

"Are You Listening?"

The Process of Integrating Sound for Paying Attention

By Kelsey Smith, MOT, OTR/L

How many times have we as parents, teachers or therapists, asked the question "Are you listening to me?" When we ask this question, we really want to know if the child is paying attention to us. Listening is more than hearing or detecting sound. It is an entire body and brain process which includes organizing and integrating sound for use with information from other senses. Listening is an active process and is closely related to alertness and attention, which allows us to meaningfully engage and interact within our environment.

Anatomy of the Ear Very Simplified

To better understand listening, we need to first understand the anatomy of the inner ear. The inner ear contains the cochlea, which is the hearing mechanism, and the vestibular connections, which detect motion. The receptors for these two mechanisms are not clearly divided and are housed within a continuous membrane structure. Because they are anatomically close to each other, their functions overlap. The vestibular system detects movement and gravitational pull which affects our posture, muscle tone, balance, coordination, and attention. Therefore listening can be considered a sensory integrative process.



Ambient and Focal Awareness

Our auditory system allows us to engage in two very different types of awareness. One kind of awareness is called ambient or subconscious monitoring which is designed for safety by registering change and monitoring the environment and background. Without realizing it, we are constantly monitoring our auditory environment in order to protect ourselves from potential threats and detect sounds that may demand further attention. The second kind of awareness is called focal awareness. Focal awareness is designed for registering details of sounds, value and content, all of which cause us to focus our attention. When we detect a sound that warrants our attention, we begin to listen in a more focused and conscious way. The ability to process both types of auditory information, and the ability to switch smoothly between both types of auditory processing, is a very important skill for engaging in activities of daily life.

Auditory Defensiveness

During the early years of development, it is not uncommon for children to display some discomfort or sensitivity to sounds, especially those sounds that are loud or unexpected such as a passing train or fire alarm. The difference, however, between a typical child and a child with auditory defensiveness is the intensity and the duration of the reaction. For example, the defensive child reacts emotionally and may experience severe pain as compared to the typical child who is annoyed and bothered by the sound. The discomfort that the typical child experiences usually subsides immediately after the sound has stopped. In contrast, the defensive child may continue to show discomfort long after the sound has gone, and may continue to display anxiety and fear at the thought of the noxious stimuli reoccurring. It is important to remember that a variety of sounds can trigger a defensive response, including garbage trucks, car engines, lawn mowers, vacuum cleaners, toilets, air vents or fans. If left untreated, continued exposure to sounds or acoustic environments that are constantly being interpreted by the child as threatening or stressful can have a negative impact on a child's ability to listen, regulate his or her behavior and sustain attention. In extreme cases, it can negatively impact social-emotional, motor and learning development.

Other factors that can affect listening are briefly described below. This list is not meant to be comprehensive, rather its purpose is to shed light on other reasons a child may have difficulty listening.

- **Poor ability to filter out irrelevant sounds** within a complex acoustic environment (such as a noisy classroom) in order to listen to the teacher's directions.
- **Attention-Deficit or Hyper-active Disorder (ADHD):** Children with ADHD can display difficulty listening to directions, especially when the instructions do not provide enough stimulation to their brains. Children with ADHD have to work harder and exert more mental effort than their peers in order to pay attention and listen.
- **Central Auditory Processing Disorder (CAPD):** Children with CAPD have difficulty listening because they have difficulty recognizing and interpreting sounds correctly, especially sounds used in speech.
- **Poor receptive language skills:** Children with poor receptive language skills have difficulty comprehending language, following directions and understanding communication.



[continues]

- **Chronic middle ear infections:** Frequent middle ear infections can cause a buildup of fluid in the ears and can block or distort sounds, thus influencing the child's ability to detect and process sound correctly.

Therapeutic Listening: A Modality for Improving Listening Skills (and more!)

Typically, treatment to improve listening includes compensatory strategies such as having the child sit in the front row of the classroom, adding visual cues and providing the defensive child with noise reduction headphones. There are also a variety of auditory interventions available to improve listening skills. Therapeutic Listening is one such auditory-based program available that uses electronically modified music. The music is modified through a high-pass and low-pass filter. Listening to music that alternates between this low-pass and high-pass filter trains the ear to shift back and forth between focused listening, and the awareness of background or ambient sounds. In addition, the organized, rhythmical sound patterns in the music assist in organizing the central nervous system and activating body movement to engage within the environment. The child listens to the modified music over specialized headphones that are capable of picking up a larger than normal range of sound frequencies for 30 minutes twice a day. Children are encouraged to participate



in physical movement activities aimed at developing and strengthening postural responses and adaptive responses while listening to the modified music. The music albums in the program have various music elements and sound patterns that are aimed at targeting a specific set of skills. With knowledge of the child's current challenges, as well as knowledge about the music qualities and elements of each music album, the therapist selects the appropriate album. Assessment of the child's response to the intervention occurs on an ongoing basis by a qualified therapist. Depending on the progress and outcomes, a child typically participates in the Therapeutic Listening program for 12-14 weeks.

The Therapeutic Listening program is appropriate for children with auditory defensiveness, difficulties with transitions, coordination deficits or are unable to regulate emotional responses. Children who are sluggish or have low muscle tone, as well as children who are overly active or inattentive may also benefit.

Outcomes frequently observed include improved:

- Social interactions and communication skills
- Attention and focus
- Sleep patterns
- Mood and energy level
- Responsiveness to sounds and verbal instructions
- Muscle tone and coordination

For more information or a list of references, please contact the author at ksmith@sovrehab.com.



Please join us for a free educational seminar on the topic of *Therapeutic Listening*.
When: Thursday, July 18th at 7:30 pm
Where: Sovereign Pediatric Therapy - Naperville and Chicago/Lincoln Park clinics
Call to reserve your spot:
Naperville: 630.585.7337
Chicago/Lincoln Park: 773.755.7566

Would you like to know if your child would benefit from participation in a *Therapeutic Listening* program? Please call to schedule a free 20 minute screening at any of our locations.

Naperville: 630.585.7337
Chicago/Lincoln Park: 773.755.7566
Crystal Lake: 815.477.4788

Do you have questions or concerns regarding your child's development? Sovereign Pediatric Therapy offers free screenings. Call any office to schedule an appointment.

Want to share this *News Brief* with your co-workers or friends? Visit our website at www.sovrehab.com and click the Pediatric Clinics tab at the top of our home page. See the informational topics available and click the links for past issues of *News Brief*.

***Integrated Listening* (iLs)** is another auditory intervention that utilizes bone conduction and altered music along with movement activities to retrain parts of the brain involved in learning, communicating and moving. For more information on iLs, contact Amanda Flowers or Paula Fick at our Crystal Lake office to set up a free screening for your child.

The staff of Sovereign Pediatric Therapy wishes you a happy and safe summer.



Chicago
 2835 N Sheffield Ave
 Suite 401
 Chicago, IL 60657
 773.755.7566

Crystal Lake
 390 E Congress Pky
 Unit A
 Crystal Lake, IL 60014
 815.477.4788

Naperville
 1315 Macom Dr
 Suite 103
 Naperville, IL 60564
 630.585.7337