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Texas School for the Blind and Visually Impaired Outreach Programs

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Hearing Issues for Students with Deafblindness Webinar

300-4:00 PM

March 26, 2015

Presented by

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Developed for

Texas School for the Blind & Visually Impaired
Outreach Programs

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Power Point Slides

Functional Hearing Evaluations for Students with Deafblindness

Presented by Chris Montgomery and Adam Graves,

Deafblind Education Consultants

TSBVI Outreach Programs, Texas Deafblind Project

Formal Audiological Testing (*A Review*)

- Remember - there are two different formal audiology measures
 - **behavioral** (audiology booth/pure tone, speech recognition)
 - and **physiological** auditory brainstem response (ABR), oto acoustic emission (OAE), and tympanometry.
- The most “real world” audiological measure is speech discrimination testing
 - many kids w/deafblindness aren’t tested using speech discrimination because they don’t use formal speech to communicate.

Why perform formal audiological testing?

- Formal testing - Audiologists need repeatable test measures so they can have a reliable repeatable baseline from which to test from over time.
 - Formal testing tries to eliminate as many individual characteristics as possible – repeatable test measures over a period of time to see physiological differences.
 - Need specific tests, in a controlled environment, in a controlled way.

Differences in Testing Deaf vs. DB

Students who are deaf / HH

- Can see sound sources and more easily make the connection between sound and source
- Can more easily learn to participate in behavioral assessment and audiologists know how to work with them

Students who are deafblind

- Will not make that connection unless systematically taught usually through tactile sense
- Have great difficulty participating in behavioral testing without specific instruction and audiologists do not know much about modifying testing procedures for them.

Why do an Informal Functional Hearing Evaluation (IFHE)?

- Serve as first step in evaluation for students who are unable to be/not yet tested for medical reasons.
- Gather information about the student’s ability to access auditory information in a variety of settings
- Help guide formal testing by an audiologist.

- Why do an Informal Functional Hearing Evaluation (IFHE)?
- Guide the team in creating and implementing instructional modifications and accommodations.
- Guide auditory training needs.
- IFHE provides the information to help make the decision about eligibility as deafblind

Students with Visual Impairment and Cognitive Disabilities

- Is the problem with hearing or with cognition?
- Need to rule out cognitive by supporting best auditory functioning with appropriate accommodations and modifications

General Premise #1:

Formal hearing assessment tools may suffice if the child can participate fully in testing.

It is generally not enough if the child cannot fully participate in formal testing.

- Children who do not have formal language or cannot be conditioned to participate in behavioral assessment
- Children who are medically fragile and may not be able to be sedated for testing

Who contributes to the IFHE?

- Child's educational team including classroom teacher, parents, SLP, etc.
- Teacher of the deaf and hard of hearing, teacher of the deafblind.
- With input from the teacher of the visually impaired.
- Audiologist and otologist (as information becomes available)

Where does IFHE data come from?

- Formal testing and infant screening
 - Results of newborn hearing screening
 - Results of clinical hearing tests performed by an audiologist.
- Medical reports such as student medical history, prescribed listening devices, ENT reports
- FIE documentation
 - Communication evaluation
 - AI supplement
- Parent and team interview
- Observation and diagnostic teaching

IFHE Draft Document

- Trying to develop a tool for the team to use
- Work in progress

- Based on: Formal Versus Informal Hearing Tests: What is Functional Hearing? *By Jim Durkel & Kate Moss*

<http://www.tsbvi.edu/formal-versus-informal-hearing-tests-what-is-functional-hearing>

Draft IFHE Step 1: Existing Documentation Review and Interviews

Student Name:

Date of Birth:

Age:

Grade/Placement:

Evaluators:

Date of Report:

AI Eligibility Statement:

Statement of Deafblindness:

- Draft IFHE

General History:

Etiology - cause of vision and/or hearing loss:

History of middle ear infections:

History of hearing loss in family:

History of treatment with ototoxic drugs:

- Draft IFHE

Audiological Information:

Results of ENT report:

Appearance of ears:

Results of unaided testing:

Results of aided testing:

Prescribed listening devices:

Listening devices child currently wears/uses:

Degree of hearing loss and likely implications (Audiologist recommendations): *Example - Student has mild to moderate loss in both ears (bi-laterally). Should be able to hear normal speech at a distance of 3-5 feet with prescribed hearing aids. Per audiological report dated _____.*

- Draft IFHE

Formal Evaluation Results

Speech-Language Report:

Communication Report:

General Premise #2:

- Any student with a hearing impairment may function differently in the real world than the results of the clinical testing might suggest.
- Students with deafblindness are particularly likely to demonstrate discrepancies between clinical hearing results and real world functioning because of gaps in concept development due to an increased lack of incidental learning.

