SLP, APD, IEP, 504, or RTI?

The practical importance of making a correct diagnosis is that children having different types of problems vary significantly in their needs and unless a differential diagnosis is made, their potentialities are lost.

-H. Myklebust, 1954
Matlock Disclosures

Financial Disclosures:
1. I am a faculty member of TSU and receive a salary as an academic and clinical instructor;
2. I received no financial compensation to attend this convention;
3. I received no financial compensation from any publisher of the assessments and intervention materials presented;
4. I receive no patient fees or reimbursement for clinical services.

Non-Financial Disclosures
- Clinical model discussed are used in the TSU Audiology Clinic
- TAASLP Foundation Executive Board Member
- I participate in ongoing APD research approved by the TSU IRB as a part of my faculty responsibilities
The SLP, APD, and RTI

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Based on ASHA’s Definition

- (Central) auditory processing disorder [(C)APD] refers to difficulties in the processing of auditory information in the central nervous system (CNS) as demonstrated by poor performance in one or more of the following skills:
  - sound localization and lateralization;
  - auditory discrimination;
  - auditory pattern recognition;
  - temporal aspects of audition, including temporal integration, temporal discrimination (e.g., temporal gap detection),
  - temporal ordering, and temporal masking; auditory performance in competing acoustic signals (including dichotic listening);
  - auditory performance with degraded acoustic signals (ASHA, 2005).
What happened to the “C”

  - Not sufficiently operationalized
  - Inappropriately referred to anatomical loci
  - Does not reflect potential peripheral and central interactions.

*ASHA 2005 technical paper suggest using both terms synonymously*
Nature of APD

- APD is a deficit in neural processing of auditory stimuli and may lead to or be associated with difficulties in higher order language, learning, and literacy.
- The term language processing is not synonymous with auditory processing, but may present the similar behaviors.
- Therefore there is a need for comprehensive assessment and diagnostic procedures that explore the nature of the presenting difficulties.
Does APD Cause Specific Language and Learning Disorders

• Several studies indicate that there is no one-to-one correlation between APD in general or one specific deficit area.
• APD was found to be present in 43.3% of children with learning disabilities and co-existing with developmental dyslexia in 25% of cases. The diagnosis of APD did not correlate with IQ or with the diagnosis of dyslexia (Iliadou et al., 2009).
• Auditory Processing Disorder is listed as a "rare disease" by the Office of Rare Diseases (ORD) of the National Institutes of Health (2014). This means that Auditory Processing Disorder, or a subtype of Auditory Processing Disorder, affects less than 200,000 people in the US population.
Prevalence of APD

• The are no authorized estimates of the prevalence of APD
• APD is observed in a diverse clinical population, including those with known CANS lesions and pathologies
• Several studies have linked APD with chronic otitis media.
• Stach et al. (1990) found that APD was observed in 70% of clinical patients over 60 years of age.
Prevalence of APD

• Chermak and Musiek (1997) estimated that APD occurs in 2 to 3% of children, with a 2-to-1 ratio between boys and girls.
• 5% or fewer of diagnosed cases of APD in children have underlying neurological diseases, disorders, or insults (Musiek et al, 1985, 1992).
• However, 57% of ASHA certified SLPs who work in a school setting reported regularly serving children with APD (ASHA, 2012).
Primary Characteristics of APD

- Difficulty understanding speech in adverse listening conditions
- Misunderstanding messages
- Responding inconsistently or inappropriately
- Frequently asking for information to be repeated
- Difficulty attending and avoiding distraction
- Delay in responding orally
• Difficulty following complex auditory directions
• Reduced musical or singing skills
• Difficulty with sound localization
• Associated with reading, spelling and learning problems
• Difficulty with sound localization

ASHA 2005
Other Characteristics

• Overall auditory functioning is poor consistently
• Poorer verbal IQ vs Performance or nonverbal performance
• Possible behavioral issues
Diagnosis of APD

- APD is an auditory deficit, therefore audiologists are the professionals who should diagnose (ASHA, 2002, 2004)
What is the SLP’s Responsibilities in the Identification of APD

• The SLP’s role is to **collaborate in the assessment** of the APD disorder and **provide intervention** where there is evidence of speech, language, and/or other cognitive communication disorders (ASHA, 2001)

• (C)APD screening can be conducted by audiologists, SLPs, psychologists, and others using a variety of measures that evaluate auditory-related skills (ASHA, 2005).
Past Processes for Determining eligibility for Student with APD

- APD was considered to be associated with eligibility criteria for learning disabled
- Establishing a discrepancy in test scores to determine eligibility
- Special education funding was associated with the severity and type of disability (Lynch, 2014)
The discrepancy between IQ and academic performance is no longer considered in isolation.

School systems can opt to use different criteria when using an RTI model. This flexibility allows for focused intervention before determining special education eligibility.
Response to Intervention (RTI)

• RTI is dependent on consistent data collection and monitoring of the student’s progress in response to “tiers of intervention”

  – **Level One – Universal Tier/Primary Prevention** (80%)
    • High quality instruction that meets the needs of most students.
  
  – **Level Two – Targeted Tier/Secondary Prevention** (15%)
    • Evidence-based intervention(s) of moderate intensity that addresses the learning or behavioral challenges of most at-risk students.

