Selected Recent Research:

1) Mozart Makes You Smarter!
The so-called "Mozart effect" on spatial reasoning and stimulation of the cerebral cortex:

a. A celebrated recent example of the benefits of Mozart’s music is the experiment, conducted in Suffolk, Virginia, on lab mice running a maze. At the start of the experiment, on average, mice needed 10 minutes to find their way through the maze. The experiment, conducted over a 4-week period, exposed groups of lab mice to different kinds of music, and a control group received no musical stimulation. Results after 4 weeks:
   - Mice exposed to Mozart: ran the maze in 1.5 minutes
   - Control group/no music: ran the maze in 5 minutes
   - Mice exposed to heavy-metal band, Anthrax: stumbled through the maze in 30 minutes

b. The U of California at Irvine has been the scene of a great deal of music research. One of the experiments, conducted by psychologist Frances Rauscher, physicists Gordon Shaw, and Katherine Ky, focused on college students. 36 students were given a standard IQ spatial reasoning test, preceded in one trial by 10 minutes of silence, in a second trial by 10 minutes of listening to a relaxation tape, and in a third trial by 10 minutes of listening to the Mozart Sonata in D Major for 2 Pianos. The scores after listening to Mozart averaged at least 8 points higher than those of the other 2 trials.

c. Music researcher Dee Dickinson wrote, “In a study of the ability of fourteen year-old science students in seventeen countries, the top three countries were Hungary, the Netherlands, and Japan. All three include music throughout the curriculum from kindergarten through high school. In the 1960's, the Kodály system of music education was instituted in the schools of Hungary as a result of the outstanding academic achievement of children in its “singing schools.” Today, there are no third graders who cannot sing on pitch and sing beautifully. In addition, the academic achievement of Hungarian students, especially in math and science, continues to be outstanding. The Netherlands began their music program in 1968, and Japan followed suit by learning from the experience of the other countries.

A third report reveals that the schools who produced the highest academic achievement in the United States today are spending 20 to 30% of the day on the arts, with special emphasis on music. Included are St. Augustine Bronx elementary school, which, as it was about to fail in 1984, implemented an intensive music program. Today 90% of the students are reading at or above grade level.”  http://www.menc.org/publication/articles/academic/dickins.htm

2) The Development of Neuron Pathways in Children

a. Pediatric neurobiologist Dr. Harry Chugani, at Wayne State University. Neuroscientist Mark Tramo at Harvard Medical School. Neurobiologist Gottfried Schlaug of the Heinrich Heine University in Düsseldorf, Germany. Dr. Patricia Kuhl at the University of Washington. Dr. Robert Zatorre, neuropsychologist at Montreal Neurological Institute at McGill University. These scientists have all studied children’s brains with positron-emission tomography (PET). This technology has revealed not only that music stimulates different portions of the brain, but also that this stimulation builds neurological circuitry in the brain. In other words, certain kinds of musical experiences in children stimulate measurable brain development.

b. Studies with victims of brain trauma (stroke or aneurysm patients) have revealed that speech and music do not use exactly the same areas of the brain. There are examples of stroke victims who suffered damage to the left hemisphere of the brain, losing the ability to speak, but retained the ability to sing. And vice-versa, where the ability to recognize music is altered, but the ability to speak is retained.

c. Drs. Rauscher and Shaw conducted a study with inner-city preschoolers to see how musical training might affect their brain development. 4 groups: Group one received received weekly piano lessons. Group Two received weekly singing lessons. Group Three received weekly computer lessons. Group Four received no supplemental lessons, only the standard preschool curriculum. After 6 months, the piano students performed 34% better on spatial-temporal ability tests than any other group. Dr. Shaw theorized that piano study teaches students to see how patterns work in space and time. Learning sequential finger and key patterns to play music, the neural circuits are strengthened. “Music training provides long-term modifications in neural circuitry.”

d. Studies have shown that the optimum window of opportunity for beginning study on a musical instrument is ages 3-10 years. Few concert-level performers begin playing later than the age of 10. Studies revealed that the brains of children during this age range are more active than an adult’s, which enhances the learning process. The more glucose the brain uses,
the more active the brain. Children’s brains between age 4-12 consume glucose at nearly double the rate of adult brains. Younger brains are “primed” to handle new information more readily than adults. The neurological pathways needed for musical performance are more receptive to cultivation at this age. Adult musical beginners progress more slowly, haltingly than children who are musical beginners.

3) Musical Savants: Hikari Oe, Japanese composer
Although he is mildly retarded, with an IQ of 65, which results in a mental age of 10-12 years old and limited language and motor skills, Mr. Oe is a skillful, creative composer. Mr. Oe is very unique, because most musical savants are more imitative, such as Thomas Greene Bethune (blind pianist), Harriet G. (mastered several musical instruments, including violin, trumpet, clarinet, and French horn), and Leslie Lemke (mastered numerous musical instruments, performed concerts).

