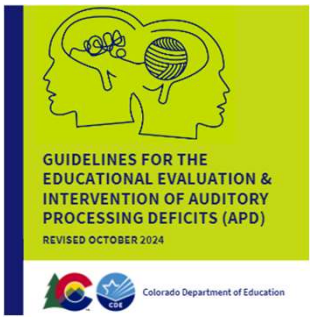


An Educational Model of APD:

Developed By and For Educational Audiologists

OSSPEAC Presentation
April 17, 2026
Lisa Lisowe, AuD, CCC-A

Introduction/Disclosure

- Educational Audiology Partners, LLC
- Colorado Department of Education, Audiology Coordinator (Contracted)
- University of Northern Colorado, Adjunct Faculty

Learning Objectives

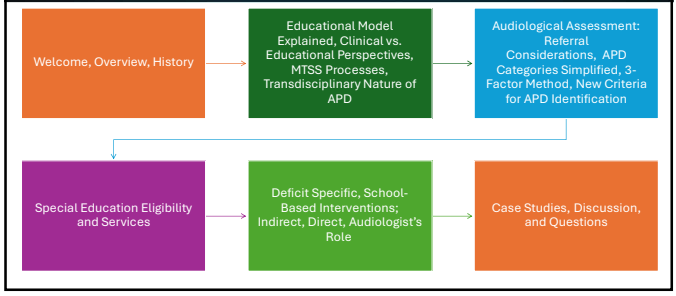
Discuss Colorado's **educational model of auditory processing** including the **transdisciplinary** nature of listening difficulties and how an **MTSS team-based** problem-solving approach supports best practices

Describe a **three-domain and three-factor assessment** framework that supports deficit-specific identification of auditory processing deficits

Identify **new recommended criteria** for determination of an educationally significant APD

Analyze how **cross-discipline interpretation** of audiological APD assessment supports **meaningful interventions for students** in the school setting

Agenda



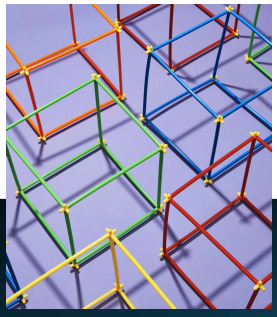
How It Began...

- **Original Guidelines 1997**
- **Major Revision 2008**
- **Review 2013**
- **Task Force Convened Fall 2018**

The purpose of these guidelines is multifold and designed to be used by school professionals and teams to:

- understand auditory processing deficits and their role in contributing to listening and learning problems
- differentiate bottom-up and top-down auditory processing
- consider why assessment of auditory processing skills is valuable in the school setting
- outline specific supports and interventions for students with suspected and identified auditory processing challenges
- determine "when" and "why" to invite the educational audiologist to the team
- delineate the various roles and responsibilities of the multidisciplinary team
- develop an efficient and sensitive referral and evaluation process
- identify auditory processing domains, the audiological assessments used within each domain, and the criteria for identification of an educationally significant auditory processing deficit
- clarify special education eligibility processes and re-evaluation recommendations

Development of an Educational Model



CLINICAL MODEL

Focus on Impairment, Diagnosis & Remediation

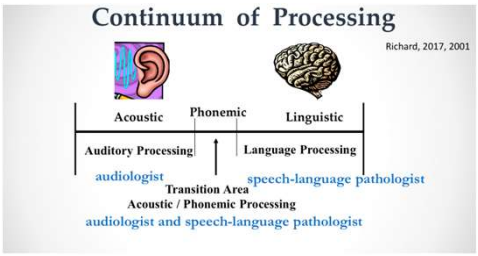
VS.

EDUCATIONAL MODEL

Focus on Access, Participation & Progress

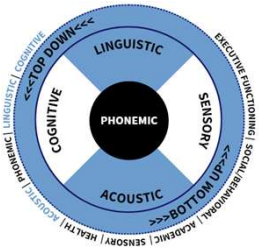
Key Question: "What is the impairment?" *vs.* "What does it mean for learning in school?"