  – **Level Three – Intensive Tier/Tertiary Prevention** (5%)
    • Individualized intervention(s) of increased intensity for students who show minimal response to secondary prevention.
RTI: Advocate for Early Intervention

• Students demonstrating auditory behaviors consistent with APD can access additional support in general education.
• A student suspected of having APD deficits may require Tier II (secondary) prevention.
• A referral to special education and an APD assessment may be needed if progress is not made.
If your LEA is implementing RTI

- SLPs and Audiologists are uniquely qualified to support a student under RTI, IEP, or 504
- Follow the recommended evaluation and monitoring process
- Consider what types of support within your LEA’s RTI model, that may help your student with possible APD deficits
The SLP’s Role

**Intensive** (Tier III): The SLP’s collaboration continues with problem solving team in order to refine more intensive intervention as needed.

**Targeted** (Tier II): The SLP collaborates with problem solving team/professionals to interpret results of screenings/observations/data collection and to plan for the provision of appropriate intervention.

**Universal Tier** (Tier I): The speech-language pathologist consults with the general education teacher regarding instruction and screening.
RTI Considerations

- Consultation
- Screening and Observation
- Team Collaboration
- Accommodations
- Monitoring
- Referral (if necessary)
Observational Tools

• Questionnaires and Checklists
  – *Children’s Auditory Performance Scale* (CHAPS)
  – *Fisher’s Auditory Problems Checklist*
  – *Screening Instrument for Targeting Educational Risk* (SIFTER)
  – *The Listening Inventory* (Geffner and Ross-Swain, 2010)
  – *Observational Profile of Classroom Communication*
Screening Test Batteries

- **Differential Screening Test for Processing (DSTP)**
- **Tests for Auditory Processing Disorders for Children (SCAN-3:C) and Adolescents and Adults (SCAN-3:A)**
- **Test of Auditory Processing Skills – 3rd Edition (TAPS-3)**
- **Multiple Auditory Processing Assessment (MAPA)**
Accommodations vs Modifications?

• **Accommodations** are changes in *how* a student accesses information and demonstrates learning. Accommodations do not substantially change the instructional level, content, or performance criteria. The changes are made in order to provide a student with equal access to learning.

• **Modifications** are changes in *what* a student is expected to learn. The changes are made to provide a student opportunities to participate meaningfully and productively along with other students in classroom and school learning experiences.
Possible RTI Accommodations for Classroom Listening/Auditory Difficulties

- Allow flexibility in classroom seating. Preferably close to the speaker and away from sources of noise.
- Reduce background noise and reverberation at home and school (i.e. from sources such as doors, windows, pencil sharpeners, etc.).
- Trial use of a FM system to increase signal-to-noise ratio (soundfield system).
- Record lessons or instructions on tape.
Possible RTI Accommodations for Classroom Listening/Auditory Difficulties

Discrimination

- Enunciate clearly without exaggerated lip movements.
- Rephrase the question or statement (rather than repeating it if student does not understand what is said) with associated visual cues, demonstration or modeling.
- List key vocabulary on the blackboard prior to discussing new material.
Possible RTI Accommodations for Classroom Listening/Auditory Difficulties

Auditory Integration (Binaural Processing)

- Periodically ask student questions about the topic under discussion to check comprehension.
- Move into new areas of academics by gradual transition and review of previous material.
- Personalize instructions by calling the student’s name or touching his or her shoulder.
- Student should be encouraged to indicate when material is not understood.
Possible RTI Accommodations for Classroom Listening/Auditory Difficulties

Output-Organization/Auditory Memory

- Allow student to read ahead on a topic to be discussed in class.
- Write assignments on the board.
- Use outlines and checklists.
- Record lessons or instructions on tape.
- Use visual cues whenever possible.
- Keep instructions brief.
General Classroom Accommodations: Peer Interactions

- Peer Helpers/Tutors
  Utilize cooperative learning strategies:
  - Assign a peer helper to check understanding of directions
If Progress is not made using RTI?

Consider the many options available to assist students:

- **IEP** and **504** are both viable options that take:
  - Teaming and planning with observation
  - Evaluation, and
  - Comparison of all professionals’ evaluation results.
Considerations for the Team before referring to the Audiologist

- Most APD tests were designed for use with patients having normal or near normal hearing.
- Language age for most tests’ vocabulary is 5 – 6 years.
- Tests were “normed” on persons with IQs of 85 -115.
- Most tests are normed on 8 year olds or older.
References


Audiological Testing for APD...

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Disclosures

• Financial: I receive a salary as a clinical professor at the University of Tennessee Health Science Center.

• Non-financial: I have recently served a 6 year term as an ASHA steering committee member for SIG 9.

• Velvet Buehler, M.A. CCC-SLP/A
APD Team Assessment

• How do we determine the appropriate test battery to evaluate if we can OR cannot “listen”?

• Who is on the team?
  – Audiologist
  – Speech-Language Pathologist
  – Psychologist
  – Special Educator
  – Classroom Teacher
  – Oto-Neurologist
  – OT/PT
  – Parents
  – Child
Contribution of the Audiologist and the Speech Pathologist

- ASHA recommends that the final diagnosis be made by the audiologist as a result of a TEAM assessment
- Team management is also recommended
- Observe behaviors and characteristics of APD
- Understand APD and how it affects academics, communication, literacy, and social/emotional skills
- Administer formal tests
Contribution of the Audiologist

- Make the diagnosis of APD
- Specify deficient auditory processes
- Identify the specific sub-profile or type of APD
- Make recommendations for management
  - ALDs
  - Compensatory strategies
  - Environmental and teacher modifications
  - Treatment areas related to auditory processes and sub-profile of APD
Differential Diagnosis

• The APD test administration must make modifications for attention, articulation, memory, sensory and language deficits
  – Notice “on again/off again” behaviors
  – Do not score items which are judged “inattentive”
  – Do not score items which are judged “misunderstood” or “too difficult” for level of child
The Typical APD Report
What does it mean?

