AUDITORY PROCESSING DISORDER

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INTRODUCTION

- Auditory processing (AP)
- Auditory Processing Disorder (APD)
- Central Auditory Processing Disorder (CAPD)

DEFINITION

Children with APD have difficulty processing, interpreting, storing and accessing auditory information despite normal hearing. APD is due to impaired neural function involving the auditory pathways leading to poor perception of speech and non-speech sounds.

Language processing

Interpreting and understanding the meaning of words, phrases and sentences

Auditory processing

Interpreting and making meaning of speech and non-speech sounds

BIRD'S EYE VIEW

How is auditory information processed?

Auditory skills necessary for learning

Clinical presentation of APD

Diagnosing APD

Treating APD

PROCESSING OF AUDITORY INFORMATION

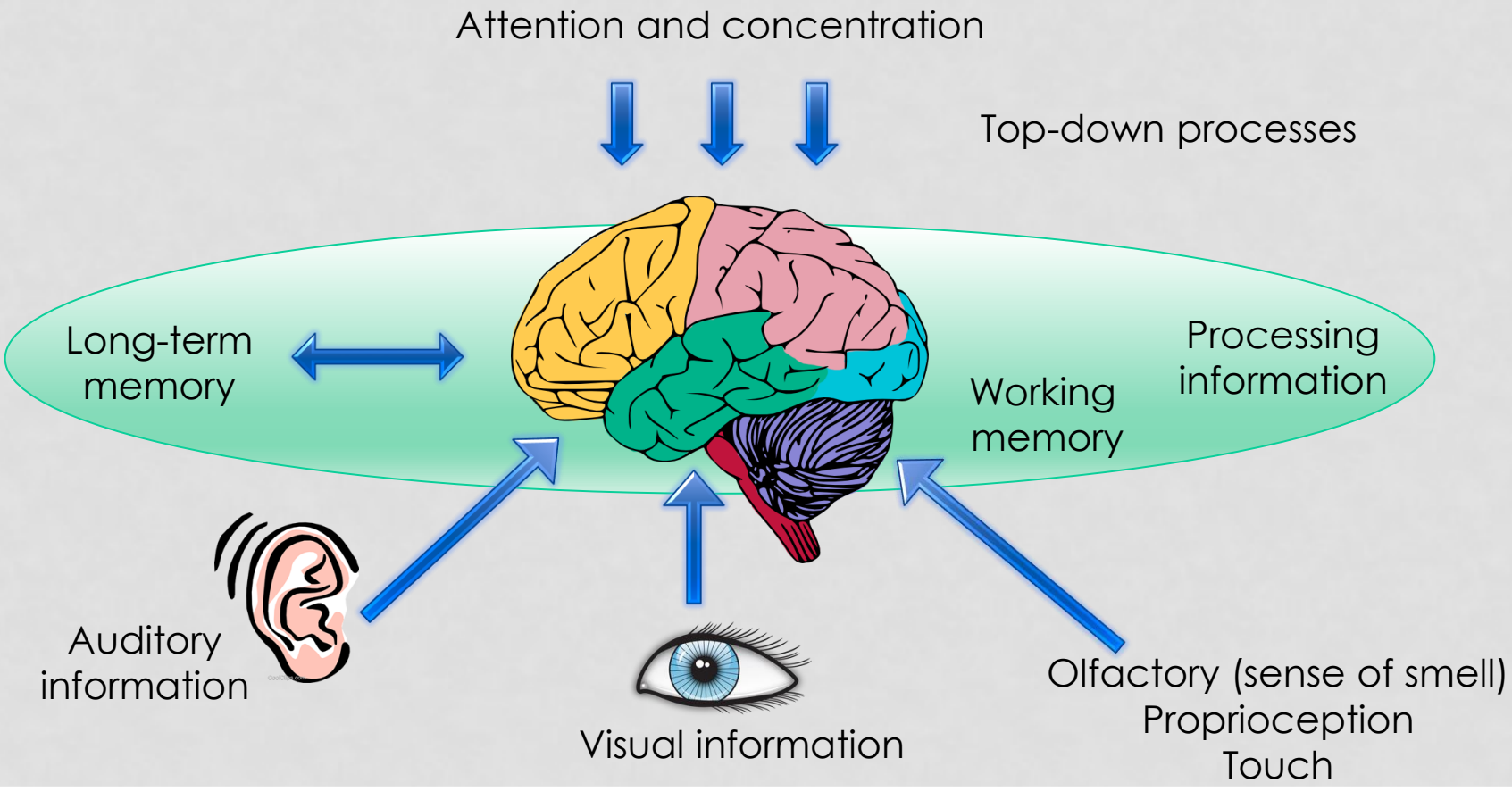
- Hearing
- Processing ability
- Three-dimensional auditory patterns
- Temporal processing
- Background noise
- Attention and concentration
- Maturation of the auditory pathways

- **Hearing**
  - Pure tone audiometry in a sound-proof room
  - Hearing acuity
  - Not functioning in a day-to-day listening environment

PROCESSING OF AUDITORY INFORMATION

- Hearing
- Processing ability

- **Processing ability**
  - Human brain receives multiple information through various sensory systems, including hearing.
  - Transformed into a language that the brain can understand before being processed.