Feature	Educational Model	Clinical / Medical Model
Primary Goal	Support access to the curriculum and participation in school.	Address medical conditions and improve quality of life across all settings.
Decision Maker	The **IEP Team**, including parents and teachers.	The **Physician** and licensed therapist.
Eligibility	Deficits must have an "educational impact".	Based on medical diagnosis or physician referral.
Setting	Schools, including classrooms, playgrounds, or buses.	Outpatient clinics, hospitals, or the home.
Funding	Provided at **no cost** under IDEA.	Paid via private insurance, Medicaid, or out-of-pocket.

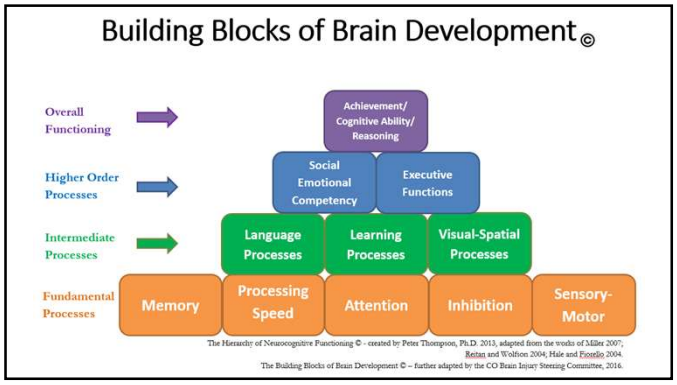


Continuum of Auditory Processing
(G. Richard, PhD, CCC-SLP)

An ***Educational Model*** of auditory processing represents an **interdisciplinary approach** in which all members of the team understand their unique role in examining each of the skills involved in the full continuum of auditory processing **from the bottom-up foundational skills to the top-down higher-order skills**.



In Colorado's educational model of APD, the goal is to connect auditory strengths and weaknesses with corresponding functional, academic, and behavioral difficulties experienced by students in the school setting.


Building Blocks of Brain Development ©
Overall Functioning
Higher Order Processes
Intermediate Processes
Fundamental Processes
Achievement/ Cognitive Ability/ Reasoning
Social Emotional Competency
Executive Functions
Language Processes
Learning Processes
Visual-Spatial Processes
Memory
Processing Speed
Attention
Inhibition
Sensory-Motor
The Hierarchy of Neurocognitive Functioning © - created by Peter Thompson, Ph.D. 2013, adapted from the works of Miller 2007; Reitan and Wolfson 2004; Hale and Fiorello 2004.
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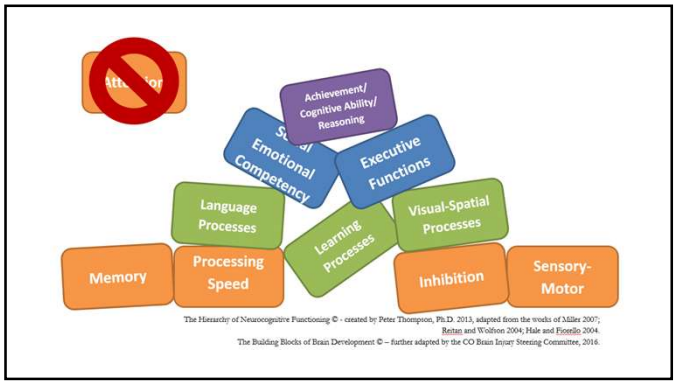
Achievement/ Cognitive Ability/ Reasoning
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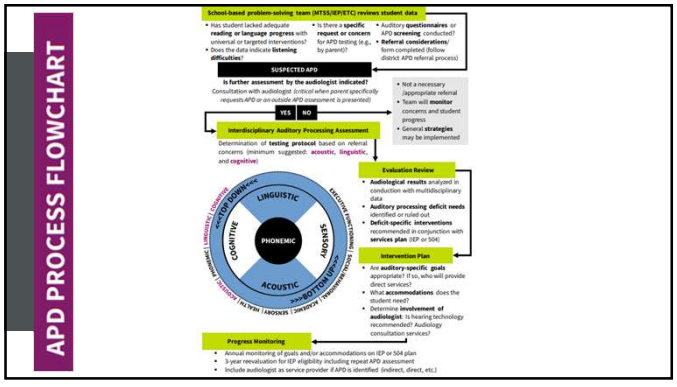