Step 2: Observation

- **Informal/unstructured observation:** Simply watching the child in familiar and unfamiliar environments
- **Structured routines:** Using information from formal hearing tests, and **within the context of a familiar routine**, observe patterns in the student's behavior indicating use of hearing.

Draft IFHE

GENERAL OBSERVATIONS

During the process, observation will be used to determine what, if any, sounds the child seems to react to and what, if any, meaning the child is getting from auditory information. Observation, of course, is also supported with information from formal hearing tests. Observation should include assessment within the context of familiar activities and functional routines, with familiar people.

EVALUATION TOOLS AND PROCEDURES

Reason for Evaluation:

Environments/Settings:

Devices/Adaptations for communication:

- Informal Evaluation
General Points

Multi-sensory approach

- Use the sandwich method of presenting sensory information – present auditory then tactual then auditory again – a small break between each piece of information.
- Pair sensory information in a very specific way – specific voice with specific movement or symbol
- Draft IFHE

State of Student at Time of Assessment:

- Appearance of congestion or middle ear infection (if possible have school nurse check ears with otoscope):
- Biobehavioral State:
- Draft IFHE

General Functioning and Awareness

- Does the child show any awareness of any sensory information (visual, tactual, etc.)?
- Does the child show any awareness of auditory information?
- How does the child show that awareness?
- What motor behaviors seem to indicate that the child was aware of and responding to sensory information?
- Draft IFHE

Sound is Meaningful

- Does the child attend to and associate auditory stimuli with its source?
- Does the child show anticipation or recognition through the use of hearing? How does the child show anticipation?
- What sounds does the child respond to?
- Draft IFHE

Auditory Patterning

- At this point, we are looking for patterns of responses. We are trying to find out which sounds under what conditions give the best (easiest to see, most consistent, meaningful to the child) responses.
- Is there a difference in performance based on the types of sounds?
- Are there any clear preferences for?
- Is there a difference in performance in different environments?
- Draft IFHE

Auditory Patterning continued

- Is there a difference in performance with competing (or supporting) information from other senses
- Directionality - Is there a difference in performance depending on where the sound comes from?
- Latency - How long after the input does it take for a typical response to occur?
 - Do responses vary across different environments? (indoors, outdoors, hallways, carpeted room, tiled rooms, etc.)
- Draft IFHE

Auditory Patterning continued

- Bio-behavioral State – are there different responses
- Does the child recognize when an adult mimics their vocal patterns? *Example: Child may stop to listen to adults vocalization and then repeat their vocalization again.*
- Does the child try to mimic familiar vocal patterns (itches and rhythms, especially)
- Draft IFHE

Sound as Meaning

How does the child use auditory information?

- Reflexive awareness - Does the child startle to sound but otherwise not pay much attention?
- At a self-regulating level - Does sound help the child enter and maintain a quiet and alert bio-behavioral state? Are there sounds that send the child into a fussy, agitated state?
- At a motor level? - Does the child turn towards or reach for an object or person making a sound, even if the child can't see or touch the sound source?
- Draft IFHE

Sound as Meaning - continued

Auditory Feedback

- At a play level? Does the child enjoy making noise, either with his or her mouth, by activating switches, hitting two objects together, playing musical instruments, etc.?
- Does child vocalize when amplification is turned on?
- Draft IFHE

Localizing a Sound Source

- The child searches for and/or finds the auditory stimulus
- Searches for familiar sound in familiar environment
- Searches for unfamiliar sound in environment
- Demonstrates directionality to unfamiliar environmental sounds
- Shows no awareness of normal but unknown sounds in familiar environment
- Draft IFHE

Auditory Discrimination

- Does the child discriminate different sounds sources that are familiar?
- Draft IFHE

Short-term Auditory Memory

- Does the child associate a particular sound with a particular event? How do they demonstrate this association?
- Does the child attempt to repeat familiar vocal sequences or sounds?
- Draft IFHE

Linguistic Auditory Processing

- At a communicative level? Does the child recognize any common words, especially his or her name?
- Does the child try to use any sounds consistently to communicate?
-

Step 3: Summarizing Results

Informal Hearing Assessment Results:

Strengths:

Needs:

Recommendations for follow-up:

Summary impressions of auditory functioning:

Recommendations for the student in the educational setting:

Interested in Helping?????

