

Introduction to Auditory Processing Disorders



MINNESOTA
DEPARTMENT OF

*Children
Families &
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Acknowledgements

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Introduction to Auditory Processing Disorders:

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Purpose Statement

The purpose of this document is to provide teams with the current definition of:

- *auditory processing disorders (APD), sometimes called central auditory processing disorders (CAPD);*
- *differentiate between APDs and other learning and attending problems in children;*
- *describe the evaluation process in determining eligibility for special education when auditory processing disorders are present;*
- *the role of the audiologist and other team members in the evaluation process; and*
- *offer some educational management and intervention strategies for educators of children who exhibit behaviors and characteristics of APDs.*

The development of this document arose to address the increase in awareness, interest, questions and referrals regarding APDs. New research has resulted in better identification and differentiation of students with APDs. Five APD profiles will be presented to describe a range of auditory processing problems by the symptoms presented, and specific instructional strategies designed to remediate those problems.

Although auditory processing disorder is a clinical diagnosis, there are no standardized medical criteria to define it. However, it is the responsibility of educational teams to consider clinical diagnoses such as auditory processing disorder. When making special education eligibility determinations, teams must follow existing state eligibility criteria. Generally, students with the presenting problems of APDs or a clinical diagnosis of APD display severe academic and/or language deficits.

Evaluation & Program Development

General Definitions of APDs

Auditory processing disorder, sometimes called a central auditory processing disorder, has been defined as:

“... A central auditory processing disorder is not really a hearing impairment of reception and reduced hearing sensitivity. Instead, a central auditory problem causes difficulty in understanding the meaning of incoming sounds ... Sounds get into the auditory system, but the brain is unable to interpret efficiently or at all, the meaning of sounds ... in an extreme case, meaningful sounds can not be differentiated from nonmeaningful sounds.” (Flexer, 1994).

The American Speech-Language-Hearing Association’s (ASHA) definitions of auditory processing and (central)auditory processing disorders are provided in Appendix A of this document. These are currently accepted working definitions; however, there is new discussion that identifies this disorder as “Auditory Processing Disorder” (APD). This document will continue to describe this disorder as APD.

Difficulty with auditory processing may be present and may or may not result in a student requiring special education service or 504 accommodations. If students meet eligibility criteria for special education, it is typically within the disability categories of speech/language (language component) or specific learning disabilities (information processing). APDs are disorders that impact language and information processing. Also by definition, APDs are not the primary barrier to learning when other disabilities are present, such as hearing loss, cognitive impairments, and autism spectrum disorders.

Children under the age of seven cannot be evaluated comprehensively, as language and auditory processes are still developing. Also, the presence of APDs cannot be legitimately evaluated when the child's primary language is not English. As with all students being considered for special education, the team must consider the needs of the whole child.

Refer to the Minnesota Department of Education Total Special Education System (TSES 2002) manual for eligibility criteria. The team may also refer to the information processing section of the Minnesota SLD Companion Manual (1998).

Differences Between APDs and ADHD

Behavioral Differences Between Auditory Processing Disorders and Attention Deficit Hyperactivity Disorder

There is a strong relationship between language, language development, auditory skills (including listening), and attention. Therefore, identifying students with auditory processing disorders may be difficult because similar behaviors are exhibited among students with attention deficit hyperactivity disorder (ADHD), hearing loss, or the presence of a specific learning disability. The predominant behaviors characteristic of ADHD and APDs was studied by Chermak, Musiek, and Hall (1999). They reported that pediatricians and audiologists rank the prevalence of behaviors among children diagnosed with ADHD in a distinct manner from students' behaviors with auditory processing disorders. The table below outlines their reported ranking.

