

# Why the Arts Matter

## **Six Good Reasons for Advocating the Importance of Arts in School, part of Neuroeducation: Learning, Arts, and the Brain**



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It is a rare roll of the dice that places me as luncheon speaker at a conference on arts education. You have to know that for four long years, from the first to the fourth grade, I lived with the dread of the hour after lunch when every day, Monday to Friday, our had art and I sat with two or three children, often girls, who were far more talented than me. I concealed my imperfect drawings while waiting desperately for the painful hour to end. Here I am 70 years later advocating the importance of the arts in the elementary school years. However, the intervening years have taught me at least six good reasons for advocating art in the schools that are easy to articulate. But, as with most other interventions, the power of some of the reasons depends on the social of the child's family.

The first advantage is that the arts boost the self confidence of children who are behind in mastery of reading and arithmetic. Today's children live in an economy where a high school diploma is absolutely necessary and a college degree advantageous for success. This was not the case a century or two earlier. Neither Benjamin Franklin nor Abraham Lincoln had more than two years of formal schooling. If we eliminate the estimated five to eight percent of American children who have a serious compromise in their cognitive abilities, due to genes, damage to their brain before or during the birth process, a postnatal infection, or a pregnant mother who abused alcohol or drugs, the remaining 92 to 95 percent are psychologically able to obtain both degrees. Therefore, we have to ask why the high school dropout rate is excessively high among youth from poor and working-class families, and why the average scores of all American youth on tests of academic skills are below those of many other developed nations.

An important reason for this sad state of affairs is that children, like adults, are vulnerable to becoming discouraged when they sense that a goal they desire is probably unattainable. Each year, a large number of juniors at my university majoring in mathematics or physics because of a profound attraction to these domains change their concentration because they realize that they do not have the talent needed to be creative in these difficult fields. I gave up playing the trumpet at age 17, after a decade of lessons, when I realized I could never play as well as Harry James.

The main source of evidence that elementary school children rely on to decide if they are able to master reading and arithmetic is the performance of the other children in the classroom. This

brute fact means that, in most American classrooms led by teachers of average skill, many children who score in the bottom third of the distribution on these skills decide by the third or fourth grade that this assignment is too difficult. There are about 20 million children in grades one through five and, therefore, about seven million are vulnerable to arriving at this faulty inference.

Teachers in many Asian countries care more than American teachers about reducing the gap between the top and bottom quartiles. They appreciate that an excellent predictor of juvenile crime in a town or city is the magnitude of the difference in reading and arithmetic achievement between the top and bottom quartiles. Moreover, the size of this difference is also an excellent predictor of the incidence of adult criminality, depression, and addiction to alcohol or drugs. America has one of the largest gaps between the top and bottom quartiles, as well as the largest percent of incarcerated juveniles and adults of any developed society. Japan has low values on both variables.

One strategy to mute a child's discouraging evaluation of self competence is to provide the child with opportunities to be successful at some classroom task. Art, dance, film, and music are perfect candidates. An eight-year-old having difficulty learning to read at grade level whose artwork or musical instrument performance is far better than many of the children in the top 30 percent on reading or arithmetic will experience a sudden boost of confidence that, in some cases, is generalized to the formal academic domains. Simply telling college-aged women that there is no sound scientific basis for the stereotyped belief that women are inferior to men in mathematics boosts their scores on tests of this talent. This is the theme in the *Wizard of Oz* when the Wizard tells the Scarecrow that all he needs is a diploma in order to feel more intellectually competent. A recent report in *Science* magazine revealed that having seventh and eighth graders write brief essays on the importance of a personal value raised grade point averages, especially among the economically disadvantaged students.

However, it is important that these artistic products not be graded or ranked, as we do for the academic subjects, or we may not reap the benefits of the program. The idea to be communicated is that each child's drawing or musical performance is acceptable because it reflects their attempt to create something of beauty. The first president of Stanford University, Leland Stanford, understood the downside of ranking intellectual efforts. This practice often crimps the desire to be original and different by forcing individuals to copy the style of those who receive the top ranks from authority figures. This practice is having unfortunate consequence in contemporary science.

Ten years ago one of my graduate students, who came from an immigrant background, knew nothing about the brain and had shown no interest in brain processes, but decided to do research for his Ph.D. thesis that required measuring in the brain. When I asked why, he said he had to "transcend his family background." This is not a good reason for the selection of a thesis topic.

A second reason for an arts/music curriculum, which has a more recent history, may help middle-class children who have been infantilized by overprotective parents excessively concerned with their grades and talent profile. When I was ten years old, as World War II began, my parents and those of my friends did not worry about their children being kidnapped or going

to the home of a friend whose parents were away in order to raid their liquor cabinet or have sex in a bedroom.