- Looking for people who want to try the IFHE
- Contact for feedback?
- Previous experience with functional hearing evaluation?

Other Reading:

Early Identification of Hearing and Vision Loss is Critical to a Child's Development

<http://www.tsbvi.edu/early-identification-of-hearing-and-vision-loss-is-critical-to-a-child-s-development>

Are You Listening? Auditory Issues for Children with Visual Impairments

<http://www.tsbvi.edu/are-you-listening-auditory-issues-for-children-with-visual-impairments>

Formal Versus Informal Hearing Tests: What Is Functional Hearing?

<http://www.tsbvi.edu/formal-versus-informal-hearing-tests>

Minimal Losses...Major Implications <http://www.tsbvi.edu/resources/2143-minimal-lossesmajor-implications>

Functional Hearing Report Shell

This document is meant to guide the teacher of the deaf and hard of hearing and teacher of the visually impaired in determining the impact of a potential hearing loss on educational functioning for student with visual impairments.

In cases where the student clearly has a documented hearing loss, it may not be necessary to capture all of the information in this document. But it can serve as a guide for the completion of assessment to determine what adaptations and/or modifications are needed in the classroom, home and community environments for the student to be able to have access to instruction and classroom discussion.

It also may be used to document concerns about a student with visual impairments and multiple disabilities where hearing loss is suspected, and the student is unable to participate in formal testing at this time. These issues are often due to health issues or other concerns where a student cannot be sedated for an ABR.

It should not serve as the sole documentation of hearing impairment: formal testing is needed ultimately. However, it can be completed as a pre-cursor to the formal testing to provide valuable information to the audiologist or ENT.

Eligibility Statement:

Meets eligibility criteria for a student with a hearing impairment as defined by the Commissioner's Rules for the State of Texas. (Reference 34 CFR, §300.8(c) (3) and (5)).

- (3) Deafness means a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification that adversely affects a child's educational performance.
- (5) Hearing impairment means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but this is not included under the definition of deafness in this section.
- A student with deafblindness is one who has been determined to meet the criteria for deafblindness as stated in 34 CFR, §300.7(c)(2). In meeting the criteria stated in 34 CFR, §300.7(c)(2), a student with deafblindness is one who, based on the evaluations specified in subsections (c)(3) and (c)(12) of this section.

(A) meets the eligibility criteria for auditory impairment specified in subsection (c)(3) of this section and visual impairment specified in subsection (c)(12) of this section;

(B) meets the eligibility criteria for a student with a visual impairment and has a suspected hearing loss that cannot be demonstrated conclusively, but a speech/language therapist, a certified speech and language therapist, or a licensed speech language pathologist indicates there is no speech at an age when speech would normally be expected;

(C) has documented hearing and visual losses that, if considered individually, may not meet the requirements for auditory impairment or visual impairment, but

the combination of such losses adversely affects the student's educational performance; or

(D) has a documented medical diagnosis of a progressive medical condition that will result in concomitant hearing and visual losses that, without special education intervention, will adversely affect the student's educational performance.

General History:

Etiology or cause of vision loss:

History of middle ear infections:

History of hearing loss in family:

History of treatment with ototoxic drugs:

Audiological Information:

Results of ENT report:

Appearance of ears:

Results of unaided testing:

Results of aided testing:

Implications of hearing loss:

Prescribed listening devices:

Listening devices child currently wears/uses:

Degree of hearing loss and likely implications:

Other Medical Information:

Results of Testing/Assessment:

Formal Test Results

Speech:

Communication:

Informal / Anecdotal Information:

Functional Hearing:

Other Anecdotal Information:

Summary of Medical Information and General History:

Auditory Strengths:

Auditory Needs:

Recommendations Related to Hearing in Instructional Settings:

