Central Auditory Processing
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Our ability to understand speech depends on our ability to perceive sounds (hear) and our ability to process what we hear. Simply stated central auditory processing refers to the efficiency and effectiveness by which the brain uses the auditory information received by the ear.

"It sounds like others mumble",
"I can hear but I can't understand, especially in the presence of background noise",
"Everyone talks too fast"

Do these sound familiar? These comments could be a sign of an actual hearing loss or they could be consistent with an auditory processing disorder.

Is it My Hearing or Is it My Brain?????
Not all difficulties with understanding speech are related to an actual hearing loss. The central auditory system coordinates information between the ear and the brain. This system plays a critical role in processing complex information such as understanding speech in the presence of background noise, detecting differences in signal loudness, perceiving differences of pitch or intonation and discrimination of longer vs shorter speech sounds.

If there is a deterioration or lack of development of the central auditory pathways there may be an inability to separate important components of complex speech stimuli which will lead to difficulty in understanding the spoken message.

Both children and adults may experience difficulties with processing correctly. One very important factor in processing is the speed at which the central auditory system is able to process speech. Recent studies have revealed that the average first grade teacher speaks at a rate of about 150 words per minute while the average first grade student processes at a rate of 125 words per minute. By our teenage years and up to about age 65 we typically will process at the 140 word per minute rate. People in their 70s with typical hearing will have a slower processing rate of about 124 words per minute. Newscasters have been measured to speak at 190 to 200 words per minute.

Higher cognitive abilities such as memory, attention and language are also a part of the auditory processing component or understanding a spoken message. Recent studies have shown that some individuals can recall fewer words if they are presented in the presence of background noise. The current hypothosis is that the background noise uses additional working memory space, thus limiting the brain's ability to process speech.

Consider these two scenarios:

1. You are in a meeting where the topic is of great interest to you. The room is quiet and you are able to follow the speaker with no difficulty. Then a loud fan is turned

on. Now you have to concentrate to understand the message. The background noise of the fan has interfered with your ability to perceive (hear) all of the sounds and therefore your brain is being required to "fill in" the missing pieces. Your auditory processing has been compromised but because you have a working knowledge of the subject matter you may able to compensate for the now missing information.

2. You are in a meeting where the topic is completely unknown to you. The speaker is using terminology and phrases that are unfamiliar to you. You are concentrating and are able to follow most but not all of what the speaker has to say. Then a loud fan is turned on. Since the fan is interfering with your ability to hear all of the sounds and the topic is unfamiliar to you, it is more difficult for your brain to "fill in" the missing pieces and your ability to understand the message is compromised. Your auditory processing has been compromised and because you do not have a working knowledge of the subject matter you have difficulty compensating to acquire the missing information.

What Can You Do?

First, it is important to obtain a comprehensive hearing (audiological) test to rule out any type of hearing loss. If a hearing loss is present then appropriate remediation will be recommended. Improving the ability to hear, or perceive speech sounds, through the use of hearing aids will provide the brain with more information to use in understanding the spoken message. Even with hearing aids your will still have some difficulty with the processing of speech sounds and will require compensatory strategies and/or environmental modifications to maximize your ability to understand especially in difficult settings.

If there is not a hearing loss present, there are tests of central auditory function that will help to define what types of processing abilities are present and what types of strategies may be used to assist in the ability to understand others. Central auditory processing abilities may be delayed in children. In this case we would expect the child's ability to process to improve as the brain matures. On the other hand, central auditory processing disorders may be permanent. In this case there are strategies or modifications that can be learned and will enable the child or adult to follow conversations more effectively and minimize the effects of the disorder on the listener's life.

This article was provided by Dr. Mary Maddock, Au.D. of Wilmington Hearing Specialists. Dr. Maddock has twenty nine years experience working with hearing impaired children and adults. She provides comprehensive audiological testing, balance testing and central auditory processing evaluations along with hearing aid dispensing at her office which is located at 3909-110 Wrightsville Ave. She can be reached at 791-4755.