Assessment Strategies for Children with Hearing Loss

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A specific test is not as important as understanding why you are administering that test and how you will set-up assessment to obtain the most accurate picture of the child as possible.

Jessie and Jane
What Will You Learn Today:

- Professional responsibilities
- General assessment considerations
- Auditory skills assessment
- Speech production assessment
- Language assessment
  - English
  - ASL
- Educational assessment
- Additional disabilities
LANGUAGE

Speaking & Listening
• Form and content for social and personal uses
• Phonemic awareness
• Lexical retrieval
• Auditory memory
• Articulation
• Fluency
• Voice

Literate Language
• Academic and metacognitive uses
• Abstract and figurative content
• Decontextualized and formal forms
• Print concepts
• Formal oral contexts
• Print contexts

LITERACY

Reading & Writing
• Letter knowledge
• Word reading
• Spelling
• Punctuation
• Reading fluency
• Reading comprehension
• Writing composition

SLP

TEACHER

Ukrainetz, 2003
Hearing loss and deafness are more than medical issues—they are cultural as well. This should be considered in the development of an assessment protocol.

<table>
<thead>
<tr>
<th>Medical Model</th>
<th>Cultural Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication options</td>
<td>Communication opportunities</td>
</tr>
<tr>
<td>Hearing loss</td>
<td>Hearing level</td>
</tr>
<tr>
<td>Intervention</td>
<td>Involvement or identification</td>
</tr>
<tr>
<td>Failed hearing test</td>
<td>Refer with explanation</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Identification</td>
</tr>
<tr>
<td>Fix the ear</td>
<td>Modify or cope</td>
</tr>
<tr>
<td>Deafness</td>
<td>Deaf, deaf people, being deaf</td>
</tr>
<tr>
<td>Hearing impaired</td>
<td>Deaf or hard of hearing</td>
</tr>
<tr>
<td>Grief process</td>
<td>Journey</td>
</tr>
<tr>
<td>Disability (cannot)</td>
<td>Cultural (adapt)</td>
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</tbody>
</table>

Benedict et al, 2009
General Considerations

- Family involvement
- Age of diagnosis
- Degree of hearing loss
- Etiology
- Age of amplification
- History of amplification, use/benefit
- Educational history
- Language history
- Primary mode of communication
Normal Hearing
Mild Loss
Moderate Loss
Moderate Severe Loss
Severe Loss
Profound Loss
Audiogram of Familiar Sounds

Frequency (Pitch) in Cycles Per Second (Hz)

Hearing Level (Intensity) in Decibels (dB)

Range of Hearing Loss

Normal Hearing

Mild

Moderate

Severe

Profound

Water Dripping

Rustling Leaves

Birds Chirping

Whispering

Talking

Crying

Vacuuming

Dog Barking

Piano

Truck

Lawn Mower

Chain Saw

Motorcycle

Fire Cracker

Band

Airplane

Siren

Complete Audiological Information

- Physiologic tests:
  - Otoacoustic Emissions (OAE)
  - Advanced Auditory Brainstem (ABR)

- Behavioral tests:
  - Unaided audiogram
  - Aided audiogram
Case History

- Tell me about your child’s hearing?
- Has your child had ear infections? If so, how often?
- Has your child had PE tubes placed?
- Has your child been fit with an amplification device?
  - What type of amplification does your child use?
  - When were they fit with amplification? Hearing/listening age?
  - How many hours a day does your child wear their amplification device?
    - When does your child desire their device?
    - What times of day are more challenging to encourage use?
- Are there any other family members who have a hearing loss?
  - If yes, please list who and type
Parent/Teacher/Student Interviews

- Parent interviews
  - Children’s Home Inventory of Listening Difficulties (CHILD)
  - Early Listening Function (ELF)
  - Meaningful Use of Speech Scale (MUSS)
  - Infant/Toddler Meaningful Audition Integration Scale (IT-MAIS)
  - Little Ears Auditory Questionnaire

- Teacher interviews:
  - Screening Instrument for Targeting Educational Risk (SIFTER)
    - Preschool
    - Elementary
    - Secondary
  - Listening Inventory for Education—Revised (LIFE-R)

- Student interviews
  - Listening Inventory for Education—Revised (LIFE-R)
  - Communication Interests and Needs

http://successforkidswithhearingloss.com/tests
Setting Up the Test Environment

- Check amplification before testing.
- Conduct testing in an optimal listening environment. Consider acoustics and lighting of the testing room.
- Decrease background noise. Consider the use of a personal listening device.
- Establish joint attention. Provide an unobstructed view of the evaluator. Allow wait time.
- Provide directions in an accessible communication modality.
- Ideally, video record testing situations.
- Consider the use of an interpreter or transliterator.
- Note any adaptations that are made to the testing materials or testing procedures. This may effect the interpretation of normative data.
- Follow all IEP mandated tests modifications.
IEP Accommodations