Informal Functional Hearing Evaluation

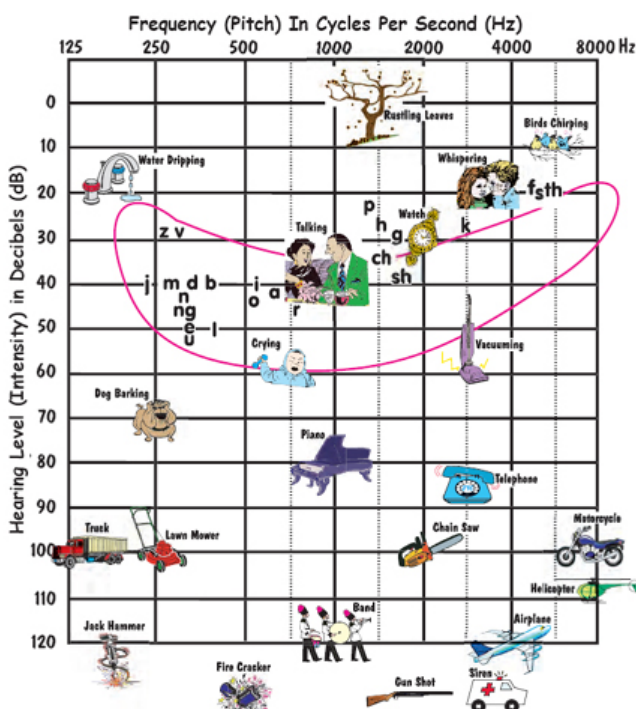
Instructions

This Informal Functional Hearing Evaluation (IFHE) should be completed by the educational team under the guidance of the teacher of the deaf and hard of hearing and/or speech-language pathologist in collaboration with the teacher of students with visual impairments. Components of the process include:

- *Parent/Staff Interview:* Discussing the child's auditory functioning to gain information about observed behaviors related to use of the child's hearing in home, classroom and community settings.
- *Natural Observation:* Simply watching the child in familiar environments and within familiar activities.
- **Systematic Observation:* Using information from formal hearing tests, you might want to set up some situations within familiar routines to help you observe patterns in the student's behavior indicating use of hearing.

* For example, the results of formal hearing tests may indicate that the child should be able to hear loud low frequency sounds, like a drumbeat. You then might want to set up a simple turn taking game involving the beating of a drum to see if the child will listen while you beat a drum then take a turn and beat a drum after you stop. If the child can do this, then you might want to try similar games with other sounds that vary by pitch and loudness to see what sounds the child can use and which he or she can't. Of course, it may take several repetitions of the game, across several days or weeks, before the child learns their role.

Frequency Spectrum of Familiar Sounds



Materials and Protocol for Systematic Observations:

In setting up activities to observe the child's responses to a variety of sound sources, several things should be done. If there is an existing audiological evaluation, review this information to determine the best available frequencies for hearing and the degree of loss. For example, is it a low frequency or high frequency loss? Collect sound sources that fall into the best range for the child's documented hearing.

If no audiological evaluation exists, choose a wide range of items with various frequencies such as a drum, a piano, a whistle, a vacuum cleaner, etc. Of course, the human voice is a good sound source as well and should be used in all evaluations.

Figure 1 Frequency Spectrum of Familiar Sounds showing frequencies and intensity of various sound sources. Creative Commons image.

Procedure

Step 1 Interview

Begin by interviewing the parent/caregiver and educational staff who have knowledge of how the child typically functions. Using the information below to guide your interview gather their thoughts about the child's auditory functioning. Questions you may want to ask are:

- What sounds do you think the child hears?
- What makes you think the child is hearing the sound and what behaviors make you think this?
- Does the child seem to associate a particular sound with a person or activity? (*For example, the sound of the garage door opening cause the child to get excited because he knows dad is home.*)
- Does the child seem to have any favorite sounds such as a song or person's voice or some sound created by an object or animal?
- Do some sounds seem to frighten or upset the child?
- Do some sounds seem to calm or soothe the child?
- Does the child vocalize? When and under what conditions?
- Does the child seem to respond to his/her name under most conditions?
- Does the child respond to other phrases under most conditions?
- Do you think there are sounds that your child does not hear? Why?
- Does your child have a history of ear infections?
- Does/did anyone in your child's family have a hearing loss?
- Has your child been treated with medicines for major infections, cancer, etc.?

Step 1 Review of Existing Documentation

Review existing documentation and complete natural and contrived observations to address the questions below. You may use the checklist at the end of this document to note your answers.

Step 2 Observations

General Functioning and Awareness

State of Student at Time of Assessment:

Appearance of congestion or middle ear infection (if possible have school nurse check ears with otoscope):

Biobehavioral State:

Questions to ask

- Does the child show any awareness of any sensory information (visual, tactual, etc.)?
- Does the child show any awareness of auditory information?