- Reason for Visit
- Background History
- Chief Concerns
- Review of Systems/Exams
  - Otoscopy
  - Tympanometry and Acoustic Reflexes
  - Fisher’s Auditory Problems Checklist
  - Peripheral Hearing
  - Central Hearing
- Assessment of Results
- Plan/Recommendations
- Prognosis
The Tests Typically Administered for Central Hearing by the Audiologist

- Staggered Spondaic Word Test (SSW)
- Dichotic Digits- Double Pairs
- Competing Sentences Test
- Pitch Pattern Sequence Test (PPST)
- CID-22 Speech in Noise Test
- Time Compressed Sentences or Words
- Low Pass Filtered Speech
- Rapid Alternating Speech
- Competing Environmental Sounds
- Phonemic Synthesis
Other Tests in APD Battery

- Complete Audiologic Evaluation
- PIPB Rollover
- Masking Level Differences
- Acoustic Reflexes
- Tympanometry
- Oto-acoustic Emissions
- ABR/MLR/P300 Evoked Potentials
Figure 2-2. Effects of lesions of the CANS on dichotic listening showing pattern of interruption for (A) right temporal lobe lesion, (B) corpus callosum lesion, and (C) left temporal lobe lesion.
Staggered Spondaic Word Test (SSW)

- Assesses dichotic listening
- Requires the auditory process of binaural integration when linguistic cues are present
  - Binaural Integration: the ability to understand and process two different messages presented simultaneously

Example: up  stairs  down  town
      RNC  RC  LC  LNC
Dichotic Digits- Double Pairs

• Assesses dichotic listening
• Requires the auditory process of binaural integration when linguistic cues are not present
  – Binaural Integration: the ability to understand and process two different messages presented simultaneously

Example: 1 4 (simultaneous)
         6 5 (simultaneous)
LE    RE
repeat all four numbers
Competing Sentences Test (CST)

• Assesses dichotic listening
• Requires the auditory process of binaural separation
  – Binaural Separation: the ability to “selectively attend” and to understand one message presented while ignoring another message presented simultaneously

Example: It was a long ride by train. RE
         I thought we would never get there. LE
         Simultaneous
         Tell me the sentence you hear at the right ear/ left ear.
Pitch Pattern Sequence Test (PPST)

- Assesses the auditory process of temporal patterning and inter-hemispheric transfer via the corpus callosum
- Requires pitch discrimination, memory, and sequencing to hum the three pitch sequence AND to label the three pitch sequence

Example: High High Low (binaural presentation)
1. Hum the three pitch sequence (Rhemisphere)
2. Label the three pitch sequence (Lhemisphere)
Pitch Pattern/Duration Pattern Sequence
CID-W22 Speech In Noise Test

• Assesses the auditory process of auditory figure ground
  - Auditory figure ground: the ability to understand messages in the presence of background noise (+5db S/N ratio)

Example: Repeat these words (25 RE, then 25 LE)

  Listen to the man and ignore the noise
  Compare difference in ears
  Compare difference in quiet and in noise
Time Compressed Sentences

- Assesses the process of auditory closure and overall temporal processing skills
  - Auditory Closure: the ability to “fill-in” the missing pieces of a compromised or degraded message

Example: Repeat sentences with 40 % time compression
Repeat sentences with 60% time compression
Do for each ear and
Compare difference between ears/ % correct
Assess the process of auditory closure and overall temporal processing skills

- Auditory Closure: the ability to “fill-in” missing pieces of a compromised or degraded message

Example: Repeat words/ Say the word burn
Passed through a low pass filter
They sound “muffled”.
25 RE, 25 LE % correct
Rapid Alternating Speech Test

- Assesses the process of binaural fusion
  - Binaural fusion: the ability of the two ears to merge auditory input being rapidly alternating between the RE and the LE

Example: Repeat the sentence
  The children came home late from school.
  Rapidly alternating between ears
Phonemic Synthesis

• Listen, sequence and remember sounds discreetly presented and blend to make word

• Example: m- i- l- k = milk
25 words increasing in number of sounds
% correct and analyze types of errors
Competing Environmental Sounds

• Dichotic task assessing Binaural Integration

• Example: hear two environmental sounds presented simultaneously to each ear and point to pictures representing the two sounds

• Car horn (RE) and sneezing (LE) get total % correct and % correct at each ear
• Use WIPI stimulus pictures (set of 8 on each page and some rhyme)

• Present 25 words while competing story is also being presented in background

  Score % correct
Contribution of the Speech-Language Pathologist

• Understand the audiologic test battery, auditory processes, types of APD and implications for treatment

• Understand, develop and implement effective treatment goals and strategies incorporating results of the audiologic evaluation AND the speech-language evaluation

• Consult with teachers for carry-over into the classroom and identify weak academic areas

• Consider results of other evaluations completed
Contribution of the SLP: Assessment

- Vocabulary
- Critical thinking skills
- Specific word finding
- Oral reading vs. Silent reading fluency
- Reading comprehension
- Paraphrasing, reasoning, inferencing
- Narrative language
- Phonological Awareness
- Phonetic Decoding
- Short and long term memory
- Working memory and sustained memory
- Sequencing
- Organization of thoughts
- Lag time in response
- Figurative/meta-linguistic/pragmatic
- Length and complexity
- Spelling
- Written language
Additional Assessment Areas For SLP:

Write Goals as needed!