4) Musical Education Initiatives
Kathy Carroll, Washington D.C. science teacher, has developed a cassette tape called Sing a Song of Science, which was produced by the students at Duke Ellington School of the Arts. That tape is useful in itself, and can also stimulate student s to create songs of their own to learn or review material. Dr. Sarah Jerome, superintendent of the Kettle Moraine School District in Wisconsin instituted a policy of providing every teacher in the district with a copy of Mozart’s Sonata in D Major for 2 Pianos. John Eliot Elementary School in Needham, Massachusetts has changed its curriculum to provide students with daily instruction in music and other art classes. Although this is one of the least affluent schools in Needham, the students are now scoring among the highest in the state on the basic skills test for 4th graders.

Selected Bibliography

Discusses windows of brain development in babies for math and logic, music, and language.
Emphasizes the benefits of music study.

Special issue, entitled “From Birth to Three,” discusses developmental potential in babies.

Discusses the musical savant Hikari Oe, as well as the phenomenon of musical savants in general.

Discusses brain research and the ramifications for curriculum development in schools.

Discusses research on the benefits of piano study, as well as music lessons in general.

Special issue, entitled “The Science of Creativity.” Discusses the role of the left and right hemispheres of the brain for understanding and responding to music. Cites medical research involving such things as stroke victims who retained musical ability but lost speech ability.

Publisher’s Weekly: “Rejecting the Freudian notion that music is a form of infantile escapism, British psychologist Storr ( Solitude ) argues that music originates from the human brain, promotes order within the mind, exalts life and gives it meaning. In an engaging inquiry, Storr speculates on music’s origins in preliterate societies and examines its therapeutic powers.”

Music and the Mind http://www.menc.org/publication/articles/academic/dickins.htm
Readin’, Writin’, and Rhythm
After years of losing out to budget cutters, music and art are making a comeback in public schools
Newsweek, April 14, 1997

Two years ago Charles R. Bugg Elementary in Raleigh, NC was a school in trouble. Test scores were below the county average, and there was little parental involvement. But now the school sings -- literally. In a science class, students grasp the vastness of space by listening to Gustav Holst’s symphonic suite The Planets. Third graders studying language arts create original poems with a writer-in-residence and learn how to choreograph a dance to go with their verses. In music class, pupils learn about fractions as they study whole, half and quarter notes.

Bugg Elementary is one of 27 schools in North Carolina experimenting with ways of using the arts to improve basic skills. It’s too soon to make any definitive judgments about whether one four-year pilot program, begun in the 1995-96 school year, will boost reading and math scores. But school officials say there’s already plenty of evidence that integrating music and poetry into the curriculum stimulates kids’ interest in other subjects. “Attendance is up and behavior problems are down,” says Jim Fatata, principal of the Bugg school.

North Carolina isn’t the only state taking a second look at the arts. Districts around the country are beginning to restore programs once eliminated as “luxuries” by financially strapped educators. According to a survey by the National Art Education Association, 28 states now require some arts study before high-school graduation compared with only two in 1980. Even big urban systems are re-evaluating the arts. In Los Angeles the school board recently approved a motion to provide elementary-school students access to music lessons at least once a week. And New York City Mayor Rudolph Giuliani is pushing to bring art and music classes to all of his city’s public schools.

Some of the renewed interest in these subjects grows out of research that shows kids learn best when they are exposed to a wide range of disciplines; that means art and music as well as reading and science. There’s even some evidence that learning music can stimulate development of critical areas of the brain. One recent study of 78 preschoolers in California, for example, found that individual piano lessons did a better job of improving abstract reasoning skills than computer instruction.

Another inspiration for including the arts is the work of Harvard psychologist Howard Gardner. His 1983 book, Frames of Mind designated musical ability as one of seven distinct forms of intelligence (others include logical-mathematical, linguistic and interpersonal). Educators influenced by Gardner have set up schools around the country that use music and other arts to improve overall learning. “If you look at most conceptions of intelligence, they focus on language or logic,” Gardner says. “How could you explain great dancing or sculpting with that?” While he believes in teaching the arts for their own sake, Gardner also says that there are other benefits. In music classes, for example, kids learn math by studying rhythm and can improve interpersonal skills through participation in a band or orchestra.

Not every district, of course, abandoned the arts. Ashley River Creative Arts Elementary in Charleston, SC, opened its doors in 1986. Just a few years later, it ranked way above the state average in standardized testing; scores have stayed high since then. At PS 314 in Brooklyn, NY, students attend dress rehearsals at the Metropolitan Opera and then use the plots and settings to help learn other subjects, like history (after watching Aida) or literature (after Faust). Students are also creating their own operas -- writing librettos, building sets, composing music. Since the collaboration started, in 1989, test scores have improved enough to remove PS 314 from the state’s list of worst-performing schools.

Even with many more success stories like these, restoring the arts to public schools won’t be easy. A nationwide survey of schools by The Instrumentalist, a music-industry trade journal, found that half of the money for music programs came from outside fund raising, often by parents. That effort is, of course, much more difficult in poorer communities. “The real concern is we’re going to end up with a cultural caste system where only the rich can afford access to music education,” says John Mahlman, executive director of the Music Educators National Conference.

That would be a sad note indeed. Consider the testimony of Aileen Chou, a fifth grader at PS 314. After a recent visit to the Met, she pronounced Charles Gounod’s Faust her favorite opera because it was “cool.” Is there any higher praise?

Barbara Kantrowitz with Connie Leslie in Brooklyn and Andrea Cooper in Raleigh