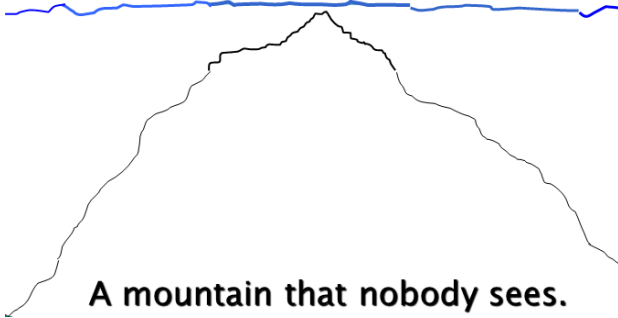
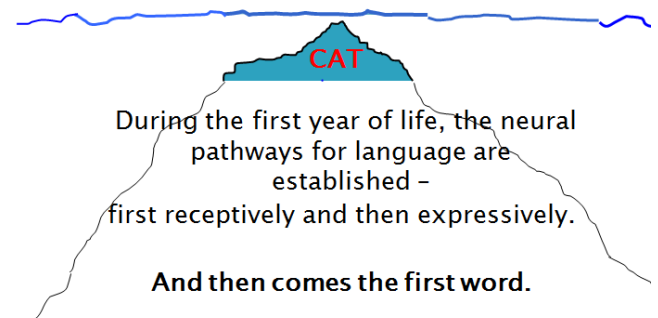


Developing Cognition, Communication & Language Skills

The Language Iceberg



The Language Iceberg



The Language Iceberg

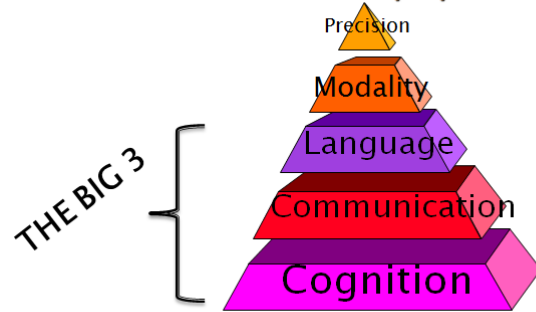
The first word emerges toward the end of the first year... evidence of the mountain of neurological foundations that make that single word possible.



Subsequent Sense of URGENCY

Every day that goes by without appropriate intervention, an infant with a hearing loss falls behind in the foundational skills of cognition, communication and language

The Priority Pyramid



Build the Brain - Interact - Develop Language

Whatever modality best achieves growth

In cognition, communication and language should be used during the first year/s.

Early intervention should be like a "dance"—

- following the baby's lead...
- keeping "the big three" as the focus.

"Language (in any modality) is the most important factor influencing spoken language."



Yoshinga-Itano and Sedley, 2000, Yoshinaga-Itano, 2003

Early intervention should be like a "dance"— As the baby develops, learning strengths will be identified and strategies/modalities can be modified to optimize language learning.

Development of residual hearing, consistent use of amplification, focus on listening, should be emphasized regardless of the primary modality of communication.

Spoken language can be the goal, however other strategies, including sign can jump start the foundation of language in the early months and years.



Communication Occurs on a Continuum

We need to 'experiment' in different situations to determine how a child will best understand the concept, process the communication, learn the language

Fully Auditory Communicator Mostly Auditory Communicator Mostly Visual Communicator Fully Visual Communicator



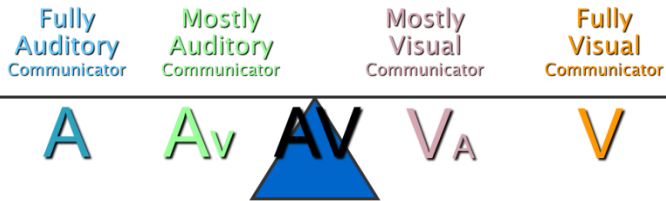
Strategy for Language Learning

- Parent presents the word, phrase, question auditorily, from a position close to child. Child cannot see parent's mouth.
If he didn't understand/respond
- Parent presents information again in auditory only, then letting the child see her face, then auditory only (*auditory sandwich*)
If he didn't understand/respond
- Parent presents the information auditorily, then provides a gesture, baby-sign, or ASL sign, then auditory only
If he didn't understand/respond
- Parent obtains the child's visual attention to the object and presents the sign; then brings the object to her mouth; presents auditorily, presents in sign again