- Auditory Memory/Sequencing/Reasoning: short term, long term, sustained memory, working memory
- Reading Comprehension
- Reading Fluency
- Written Language Skills
- Spelling
- Phonetic Decoding/Synthesis/Analysis/Phonological Awareness
- Auditory Cohesion
- Receptive and Expressive Language
Contribution of Other Team Members

- **Psychologist:**
  - Verbal vs. Performance IQ
  - Learning style
  - Attention
  - Learning disabilities
  - Hyperactivity
  - Emotional status
  - Speech of processing
  - Effects of medications
  - Impulsivity
  - ADHA or Autism Spectrum

- **Special Educator/Teacher:**
  - Complete checklists such as CHAPPS, Fisher’s Auditory Problems
  - Academic deficits

- **Occupational Therapist/Physical Therapist:**
  - Auditory visual integration
  - Fine and gross motor skills
  - Sensory integration

- **Otoneuralogist:**
  - Dizziness
  - MRI to rule out retro-cochlear pathology
Audiological Tests Identify Deficits in Auditory Processes and Sub-Profiles of APD

Review of Auditory Processes Assessed during the APD evaluation and Sub-Profiles of APD

Velvet Buehler, M.A.CCC-SLP/A
Auditory Processes and Tests

- **Binaural Integration**: Staggered Spondaic Word, Dichotic Digits
- **Binaural Separation**: Competing Sentences
- **Temporal Patterning/IHT**: Pitch Pattern Sequence
- **Auditory Figure Ground**: CID W-22 in noise or SAAT
- **Auditory Closure**: Low Pass Filtered Speech, Time Compressed Sentences
- **Binaural Fusion**: Rapid Alternating Speech
Types or Sub-classifications of Auditory Processing Disorders

Katz / Buffalo Model

- Decoding
- Tolerance Fading Memory
- Integration
- Organization
Primary Subtypes

- Auditory Decoding Deficit
  - Dysfunction in the *left* hemisphere

- Prosodic Deficit
  - Dysfunction in the *right* hemisphere

- Integration Deficit
  - Dysfunction in inter-hemispheric pathways or *right* hemisphere
Secondary Subtypes

- **Associative Deficit**
  - Dysfunction in *left* associative cortex where acoustics and meaning/syntactic analysis occurs

- **Output-Organization Deficit**
  - Dysfunction 1) in temporal-to-frontal and/or efferent system 2) with audition and higher-order abilities such as receptive language and executive function
Primary Sub- Profiles:
Auditory Decoding Deficit

• The most auditory-modality specific

• Site of dysfunction is the primary auditory cortex in the language dominant hemisphere (left hemisphere)

• Decreased intrinsic redundancy which is more pronounced in listening situations where extrinsic redundancy is reduced
Primary Sub-Profiles
Prosodic Deficit

- Often is the auditory piece of a larger, general central processing deficit arising from a dysfunction in the *right hemisphere*.

- Auditory Processes impacted:
  - Poor Temporal Patterning skills
  - Poor Auditory Discrimination of non-speech stimuli and vowels
  - Poor Binaural Separation and/or Integration
Primary Sub-Profiles
Integration Deficit

- Characterized by difficulty in tasks requiring inter-hemispheric transfer (*right hemisphere or corpus callosum*)

- Symptoms may be within a single modality or may be multimodality because the corpus callosum is a multimodal structure

- The auditory symptoms may be the primary factor or just one manifestation of multimodality difficulties
Secondary Sub-Profiles: Associative Deficit

- Inability to apply the rules of language to incoming acoustic information (example: misunderstand passive voice, “the cat was chased by the dog”, compound sentences, and complex linguistic messages
- Inability to attach linguistic meaning to phonemic units of speech
Secondary Sub-Profiles: Output-Organization Deficit

- Symptoms can overlap with many other disorders so evidence of an auditory deficit must be confirmed.
- Inability to sequence, plan, and organize responses to auditory information or instructions.
- Receptive auditory skills are good, but the ability to act upon incoming auditory information is poor.
Successful Management

Direct Intervention

Compensatory Strategies

Environmental Modifications
Direct Intervention Techniques

Decisions based on characteristics of the type of AP disorder

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Disclosure

• I am the owner of Parent Child Services Group in Knoxville, TN and receive a salary.

• Lynne Harmon, M.A, CCC-SLP/A
Auditory Processing includes…

• “Bottom-Up” processes
  – Occur in the auditory system prior to higher-order cognitive and linguistic operations at the cortical level

• “Top-Down” processes
  – Influenced by attention, memory and linguistic competence
APD may cause deficits in areas that impact LEARNING!

- If a child does not develop good listening skills, then learning is impacted.

- If a child does not develop good reading skills, then learning is impacted.

“Children who do not LISTEN and READ well are limiting their potential to continue to LEARN at the rate that other children do.”
We must ensure that AP is ruled in or out!

To ensure that we address all deficit areas that may contribute to reading and learning disorders.
Treatment

Can we make a difference?
BUT there is no cookbook!!
So what do we need to change?

