Our ears are always open. Whether busy with the activities that fill our lives in the light of day, or during a restful sleep under the shadow of night, the auditory sense is feeding our brain information about the environment.

Naturally, we recognize the significant part the auditory system plays in attention, listening, and learning. Its role in balance, posture, and spatial awareness is also implicit.

Many children and adults experience difficulties processing auditory information. Some of these fascinating challenges include:

- auditory attention
- hypersensitivity to sounds
- filtering out background sounds
- temporal processing
- auditory memory
- understanding the meaning of what is being communicated

As the understanding of the neurobiological mechanisms of auditory function advances, so does our ability to develop and study the effects of auditory stimulation, both on brain organization and as an intervention strategy.

Researchers have made a link between the middle ear and social engagement that provides insight into why some children may demonstrate atypical behaviors and communication difficulties in certain situations and environments.

Middle Ear and Social Engagement

One clearly explicit model of a link between the middle ear and social engagement is provided by The Polyvalg Theory, formed by Dr. Stephen Porges at the University of Illinois at Chicago. He links the evolution of the neural regulation of the heart to afferent experience, emotional expression, facial gestures, vocal communication, and social behavior that is responsive to the behavior of others. The theory proposes that the neural control of the heart is neuroanatomically linked to the neural control of the muscles of the face and head through mechanisms of the vagus, or tenth cranial nerve (Porges 2004).

The vagus nerve, a primary component of the autonomic nervous system, exits the brainstem and has two branches that regulate the striated muscles of the head and face (e.g., facial muscles, eyelids, middle ear muscles, larynx, pharynx, muscles of mastication) and in several visceral organs, (e.g., heart and gut) (Porges 2001). Porges suggests that specific neural circuits can compromise social engagement in some psychiatric and behavioral disorders including autism. Social engagement is dependent, in part, on the control of the muscles of the face and neck, which enable us to express a wide range of emotions in ways that others around us can detect, enjoy, and respond to. A key to comfortable social engagement is the vagal nerve innervation of two tiny muscles in the middle ear.

The two muscles of the middle ear are the tensor tympani and the stapedius. Together, they regulate the stiffness of the tympanic membrane (eardrum) and the ossicular chain (consisting of three bones; malleus, incus, stapes) as a pathway of sound conduction to the inner ear. These muscles must function properly to protect the inner ear from loud sounds and to attenuate low frequencies so that the higher frequencies contained within the human voice can be discriminated. This is especially important with speech in the presence of back-
Auditory Stimulation for Improved Social Engagement

By G. Alexander Doman

The noise creates a certain level of nervous tension. It becomes a challenge to modulate the middle ear muscles to listen and speak, to make eye contact, and to read and display positive facial expressions. This stressful experience may result in agitation and a desire to exit from the situation, causing you to become socially disconnected.

The social engagement system is intimately related to stress reactivity (Porges 2001). Sensitivity to the social engagement behavior of others also decreases.

Lower level needs including physiological and safety needs are prioritized before higher level needs such as love and belonging, esteem and self actualization can be met. If one is merely trying to survive, one cannot express or experience love, belonging, or intimacy, much less be confident, learn, problem solve, and show empathy and acceptance of others. Some of the very qualities that make us distinctively human are impaired.

Intervention

To improve spontaneous social behavior, Dr. Porges has proposed that an intervention must stimulate the neural circuits that regulate the muscles of the face and head.

Theoretically, once the regulation of these structures is activated, social engagement and communication will spontaneously occur as natural emergent properties of the biological system (Porges 2004).

The Listening Program® (TLP) method uses music-based auditory stimulation to modulate the regulation of the middle ear muscles. The theory is that the middle ear muscles need to be regulated during listening, and the nerves that regulate the muscles are linked to the nerves that regulate the other muscles of the face and head involved in social engagement (Porges 2004). TLP is engineered to do this, and included in the method are processes that stimulate and exercise the neural pathways involved in listening and simultaneously stimulate the function of other aspects of the social engagement system.

Technical Details of The Listening Program

Since The Listening Program® (TLP) was introduced in 1999, parents and providers have recurrently reported a reduction in hypersensitivity to sounds with improved communication and

Continued on page 16
social engagement. When the regulation of the middle ear muscles improves, so does comfort and safety in the environment. When a listener no longer has to devote his internal resources to comfort and safety, he becomes available to listen, learn, communicate, and engage in prosocial behaviors.

TLP is a patent-pending, music-based auditory stimulation method that is intended to improve auditory, vestibular, and other brain functions.

It involves, in part, listening to acoustically modified music through headphones. Listening schedules are five days per week, 15-30 minutes each listening session. The program length is typically five months and is individualized to meet the needs and goals of each listener. Listening can be done for shorter and longer time periods. In addition, certain programs can be delivered through speakers when a person cannot tolerate headphones. The method is normally integrated within academic and therapeutic programs in home, school, and clinic.

The Listening Program incorporates the most advanced psycho-acoustic processes, including the highest quality music available, recorded specifically for the method at 24-bit 192 kHz HD using ABT’s Spatial Surround® process delivered with Dolby Headphone® technology.

The music consists of Classical pieces performed by the award-winning Arcangelos Chamber Ensemble. The compositions are principally Mozart with Haydn, Vivaldi, Corelli, and Danzi, offering a rich tapestry of sound with instrumentation of strings and woodwinds.

