Connect the Dots

The Path to Listening, Talking, and Reading for Children with Hearing Loss

HEARING FIRST

FOREWORD

Children who are deaf or hard of hearing are learning to listen, talk, and read everyday! As a parent with a newly diagnosed young child with hearing loss you may be asking, "How is that even possible?" It's not only possible but probable when we follow a proven path based on the research evidence.

Hearing First recognized the need to present what it takes to teach a child to listen and talk in a logical and organized way for parents and professionals to easily understand and use. In 2017, Dr. Carol Flexer, Distinguished Professor Emeritus of Audiology, University of Akron, was commissioned to gather, analyze, and synthesize the latest supporting research for the white paper, **Start with the Brain and Connect the Dots**. That white paper is organized as a logic chain that connects the dots between brain biology, how we learn to talk, and the development of literacy in the early school years.

Hearing First also recognized the need to apply that logic chain to a family's journey to clearly highlight the path to listening, talking, and reading for children with hearing loss. So, Dr. Flexer has translated the white paper into a helpful and family-friendly resource, this eBook.

The eBook shows how the Cooper family followed each link in the logic chain to reach their goal of listening and spoken language for their child. A family needs all the links working together and this eBook will help families understand each step on the path, or link in the logic chain, to help their child reach their full potential.

We're sharing this with families and professionals alike so that it may help families navigating their own LSL journey to understand each critical component as they teach their child with hearing loss to listen, talk, and read. Together, we will power the potential of all children who are deaf or hard of hearing.

Kindest Regards,

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CEO
Hearing First

Shortly after the Cooper family welcomed the arrival of their baby boy, Dakota, they learned he has hearing loss.

When he didn't pass the newborn hearing screening, they made a follow-up appointment with a pediatric audiologist who confirmed Dakota's hearing loss. The Coopers didn't know anything about childhood hearing loss so they quickly began their hunt for information, encouragement, and support as they navigated their next steps.

They did some research online, spoke with several professionals, and heard from families who also have children with hearing loss. After weighing the options and thinking about what they wanted for Dakota's future, the Coopers decided on Listening and Spoken Language (LSL). The LSL communication approach aligns with the Coopers' desire to help Dakota learn to talk with family and friends, attend and do well at his local school, and have the opportunity to do and be whatever he imagines as he grows up.

Once the Coopers chose LSL, they wanted specific guidance about what it takes to reach that LSL outcome for Dakota. What do they need to do each day? What steps need to be in place?

Start with the Big Picture

How do today's children with hearing loss learn to listen, talk, and read just like children with typical hearing? Let's start with the big picture about LSL development, beginning with the brain.

There's a specific path families can take to reach their goal of listening and spoken language for their child who's deaf or hard of hearing. This path, or "Logic Chain," connects the dots between basic brain biology and how we learn to talk and read.

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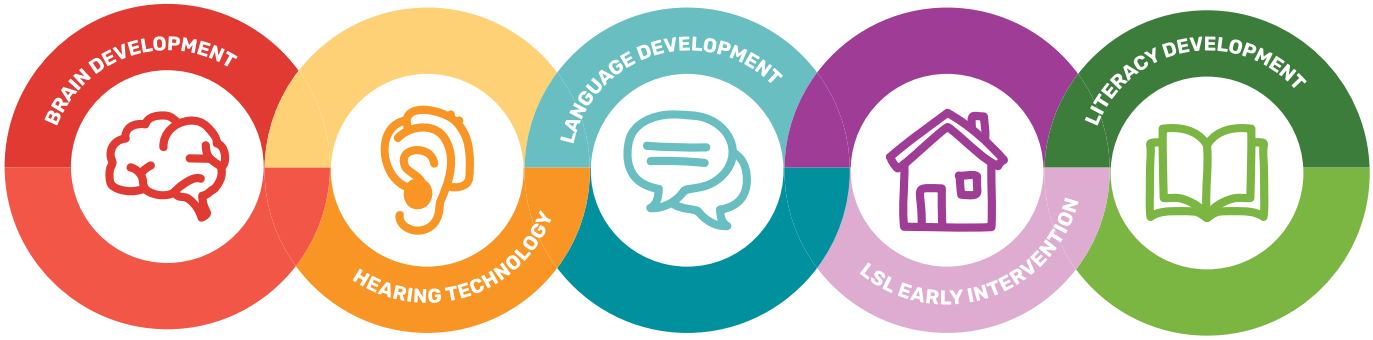
The Logic Chain shows what we know about the different pieces needed to develop a child's brain. Each piece serves as a critical link in the chain. A family, like the Coopers, needs ALL the links working together to reach a listening, spoken language, and literacy outcome for their child. No link can be skipped!



