Will Piano Lessons Make My Child Smarter? by Vadim Prokhorov

Governor Zell Miller of Georgia came up with a novel proposal as part of his state budget: to make $105,000 available so that each newborn child in the state - approximately 100,000 children a year - would be sent home from the hospital with a CD or tape of classical music.

"No one doubts that listening to music, especially at an early age, affects the reasoning that underlies math and engineering and chess," the governor told lawmakers. "I believe it can help Georgia children to excel."

Governor Miller may be on to something. new scientific studies have shown that early musical training shapes children's growing brains and boosts their learning power, aiding in the development of logic, abstract thinking, memory and creativity.

The Mozart Effect. In 1993, two researchers reported that college students who listened to 10 minutes of Mozart's Sonata in D Major for Two Pianos scored 8 or 9 points higher on a spatial-temporal test than when they had 10 minutes of silence or relaxation tapes. (Spatial-temporal reasoning is the ability not only to recognize objects as the same or different but also to be able to form the mental images of physical objects. it is key to the higher brain function required in mathematics, physics and engineering.)

The researchers - Dr. Gordon Shaw, a physicist at the University of California at Irvine, and Dr. Frances Rauscher, a psychologist now at the University of Wisconsin at Oshkosh - called their findings the "Mozart Effect." Actually, the Mozart experiment began in 1990, when researchers discovered that the brain in a sense made its own music. Using a computer-generated model of neural firing patterns (electrical brain activity), Dr. Shaw's research team fed various brain patterns through a synthesizer. What they heard were recognizable but different styles of music. Some sounded like Baroque music, some like Eastern music, others like folk music. In other words, the communicating neurons (nerve cells) "play" music.

That gave the researchers an idea: Perhaps music itself might also make those neurons communicate.

Drs. Rauscher and Shaw began working with inner-city preschoolers to see how musical training might affect their brain development. They had four groups: One was given keyboard lessons; the second, computer lessons; the third, singing sessions; and the fourth, no lessons, only the standard curriculum. Six months later, the keyboard students performed 34 percent better on spatial-temporal ability test than any other group, including the computer students.

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How does music affect the brain? After birth, a child's brain keeps developing. Both environment and experience continue to create mental circuits and patterns between neurons - the tiny, electrically charged nerve cells that transfer information through the brain. The brain has trillions of such neurons, but scientists have found that if it does not use some of them and does not form pathways between the neurons, it starts to trim them. It prunes itself. In other words, either you use it or you lose it. The richer the environment the child inhabits, the richer the brain network.

The most powerful period of brain development - a critical window of opportunity - starts at birth and ends around the age of 10. This is true for both verbal and musical abilities. Recent studies have shown that the neurological foundations for problem-solving and

general reasoning are largely established by age one. The spoken language an infant hears creates a complex set of interconnections, which has an important impact on overall brain development. Similarly, studies suggest that the more parents sing or play melodious and structured music to their baby, the more the baby's brain generates neural circuits and patterns.

"There's an overlap in the brain mechanism - in the neurons used to process music, language, mathematics and abstract reasoning." says Dr. Mark Tramo, a neuroscientist at Harvard Medical School. "We believe a handful of neural codes is used by the brain, so exercising the brain through music strengthens other cognitive skills."

Teach music first? More than 2300 years ago, Plato said: "Music is a more potent instrument than any other for education, and children should be taught music before anything else."

The academic achievements resulting from this approach can be impressive. For years the students at John Eliot - one of the least affluent schools in Needham - have scored among the highest in Massachusetts on the basic skills test. When the school's fourth graders recently were tested by the state, they got 1600 out of 1600 in math (the state average is 1330), 1580 in reading, 1570 in science and 1560 in social studies.

"My children do their homework the same way they practice music," reports Thomas Healy, who has had two daughters at John Eliot. "They aren't afraid of repetition and do not give up easily."

What kind of music? One enterprising student - David Merrell, a senior at Nansemond River High School in Suffolk, Va. - sought to find out which kind of music by experimenting with lab mice and different kinds of music for his science fair project.

At the start of his project, Merrell ran 72 mice through a maze. On average, they needed 10 minutes to find their way. Then he divided them into three groups, exposing one to the heavy-metal band Anthrax and the second to classical music by Mozart. A control group heard no music.

At the end of four weeks, he timed the mice as they maneuvered through the maze. **The control group averaged 5 minutes; the Mozart mice, just 1.5 minutes; and the hard-rock mice stumbled through the maze in an average of 30 minutes.**

Most scientist believe there is something special about the structure of classical music that makes the brain respond positively. Dr. Rauscher, however, thinks that any complex music is effective: Complexity is the keyword.

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And, not surprisingly, all of those who have studied the issue agree that **learning music and understanding its dynamics make a much greater impression on the brain than simply listening to it.**

Beyond brain power. There are many reasons to teach music to children, and enhancing their brain power is only one of them. Even the scientists who conducted the neurological studies believe it would be regrettable if that became the main focus of music education. **"It is ironic and sad," says Dr. Rauscher, "that all this attention is brought to the importance of music because it does something nonmusical."**

"Music can soothe emotions and excite enthusiasm, and it gives us a sense of cultural identity. Music should be taught for these values - and not least for the pleasure it brings the listener.