The “Mozart Effect II” And Other Communication/Learning Links

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I believe that a nation that allows music to be expendable is in danger of becoming expendable itself.

---Richard Dreyfuss, star of *Mr. Holland’s Opus* @ the Grammy Awards (1996)

Canst thou not minister to a mind diseased, Pluck from the memory a rooted sorrow,

Raze out the written troubles of the brain, And with some sweet oblivious antidote,

Cleanse the full bosom of that perilous stuff Which weights upon the heart . . .

---Macbeth, reflecting on music in *Macbeth*, Shakespeare

Is a soul greater than the hum of its parts?

---Douglas Hofstadter, *The Mind’s Eye*

ABSTRACT

While exploring the development of Communication and Learning Aids in all venues, particularly the effect of music on learning, several different tracks were followed. The therapeutic use of music is for relaxation and stress reduction, which apparently helps the body to access and discharge deeply locked-in material. The Mozart Effect track which although tried on college students [improved their Spatial-Temporal (ST) abilities] exploded into “Miracle of Mozart” claims made to stimulate the brain and accelerate the learning process by increasing receptivity and retention. The “Mozart Effect” is a term coined by Alfred Tomatis (Toma-teece), a French physician who has devoted his life over the past fifty years to the physiological effects of sound. He observed that of all types and composers of music, Mozart’s high frequency (HF) music created the greatest healing effect on the human body. More recently, Gordon Shaw and Frances Rauscher at the Department of Physics and the Center for the Neurobiology of Learning and Memory (University of California, Irvine) conducted specific research studies where college students who listened to the Mozart Sonata for Two Pianos in D Major (K.448) had short-term enhancement of their spatial-temporal (ST) reasoning, as in chess, music or mathematics--- like Gardner’s “Spatial Intelligence.” The researchers likened the Mozart Effect to a “Rosetta stone for the ‘code’ or internal language of higher brain function {HBF}.” The leading therapeutic use of music and imagery today is known as Guided Imagery & Music (GIM), although there is no guided imagery in the process. Imagery is, however, used successfully as a pre-surgical tool, as well as its designation as a placebo---a thing that has no intrinsic medicinal properties, but through the power of suggestion, produces a healing effect through the release of endorphins that can elevate mood and provide quick release from pain and discomfort. However, the term Mozart Effect has become generalized and popularized to refer to the beneficial effects of any type of music on the body-mind-spirit triad for healing the body, strengthening the mind and/or unlocking the creative spirit---any music-mind-intelligence-learning technology experience. Ex-President Bill Clinton tore a tendon and required extensive surgery (1997), which he chose to undergo without anesthesia---but with the operating room resounding with the kind of country-western music that had pulled him through his tough Arkansas youth. In Tokyo, noodle makers sell “Musical Udon” made with tapes of Vivaldi’s *The Four Seasons* and the chirping of birds playing in the background. In monasteries in Brittany, monks play music to the

animals in their care, having found that cows serenaded with Mozart give more milk. Yet, as with all unsubstantiated, improvable “snake-oil” type claims of coincidence and murky cure-alls: Caveat emptor--- Let the buyer beware!

INTRODUCTION

Something outside of you charges up your battery cells and this something is *sound*, particularly high-frequency sound. The middlemen are your remarkable Corti cells. Arranged in rows, 24,600 long-stemmed cells dance in perfect precision to each sound, much like the Rockettes of Radio City Music Hall. The energy produced by this extraordinary dance flows to your brain and some of it also spills off through the vestibular branch of your auditory nerve and flashes to the muscles of your body. High frequency sound energizes your brain while at the same time, it releases muscle tension and balances the body in many other ways, even affecting your posture. “Dr. Tomatis states that you don’t get the jolt of energy if you can’t *hear* the high frequency sounds. One reason we start to feel worn out as we get older is that we can no longer hear the higher pitched sounds that could reenergize us [4].

