Instructions for submitting forms for ASHA CEUs

Pearson will submit completed CE forms to ASHA if you attend the entire 60 minutes of the live session (confirmed by our ReadyTalk verification report).

Complete the:
- Attendance Sheet (only if more than one person is at your site)
- ASHA Participant Form
- Evaluation Form

Please mail the forms postmarked no later than May 22, 2017 to:
Darlene Davis, Pearson
19500 Bulverde Road, Ste. 201
San Antonio, TX, 78259

Questions about CEUs?
Contact Darlene Davis at darlene.k.davis@pearson.com

Central Auditory Processing: What Age Should We Test?

Donna Gelman, PhD, CCC/SLPA

May 10, 2017
Disclosures

Financial: Donna Geffner is the author of the Auditory Skills Assessment (ASA) and receives a royalty from Pearson Assessment on the sale of this test.

Non-financial: There are no non-financial relationships to disclose.

The Pearson Assessment Division, the sponsor of this presentation, develops and distributes assessments and intervention tools for speech-language pathologists and is the sponsor for this webinar/presentation. Course information will cover information that various assessment, but will focus on the effective and appropriate use and interpretation of the ASA, an assessment tool developed by Pearson Clinical Assessment.

Learner Outcomes

1. Participants will be able to identify the various behaviors associated with auditory processing disorders in young children.
2. Participants will know the various tests and instruments available to test younger children.
3. Participants will be able to apply the Auditory Skills Assessment (ASA) for identification, management and treatment in young children with CAPD/APD.
Agenda

Introduction to the history of testing young children with CAPD/APD

Symptoms of young children who exhibit CAPD/APD

Overview of instruments available to test younger children for CAPD/APD

ASA and its benefits in identifying young children

Case studies

Purpose

This webinar will provide a rationale for early testing of auditory processing skills to identify youngsters at risk, and to provide an overview of assessments (with a focus on the Auditory Skills Assessment) that can be used to assess these youngsters.
History of Testing and Symptoms of Young Children with CAPD

Current Research in Testing Young Children

How young can I test for linguistic and non-linguistic auditory skills?
What Has Been Done to Assess Auditory Skills in Young Children?

Children as young as 3 years of age can be aware of onsets and rimes, and a strong relationship has been established between the knowledge of nursery rhymes and the development of *intrasyllabic awareness skills* (Maclean et al., 1987). Phoneme isolation and segmentation have the best predictive validity for later reading skills (Liberman & Shankweiler, 1985; Yopp, 1988).
Children’s ability (ages 4–6 years) to discriminate between stimuli that vary along single acoustic dimensions is much **poorer** than that of adults.

Intensity discrimination was adult-like by **age 5**.

Frequency and duration improved with age, but remained poorer than adults’ discrimination for many 6-year-olds.

- This may be reflected in general music skill development, as in the commonly observed difficulties of young children to stay “on tune” or in rhythm.

*Jenson & Neff, 1993*

---

The ability of normal hearing children ages 4–7 years on an auditory discrimination task improved with increasing age until age 7 at which time performance was adult-like.

The 7-year-olds and the adults were able to discriminate the sequence of tonal pairs with component frequencies.

As the sequences were increased, the 4- to 6-year-olds as a group were **not** able to perform the task.

*Allen & Nelles, 1996*
Found that children can detect and compose rhymes by kindergarten.

By the end of kindergarten, they can isolate and pronounce the beginning sounds in a word.

Midway through 1st grade, they can isolate and pronounce all the sounds in two- and three-phoneme words.

_Torgesen & Mathes, 1998_

---

By the end of 1st grade, children can isolate and pronounce the sounds in four-phoneme words containing initial blends

Although some children may acquire some rudimentary phonological awareness skills as early as 2½ to 3 years of age, more advanced skills are not mastered until the end of 1st grade

_Torgesen & Mathes, 1998_
Normally developing preschool children can:

- Produce consistent phonological representations
- Imitate nonwords
- Produce lexical items in imitation, naming, and connected speech with low variation and high accuracy
- Segment words into syllables*
- Demonstrate awareness of rime*
- Demonstrate awareness of onset*

*Older and upper SES children have the best ability.

Burt, Holm, & Dodd, 1999; UK

---

**Early identification** of children with poor phonological awareness would allow appropriate intervention to be offered.

