

From the Trenches

“Thanks, Gordon”

By Bob Morrison

On Tuesday Morning April 28, 2005 the music education community lost one of our greatest, influential, and most unsung of heroes – Dr. Gordon Shaw. He was not a musician; his art form was his science.

You may not know him by his name, but you, and nearly every other person in the developed world, know of his work. Gordon was Professor Emeritus at the University of California at Irvine (UCI). Dr. Shaw’s pioneering scientific work on “music as a window into higher brain function” helped launch an entire field of research, and an unending debate, about the impact of music on the development of the brain and music’s role in education.

The Missing Link

Gordon’s work uncovered a “holy grail” in research: the elusive “causal link” between music and higher order thinking skills, specifically spatial-temporal reasoning. The reverberations of this major scientific breakthrough continue to be felt today. What Plato, Socrates, and Einstein knew intuitively, but could never prove about the importance of music, Dr. Shaw demonstrated through his science.

This connection between music and the brain, and the plethora of studies it has spawned, has helped the music community make the case for the role of music in the education of our children. It has helped to convince many of those policy makers for whom no impassioned plea about the intrinsic value of music education would work. Gordon’s science has been directly responsible for the saving of music education programs for thousands and thousands of children, while forcing educational policy makers to re-evaluate the educational impact of music in our schools.

In addition, many efforts either cite or have been inspired by Gordon’s work: Music Makes You Smarter, *The Mozart Effect*, Baby Mozart products, Governor Zell Miller’s *CDs for Newborns* in Georgia, Johnson and Johnson’s CD for young children, a state law in Florida, VH1’s Save The Music campaign and theme “*Music Education Equals Brain Power*,” the marketing effort behind the films *Mr. Holland’s Opus* and *Music of the Heart*, *Newsweek* cover stories, *Dateline NBC*, the *Today Show* national radio, television and newspaper stories, cultural references, a *Simpsons* episode, and the various advocacy efforts claiming connections between music and improved learning, oftentimes for better (though sometimes for worse...) – All of these efforts, and many more, track their beginnings to the “Brain Power” of Dr. Gordon Shaw.

The Mozart Effect

Unfortunately, the heart of Gordon’s work has been largely overshadowed by the manufactured controversy—and marketing hype— regarding one study he conducted that was misunderstood and misinterpreted. The findings of this study became popularly known as “The Mozart Effect.”

This study noted how, after listening to the Mozart Sonata for Two Pianos k.448, college students showed a temporary, less than 15 minute, increase in their spatial reasoning IQ. When this study was published in the research journal *Nature*, the media had a feeding frenzy about all things Mozart—and extended the implications of Gordon’s scientific paper far, far beyond its actual findings. Almost instantly record stores (remember records?) ran out of Mozart albums and new companies, books, tapes and children’s products popped up to exploit the media and public fascination. Other scientists took it upon themselves to debunk the Mozart hysteria.

The misrepresentation of this research is a disservice to a man and his colleagues who, in my opinion, have contributed more to the body of knowledge about music, brain function and educational practice than any others in the last century.

Synopsis

For your consideration, and as a tribute to Dr. Shaw, here are some of the highlights of his work:

In **1985**, Gordon Shaw, Dennis Silverman and John Pearson presented the trion model of the brain's neuronal structure (*Proceedings of the National Academy of Sciences*, USA 82 [1985]: 2364-2368). In the late 1980's Gordon Shaw met with Karl Bruhn who at the time was the senior vice president at Yamaha for funding of his research. It was this meeting with Karl that created an important partnership that would lead to the significant music products industry funding of Shaw's work.

In **1989**, experiments in which musicians performed mental rehearsals of music indicated that music and other creative skills, such as mathematics and chess, may involve extremely precise firing patterns by billions of brain neurons (Leslie Brothers and Gordon Shaw, *Models of Brain Function*, edited by R. Cotterill. Cambridge: Cambridge University Press, 1989).