- Amplification
- Assistive Devices
- Communication Accommodations
- Instructional Accommodations
- Curricular Modifications
- Test Modifications
Developing an Assessment Protocol

- Auditory Skills
- Speech & Voice Characteristics
- Language (English/ASL)
- Educational
### Auditory Skills

<table>
<thead>
<tr>
<th>Erber’s Stages of Auditory Development</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection</td>
<td>Detection is the basic process of determining whether sound is present or absent.</td>
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<tr>
<td>Discrimination</td>
<td>Discrimination is the ability to perceive the differences between speech and nonspeech sounds.</td>
</tr>
<tr>
<td>Identification</td>
<td>Identification is the ability to attach a label to a stimulus that may include the ability to repeat or replicate.</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Comprehension is the ability to demonstrate understanding and often includes an appropriate response.</td>
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Source: Mahshie et al, 2006
Ling Six Sound Test

- The Ling 6 sounds represent different speech sounds from low to high pitch (frequency).

- They help to test your child’s hearing and to check that they have access to the full range of speech sounds necessary for learning language.
Available through Advanced Bionics

Identifies five hierarchical levels with therapeutic goals at each level to develop auditory skills

Provides post-implant auditory milestone expectations by week
Auditory Perception Test for the Hearing Impaired—Revised

- Available through: Plural Publishing

- Designed for children with hearing loss aged three years and older

- Criterion-based test enables the accurate determination of children’s discrete auditory perception abilities by profiling in sixteen different skill areas.

- A performance profile (rather than a score) provides a display of mastered, emerging, and missing skills
CLIX—Auditory Skills Placement Test

- Available for free PC download through Advanced Bionic’s Listening Room
  - Kids version
  - Teen version (beginner, intermediate and advanced)

- Adult version available as an iPad app

- Placement test enables the accurate determination of individual’s discrete auditory perception abilities by profiling in different skill areas.
Contrasts for Auditory and Speech Training—CAST

- Available through: Linguisystems
- Training kit includes a pretest for placement
- Uses a bottom-up approach in which the parts of the speech signal (e.g., suprasegmental characteristics and vowel and consonant features) are highlighted and contrasted in pairs to improve speech recognition ability
Cottage Acquisition Scales for Listening, Language and Speech

- Available through: Sunshine Cottage School for the Deaf
- Includes 5 separate criterion-referenced scales based on the research in normal child language acquisition.
- Behaviors are divided into convenient age spans that can be used in relationship to listening age and chronological age.
- Listening develops from sound awareness to comprehension of paragraphs, including phonetic listening skills.
- Pre-verbal language through complex sentences, including pragmatic development.
Test of Auditory Comprehension of Language—TACL-4

- Available through: Mayer Johnson, Pro-Ed; Super Duper Publications

- Reliable and valid measure of a child’s (3;0 to 12;11) receptive spoken vocabulary, grammar, and syntax. The test measures children’s ability to understand three language forms:
  - Vocabulary
  - Grammatical morphemes
  - Elaborated phrases and sentences
Speech & Voice Characteristics of Children with Hearing Loss

- Omit final and initial consonants and omit /s/ more consistently;
- Produce final consonants weakly;
- Substitute voiced consonants for voiceless consonants, nasal sounds for oral sounds, one vowel for another, and diphthongs for vowels and vowels for diphthongs,
- Produce distorted sounds—for example, producing stops and fricatives with too little or too much force;
- Produce vowels with imprecision, indefiniteness, and often with excessive duration;
- Produce speech with marker hypernasality, especially in vowels;
- Insert unnecessary vowels between consonants (e.g., selow for slow);
- Inappropriately release final consonants (e.g., mopʰ for mop);
- Use inappropriate stress on syllables;
- Exhibit a harsh and breathy voice;
- Speak with a pitch that is too high or too low;
- Exhibit inappropriate prosodic features.