Comparison of Behaviors Demonstrated with Attention Deficit Hyperactivity Disorder and Auditory Processing Disorders in Frequency of Occurrence

ADHD	APDs
1. Inattentive	1. Difficulty hearing in background noise
2. Distracted	2. Difficulty following oral instructions
3. Hyperactive	3. Poor listening skills
4. Fidgety/restless	4. Academic difficulties
5. Hasty/impulsive	5. Poor auditory association skills
6. Interrupts/intrudes	6. Distracted
	7. Inattentive

This study suggests a basic difference in students with ADHD and APDs—namely a more global attention deficit is present with ADHD, which may result in auditory processing difficulties. A more specific auditory attention deficit is present with APDs, and may result in behavior problems, or the student may appear to have a hearing loss.

It is now widely accepted that both ADHD and APDs may co-exist or occur independently. This confusion and its potential educational impact support the importance of a multi-disciplinary approach to CAPD evaluation and appropriate educational strategies.

Special Education Evaluation Process (See APDs Flow Chart)

Due to the increase in referrals for special educational evaluation in children with suspected APDs or a diagnosis of APD (obtained from a source outside the child's school), a process has been established to address each referral.

A. Pre-referral

Possible Outcomes:

1. Building teams (SSTs, TATs, speech clinician, nurse, SLD teacher, and others) provide general education teacher with interventions or accommodations to try in the classroom and the child is successful in the educational environment. This includes environmental modifications and coping strategies (see Appendix B).
2. If the general education teacher provides interventions or accommodations in the classroom and the child is not successful in the educational environment:
 - the Teacher Assistance Team (TAT) requests development and of additional intervention for the general education setting,
OR
 - team may proceed with a referral for a special education evaluation or 504 Plan consideration. The TAT determines if additional evaluation information is required based on the student's presenting needs,
OR
 - school receives a written request from the parent for a special education evaluation.

B. Referral for Special Education

The evaluation is completed by appropriately licensed team members. The team must include parents, general education teacher, special education teacher, and a representative from the school district. It may include psychologist, learning disabilities teacher, speech-language clinician, nurse, or other special education teachers. In addition, the team may request consultation from an educational audiologist at this time. Advocates and clinic representatives may also be included as part of the team.

At the team meeting, the team reports their findings and determines the student's eligibility for special education based on Minnesota state criteria. The team may also refer the student for consideration of a 504 Plan.

Special Education Evaluation Process (See APDs Flow Chart)

(Continued from page 7)

C. Program

Possible options based on the evaluation results:

1. Student does not meet state criteria for special education:
 - 504 Plan may be considered,
OR
 - accommodations for the student's learning needs may be considered in general education.

2. Student does meet eligibility criteria for special education through the Specific Learning Disabilities or the Speech-Language criteria:
 - An Individual Education Plan (IEP) is written and implemented.

If, during the team meeting, it is determined that additional information regarding APD is required, an educational audiologist may be consulted.

The Role of the Audiologist in Consultant Evaluation of APDs

Evaluating a student with potential auditory processing disorders is a team activity with each member contributing information from evaluation and observation. A district IEP team may choose to include or request consultation from an audiologist at two specific points in the evaluation process:

- Prior to the evaluation to help guide the team process as an initial consultation
OR
- After the evaluation is completed and additional information is required to clarify a student's auditory processing strengths and weaknesses a consultation may be needed.