In **1990**, computer experiments revealed that trion firing patterns could be mapped onto pitches and instrument timbres to produce music. This suggested that the trion model is a viable model for the coding of certain aspects of musical structure in human composition and perception, and that the trion model is relevant for examining creativity in higher cognitive functions, such as mathematics and chess, that are similar to music (Xiaodan Leng, Gordon Shaw and Eric Wright, *Music Perception*, Vol. 8, No.1 [Fall 1990]: 49-62).

In **1991**, Xiaodan Leng and Gordon Shaw proposed that music may be considered a "pre- language," and that early music training may be useful in "exercising" the brain for certain higher cognitive functions (*Concepts in Neuroscience*, Vol. 2, No. 2 [1991]: 229-258). A presentation of this concept to senior music industry leaders at the 1991 winter NAMM Convention led to NAMM significantly funding Gordon's work for the remainder of the decade.

In **1993**, a pilot study found that preschool children given music training displayed significant improvement in spatial reasoning ability. (Frances Rauscher, Gordon Shaw).

A different experiment with college students found that, after listening to a Mozart sonata, they experienced a significant although temporary gain in spatial reasoning skills (Frances Rauscher, Gordon Shaw and Katherine Ky, *Nature*, Vol. 365 [1993]: 611). This is the "Mozart Effect" study.

In **1994**, a Stage II follow-up to the pilot study again found that music training improved spatial reasoning in preschool children. This gain did not occur in those without music training (Frances Rauscher, Gordon Shaw, Linda Levine and Katherine Ky, Paper presented at the American Psychological Association, Los Angeles [August 1994]). This is the study that identified the first "causal link" between music and spatial reasoning.

Confusion in the media between the Mozart listening study and the preschool music making study created the myth of "Listening to Mozart improves the spatial skills of young children." There was no such research... but this did not stop the media or others (never let the facts get in the way of a good story!)

In **1995**, a follow up to the first Mozart study confirmed that listening to Mozart improved spatial reasoning, and that this effect can increase with repeated testing over days. However, the effect may not occur when music lacks sufficient complexity. (Frances Rauscher, Gordon Shaw and Katherine Ky, *Neuroscience Letters*, Vol. 185 [1995]: 44-47.)

In **1997**, a study found that keyboard training caused long-term enhancement of preschool children's spatial-temporal reasoning (Frances Rauscher, Gordon Shaw, Linda Levine et al, *Neurological Research*, Volume 19 [1997], 2-8).

In 1998, Gordon co-founded the non-profit MIND Institute in 1998 after 30 years of scientific research at the University of California, Irvine. His vision of teaching all kids, regardless of cultural and socio-economic background, how to think, reason and create mathematically - is the foundation for the Institute's revolutionary Math+Music curricula.

In 1999, a study examined enhanced learning of proportional math through music training combined with a spatial approach to learning math concepts. Children given piano keyboard training along with a specially designed Math Video Game training scored significantly higher on proportional math and fractions than children given a control training along with the same video game (Amy Graziano, Matthew Peterson and Gordon Shaw, *Neurological Research*, Volume 21 [1999], pp. 139-152).

Ongoing Impact

Gordon's MIND Institute (www.mindinstitute.net) continues his research work, with 61 schools using his Math+Music curricula.

Beyond the research, the work of Gordon and his colleagues has had a tremendous impact on policy. President Clinton and then First Lady Hillary Rodham Clinton cited his work in forums and policy speeches. His work was referenced in Congressional testimony, resolutions, and in remarks made by both senators and congressmen in the hall of our nation's capitol. Secretaries of Education Richard Riley and Rod Paige acknowledged this work in making the case for moving music and arts education to the center of education reform. Awareness of his research made the passage of music friendly educational policies across the country easier.

From the hallowed halls of the White House and the Capital to local school board meetings across the country and around kitchen tables where parents groups meet, Gordon's efforts have made a difference.

Gordon believed that, *"Music will not only help us understand how we think, reason, and create, but will enable us to learn how to bring each child's potential to its highest level."*

All of us in the music community owe Gordon our gratitude for a life well lived and a dedication to his art form – science – that has changed our art form and our world.

May he long be remembered for his incredible contributions to our field.

Thanks, Gordon.