Intervention could prevent reading and spelling failure and the negative consequences commonly associated with literacy difficulties.

Burt, Holm, & Dodd, 1999; UK
Auditory discrimination skills are developed by age 6.

Krause, et.al. used just noticeable differences (JND) and mismatch responses for synthetic syllables that differed in formants. This does not require a behavioral response or attention.

Many aspects of auditory perception of non-speech and speech stimuli are largely mature by school age but perception continues to develop during school-age years, which can be modified by auditory experience.

Kraus, Koch, McGee, Nicol, & Cunningham, 1999

Children who presented significant pre-school deficits in phonological awareness, rapid automatic naming, speech-in-noise perception and frequency modulation detection were those who had increased family risk and literacy impairment at the end of first grade.

Boets, Wouters, van Wieringen, & Ghesquière, 2007: Belgium
Predicting Reading Skills in Young Children

Through the use of brain scans and cABR, it is possible to predict the 3- and 4-year old children at risk for a reading disability on the basis of their ability to separate speech sounds from noise.

When retested a year later, it was possible to predict that children who were able to detect the "Da" from background noise consistently were not at risk for a reading disorder.

Children who are unable to listen in a background of noise ("the din of the classroom") are at risk for learning to read.

Auditory processing in noise is a "biomarker for literacy"

Carr, Nico, Bradlow, Kraus, Hearing Research, 2015
Auditory Skills in Children with a Reading Impairment

Children with reading impairments show subtle speech perception deficits in quiet but very significant deficits in background noise.

Ziegler, Pech-Georgel, George, Alario, & Lorenzi, 2005

Auditory Skills in Children with a Learning Disability

Children with a learning disability perform more poorly and are more adversely affected by degrading signal-to-noise ratio on speech in noise tasks.

Chermak, Vonhof & Bendel, 1989; Bradlow, Kraus, & Hayes, 2003

Children (2–4 years old) with a receptive language problem showed poorer performance on a nonsense word repetition task.

Roy & Chiat, 2004

Showing that poor performance on a nonsense word repetition task may be indicative of a wider language problem, at least in young children.
Auditory Skills and Children with Dyslexia

When normal-learning children are compared to children with dyslexia combined with oral language disorders, children with dyslexia had poorer S/N performance only when using small sets of stimuli, but not when using large sets.

Ahissar et al, 2006

Auditory Skills and Children with Dyslexia

Human auditory brainstem encoding is determined by both
• the acoustics of the incoming stimulus, and
• the context in which the stimulus occurs.

Such plasticity occurs more rapidly than thought, and may function to improve perception in challenging listening backgrounds.

In children with developmental dyslexia, a broad deficit in the extraction of stimulus regularities may contribute to the critical deficit in noise exclusion, a hallmark symptom in developmental dyslexia.

Chandrasekaran, Hornickel, Skoe, Nicol, Kraus, Neuron, 2008
### Chart of Listening Auditory Skills Milestones

<table>
<thead>
<tr>
<th>AGE</th>
<th>SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth – 3 months</td>
<td>• Discriminates speech from non-speech sounds</td>
</tr>
<tr>
<td></td>
<td>• Quiets or excites in response to novel sounds</td>
</tr>
<tr>
<td></td>
<td>• Recognizes a primary caregiver’s voice</td>
</tr>
<tr>
<td>3 – 6 m</td>
<td>• Moves eyes in direction of sounds</td>
</tr>
<tr>
<td></td>
<td>• Discriminates friendly and angry voices</td>
</tr>
<tr>
<td></td>
<td>• Reacts to changes in tone of voice</td>
</tr>
<tr>
<td></td>
<td>• Attends to music and toys that make sounds</td>
</tr>
<tr>
<td>6 – 12 months</td>
<td>• Responds physically to music</td>
</tr>
<tr>
<td></td>
<td>• Listens with increased interest to new words</td>
</tr>
<tr>
<td></td>
<td>• Begins to respond to simple requests, such as “Sit here”</td>
</tr>
<tr>
<td>1 – 2 years</td>
<td>• Follows one-step directions with cues</td>
</tr>
<tr>
<td></td>
<td>• Points to named pictures in a book</td>
</tr>
<tr>
<td></td>
<td>• Follows directions to find two familiar objects</td>
</tr>
</tbody>
</table>