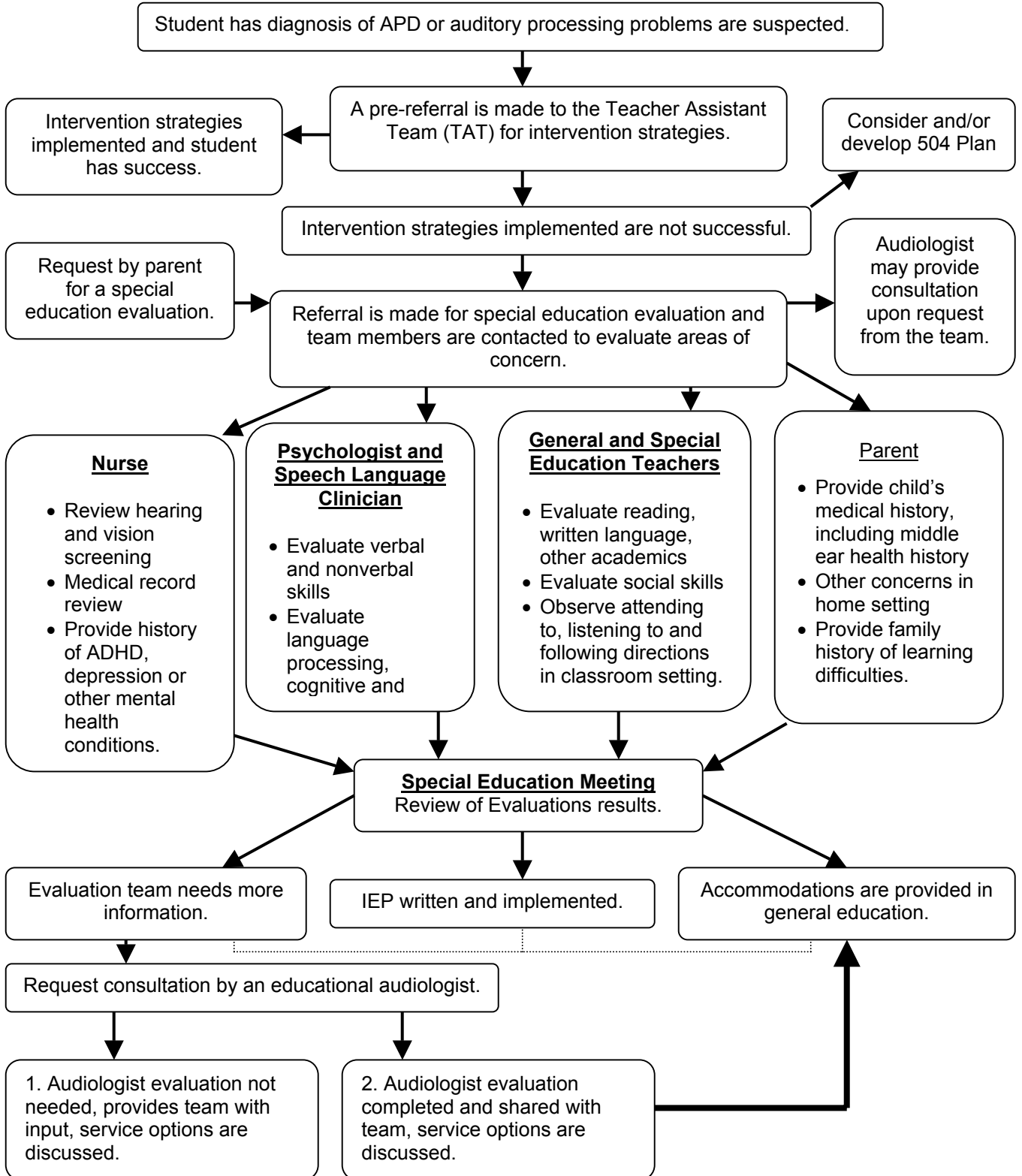
The audiologist may:

- answer specific questions;
- suggest general classroom strategies (see Appendix B);
- suggest ideas for working with preschool children (see Appendix C);
- suggest a screening protocol to determine the likelihood of presence of a APD;
- review student records; or
- consider an audiological battery of APD tests.

An audiologist may also be involved when the use of classroom or personal amplification is recommended, or implemented on a trial basis. A list of possible screening procedures and audiological evaluation tools is included in Appendix D. Information on obtaining those tools can be found in Appendix E.