APD PROCESS FLOWCHART
School-based problem-solving team (MTSS/IEP/ETC) reviews student data
SUSPECTED APD
Is further assessment by the audiologist indicated?
YES
NO
Interdisciplinary Auditory Processing Assessment
Evaluation Review
Intervention Plan
Progress Monitoring
LINGUISTIC
COGNITIVE
SENSORY
ACOUSTIC
PHONEMIC

ROLES & RESPONSIBILITIES

While the audiologist's and the speech-language pathologist's role in auditory processing are defined by the American Speech-Language-Hearing Association (ASHA Practice Portal: Roles), other members of the multidisciplinary team are less well-defined. Each professional has much to contribute from their own area of expertise.

Take the following scenario. The MTSS team at a school is presented with a case involving a 3rd grader referred by his teacher. According to the teacher, the student:

- is having trouble following directions
- is distracted in noisy backgrounds
- takes a long time to answer a question
- often responds inappropriately,
- and has trouble paying attention during instruction.

The student often asks "huh" or "what" and appears not to have heard or understand what was said. In addition, the student is struggling in reading and showing signs of negative behaviors in the classroom that are disruptive to fellow learners.

EXECUTIVE FUNCTIONING	**SCHOOL PSYCHOLOGIST; MENTAL HEALTH TEAM**
Umbrella term for functions of self-control, major traits: flexibility, planning, organization, self-monitoring	
COMMON LOOK FORS	poor organization, inflexible thinking, difficulty initiating tasks, behavior problems
LANGUAGE PROCESSING	**SPEECH-LANGUAGE PATHOLOGIST**
Vehicle for communication and thinking; essential integration of multiple brain functions	
COMMON LOOK FORS	poor understanding, confused, slow responses, hard time expressing, poor reading
PHONEMIC PROCESSING	**SPEECH-LANGUAGE PATHOLOGIST; AUDIOLOGIST; OTHER TEAM MEMBERS**
Bridge between auditory and language processes	
COMMON LOOK FORS	mishears sounds, confuses words, mispronounces words, struggles with complex words, delayed literacy skills
SENSORY: AUDITORY (ACOUSTIC) PROCESSING	**AUDIOLOGIST**
Auditory perceptual abilities	
COMMON LOOK FORS	mishears despite normal hearing, difficulty following verbal directions, highly distracted in noisy situations
SENSORY: VISUAL/MOTOR	**OCCUPATIONAL THERAPIST**
Visual perceptual abilities and motor functions	
COMMON LOOK FORS	over or under stimulation of senses, sensory seeking/avoiding, messy, poor handwriting, overwhelmed

PROCESSING SPEED	**SCHOOL PSYCHOLOGIST; MULTIDISCIPLINARY**
Speed at which information comes into the brain, is processed, stored and outputted	
COMMON LOOK FORS	difficulties with rapid naming, timed tasks, fluency tasks
MEMORY	**SCHOOL PSYCHOLOGIST; MULTIDISCIPLINARY**
Storage room for experience and knowledge	
COMMON LOOK FORS	cannot repeat what was heard, gets lost, forgets things, poor spelling, splintered learning
INHIBITION & BEHAVIOR	**SCHOOL PSYCHOLOGIST; MENTAL HEALTH TEAM**
Behavioral and emotional control; linked strongly to attention and executive function	
COMMON LOOK FORS	impulsivity, fidgety, poor social boundaries, unsafe behaviors
ATTENTION	**SCHOOL PSYCHOLOGIST; MENTAL HEALTH TEAM**
The ability to orient and focus on a task for other processes to work; first step in all learning	
COMMON LOOK FORS	memory problems, inconsistent work, discipline issues, poor handwriting

Table 1b: Transdisciplinary continuum of auditory processing describing the common look fors and formal assessment roles of each processing level.