Top-down

Bottom-up

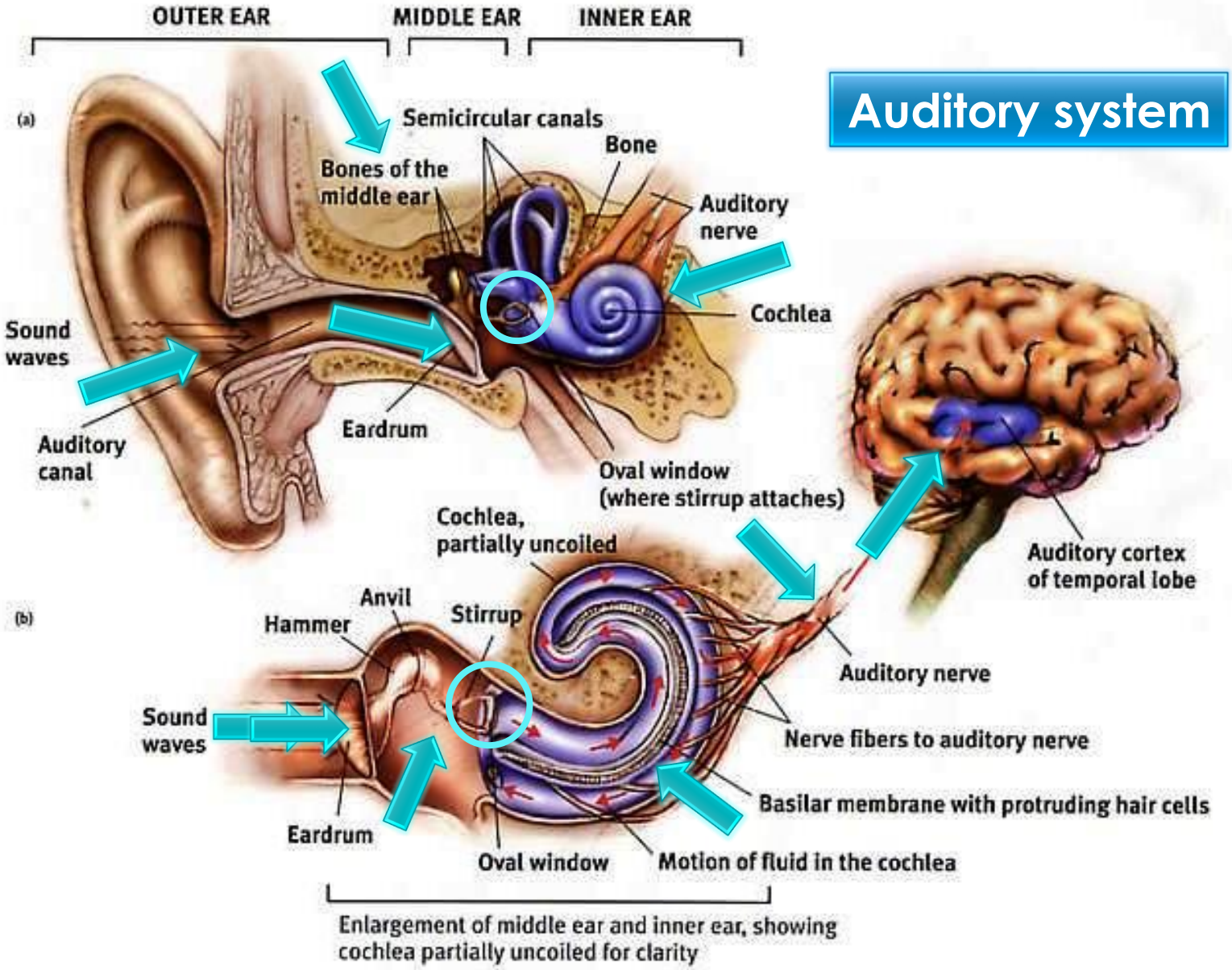
Hearing

Ability to perceive sound

Listening

Ability to apply meaning to sound

Auditory system



PROCESSING OF AUDITORY INFORMATION

- Hearing
- Processing ability
- Three-dimensional auditory patterns

• Three-dimensional auditory patterns

WORD PATTERNS 3D
Loudness (intensity)
Pitch (frequency)
Duration (time)

Transporting these patterns to the brain (processor) where pattern matching takes place.