Two hundred years after Wolfgang Amadeus Mozart’s death, French physician Dr. Albert A. Tomatis, known as “Dr. Mozart,” discovered a relationship between listening and learning, with music acting as a carrier, using the melody or beat to help encode the content. According to medical studies, he found that the music of Mozart, in particular, has a profound effect on the human mind, body, and spirit. Remarkably, Dr. Tomatis had also discovered that children start the development of their listening and learning abilities in the womb starting during the 26th week. Mozart’s music can be used as a primer to prime / prepare (excite and arouse) specific neural pathways for learning content or processing. Frequencies may be critical for some effects: Alfred Tomatis suggests that because the ear’s vestibular function influences several muscles and through the vagus nerve connects to several organs, auditory vibrations from the eardrum interact with parasympathetic nerves which regulate all the major organs of the body. Music can manage states, to calm down or to energize. There are Tomatis Listening Centers throughout the world for listening disabilities, vocal and auditory handicaps, and learning disorders. One of his most famous patients was the young tongue-tied wanabee actor Gérard Depardieu, who Dr. Tomatis found had listening problems---his right ear was unable to control incoming sound, which meant that his own voice, even in a whisper, sounded very loud. In addition to inhibiting his voice, the faulty ear affected neural functions related to memory and concentration. The prescription of Tomatis was---Two hours a day of Mozart! Depardieu stated that before Tomatis, “I could not complete any of my sentences. It was he who helped give continuity to my thoughts, and it was he who gave me the power to synthesize and understand what I was thinking [4].”

Mozart’s life fits the classic *La Boheme* cliché--- that the artist must suffer to produce. Simkin points out that Mozart’s Tourettic quirks may have contributed to some of his finest music. Simkin hears “Tourettisms” in the sudden clashes of harmony and texture, in the kaleidoscopic mixture of simultaneous dances in the ballroom finale of *Don Giovanni* [18].

Today Mozart might be diagnosed with Tourette Syndrome (TS), and Attention Deficit Disorder (ADD), and current prescription drugs, [e.g., Tenex, Risperdal, Haldol, Orap, Prolixin, Catapres, etc.] may prevent him finding and using those high frequencies of exquisite sound. His haunting *Two Piano Sonata in D Major* (K.448), which he composed at twenty, takes us beyond mere musical appreciation. We sense something is happening to us, that something more was also happening to the composer.

Violinist and brain researcher Paul Robertson introduces us to a deeper understanding of Mozart as creator. The Mozart we know from his biographers, suffered throughout his short life [he died at thirty-five, the cause of his death remains unknown] from an inability to control, not only his speech, but also certain facial and bodily movements. Drs. Oliver Sacks and Benjamin

Simkin, as well as musicologist Don Campbell, confirm this fact. Robertson suggests that Mozart’s high

frequency compositions resulted from his attempt to deal with those unfortunate symptoms. He used his composing as a salutary weapon in his struggle against the debilitating and disorganizing symptoms of Tourette Syndrome. The intense high frequency compositions he produced resulted in a healing and calming effect on their creator, as they do in the body and mind of the listener---liberating his brain, enhancing its powers, enabling him to survive.

We get a pitiful, uncommon portrait of the young *Wunderkind* Mozart from Robertson, Sacks, Simkin, Campbell *et al* of a tormented young man spending his days in frustration over the tics, twitching, blinking and snorting, helplessly swearing in rage---finding solace and peace only in his music, rushing to spill out the melodies that hummed through his brain, and consoled him temporarily.

In the recent Rauscher / Shaw Study,³⁶ undergraduate students from the psychology department scored 8 - 9 points higher in a spatial IQ test (part of Stanford-Binet Intelligence Scale) after listening to 10 minutes of Mozart "*Sonata for Two Pianos in D Major, K.448*." The effect lasted 10 - 15 minutes. There have been several follow-up studies and trials in schools. Scientists suggest that listening to Mozart helps organize the firing patterns of neurons in the cerebral cortex, especially strengthening creative right-brain processes associated with spatial-temporal reasoning.

