

# What is an Auditory Processing Disorder?

Definition and characteristics



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## Is this true?

“A person with an auditory processing disorder has normal hearing.”

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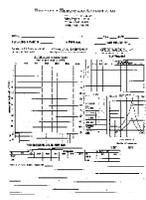
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## Consider: What is normal hearing?

- ▶ Results of standard audiological evaluation?
- ▶ Acuity for subset of frequencies, tested one at a time?
- ▶ In an artificially-damped enclosure under earphones?
- ▶ When tested one ear at a time with no variation in azimuth?
- ▶ Ability to repeat one- or two-syllable words in ideal listening conditions?



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### What do we expect of our auditory system?



- ▶ Always on 24 hours/day, throughout one's whole life. (Never turned off.)
- ▶ Highest level of acoustic precision
- ▶ Binaural integration: binaural beats, masking level differences. Both ears work together exquisitely.
- ▶ Exquisite spatial lateralization and localization (360 degree sound) and also track moving targets.
- ▶ Identify simultaneous and closely co-located sound sources.
- ▶ Working in synch with other perceptual systems (finds visually hidden sound sources)
- ▶ Selective listening (hear what we want to hear, ignore what we don't care about)
- ▶ Listening in noise (we comprehend even in degraded conditions)

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### This is normal hearing ability:

- ▶ Ability to hear soft sounds
- ▶ Ability to tolerate loud sounds
- ▶ Ability to comprehend speech in quiet environments, but also ability to comprehend in noise or competition
- ▶ Ability to selectively attend and comprehend one speech stream in presence of multiple speech streams
- ▶ Precise coordination of ears to listen selectively, determine horizontal or vertical direction from which a sound is coming, track moving sound targets, find hidden acoustic targets, etc.
- ▶ Ability to understand degraded acoustic stimuli
- ▶ With high precision and sustainability 24/7 for approximately 80 years

▶ People with auditory processing disorders do not have normal hearing ability, although they usually have normal hearing acuity.

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My preferred definition of APD accords with Kraus lab definition of APD:

**“A subject with APD does not have a defined anatomical abnormality, but has an apparent hearing problem in difficult listening situations.”**

Nina Kraus and Samira Anderson, 2016

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**APD Definition in audiology literature:**  
 estimated 3-5% of school age children show APD  
 (Chermak/Musiek 1997)

▶ *An Auditory Processing Disorder is a deficit in neural processing of auditory stimuli that is not due to language, cognitive, or related factors.* (ASHA Technical Report 2005).

▶ Deficit in these auditory skills:

- ▶ Sound localization and lateralization
- ▶ Auditory discrimination
- ▶ Auditory pattern recognition
- ▶ Temporal aspects of audition (including temporal masking, temporal resolution, temporal integration, temporal ordering).
- ▶ Comprehension amid competing acoustic signals
- ▶ Comprehension of degraded acoustic signals.

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**Characteristics associated with an Auditory Processing Disorder:**

- ▶ Poor sound localization or lateralization
- ▶ Difficulty hearing or focusing in noise or competition or reverberation
- ▶ Frequent requests for repetitions
- ▶ Lack of alerting when spoken to
- ▶ Mishearing of fine auditory differences
- ▶ Difficulty attending when in a group listening to a speaker
- ▶ Misunderstanding of prosody/intonation (social)
- ▶ Difficulty learning phonics



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**Predisposing Factors**

- ▶ Otitis media (auditory deprivation)
- ▶ Jaundice at birth (damages auditory nuclei)
- ▶ Head injury (such as concussion)
- ▶ Any condition resulting in anoxia
- ▶ Having a relative with similar condition
- ▶ History of speech/language delay
- ▶ History of receiving speech therapy
- ▶ Difficulty learning to read.

▶ But, the cause??? Don't know.

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### Typical for persons with APD

- ▶ Hearing acuity is “normal.”
- ▶ Speech/language: intelligible\*\* and relatively normal.
- ▶ Auditory Memory and Sequencing are impacted.
- ▶ Understanding of prosody can be impacted.
- ▶ Can be co-morbid with SLI, ADD and dyslexia.
  - ▶ (\*\*children often show mis-articulations, especially of phoneme /r/, but they can be understood by strangers)



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### Consider referral for APD when:

- ▶ You suspect that child is not comprehending well, but passes hearing screens or tests
- ▶ Seems not to hear; requires frequent repetitions; routinely scans room to look at others to find out what instructions were; responds with 'but you never said that.'
- ▶ Good behavior in quiet, but “hyper” or agitated or oblivious in noise
- ▶ ‘Spaces out’ or sits passively when listening in a group to a speaker. Unable to recall what topic was in group discussion.
- ▶ Difficulty learning phonics. Poor reading skills.
- ▶ Needs unusually long lag time before responding.
- ▶ Cannot reproduce song lyrics correctly.
- ▶ Complains about, or avoids, or acts out in noisy situations so as to get away from noise.
- ▶ Inappropriately loud voice. Poor at hints or insinuations.

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