Unique patterns stored in long-term memory

PROCESSING OF AUDITORY INFORMATION

- Hearing
- Processing ability
- Three-dimensional auditory patterns
- Temporal processing

- **Temporal Processing**
  - Rate at which we can process auditory information
  - Person must process auditory information at a rapid pace to develop listening and language skills
  - "Temporal window"
  - Too large - difficult to understand speech
  - Distorted communication

Small temporal window

Big temporal window

Rapid auditory processing

Slow auditory processing

PROCESSING OF AUDITORY INFORMATION

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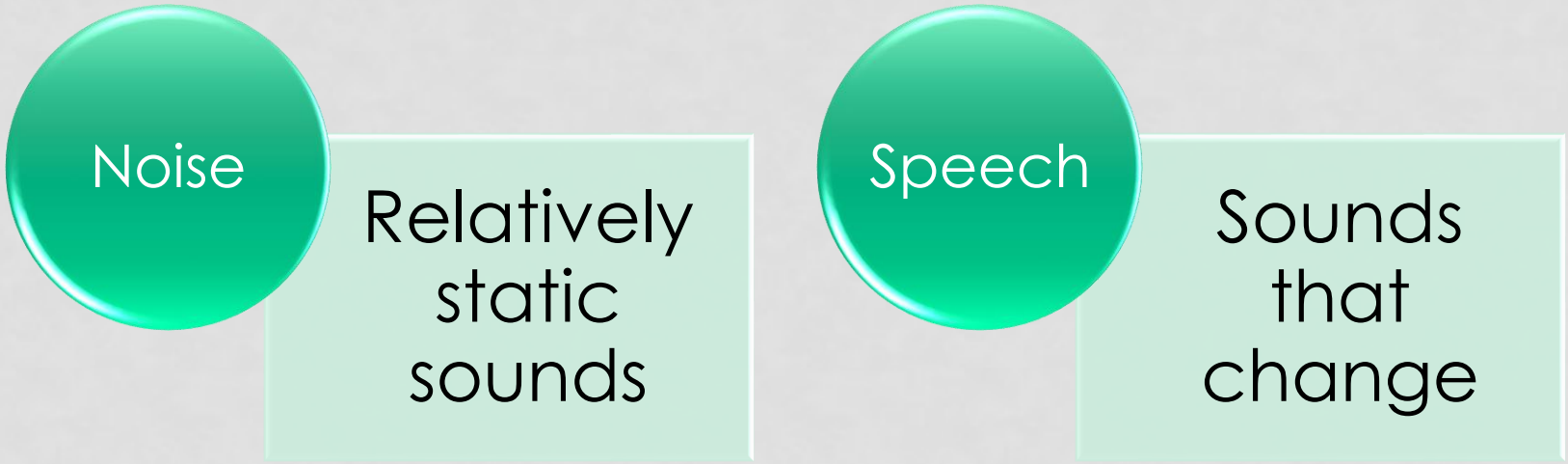
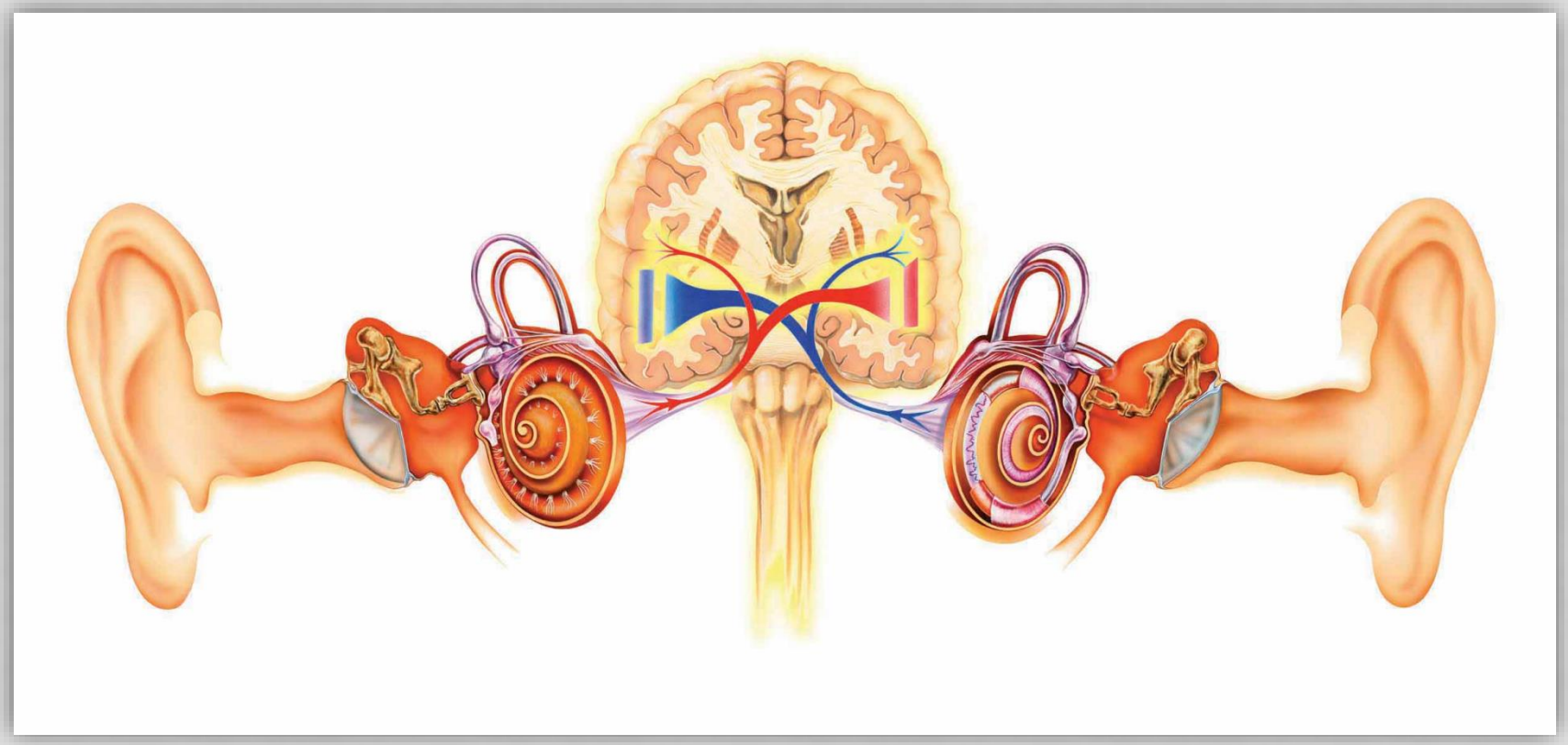
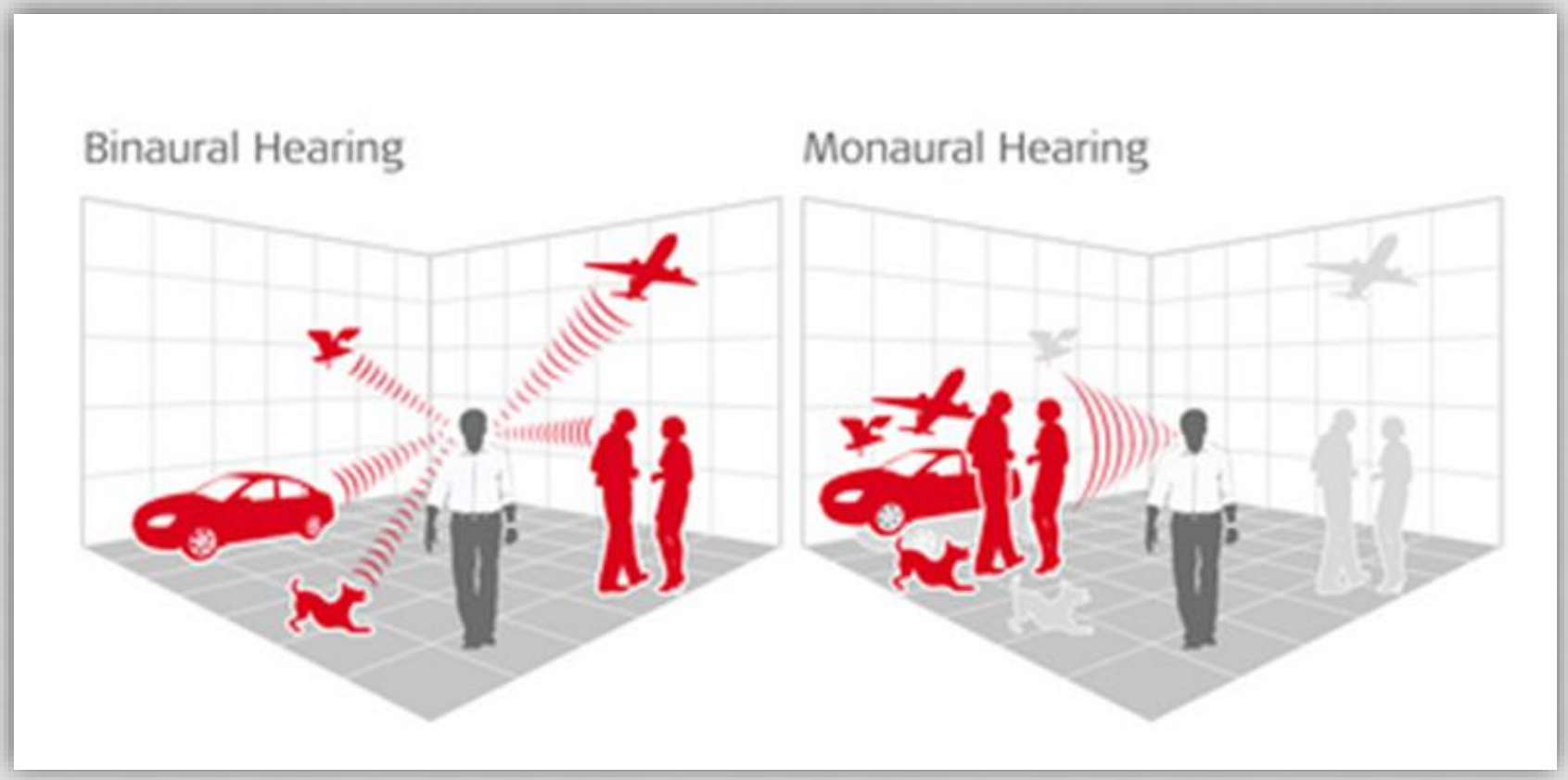
- **Background noise**
  - Extracting speech from background noise occurs at different levels within the auditory pathways.