- Ensure that the brain is better organized so that it can process more rapidly
- Ensure that connections are made between areas of the brain that should function together
- Ensure that specialization occurs in areas as a result of appropriate repeated stimulation
Brain-Based Learning

• Learning in accordance with the way the brain is naturally designed to learn.

• Multidisciplinary

• Use what is known about the brain to make better treatment decisions.
  – Eric Jensen, Brain-Based Learning (2000)
Basis of Effectiveness for any Method

- 1) Frequency
- 2) Adaptivity
- 3) Motivation
- 4) Intensity
How do we decide which method??

• Analyze behaviors noted by the audiologist and SLP

• Analyze areas of need

• Involve a team

• Use the brain-based methods from today’s research
Comparisons of Methods

• Two studies have been instrumental in our understanding of the effectiveness of these brain-based principals
Research – the beginning

Research – controversy!

FFW-L, CALI, ILI, AE groups

• 216 children with language impairment and poor reading – ages 6 to 9

• 3 summers of treatment with 3 different cohorts of children

• 6 weeks of intervention, 5 days a week, 1 hr. 40 min. per day
Treatment

• FFW-L for auditory processing and language

• Specially selected computer games for language and auditory (Earobics/Lexia)

• Computer games for math, social studies, and science (enrichment)

• Speech-language with emphasis on reading picture books
…80% of children working with the SLP made large gains.

“…74% of the children in our study who received (FFW-L) had follow-up scores that were significantly greater than their pre-test scores six months after treatment ended. I judge that to be a substantial benefit.”

…69% of children in the general academic enrichment group made large gains.

…63% of the children who received (CALI) made large improvements.

Dr. Ron Gillam
Addressing Types of APD with…

Classroom Accommodations, Direct Therapy, and Compensatory Strategies
Decoding AP Type…

- **Classroom Accommodations:**
  - Assistive listening device
  - Preferential seating
  - Use of multimodality cues
  - Repetition
  - Note-taker
  - Pre-teach new information/vocabulary
  - Training for self-advocacy and dealing with adverse listening conditions
  - Avoid auditory fatigue/ give listening breaks
  - Frequent checks for comprehension
Decoding AP Type…

• **Direct Intervention:**
  - Auditory Closure
  - Binaural Integration/Separation with Dichotic Listening
  - Auditory Figure Ground
  - Auditory Discrimination
  - Phonological Awareness
  - Reading Comprehension
  - Reading Decoding and Spelling
  - Written Language and Narrative Language
  - Vocabulary Building
Decoding AP Type…

• **Compensatory Strategies:**
  
  – Enhance Motivation/Avoid Fatigue
  – Teach Active Listening Techniques
  – Teach “Look *and* Listen” strategy
  – Provide Attribution Training
  – Teach Meta-linguistic, meta-cognitive, and meta-memory strategies
  – Teach Schema Induction – categorical knowledge
Prosodic AP Type…

- Classroom Accommodations:
  - Animated teacher placement
  - Preferential seating
  - Multimodality cues use of demonstrations and examples
  - Avoid hints/tell exact meaning
  - Repetition or rephrasing (with prosodic cues more perceptually salient)
  - Note-taker
  - Making frequent checks for comprehension
  - Un-timed Tests
  - ALD seldom indicated because difficulty is not related to the clarity of the acoustic signal
Prosodic AP Type...

- **Direct Intervention:**
  - Pragmatic Language Intervention
  - Reading Fluency Program/Sight Word Enhancement
  - Visualizing and Verbalizing Program
  - Prosody Training
  - Temporal Patterning Training
  - Inter-hemispheric Transfer Activities
Prosodic AP Type...

• **Compensatory Strategies:**
  - Teach Schema Induction (to improve social situation interpretation)
  - Teach Active Listening Strategies
  - Attribution Training
  - Memory Enhancement Strategies
  - Dance, Drama or Music Lessons
  - Games such as “Bop IT”
  - Teach Key Word Extraction
  - Referral? Counseling
Integration AP Type....

- **Classroom Accommodations**
  - Preferential seating
  - Break information and directions into small parts
  - Provide “how to” information
  - Repeat, don’t rephrase
  - Un-timed tests in quiet room
  - Abbreviated assignments or more time
  - Note-taking assistance
  - Avoid multi-modality presentation
  - Hands-on experiential environment
  - Provide multi-modal inputs one at a time
  - ALD may not be indicated in order to “get the big picture”
Integration AP Type….

• Direct Intervention
  – Speech-Language Treatment to address possible receptive/expressive language delays
  – Vocabulary Building
  – Auditory Memory and Sequencing Activities
  – Key Word Extraction for Sustained Attention
  – Dichotic Listening and Localization Training
  – Speech in Noise Training
• **Direct Intervention:**
  – Auditory Closure Activities
  – Auditory Cohesion Goals
  – Temporal Patterning Training
  – Prosody Training
  – Inter-hemispheric Transfer Exercises (including dance,
  – Phonetic Discrimination/Decoding/Synthesis Training
  – Dance, music, juggling, karate
Integration AP Type....

- Compensatory Strategies:
  - Provide education about nature of difficulties/attribution training
  - Teach recognition of difficult listening situations and problem solve
  - Teach meta-memory strategies
  - Formal and content schema induction
  - Teach “look or listen”, “look then listen”
Associative AP Type….