Pena-Brooks & Hedge, 2000
Speech & Voice Assessment: The Younger Child

- Representative Tests to evaluate speech production of Deaf and Hard of Hearing Learners
  - Arizona Articulation Proficiency Scale (ARIZONA—3)
  - Cottage Acquisition Scales For Listening, Language, and Speech
  - Goldman-Fristoe Test of Articulation (GFTA—2)
  - The Ling Phonetic-Phonologic Speech Evaluation
  - Meaningful Use of Speech Scale
Speech & Voice Assessment: The Older Child

- Representative Tests to evaluate speech production of Deaf and Hard of Hearing Learners
  - Arizona Articulation Proficiency Scale (ARIZONA—3)
  - Clarke Sentences
  - Fisher-Logemann Test of Articulation Competence
  - Goldman-Fristoe Test of Articulation (GFTA—2)
  - The Ling Phonetic-Phonologic Speech Evaluation
  - Rainbow Passage
  - National Technological Institute of the Deaf Voice and Speech Examination
    - http://www.rit.edu/ntid/speechlang/slpros/home
Language Skills

General Diagnostic Questions:

- How does the child use language to communicate in a variety of contexts? (communicative)
- How does the child use language to learn? (metalinguistic)
- What are the regularities in the child’s language performance?
- What are the areas that need repair?
SKI-HI Language Development Scale

- Available through: Hope Publishing
- This scale is developmentally ordered and contains a list of communication and language skills in varying intervals for different ages.
- Each age interval is represented by enough observable receptive and expressive language skills to obtain a good profile of a child's language ability.
CID TAGS: Teacher Assessment of Grammatical Structures

- Available through: Central Institute for Deaf

- Series of three rating forms developed to evaluate a child’s understanding and use of the grammatical structures of English.

- The rating forms provide a representation of grammatical structures children with hearing loss who develop grammatical structures in smaller increments and at slower rates compared to children who are typically developing.
Rhode Island Test of Language Structure

- Available through PRO-ED
- Norms were developed from 513 children with hearing loss and 283 children without hearing loss.
- Provides a measure of English language development and assessment data.
- Focuses on syntax.
Carolina Picture Vocabulary Test (CPVT)

- Available through PRO-ED
- Assesses the receptive vocabulary of signing Deaf children
- Provides a standardized score
Assessment of ASL Skills

- **Checklist of Emerging ASL Skills**
  - This checklist provides a series of indicators to judge whether a deaf child has components of ASL in his or her communication system. The evaluator should not judge a child's skills based on English ability. The focus should be on ASL.
  - The checklist should be filled out by at least three different evaluators who are familiar with the child and who are proficient in ASL.

- **ASL Development Observation Record**
  - Available through: ASL Resource Teacher, Early Childhood Education Program, California School for the Deaf, Fremont (CSDF), 39350 Gallaudet Drive, Fremont, CA 94538 (510) 794-2536
  - This tool was developed by the Early Childhood Education program at the CSDF to document the ASL language development of deaf children from the time they entered the program to Kindergarten. The goal of the observation record is to identify the language strengths and needs of each child and to document the progress made over the time spent in the Early Childhood Education program. This record also serves as a guide for teachers in assessing their role as language models and how they use language with the children.
Assessment of ASL Skills

- **The American Sign Language Proficiency Assessment (ASL-PA)**
  - Available by contacting: Dr. Sam Supalla, Department of Special Education, Rehabilitation, and School Psychology, College of Education, University of Arizona, Tucson, AZ 85721 (520) 621-9466 (TTY) E-mail: ssupalla@u.arizona.edu
  - The ASL-PA globally assesses the expressive ASL skills of children ages 6-12 years of age. Items/target features are based on ASL acquisition studies. Language samples are elicited from varied discourse contexts. There are no sample norms presently available.

- **Test of American Sign Language (TASL)**
  - Available by contacting: Dr. Philip Prinz, Department of Special Education and Communicative Disorders, San Francisco State University (415) 338-7655 E-mail: pm@sfsu.edu
  - The TASL consists of two production measures (Classifier Production Test, and Sign Narrative) and four comprehension measures (Story Comprehension, Classifier Comprehension Test, Time Marker Test, and Map Marker Test). *It is designed to be used with deaf students ages 8-15 years.*
The MacArthur Communicative Development Inventory for ASL

- Available by contacting Diane Anderson at the University of California (jollysox@earthlink.net)
- A tool for measuring early vocabulary development of deaf children acquiring ASL
- Measures production only
## The MacArthur Communicative Development Inventory for ASL CON’T

### Approximate Age and Vocabulary Ranges for the Emergence of Specific Lexical Items

<table>
<thead>
<tr>
<th>Age</th>
<th>Vocabulary Range</th>
<th>Wh-Forms</th>
<th>Negatives</th>
<th>Emotion Signs</th>
<th>Cognitive Verbs</th>
<th>Pronouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18 months</td>
<td>150 signs</td>
<td></td>
<td>NO</td>
<td>SLEEP, HUNGRY, THIRSTY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-21 months</td>
<td>150-250 signs</td>
<td>WHERE, WHAT</td>
<td>DON’T- WANT, NONE</td>
<td>CRY</td>
<td>WANT</td>
<td>general points to others</td>
</tr>
<tr>
<td>21-24 months</td>
<td>250-350 signs</td>
<td>WHO, WHICH, FOR-FOR</td>
<td>DON’T’- LIKE, DON’T-KNOW, NOT-YE</td>
<td>SAD, HAPPY, SCARED</td>
<td>LIKE</td>
<td>ME, YOU</td>
</tr>
<tr>
<td>30-35 months</td>
<td>&gt;350 signs</td>
<td>HOW, WHY, DO-DO</td>
<td>CAN’T, NOT</td>
<td>ANGRY</td>
<td>THINK</td>
<td>HE/SHE/IT</td>
</tr>
</tbody>
</table>
Visual Language
Visual Learning (VL2)

