.
- Douglas, M. (2011). Spoken language assessment considerations for children with hearing impairment when the home language is not English. *Perspectives on Hearing Disorders and Hearing Disorders in Children*, 21(1), 4-19.

- Edwards, C., & Estabrooks, W. (2006). Learning through listening: A hierarchy. In W. Estabrooks (Ed.), *Auditory-verbal therapy and practice*. Washington, DC: Alexander Graham Bell Association for the Deaf and Hard of Hearing.
- Estabrooks, W. (Ed.). (1994). Auditory-verbal therapy for parents and professionals. Washington, DC: Alexander Graham Bell Association for the Deaf and Hard of Hearing.
- Fitzpatrick, J. (1997). *Phonemic awareness: Playing with sounds to strengthen beginning reading skills.* Cypress, CA: Creative Teaching Press, Inc.
- Flexer, C. (1994). Facilitating hearing and listening in young children. San Diego, CA: Singular Publishing Group, Inc.
- Flexer, C. A. (1999). Facilitating bearing and listening in young children. San Diego, CA: Singular Publishing Group, Inc.
- Flexer, C., & Rhoades, E. A. (2016). Hearing, listening, the brain, and auditory-verbal therapy. In W. Estabrooks, K. MacIver-Lux, & E. A. Rhoades (Eds.), *Auditory-verbal therapy* (pp. 23-34). San Diego: CA: Plural Publishing, Inc.
- Fox, M. (2008). *Reading magic*. Orlando, FL: Houghton Mifflin Harcourt.
- Geers, A. E. (2006). Factors influencing spoken language outcomes in children following early cochlear implantation. In *Cochlear and brainstem implants* (Vol. 64, pp. 50–65). Basel, Switzerland: Karger Publishers.
- Geers, A., & Hayes, H. (2010). Reading, writing, and phonological processing skills of adolescents with 10 or more years of cochlear implant experience. *Ear and Hearing*, 32, 498–598.
- Goldberg, D. M. (1993). Rational for auditory-verbal practice. *The Volta Review*, 95(3), 183-184.
- Goodman, K. (1994). Reading, writing, and written texts: A transactional sociopsycholinguistic view. In R. Ruddell, M. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading* (4th ed., pp. 1093–1130). Newark, DE: International Reading Association.
- Goswami, U. (2002). Early phonological development and the acquisition of literacy. In S. Neuman & D. Dickinson (Eds.), *Handbook of early literacy research* (pp. 111–125). New York: Guilford Press.
- Guiberson, M. (2013). Survey of Spanish parents of children who are deaf or hard of hearing: Decision-making factors associated with communication modality and bilingualism. *American Journal of Audiology*, 22(1), 105-119.
- Hayes, H., Geers, A. E., Treiman, R., & Moog, J. S. (2009). Receptive vocabulary development in deaf children with cochlear implants: Achievement in an intensive auditory-oral educational setting. *Ear and Hearing*, *30*(1), 128–135.
- Houston, K. T., Munoz, K., & Bradham, T. S. (2011). Professional development: Are we meeting the needs of state EHDI programs? *The Volta Review*, 111(2), 209-223.

- Houston, K. T., & Perigoe, C. B. (2010). Speech-language pathologists: Vital listening and spoken language professionals. *The Volta Review*, *110*(2), 219–230.
- Johnson, C., & Goswami, U. (2010). Phonological awareness, vocabulary, and reading in deaf children with cochlear implants. *Journal of Speech, Language, and Hearing Research*, 53, 237–261.
- 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.
- Ling, D. (1993). Auditory-verbal options for children with hearing impairment: Helping to pioneer an applied science. *The Volta Review*, 95(3), 187-196.
- Ling, D. (2002). *Speech and the bearing impaired child* (2nd ed.). Washington, DC: AG Bell Association for the Deaf and Hard of Hearing.
- Luckhurst, J. A. (2008). Professional preparedness for provision of auditory oral programs to children with hearing loss: Results of a survey. *Perspectives on Aural Rebabilitation and Its Instrumentation*, 15, 2-18.
- Madell, J. (2015). It's not the same old deafness. Retrieved March 30, 2017, from http://hearinghealth matters.org/hearingandkids/2015/its-not-the-same-old -deafness-2/
- Manley, J. (2016). *Speech perception instructional curriculum and evaluation* (2nd ed.). St. Louis, MO: Central Institute for the Deaf.
- Marlatt, E. (2014). The evolution of the education of deaf and hard of hearing children into speech-language pathology, educational audiology, and special education. American Annals of the Deaf, 158(5), 484–485.
- McConkey Robbins, A., Green, J. E., & Waltzman, S. B. (2004). Bilingual oral language proficiency in children with cochlear implants. *Archives of Otolaryngology—Head and Neck Surgery*, 130(5), 644-647.
- Miller, K. (2014). Trends impacting one public school program for students who are deaf or hard-of-hearing. *Communication Disorders Quarterly*, 36(1), 35-43.
- Moeller, M. P., White, K. R., & Shisler, L. (2006). Primary care physicians' knowledge, attitudes, and practices related to newborn hearing screening. *Pediatrics*, *118*(4), 1357-1370.
- National Center for Education Statistics. (n.d.) *NAEP reading achievement levels by grade*. Retrieved October 13, 2017, from https://nces.ed.gov/nations reportcard/reading/achieve.aspx
- National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office. Also retrieved from http://www.nichd.hih.gov/ publications/nrp/report.htm

- Nicholas, J. G., & Geers, A. E. (2007). Will they catch up? The role of age at cochlear implantation in the spoken language development of children with severe to profound hearing loss. *Journal of Speech, Language and Hearing Research*, 50(4), 1048-1062.
- 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.
- Paradis, J., Genesee, F., & Crago, M. B. (2011). Dual language development and disorders: A handbook on bilingualism and second language learning. Baltimore, MD: Paul H. Brookes Publishing Co.
- Pogorzelski, S., & Wheldall, K. (2006). The importance of phonological processing skills for older low-progress readers. *Educational Psychology in Practice*, 21(1), 1–22. doi:10.1080/02667360500035074
- Pollack, P. (1970). *Educational audiology for the limited-bearing infant*. Springfield, IL: Charles C. Thomas.
- Robbins, A. M. (2007). Clinical management of bilingual families and children with cochlear implants. *Loud & Clear: A Cochlear Implant Rehabilitation Newsletter*, 1. Retrieved from www.advancedbionics.com/ userfiles/File/Loud_and_Clear_107.pdf.
- Robbins, A. M., Koch, D. B., Osberger, M. J., Zimmerman-Philips, S., & Kishon-Rabin, L. (2004). Effect of age at cochlear implantation on auditory skill development in infants and toddlers. *Archives of Otolaryngology— Head and Neck Surgery*, 130(5), 570-574.
- Robertson, L. (2014). Literacy and deafness: Listening and spoken language (2nd ed.). San Diego, CA: Plural Publishing.
- Robertson, L., Dow, G., & Hainzinger, S. (2006). Story retelling patterns among children with and without hearing loss: Effects of repeated practice and parentchild attunement. *The Volta Review*, 106(2), 147– 170.
- Rosa-Lugo, L. I. (2016). APT/HI-R and children who are English as second language (ESL) learners. In S. Allen (Ed.), Assessment to intervention: A guidebook for the auditory perception test for the hearing impaired (Rev. ed., pp. 175-189). San Diego, CA: Plural Publishing.
- Rosa-Lugo, L. I., & Allen, S. G. (2011, March 15). Assessing listening skills in children with cochlear implants: Guidance for speech-language pathologists. *The ASHA Leader*. Retrieved from https://leader.pubs.asha.org/ article.aspx?articleid=2279014

- Scarborough, H. (2002). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook of early literacy research* (pp. 97-110). New York: Guilford Press.
- Schuele, C. M., & Boudreau, D. (2008). Phonological awareness intervention: Beyond the basics. *Lan*guage, Speech, and Hearing Services in Schools, 39, 3-20.
- Shulman, S., Besculides, M., Saltzman, A., Ireys, H., & White, K. R. (2010). Evaluation of the universal newborn hearing screening and intervention program. *Pediatrics*, *126*, S19–S27.
- Smith, F. (2004). Understanding reading (6th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Snow, C., Burns, M., & Griffin, P. (Eds.). (1998). Preventing reading difficulties in young children. Washington, DC: National Academy Press.
- Thompson, M. D., & Thompson, G. (1991). Early identification of hearing loss: Listen to parents. *Clinical Pediatrics*, 30(2), 77–80.
- Trelease, J. (2006). How non-reading students are related to their non-reading parents and teachers. Retrieved from http://www trelease-on-reading.com/ whatsnu_morrie.html
- Trelease, J. (2013). *The read-aloud handbook* (6th ed.). New York: Penguin.
- White, K. (2007). Early intervention for children with permanent hearing loss: Finishing the EHDI revolution. *The Volta Review*, 106(3), 237–258.
- White, K. R. (2008). Newborn hearing screening. In J. R. Madell & C. Flexer (Eds.), *Pediatric audiology: Diagnosis, technology, and management* (pp. 31-41). New York: Thieme.
- Yennari, M. (2010). Beginnings of song in young deaf children using cochlear implants: The song they move, the song they feel, the song they share. *Music Education Research*, 12(3), 281–297.
- Ying, E. (2008). Speech/language/auditory management of infants and children with hearing loss. In J. R. Madell & C. Flexer (Eds.), *Pediatric audiology: Diagnosis, technology, and management* (1st ed.). New York: Thieme.
- Yopp, H. K. (November, 1997). Research developments in phonemic awareness and implications for classroom practice. Presentation at the Research Institute at the annual meeting of the California Reading Association, San Diego, CA.
- Yopp, H. K, & Yopp, R. H. (2000). Supporting phonemic awareness development in the classroom. *The Reading Teacher*, 54, 130-143.