TLP includes four training categories: full spectrum, sensory integration, speech and language, and high spectrum. This progressive structure allows for refined stimulation and training at any point in the program. To accommodate individual listener preferences, there are options to follow a program with or without sounds of nature. While many prefer to enjoy and focus on the exquisite music, others, especially children, benefit from the novelty of combining music with beautiful sounds from nature.

The program is available on CD and iListen™. The CD version includes ten 60-minute albums, an easy-to-use guidebook, a portable CD wallet, listening schedules, and free access to online listener resources.

iListen is an iPod with preloaded music (uncompressed), with the ten 60-minute albums and a library of music from the Sound Health® collection (music for relaxation, thinking, etc.), as well as the guidebook, carry case, listening schedules, and free access to online resources.

A recent technological development was the introduction of ABT Bone Conduction Technology™. It combines the experience of listening through specialized headphones adding subtle vibration to the skin and skeletal system, engaging the whole body and brain in the listening process. This multi-sensory approach accelerates and expands the benefits of The Listening Program. It can be particularly targeted to listeners with social engagement problems, making them more available to benefit from the program. This portable equipment is compatible with iListen and portable CD players.

TLP is available exclusively through an international network of professionals who receive extensive training, certification and continuing education through Advanced Brain Technologies (ABT). The providers offer information, assessment, individualized program development, and support to their clients. Parents and professionals may contact Advanced Brain Technologies for a free consultation or referral to a TLP Provider by phoning +1.801.622.5676 or visiting www.thelisteningprogram.com.

ABC Modular Design

The Listening Program’s patent-pending ABC Modular Design™ provides appropriate training for social engagement by effectively exercising the auditory system. The training has three phases: “accommodation/warm-up,” “training/workout,” and “integration/cool-down” – akin to a “sensory diet” for the ears.

Each 60-minute TLP album contains four 15-minute modules. Each module provides three phases of stimulation. The first phase, “A,” relaxes the listener, making her nervous system available to benefit from the more intensive stimulation of the “B” phase. This is the phase in which a technology called audio bursting stimulates and exercises the neural pathways involved in listening and simultaneously stimulates the function of other aspects of the social engagement system. The listener is then guided to a relaxed state during the final “C” phase.

These modules integrate progressive entrainment processes of
The investigator was the Occupa-

Medical Center (PCMC) in Utah. 

Program® at Primary Children’s 

research study on The Listening 

Sensory Processing Disorder. 

was ADHD, PDD-NOS, and a 

spectrum disorders. His diagnosis 

for a school specializing in autism 

Michael was also on a waiting list 

mornings a week and was receiving 

shutting down. At that time, he was 

sensory limit, either responding with 

the day, he would quickly reach his 

effectively. During the course of 

this type of sensory information 

sensory input, unable to modulate 

Michael's mother video-taped 

him as he participated in two 

school musical programs. In the 

pre-program video, he demon-

strated a rapid decline in social 

engagement as the school program 

progressed through several holiday 

songs. Michael’s facial affect flat-

tened, he covered his ears and eyes, 

rocked himself, and progressively 

shut down as he became increas-

ingly overloaded by all the activity 

and bombardment of sound. 

Observing Michael in the post-

program video, you see a very 

different child. He is paying atten-

tion, smiling, dancing, has excellent 

motor timing and coordination, 

initiates and maintains eye contact, 

and actively sings throughout a nine 

song program, completely engaged 

with the other students. To the lay 

observer, it is difficult to differenti-

ate him from his peers. 

In the course of his initial TLP 

program, Michael greatly improved 

his ability to modulate sensory 

input, began to engage in imaginary 

play, had reduced hyperactivity, and 

expressed appropriate emotions 

with adults and his peers. Accord-

ing to his speech therapist, his 

receptive and expressive language 

skills improved, as did his social 

skills. Michael now follows multi-

step directions, maintains good eye 

contact, has increased facial expres-

sion and reduced sensitivity to 

sound and touch, and has improved 

emotional regulation. 

Consequently, The Listen-

ing Program continues to be an 

integral part of Michael’s every-

day routine. He was discharged 

from therapy and is no longer on 

the waiting list for the specialized 

school, as he is currently attending 

and thriving in a regular education 

first grade class. 

REFERENCES 


system for detecting threats and safety. Zero to Three 


substrates of a social nervous system. International 

Journal of Psychophysiology. 42, 123-146. 


Listening Program to help individuals with autism 

spectrum disorders improve auditory processing. Autism 

Asperger’s Digest. November-December, 18-25. 

G. Alexander Doman is the Founder, President and CEO 

of Advanced Brain Technologies (ABT), a neurotechnology 

company that develops and distributes interactive software 

and music programs for the improvement of memory, atten-

tion, listening, academic skills, sensory processing, brain 

health, peak performance and more. Prior to founding ABT 

he served as Executive Director of the National Academy for 

Child Development. For the last 15 years his career has been 

focused on research, product development, and education 

primarily in the areas of psychoacoustic music technologies 

and brain fitness software. 

Email: alex@advancedbrain.com 

Questions about Michael may be directed to; 

Bryan Gee, OTD, M.S., OTR/L 

Idaho State University 

Department of Physical and Occupational Therapy 

Clinical Assistant Professor of Occupational Therapy 

Academic Fieldwork Coordinator 

Email: geebrya@isu.edu
As appeared in the Spring 2008 issue.
www.SIfocus.com