Examples of Flexible Use of the Communication Access Continuum

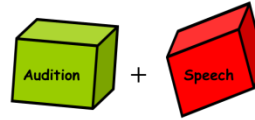
Communication Occurs on a Continuum

We need to 'experiment' in different situations to determine how a child will best understand the concept, process the communication, learn the language

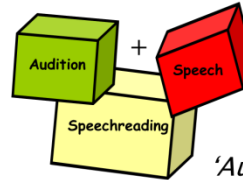


EX: Communication Access Continuum

"Do you want orange juice or milk?" *Pause*



Confused look, no response



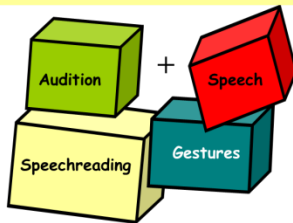
Let him see your face and emphasize orange juice and milk. Then repeat without emphasis.

'Auditory sandwich = 2 slices of LISTEN with a LOOK in between'
Don Goldberg

EX: Communication Access Continuum

Still didn't get it...

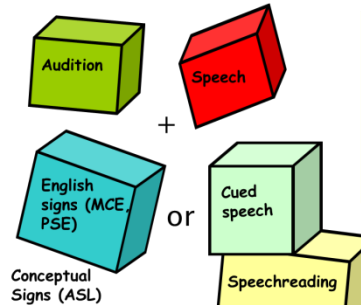
Repeat, holding out the cartons and emphasizing the words orange juice and then milk



EX: Communication Access Continuum

Still didn't get it...

Add a visual language support. Families can choose what feels most comfortable or desired



Focus on building cognition and language skills – provide enough chances and enough pauses.

What input does the child need to progress at a typical pace in language development?

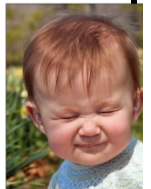
Summary of Strategy for Language Learning

1. Parent presents the word, phrase, question auditorily, from a position close to child. Child cannot see parent's mouth.
If he didn't understand/respond
2. Parent presents information again in auditory only, then letting the child see her face, then auditory only (*auditory sandwich*)
If he didn't understand/respond
3. Parent presents the information auditorily, then provides a gesture, baby-sign, or ASL sign, then auditory only
If he didn't understand/respond
4. Parent obtains the child's visual attention to the object and presents the sign; then brings the object to her mouth; presents auditorily, presents in sign again

Every communication opportunity is a chance for learning

- New word? (juice)
- Discriminating 2 vs. 3 syllables?
- New concept? (choice)
- Turn taking?
- Is this a chance to practice saying a word or will pointing be enough in this situation?

Early intervention services should help parents identify specific goals during everyday activities and routines.



A Good Start: Suggestions for Visual Conversations with Babies and Toddlers who are Deaf or Hard of Hearing

I. Engage in frequent, positive communication with your baby to help language develop faster

- ▶ Take time to respond to your baby's needs to let your baby know by your smiles and touch that he or she is loved. Play and loving contact are almost as important as food to babies!
- ▶ Use as many senses as you can to send messages to a deaf or hard of hearing baby. Emphasize touching games. Move your body and face and hands around in front of the baby. Emphasize your facial expressions even more than usual. Talk to the baby, too.

II. Be responsive – follow the baby's lead

- ▶ Notice where the baby is looking or what the baby seems to be interested in. Talk or sign about that object or activity.
- ▶ Pay attention to the baby's arm, leg, and body movements. These movements can tell us when the baby is excited. They might also show us that the baby is trying to communicate
- ▶ Respect the baby's right to stop playing or communicating. Sometimes babies look away or even begin to fuss when they have had too much playing — too much stimulation.