- **Classroom Accommodations:**
  - Focus on “rules”
  - Use multi-modality cues
  - Rephrase information and repeat with smaller linguistic units
  - Comprehension checks: ask for paraphrase not repetition of what was heard
  - Pre-teach new information
  - Use organizational aids
  - Allow for foreign language substitution or modifications
  - Use multiple choice or closed set tests
Associative AP Type….

• Direct Intervention:
  – Speech language treatment to include receptive vocabulary, syntax and pragmatic language goals
  – Teach paraphrasing and inferencing skills
  – Teach contextual derivation of word meaning
  – Teach rules of language
  – Teach discourse cohesion (conversational competence)
  – Teach metalinguistic vocabulary
Associative AP Type...

- **Compensatory Strategies:**
  - Teach Meta-memory Strategies
  - Training in the Rules of Language
  - Formal and Content Schema Induction
• Classroom Accommodations:
  – Recommend highly structured, rule-based classroom
  – Use an assignment book checked by teacher
  – Provide written instructions
  – Preferential seating
  – Trial use of ALD
  – Rephrasing using smaller linguistic units
  – Avoid auditory fatigue
  – Use positive reinforcement
Output Organization AP Type….

- **Direct Intervention:**
  - Auditory Memory Activities/Speech In Noise Training
    - immediate and delayed responses
    - varying degrees of noise/speech competition
  - Auditory Sequencing Activities
  - Assess Expressive Language and target deficit areas
  - Assess Sensory Integration and Fine Motor Skills (OT)
  - Assess for ADD/ADHD
• Compensatory Strategies:
  – Teach Rules of Organization
  – Teach Active Listening Strategies
  – Teach Meta-Memory Strategies
  – Teach Study and Test Taking Skills
  – Teach Note-taking and Outlining Skills
Program Ideas…

- **CAP Kit** – (Mokhemar) for missing word/syllable/phoneme activities, binaural integration, binaural separation/integration
- **Differential Processing Training** by Winget
- **WINT 1** by Katz and Bricault – for auditory figure ground
- **Processing Power** by Ferre for rhyming, word associations, speech in noise, speech-reading
- **HELP** for Memory
- **It’s Time to Listen Program** - Hamaguchi
Programs for Reading and Written Language Intervention

– Lindamood Phoneme Sequencing Program (LiPs)
– Wilson Program
– Visualizing and Verbalizing by Nanci Bell
– SPPELL-Links to Reading and Writing
– Vanilla Vocabulary
– Seeing Stars (symbol imagery)
– Wisnia-Kapps Reading Program (WKRP)
– Story Grammar Marker
Computer-Assisted Auditory Processing/Language and Reading Programs

• Earobics – Ages 4 to adult - phonological awareness and auditory processing skills such as auditory processing & memory, phoneme identification, sound blending, segmenting, rhyming, and sound discrimination.

• Lexia – Pre-K to grade 5 – phonological awareness, phonics phonemic awareness, structural awareness, automaticity/fluency, vocabulary, and comprehension.
Fast ForWord Family of Programs

- Ages 4 to 22 (scilearn.com);
- Adults – (positscience.com)

- Processing speed, discrimination, language processing, memory, attention, sequencing, reading, reading fluency, reading comprehension, phonological processing, and auditory processing
Brain activation patterns actually changed after eight weeks of intensive intervention and students had significantly improved reading performance.


Cortical Areas Critical for Reading
Additional Resources

• The Brain and Sensory Plasticity (Charles I. Berlin and Therodore G. Weyand) (2003)
• When the Brain Can’t Hear (Terri James Bellis) (2002)
• Like Sound Through Water (Karen J. Foli) (2002)
• Handbook of (Central) Auditory Processing Disorder (Gail D. Chermak and Frank E. Musiek) (2007)
• Auditory Processing Disorders: Assessment, Management, and Treatment (Donna Geffner and Deborah Ross-Swain) (2007)
• The Brain that Changes Itself (Norman Doidge) (2007)
School Based Approaches for the SLP

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Fitzgerald Disclosures

Financial Disclosures:
1. I am a faculty member of TSU and receive a salary as an academic and clinical instructor;
2. I received no financial compensation to attend this convention;
3. I received no financial compensation from any publisher of the assessments and intervention materials presented;
4. I receive no patient fees or reimbursement for clinical services.

Non-Financial Disclosures

• Clinical model discussed are used in the TSU Audiology and Speech Clinics
• TAASLP Foundation Executive Board Member
• I participate in ongoing APD research approved by the TSU IRB as a part of my faculty responsibilities
SLP Assessment of Auditory Perception / Processing Skills

- CTOPP-2
- SCAN 3-C, SCAN-A
- Phonological Awareness Test
- Lindamood Auditory Conceptualization Test
- Auditory Skills Assessment
- Language Processing Test-3
- Listening Test
- CASL
- CELF-5
- Test of Auditory Perceptual Skills TAPS-3
- Differential Screening Test for Processing (DSTP)
<table>
<thead>
<tr>
<th>Processing Differential Levels</th>
<th>Behavioral Objective/Goal</th>
<th>Assessment Tasks</th>
<th>Intervention Tasks</th>
</tr>
</thead>
</table>
| **Acoustic (AUD)**            | Receiving the signal – intact transmission | • Word Recognition  
• Tone Discrimination  
• Pattern Repetition | • FM System  
• Preferential Seating  
• Lip Reading  
• Tape Recording  
• Figure Ground |
| **Phonetic/Phonemic (AUD & SLP)** | Analyzing the signal – discrimination of acoustic segments | • Word segmentation  
• Rhyming  
• Sound Discrimination | • Sound Blending  
• Word analysis  
• Grapheme-phoneme Correspondence |
| **Linguistic (SLP)**           | Understanding the signal – attaching meaning | • Identifying objects  
• Identifying concepts  
• Semantic Relationships | • Concept development  
• Word/object Association  
• Answering wh questions  
• Compare/Contrast tasks |
| **Executive Function**         | Managing and organizing a response to the signal | • Pragmatic language  
• Problem solving/reasoning  
• Prosodic Interpretation | • Role play pragmatic situations  
• Work on impulse control  
• Judgment and interpretation |
Approaches to Management