Famous People with Tourette Syndrome include Jim Eisenreich, professional baseball player who was not diagnosed with Tourette Syndrome until he was 23 years old. His baseball career was put in jeopardy when his symptoms worsened. It took more than three years to find the right combination and dosage of antidepressants to control his symptoms, but he succeeded in doing so and continued his baseball career. He gives talks about living with Tourette Syndrome and has appeared in a video for children called "Handling It Like a Winner." Mahmoud Abdul-Rauf, professional basketball player (formerly named Chris Jackson) was one of the leading free-throw shooters in the NBA. He is featured in an independent documentary called "Twitch and Shout," which was produced by two people with TS. It has been suggested that Abdul-Rauf's obsessive-compulsive TS traits underlie his amazing free throw success.

The jury is still out on whether Samuel Johnson (1709-1784), the famous British writer [*Dictionary of the English Language, Lives of Poets*] who had almost constant tics and uncontrolled movements and compulsive complex rituals actually had Tourette Syndrome.

BACKGROUND

The goal of accelerated learning cited *supra* is exactly what Dr. Georgi Lazanov believes he has created---a teaching method that speeds up learning 50 times, increases retention, yet requires virtually no effort on the part of the student, reaches retarded and brilliant students alike, and requires no special equipment. "You can lean back, relax, listen to music, and learn without effort and without realizing it." At the Bulgarian Institute of Suggestology and Parapsychology records of controlled tests reveal that hundreds of people from all levels of society learned entire two-year language courses in as little as twenty (20) days. Small experimental groups mastered courses in basic mathematics, physics, chemistry and biology in a matter of weeks! It is not hypnosis or sleep learning. It is far more practical than that. The student is fully awake and in complete control of himself, says Dr. Lazanov. It is a kind of mind contact between teacher and student, based on the Yoga technique of relaxation known as *Savasanna*. Using suggestion and auto-suggestion, muscle tension is relaxed and the brain is relieved of the usual activities and stresses. In this relaxed free state of consciousness or meditative state, fatigue quickly vanishes. Freed from all distractions which hamper its functioning, the brain resembles a sponge able to absorb knowledge of all kinds. "The possibilities of using Suggestopedia on a mass scale are very promising," says Lazanov, adding, "It is inexpensive and ideally exportable [3]."

Bancroft in her persistence investigation of the Lazanov Language Method found out that the opening 74-beat music was slowed down to 60-beat music with precision data pacing on an eight-second cycle. She concluded that this must be part of the acoustical breakthrough that mobilizes the subconscious, harmonizes right- and left-brain, relaxes the body, alerts the mind and expands memory [2]. Slow Baroque music is the link to the subconscious.

Also, the up-tempo high-frequency music [Mozart] serves as a backdrop to the dramatic reading of learning material, gives an energy boost to the cerebral cortex to help charge up and rebalance brain and body. After listening to high-frequency music for a certain time, research shows that the brain seems to become harmonized, energized and sharpened---giving out the right signals to the rest of the system to re-vitalize the whole self.

The secret of this technique is that material does not reach the memory in the ordinary way, because the student does not participate consciously in the process [10]. With basic knowledge quickly and painlessly instilled, schools could increasingly become places of creative teaching and thinking. A typical classroom [French] lesson using Suggestology, is demonstrated against a background of Brahms and Beethoven. During the time the teacher intones words against a musical background, there seems to be distinct physiological changes in the body and changed brain control of *alpha* waves, putting a predominately rhythm of rest in the brain. Once the mind is opened in this reverie-like state, Lazanov found that the capacity to remember seems almost boundless---there is no apparent cutoff point. It is as easy to remember a hundred words as fifty [2]!

Like Dr. Lazanov, Dr. Lozano Caycedo, also a medical doctor, at the University of Madrid, investigated techniques that permit a person to modify states of consciousness and thus act on the body/mind linkage. Founding the Centre of Sophrology in 1960 in Barcelona, he initially used sophrology medically in many areas, including gastroenterology, psychiatry, and obstetrics. Caycedo says, "We teach people how to breathe properly, how to anesthetize themselves and how to relax. We reinforce in a person his capacity to take charge, and thus his capacity for hope." From medicine, Sophrology moved to sports and education, where Caycedo observed that people developed *hypermnnesia*--or super-memory---through Japanese Zen (which he considers a "perfection of Raja Yoga") and his own "dynamic relaxation" technique [3].