III. Help babies see the communication and language that you are using

- ▶ Especially with a young baby, often move your hand or body so the baby can see your communication while still looking at a toy or activity.
- ▶ Move an object (such as a toy) in front of the baby and then move it up toward your own face. When the baby can see your face and the object, communicate about it.
- ▶ Tap on an object, perhaps several times, before and after you communicate something about it. This helps the baby know what your communication is about.
- ▶ Tap on the baby to signal, "Look at me." Repeat the tapping signal or combine it with moving an object if your first try isn't successful. Remember that babies have to learn to look up when they are tapped. It doesn't happen automatically. It takes time. Be patient while the baby is learning the signal.
- ▶ Relax — wait for the baby to look up on her own. You do not have to fill every moment with communication and language. It is more important to follow up on the baby's interests and make sure he or she can see your communication.

IV. Gradually modify your communication to make your baby's transition to language easier

- ▶ When a baby shows that he or she is beginning to understand language, parents can start using very short sentences: one, two, or three words or signs at a time, plus pointing or tapping on objects.
- ▶ Repeat words, signs, or short sentences several times. Also, tap on objects or point to activities to show the child what you are communicating about.
- ▶ If you use signed language, you can also use fingerspelling.
- ▶ Don't try to send too many messages. It is not necessary to "flood" the child with language.



Figure 10-1. During the free play situation, this deaf mother tapped her 9-month-old child's shoulder. Failing to get a response, she moved a doll past the child's face and held it next to her own face. The child's gaze followed the moving toy.

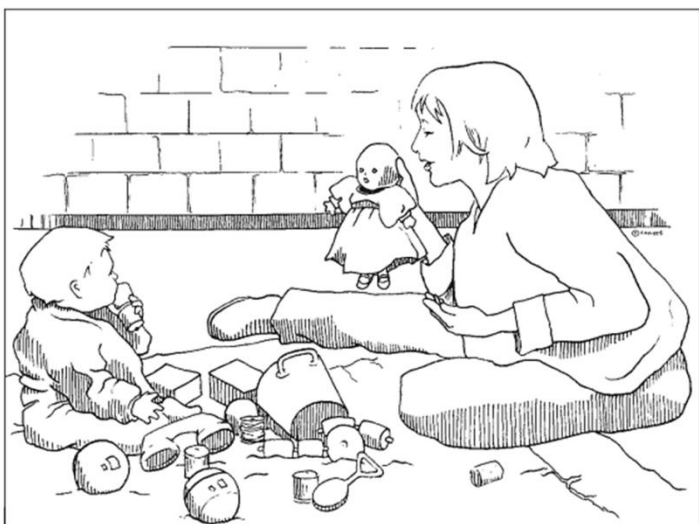


Figure 10-2. After having obtained her infant's visual attention, the mother signs "baby" to label the toy she holds.

Hearing Loss Discovery - Experiencing a Hearing Loss Yourself

Discover the meaning of hearing loss



You need to experience it yourself

Buy foam ear plugs at the hardware store or drug department of a large store. Be sure to insert them correctly so they cause a mild (30–35 dB) hearing loss. Be ready to record your thoughts as you try the different activities. Make a commitment to yourself to wear the earplugs for at least 3 hours.



You need to experience it yourself

Activities to do in your 3 hours:



1. Spend time talking quietly with someone with the television on in the background.
2. Have someone talk to you from another room or from across a large room
3. Use some of the *ELF* listening activities
 - a) when you are not looking at them
 - b) when you are reading or doing something you really enjoy or that interests you
 - c) with and without background noise.

You need to experience it yourself

More activities to do in your 3 hours:

- ▶ Listen to a TV show or radio show – don't turn up the volume.
- ▶ Have a conversation sitting close with no background noise.
- ▶ Talk in the car or listen to talk radio
- ▶ Talk to someone outside at a distance.



