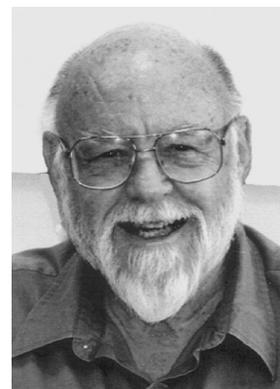


Editorial

Auditory Processing Disorders in Children



A review of the literature suggests that there may be more theories of what causes auditory processing disorder (APD) in children than there are children with the disorder. Here are just some of the explanations that have been proffered over the past few decades.

Problems with:

- Auditory discrimination
- Auditory pattern recognition
- Competing signals
- Degraded signals
- Auditory memory
- Closure
- Sound localization
- Listening comprehension
- Auditory decoding
- Association
- Output organization
- Language
- Phonemic structure
- Phonological awareness
- Listening or comprehending auditory information
- Learning through hearing
- Dichotic listening
- Rapid temporal processing

If a child had only a few of these problems, it is difficult to imagine how he or she could make it to school every day.

In this issue of *JAAA*, Australian contributors Sharon Cameron, Harvey Dillon, and Phillip Newall provide data that may eventually bring some measure of order to this chaotic scene. They studied ten children at risk for APD because of abnormal academic performance at school that was not related to either intellectual or attentional

deficit. In addition to several APD tests now in clinical use, they evaluated a new measure, the Listening in Spatialized Noise test (LISN)[®]. In a virtual sound field created under earphones, the children were instructed to attend to continuous discourse (a story) and to indicate, in a three alternative forced choice adaptive procedure, when the story was either easy to understand, just understandable, or too difficult to understand. This target story was always at 0° azimuth. At the same time, distracter sentences were presented either from 0° azimuth or at ±90° azimuth. The distracter sentences were read by either the same female talker who read the story or by one of two different female talkers. This procedure yielded a number of both absolute and relative measures including:

1. Low-cue signal-to-noise ratio (ability to understand the story with only minimal cues).
2. High-cue signal-to-noise ratio (ability to understand the story when abundant cues are available).
3. Tonal advantage (ability to take advantage of differences between voices of story talker and distracter-sentence talker).
4. Spatial advantage (ability to use spatial cues to understand the story).

When the outcomes were analyzed by individual child, several results were particularly illuminating. On traditional APD tests, few of the children at risk for APD fell outside the normal range. On BKB (Bamford-Knowal-Bench) sentences in babble, none were abnormal. On the dichotic digits test, none were abnormal. On Pitch

Pattern Sequence, only one was abnormal. Finally, on the Random Gap Detection Test, only three were abnormal.

On the low-cue SNR measure of the LISN battery, where there was no spatial dimension, no child was outside normal limits (two standard deviations criterion). This is an interesting finding because so many of the so-called low-redundancy speech measures that form the basis for APD tests are based on the principle that just making the listening task difficult will separate APD children from normal children.

The spatial advantage measure of the LISN battery yielded the most striking difference between children at risk for APD and control children. Nine of the ten APD children were outside the normal range, and the tenth was just at the fringe. This was by far the most dramatic effect noted in the

study. It suggests that difficulty understanding speech in background competition, arguably the cardinal symptom of APD, is perhaps best understood as a perceptual deficit in the structuring of auditory space. Cameron et al conclude that “of those children with APD, there may be a high proportion who have deficits in the binaural processing mechanisms that normally use the spatial distribution of sources to suppress unwanted signals.”

Perhaps future efforts to devise diagnostic test batteries should focus on this fundamental aspect of listening behavior, rather than on hypothesized, and obscurely defined, language processing deficits.

*James Jerger
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