- Binaural hearing refers to being able to integrate information that the brain receives from both ears.



- Binaural hearing is known to help us with the ability to listen in noisy, complex auditory environments and to localize sound sources.



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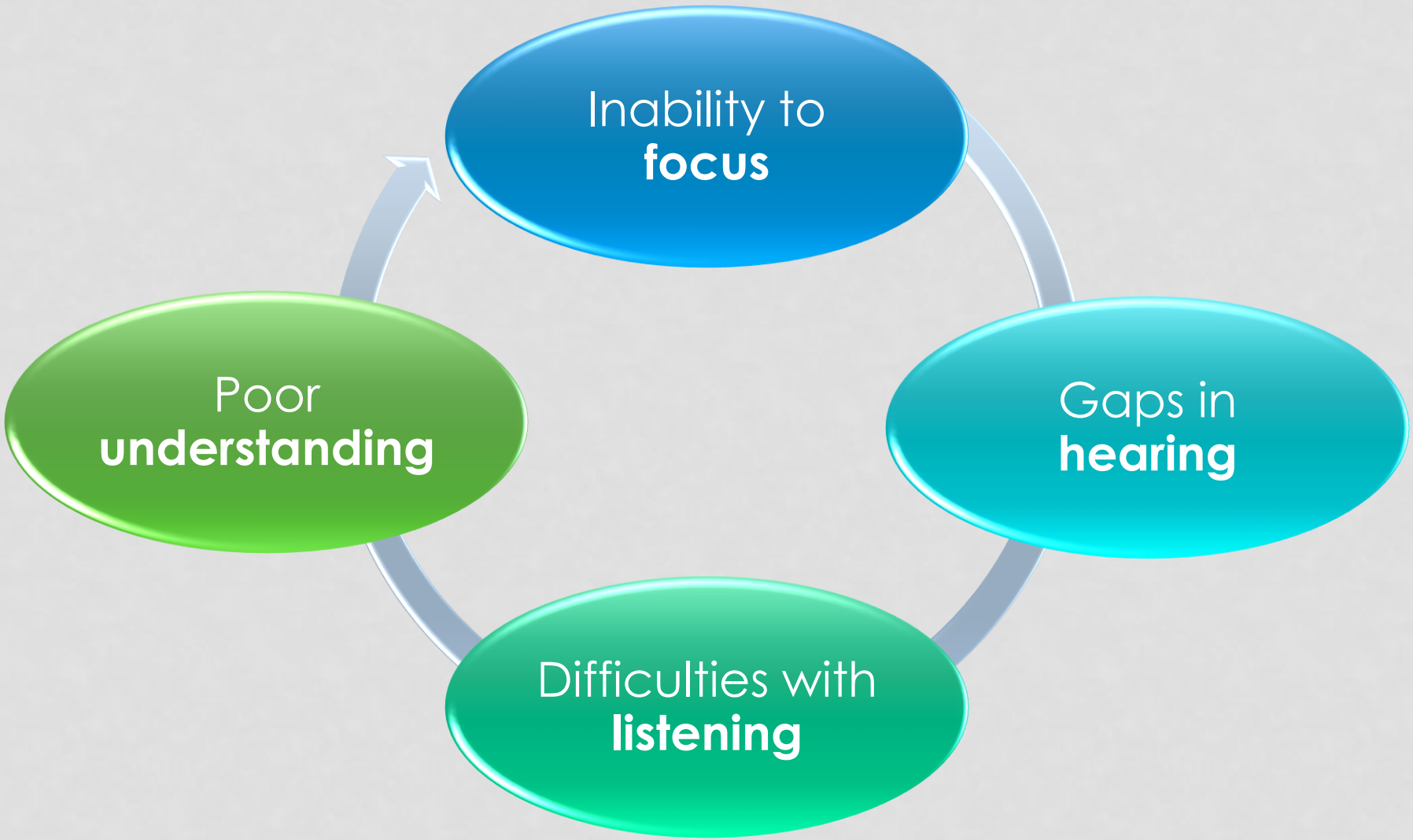
- **Attention and concentration**