Hearing Issues for Students with Deafblindness – Graves, A. & Montgomery, C., 2015

- Contextual - Familiar sounds in a familiar routine/environment.
- Out of context - Familiar sounds in and unfamiliar routine/environment.
- Novel – new sounds in a familiar context/environment.
- Novel/unfamiliar – novel sounds in an unfamiliar context/environment.
- How does the child show that awareness?
- What motor behaviors seem to indicate that the child was aware of and responding to sensory information?
- What does the child do with sensory information?
- Has the child learned (or can she learn) to associate movement cues with a pleasurable activity?
- Does the child show anticipation of an event from seeing or touching an object?

Sound is Meaningful

- Does the child attend to and associate auditory stimuli with its source?
- Does the child show anticipation or recognition through the use of hearing? *Example: does the child anticipate an event when they only hear a sound associated with that event (before they see or touch something associated with the event)?*
- How does the child show anticipation?
 - In familiar context.
 - In unfamiliar context.
- What sounds does the child respond to?

Auditory Patterning

At this point, we are looking for patterns of responses. We are trying to find out which sounds under what conditions give the best (easiest to see, most consistent, meaningful to the child) responses.

- Is there a difference in performance based on the types of sounds?
 - Low pitch vs. high pitch
 - Onset vs. cessation
 - Simple vs. complex (for example, one instrument vs. orchestra)
 - Rhythms
 - Loud vs. soft
 - Long vs. short (duration)
- Are there any clear preferences for?
 - People's voices (male/female, young/old, familiar/unfamiliar)
 - Types of music
 - Musical instruments
- Is there a difference in performance in different environments?
 - Quiet vs. noisy
 - Echo
- Is there a difference in performance with competing (or supporting) information from other senses
- Directionality - Is there a difference in performance depending on where the sound

comes from?

- in front
- behind
- right
- left
- above
- below
- Latency - How long after the input does it take for a typical response to occur?
 - Do responses vary across different environments? (indoors, outdoors, hallways, carpeted room, tiled rooms, etc.)
- Bio-behavioral State – are there different responses
 - At different times of day?
 - Before or after meal time?
 - Before or after receiving medication?
 - With the physical position of the child?
- Does the child recognize when an adult mimics their vocal patterns? *Example: Child may stop to listen to adult's vocalization and then repeat their vocalization again.*
- Does the child try to mimic familiar vocal patterns (pitches and rhythms, especially)

Sound as Meaning

How does the child use auditory information?

- Reflexive awareness - Does the child startle to sound but otherwise not pay much attention?
- At a self-regulating level: Does sound help the child enter and maintain a quiet and alert bio-behavioral state?
- Are there sounds that send the child into a fussy, agitated state?
- At a motor level? Does the child turn towards or reach for an object or person making a sound, even if the child can't see or touch the sound source?

Auditory Feedback

- At a play level? Does the child enjoy making noise, either with his or her mouth, by activating switches, hitting two objects together, playing musical instruments, etc.?
- Does child vocalize when amplification is turned on?

Localizing a Sound Source

The child searches for and/or finds the auditory stimulus – *students with hearing in only one ear may not be able to localize sound sources.*

- Searches for familiar sound in familiar environment
- Searches for unfamiliar sound in environment
- Demonstrates directionality to unfamiliar environmental sounds
- Shows no awareness of familiar sounds regularly occurring in his/her environment that have no meaning for him. *For example, the phone ringing or the garbage truck loading garbage.*

Auditory Discrimination

- Does the child discriminate different sounds sources that are familiar?
 - Environmental cues – phone ringing, doorbell, etc.
 - Familiar adults and familiar children
 - Mothers voice from fathers voice
 - Pets sounds

Short-term Auditory Memory

- Does the child associate a particular sound with a particular event? How do they demonstrate this association?
- Does the child attempt to repeat familiar vocal sequences or sounds?

Linguistic Auditory Processing

- At a communicative level? Does the child recognize any common words, especially his or her name?
- Does the child try to use any sounds consistently to communicate?

Step 3 Writing the Report, Recommendations, and Diagnostic Teaching

After compiling all information the teacher of the deaf and hard of hearing and/or speech-language pathologist should determine whether referral for formal testing should be made and make their recommendation to the IEP team. If possible the results of the IFHE should be shared with the audiologist prior to testing.

The IEP team should also discuss possible accommodations and modifications to make to instructional strategies and the learning environment before beginning a phase of diagnostic teaching. This should include specific focus on connecting sound sources to the person or object producing the sound during familiar activities and routines. By documenting progress or lack of progress with these supports in place, along with information from the formal testing results, the IEP should be able to determine whether the child meets eligibility as deafblind and be added to the Deafblind Child Count.

