

An Intelligence View of Music Education
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As music educators we ought to be grateful for, and knowledgeable about, three major developments in recent years that have strengthened our position in promoting music as a significant and research supported discipline that ought to be at the core of the curriculum. They are: (1) The extensive amount of Brain Research, much of it using music to understand the human brain, encouraged by the 1990's being proclaimed "The Decade of the Brain"; (2) Howard Gardner's development of the "Theory of Multiple Intelligences", providing a model of human intelligence for educational reform that gives music a significant place in the development of educational programs; and (3) the highly publicized research of Frances Rauscher, Gordon Shaw and colleagues at the University of California, Irvine on "The Mozart Effect", research that showed a causal relationship between music and aspects of intelligence.

As music educators we received a powerful emotional boost for music education in recent years as a result of the release of the film, *Mr. Holland's Opus*. Building on this momentum, it is important to know where rational and scientific research data may be found to support our beliefs that music is indeed important in the education of all children. Having produced a 7 part video series in the 1980's on MUSIC AND THE BRAIN, it is exciting to see the current and expanding interest in music and the brain from a variety of perspectives as represented in the following selected publications:

- ...June 11, 1990 *U.S. News and World Report* "The Musical Brain".
- ...May 16, 1995 *The New York Times: Science Times* "The Mystery of Music: How ITWorks in the Brain".
- ...February 19, 1996 *Newsweek* "Your Child's BRAIN: How Kids are Wired for Music, Math & Emotions.
- ...March/April 1996 *Learning* "Music: Exercise for the Brain."
- ...August 1996 *Parents Magazine* "Does Music Make Babies Smart?"
- ...September 17, 1996 *Family Circle* "5 WAYS TO INCREASE YOUR MUSIC IQ."
- ...October 1996 *Discover* "Music of the Hemispheres."
- ...January 1997 *The American School Board Journal* "The Musical Mind".

A significant number of neurologists are studying the relationship between music and brain development. One such study published in *Science* in 1995 reported that musicians who learned to play string or keyboard instruments before adolescence appear to have larger areas of the brain devoted to touch perception of the fingers. In the journal

Neuropsychologia it was reported that musicians who started keyboard training before the age of seven had 12% thicker nerve fibers in the corpus callosum, that part of the brain that carries signals between the two hemispheres. Sharon Begley's article, "Your Child's Brain..." in *Newsweek* reported that researchers at the University of Konstanz in Germany had evidence that exposure to music rewires neural circuits.

At a January 1997, International Alliance for Learning Conference called "Unleashing the Brain's Potential" in San Antonio, Texas, the majority of the presentations focused on the use of music to accelerate learning, as initially developed by Dr. Georgi Lazanov, and now used throughout the world as an important educational methodology, to optimize memory and other cognitive processes. Educational Listening Centers around the United States utilizing the research of Dr. Alfred Tomatis, use the music of Mozart as a vehicle for remediating audiological and neurological dysfunctions and facilitating higher levels of brain function. Even the popular press and recording companies are advertising that "Mozart Makes You Smarter".

To assist me in the process of writing this article, while I'm reading and typing I am listening to "Classical Rhythms" from Relax With the Classics produced by LIND Institute, for which I served as consultant. The program notes read, "The exceptional beauty of Baroque Music, combined with its power to enliven the brain, is the hallmark of these Baroque allegro selections, which will energize you both physically and mentally. In contrast to the slower tempos of other RELAX WITH CLASSICS recordings, these faster allegro tempo pieces activate the most alert brain state--the beta brain wave state, enabling you to work, to study, to think, and to exercise with optimal energy and productivity. The bright tempos and tonal qualities of the instrumentation have been selected to help maintain a positive mental attitude.