Referral & Assessment

Starts With Look Fors

OBSERVED CHALLENGES

- Behaves as if hearing loss is present, despite hearing levels within normal range
- Frequently requests repetitions (says "huh" or "what" often)
- Misunderstands spoken language
  - in noisy situations
  - in large, echo-y or reverberant rooms
  - when speech is fast or unclear (e.g. announcements, media recordings, unfamiliar accents)
  - when using listening only (without other supports such as visuals)
- Delayed, inconsistent, or inappropriate responses in oral communication situations
- Misheard words or confuses similar sounding words
- Confused, distracted, inattentive, or zoned out during listening activities
- Difficulty figuring out where a sound is coming from (on a playground, near streets, etc.)
- Misunderstands messages that rely on tone of voice such as sarcasm or humor

POSSIBLE SCHOOL-RELATED IMPACTS

- Poor performance on auditory-based tasks (e.g. listening comprehension, discriminating sounds, phonology, or letter-sound association)
- Associated academic difficulties in reading, spelling, and/or learning
- Difficulty attending to long lectures or extended periods of listening
- Unable to follow multi-step verbal directions
- Struggles to learn simple songs (e.g. nursery rhymes) or new languages
- Problems socializing in large groups or in noisy environment

Student Referral Considerations

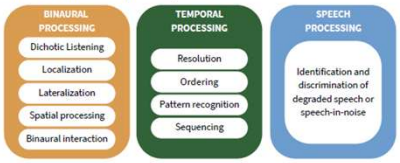
Language has been revised to be more inclusive:

- Age
- Cognitive status
- MLL status
- Other conditions (ADHD, ASD, etc.)

AUDIOLOGICAL PERSPECTIVE

When referring to auditory processing from a "bottom-up" perspective, the audiologist has the singular expertise in assessing and interpreting multiple, specific acoustic-level skills.

The question to be asked is "what is happening to the acoustic signal while it is traveling from the ear through the brain?" **Central auditory processing includes bottom-up mechanisms and neural impulses responsible for:**



When one or more of these processes are found to be functioning outside of the typical age-level range, an auditory processing deficit (APD) may be identified. Many students may perform poorly on APD tests due to higher order linguistic or cognitive factors and this makes differentiating an APD from other primary or global deficits quite challenging. While APDs can and often do exist alongside other other disorders (such as ADHD or Dyslexia), APD is understood to be specific to the auditory modality and not a result of other processing disorders.

3-Factor Method of Assessment

Audiological Assessment Simplified

Ensuring a Comprehensive Evaluation With the 3 Factor Model*

- Founded upon legal and "best practice" principles
  - Legal: Federal Law requires a full and comprehensive evaluation that uses a variety of informational sources
  - Best Practice: Uses scientific processes to create a strong "body of evidence"

Model is integrated in ***All*** evaluations. It is the driver and guides your general approach to assessment

Thompson and Sousa 2013

3-Factor Method (Thompson & Sousa, 2020)

AUDIOLOGY APD ASSESSMENT SHOULD INCLUDE ALL:

- **Informal data** (consultation, record review, parent interview, classroom observation)
- **Semi-Formal data** (screening questionnaires specific to auditory processing/listening; parent, student, teacher)
- **Formal data** (norm referenced and/or standardized assessments of auditory processing)

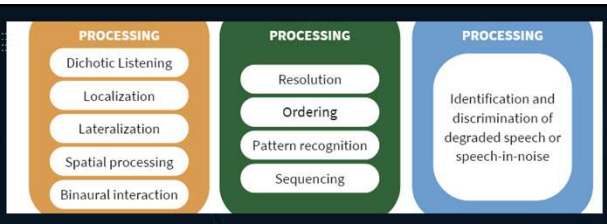
SEMI-FORMAL METHODS

- Bridge the formal and informal
- Both qualitative and quantitative
- Multiple perspectives and voices
- Inexpensive (can be self-created)
- Moderates bias

Semi-Formal APD Data Tools

QUESTIONNAIRE	AGE RANGE (3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 +)
Preschool SIFTER	3-5
The Listening Inventory	4-17
Fisher's Auditory Problems Checklist	5-11
SIFTER: Screening Instrument for Targeting Educational Risk	5-11
Evaluation of Children's Listening and Processing Skills	6-11
Listening Inventory for Education (Teacher LIFE-R)	6+
Scale of Auditory Behaviors (SAB)	7-14
Auditory Processing Domains Questionnaire (APDQ)	7-18
Children's Auditory Performance Scale (CHAPS)	7+
Listening Inventory for Education (Student LIFE-R)	8+
University of Cincinnati Auditory Processing Inventory	12+
Secondary SIFTER	12+

Table 2: Commonly utilized APD questionnaires organized by the age range that they evaluate.



