Music – A Treat for the Ear, Food for the Brain
By Suz Lipman

Music is a major part of a lot of our lives, enhancing our emotions and our experiences. Indeed, our favorite memories often carry a musical soundtrack.

Many of us have also heard about the "Mozart Effect,", based on the work of UC Irvine researchers Drs. Frances Rauscher and Gordon Shaw, which shows that music has the power to enhance some higher brain functions. Lots of us play or played music to our young children, either because of the research, or because it was a fun thing to do. Either way, the product was joyous. But just what was happening in the brain?

There is a link between music and spatial reasoning, the "Mozart" studies show. Spatial-temporal reasoning, generally considered a "right-brain" function, involves orientation of shapes in space. It's especially relevant to the fields of geometry and other higher math, engineering, architecture, design, drawing, filmmaking, aviation, sports, chess, and, of course, music.

In the studies, college students were divided into three groups. Some listened to 10 minutes of Mozart's "Sonata for Two Pianos in D Major", while others heard silence or a meditation tape. The group that heard the Mozart scored approximately 9 points higher in IQ tests that involved abstract spatial reasoning than did the other groups. In another experiment by the same team, students who listened to Mozart solved visual puzzles faster and better than those in other groups.

Drs. Rauscher and Shaw went on to study preschool children. Their results showed that the spatial performance of children who received eight months of music lessons far exceeded the performance of demographically comparable students who did not receive the music lessons. Early studies have also been done, by others, on people with Alzheimer's disease, and they show that Alzheimer's sufferers also scored better on spatial-temporal tasks after listening to Mozart's music.

What is it about Mozart, and will only Wolfgang Amadeus do? The researchers surmised that Mozart's complex patterns of evolving musical themes primed the same neural circuits that the brain uses for complex visual-spatial tasks. Those neural circuits become stronger each time they are used. In other words, music can create a kind of computer hardware for the brain. This hard-wiring can take place extremely early in one's life. Dr. Shaw calls music a "pre-language" that exists in a separate place in the brain from other languages. While enhancing the spatial-temporal areas of the brain, music can also boost the language-analytic areas of the "left brain", because much of the brain works as an interconnected whole.

In 1998, researchers at the University of Munster in Germany reported that music lessons in childhood actually enlarge the brain. The auditory cortex, the area of the brain that processes sound and analyzes music pitch, is 25% larger in musicians than in non-musicians. The same part of the brain that responds to sound -- by having its neurons create their own sound-frequency map -- is responsible for spatial-temporal reasoning, and the results in that part of the brain can exist long-term.

Good News: Brains Can Benefit From Music At Any Age

The earlier music training was begun, the bigger the brain's auditory cortex appeared to be. But some very exciting work by Edward Taub, a behavioral neuroscientist at the University of Alabama, Birmingham, indicates that, although tremendous brain remapping can take place before age 12, adult brains can still change in response to music.

Many types of music -- classical, jazz, pop, folk, Native American, African, Latin, and more -- offer the same sense of symmetry, and the same neural benefits, that Mozart's does. Researchers do note that playing a musical instrument has a greater effect than listening to music, even if it is Mozart.

Interestingly, Dr. Rauscher herself was a concert cellist before entering the field of neuropsychology. She is a Research Psychologist at the Center for Neurobiology of Learning and Memory at UC Irvine, along with Dr. Shaw. The pair has authored numerous papers, including "Music and Spatial Task Performance: A Causal Relationship, University of California, 1994" and other work appearing in the journals, "Nature" and "Neurological Research."

The work from the University of Munster was reported in the April, 1998, issue of 'Nature". Edward Taub is recipient of the 2004 American Psychological Association Distinguished Scientific Award. His work and others' can be found in the book "The Mind and the Brain : Neuroplasticity and the Power of Mental Force", by Jeffrey M. Schwartz and Sharon Begley.

Suz Lipman is a writer and parent who serves on the Board of Directors of Kiddo!, The Mill Valley Schools Community Foundation.