

The Brain Ear Connection

WRITTEN BY:

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There is little doubt that music plays an important role in clinical recovery for many clients. One program I have used personally and clinically with great success is The Listening Program® (TLP). We find The Listening Program improves many clients' abilities to hear in noisy environments. Additionally we see improvements in auditory processing speed and attention.

Auditory processing speed is necessary for sustained attention. It is commonly known that individuals can't process what they fail to attend to, but what is less cited is that when auditory processing is slowed, cognitive reserve is taxed and cognitive load increases. This places unreasonable demands on the central processing capacity, and individuals use energy normally allocated for learning and consolidating materials for hearing survival.

An example of this could be trying to write the final draft of an important paper immediately following an overseas flight where the ears are plugged and not operating at optimal capacity. For people with difficulty processing auditory information this is what it is like for them on a daily basis.

I personally used The Listening Program® after an acquired brain injury. My ability to discriminate sound in a noisy environment was improved and in addition I recovered the ability to hear frequencies that were impaired prior to the brain injury.

The Listening Program® has matched spectral bands with somato-sensory cortex patterns and taken out some of these frequency bands. Participants enjoy the music in a classical format. The brain then attempts to match the missing frequencies to strengthen synaptic connections in the new pattern. The program employs dichotic listening in order to restore the balance in the way sound is perceived by the ears and translated by the brain.

Impaired auditory processing skills can be seen with imaging techniques as an abnormally enlarged auditory cortex is with the neurons responding over a greater area producing increased sensitivity as a compensatory measure. Unfortunately this also produces a greater signal to noise ratio in the brain. This may translate to reduced auditory accuracy in noisy environments. The ability to filter extraneous interference and to accurately discriminate sound is compromised. This same process takes place in chronic pain patients who are slower to feel the initial sensation of pain but are found to have increased sensitivity to pain, less tolerance and this pain is spread over a wider area.

One logical way to solve this problem would be to help the brain create a new path, making it less reactive to all stimuli and more sensitive to discriminating important stimuli. The Listening Program® is effective as a tool to train the brain in this way. The orderly cadence of classical music in its mathematical formation can act as a filing cabinet for the auditory cortex. The frequency filtering allows the brain to come out of an automatic mode and learn a new way of hearing. The stereophonic listening gives the brain an opportunity to generalize where and how it will process new sound.

Song is often used to awaken dormant skills in comatose or stroke patients, evoking auditory response and initiating corrective response. Individuals may be unable to say words but they can repeat them when they are sung to

them by a participating therapist. After singing, they then say the same words that were impossible for them just moments before. It may be that when people cycle between speaking and singing, the contour and spacing of musical sounds may be decoded by additional areas in the brain which can then act as a conduit to the language centres of the brain. This may be because language uses motor, auditory and visual skills. Singing may engage other brain areas and then cue brain neurons to act as a construction crew to make a detour around the damaged area, or to enlist nearby neurons to build a strong new path. Recently neuro imaging tools have advanced so that changes caused by this kind of learning can be demonstrated by an increase in white and gray matter cells in the brain.

The Listening Program[®] also serves as a relaxing way to restore cognitive reserve and reduce the fight or flight response created by learning anxiety. Many brain therapy patients spend hours in occupational, speech pathology, and physical therapy every day. This concentration is required to build new paths in the brain, however in early stages of recovery the brain is vulnerable and becomes tired. The Listening Program can provide a restful interlude in the midst of these other therapies. Clients report that using TLP between other therapies refreshes them and allows them to be more productive.

Usually the cognitive system works quite well, but when a brain is tormented by post-traumatic stress disorder (PTSD), acquired brain injury or other cognitive disabilities, attention can focus or get stuck on the wrong thing. Life becomes like a movie from the past that won't quit. What is being established through research and experience is that many people with cognitive deficits can relearn the ability to filter their environment and turn off thoughts that are negative and bring pain.

Negative thoughts and fears turn on a fight-or-flight response by keeping the heart in a constant state of arousal and diverting oxygen from the brain. This is good to give us an extra boost to escape an attacker, but when we have to fight mental battles, it produces exhaustion and confusion. Many trauma survivors are stuck in a fight-or-flight mode, which saps energy and mental clarity.

Research indicates self-regulation can assist the nervous system in filtering unneeded sensory information and can increase an individual's ability to choose his or her focus. When people can choose focus, it offers them an element of control and of power. This multiplies self-esteem.

Some of our traumatic brain injury (TBI) clients find that The Listening Program[®] enhances their ability to spend time with people and pay attention. They perform faster and with increased accuracy on cognitive tasks and in particular executive functioning and auditory processing. This leads to better adoption of new materials and an increased retention rate for working memory.

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Dr. Amy Price is a Psychologist and Neuroscientist who divides her time between brain science research, brain injury specific forensics, clinical practice and world missions. Her practice is in Boca Raton, Florida and she welcomes consultation opportunities and clients of all ages. She specializes in treating those who need help restoring their cognitive skills and those who suffer from PTSD. Dr. Price herself is a brain injury survivor and her message to others is: "Refuse to let other people define your boundaries and enforce your limitations. The seeds of greatness are on the inside of you and they are waiting to be birthed. Hold onto your flexibility and sense of

humor...you will need it on the ride of life! It is seldom a smooth ride but you can be the driver. There will be falls along the way but the difference between a success and a failure is choosing to get up one more time in whatever way you can!"



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