FORMAL APD Assessment

- Consists of auditory specific, acoustically controlled measures
- Attempts to take out linguistic effects
- Provides a glimpse into the central auditory nervous system
- Provides a profile or description of auditory abilities

Availability of Assessment Batteries

- Easy to give outside of the sound booth
- Each contain a variety of all three APD domains
- Each have standardized or norm-referenced scoring

Availability of Assessment Batteries: SCAN

BINAURAL

- Competing Words (screening subtest)
- Competing words
- Competing sentences

What's missing or ?

Dichotic tests not scored by ear but ear advantage typicality can be analyzed

Higher linguistically

TEMPORAL

- Gap detection (screening subtest)
- Time compressed sentences

What's missing or ?

Temporal ordering/patterning

SPEECH

- Auditory Figure Ground (+8 screening test)
- Filtered words
- Auditory figure ground +12,+8, 0)

What's missing or ?

Availability of Assessment Batteries: MAPA-2

BINAURAL

- Dichotic digits
- Dichotic (competing) sentences
- Lateralization/localization

What's missing or ?

Dichotic digits not scored by ear and consists of TRIPLE digits

TEMPORAL

- Tap test
- Pitch patterns
- Supplemental
  - gap detection
  - duration patterns

What's missing or ?

SPEECH

- Selective attention (high interest story)
- Speech in noise (pink noise)

What's missing or ?

Availability of Assessment Batteries: FEATHER SQUADRON

BINAURAL

- Dichotic sounds (single or double)
- Dichotic digits
- Dichotic words (colors)
- Lateralization/localization

What's missing or ?

Binaural separation task

Higher level linguistic task

TEMPORAL

- Rapid tones
- Tonal patterns

What's missing or ?

Rapid tones can be a confusing test

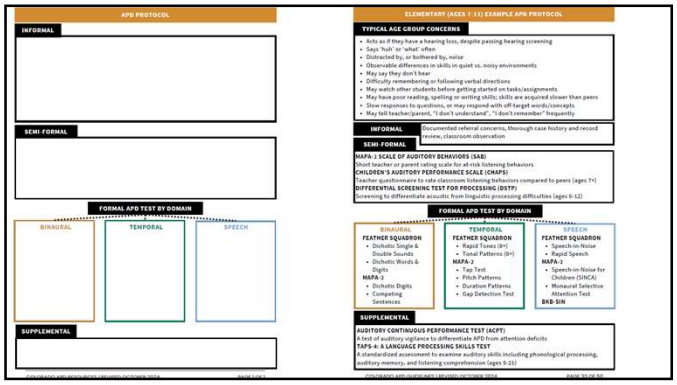
SPEECH

- Speech-in-noise
- Rapid speech

What's missing or ?

Filtered speech

Ear specific test



Criteria for Identification of "Educationally Significant" APD

Old Criteria

- Performance of at least 2 SD below the mean on two or more tests in the battery
- Performance of at least 3 SD below the mean on one test

New Criteria

- Performance of at least **1.5 SD** below the mean on **2 or more APD tests in the same processing domain**

Cross-Discipline Interpretation & Educational Programming

Cross-Discipline Analysis

COMMONLY LINKED EDUCATIONAL DIFFICULTIES		
BINAURAL	TEMPORAL	SPEECH
• Easily distracted by noise or multiple speakers • Sensitive to background noises, especially loud sounds • Difficulty with multi-modal inputs • May demonstrate complex sensory profile • Poor sound-symbol association • Developmental delays • Non-verbal learning difficulties • Visual processing/integration difficulties • Short-term memory deficits	• Phonological processing difficulties • Poor spelling • Difficulty sequencing • Pragmatic, social/peer communication difficulties • Delayed responses to verbal messages • Reading disorders	• Mishears or misunderstands especially in noisy environments • Receptive language delay • Difficulties discriminating speech sounds • Strengths in non-verbal and math skills • Auditory fatigue • ADHD/ADD