An awareness of the breadth and depth of resources and approaches to the relationship of music to brain function and development has been the purpose of the preceding section. Of related interest, and of equal importance in understanding the necessary role that music can play in education is the work of Howard Gardner, a cognitive psychologist from Harvard University, who developed a Theory of Multiple Intelligences. In his *Frames of Mind: The Theory of Multiple Intelligences*, published in 1983, he first challenged the commonly held practice of categorizing people by single measures of intelligence and proposed that there are seven basic intelligences.

In 1991, Gardner published *To Open Minds* and in 1993 *Multiple Intelligences: The Theory in Practice*, updating the theory to reflect developments in his thinking. In *Multiple Intelligences in the Classroom*, Thomas Armstrong describes Gardner's seven basic intelligences as a framework for educational practice. In a recent September 16, 1996 *Business Week* article, "How Many Smarts Do You Have" and in a Spring, 1996 *Scholastic Parent and Child* article, "Your Child's Intelligence(s)" an eighth intelligence--Naturalist: The ability to recognize species of plants or animals in one's environment, was added. For our purposes, we will limit discussion to the following seven intelligences.

- Linguistic intelligence: The capacity to use words effectively, orally or written.
- Logical-Mathematical Intelligence: The capacity to use numbers effectively and to reason well.
- Spatial Intelligence: The ability to perceive the visual-spatial world accurately and to perform transformations upon those perceptions.
- Bodily-Kinesthetic Intelligence: Expertise in using one's whole body to express ideas and feelings and facility in using one's hands to produce or transform things.
- Musical Intelligence: The capacity to perceive, discriminate, transform, and express musical forms.
- Interpersonal Intelligence: The ability to perceive and make distinctions in the moods, intentions, motivations, and feelings of other people.
- Intrapersonal Intelligence: Self-knowledge and the ability to act adaptively on the basis of that knowledge.

In the January 1997 article, "The Musical Mind", Gardner was quoted as saying that music might be a special intelligence which should be viewed differently from other intelligences. He stated that musical intelligence probably carries more emotional, spiritual and cultural weight than the other intelligences. But perhaps most important, Gardner says, is that music helps some people organize the way they think and work by helping them develop in other areas, such as math, language, and spatial reasoning. In a January 1997 publication, Gardner states that school districts that "lop off" music in a child's education are simply "arrogant" and unmindful of how humans have evolved with music brains and intelligences. Students are entitled to all the artistic and cultural riches the human species has created.

While it is understood that music education can have an important impact on musical intelligence, there is accumulating a significant amount of research supporting the impact of music education on all seven intelligences. This article will provide a few recent selected examples for the purpose illustration. An important recent 1995 publication, *Spin-Offs: The Extra-Musical Advantages of a Musical Education* reviews the research literature from 1970 to 1992 and should be consulted for additional research.

Linguistic

A study by Hall in 1952, reported that when examining 278 eighth and ninth graders, the use of background music in study halls resulted in substantially more improvement of reading comprehension than those that studied without music.

In a study by Ramey and Frances Campbell of the University of North Carolina (as reported in "You Can Raise Your Child's IQ" in *Readers Digest* October 1996) preschool children taught with games and songs showed an IQ advantage for 10 to 20 points over those without the songs, and at age 15 had higher reading and math scores.

Logical-Mathematical

The Council on Basic Education conducted a study comparing the amount of time spent on the arts by schools in Germany, Japan, England and the United States, and found that not only did the U.S. trail the other countries in time devoted and percentage of time devoted to arts instruction, but that the U.S. trailed countries in math and science scores.

A study in Rhode Island published in the May 23, 1996 issue of *Nature* reported that first-graders who participated in special music classes as part of an arts study saw their reading skills and math proficiency increase dramatically. Students who studied music appreciation scored 46 points higher on the math portion of the SAT in 1995, and 39 points higher if they had music performance experiences, than those without music education.

Spatial

In a study by Frances Rauscher and Gordon Shaw at the University of California, Irvine, that was presented in 1994 at the American Psychological Association, they reported that pre-schoolers who took daily 30 minute group singing lessons and a weekly 10-15 minute private keyboard lesson scored 80 percent higher in object-assembly skills than students who did not have the music lessons.

