

## **Debating The Mozart Theory**

By Roberta Hershenson

Never mind that Mozart's concertos strike peaceful chords in music lovers. In academia, the battle lines are drawn, and the next salvo in the Mozart wars is about to be fired. Researchers are mustering data to counter debunkers of the "Mozart effect" -- the theory that classical music makes the brain work better -- and they have some high-profile allies. President Clinton and the musician Billy Joel, for example, spoke in June at an East Harlem school that received a donation of \$5 million in musical instruments from VH1 Save the Music Foundation, in support of the notion that musical education can provide a powerful intellectual stimulus.

In May, Harold O. Levy, the chancellor of New York City's public schools, surprised 43 school superintendents by arranging for them to take a group violin lesson from Isaac Stern. Music educators have long claimed that music, one of civilization's great gifts, sharpens children's concentration and makes them brighter and livelier. If music's beauty and mystery fail to impress cost-conscious school boards, the thinking goes, then proving its ancillary benefits might save music programs from the budgetary ax.

To help determine who is right, an array of scientists is studying how music works in the brain. The researchers have analyzed babies' responses to lullabies, as well as their awareness of pitch and rhythm, showing, in some studies, that infants experience music much as adults do. We arrive ready to make music, the scientists say, but too often the schools have packed the instruments away.

A report that will appear in the fall issue of the Journal of Aesthetic Education, published by the University of Illinois Press, suggests that those instruments should be hauled out and tuned up. According to the report, written by Lois Hetland, a cognitive psychologist at Project Zero--a research organization co-directed by Howard Gardner at the Harvard Graduate School of Education--when young children are given keyboard lessons for several months or years, their performance on spatial reasoning tests improves while the instruction lasts and for up to two years afterward.

That observation was the genesis of the term "Mozart effect," which has been trademarked by the musician and author Don Campbell, although his new book, "The Mozart Effect For Children," to be published next month by William Morrow, is unrelated to the study that started the debate.

In the original 1993 study, Gordon L. Shaw and Frances H. Rauscher showed that a small group of college students performed better on certain spatial-reasoning tests after listening to a Mozart sonata--"seeing" the design of a snowflake, for example, after mentally cutting and folding a piece of paper, or rotating and comparing objects conceptually in space.

The effect lasted only 10 to 15 minutes, but the news was treated like a formula to get smart quick.

Classical music seemed like the latest mega-vitamin: a little hard to swallow, but so good for you. The theory, which made the rounds of magazine cover stories, quickly found its biggest audience in the conscientious parents of young children. Even parents-to-be hurried to buy specially packaged renditions of Pachelbel's Canon for their babies in utero.

In Georgia, Governor Zell Miller, citing the Mozart effect, proposed in 1998 giving the parents of every newborn in the state a classical music cassette or compact disc. Sony produced the albums free, and they were included in gift packets at hospitals.

Some neuroscientists, however, cringed at the simplistic scenario. So did Dr. Rauscher, who cautioned against distorting her team's modest findings. The Mozart hype, especially in relation to infants, was ripe for puncturing, and Dr. John Bruer obliged in his book, "The Myth of the First Three Years," published last fall by Free Press. Dr. Bruer, president of the McDonnell Foundation in St. Louis, which finances research in neuroscience and cognition, argued that no one need rush to program music or anything else into babies' brains. The brain, he reassured parents, was most likely malleable for life.

Dr. Hetland, whose work addresses college students as well as preschool and elementary-school children, conducted two comprehensive analyses of all the known studies of the subject as part of Project Zero's Reviewing Education in the Arts Project, which she served as manager.

In the first analysis, more than 2,000 college students participating in 31 studies listened to several different kinds of music, as well as to silence and to a vocal-relaxation tape. They scored higher on spatial-reasoning tests after hearing Mozart, Schubert and Mendelssohn than under any other conditions, including listening to music by Philip Glass, Pearl Jam and other rock groups. Music with a complex structure and rhythm won out over repetitious, more predictable music, Dr. Hetland said.

However, school music advocates say that it is good, but not enough, to expose children to well-played live concerts of "Peter and the Wolf," for example. For children to benefit most, the advocates say, they need to get up and join the band. Indeed, Dr. Hetland's second analysis showed that. It involved 700 preschool and elementary school children who participated in 15 different studies. Some children received weekly 15-minute periods of active music instruction, both individually and in groups. They listened to music and moved to its rhythms, played percussion instruments, sang and took piano lessons. The control groups received either passive music instruction, computerized reading and arithmetic instruction or no special instruction.