Information available at the Gallaudet University web site

Since its inception, VL2 has had an ongoing effort to develop and validate measures of ASL skill, especially those that are suitable for tracking and monitoring the development of ASL skill among young children. We have also been working to adapt and modify a broad array of neuro-cognitive measures with ASL translations and methods suitable for both children and adults.

http://vl2.gallaudet.edu/resources/asl-assessment-toolkits/
Qualitative Reading Inventory (QRI)

- The QRI is an individually administered informal reading inventory.

- Results can be used to:
  - Estimate students reading levels
  - Group students
  - Choose appropriate ELA materials
  - Monitor student progress

- Passages read by the student assess the student’s ability to read and comprehend different types of passages.

- Comprehension measures are designed to:
  - Assess the quality of the reader’s recall
  - Assess the reader’s understanding of the text
  - Examine the quality of a student’s comprehension during reading

- SMSD administers the QRI to students receiving SRA “Direct Instruction”

- Test protocol
  - Administered twice per year (Fall, Spring)
  - Administered by the Reading Specialists
  - Testing sessions recorded
  - Results analyzed and reported using QRI Analysis Form, created by SMSD reading specialists collaboratively with Dr. Beverly Trezek of DePaul University

- QRI Components
  - Graded word lists to assess accuracy of word identification in isolation
  - Reading passages – concept questions, graded passage, oral retell, comprehension questions, written retell. Used to assess word identification in context, decoding and level of comprehension.

- Uses of data
  - Appropriate DI placement
  - Direction for ELA instruction
  - Provide SLPs with specific student needs
  - Assess student growth
Language Sample Analysis

Semantic Analysis
- Analyze vocabulary diversity
- Type-Token Ratio (TTR) is a measure or ratio of the number of different words compared to the total number of words used.

Syntactic Analysis
- Mean Length of Utterance in Morphemes (MLU)
- Variation’s in Utterance Length
- Brown’s Grammatical Morphemes

Comprehensibility
- The extent to which a listener understands utterances produced by a speaker in a communication context.
- Is associated with both speech intelligibility and language proficiency
Educational Assessment Tools

- Braken Basic Concepts – for ages 3 to 7; assesses numbers, letters, colors, concepts such as more than, equal, etc. as well as social awareness.

- Boehm Test of Basic Concepts-3 – for K through 2; similar to Braken but for slightly older children; also preschool edition (ages 3 – 5.11)

- DIAL—4 – (Developmental Indicators for Assessment of Learning; ages 2.6 – 5.11) assesses motor, language, concepts, self-help, and social skills.

- Woodcock-Johnson – (ages 2 – 90) used for educational evaluation; often used in triennial evals; can be used to assess ELA levels.

- KTEA-3 – Kaufman Test of Educational Achievement; in-depth assessment of key academic skills of children 4-26.


- BRIGANCE IED – Inventory of Early Development for students who are alternatively assessed; criteria referenced; checklist of student ability appropriate for children below a developmental age of 8.

- NWEA – North Western Educational Assessment; pre-K through 12; aligned with Common Core Learning Standards.

None of these tests are normed on the deaf or hard-of-hearing population.

These are suggested resources.
Consideration of Additional Disabilities

- Some additional disabilities are “obvious”:
  - Vision loss
  - Physical disabilities

- Others are more “subtle”:
  - Learning disabilities
  - Cognitive disabilities
  - Emotional disabilities

- Hearing loss itself is an “invisible” disability!

- Any of these disabilities or combination of these disabilities may effect:
  - Attention span
  - Student response or ability to respond appropriately
  - Comprehension of expectations

- Goal is to assess student abilities and knowledge

- Consider your own affect

- Obtain relevant info from teachers, parents and others who know the child well

- Provide appropriate test modifications, (if possible, not solely IEP modifications):
  - Allow breaks/movement
  - Allow extra time
  - Technology needs
  - Interject motivational activities/rewards

- Environment
  - Comfortable – temperature, physical space, lighting, seating
  - Acoustically appropriate
Questions/Comments??