Bodily-Kinesthetic

In a report of the significance of singing in *MUSICA* Research Notes in Fall 1996 Weinberger cites research of Kalmar dealing with the positive effects of singing in normal children in a long term study, as she studied the effects of the Kodaly method of instruction, and found significant effects on motor development and cognitive development of those participating in the music program.

Musical

A report in *The New York Times International* in May 1996 indicated that in Japan, Korea, Taiwan, and China music is a more significant part of education for children than in the U.S.A., and the children in those countries are far more likely to have what some regard as one of the most striking signals of a musical mind, absolute pitch. As reported in "The Musical Mind" by Susan Black, neuromusical investigations are producing evidence that infants are born with neural mechanisms devoted exclusively to music. And perhaps, even more importantly, studies show that early and ongoing musical training helps organize and develop children's brains.

A report by John Langstaff and Elizabeth Mayer in *Learning*, March/April 1996, presented a rationale for the importance of music education in early childhood. By approximately age 11, neuron circuits that permit all kinds of perceptual and sensory discrimination, such as identifying pitch and rhythm, become closed off. Not using them dooms the child to be forever tone deaf and offbeat.

Interpersonal

A study done in 1978 by McCarty, McElfresh, Risce and Wilson, reported that a pattern of inappropriate student behavior on a school bus was changed by playing music. Research at the Harvard Project Zero as reported by Colwell and Davidson, suggests that arts activities for all students on Fridays and Mondays reduces the absentee rate on those days.

Intrapersonal

Martha Mead Giles found in a study reported in the *Journal of Music Therapy* that music and art instruction may be an important link to children's emotional well-being. In an *Update: Applications of Research in Music Education* report, Fall/Winter 1994, research was cited that in addition to an enhancement of self-concept as an outcome of music education, trust and cooperation, empathy, and social skills were also shown to be benefits of a music education.

Historically music education and music therapy researchers have provided a clear evidence that music and music education does have a measurable impact on individuals. However, it was the research efforts of Frances Rauscher (now at the University of Wisconsin, Oshkosh), Gordon Shaw and colleagues, at the Center for the Neurobiology of Learning and Memory at the University of California at Irvine dealing with the causal relationship between music and spatial task performance that resulted in the creation of the term "The Mozart Effect" and the proclamation that music can and does indeed make you smarter. A new book, *The Mozart Effect*, by Don Campbell, is to be released later this year.

The October 1993 issue of *Nature* included the report of a study done by Rauscher, Shaw and Ky that found that listening to 10 minutes of Mozart's piano Sonata K.448 over a period of time increased spatial IQ scores in college students. A further study on spatial performance and music found that the spatial reasoning skills of 19 preschool children who were given 8 months of music lessons far exceeded the spatial reasoning performance of 15 children who had no musical training. Whereas the effect of listening to Mozart lasted only a short time (about 15 minutes), the results of the study with preschool children suggested to the researchers that music can improve intelligence for long periods of time, maybe even permanently.

In 1995, Rauscher and other researchers replicated and extended their findings concerning the Mozart effect and reported the results in *Neuroscience Letters*. In the most recent study, they used the same task as in their first experiment but extended the types of listening experienced. Seventy-nine college students were divided into three groups: silence, the same Mozart as used in the 1993 study, and a work by Philip Glass. Only the Mozart group showed a significant increase in spatial IQ score.

Rauscher and Shaw developed their research based on a neurobiological model that posits that music will enhance higher brain functions. There are certain synaptic connections

being made through music training that are similar to those required for abstract and spatial reasoning.

What we as musicians knew experientially and intuitively, scientific studies on the brain, intelligence and music are confirming that we hold in our hands as music educators a powerful tool, a key that may unlock the door to developing the great potential residing in the human brain. May this sampler whet your appetite to taste more from this table of knowledge.

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