Your thoughts and reactions:

Amount of effort to understand all speech in

- ▶ Quiet _____
- ▶ Across room _____
- ▶ Another room _____
- ▶ Noise (TV) _____
- ▶ In car _____
- ▶ Outside distance _____

Think in terms of *Listening Bubble size*

Think about it



How much effort did it take you to listen? How did background noise affect your ability to pay attention and easily understand what was said? What was the difference between having a conversation within a few feet and from across the room, outside or in the car? Remember – you already have developed language and have the ability to 'fill in the blanks' if you miss part of a word.



ELF Early Listening Function

Why: Hearing is a distance sense. A child with a hearing loss will have a reduced hearing range, or a smaller listening bubble, than a child with normal hearing.

- ❖ Audiologists test to find out what tones a child can detect, but only someone who is with the child for hours everyday can observe how the child is using hearing in daily situations.
- ❖ Hearing instruments will improve the size of the **listening bubble**. With use of amplification during all waking hours, auditory skills will usually improve over time.

Observing child behavior when presented with contrived listening activities at different distances and in quiet and noise

- ❖ 6 inches, 3 feet, 6 feet, 10 feet, 15+ feet
- ❖ 12 Activities:
 - 4 quiet, 4 typical loudness, 4 loud
- ❖ Loudness calibration is not critical – parent participation in typical environments is critical
- ❖ Quiet and noise: develop awareness of how having the TV always on limits the child's perception of other sounds

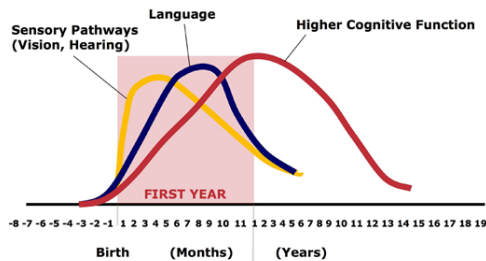


Consistent Auditory Input – Step 1 for Growing Your Child’s Brain

Brain Development & Hearing Loss

Hearing typically starts at 4 months gestation. It contributes to the early foundation of development of neurons – the basis of language and future learning.

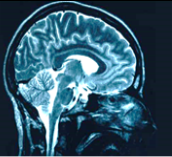
Human Brain Development Neural Connections for Different Functions Develop Sequentially



http://developingchild.harvard.edu/index.php/resources/briefs/inbrief_series/inbrief_the_science_of_ecd

Brain Development – why hearing aids can’t wait

- ▶ At birth, each neuron in the brain has approximately 2,500 synapses, or connections.
- ▶ As a result of constant sensory stimulation and experiences with the world, the number of synapses grows to 15,000 synapses per neuron by the time an infant is 2–3 years old.
- ▶ This amount is about twice that of the average adult brain!
- ▶ Then something called “synaptic pruning” starts to happen. The weaker synaptic contacts are eliminated while stronger connections are kept and strengthened.
- ▶ A baby’s experiences determine which connections in the brain will be strengthened and which will be pruned away. Ineffective, unused or weak connections are “pruned” away.



Brain access tools

- ▶ The best predictors of verbal language skill development are the child’s age when full time hearing aid use started, the degree of the child’s hearing loss and the amount of his/her exposure to meaningful listening experiences.
- ▶ Using technology, hearing ability must be provided as close to the typical hearing level as possible if the family wants the child to learn to listen and use spoken language.

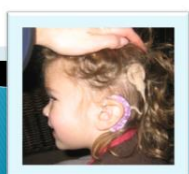
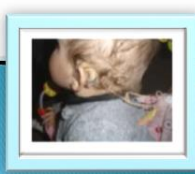
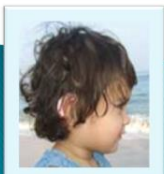
But he’s Deaf, why use hearing aids?