PROCESSING OF AUDITORY INFORMATION

- Hearing
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- Background noise
- Attention and concentration
- Maturation of the auditory pathways

- **Maturation of the auditory pathways**
  - Immature or delayed auditory functions in spite of normal hearing acuity
  - Recurrent ear infections (otitis media)

AUDITORY SKILLS NECESSARY FOR LEARNING LANGUAGE

Auditory information processing involves all of these skills simultaneously. However, it is important to know what constitutes the ability to process auditory information, so that we can look at each area to determine if it is functioning properly.

Localization

Discrimination

Auditory attention

Auditory figure/ground

Auditory closure

Auditory sequencing

Auditory memory

Phonological awareness

Phonological awareness

- Good listening skills
- Auditory discrimination
  - ***b****ed*-***d****ead*
- Rhyming skills
  - *What sounds the same as* ***call*** *→* ***fall***
- Auditory analysis
  - *What sounds do you hear in* ***cat****?*
- Auditory synthesis
  - *What is this word:* ***b-i-g***
- Manipulation of sounds in words
  - *Omitting: Say* ***man****, say it again, but don't say* ***m (an)***
  - *Adding: Say* ***pan****, say is again but put a* ***l*** *after* ***p (plan)***
  - *Replacing: Say* ***mat****, but in place of the* ***m*** *say* ***b (bat)*** *or in place of the* ***t*** *say* ***n (man)***

SUPPORT NEEDS ASSESSMENT (SNA 1 & 2)

(School-Level Intervention)

Both SNA 1 and 2 must be completed at school level

A Learner Profile, SNA 1 and SNA 2 will be required when support is requested from the District-based Support Team (DBST).

SNA 1: ASSESSMENT AND INTERVENTION BY TEACHER

To be completed by the class teacher and/or subject teachers if the learner is taught by more than one teacher.

- To be completed if the Learner Profile or Screening Report or teacher observation or parent interview shows that a learner has additional support needs.
- Captures information that will be needed when support is requested from the School-based Support Team (SBST) by the teacher concerned.

1. AREAS OF CONCERN

CLINICAL PRESENTATION OF APD

- Range of symptoms –common to a number of other neurodevelopmental disorders:
  - ADD/ADHD
  - Dyslexia
  - Specific language disorder
  - Autism
- Conditions can co-exist with APD.
- Important to separate true APD from symptoms due to poor auditory memory, attention, concentration, language and cognitive difficulties.
- Characteristics of APD – four areas:
  - Communication
  - Social skills
  - Behaviour
  - Academic

Communication

- Answering questions or following verbal instructions
- Misinterprets verbal messages
- Slow or delayed response to verbal stimuli
- Organizing and integrating thoughts
- Over talkative
- Flat monotone or shrill voice
- Poor vocabulary
- Unclear speech
- Drop ends of words and syllables
- Ask speakers to repeat what they've said
- Problems with receptive language

Social skills

- Pragmatics and conversational skills
- May avoid conversations with peers – hard to follow, process and respond to what is being said
- Focus on understanding words in conversations - miss social cues, sarcasm and other forms of nonverbal communication
- Telling stories
- Illogical flow of stories and ideas
- Understanding and telling jokes
- Following the rules of games

