Insights Gained Into Arts and Smarts
By Debra Viadero

Findings released this week from three years of studies by neuroscientists and psychologists at seven universities help amplify scientists' understanding of how training in the arts might contribute to improving the general thinking skills of children and adults.

"We tend to think of the artist, on the one hand, and scientists and mathematicians, on the other, as fundamentally different people," said Elizabeth S. Spelke, one of the scholars who took part in the research project. "I think the work done here suggests a much closer connection between the cognitive processes that give rise to the arts and the cognitive processes that give rise to the sciences."

The idea that the arts, and music in particular, could make children smarter in other ways gained currency in the 1990s, after a pair of researchers published a study showing that college students performed better on some mathematical tests after listening to a 10-minute Mozart sonata.

The news led to some widely reported, if fleeting, efforts to promote music learning. Georgia legislators, in fact, even voted to provide parents of newborns with tapes of classical music.
But most neuroscientists viewed such policy moves as premature: The studies never definitively determined whether exposure to music, or other arts, causes changes in the brain that sharpen other kinds of thinking skills. Left unsettled, experts say, is whether the arts make people smarter or whether smart people simply gravitate to the arts.

Burying Myths

In an effort to get at that question in a more comprehensive, systematic way, the Dana Foundation of New York City in 2004 brought together neuroscientists and cognitive psychologists from seven universities to launch a broad program of studies looking at how experience in dance, music, theater, and visual arts might spill over into other areas of learning, and to explore possible mechanisms for those links in the anatomy of the brain— even at the genetic level.

The final report from that $2.1 million effort was unveiled at a March 3 conference at the center's Washington headquarters.
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While the report still doesn't provide any definitive answers to the arts-makes-you-smarter question, it sounds a final death knell to the myth that students are either right- or left-brained learners, say the scientists involved in the study. It also offers hints on how arts learning might conceivably spill over into other academic domains.

The research team at Stanford University, for instance, studied the development of reading fluency in 49 children between ages 7 and 12. They found that the

students who came to the study with more musical training tended to make faster gains in reading fluency than did students with no musical backgrounds.

The researchers also used brain scans and newly developed software technology to study the corpus callosum, the part of the brain linking the left and right hemispheres, as the children grew. They found that the "white matter" pathways responsible for phonological awareness—the ability to pull apart and manipulate the sounds in speech—grew to be more highly developed in the children who were stronger readers than in those with weaker reading skills.

"We think these things all go together," said Brian Wandell, who led the Stanford study. "Listening carefully to other sounds has long been thought to be important to the development of phonological awareness and reading fluency."

But until now, few or no longitudinal studies backed up that connection, Mr.Wandell added.
In a finding that surprised them, the Stanford researchers also found preliminary evidence suggesting a link between visual-arts lessons outside of school and children's skill at math calculations, possibly because both activities involve recognizing patterns.

Paying Attention

In her study, Ms. Spelke, a psychology professor at Harvard University who usually studies the basic understandings that babies bring into the world, attempts to peel back the layers on the "Mozart effect" with three experiments involving children and adults.

She found that middle and high school students who studied music intensively, typically because they were enrolled in special schools for the arts, were better than students with little or no musical training at tasks involving basic geometric skills, but not at tasks involving other kinds of fundamental mathematical systems, such as basic number representation.
Other studies in the mix also suggest a link between music training and skill at manipulating information in both longterm and working memory; between music learning and speaking fluency in second-language learning; and dance and the ability to learn by observing movement.

Training in acting, the study also found, also appears to lead to memory improvement.
One way that arts learning might lead to improved thinking skills, hypothesized Michael Posner, a professor emeritus at the University of Oregon in Eugene and an adjunct psychology professor at Cornell University in Ithaca, N.Y., might be in motivating students to pay attention.

"We know that if you train attention, then you'll be more successful at various cognitive tasks," he added.

Some of the researchers also identified genes that might play a role in predisposing children toward an interest in the arts.

“It’s an important first step, but what we really need are experimental studies with large samples,” said Ellen Winner, a psychology professor at Boston College who studies arts learning but was not part of the Dana Consortium. “We can’t conclude anything about causality from correlational studies,” she added.

Interrelationships

Only one of the studies, in fact, involved a randomized study directly related to arts learning. Researchers at the University of Oregon, led by Helen Neville, a professor of psychology and neuroscience, randomly assigned 88 children taking part in the federal Head Start program for disadvantaged preschoolers to a variety of different learning groups.

One group of 26 children met in small groups with teachers for music-related activities. Another group of 19 children received classwide Head Start instruction, while another, similar-sized group got the same instruction in smaller teacher-pupil groups. A fourth group of 23 children received small-group instruction in focusing attention and becoming aware of details.
All the special classes were 40 minutes long and took place four days a week.

Spatial skills and other nonverbal IQ skills did improve in the music students over the course of the eight-week study, but that was also true for the children who got attention training and the Head Start children who worked in small groups. Only the children in the large Head Start class failed to make any progress in those areas.

Those results, the researchers conclude, “may derive from the fact that music training typically involves time being individually tutored, or being in a small group, which may itself increase opportunities for training attention.”

Nonetheless, arts advocates and many of the researchers taking part in the project see the report’s overall findings as important fodder for ongoing efforts to dissuade schools from dropping arts instruction in the face of pressure under the federal No Child Left Behind law to raise students’ test scores in mathematics, reading, and science.

“What we are seeing here is that we have quantitative data that confirm our assumptions about the interrelationships in the way children learn,” said poet Dana Gioia, the chairman of the National Endowment for the Arts, at the Dana conference. “And the purpose of education is to realize the full human potential of every child.”