APDs Flow Chart

Evaluation and Program Development



Auditory Processing Disorders (APDs)

Five General Profiles

Because students with APDs exhibit a broad range of strengths and weaknesses, a model of five general profiles of auditory processing disorders was developed by Teri James Bellis (1999) and Jeanane Ferre (1996). These five profiles are presented to aid staff and parents in better identification, instructional strategies and accommodations that are specific to each child's academic needs. Students often demonstrate characteristics in more than one profile. The authors note that this model will continue to evolve as new knowledge emerges and that it is not all inclusive. For more information, see the resource pages included in this document.

Profile Name: (1) Auditory Decoding Weakness	
Example: John has difficulty with phonics. He is very distracted when his teacher gives instructions in a noisy classroom. He enjoys math, but does not like reading or spelling.	
Typical Symptoms	Examples of Instructional Strategies
<ul style="list-style-type: none"> • Cognitive testing often reveals discrepancy between verbal and nonverbal test scores because basic reading skills are not required (matching sounds to their letter symbol). • Commonly has difficulty with decoding letters. • Has difficulty hearing in noise, or may ask for repetition. • Appears to “mishear” and substitute similar-sounding words for the actual auditory target, similar to a student with high frequency hearing loss. • Has difficulty with sound blending or spelling. • Tends to perform better in subjects such as math computation. 	<ul style="list-style-type: none"> • Make environmental modifications and accommodations in the classroom to improve student’s ability to hear the teacher in noise: <ul style="list-style-type: none"> - preferential seating to maximize both auditory and visual information (placement of student to see the speaker’s face). - consideration of a peer note taker. • Provide speech sound training; focus on stop consonants (b, p, t, d, k) and other “hard-to-hear” contrasts (s, sh, ch, j). • Provide activities to enhance ability to “fill in the gaps” (complete rhymes, or anticipate answers); use of contextual clues is often helpful. • Counsel toward self-advocacy for listening, including recognition of adverse listening conditions and methods of dealing with them. • Teach visualization and verbalization approach to spelling and reading decoding skills that reinforce sound-symbol association may be effective. • Provide repetition or rephrasing as an appropriate modification. • Use assistive listening device (ALD)/ technology if poor learning in noise documented. *See note below.
<p>Note: An assistive listening device (ALD) is a piece of equipment used to augment hearing ... in difficult listening situations, through the use of a remote microphone, assistive listening devices provide a superior signal-to-noise ratio which enhances the clarity (intelligibility) of the speech signal (Flexer, 1994). Use of an assistive listening device requires an educational audiologist and input from the educational team.</p>	

Profile Name: (2) Prosody Weakness

(Refers to rhythm and pattern; the nonlinguistic aspects of speech)

Example: Susie reads without any intonation in her voice. She has difficulty understanding age-appropriate jokes.

Typical Symptoms	Examples of Instructional Strategies
<ul style="list-style-type: none">• Has good word attack skills but difficulty with sight words.• Frequently demonstrates weak social communication skills (pragmatics) and often may respond inappropriately.• Has flat or monotonic speech and oral reading, difficulty with rhythm or stress.• Cognitive testing reveals discrepancy between verbal and nonverbal test scores, with higher verbal scores.	<ul style="list-style-type: none">• Place with an animated teacher.• Provide key word extraction--activities focusing on searching for and extracting key words from oral or written narratives of increasing linguistic complexity.• Direct teaching of social language skills.• Provide drill/practice/games with sight words.• Monitor social communication in all settings and teach appropriate responses directly.• Model and teach oral reading with intonation.• Tape record student reading and then listen for rhythm and stress.
<p>Please Note: Use of assistive listening device is seldom indicated (unless poor learning in noise has been documented.)</p>	

Profile Name: (3) Integration Weakness

Example: Peter cannot do more than one task at a time. He has great difficulty taking notes, listening to his teacher and watching the overhead projector simultaneously.