#### Additional Notes
- [ASHA.org](asha.org)
Symptoms of Young Children who Exhibit CAPD/APD

Characteristics

- Poor listening skills
- Difficulty learning through the auditory modality
- Difficulty following auditory directions
- Short auditory memory span
- Difficulty understanding in the presence of background noise
- They say “huh?” and “what?”
- They misunderstand what is said to them or “mishear”
- They have difficulty understanding speech when it is muffled or distorted
- They request information to be repeated.
- They have poor auditory attention.
- Easily distracted, especially in background noise
- Auditory integration deficits for sound blending and auditory closure, phonological awareness, and phonic skills.

Keith, 1994, 2000
Characteristics (continued)

- Poor auditory memory span for commands and sequences
- They recall the last part of the sequence and forget what is said soon after
- They give slow or delayed response to verbal stimuli
- They may have reduced tolerance for loud noise and sensitivity to noise
- May have better-than-normal hearing or hypersensitivity
- Reduced comfort levels and tolerance levels of listening
- Easily distracted in background noise
- Poor speech recognition in noise
- Figure-ground listening skill deficit
- Difficulty understanding rapid speech
- Often poor receptive and expressive language skills
- Problems with reading, spelling, and academics
- May exhibit behavior problems

Keith, 1994, 2000

Listening Assessments

- Auditory Skills Assessment (ASA)
- The Listening Inventory (TLI)
- The Listening Comprehension Test-2
- Oral and Written Language Scales, 2nd Edition (OWLS-II)
- Ross Information Processing Assessment, 2nd Edition (RIPA-2)
- Test for Auditory Comprehension of Language-4th Edition (TACL-4)
- Receptive Expressive and Social Communication Assessment (RESCA-E)
- Comprehensive Test of Phonological Processing (CTOPP)
- Phonemic Synthesis Picture Test (Katz)
- Phonological and Print Awareness (PPA)
- Casel-2 Comprehensive Assessment of Spoken Language (OPUS)
ASA and Its Benefits in Identifying Young Children

What are the components, the content areas, and the research behind this developmental effort?
ASA Components

Which auditory skill areas should be assessed?
Auditory Skills to Consider for Assessment

---

Product Domains/Sections

**ASA Domains and Sections**

**Speech Discrimination Domain**
- Section 1: Speech Discrimination In Noise
  - Discriminate words heard against a background of conversational noise
- Section 2: Memory
  - Repeat a spoken sentence

**Phonological Awareness Domain**
- Section 3: Blending
  - Recognize or say a word after hearing its syllables or rhymes spoken in pieces
- Section 4: Rhyming
  - Indicate whether two spoken words rhyme

**Nonspeech Processing Domain**
- Section 5: Tonal Discrimination
  - Indicate if two tones are from the same instrument
- Section 6: Tonal Pattern
  - Indicate which of two tones was presented last

Note: Ages 36-4.11 are administered the tasks in the Speech Discrimination Domain only; ages 5.0-6.71 are administered all six sections across all three domains.
Auditory Skills Tested in Development Research

1. **Speech Discrimination in Quiet** (27 items)
   - For each item, one stimulus word is played from a stimulus CD
     - Child must point to the one picture from a set of four that illustrates the word

2. **Speech Discrimination in Noise** (27 items)
   - For each item, one stimulus word is played against a background of conversation-like noise from a stimulus CD
     - Child must point to the one picture from a set of four that illustrates the word

3. **Mimicry** (24 items)
   - For each item, a nonsense word that follows conventional English sound patterns is played from a stimulus CD
   - Stimulus words are 1-4 syllables long
     - Child is asked to repeat the word

Auditory Skills Tested in Development Research (continued)

4. **Blending** (24 items)
   - For each item, phonemes of a common vocabulary word, separated by brief pauses, are played from a stimulus CD
     - Part 1: Child points to the one picture from a set of six that illustrates the word
     - Part 2: Child is asked to say the blended word (no visual clues)
5. **Segmentation** (18 items)
   - Concept of “first” and “last” sound taught through examples and practice items
   - For each item, a one-syllable nonsense word is played from a stimulus CD
     - Items 1–9: Child is asked to say the first sound in the nonsense word
     - Items 10–18: Child is asked to say the last sound in the nonsense word