Behaviour

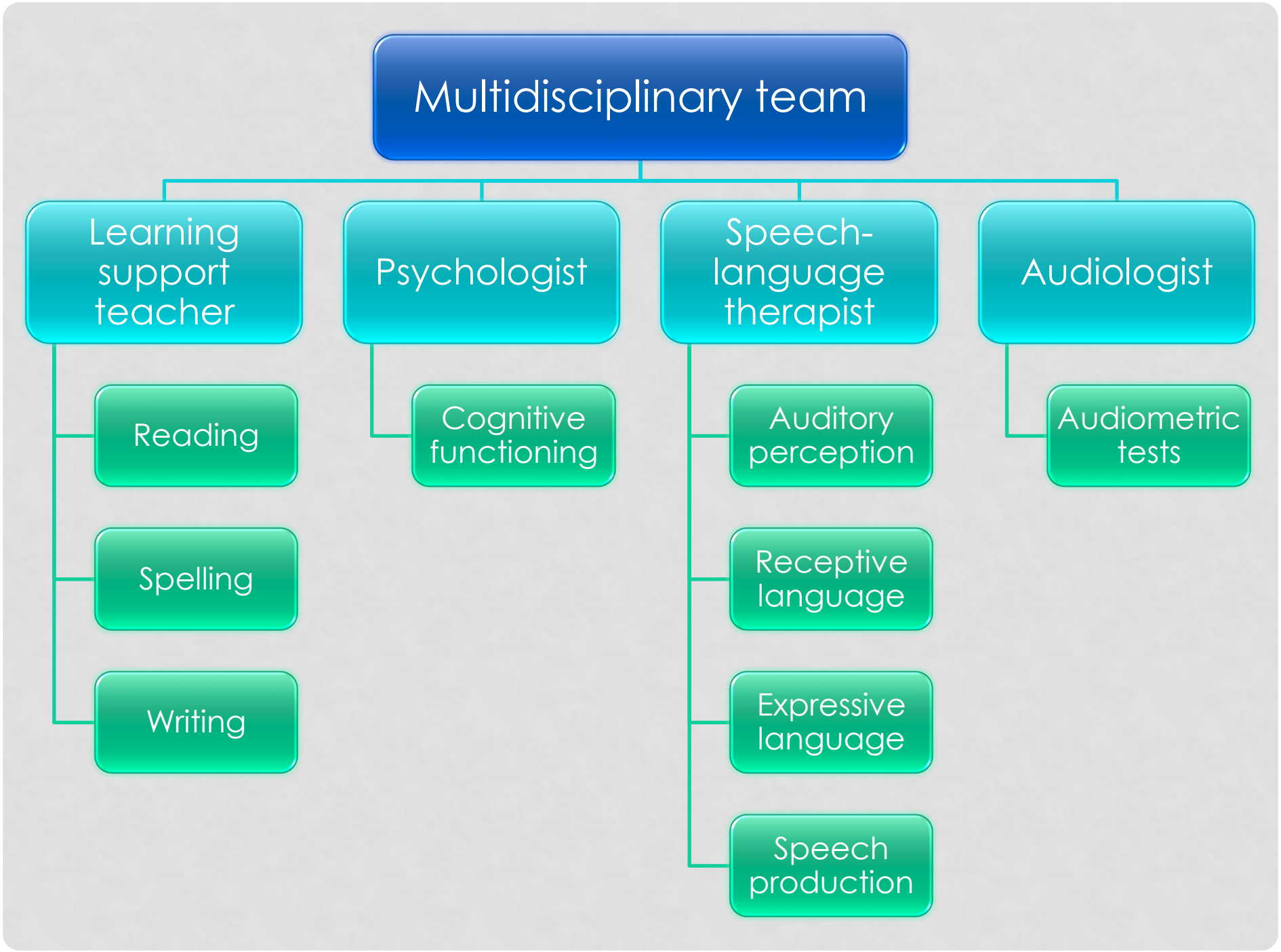
- Attention to verbal instructions
- Focusing on a task
- Has poor personal organisation
- Short attention span
- Daydreaming
- Easily distracted by noise
- Increased sensitivity to loud sounds
- Easily fatigued
- Easily frustrated, overwhelmed, irritated

Academic

- Sound discrimination
- Associate sounds with their written symbols
- Learning vowels and developing phonological awareness
- Phonics
- Reading and spelling
- Poor reading comprehension
- Songs or nursery rhymes
- Poor auditory sequential memory
- Remembering details

DIAGNOSING APD

A multidisciplinary team approach is critical to fully assess and understand the cluster of problems exhibited by children with APD.


Multidisciplinary team
Learning support teacher
Psychologist
Speech-language therapist
Audiologist
Reading
Spelling
Writing
Cognitive functioning
Auditory perception
Receptive language
Expressive language
Speech production
Audiometric tests

- Determine the nature of the disorder.
- Many types of auditory processing deficits
- Individualized management and treatment
- Lifelong difficulties if not diagnosed and managed correctly

TREATING APD

It is important to understand that there is not one, cure-all method of treating APD. Treatment of APD must be individualized and deficit-specific.