Typical Symptoms	Examples of Instructional Strategies
<ul style="list-style-type: none">• Has difficulty linking prosodic (rhythm and pattern) elements with linguistic content of a spoken message, resulting in:<ul style="list-style-type: none">- compromised linguistic content, missing components- difficulty processing ongoing discourse- difficulty following verbally presented directions• Has poor speech-in-noise skills.• Has phonological deficits, such as patterns of sound omission, or verb endings.• Exhibits reading and spelling difficulties.	<ul style="list-style-type: none">• Limit or discontinue use of multimodality cues (more than one sensory mode used together, i.e.; auditory and visual, auditory, visual, and hands-on).• Preteach new information and new vocabulary.• Reduce classroom distractions.• Consider using a peer note taker.
<p>Please note: Use of assistive listening device (ALD) is seldom indicated, unless poor learning in noise has been documented.</p>	

Profile Name: (4) Organization Weakness

Example: Rebecca has one of the messiest desks in the classroom. She is uncertain regarding her schedule and assignments. Her difficulties become more apparent as she gets older.

Typical Symptoms	Examples of Instructional Strategies
<ul style="list-style-type: none">• Demonstrates poor organizational skills, such as poor note taking and assignment completion skills (may be considered “messy child”).• Has poor sequencing in general; of pictures, events or functional tasks.• May have poor speech-in-noise skills.	<ul style="list-style-type: none">• Provide highly structured directions and information one step at a time.• Train in use of organizational aids (e.g.; outlines, making lists, using planning books and calendars).• Structure routines into classroom to develop consistency.• Provide therapy focusing on expressive language and word retrieval strategies• Sequence activities, such as picture sentences.• Use an assistive listening device (ALD) if poor learning in noise has been documented.

Profile Name: (5) Auditory Associative Weakness (Auditory Language)

Example: Michael struggles with the whole language curriculum in his classroom. He has difficulty performing any independent academic tasks. Instruction must be simplified.

Typical Symptoms	Examples of Instructional Strategies
<ul style="list-style-type: none">• Has receptive language deficits, including semantics and syntax.• Has difficulty with whole language concepts.• Demonstrates expressive semantic difficulties, such as poor use and understanding of antonyms, categorizations, synonyms, or homonyms.• Shows difficulty comprehending information of increasing linguistic complexity.• Has difficulty understanding words that have multiple meanings.• May have writing difficulties (grammar).• Has difficulty with reading comprehension and story problems in math.	<ul style="list-style-type: none">• Rephrase information using smaller linguistic units. (The focus is on linguistic clarity, not acoustic clarity.)• Use a learning approach that includes a systematic, multisensory, rule-based method to language and learning.• Teach methods to enhance auditory comprehension and memory:<ul style="list-style-type: none">- chunking- verbal chaining- mnemonics- rehearsal- paraphrasing- summarizing• Check comprehension by asking for demonstration or a paraphrasing rather than repetition of information.• Analyze grammatical errors in writing and teach to “fix” errors.• Directly teach antonyms, synonyms, homonyms, and increase complexity over time.

APDs Resources

Websites

<http://www.asha.org>

<http://www.audiology.org>

<http://www.edaud.org>

<http://www.theshop.net/campbell/central.htm>

<http://www.audiologyinfo.com>

<http://www.searchwave.com>

<http://www.kidspeech.com/tips.html>

<http://www.engr.colostate.edu/depts/ee/research/cad>

<http://www.ldonline.org/llddepth/processdeficit/visualauditory.html>

<http://www.kidshealth.org/parent/healthy/centralauditory.html>

<http://listen-up.org><http://pages.cthome.net/Bristol/capd.html>

<http://www.aos-jax.com.capd.htm><http://members.aol.com/HERDEWE/index.html>

<http://laran.waisman.wisc.edu/fv/www/libcapd.html>

<http://hearingbalance.com/hbscapd.htm>

<http://www.families.com/experts/advice/0,1183,1-3347,00.html>

<http://www.thehearingjournal.com>

Books

Bellis, T. J. (1996). *Assessment and Management of Central Auditory Processing Disorders in the Educational Setting*. San Diego, CA: Singular Publishing Group, Inc. ISBN 1-56593-628-0.