Caycedo's system also used visualization exercises to achieve synchronization of body/mind rhythms, and sounds---not an orchestra like Lazanov---but by the human voice, "Left brain and right brain are stimulated globally by having the course material read almost in a singing way with special rhythms and intonation. This technique he calls *terpnos logos*, and it goes back to the ancient Greeks. [Plato described it as a special tone of voice---a soft, soothing, monotonous, melodious tone somewhat like an incantation.] Sophrology teachers are even given voice coaching along the lines of an actor or singer [3]."

Like Lazanov's Suggestology, Caycedo's Sophrology brings not only learning, but therapeutic spin-off benefits---improved self-confidence, improved creativity, improved emotional development and self-expression, and freedom of unlimited ideas about capabilities.

The Sound Therapy work of Dr. Alfred Tomatis (Toma-*teece*), the Paris E.N.T. specialist who believes that "listening is the road to learning," works to restore the full physical response of the ear as well as the person's emotional receptivity to sound. High-frequency music has been documented to assuage a wide range of learning disorders, such as dyslexia, attention deficit disorder (ADD) as well as related behavior problems (e.g., hyperactivity, often associated with ADD, as ADHD). Developmental disorders, e.g., autism, and Down Syndrome have been treated with high frequency music, as have fluency problems (e.g., stuttering), hearing problems (e.g. Tinnitus); auditory processing difficulties (so described by actor Depardieu above, concerning his own difficulties in dealing with incoming speech sounds); problems with vertigo and insomnia have also been addressed.

"The Ear is not made only for hearing---the ear is designed to energize the brain and body [4]." The *modus operandi* is that energy comes through the ears; Tomatis tracked Bach, Mozart, Gregorian chants and the singing of OM on his instruments, observing that the debilitating effects of stress come when the central gray nuclei brain cells run low on electrical potential, like rechargeable batteries, generating the brain's electricity, powering the brainwaves showing up on the EEG. Tomatis says that through the ear you can tap into the vast, natural supply of cosmic energy---which never has shortages. And that is where a major breakthrough occurs. The Electronic Ear, a device invented and patented by Tomatis, emits bursts of varied high/low frequency sounds, alternating from ear to ear and forcing the middle-ear muscles to shape up. Once they do, the inner ear is "opened" and high frequency hearing is restored.

An “open ear” is the Open Sesame for power learning, as well as the key to turning around widespread, ever increasing, learning disabilities. Sounds from 5,000 to 8,000 Hertz recharge “brain-batteries” most rapidly. The music richest in these ultrahigh frequency recharging sounds is Mozart. Tomatis also pinpointed frequencies that deplete mind/body: low frequency sounds, such as noise from traffic, airports, construction sites, also the low pounding sounds in rock music. A comparison of the work of Dr. Caycedo and Lazanov has been made by Bancroft [3].

SUMMARY

Navigating around techniques of differing assumptions, through the waters of Scylla and Charybdis, we boldly steer toward new ideas and innovative methods that can possibly enhance education and learning today. Techniques presented are intended to enlighten, expand and change the learning eco-environment---helping to reduce the stress and other anxieties inherent in the new digital Wave-3 world---in other words, to try to figure out how best to save the world, to change the obsolete teaching paradigm to meet the velocity of the new learning milieu.

We must not lose sight of the goal---to motivate educational learning to the MAX, whatever the individual’s primary style(s) of learning may be---auditory, visual, tactile, kinesthetic--and focus on whatever sense is paramount to each individual’s learning. The obverse side of the coin is that the current philosophy of learning must change, both in perception and assumptions---instead of thinking or using trial-and-error approaches for Eureka-type solutions, the new paradigm of the art of quantum learning is that game-like devices are programmed to offer suggestions for their own survival or comfort, interacting as they convert the essential data into a “new” body of eclectic learning. Imagine a ten-year-old Taiwanese girl going to an American secondary school and having a culture shock in permissiveness and disrespect for pedagogic authority. What should a teacher’s job morph into? A Webmaster, advisor, electronics repair technician, game master, educational psychologist, referee? Techniques that could break through the barrier in the mind that prevent using the major moiety of our intellectual capabilities would be revolutionary.