TREATING APD

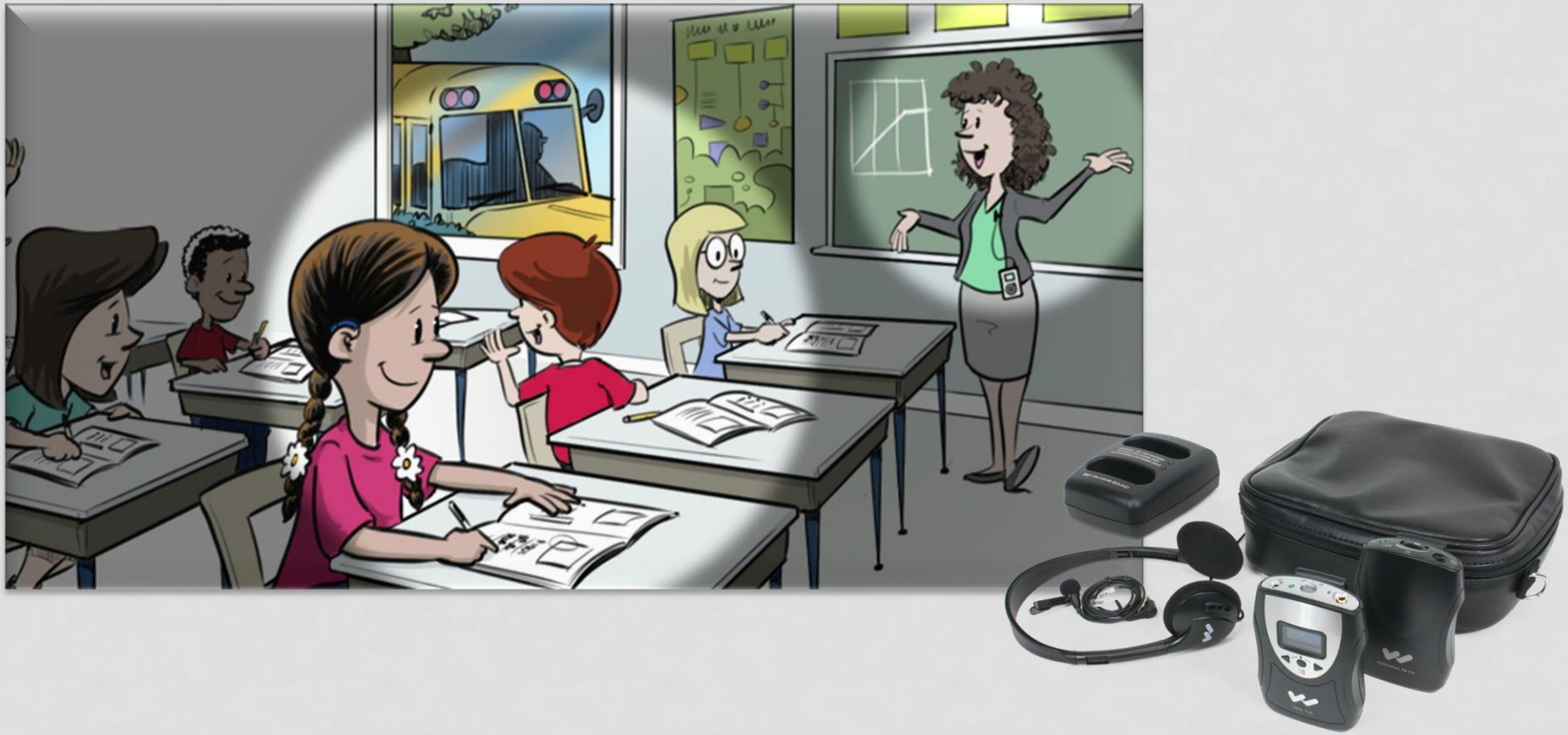
Improving the acoustic, learning and communication environment

Developing higher-order skills to help compensate for the disorder

Remediation of the auditory deficit itself

Improving the acoustic, learning and communication environment

- Improve the speech-to-noise ratio.



- Seating
- Light on the speaker's face
- Quiet area

- Wait for the room to become quiet.
- Make eye contact.
- Enforce appropriate speaker-listener manners.
- Gain attention

- Speak clearly - stand in one place - face the child.
- Longer time
- Simplify/explain
- Encourage questions.

- Concrete examples
- Break complicated directions into fewer parts.
- Two or three main points - check memory and understanding of points.
- Use the child's strengths to convey information.

Developing higher-order skills to help compensate for the disorder

- Focus on strengthening higher-order skills.
  - Language
  - Problem-solving
  - Memory
  - Attention
  - Other cognitive skills
- Responsible for own listening success or failure.
- Active participant in daily listening activities
  - Active listening
  - Problem-solving techniques

Compensatory strategies

- Eye contact
- Good listening behaviour
- Ask to have instructions repeated or clarified.
- Re-auditorize verbal instructions.
- Word meanings
- Visualize
- Wait for instructions and answers to questions before starting a task.
- Write down your homework at school.

Remediation of the auditory deficit itself

- Wide variety of treatment activities:
  - Auditory perceptual activities
  - Development of phonological awareness
  - Computer based listening programs
- Learning support teacher and/or a speech-language therapist.
- No one treatment approach that is appropriate for all children with APD.
- Therapeutic intervention programs must be specific.

With appropriate intervention, all children with APD can learn to become active participants in their own listening, learning and communication success.

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