Flexer, C. (1994). *Facilitating Hearing and Listening in Young Children*. San Diego, CA: Singular Publishing Group, Inc. ISBN 1-879105-934.

Ferre, J. (1997). *Processing Power: A Guide to CAPD Assessment and Management*. San Antonio, TX: The Psychological Corporation.

Gillet, P. (1993). *Auditory Processes*. Novato, CA: Academic Therapy Publications.

Katz, J. (1992). Classification of auditory processing disorders. In J. Katz N. Stecker, & D. Henderson (Eds.), *Auditory Processing: A Transdisciplinary View*. St. Louis: Moseby.

Johnson, C. D., Benson, P., and Seaton, J. (1997). *The Educational Audiology Handbook*. San Diego, CA: Singular Publishing Group, Inc.

Kelly, D. A. (1995). *Central Auditory Processing Disorder*. Communication Skill Builders/The Psychological Corporation. ISBN 0761631623. (800-211-8378).

Masters, M. G., Stecker, N., and Katz, J. (1998). *Central Auditory Processing Disorders Mostly Management*. Boston: Allyn and Bacon.

Musiek, F. and Chermak, G. (1997). *Central Auditory Processing Disorders, A New Perspective*. San Diego, CA: Singular Publishing Group, Inc.

SLD Companion Manual (1998). Minnesota Department of Children, Families & Learning.

Other

American Speech-Language-Hearing Association (1996). Central auditory processing: Current status of research and implications for clinical practice. *American Journal of Audiology*, 5: 41-54.

Bellis, T. J. (1999). Subprofiles of central auditory processing disorders. *Educational Audiology Review*, 16 (2), 4-9.

Bellis, T. J. & Ferre, J. (1999). Multidimensional approach to the differential diagnosis of central auditory processing disorders in children. *Journal of the American Academy of Audiology*, 10: 319-328.

Chermak, G. (2001). Auditory processing disorder: An overview for the clinician. *The Hearing Journal*, 54 (7) 10, 12, 16, 18-22, 25.

Chermak, G., Hall, J., Musiek, F. (1999). Differential diagnosis and management of central auditory processing disorder and attention deficit hyperactivity disorder. *Journal of the American Academy of Audiology*, 10: 289-303.

Chermak, G. & Musiek, F. (1992). Managing central auditory processing disorders in children and youth. *American Journal of Audiology*, 1 (3), 61-65.

Ferre, J. (1999). CAP tips. *Educational Audiology Review*, 16 (2), 28.

Jerger, J. & Musiek, F. (2000). Report of the Consensus Conference on the diagnosis of auditory processing disorders in school-aged children. *Journal of the American Academy of Audiology*, 11: 467-474.

Keith, R. (1999). Clinical issues in central auditory processing disorders. *Language, Speech and Hearing Services in Schools*, 30: 339-344.

Keith, R., Young, M., and McCroskey, R. (1999). A brief introduction to the Auditory Fusion Test-Revised. *Educational Audiology Review*, 16 (2), 16-19.

Keith, R. (1996). Understanding central auditory processing disorders: Diagnosis and remediation. *The Hearing Journal*, 49 (11) 19-20, 22, 24, 27-28.

Musiek, F. (1999). Habilitation and management of auditory processing disorders: Overview of selected procedures. *Journal of the American Academy of Audiology*, 10: 329-342.

Technical Definitions

American Speech-Language-Hearing Association (ASHA) Task Force on Central Auditory Processing (1996), now called Auditory Processing Disorders:

[Auditory processes] or Central Auditory processes are the auditory system mechanisms and processes responsible for the following behavioral phenomena:

- Sound localization and lateralization
- Auditory discrimination
- Auditory pattern recognition
- Temporal aspects of audition, including:
 - temporal resolution
 - temporal masking
 - temporal integration
 - temporal ordering
- Auditory performance decrements with competing acoustic signals
- Auditory performance decrements with degraded acoustic signals

Keith (1999) stated that according to the ASHA statement, these mechanisms and processes are presumed to apply to nonverbal as well as verbal signals, and to affect many areas of function, including speech and language. They have neurophysiological as well as behavioral correlates.