Table 6: *Some commonly linked educational difficulties to the three auditory processing domains*

Cross-Discipline Analysis

- Neurodiversity
- Sound Sensitivity Disorders (including hyperacusis, misophonia, and tinnitus)

Eligibility Determination Considerations

- APD assessment data should be considered as **part of the body of evidence**
- Adverse Educational Impact
  - Academic
  - Communication
  - Social
  - Functional

Eligibility for Special Education

APD is NOT considered a hearing disability (Hearing Impairment, Including Deafness)

Assessment data should be considered as part of the body of evidence

Student must meet criteria for one of these:

- Speech-language impairment (SLI)
- Specific learning disability (SLD)
- Additional (less-common) options
  - Other Health Impairment (OHI)
  - Traumatic Brain Injury (TBI)
  - Developmental Delay (DD)

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Eligibility for 504 Plan

Typically appropriate for mildly impacted students who do not need specially designed instruction (SDI)

Educational audiologist should ALWAYS be part of the educational team (IEP or 504)

Clinical/Outside Diagnoses

- Do not automatically infer adverse educational impact or educational disability
- Parents have a right to bring forth evaluations and teams must meaningfully consider
- Audiologists MUST be included in the consideration of outside APD assessments
- Team must document how outside evaluation was considered and whether it meets acceptable standards of assessment and appropriate next steps

Deficit-Specific, School-Based Interventions

"The overall goal of intervention is to provide the individual with the ability to communicate more effectively in everyday contexts (e.g. home, classroom) . . . and requires an analysis of functional deficits and specific recommendations for change across settings" (ASHA, 2018).

↕ Because listening difficulties can originate from and manifest within both bottom-up (acoustic level) and top-down (higher-order cognitive or linguistic) levels, interventions must also be considered from both perspectives (Moore, 2012).

School Provided Interventions

School Provided Interventions

Management of APD should be multifold and at minimum include instructional and environmental strategies, or indirect services, designed to support increased auditory access in the classroom. Direct services, including specially designed instruction (SDI), also need to be considered based on the skill gaps identified in the comprehensive evaluation.

Indirect Interventions (Accommodations)

INDIRECT | TOP-DOWN | Instructional strategies are considered top-down and primarily delivered by the classroom teacher to increase accessibility to the verbal message.

- *Instructional strategies*
- *Visuals*
- *Teacher strategies*

INDIRECT | BOTTOM UP | Speech enhancement includes bottom-up methods with the same purpose - to increase auditory access to speech in the classroom.

- *HAT*
- *Acoustic/room modifications*
- *Seating*
- *Lighting*

Direct Interventions (Specially Designed Instruction)

DIRECT | TOP-DOWN | To address auditory processing deficits from the top-down, students will benefit from direct interventions that focus on other learning needs identified in their evaluation.

- *Compensatory strategies*
- *Language building*
- *Memory techniques*
- *Metacognitive skills*

DIRECT | BOTTOM UP | Auditory training, which addresses student needs from a bottom-up perspective, includes skill-building activities focused on strengthening auditory-specific processing weaknesses identified on the APD evaluation.

- *Auditory training*
- *Listening skills training*
- *Reading/phonological training*

Case Studies, Discussion and Q&A

SECTION 5: RESOURCES

Resources:

- APD Look Fors in Children & Youth
- General Strategies for Students with Listening Difficulties
- APD FAQs
- APD Assessment Referral Consideration Form
- APD Case History
- Auditory-Focused Questionnaires
- APD Assessment Resources
- APD Protocol Template
- APD Assessment Profile Sample Template | APD Assessment Profile Example
- Deficit Specific Interventions
- Computer Based Auditory Training Programs
- Glossary of Terms

Questions?

Thanks for being here!

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