- Direct training in auditory skills
- Direct teaching & strengthening the use of compensatory skills and strategies
- By-pass environmental strategies
- Curricular and instructional modifications
- Development of self-advocacy skills
- Computer-assisted programs
General Goals

- To establish as accurately as possible a phonetic representation of the speech sound signal. To establish a link between phonemes (speech) and graphemes (print)
- To facilitate the understanding of spoken messages through the development of metalinguistic and metacognitive strategies: SLANT
- To facilitate classroom learning by modifying the environment & instructional process so that the effect of APD on listening & understanding are removed or reduced
Management Principles

- Management is a team approach with Audiologist, SLP, Teacher, Psychologist, Parent and Child

Speech-Language Pathologists
- Evaluate language development and phonological skills
- Build vocabulary
- Teach students how to recognize and increase key vocabulary associated with content area
- Ensure the use of compensatory strategies in the classroom

Audiologists
- Perform classroom observations to evaluate auditory behaviors in noise and in quiet
- Screen for possible APD deficits
- Assess needs for and selection of assistive listening devices (ALDs)
- Counsel parents, teachers and team members about the APD and the use of ALDs
- Provide training to teachers and older students to check ALDs on a daily basis and how to troubleshoot problems
The Three-Legged Stool

• Tripod approach “three legs” of the stool
  1. Environmental modifications
  2. Remediation activities
  3. Compensatory strategies

Some elements maybe offered though S-team option, or early targeted RTI2 services or 504 Plans as well as IEP plans for qualified students
Factors that influence the auditory processing load

- These factors need to be reduced or compensated for when possible:
  - Signal to noise ratio
  - Rapidity of acoustic transitions, briefness of signal
  - Length of message
  - Phonetic complexity & similarity
  - Familiarity of linguistic material
  - Redundancy of linguistic material
  - Complexity of linguistic content
Environmental Modifications, Accommodations and Classroom Strategies

- Designed to improve the child’s access to and use of auditory information
- FM system if indicated by testing
- Preferential seating
- Acoustic modifications in classroom
- Redundant learning environment
- Multimodal presentation of materials in UDL
- Frequent listening checks
- Listening breaks
- Notetakers/CART/audiotapes

Some of these can be offered as RTI2 or 504 services as well as IEP services
Compensatory Strategies

- **Active Listening**
  - Attribution training
  - Whole body listening

- **Metacognitive Strategies**
  - Self-instruction, reauditorization, metamemory strategies, rehearsal strategies, set task to music

- **Metalinguistic training**
  - Morphological language rules and cohesion devices training in scripts and schema

*Many of these strategies can be taught through RTI2 or 504 services as well as formal IEP services*
Accommodations

- Acoustic Processing – Modifications and Strategies
- Gain visual attention before beginning to present verbal directions
- Position yourself in good light and facing the student
- Eliminate/reduce distracting background noise
- Direct signal enhancement via assistive technology
- Use Clear Speech
- It’s all about improving access to acoustic signal
Accommodations

- Linguistic Processing – Modifications & Strategies
- Repetition, rehearsal, restatement, and confirmation of auditory information
- Provide clear, succinct verbal directions
- Use clear language
- Supplement verbal with visual stimuli
- Play compare contrast games with visual-motor to supplement auditory input
- Use visual cues or prompts for ‘listen’ and ‘do’ to promote careful listening before initiating a task
- It’s all about linguistic clarity
Accommodations

• Phonemic Processing – Modifications & Strategies
• Use visual phonics or gestures to represent various auditory sounds
• Play games using visual-motor actions to represent auditory sounds or segments
• Play detective to analyze and segment sound aspects of words
• It’s about structure and quantity of incoming information
Direct Remediation

• The primary purpose of direct remediation is to attempt to alleviate the disorder through specific therapeutic activities when child qualifies for IDEA services and requires specially designed instruction.

• Increased stimulation through therapy may result in changes in the CANS and functional improvement in auditory processing skills.
Direct Remediation

- **Auditory Closure Activities** or learning to fill in the gaps or missing parts of the message to perceive the whole ex. missing phoneme, missing syllable, vocabulary training

- **Binaural Separation/Integration Activities** to learn to listen to signal in one ear only or the signal in both ears and to localize sounds ex. Target to competition, Marco Polo, Blind Man’s bluff
Direct Remediation

• **Temporal Patterning Activities** to enhance perception of rhythmic and prosody patterns recognizing stress, loudness and pitch differences and imitating these, intonation patterns

• **Phonemic Discrimination and Sound to Symbol Skill Activities** to develop accurate phonemic representation and speech-to-print skills, phonological awareness,
Direct Remediation

• **Temporal Processing Activities**
  acoustically-modified speech discrimination tasks

• **Interhemispheric Exercises**
  verbal to motor transfers grab bag, music, listening to songs and answering questions, bipedal and bimanual sports, games
Illustrative Approaches

- **Bottom-up approaches** Sloan (1990) Swank & Catts (1994) auditory-perceptual training/phonological awareness training
- **Top-down approaches** Metacognitive & schema approaches Chermak & Musieek (2002)
- **Learning Strategies approaches** approaches such LINC for vocabulary, SLANT for listening comprehension, visual imagery techniques for memory
School-Based Approaches

• ASHA Technical Report, 2005: Recommendations for remediation of CAPD align with direct skills remediation, compensatory strategies, and environmental considerations.