6. **Rhyming** (15 items)
   - Concept of rhyming taught through examples and practice items
   - For each item, a pair of words is played from a stimulus CD
     - Child is asked if the two words rhyme (yes/no)

7. **Memory** (12 items)
   - For each item, a set of 2–4 unrelated, common vocabulary words are played from a stimulus CD.
     - Child is asked to repeat the words in the same order
     - Responses were scored according to the number of correct words repeated (content score), plus a bonus point if words were given in the correct sequence (sequence score).
8. **Tonal Discrimination** (12 items)
   - For each item, a pair of musical tones are played from a stimulus CD: either (1) one oboe and one piano, or (2) two tones from the same instrument.
   - Child is asked if the two sounds are the same (yes/no)

9. **Tonal Patterning** (12 items)
   - Concept of "which played last" taught through examples and practice items
   - For each item, two successive tones—one from each instrument (oboe/piano)—is played from a stimulus CD
   - A card with a picture of an oboe and a piano is presented
   - Child points to the picture of the instrument that was played last

---

**Research Questions**

1. At what age can children understand and successfully perform the task posed in each auditory skill subtest?

2. At what age can reliable data be obtained for each subtest?

3. Do the subtests discriminate sufficiently between clinical and nonclinical cases?

4. Is there value to testing speech vs. non-speech discrimination?
Challenges When Testing Young Children

- Memory and attention
- Many do not have intelligible speech
- Age-appropriate instructions and response requirements
- Concept limitations
- Difficult to test and obtain consistent responses
- Poor reliability

General Administration Procedures Used to Minimize Response and Concept Limitations

- Select words likely to be recognized by young children
- When picture pointing response is required, picture-word association training is provided.
- When mimicry response is required, provide items that are easily articulated.
- Introduce and explain tasks in a way that young children would understand (child-friendly, scripted examiner text).
- Practice items are provided to ensure that children knew how to do the tasks.
- Teaching provided after failed practice items.
Before Testing: Picture word training

I will say a word and you point to the picture. Ready? Point to *cone*.

TESTING: Listen and point to the picture of the word you hear: *cone*

Geffner & Goldman, 2007
Rhyming - Introduction

Say:
Listen to these words: man...pan.
*Man* and *pan* rhyme--they sound alike at the end.
Here are more words that rhyme with *man* and *pan*:
fan...tan...fan.

Rhyming – Practice Item A

Say:
Do *CAN* and *MAN* rhyme?
If correct, say: Yes. *CAN* and *MAN* rhyme--they sound the same.
Continue with Practice Item B.
If incorrect, say:
*CAN* and *MAN* do rhyme. Listen again can...man.
Do these words sound the same?
Administration Procedures

Studies 1 and 2 began with 49 training items.

All subtests except Speech Discrimination in Quiet began with several practice items to ensure that children knew how to do the tasks.

Teaching provided after failed practice items.

Every effort was made to introduce and explain tasks in a way that young children would understand (child-friendly, scripted examiner text).

Method

Study 1 (May–June 2007)

- N = 547
- Ages 3:6–3:11
- Nonclinical cases of children with no prior diagnosis of hearing loss and no current ear infections
- Subtests: Speech Discrimination in Quiet, Speech Discrimination in Noise, Mimicry, Rhyming, Blending, Segmenting, Memory

Study 2 (July–August 2007)

- N = 209
- Ages 3:6–3:11
- Nonclinical cases of children with no prior diagnosis of hearing loss and no current ear infections
- Subtests: Nonspeech Processing—Tonal Discrimination and Tonal Patterning
Method (continued)

Study 3 (Oct–Nov 2007)

- \( N = 45 \)
- Ages 3:6–6:11
- Clinical cases of children judged by SLPs to be at-risk for auditory skill deficits
- Subtests: All subtests from Studies 1 & 2 except Speech Discrimination in Quiet

Research Questions

1. **At what age can children understand and successfully perform various types of tasks** that reflect different auditory skills?