[Auditory Processing Disorder] or Central Auditory Processing Disorder is an observed deficiency in one or more of the above-listed behaviors. It is a sensory processing deficit that commonly impacts listening, spoken language comprehension and learning.

American Speech-Language-Hearing Association (ASHA) Auditory Processing Ad Hoc Committee (1990):

[Auditory processing disorders] or Central auditory processing disorders are deficits in the information processing of audible signals not attributed to impaired hearing sensitivity or intellectual impairment. Specifically, CAPD refers to limitations in the ongoing transmission, analysis, organization, transformation, elaboration, storage, retrieval, and use of information contained in audible signals. This processing involves perceptual, cognitive, and linguistic functions that, with appropriate interaction, result in effective receptive communication of passive (e.g. conscious and unconscious, mediated and unmediated) ability to:

- attend, discriminate, and identify acoustic signals;
- transform and continuously transmit information through both the peripheral and central nervous systems;
- filter, sort, and combine information at appropriate perceptual and conceptual levels;
- store and retrieve information efficiently;
- restore, using phonological, semantic, syntactic, and pragmatic knowledge; and
- attach meaning to a stream of acoustic signals through utilization of linguistic and non-linguistic contexts.

Guidelines for Classroom Management of a Child with Auditory Processing Problems

Environmental Modifications

Classroom Placement: Determine the available options for classroom placement. Consider the acoustics relevant to noise and reverberation, the amount of structure, and the teacher's communicative style. Open classrooms are less structured and have higher noise levels than self-contained classrooms.

Classroom Seating: A child with auditory deficits should be seated away from noise-generating areas, such as doors, windows and pencil sharpeners. If the audiologist has determined that a child has a weaker ear on auditory tests, he or she should be seated so that the better ear is favored.

Quiet Study Areas: Provide an individual study area relatively free from distractions of the mainstream of family life or from small group activities in the classroom.

Visual Aids: Some children may have better visual learning skills. Use visual aids to provide auditory/visual association. Write Instructions. Write instructions on the blackboard and encourage the use of an assignment book.

Compensatory Strategies

Look and Listen: Preferential seating is a major consideration in managing a child with APD. Encourage the child to watch the teacher's face.

Gain Attention: Always gain the child's attention before giving oral instructions by calling he or she by name or touching his or her shoulder.

Check Comprehension: Have the child repeat directions and instructions to make certain they are comprehended.

Rephrase and Restate: Encourage the child to indicate when he or she does not understand what has been said. Rephrase the statement using simplified grammar or by substituting words, so that the intended meaning is conveyed. Keep instructions relatively short.

Pre-Tutor: Have the child read ahead on a subject to be discussed in class so that he or she is familiar with new vocabulary and concepts.

Monitor Efforts: Provide short, intensive periods of instruction with breaks.

Inform Parents: Provide parents with consistent input so that they understand the goals of therapy, educational management and progress.

Ideas for Developing Listening Behaviors for the Preschool Child at Home and School