• The recommendations provided by ASHA are built on the use of “systems theory” to support a collaborative context-based model of intervention. This model of intervention is necessary within the educational setting, given the many environments and professionals the student with CAPD will encounter.
School-Based Approaches

- Direct Skills Remediation
- Compensatory Strategies
- Environmental Modifications

Accommodations (504), RTI2, or SDI?
School-Based Approaches

• Using the terms associated with special education, these three intervention legs of the tripod or stool can align as “Specially Designed Instruction” in an IEP or as “Accommodations” in a 504 plan depending on the student’s assessment and eligibility pattern or in some cases as brief targeted Tier 2 or intensive Tier 3 RTI2 interventions.
RTI2 Strategies Tier 1 Universal Level

• Therapy and Remediation
  – Phonological awareness training—
    basic phonological awareness or additions of
    multisensory approaches and sound tapping
  – Vocabulary building
  – Listening comprehension training
  – Active listening

Adapted from Johnson 2012
RTI2 Strategies Tier 1 Universal Level

• Compensatory/Metacognitive
  Learning to be active listeners

• Classroom Environmental Management
  – Classroom acoustical considerations
  – Frequent checks for comprehension
  – Multi-sensory instruction
  – Classroom communication accommodations

Adapted from Johnson 2012
RTI2 Strategies Tier 2 Targeted Level + Tier 1

• Compensatory/Metacognitive
  – Teach and model self-advocacy regarding obstacles for learning and appropriate interaction with teachers and peers
  – Teach and model organizational skills
  – Encourage use of visualizing skills
  – Use of peer note-taker as needed
RTI2 Strategies Tier 2 Targeted Level + Tier 1

• Therapy and Remediation
  • Advanced targeted evidenced – based phonemic awareness and phonological decoding training
    – Advanced specific listening comprehension training
    – Advanced vocabulary building and pre-teaching new items

Adapted from Johnson 2012
RTI2 Strategies Tier 2 Targeted Level + Tier 1

• Classroom Environmental Management
  – Special seating
  – Obtain student’s attention prior to engaging
  – Use earmuffs or quiet study areas during independent work time
  – Monitor student for fatigue and length of time attending providing breaks when necessary

Adapted from Johnson 2012
RTI2 Strategies Tier 3 Intensive
Level + Tiers 1 and 2

• Therapy and Remediation
  – Provide specific evidence-based practice training in deficit areas (e.g., auditory closure, auditory comprehension, prosody, temporal patterning, binaural processing, speech recognition in noise)

Adapted from Johnson 2012
RTI2 Strategies Tier 3 Intensive Level + Tiers 1 and 2

- Compensatory/Metacognitive
  - Teach awareness of communication breakdown
  - Teach specific chunking skills
  - Teach subvocalizing skills
  - Encourage and promote use of technology (e.g., FM, note-taking system, voice recorder, CART)

Adapted from Johnson 2012
RTI2 Strategies Tier 3 Intensive Level + Tiers 1 and 2

- Classroom Environmental Management
  - Use classroom or personal FM system
  - Use computer assisted note taking or CART

Adapted from Johnson 2012
School-Based Therapy Approaches

Direct Intervention
- Specially Designed Instruction (SDI)
- Specialist Involved

Compensatory Strategies
- SDI or 504
- Specialist Involved
Sample Commercial Programs

- Fast Forward (1999)
- Earobics (1996)
- Start-In (2006)
- HearBuilder (2011)
- Lindamood LIPS (1999)
- Processing Power (1997)
- Phonological Awareness Kit
- Easy Does it for Young Listeners
- Question the Direction
Beyond the Three-legged Stool

- In addition to environmental management, compensatory strategies and direct remediation, SLPs will have three additional aspects of the total intervention plan that they may wish to implement:

  - **Specific Classroom management recommendations** for teachers that the SLP will convey to the IEP Team members

  - **Self-Advocacy** Training that the SLP will address as part of therapy services to the child

  - **Specific Parent Counseling** aspects of the student’s management that the SLP will want to implement.
Summary

• Interventions for APD are most effective in an interdisciplinary approach when the diagnosis is supported by specific audiological and speech-language assessment. These disorders must be differentiated from more global dysfunctions by precise testing.
Summary

• Interventions should be related to the individual’s unique symptoms and environment. A three-pronged approach that considers environmental modifications, compensatory strategies to enhance comprehension and retention of auditory materials and to self-advocate for listening needs, and
Summary

• Direct remediation activities in the form of specific auditory training in deficit areas can optimize functioning. Classroom management suggestions, self-advocacy training and direct parent counseling may also be part of the SLP’s role. Finally, specific research designed to document treatment outcomes is clearly needed, and consensus is yet to be reached regarding recommended treatment procedures.
References


References


References


References