Equally important, there was no television, cell phones, or Internet. Each of us was free to choose how to spend the afternoon; the games we played, as a group or alone, helped us acquire a sense of agency. I remember getting on my bicycle and exploring the areas of my town of 20,000. When a friend was not available, I often played a game with dice and a cardboard football field for which I made the decisions for both teams. If I had been born in the year 2000, I probably would have spent some of that time watching television or text messaging my friends.

Today's middle-class parents worry too much about their child's accomplishments in many domains. Some children interpret this intrusive concern as indicating that their achievements are necessary for the parents' happiness. The combination of excessive parental worry over a child's safety and achievements and the restriction of a child's free time together with television and the Internet, which promote conformity to peer values, have impaired, to some degree, the integrity of the sense of agency that all children must develop. The opportunity to invest effort in the service of completing a drawing or musical performance that pleases the child might help the child develop the personal agency that seems to me to be eroding.

A third advantage to an arts/music program, which might help all children, is based on the fact that the mind uses three distinct forms, or tools, to acquire, store, and communicate knowledge. The balance among the three has changed over time. For most of the first 100,000 years of human presence, the most important knowledge was contained in motor skills, such as planting, harvesting, molding, building, cooking, and hunting. The artisans of earlier societies were a critical component of the burgeoning middle-class, especially after the European Renaissance. The Industrial Revolution changed much of this by moving the role of builder from artisan to machine. You and I can order a prefabricated house and purchase most of the artifacts we need for living by shopping at Walmart. The knowledge that psychologists call procedural has become less important for successful adaptation than it was two centuries ago. Art and music require procedural knowledge.

A second tool consists of perceptual representations, which psychologists call schemata, which are called up at will when the mind creates an image of a scene, object, face, or melody. Schemata are critical tools for the artist and musician, and all of us rely on this form of representation to some degree. The 19<sup>th</sup>-century German chemist Friedrich Kekulé determined the molecular structure of benzene through a dream in which he imagined the six carbon atoms connected in a ring. One of Einstein's great insights, which was the basis of relativity, occurred when he imagined he was riding a light wave.

James Watson and Francis Crick beat Rosalind Franklin in detecting the correct structure of DNA because the two men built a mechanical model of the molecule and could see the spatial relations among the four nucleotides of DNA. The physicist George Gamow anticipated Crick's and Watson's insight that DNA was a helical structure of four bases. But because Gamow thought in terms of the mathematical concept of symmetry rather than with schemata, he assumed that mRNA transcribed DNA equally well from left to right or from right to left.

Because mRNA only reads the DNA molecule in one direction, Gamow missed being the first discoverer of this life molecule.

A Radcliffe student who had been raped in a poor neighborhood in New York City decided for her senior thesis to return to the area to photograph the callous faces of 24 men who inhabited the space. She submitted the photos, without any words, as her thesis and won a prize.

The third tool, language, has come to dominate life in developed societies and their schools. Most contemporary science is conceptual, resting on complex semantic networks, often penetrated with mathematics for ideas like black holes, molecules, genes, mutation, and diseases. However, biologists now define a gene not as a string of nucleotides one can draw, but by what the gene does; these functions are described in semantic networks. Economists, businessmen, and social scientists deal primarily with knowledge described with words, not with actions or schemata. Adolescents who consult Google or Wikipedia typically obtain semantic knowledge, not procedural or schematic understandings. The films made by Italian, Swedish, Japanese, Chinese, and Iranian directors enrich our comprehension of these cultures in ways that are distinctive from the effects of books. Rent and view De Sica's *The Bicycle Thief*, Bergman's *The Seventh Seal*, the Japanese film, *The Suicide Club*, the Chinese film, *To Live*, and the Iranian film, *Leila*, and you will appreciate this claim.

The heavy reliance on semantic networks is unfortunate because words, especially English words, do not specify phenomena with the detail that permits differentiation among distinct members of a concept. The problem is that very diverse events are given the same name. The word "bird" is an example. Robins, ducks, hawks, and penguins are very different members of the same semantic concept. An epidemiologist who conducted telephone interviews with 5,000 adults in order to learn about depression has a far leaner understanding of this syndrome than a clinician who, for the past 30 years, has seen and heard depressed patients describe their symptoms in a whisper as they slumped listlessly in a chair with pale cheeks, uncombed hair, and a stained blouse. Our respect for schematic and procedural knowledge is revealed by the fact that we are willing to pay extra money to see a specialist when we are ill because we know that the specialist has schematic and procedural knowledge that the novice does not.