Let's start with the brain and connect the dots between each link on the Logic Chain.

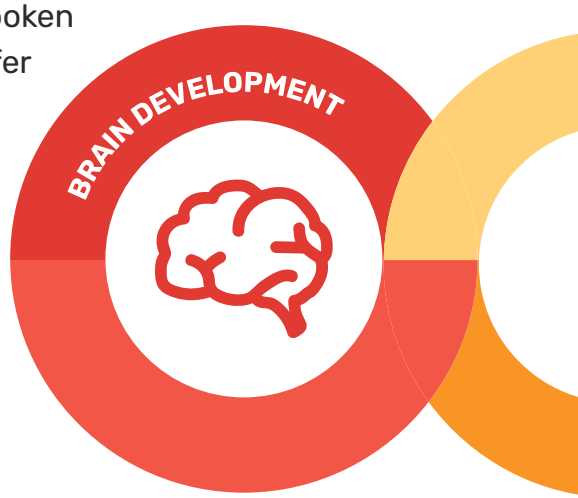
THE FIRST LINK:
BRAIN DEVELOPMENT

Most people think we hear with our ears, but our biology confirms that **hearing really occurs in the brain**. The ear merely captures vibrations (like the speech of parents, music, chirping birds, classroom discussion, etc.), and directs that vibratory information to the brain where learning and understanding take place.

This video shows how sounds travel from the ear to the brain, where they are interpreted and understood.

Therefore, our ears can be thought of as “doorways” to auditory brain centers where hearing truly occurs. In a similar way, eyes can be viewed as doorways to the brain for visual information. Learning to identify what one is seeing occurs in the brain, not in the eyes. The actual hearing — learning the meaning of sound — occurs in the brain, not in the ears.

The brain clearly receiving auditory information — such as the conversations happening around them, hearing someone reading aloud, and songs and music — is necessary for children to learn spoken language and for reading and writing. These sounds offer information to the brain and that information becomes knowledge! Lack of information to the brain will seriously interfere with a child’s ability to listen, talk, read, write, and more. Fortunately, we have a way to open the doorway – hearing technology.



The foundational architecture of a child’s brain is built primarily before their first birthday. This initial brain development depends on experience and language input by family members in the child’s world. The point is: timing is critical. The early stimulation of an infant’s brain with information they hear, such as conversations or someone reading to them, should be considered a neuro-developmental emergency.

Brain development is dependent on environmental experience. The very early fitting of hearing aids or cochlear implants will allow a family to nourish their baby's auditory brain and promote neural connections to the rest of the brain. Through all of these neural connections, a child's brain will be able to learn the meaning of speech and other sounds, which is critical to language, knowledge, and literacy development.

The bottom line? Babies and children must have very early access to clear speech and meaningful auditory information to fully grow and connect critical areas of the brain. Hearing is a necessary stepping stone to the child's ability to think and learn.

So, we can define *hearing* as the brain's perception of auditory information. And, we can refer to hearing technology, such as hearing aids and cochlear implants, as brain access devices, instead of ear devices.

Identifying hearing loss as a brain issue, rather than an ear issue, opened up a new realization for the Coopers. This shift in understanding reinforced their job as the architects of Dakota's listening and spoken language development.

THE SECOND LINK: **EARLY AND CONSISTENT USE OF HEARING TECHNOLOGY**

Our biology is that we **hear with the brain.**

The ear is the structure that captures raw, vibratory sound from the environment and directs it to the brain; but it's the brain that processes and gives meaning to that auditory information.

Our ears are merely “doorways” to our auditory neural centers. Which means hearing loss can be thought of as a blocked doorway that prevents a little, a lot, or all auditory information from reaching the brain. To over-simplify, hearing loss is a “doorway problem.” Spoken language development depends on overcoming the doorway problem and getting information to the brain.

Hearing technologies, such as hearing aids, cochlear implants, bone-anchored devices, and remote microphone systems are engineered to help sound break through the blocked doorway. Their purpose is to allow access, activation, stimulation, and development of auditory neural pathways with auditory information, like you talking to your baby, singing a lullaby, saying “I love you,” and reading a book aloud.

Therefore, the only point of wearing hearing technologies is to get that important auditory information through the doorway to the brain.

This surprised the Cooper family. They had been thinking about hearing aids as a way to develop the ear, not as a way to develop the brain. When hearing aids or cochlear implants are not worn, the doorway is obstructed or closed. The Coopers realized that Dakota’s auditory brain development will suffer unless his “doorway” is opened by technology.

Because of newborn hearing screening, we can identify a doorway problem at birth. We can — and must — fit hearing devices in the first weeks of life to activate and grow auditory neural connections as a foundation for language, reading, and knowledge development.

Devices must be worn at least 10 to 12 hours per day, and children need to experience a conversation-enriched environment.

It should be noted that while hearing aids can be fit within days of birth, cochlear implants, which are appropriate for babies with severe to profound hearing loss, aren't able to be surgically implanted until 6-12 months of age, depending on the protocols where you live.

For families who choose an LSL outcome, their children must be fit with appropriate hearing technology by a pediatric audiologist as early as possible. The devices must be **worn at least 10 to 12 hours per day**, and children need to experience a conversation-enriched environment.

The Coopers were able to obtain hearing aids for Dakota by one month of age. They learned how to keep his hearing aids on every waking moment. They recognized they were on the road to developing Dakota's brain with the use of his hearing aids and consistent **use of the "3Ts"** strategy.

THE THIRD LINK: **CHILD LANGUAGE DEVELOPMENT**

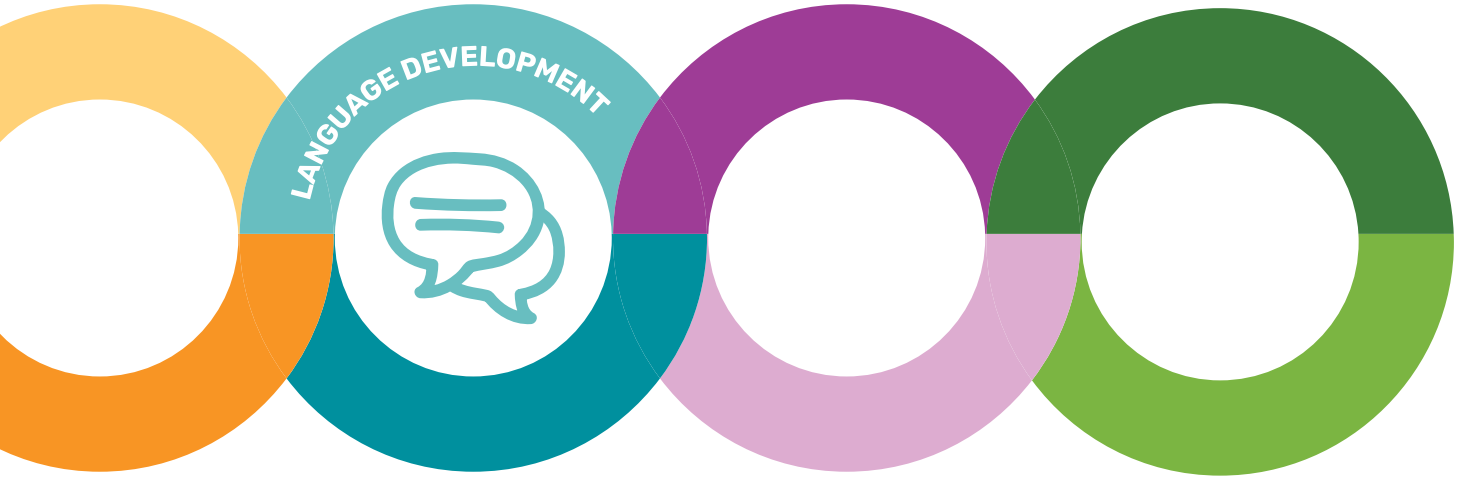
First, we need to understand: What is language? Simply put, language is an organized system of communication used to share information. Spoken language consists of sounds, words, and grammar used to express inner thoughts and emotions. Language includes facial expressions, gestures, and body movements. Language allows us to learn and share knowledge.

The language environment at home is the basis of an infant's brain growth. It also best predicts a child's language, reading, and IQ outcomes — whether or not the child has hearing loss. Think about how often family members have conversations, read books aloud, and enjoy singing and rhyming with their children. The more often, the better!

Learning language and acquiring knowledge begins in infancy, so talk with your baby. Because language, and the information it provides, is learned best in social interactions with the people who love your baby, it's the parents who generally become their child's first teacher. Parents teach their child the language and knowledge of the home.

All families are advised to speak the language they know best right from the beginning, whether that language is English, Spanish, Russian, sign language, or another language. Science tells us that parents should speak the language where they know the most words. This allows them to teach the most information to their child, which in turn grows their brain.

Based on this science of general early language learning, families of children who are deaf or hard of hearing can best provide early brain development experiences by talking with their children in the language the family uses at home, with the use of their child's hearing aids or cochlear implants.



Ninety-five percent of children with hearing loss are born to hearing families, while less than 1% of the U.S. population is fluent in sign language. About 25% of U.S. families do not speak English at home. Their children will need to know at least two spoken languages — the language of the home and the language of school.

How do we use spoken language to build the brain? Dana Suskind, physician and author, offers valuable tips for family conversation based on the 3 "Ts."

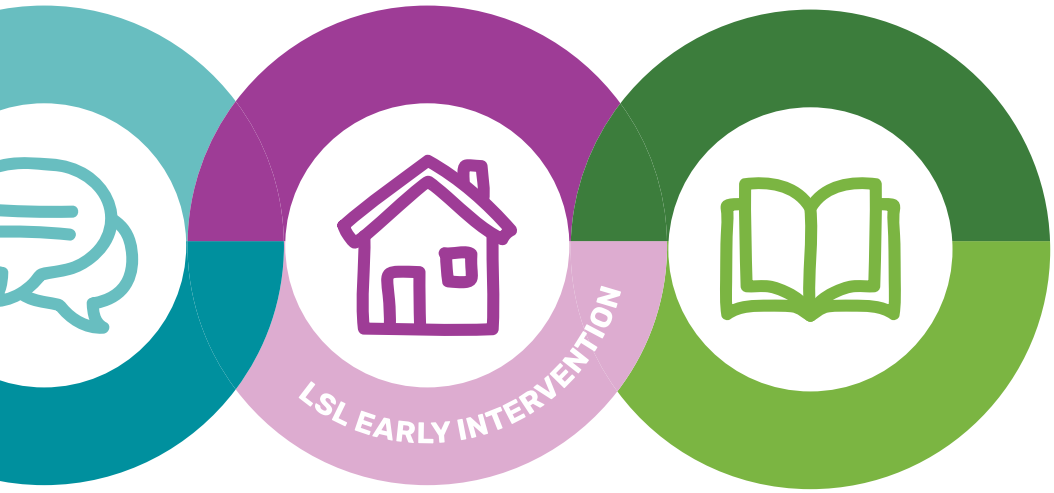
1. **Tune In:** Tune into what the child is interested in. Follow their lead, or get the child interested in what the parent is doing.
2. **Talk More:** When talking, use rich and varied vocabulary.
3. **Take Turns:** View the child as a conversational partner from day one.

The brain, unlike any other organ, is essentially unformed when we are born, and brain development is completely dependent on environmental experiences. So that's why, in the first three years of life, the foundation for all of the child's future thinking and learning is being built through parent talk and conversational interaction.

The Coopers shared both the "tune in/ talk more/taking turns" strategy as well as the importance of talking with Dakota, even while he was an infant, with other family members.

THE FOURTH LINK: **FAMILY-FOCUSED LSL EARLY INTERVENTION**

Family-focused Listening and Spoken Language (LSL) early intervention by an LSL Specialist is necessary so the child will not lag behind in reading and academic skills.



A child's brain needs continuous enrichment with deliberate exposure to auditory information, like conversations and hearing a book read aloud, because:

1. **We need to make up for lost time** — the doorway is partially or completely closed when hearing technology is not used.
2. **Although very effective, hearing devices aren't perfect.** A child using hearing technology may miss some casual auditory information that is floating around the environment.

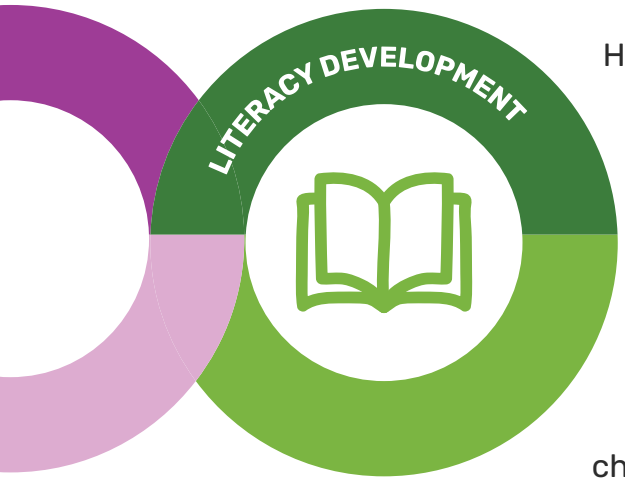
Distance from the speaker and/or noise in the environment can interfere with hearing conversations. Therefore, listening, which is paying attention to auditory information, must be taught to a child with hearing loss.

To summarize, specific LSL early intervention is critical to take full advantage of the child's hearing technology. In addition, LSL intervention allows children with hearing loss to catch up and to keep pace with their hearing friends in terms of language, literacy, knowledge, and social development.

The Coopers located an LSL Specialist to work with Dakota and the family. Some of their sessions were in-person and some sessions were online with tele-intervention. These sessions focused on guiding and supporting what they were already doing with Dakota, their daily routine and interactions, rather than direct teaching of Dakota. With each session, the Coopers received more information and learned new strategies. They gained confidence in their very important role in Dakota's LSL development.

THE FIFTH LINK: **LITERACY DEVELOPMENT**

Literacy is tied to knowledge — knowledge of words and sounds, and knowledge about how the world works. In fact, in today's world, the word literacy can mean more than simply reading and writing. **Literacy can include being good in math, having computer skills, and being able to solve problems.**



High levels of reading and writing are needed to do well in school and in a job, and will open doors for life-long career flexibility and success in work and in social situations.

To begin the literacy journey, infants and children should be read aloud to daily. In fact, studies show that reading aloud is one of the most important activities we can do with our children, because:

- Exposure to storybooks is the biggest factor in developing a preschooler's vocabulary.
- More parent-child conversations occur during read alouds than during any other activity.
- Children who receive read-alouds show gains of more than twice as many new words.
- Reading aloud to children before age 6 promotes language and literacy development.

Although the Coopers were already reading to Dakota several times each day, their LSL Specialist suggested numerous new colorful and interesting books to be read aloud. In addition, the Coopers' LSL Specialist demonstrated how to add music as a bridge to literacy development and social engagement.

By music, we mean adult-directed singing out loud with a child throughout the day – an active and interactive social conversation.

Why emphasize music? The words of a song stimulate mostly the left side of the brain and the rhythm stimulates mostly the right side of the brain. So, music activates the entire brain for a total brain work-out! Active music participation is better than passive listening. Listening to music affects movement since they're closely connected.

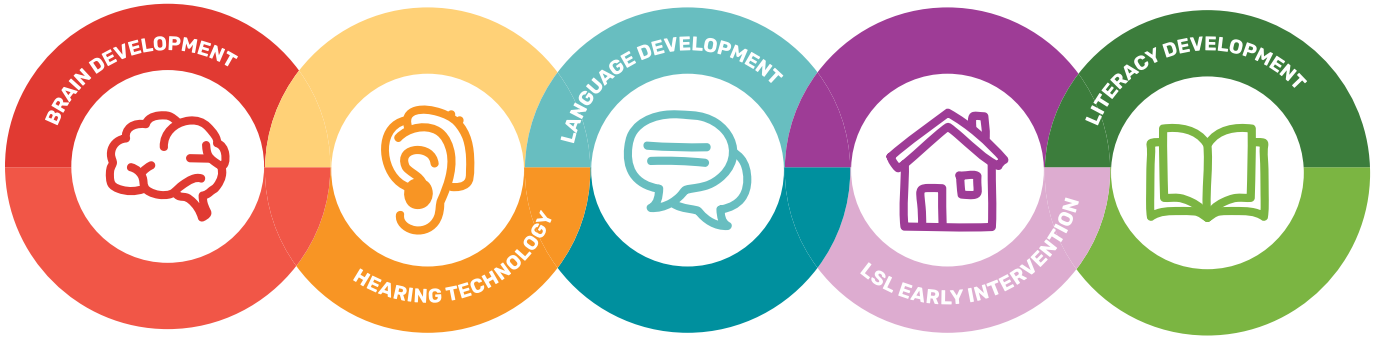
Dakota bounces to the beat every time he hears his mother and father sing. Synchronizing in time with others, such as when dancing, is important for social development. When they realized that the brain thrives on music, the Cooper family enjoyed singing nursery rhymes and made-up family songs with Dakota many times during the day.

SUMMARY AND CONCLUSION

Today, there's a new population of children with hearing loss, like Dakota. These children listen, talk, and learn just like children with typical hearing, thanks to the newborn hearing screening and very early use of modern hearing technologies that allow important auditory information to reach the brain, which develops valuable neural connections.