1. Get close to the child when communicating. A distance of 3-5 feet is optimal. Encourage him or her to watch speakers' faces when they are talking.
2. Use words and phrases that encourage and reinforce listening behaviors, for example:
 - "I heard you"
 - "You heard that"
 - "You knew daddy was speaking"
 - "I like it when you listen"
 - "You looked at me when I called your name because you were listening"
 - "You heard me the very first time I called, 'Wow!'"
 - "What's that sound?"
3. Think of games that identify different sounds ... i.e., "I'm thinking of an animal that says 'Quack, quack'... who am I?"
4. Reading to your child:
 - Read age-appropriate books to your child and later ask questions for comprehension checks.
 - Picture books allow the adult and the child to initiate conversation and vocabulary based on the child's interests.
 - Music/action activity books may be found at the library. Research supports singing/action activities with children as a means to "exercise" the brain. It is also a way to have children listen to what "action" they must do while you are singing together. A good example is "I'm a Little Teapot."
5. Family interaction:
 - Speak to your child and ask questions about events that occur routinely throughout your child's day.
 - Plan a listening activity at a time during the day that is usually quiet.
6. Managing the noise in your environment:
 - Your child will have more difficulty deciding what to listen to when background noise is present. Reducing background noise during important conversational times will help, i.e. turning off the television, stereo or vacuum.
 - As the child's listening ability improves, introduce a little noise, such as a radio at a soft volume while doing a listening activity, such as reading a book. Children need to practice listening when background noise is present in preparation for school and the world around them.

Appendix D

The following is a suggested, but not all inclusive guide to appropriate screening and evaluation for Auditory Processing Disorders. Information for ordering screening instruments is provided in Appendix E.

Possible Screening Tools for Auditory Processing Disorders

1. Case history, to include:
 - interview with student and parents regarding areas of concern;
 - presenting problems/behaviors--acts out frustration, shy/withdrawn;
 - existing medical conditions, such as depression, attention problems;
 - history of otitis media (middle ear problems); and
 - family history of learning problems.
2. Screening Test for Auditory Processing Disorders-Revised (SCAN-C)
3. Test of Auditory Perceptual Skills Revised (TAPS-R)
4. Children's Auditory Processing Performance Scale (CHAPPS)
5. Auditory Continuous Performance Test (ACPT)
6. Classroom observation (Behaviors to observe include attention span; attention to both structured and unstructured tasks; cooperation in difficult and easy tasks; frustration level; and ability to attend in both quiet and noisy settings.)

NOTE: Building level personnel perform the above screening procedures.

Possible Audiological Tools for Evaluation of Auditory Processing Disorders

1. Case history and interview (additional as needed upon review of records)
2. Tympanometry and acoustic reflexes
3. Pure tone audiometry (including bone conduction if necessary)
4. Screening Test for Auditory Processing Disorders (SCAN-C)
- * 5. Word recognition in quiet and noise.
- * 6. Staggered Spondaic Words (SSW) at 50 dB SL (50 decibels sensation level, a dichotic listening task in which different information is presented to each ear)
- * 7. Phonemic Synthesis (Phonemic blending skills) at 50 dB SL
- * 8. Time compressed speech (monaural low redundancy)
- * 9. Filtered words (monaural low redundancy)
10. Temporal processing (frequency or duration patterns)

**NOTE: An audiologist obtains the audiological evaluation measures. It is necessary to obtain results in items 5-9 in an audiometric sound suite with a two-channel audiometer.*

Ordering Selected APD Tools

Screening Tools

Children's Auditory Processing Performance Scale (CHAPPS)

Educational Audiology Association
4319 Ehrlich Road
Tampa, FL 33624
(800) 460-7322
(813) 968-3597 Fax

Screening Test for Auditory Processing Disorders SCAN-C

The Psychologist Corporation
Harcourt, Brace, Jovanovich
555 Academic Court
San Antonio, TX 78204-2498
(800) 211-8378

Test of Auditory Perceptual Skills-Revised (TAPS-R)

Psychological and Educational Publications, Inc.
P.O. Box 520
Hydesville, CA 95547
(800) 523-5775

Audiology Tools

Auditory Continuous Performance Test (ACPT)

The Psychologist Corporation
Harcourt, Brace, Jovanovich
555 Academic Court
San Antonio, TX 78204-2498
(800) 211-8378

Staggered Spondaic Word (SSW) Test

Precision Acoustics
411 N.E. 87th Avenue, Suite B
Vancouver, WA 98664
(360) 892-9367