- ▶ Families may choose to implant their child at a later date. It is a big decision and some families wait before they come to a decision that is right for them and their child.
- ▶ Even if a child has not shown any auditory response, encourage full-time use of appropriate amplification.
- ▶ Even if there is the slightest auditory stimulation it will keep the auditory pathway open in preparation for a cochlear implant.
- ▶ Compare this practice to preventing the pipes from freezing in winter by keeping the water dripping

We know..

For most children, the single most effective means to address learning and development issues associated with hearing loss is through the consistent use of hearing technology (hearing aids, cochlear implants, BAHA, FM)



First step to auditory brain access

- ▶ **Hearing aid wear for ALL waking hours**
 - ▶ Provides consistent auditory input
 - ▶ ‘Hearing the child (and family) can count on’
 - ▶ ‘Bond’ with the hearing aids by age 1
- Concerns about loss, damage CAN be addressed
- ▶ Ear Gear – ‘mitten strings’
 - ▶ Headbands, clips, tape, hats



Hearing Aid Wear All Waking Hours – Why it Matters!

The *math* of hearing aid wear

- ▶ Babies listen for about a year before they say their first word.
- ▶ If a baby with hearing loss is awake for 8 hours day and only wears hearing aids for 2 hours then he will only be able to 'tune in' to the hearing world 25% of the time.
- ▶ It may take up to 4 years for his first word.
- ▶ A school-aged child is awake about 100 hours/week.
- ▶ If he only wears hearing aids in school, that is about 30 hours/week.
- ▶ If the child is only wearing hearing aids 30% of the time then we can expect 30% achievement since listening and language development occurs during all waking hours.

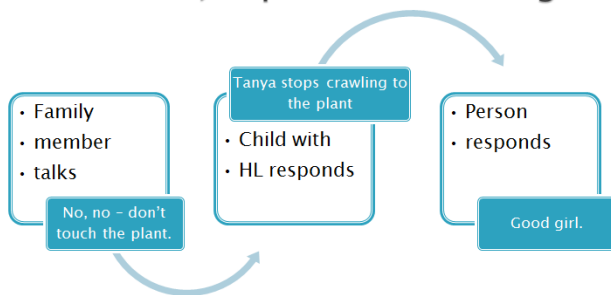


Imagine being a 9 months old and crawling. You see a houseplant in the corner of the room and want to explore what it is. Mommy is on the other side of the room. As you start to crawl toward the plant, she sees where you are going and says "no, no – we don't touch plants." Her voice isn't angry. You know the words no-no and she has now linked no-no to the plant. You consider other places you can crawl.

Contrast this with not being able to hear Mommy tell you no-no. You continue to crawl toward the plant. She sees you disregard her warning and may tell you no-no again. You are now farther away and can't hear her voice at all. Suddenly Mommy picks you up. She has an angry face and voice. You don't know what you did wrong and you're scared.

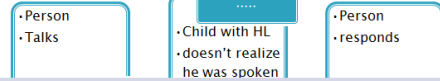


Communication expectations: Consistent, dependable hearing



Family communication can be adjusted: "Tanya will hear and respond to me as long as we are in the same room."

Family communication is unpredictable: "Tanya may have her hearing aids out and not hear me. I'll try anyway. I have to yell at her sometimes to get her attention! She seems to ignore me! It's easier just to stop her than to try to explain right and wrong."



Tanya's level of confidence in receiving communication is low. People yell at her or just ignore him. She probably does not perceive the situation is related to wearing her hearing aids.



End result - less exposure to incidental language, fewer turns at conversation, increasing feelings of isolation and unworthiness. Greater issues with trust, self-concept, making friends & socializing.

More, and more, and more...

- About 90% of what very young children know about the world is learned incidentally, casually and passively.
- Children with hearing loss require 3 times the exposure to learn new words and concepts due to their reduced ability to easily overhear the language used around them.
- Only through the concerted effort of families, can children with hearing loss catch up and learn language at a rate similar to age peers.