Dakota, and other children of his generation, have the benefit of brain science, digital technologies, language-development research, and family systems research. Together, those links lead to positive spoken language and literacy outcomes WHEN we do what it takes.

What does it take? System-wide attention to all five links in the Logic Chain – no link can be skipped!



Key Takeaways

For families such as the Coopers who choose an LSL outcome for their child who is deaf or hard of hearing, it is important to remember:

The ears are doorways to the brain where actual hearing occurs.

Your child's hearing technology must be fit and managed as soon as possible after birth by a pediatric audiologist to open the doorway.

Your child's "brain access devices" must be worn at least 10 to 12 hours per day. Remember "eyes open, technology on!"

With the guidance of an LSL Specialist, families are encouraged to use the language they speak at home with their child, beginning in infancy.

Your child needs to be consistently in a variety of conversation-enriched (talking, reading aloud, and musical) environments in order to grow their brain for spoken language, reading, and social development.

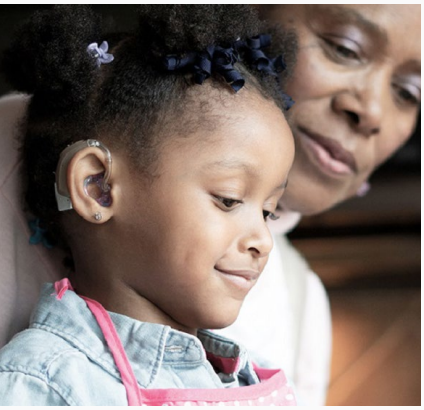
The Cooper family continues to gain confidence in their natural parenting skills of talking, reading aloud, singing and dancing, and socially interacting with Dakota. They realize they know how to do what it takes during routines of daily living. Most importantly, they observe Dakota's rapid progress as he reaches age-appropriate developmental milestones. With the cooperative guidance and coaching of the LSL Specialist and pediatric audiologist, the Coopers have maintained their crucial role as Dakota's first and best teachers.

LSL Life

Find more stories of hope from families like the Coopers with LSL Life, a moving docuseries that features different families as they learn and grow with LSL.

Maggie's Story

When Maggie was diagnosed with hearing loss as a baby, her parents had no experience with hearing loss, cochlear implants, or Listening and Spoken Language (LSL). Maggie's parents dedicated themselves to helping her learn to listen and speak, working closely with her LSL early interventionist and pediatric audiologist. Now in 4th grade, Maggie listens, speaks, and reads on par with hearing friends.



Corlena's Story

When Corlena was born, she failed her newborn hearing screening. Her diagnosis of hearing loss initially felt like a tragedy to her parents. But after they were introduced to Listening and Spoken Language (LSL) resources and information, it felt like a door opened for them. Today, hearing loss has become a minor detail in a full and vibrant life for this chatty three-and-a-half year old.

Corlena and Maggie are just two of the captivating stories LSL Life shares. Get inspired and see how families use LSL to help their children reach their full potential.

Visit HearingFirst.org/LSLLife

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Acknowledgement

Hearing First gratefully acknowledges Dr. Carol Flexer, her work on this eBook for families of children with hearing loss, and the importance of the logic chain for teaching children who are deaf or hard of hearing to listen and talk.

We appreciate the opportunity to collaborate with Dr. Flexer in developing this resource that highlights the path to listening, talking, and reading for children with hearing loss. With this eBook, we can foster a greater knowledge and understanding of what it takes for the LSL professional field, families of children who are deaf or hard of hearing on the LSL journey, and the general public.

Carol Flexer, Ph.D., CCC/A, LSLS Cert. AVT

Dr. Carol Flexer is a Distinguished Professor Emeritus of Audiology at the University of Akron. Her career has been dedicated to advocating for better listening, learning, and literacy for children with hearing loss. An international lecturer and consultant in pediatric and educational audiology and author of more than 155 publications including 17 books, Dr. Flexer is a past president of the Educational Audiology Association, the American Academy of Audiology, and the AG Bell Academy for Listening and Spoken Language. For her research and advocacy for children with hearing loss, Dr. Flexer has received four prestigious awards: two from The AG Bell Association for the Deaf and Hard of Hearing, the Volta Award and Professional of the Year Award; one from the American Academy of Audiology, the 2012 Distinguished Achievement Award; and one from Kent State University, The EHHS Hall of Fame Distinguished Alumni Award, 2015. Dr. Flexer is a Certified Auditory-Verbal Therapist (LSLS Cert. AVT) and a licensed audiologist.

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