Art and music require the use of both schematic and procedural knowledge and, therefore, amplify a child's understanding of self and the world. I had read a great deal about Venice over the years, but only after visiting and seeing the relation between the canals and the land did I fully comprehend this city. I borrow William Jennings Bryan's phrase "Do not crucify America on a cross of gold" to suggest that we should not crucify America's children on a cross of words. The combined use of hands and imagination makes an important contribution to what it means "to know" something. You cannot learn to play tennis by reading a book.

The Japanese distinguish between two modes of interacting with another. When one is in the mode called *tatema*, politeness and suppression of any comment that might anger or embarrass the other is always required. When one is in the mode called *honne*, which is appropriate with intimates, it is permissible to be honest. I had read about the meanings of these concepts, but understood them more fully when I visited a Tokyo art museum and saw the many paintings that made them the theme of the art. For example, one artist painted two people, one facing the

viewer and the other with his back to the viewer. Another illustrated two flying gulls; one with its feet showing and the other with its feet hidden. These pictures enhanced my appreciation of the contrast.

Howard Gardner's popular book, *Frames of Mind*, was celebrated by many educators who sensed that I.Q. test scores did not measure procedural and schematic knowledge, but mainly semantic knowledge. Recall Eliza Doolittle in the musical *My Fair Lady*, who says to Freddy, "Don't talk of love lasting through time ... show me now."

The brain sciences confirm these suggestions. Verbal products rely mainly on sites in the temporal cortex in the left hemisphere. Schematic knowledge relies more heavily on the parietal cortex in the right hemisphere, and procedural knowledge requires neuronal clusters in the premotor cortex, cerebellum, and the structures called the basal ganglia. All three sources of knowledge contribute to the healthy development of a brain.

Niels Bohr was, after Einstein, the outstanding physicist of the first half of the last century. His model of the atom was the one I read as a student. Thus, I was surprised to learn recently that there were no equations in his research notebooks, only words and pictures! He illustrated the discovery of the fissioning of the uranium atom as a water drop being deformed in the middle to the shape of a peanut and then splitting into two parts.

I believe that a major reason why I was so poor at drawing in elementary school, and continue to be incompetent today, is that I was delivered by a pair of forceps that damaged the cornea of my left eye. As a result, my vision in the left eye is 20/200. I began life using only my right eye, which meant that events in my right visual field were given greater salience. Because events in the right visual field are more elaborated by the left than by the right hemisphere, my left hemisphere, where language is dominant, developed at the expense of my right, where schemata dominate. I suspect this is one reason why I have always had great difficulty with art and music. I still sing off key and remember that, although I had the lead speaking role in the fifth grade operetta, my singing teacher, Ms. Collier, told me to open my mouth but make no sounds—a cruel request to an 11-year-old who liked to sing.

A fourth advantage lies with the opportunity to provide all American youth with some values they feel warrant consistent loyalty. Most youth from earlier generations were relatively more certain of the ethical values they believed had to be honored under all usual circumstances. I was certain as an adolescent that loyalty, perseverance, and work that would benefit humanity were ideals that were immune from challenge. Too many of today's youth are more loosely tied to these ethical ideas and a bit more confused over the imperatives that demand reflex obedience. This void in their psyche is unfortunate, for humans demand that some acts and some people are good or bad in an absolute sense. They resist the scientists' argument that nature has no special moral favorites, only survival and begetting the next generation. Many youth feel uncertain and are looking for heroes and heroines who might represent some ideals for which they are willing to exert effort.

Humans place a high value on correctness as the primary criterion when reading, solving arithmetic problems, and mounting a logical argument. But humans also want to know what is

“right,” where right refers to judgments of products that automatically evoke a morally proper feeling without first passing through a conscious intellectual censor checking for errors. That is why so many Americans were upset by the torture of Iraqi prisoners by our soldiers trying to obtain confessions that might protect America from another attack. The latter motive may be logically defensible, but morally it was not right.

The arts and music provide an opportunity to persuade children that investing effort to create an object of beauty is an ideal worthy of celebration. Making beauty has an advantage over obtaining “A” grades because others can share in the enjoyment of a beautiful product; only the self enjoys high grades. My daughter, who lives in Chapel Hill, North Carolina and works in public art, persuaded city officials to allow the art of Chapel Hill pupils to be mounted inside metropolitan buses. The children experienced extraordinary pride from knowing that their products were displayed in a public place and were reassured that the adult community valued qualities other than academic excellence on the formal skills. The community took pleasure from learning that this set of talents was being developed in their children.

