Why Auditory Processing Disorders are Hard to Spot and How to Improve Them

Could it be Poor Listening Skills?

Poor Listening Skills Or Something Else?

Does this ever happen to you? You ask your child to do something simple, and he or she says, “huh?” For example, you might say something like, “Chris, time to get ready for school: go upstairs, get your shoes, grab your homework (we worked really hard on that last night) and shut your window because it looks like rain.” And your child acts as though he didn’t hear a word.

Often teachers describe a child like this as having poor listening skills because the same thing will happen in class—except that in school the child misses important assignments, fails to follow instructions on tests, or is unable to learn information when it is presented orally. What is going on here?

Parents or teachers may assume that a child is deliberately ignoring them when they ask to have instructions repeated or miss important information in school. But audiologists, who are specialists in hearing, have identified a specific reason for these listening problems. They refer to them as auditory processing disorders, or APD for short.

What APD Is Not

APD is not a hearing loss and not an attentional problem, although it can often seem as though the child is not paying attention. Rather, with APD a child has trouble figuring out what was said, although it sounds loud enough. All of us suffer from this problem when we are trying to listen to someone talk in a very noisy room, like at a party where a band is playing very loudly. We know the person is speaking—we can hear their voice—but we can’t easily discern what they are saying. Sometimes we try to read the person’s lips to figure out what they are talking about. But after a while it gets so hard to listen we just tune out or leave the situation. Now, imagine you are a child and speech always sounds muddled like that. The child’s natural instinct, just like yours, is just to stop listening. As a result, children with APD often achieve way under their potential despite being very bright. And in some cases, the children may have speech and/or language problems as well.

Audiologists have been able to diagnose auditory processing problems for many years. The recommendations for school intervention with children with this disorder have been largely compensatory, such as “seat the child at the front of the class, right in front of the teacher” or “amplify the teacher’s voice with a microphone and provide the child with a listening device to hear the teacher’s amplified voice more clearly than other noises in the room.” Specific, targeted interventions like Fast ForWord are a more recent development.

Although Fast ForWord Language and later Fast ForWord Language v2 were specifically developed to treat temporal sequencing problems associated with specific language impairment, and the programs have been successfully used as a clinical intervention for auditory processing problems for fifteen years, specific peer reviewed case studies on auditory processing benefit from these programs has been lacking. That changed in April of 2013 when researchers at Auburn University, a leader in the study of APD, published controlled research in International Journal of Pediatric Otorhinolaryngology on the benefits of intervention with children diagnosed with APD. The researchers not only found that Fast ForWord Language v2 improved auditory processing skills, and in one child language and cognitive skills as well, but they found evidence of what scientists call “neuroplastic” brain changes in the children with APD after the program as well. This means that the children’s brains were rewiring themselves and getting better at auditory processing at the same time.

Speech Perception

To understand what brain changes the researchers found it is helpful to explain first how the brain actually goes about the task of perceiving speech. The first job the brain has to tackle when one person is listening to another person speak is to sort out the speech signal from the other sounds in the environment. That, of course, is the problem we have when listening to someone at a loud party. But that is also a challenge in most classrooms. Children, as we know, have trouble sitting perfectly still and younger children especially are often fidgeting and scooting their chairs around as well as whispering to children nearby. Add to that noise that comes from outside the classroom like hallway noise and playground noise, which even the best teacher cannot control, and a classroom

can be a very noisy place. Part of maturation of the brain is the ability to learn to filter out irrelevant noises. But children must learn to do this and many with APD find that a real challenge.

It is not clearly understood why some children develop this capacity to filter speech from noise fairly easily and others do not, but audiologists do know that the problem can be traced to specific regions of the brain, especially regions of the brainstem. These regions can be tested through a process referred to as auditory brainstem response, or ABR. This test allows researchers to measure brain stem responses to sound through use of electrodes placed on the scalp. ABR is a critical measure of sound processing because it provides information about how well the auditory pathways to the brain from the ear have matured and how well they are functioning. In the study at Auburn University, a specific kind of ABR was used that has been shown to be especially helpful in diagnosing APD in children with language-based learning problems. It is called BioMARK. Using this procedure, the researchers could objectively measure whether a specific intervention not only improved listening skills but also whether it changed the brainstem response to speech.

To test whether auditory processing disorders can be improved though targeted intervention, the researchers at Auburn identified four children with APD using a battery of auditory processing, language, and intelligence tests that they administered before and after eight weeks of Fast ForWord Language v2. They also used BioMARK testing before and after Fast ForWord to determine if the actual brainstem response was affected by the intervention.

Results

Their results were very exciting. The children who completed all of the before treatment tests, eight weeks of Fast ForWord Language training, and all the post treatment tests plus BioMARK showed marked improvements in their auditory processing skills. For example, the children showed improvements in a test designed to assess listening to competing words (like we have to do when two people are talking to us at the same time) as well as deciphering words that are not very clear (like listening on a cell phone when there is a poor

connection). They also improved in skills like listening for sound patterns and remembering complex sentences. And, important to teachers and parents, one of the children showed marked improvement in a measure of nonverbal intelligence as well as ability to follow complex directions.

Those results alone were remarkable after just eight weeks of intervention. But the most compelling part of the research was the finding that the BioMARK results also changed significantly in the children. And the changes were positive, meaning the children's brain stem responses resembled typical children, those who do not have any evidence of auditory processing disorders affecting language skills and listening. In other words, the eight weeks of Fast ForWord resulted in what brain scientists call "neuroplastic" changes in brain function. And the changes occurred specifically in regions that are very specific to and important for accurate listening and language processing.

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