2. **Can reliable data be obtained** for children of a certain age performing particular auditory skills tasks?
Studies 1-3 Data Analysis

The following results would suggest that a particular subtest is an age-appropriate assessment tool:

- Fewer than 20% of children with normal hearing acuity score at or near the “guessing” or “chance” level
  ➢ indicates task is comprehensible for children at this age

- Internal–consistency reliability statistics obtained for the subtest for a particular age group are acceptably high
  ➢ indicates subtest is measuring a specific construct

Studies 1-3 Data Analysis (continued)

Reliable data could be obtained for children as young as 3 years 6 months for the following subtests:

- Speech Discrimination in Quiet
- Speech Discrimination in Noise
- Mimicry
- Memory
Studies 1-3 Data Analysis
(continued)

Reliable data could be obtained for children as young as age 5 years for:

- Mimicry
- Blending
- Rhyming
- Non-speech Processing—Tonal Discrimination & Tonal Patterning

Reliable data could be obtained for children as young as age 5 years, 6 months for:

- Segmentation

3. Do the subtests discriminate sufficiently between clinical and nonclinical cases?
Studies 1-3 Data Analysis (continued)

An analysis of the score differences between the nonclinical samples in Studies 1 and 2 and the clinical sample in Study 3 indicated that all of the subtests compared showed acceptable levels of sensitivity and specificity.

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Mean z*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech Discrimination in Noise</td>
<td>.60</td>
<td>.60</td>
<td>-.36</td>
</tr>
<tr>
<td>Minimy</td>
<td>.60</td>
<td>.59</td>
<td>-.37</td>
</tr>
<tr>
<td>Rhyming</td>
<td>.65</td>
<td>.64</td>
<td>-.57</td>
</tr>
<tr>
<td>Blending</td>
<td>.65</td>
<td>.62</td>
<td>-.79</td>
</tr>
<tr>
<td>Segmentation</td>
<td>.65</td>
<td>.54</td>
<td>-.63</td>
</tr>
<tr>
<td>Memory</td>
<td>.65</td>
<td>.62</td>
<td>-.62</td>
</tr>
<tr>
<td>Nonspeech Processing</td>
<td>.70</td>
<td>.65</td>
<td>-.98</td>
</tr>
</tbody>
</table>

*Age-based z scores based on the nonclinical sample.

Note. Speech Discrimination in Quiet was not included in Study 3; thus, it is not reported here. Analyses adjusted for sex, SES, and race/ethnicity.

Research Questions

4. Is there value in testing speech vs. non-speech discrimination?
Non-speech Processing

Among the various tasks presented to young children (ages 3.6-6.11), discriminating between two musical instruments and their patterns was the most discerning between a typical population and those at risk for CAPD.

Test Sections Eliminated

Speech Discrimination in Quiet
- Too easy
- Not as discriminating as Noise Segmentation
- Too difficult and unreliable for children under 5 years, 6 months

Memory
- Weak retest reliability
- Lengthy administration

Reduced total number of test items from 147 to 56!
Test Materials

Manual
Response Forms
Stimulus CD
Stimulus Book

Standardization

- December 2008 through May 2009
- 600 + children at 123 sites
- Final norms based on nationwide sample of 475 children, ages 3 years 6 months through 6 years 11 months
  - Stratified by sex, race/ethnicity, SES (mother's education level), and geographic region.
Standardization

Normative sample

- Normal hearing acuity
- English as primary (most frequently spoken) language
- Normal vision
- Free of upper respiratory problems or ear infections at the time of testing

Normative sample exclusionary criteria

- Prior diagnosis of hearing loss
- History of chronic or recurring ear infections
- Had PE tubes
- Receiving Special Education services or a clinical diagnosis that would impact their language or cognitive functioning
- At risk for auditory skill deficits, including auditory processing disorders
Standardization

Clinical sample
- Judged by an audiologist or SLP to have difficulty with auditory skills
- Normal hearing acuity
- English as a primary (most frequently spoken) language
- Normal vision
- Free of upper respiratory problems or ear infections at the time of testing
- Use of a criterion referenced questionnaire

Standardization

Clinical sample exclusionary criteria
- Prior diagnosis of hearing loss
- History of chronic or recurring ear infections
- Had PE tubes
- Receiving Special Education services or a clinical diagnosis of intellectual disability or autism spectrum disorder
Cut Scores

An overall cut score was determined for each 6-month age group, indicating a cutoff at the total score level between normal and at risk cases based on the norm sample, the clinical sample, and a matched control sample.