The fifth advantage of an arts curriculum is that it allows a number of children to work as a cooperative unit, as when they compose a mural or play in the school band or orchestra. American society has always been more individualistic than most European nations, but in the past this individualism was balanced a little with the requirement to be loyal to friends and the community. The imperative for loyalty has been eroding over the past 50 years, leaving every individual with the recognition that, in the end, they are alone and on their own. The men and women who persuaded poor families to take on mortgages they could not afford, the lack of commitment between employees (including professors and lawyers) and employers, and the deception of close friends by Bernard Madoff are only three blatant examples of the blizzard of lies and corrosive mistrust that have penetrated our society and are captured in the pop songs youth listen to and sing. I am certain that this loss of an appropriate balance between concern with self and concern for others is not healthy.

When a dozen children complete a mural or play an orchestral piece, the group, not the individual, is the target of praise. My friends who sing in choirs report an intense feeling of exhilaration when they are singing together in front of an audience. This emotion is not exactly like the feeling evoked when one receives a grade of 100 on a test. The problems facing the contemporary world demand some subversion of self interest in order to lift the interests of the larger community into a position of ascendance. Perhaps participation in a school orchestra is a useful preparation for the stance that will be required in this century.

Finally, art and music provide opportunities for all children to experience and express feelings and conflicts that are not yet fully conscious and cannot be expressed coherently in words. A child who is afraid of the bully, angry at a harsh father, or jealous of an attractive older sister, but cannot put these feelings into words might be able to express these feelings in art. A psychologist in Texas asked one group of undergraduates to write, anonymously, for 30 days on any theme they wished and then to throw away the piece of paper. A control group did nothing. The former, who were allowed to put down their worries and hostilities each morning, had fewer colds and reported fewer aches and pains during the period.

I kept a diary from 1965 to 2000, and confess that the morning after a very tense day at the university, the opportunity to write down my thoughts altered my mood considerably. Suppose every American classroom began with a 10-minute interval in which every child was told to draw the way they felt that morning on a piece of paper and then to toss the paper into a wastebasket.

In sum, arts and music have an important role to play in American schools. I suspect that if American teachers devoted one hour each day to art or music, or even one hour two days a week, the proportion of youth who dropped out of high school might be reduced. Moreover, the child's products would provide parents of failing children with an opportunity to praise children rather than criticize them for laziness.

The argument for arts and music in the curriculum does not have to be sentimental, but can rest on pragmatic grounds. Americans reserve their respect for pragmatic products and associated skills that make money, cure disease, or permit a gain in status, and believe that art and music are luxuries with no useful consequences. However, if an arts program helped only one-half of the seven million children who are behind in reading and arithmetic by providing them with a sense of pride and the belief that they might have some talent, the high school dropout rate would fall. This program might also help children gain a richer appreciation of their emotional life and what it means to be human. The film *Saving Private Ryan* provokes a set of emotions over the horrors of war that most novels could not accomplish. Allowing youth to make short films dealing with their sources of tension could have benevolent consequences for them and for the larger community.

Americans and Europeans, but not the Chinese, have always celebrated a rational, logical approach to important decisions because of a fear of relying on values and sentiments that were closely associated with an ethnic group or particular religion. But America has matured to a point where most are now tolerant of all ethnic and religious affiliations and, therefore, we can relax a little and permit some sentiment to enter our deliberations on human affairs. It is not possible to live by rationality alone. The human conscience relies on empathy for others and the anticipation of anxiety, guilt, or shame for violating a community norm. Children need a deeper understanding of these feelings and the arts contribute to this goal.

The current economic crisis occurred because too many bankers trusted the rational analyses of computer programmers who set the risk of credit default swaps too low. The rationally based advice was terribly wrong and the bankers should have trusted their gut feelings. Some of you may remember that Robert McNamara, the secretary of defense during the Vietnam War who also worshipped at the altar of rational analysis, confessed years later that this premise was flawed. Alan Greenspan made a similar confession last year as the economic crisis accelerated.

It will be difficult to persuade school boards and superintendents to change the curriculum and devote an hour a day to arts and music as a replacement for reading or mathematical instruction because empirical proof of my optimistic claims is lacking.

Moreover, these claims are based on rational deductions from my knowledge of children, and, therefore, are vulnerable to the flaws trailing all rational analyses. Thus, I could be wrong. But I

believe it is worthwhile to test the validity of these predictions. Perhaps some of you will implement demonstrations of these ideas next year. It is worth trying. They are as deserving of a clinical trial as a new drug for cancer that has not yet been proven to be effective.