The gap between the before-and-after scores on spatial-reasoning tests of the children who received active music instruction was much greater than the gaps in the scores of the children in the control groups, Dr. Hetland said. She defined spatial skill as the ability to conceive of and

understand the placement of objects and images in two-or three-dimensional space. The test scores of children who learned to read notes on a musical staff jumped the most. "This does give music education advocates a lobbying tool, if they want to justify a music program," Dr. Hetland said. Surgeons, engineers and archaeologists need spatial skills. So do artists and chess players.

"Spatial instruction is a great way to teach math," she said. "If you can enhance people's spatial ability through a program of music instruction, we're not sure why, but most kids would benefit." Without an explanation for music's demonstrated benefit, controversy keeps bubbling in the overlapping fields of cognitive science and early-childhood education. Does music per se improve mental gymnastics? Or does the spatial-reasoning effect result from something else -- the spatial patterns made by the black and white keys, perhaps, or a factor like change of mood after participating in music?

E. Glenn Schellenberg, an associate professor of psychology at the University of Toronto, is skeptical about the Project Zero report. "Just because there's an association doesn't mean it's causal," he said. "They've got to show that the effect is specific to music. The right experiment has not been done."

Dr. Schellenberg has a \$150,000 grant from the International Foundation for Music Research in San Diego to give 36 weeks of free arts lessons to 6-year-olds, beginning next month. He will randomly assign groups of children to keyboard, voice or drama classes. "We'll be looking to see whether the two music groups show greater levels of improvement on before-and-after-tests than the drama groups," he said, "and whether the two music groups differ." "Who knows," he added, "music could be special."

But some music teachers are impatient with the plodding scientific approach. "I don't need proof," said Lisha Papert Lercari, director of the Music and the Brain Project of the 42nd Street Development Fund in Manhattan, which has developed a keyboard program that is now being taught in 23 schools "The kids are discovering form and patterns, and noticing things we never saw." She said the keyboard training, which involves reading music, also helped Hispanic children in Queens pick up English unusually fast. She has nearly completed a study documenting the language effect.

Educators like Ms. Lercari regard Dr. Rauscher, one of the original Mozart-effect researchers, as their spokeswoman. Not surprisingly, Dr. Rauscher was elated by the advance news of Dr. Hetland's report. "I think that to ignore these findings is really to do a disservice to the children who can benefit most from them, especially disadvantaged children," Dr. Rauscher said. "These are kids whose parents can't afford the time or the money to take them to piano lessons. They really rely on the public schools for this, and a prekindergarten program would be the ideal place to start."

Dr. Rauscher, a former concert cellist who is now an assistant professor of cognitive development at the University of Wisconsin at Oshkosh, in her own research since 1993, has consistently found that higher spatial-

reasoning scores correlate with keyboard and xylophone instruction for elementary school children. Singing also plays a role. In White Plains, which was recently named one of the top 10 communities in the country for music education in a survey conducted by the American Music Conference, the National Association for Music Education, the Music Teachers National Association and the National School Boards Association, singing is being integrated into prekindergarten and kindergarten classrooms.

Teresa Niss, coordinator of fine arts programs in the White Plains schools, said that if kindergarten children are learning about the letter "S," for example, they may sing songs about snakes and starfish. Musical counts help illustrate groups of numbers, while songs sung in connection with pictures facilitate reading. "We have seen changes in children's language development faster than we normally would," she said. The district is 35 percent Hispanic, and like Ms. Lercari, Ms. Niss said that Hispanic children arriving in school without knowledge of English "are acquiring the language more quickly" after taking part in music.

With a \$100,000, three-year grant, provided by Texaco and the Eastman School of Music through their Partnership Opportunities program, the district recently extended its program to prekindergarten students and brought Linda P. Neelly, an early-childhood music consultant in Rochester, into the lower grades to work with music teachers and classroom teachers.

One recent morning, Dr. Neelly gathered kindergarten students in a circle and asked them to take turns singing their names as she beat the rhythm on a tambourine. Then, in a clear and melodious voice, she repeated what each child had sung, enticing the children into a musical conversation as they drew or participated in group activities. In Dr. Neelly's view music should flow naturally through the school day.

For this to happen, classroom teachers must also become musicmakers, and part of Dr. Neelly's job was to show them how. One technique was to ask the teachers to sing in a higher key than normal so that children could replicate the sound. "Children will sing in tune if they sing higher," Ms. Niss said.

All the musical failures that critics portray seemed to fall on the small shoulders of Aifa, who was silent when it was her turn to sing her name. "I don't know how to sing," she said, crestfallen. Dr. Neelly moved on to the next child, but when the group sang together later, Aifa, no longer in the spotlight, joined in.

"Every child has innate musical capacity," Dr. Neelly said. "If we're not tapping in and finding ways to develop that ability, we're not doing our job."