Expectations for Hearing Aid Wear *Nothing less than full-time!*

"If your baby wears hearing aids only four hours each day, it will take six years to give him as much listening experience as a normally hearing infant accumulates in one year."

(Stovall, D. [1982]. *Teaching Speech to Hearing Impaired Infants and Children*. Springfield, IL: Charles C. Thomas.)



Handout describes how to establish hearing aid wear step-by-step.

Biggest challenges to Achieving Full-Time Amplification Wear

- ▶ On-off-on-off transitions throughout the day
- ▶ Child temperament issues
- ▶ Activity-based issues (car!)



Strategies:

- ▶ Stick to the schedule - no weekends or days 'off!'
 - When he gets up and you change his diaper put his hearing aids on - every time. He will soon associate two activities. As he 'graduates' into underwear it will be natural for him to recognize that he needs to wear his hearing aids all day, everyday just like he needs to wear his underwear.
 - Keep the hearing aids in the same place ('hearing aid house')
 - Teach him that he needs to ask an adult to take off the hearing aids. When he asks to have them off consider if it is too noisy, he may have an ear infection, a battery may be dead, the hearing aids are malfunctioning, etc.
- ▶ Tantrums happen. When he calms down distract him with something he likes (i.e., reading a book) and try again. Do not let the hearing aids become a way that he 'misbehaves to get your attention'
- ▶ It is natural for him to be curious about his hearing aids. Use hearing aid accessories and strategies to keep the hearing aids on and safe from him removing them, taking them apart, swallowing the batteries.

Tricks and Strategies to Keep Hearing Aids on Active Infants & Toddlers

Parent's Strategies for What Works!

- ▶ Different strategies are needed as children's dexterity and independence changes. All children go through a phase where they take off their hearing aids.
- ▶ Persistence in putting them back in, using accessories to keep them on the child's head and keeping the child distracted and 'happily listening' helps you get through!
- ▶ Ear Gear was the most highly rated accessory for effectiveness, safety, durability
- ▶ Ear Gear + wig tape
- ▶ Sing whenever he pulls off his hearing aid – he won't want to miss hearing his favorite song!

2012 Pediatric Hearing Aid Retention Project Survey results of 286 parents by Karen L. Anderson, PhD & Jane Madell, PhD

Parent's Strategies for What Works!

- ▶ Clips to hearing aids attached to barrettes in hair; if child tries to pull off – she pulls hair too
- ▶ Wig tape to support a large hearing aid or FM on a tiny ear
- ▶ Cap over the hearing aids (Hearing Henry; Hannah Andersson) with strings criss-crossed under chin and bow tied behind neck
- ▶ When in a carseat, wrap a blanket around her that has a Velcro strip so she can't bend her elbows (a week or less may be all that is needed before she learns to not touch her hearing aids)
- ▶ Beware of clips with sharp edges and accessories that still allow the child to pull off the hearing aid and put it in his/her mouth (batteries are poisonous!)

2012 Pediatric Hearing Aid Retention Project Survey results of 286 parents by Karen L. Anderson, PhD & Jane Madell, PhD

Strategies:

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HIPS Accessories!

Hearing Instrument Protection & Safety

▶ Clips



Critic Clips
Westone



Junior Kidz Clips
Phonak



OtoClips
Westone

- ▶ Consider sharp edges
- ▶ Can the baby still put the device in his mouth?

HIPS Accessories!

- ▶ Clips + firmer device holders



Ear Gear



SafeNSound



- ▶ Consider sharp edges
- ▶ Can the baby still put the device in his mouth?

HIPS Accessories!

- ▶ Other device holders



Huggie Aids



Huggie Aids
Headband



Headband
Hearing Henry



Caps
Hearing Henry

- ▶ Consider acoustic transparency, comfort, difficulty putting on, washing, durability

By Karen L. Anderson, PhD, 2013. *Supporting Success for Children with Hearing Loss*. <https://successforkidswithhearingloss.com>

What we will try: