# *SHARPENING THE BRAIN WITH NEW TECHNOLOGIES*

By Teresa Garland, MOT, OTR

Here's a scenario: You know that you're an intelligent person, but your thoughts keep bumping into each other, making it difficult to access ideas, memories, and creativity. As a result, you often feel overwhelmed and anxious, leading to procrastination, disorganization, or a feeling of helplessness. This is an example of a brain that's out-of-synch.

The problem is one of timing, rhythm, and synchronization in the brain. All of us—athletes, musicians, and great thinkers included—can use a tune-up of our inner timing. The average person might find that a tune-up can polish the rough surfaces and help her perform at her best. But another person who is out-of-synch might have serious symptoms such as a learning disability, impaired attention, lack of motor planning, problems with sensory processing, and impaired social skills. For that person, a tune-up can have life-changing benefits.

When we refer to the body's internal rhythm, we typically think of the circadian clock that regulates us by day and by night. But there are other brain rhythms, too. At the microsecond level (millionths of a second), we process sound, touch, and fight-or-flight response. At the millisecond level (thousands of a second), we process thoughts, speech, communication, movement, memory, and senses. At the level of interval timing involving full seconds, we establish mental attention and we process more complex brain operations.

A good brain-body therapy can tune up our inner timing. One of the best-researched therapies was developed by a man from Grand Rapids named Jim Cassily. He was a producer for singer Bob Segar and sound-mixer for Janis Joplin. In 1994, Cassily developed a computer-based device (called the Interactive Metronome) as a way to teach "natural timing" to musicians. Cassily had another profession: he taught children with autism to play piano, and he used his new invention as an aide for them. Parents of the children were amazed at the gains their children were making as a result of this intervention. One of his students was a patient of Dr. Stanley Greenspan, a psychiatrist widely known for his work with children with autism and ADHD. Dr. Greenspan joined up with Cassily to get the device properly researched and brought to market for use in clinics.

Interactive Metronome (IM) gives feedback within one millisecond of how well a person can clap his hands or tap his feet in time to a regular beat. Instantaneous audio and visual feedback through headphones and a computer monitor guide the individual's performance. Over several sessions, the person's brain timing improves along with his timing on the device.

A review article of IM research in the American Journal of Occupational Therapy cited statistically significant improvements in attention and focus, motor control and

coordination, and language processing. Improvements were also cited in reading and math fluency, as well as in the ability to regulate aggression and impulsivity.

Another study, this one of 1,500 middle and high school students from 20 different schools, found gains of 2.21 years in reading fluency, 1.66 years in math fluency, and 2.5 years in overall cognitive processing speed. A study of 585 elementary school students noted 18 to 20 percent gains in reading and math achievement in three to four weeks. In a study of 56 children with ADHD, Dr. Greenspan found significantly increased motor control, coordination, processing speeds, and a decrease in aggressive behaviors.

IM is being used to help recover speech and limb movement after a stroke, and to help maintain brain-body function for those with Parkinson's Disease and Multiple Sclerosis. Walter Reed Army Medical Center is currently looking at the effects of an IM program on Post Traumatic Stress Disorder, sleep, and cognition. Success in individual cases has been reported with reduction of body and vocal tics including Tourette's syndrome, sensory defensiveness, sensory processing disorders, and episodic depression.

Athletes have better timing than the general populace, yet they also can improve with this type of training. After a 12-session program, members of a high-school football team improved focus and synchronization, and their offensive miscues decreased by 50 percent. PGA golfer Vijay Singh takes an IM station with him to tournaments, and he claims it has made "big improvements in my shot accuracy." Typical adults find that a session energizes them. They often notice a lessening of anxiety. They also report improvements in dancing skill, coordination, organization, and mental function.

While IM works at the second and millisecond levels, there are other therapies that work at the microsecond level. These include sound therapies such as Therapeutic Listening, AIT, and Samonas, as well as touch-based therapies such as the Wilbarger Protocol. Both types of therapy have been used successfully for several years and are supported by research. The sound therapies target self-regulation, auditory and tactile defensiveness, and sensory sensitivities. They also help with fine motor skills. The Wilburger Protocol, which works through the skin and joint receptors, helps with self-regulation and settles down the fight-or-flight reflex.

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