Clinical Validity

Compared to the matched control sample, the clinical sample's average scores are significantly lower (p<.01) on all ASA domains and the overall total scores for both age ranges reported (3:6-4:11 and 5:0 – 6:11)
Cut Scores

The sensitivity and specificity of the cut scores are .77 and .68, respectively.

In setting the cut scores, preference was given to attaining high sensitivity because of the importance of flagging children who truly have poor auditory skills.

Administration Time

- 5 mins for 3⅓ and 4 year olds
- 15 mins for 5 and 6 year olds
What makes ASA different?

- Large, full-color illustrations tested to appeal to young children
- No headphones or specialized equipment
- Quick administration

Figure 2.6 Completed score summary and performance descriptor for Child A
### Table B-1
Cut Scores, by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Cut Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:6–3:11</td>
<td>12</td>
</tr>
<tr>
<td>4:0–4:5</td>
<td>14</td>
</tr>
<tr>
<td>4:6–4:11</td>
<td>14</td>
</tr>
<tr>
<td>5:0–5:5</td>
<td>38</td>
</tr>
<tr>
<td>5:6–5:11</td>
<td>41</td>
</tr>
<tr>
<td>6:0–6:5</td>
<td>43</td>
</tr>
<tr>
<td>6:6–6:11</td>
<td>45</td>
</tr>
</tbody>
</table>

#### Figure 2.7
Cut score for Child A

### Table B-2
Percentile Ranks Corresponding to Total Test Scores, by Age

<table>
<thead>
<tr>
<th>%ile Rank</th>
<th>Age</th>
<th>%ile Rank</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;99</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>99</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>98</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>97</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>96</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>95</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>94</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>93</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>92</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>91</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>90</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
<tr>
<td>89</td>
<td>1:1-3:11</td>
<td>50</td>
<td>5:6-5:11</td>
</tr>
</tbody>
</table>

#### Figure 2.8
Percentile rank for Child A
Appropriate Applications for Testing Young Children for (C)APD

Where might I use this kind of screening tool in my work?

Applications

Early identification and intervention
- Possible candidate for in-depth evaluation and/or intervention

Universal screening
- Possible companion to hearing screening

Progress Monitoring
- Check progress of intervention
Case Studies

Case Study: David

David, Age 4: Referral concerns

Referral
- Referred by parents
- Concerned that he has difficulty repeating or imitating words, songs, and nursery rhymes
- Hearing screening: WNL
Case Study: David

David, Age 4: Test Results

- ASA Total Raw Score of 12
- Cut score is 14, indicating that he may be at risk of auditory skill deficits
- Correctly identified 8 of 10 items on Speech Discrimination in Noise
- Imitated only 4 of 10 Memory Items

Results suggest that although he was able to identify known words, he may not have been able to use his phonemic awareness of sound order to conceptualize an unfamiliar (e.g., nonsense) word. Or he does not discriminate the individual phonemes accurately or mishear them, which resulted in mishearing the entire word.

Case Study: David

David, Age 4

Interpretation
- Demonstrates characteristics of children at risk for auditory skill deficits

Recommendations
- May benefit from activities such as using musical instruments to improve discrimination of sounds differing in pitch, duration, and intensity as well as recognizing changing patterns and rhythms.

Follow-Up
- If David continues to exhibit behaviors that are consistent with having auditory speech deficits, he should be evaluated with early phonemic measures
- He might benefit from a phonemic awareness training program, such as the Phonic Training Program and Phonemic Synthesis Therapy (Katz, 2007)
- Monitor progress and retest with ASA in 12 weeks
Case Study: Kayla

Kayla, Age 6

Referral
- Referred by classroom teacher

Background Information
- Diagnosed with a receptive and expressive language disorder, has difficulty staying on task, and is unable to play in a group and follow directions well. She often asks “What?”
- History of frequent ear infections
- Hearing screening: Passed

Case Study: Kayla

Kayla, Age 6

Kayla’s Test Results

ASA
- Performed well below average on all ASA domains and sections except Tonal Pattern
- ASA Total Raw Score of 17
- Cut score is 43, indicating that she is at risk of auditory skill deficits
- Referred for a full audiological evaluation, including auditory processing tests
Case Study: Kayla