The areas of discoveries, speculation and inventions, *supra*, have been at the fringes of the business and educational establishments for varying lengths of time. Some may even develop into vital approaches for new millennial teaching. But learning without play is difficult--a plethora of grim and boring presentations. It may be one of the major failings of our current educational system, especially as training for persuasive information and communication skills. Humor is the secret strategic weapon!

The serendipitous benefit is that the use of the entertainment arts, the music, the simulation concept and the audio-visual approaches of suggestology/sophrology/visceral multi-learning can be used in all disciplines---providing needed, rapid meta-fun learning techniques for the accelerating 21st Century venues. Oddly enough, the use of “sacred” sound in the form of repetitions, mantras, zikrs, and affirmations go far back, historically, to ancient neuro-physiolog-ical powers of chanting, singing, toning, humming to reorganize and heal the nervous system and center consciousness---providing pathways to real learning by the deeper self.

Although the research here is dramatic, the work of music therapists is still evolving. No one has been able to duplicate the feat of the sons of Autolykos “who sang incantations over the wounds of Odysseus and stayed the black blood...healing him well [4]!” Some healers provide patients with images giving them power over their injuries, advising them to hum to change fear into deep wellness and rapid cure. One theory is that high frequency sound stimulates an area of the brain called the limbic system - which is believed to play a key role in controlling emotional responses. Certain kinds of music may be particularly effective at prompting the release of chemicals such as endorphins. Endorphins help reduce blood pressure and that reduces the level of adrenaline and steroids in the body. The amounts of these chemicals lower the hyperactivity, and therefore aid co-ordination. New approaches to better communication skills have been tried at many universities for MBAs and other graduate students. Companies are also trying to improve the vision and leadership ability of their executives. Unorthodox ways used in colleges to augment persuasion and articulation ability in management schools is to use stand-up comedy (University of Chicago), song writing, storytelling and improvisation (Vanderbilt University at Owens Management Center), and for

costumed Shakespearean acting to develop motivational management skills at the corporate executive level (Northrop Grumman) temporal vision [6].

Basic problem-solving skills for decisions in the “real” world, using street smarts of common sense, are being cultivated in some classrooms. David Perkins, co-Director of Project Zero--a research group at the Harvard School of Education--states, “the world is not made up of well-defined problems. It is made up of complicated, messy, chaotic situations...for which we’d better have the skills to cope.” Perkins *et al* have dubbed this coping ability “intelligence in the wild.” Thinking “in the wild” means not just being able to solve a problem, but also recognizing that a problem exists in the first place, what that problem is, and how much energy and effort should be invested in solving it. Common sense is a component of this kind of intelligence, but so are curiosity, open-mindedness and sensitivity to one’s surroundings. Perkins recommends that teachers ideally have students answer three types of questions---questions of exploration, conclusion and connection.

As we enter Millennium-3, we think of alternate futures---some with bad terminal outcomes, like man becoming the victim of his own out-sourcing hubris. In another, man learns to control those forces shaping his existence---conscious of the way he is creating the future, more conducive to his new cosmic awareness, than the present. “We are all futurists without knowing it. We all construct the future by everything we think, feel and do, but we tend to do it unconsciously, with limited spatial and informational capability.”

Before closing, let us have one last visit with Dr. A. Tomatis, aka “Dr. Mozart,” who reminds us again that we cannot receive life-lifting renewals of energy from high frequency sounds, as in Mozart’s music, if we are unable to hear them. As people age, hearing skills may decline, but a large portion of the population should be able to maintain the ability to hear energizing tones providing they can avoid (or considerably reduce) exposure to loud low frequency noises that pollute our environment (e.g., ear splitting heavy pounding of rock music; loud bursts of noise from heavy traffic; hard hitting low tones from construction site endeavors). If high frequency sounds are to be effective as a learning tool, there need not be loudness. Evidence exists that soft to moderate background high frequency music might contain the code for moving brain and body through imaginative change [4].

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