References

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- Inventory of Sound in the Home and Community Environments. <http://documents.nationaldb.org/TA/Inventory%20of%20Sounds%20in%20Home.pdf>
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- Petroff, J.G., Ruetsch, C.L., & Scott, E., 2003. Functional Assessment of Sensory Status of Children who are Deafblind. New Jersey Technical Assistance Project (N.J. TAP). <http://documents.nationaldb.org/products/SensoryFunctioningAssessment2004.doc>

Record of Informal Functional Hearing Evaluation

Student Name:

Date(s):

Completed by:

General Functioning and Awareness	Yes	No	Comment
1. Does the child show any awareness of any sensory information (visual, tactual, etc.) and how do you know this?			
2. Does the child show any awareness of auditory information and how do you know this?			
Contextual - Familiar sounds in a familiar routine/environment.			
Out of context - Familiar sounds in and unfamiliar routine/environment.			
Novel – new sounds in a familiar context/environment.			
Novel/unfamiliar –novel sounds in an unfamiliar context/environment.			
Sound is Meaningful	Yes	No	Comment
3. Does the child attend to and associate auditory stimuli with its source?			
4. Does the child show anticipation of an event or recognition of a person or object through the use of hearing?			
In familiar context			
In unfamiliar context			

Auditory Patterning	Yes	No	Comment
5. Does the child show an awareness of the start and the cessation of the sound?			
6. Is there a difference in performance based on the types of sounds?			
Pitch (high vs. low)			
Auditory Patterning (continued)	Yes	No	Comment
Rhythm (simple vs. complex)			
Intensity (loud vs. soft)			
Duration (short vs. long)			
Vowel sounds (in isolation)			
Consonant sounds (in isolation)			
Sound source (voice vs. environmental)			
Male vs. female voices			
Familiar vs. unfamiliar voices			
Specific type(s) of music			
Specific instrument(s)			
7. Is there a difference in performance in different environments?	Yes	No	
Quiet vs. noisy			
Places with echo and without echo			
Places with competing vocal and environmental sounds (e.g. teacher's voice when AC turns on)			
Places with competing sensory information (lights, smells, etc.)			

8. Is there a delay in response? (Latency)	Yes	No	
In quiet environments			
In noisy environments			
In familiar context			
In unfamiliar context			
Auditory Patterning (continued)	Yes	No	Comment
9. Are there different responses based on the child's biobehavioral state or at various times of day?	Yes	No	
Before or after a meal			
Before or after medication			
Time of day			
Quiet alert or active alert vs. fussy or agitated			
10. Does child recognize when an adult mimics his/her vocalizations?	Yes	No	
Familiar adult with familiar pattern			
Unfamiliar adult with familiar pattern			
Familiar adult with random pattern			
Unfamiliar adult with random pattern			
11. Does the child try to mimic familiar vocal patterns?	Yes	No	
Mimics rhythm			
Mimics pitch			
Mimics vowel sounds			
Mimics consonant sounds			
Mimics animal sounds or funny sounds			
Mimics line from a song or rhyme			

Sound as Meaning	Yes	No	Comment
12. Does the child startle to sound but otherwise not pay much attention? (reflexive awareness)			
13. Does sound help the child enter and maintain a quiet alert or active alert state? (self-regulation)			
14. Does sound create fussy or agitated state?			
Localization	Yes	No	Comment
15. Does child turn or move toward or reach for a sound source?			
Familiar object or environmental sound			
Unfamiliar object or environmental sound			
Localization (continued)	Yes	No	Comment
Familiar human voice			
Unfamiliar human voice			
Auditory Feedback	Yes	No	Comment
16. Does the child enjoy making noise, either with his or her mouth, by activating switches, hitting two objects together, playing musical instruments, etc.?			
17. Does child vocalize when amplification is turned on?			
18. Does the child vocalize in response to others vocal play?			
Short-term Auditory Memory	Yes	No	Comment
19. Does the child associate a particular sound with a particular event?			
20. Does the child attempt to repeat familiar vocal sequences or sounds?			

Linguistic Auditory Processing	Yes	No	Comment
21. Does the child recognize any common words, especially his or her name?			
22. Does the child try to use any sounds consistently to communicate?			

Summary impressions of auditory functioning:

Recommendations for the student in the educational setting:

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Figure 2 TSBVI logo.



"This project is supported by the U.S. Department of Education, Office of Special Education Programs (OSEP). Opinions expressed herein are those of the authors and do not necessarily represent the position of the U.S. Department of Education."

Figure 3 IDEAs that Work logo and OSEP disclaimer.