Kayla, Age 6

Intervention

- The speech-language pathologist (SLP) began a program that included:
  - Follow up home activities to teach Kayla to recognize and discriminate non-speech sounds that differ greatly in pitch, intensity, and duration.
  - The program progressed to more difficult discriminations, eventually adding background noises, moving from non-speech to speech discrimination training.
  - Training began with phonemes and progressed to words and sentences.
  - Phonological awareness training was initiated, consisting of sound analysis and sound blending.
  - Introduction of a phonics-oriented reading program might be considered.
  - Consider an assistive listening device to improve focus.

Case Study: Bridgeport Preschool

4-Year-Old Universal Screening

Screening

- Thirty 4-year-olds screened as part of a routine universal hearing screening program in the community.
- All children administered a standard hearing screening at 20 dB at 1000, 2000, and 4000 Hz.
- Children who failed were rescreened in 2 weeks.
- ASA was administered to children who passed the hearing screening to test early sound awareness.
Case Study: Bridgeport Preschool

4-Year-Old Universal Screening

- Five children failed the hearing screening. Scheduled for follow up after they passed the hearing screening.
- All the children were administered ASA (including those who initially failed the hearing screening but later passed it).
- Six of the 30 children did not exceed the ASA cut score. They were considered at-risk for auditory skill deficits.

---

Case Study: Bridgeport Preschool

4-Year-Old Universal Screening

- Of the six children, three scored in the low range on the Speech Discrimination domain, and three scored in the average range.
- The three children scoring in the average range were scheduled for ASA follow up in 8 weeks. The teacher was encouraged to emphasize sounds and sound play during the course of the normal preschool curriculum whenever possible.
- The three children scoring in the low range were referred for inclusion in an early intervention group for sound awareness and phonological skill training. After 8 weeks, the children were retested on the ASA, along with the three children scoring in the average range on the Speech Discrimination domain of ASA.
Case Study: Bridgeport Preschool

4-Year-Old Universal Screening

After an 8 week follow up,
• All but two of the six children who did not initially pass the ASA successfully performed above the cut score upon rescreening.
• The two children who did not pass ASA the 2nd time were referred for an in-depth evaluation with a nationally-certified SLP to determine other factors that might be contributing to poor performance.

Why Test Early?

“We are aware that children demonstrate auditory processing deficits as young as age 3.6 or below. We know that these problems in young pre-school children can be remediated. We see these children
• struggle with learning sound-letter association,
• hearing words clearly,
• asking “what?”
• unable to listen in noise,
• having trouble following directions or following a conversation because it is too fast, or
• having trouble recognizing sounds in words or decoding or blending sounds into words.
These children are at risk. If we wait until 7-8, we will have lost valuable years for intervention remediation and treatment.”

Gelfinor, January 2017. Hearing Review. Letter to the Editor

Such intervention should include an FM system, found that children using an FM system for one year had significant changes in their neurophysiology and reading skills. The use of an FM reduced variability of subcortical responses to sound. Horrickel, Ziecker, Bradlow, and Kraus, (2012)
"My vision for this is to have every child tested at birth. It is because of what we have known for decades. When it come to helping kids with literacy challenges, earlier is better."

Nina Kraus, A Test That Can Look into a Child's [reading] Future
NPR interview 4/15/17

Questions & Answers
Instructions for submitting forms for ASHA CEUs

Pearson will submit completed CE forms to ASHA if you:
Attend the entire 60 minutes of the live session
(continued by our ReadyTalk verification report)

Complete the:
• Attendance Sheet (only if more than one person is at your site)
• ASHA Participant Form
• Evaluation Form

Please mail the forms postmarked no later than
5/22/17 to:
Darlene Davis, Pearson
19500 Bulverde Road, Ste. 201
San Antonio, TX, 78259

Questions about CEUs?
Contact Darlene Davis at darlene.k.davis@pearson.com

Pearson will not submit completed CE forms to ASHA if:
The mailed CE forms are postmarked after
5/22/17
CE forms are sent via fax or email
CE forms are submitted for “partial credit” (not available)
CE forms are submitted if you view the webinar recording on PearsonClinical.com or speechandlanguage.com.